

Meaning and Necessity: Quine's Objection

Ed Dean

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1 Carnap v. Quine: The Steel Cage Match

When trying to combine quantification with modalities, we run into a familiar problem. In both [4] and the later [6], Quine points to the following example. The statements

- (1) 9 is necessarily greater than 7.
- (2) The number of planets = 9.

are regarded as being true. But in the context of (1), we cannot substitute “The number of planets” in for “9” in a truth-preserving manner:

- (3) The number of planets is necessarily greater than 7.

is false. Quine sees this as representing a problem for the combination of modalities and quantifiers. For suppose we infer from (1) by existential generalization the statement

- (4) $\exists x(x \text{ is necessarily greater than } 7)$.

Quine then asks what this number is; according to (1) it is 9, which by (2) is the number of planets. But this conflicts with the falsehood of (3).

This problem leads Quine to doubt the possibility of combining quantifiers and modalities. Carnap:

The problem of whether or not it is possible to combine modalities and variables in such a way that the customary inferences of the logic of quantification—in particular, specification and existential generalization—remain valid is, of course, of greatest importance. Any system of modal logic without quantification is of interest only as a basis for a wider system including quantification. ([1], 195-6)

While the latter claim seems to be a bit of an overstatement given the extant modern literature on propositional modal logic, obviously the problem is central for Carnap's endeavor in *Meaning and Necessity*, and it is imperative for him to be clear on if there really is a problem here, and how to deal with it if so.

2 Church's Review

Carnap makes allusion to Church's *JSL* review [2] of Quine's [4], noting his shared dissent from Quine's conclusion. A still brief, but somewhat more in-depth look at the review than Carnap offers, might be useful. The following passage from the review begins with the snippet quoted by Carnap:

the reviewer would question strongly the conclusion which the author draws that no variable within an intensional context ... can refer back to a quantifier prior to that context (outside the scope of the modal operator). The conclusion should rather be that in order to do this a variable must have an intensional range—a range, for instance, composed of attributes rather than classes. To paraphrase an argument which Quine applies to a somewhat different illustration, let 'b', 'f', and 'm' mean respectively the class of bipeds, the class of naturally featherless creatures, and the class of men. Then the sentence is true (9) ' $fb = m \Diamond fb \neq m$ '—the non-existence of featherless bipeds other than men being a zoological accident.

Carnap has made use of this same example in §42. Now Church agrees with Quine that we should not infer¹

$$\exists \alpha (\alpha = m \wedge \Diamond \alpha \neq m)$$

from (9), where α is a *class* variable; since $\alpha = m$, then substituting equals for equals we could derive $\Diamond m \neq m$. But Church, being familiar with Frege's distinction between *Sinn* and *Bedeutung*, immediately points to the idea that we should be able to infer from (9) without any problem

$$\exists \varphi [\forall x (\varphi x \leftrightarrow x \in m) \wedge \Diamond \neg \forall x (\varphi x \leftrightarrow x \in m)],$$

where φ is a variable ranging over *attributes*.² That is, there is an attribute φ which is co-extensional with the class m , but which is not necessarily so. Whereas before we could use $\alpha = m$ in order to derive $\Diamond m \neq m$, here since φ ranges over intensions the mere co-extensionality expressed by $\forall x (\varphi x \leftrightarrow x \in m)$ does not warrant the substitution of m for the φ that would yield the problematical conclusion $\Diamond \neg \forall x (x \in m \leftrightarrow x \in m)$.

This approach really is a direct outgrowth of Frege's. Church continues:

This leads naturally to Frege's conclusion that a name in its oblique use does not lack a denotation (or designatum) but rather has a different denotation, namely it has as denotation that which would be its sense in its ordinary use. ... In fact Quine here introduces a distinction between meaning and designation which closely parallels Frege's between sense and denotation.

Indeed, early in the review Church surmises that Quine must not be familiar with Frege's notions since he does not reference them in any way:

In the distinction between purely designative occurrences of names and other occurrences, and its criterion, Quine is fully anticipated by Frege ... who distinguishes in the same way between the ordinary (gewöhnlich) and the oblique (ungerade) use of a name. In fact the relationship between Quine's present paper and Frege's of 1892 is close throughout, even to the use of similar, and in one instance identical, illustrations. Quine's failure to refer to Frege's paper indicates that he is unacquainted with it, but it is probable that he is indirectly indebted to Frege through [Russell].

¹I'll use an updated notation when not quoting Church directly.

²Church uses this term; we could of course just as easily use 'property' or some other intensional notion.

I tried to do a (very) little historical detective work, but did not determine the degree to which Quine was familiar with Frege in 1943; it just *seems* wrong to me that Quine was unacquainted with Frege’s “Über Sinn und Bedeutung” at that point, though I am certainly no expert. He uses the Morning-star/Evening-star example, and while it is possible he was aware of this example only indirectly, that seems far-fetched. And really, Quine was so familiar with Russell, and if nothing else there was that interesting year Carnap (a student of Frege’s of course) spent at Quine’s Harvard in 1940-1.³ Perhaps Church was just joking.

Anyway, returning to Church’s text, he continues:

The one significant difference is that Quine regards meaning as exclusively a syntactical or semantical concept ... while Frege’s sense is an abstract object not having a syntactical make-up. In particular, it is not clear that Quine would be willing to identify the meaning of a sentence, as Frege does the sense, with the proposition which the sentence expresses. ... In the reviewer’s opinion, the advantage lies with Frege’s concept of sense, especially since Quine himself seems willing at least provisionally to countenance such intensional abstract objects as attributes.

So Church thinks that instead of abandoning all hope of combining quantifiers and modal operators, Quine should be amenable to the kind of distinction Church lays out, which is really nothing more than an implementation of Frege’s sense/reference distinction. To be sure, Church thinks that Frege’s distinction solves things very nicely and is simply the way to go.

Now Quine’s willingness to entertain abstract objects comes in a specific form; namely, he will still stick to his ontological guns expounded in [5], maintaining the slogan that “to be is to be the value of a variable.” Thus he points out that abstract objects “have to be admitted in the domain of the quantifier” ([4], 125) if they are to be admitted; this is the criterion for any kind of entity, concrete or abstract. Quine will begin his statement in *Meaning and Necessity* by reiterating this central tenet of his philosophy: “The question *what there is* from the point of view of a given language—the question of the *ontology* of the language—is the question of the range of values of its variables” ([1], 196).

3 Quine’s Statement to Carnap

Carnap’s favorite part of Quine’s correspondence can be found in the following paragraph:

I agree that such adherence to an intensional ontology, with extrusion of extensional entities altogether from the range of values of the variables, *is indeed an effective way of reconciling quantification and modality*. The cases of conflict between quantification and modality depend on extensions as values of variables. In your object language we may unhesitatingly quantify modalities because extensions have been dropped from among the values of the variables; even the individuals of the concrete world have disappeared, leaving only their concepts behind them. ([1], 197, my emphasis)

It does seem that at this point Quine finds Church’s proposed solution to be acceptable. He notes that if we were to reformulate the statement

³So perhaps Greg Frost-Arnold can at least tell us whether Frege’s work comes up in Carnap’s notes from the discussions at that time?

The number of planets is a power of three.

then, needing to do so with intensional values for our variables would necessitate that

The logical predicate ‘=’ of identity ... would thereupon have to give way to a logical predicate of extensional equivalence of concepts. [Just as in Church’s example above.—Ed] The logical predicate ‘is a natural number’ ... would have to give way to a logical predicate having the sense ‘is a natural-number-concept’. ... These examples do not prove your language-structure inadequate, but they give some hint of the unusual character which a development of it adequate to general purposes would have to assume.

So Quine apparently accepts Church’s answer for how things can be fixed.

Carnap quickly thanks Quine for the concession highlighted above, and then proceeds to correct Quine by pointing out that in S_2 the variables do not take on intensional values only, but extensional as well. Now, look at that first paragraph again; clearly, Quine is not explicitly sanctioning the combination of quantification and modalities in a system like that. Rather, he is only sanctioning that combination in a system “with extrusion of extensional entities *altogether* from the range of values of the variables.” Thus Carnap cannot really accept Quine’s blessing for his system S_2 as he has construed it.

What exactly was Quine agreeing to, and why did he think he was agreeing with Carnap? With the ontological mantra indicated above in mind, Quine writes concerning S_2 :

The general question whether for example individuals, or classes, or properties, etc., are admitted among the values of the variables of a given language, will be an a priori question regarding the nature and intended interpretation of the language itself. ... Let us turn our attention to the ontology, in this sense, of your object language. ... It is now readily seen that those values are merely intensions, rather than extensions or both. For, we have:

$$(x)(x \equiv x),$$

i.e., every entity is L-equivalent to itself. This is the same as saying that entities between which L-equivalence fails are distinct entities—a clear indication that the *values* ... of the variables are properties rather than classes, propositions rather than truth-values, individual concepts rather than individuals. ([1], 196-7)

According to Quine’s ontological doctrine, S_2 then has a purely intensional ontology, and he is prepared to make his concession for such a system. Setting aside for the present the disagreement between Carnap and Quine over the ontology of S_2 , we see that Quine momentarily (before retracting the view in “Reference and Modality”) adopts the belief that if we drop concrete objects from our universe and have purely intensional ranges of values for our variables, then all the problems involved with combining modalities and quantification dissolve.

As it turns out, the kind of purely intensional ontology Quine perceives here is in fact unattainable, as the proof in [6] shows (eh, Peter?). But I do not see why Church’s solution, allowing the existential generalization inference only to an intensional variable (but not disallowing variables with extensional values), does not fix things. The idea, which is a direct descendant of Frege’s work, seems amenable to Quine.

And furthermore there is not even a problem of being pushed toward essentialism. Linsky summed up the difficulty facing the erstwhile quantified modal logician:

The modal logician, saddled as he is with $[\exists x (x \text{ is necessarily greater than } 7)]$, is thus committed to a metaphysical view, ‘Aristotelian essentialism’ to give it a name, according to which necessary and contingent properties *do* belong to objects irrespective of their modes of specification, if specified at all. ([3], 3)

But Church is not thus saddled, for he has not allowed the inference to extensional variables, but only to intensional, in which case things are not “irrespective of ... modes of specification.”

References

- [1] R. CARNAP, *Meaning and Necessity*, University of Chicago Press, 1st ed., 1947.
- [2] A. CHURCH, *Review of [4]*, Journal of Symbolic Logic, 8 (1943), pp. 25–27.
- [3] L. LINSKY, *Introduction*, in Reference and Modality, L. Linsky, ed., Oxford University Press, 1971, pp. 1–16.
- [4] W. V. QUINE, *Notes on existence and necessity*, Journal of Philosophy, 40 (1943), pp. 113–127.
- [5] ———, *On what there is*, in From a Logical Point of View, W. V. Quine, ed., Harvard University Press, 1953, pp. 1–19.
- [6] ———, *Reference and modality*, in Reference and Modality, L. Linsky, ed., Oxford University Press, 1971, pp. 17–34.