

Modality

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Abstract and Keywords

This chapter examines modality in the history of analytic philosophy. There were, in this history, two principal types of reductionism or eliminativism about modality, and two corresponding phases in the rejection of anti-modal stances. First, the founders of analytic philosophy, Frege, Moore, and Russell, took necessity and possibility to be reducible to more fundamental logical notions, where logic for these thinkers consists of truths about a mind- and language-independent reality extending beyond the empirical world. Against this reductionism, C. I. Lewis and Wittgenstein argued that logic itself requires modal notions. Second, Carnap advanced a pragmatically motivated account of modal terms as expressing pseudo-object properties, which appear to be properties of objects but can be construed as properties of their designations. Quine criticized this account and proposed a thoroughgoing elimination of modality. Quine's well-known claim that quantifying into modal contexts is unintelligible without resorting to essentialism cannot be fully understood independently of Carnap's notion of pseudo-object property. Against Quine, Ruth Marcus and Saul Kripke argued for the coherence of modal concepts and their entrenchment in ordinary language and thought, leading to the now dominant view that modal properties are mind- and language-independent features of the world.

Keywords: modality, analytic philosophy, logic, a priori, a posteriori, analytic, synthetic, necessary, contingent, essentialism, Frege, G. E. Moore, Bertrand Russell, C. I. Lewis, Ludwig Wittgenstein, Rudolf Carnap, W. V. O. Quine, Ruth Barcan Marcus

MODAL concepts, especially the Leibnizian notion of possible worlds, are central in contemporary analytic philosophy. Quite the opposite was the case earlier. Until the 1970s, the default attitude towards modality among analytic philosophers was some degree of suspicion. My aim in this chapter is to provide an overview of the main forms of this distrust, and the ways in which it faded from the mainstream.

The period of analytic philosophy closest to us contains the heyday of logical positivism and its decline. Since many contemporary analytic philosophical preoccupations arose in reaction to positivism, we have an understandable, and not altogether unjustifiable, tendency to think of positivism as an amalgam of easily identifiable philosophical mistakes, and to project these mistakes onto all of our predecessors.¹ Thus, we take suspicion of modality to have been based on the now discredited anti-metaphysical empiricist criterion of significance: there are no sensory or observational grounds for modal sentences, so the only respectable species of necessity consists of *a priori* analytic truths that are a product of the meanings conventionally attached to linguistic expressions. With the demise of the criterion of significance, opposition to modality collapsed.²

The analytic tradition is a complex interweaving of many strands of thought, so this picture is not entirely false, even of positivism. But it undoubtedly fails to fit the founders of analytic philosophy, Gottlob Frege, G. E. Moore, and Bertrand Russell, all of whom opposed empiricism and held no brief against metaphysics. For them lack of empirical grounds is no basis for denial of mind-independent objectivity. So while they took necessity and possibility to be reducible to more fundamental logical notions, logic for these thinkers consists of truths about a mind- and language-independent reality extending beyond the empirical world. In addition, their conceptions of the relations among the notions of necessity, analyticity, and apriority differ significantly from the positivists' views.

Thus there were, in the history of the analytic tradition, at least two main forms of reductionism or eliminativism

about modality. Correspondingly, there were two major phases in the passing of anti-modal stances. In the first phase it was argued that modal notions are not reducible to logical ones because logic itself requires modal notions. In the second phase it was argued that modal properties are mind- and language-independent features of the world.

I begin with a brief account of Frege, Moore, and Russell. I turn then to two critiques of Russell's conception of logic that constitute the first phase: C. I. Lewis's rejection of Russell's material implication, and more briefly Ludwig Wittgenstein's rejection, in *Tractatus Logico-Philosophicus* (1922 [1921]), of Russell's view of the nature of logic. Next I outline Rudolf Carnap's pragmatically motivated account of modal terms as expressing pseudo-object properties, properties which appear to be of objects, but can be construed as holding of their designations. Quine's sharpening and critique of Lewis's and Carnap's accounts of necessity as analyticity is a pivotal moment in the history recounted here, since the second phase arose in response to Quine's critique. Two central planks of Quine's critique—the difficulties of quantifying into modal contexts, and the need to resort to essentialism to overcome these difficulties—originate in Carnap's notion of pseudo-object property.

Opposition to Quine's modal scepticism appeared as soon as Quine published his arguments in 1943, but it wasn't until the 1960s that there was a sustained movement away from Quine's views. Among the main works opposing Quine in this period are Ruth Barcan Marcus (1961), Dagfinn Føllesdal (1961, 1965), Jaakko Hintikka (1963, 1969), A. N. Prior (1963), N. L. Wilson (1965), Bede Rundle (1965), Richard Cartwright (1968), Leonard Linsky (1969), Alvin Plantinga (1969, 1970), and Saul Kripke (1971, 1972). Since this work is relatively well-known, and since it's obviously not possible to provide adequate analyses of all these texts here, I give merely a brief outline of two of the most significant factors in dispelling the Quinean attitude to modality. These are Marcus's rejection of necessity as analyticity through a directly referential conception of naming and Kripke's use of our intuitive understanding of modal statements to support the cogency of essentialism.³

In general I have chosen, at the expense of completeness of coverage, to isolate a few central lines of development, focusing on philosophically significant views and arguments. Limitations of space force me to forgo consideration of a number of salient philosophical developments. Apart from the works already mentioned, I particularly regret not discussing the role of modality in motivating Jan Łukasiewicz's work in many-valued logic,⁴ work on modal expressions in the ordinary language philosophy tradition,⁵ and Wilfrid Sellars's (1948) view of laws. Finally, I don't treat connected developments in modal logic.

36.1 Reductionism about Modality: Frege, Moore, and Russell

As noted above, modal notions are neither central nor foundational in the philosophical projects that inaugurated analytic philosophy: Frege's use of higher-order quantificational logic in logicism, and Moore's and Russell's collaborative rejection of British Idealism. These philosophers treated modal notions reductively or eliminatively, explaining them away in terms of logical notions.

One of Frege's concerns in the early sections of *Begriffsschrift* (1970 [1879]) is to set out *his* notions of judgment, proposition, and conceptual content in contrast to the corresponding notions in traditional logic. In § 4 Frege asserts that his notion of conceptual content does not distinguish between the traditional notions of apodictic and assertoric judgments. From Frege's perspective, a judgment in apodictic form merely 'suggests the existence of universal judgments from which [it] can be inferred', so in characterizing a proposition as necessary one merely gives 'a hint about the grounds for' one's judgment (13). Similarly, in characterizing a proposition as possible 'either the speaker is suspending judgment by suggesting that he knows no laws from which the negation of the proposition would follow or he says that the generalization of this negation is false' (13). Thus for Frege modal predicates do not contribute to the conceptual contents of judgments in whose expressions they occur, but merely 'hint at', or 'suggest' the existence of deductive relations between those

contents and laws or generalizations, and so perhaps contribute to 'coloring and shading' (1984 [1892], 161). To the extent that such hints are objective features of assertions, they might be eliminated by explicitly stating these deductive relations.⁶

In *The Foundations of Arithmetic* (1980 [1884], § 3), Frege provides accounts of the analytic/synthetic and *a priori/a posteriori* distinctions in terms of kinds of deductive justification. A truth is analytic if its proof rests ultimately 'only on general logical laws and on definitions', synthetic if its proof also depends on 'truths which are not of a general logical nature, but belong to the sphere of some special science' (3). The notion of analyticity here is recognizable as an ancestor of semantic accounts of analyticity; but it differs from such accounts since for Frege definitions are supposed to reflect analyses of concepts, and so are not arbitrarily adopted but have to be justified.⁷ A truth is *a posteriori* if its proof requires appeal to 'truths which cannot be proved and are not general, since they contain assertions about particular objects', *a priori* 'if ... its proof can be derived exclusively from general laws' (3). These accounts obviously do not rule out truths whose justification depends on general but non-logical laws, and Frege explicitly agrees with Kant in holding that 'the truths of geometry [are] synthetic and *a priori*' (§ 88, 101). Moreover, the distinction between *a priori* and *a posteriori* turns simply on the generality or particularity of grounds, and so does not imply anything about whether sensory experience or observation is required. Finally, Frege's views don't rule out necessary propositions that are *a posteriori*. The 'suggestion' that a judgment can be inferred from general laws entails neither that its ultimate grounds *in fact* contain general laws, nor, even if they do, that they do not *also* contain particular truths.

Central to Moore and Russell's rejection of idealism is a theory of propositions first articulated in Moore's 'The Nature of Judgment' (1899).⁸ Propositions are composed of the very entities, called 'concepts', that they are about.⁹ Truth is an unanalysable property of propositions not constituted by correspondence to facts in the world. Instead, existence, reality, and fact are explained in terms of true propositions.¹⁰ On the basis of this view Moore claims that Kant's *a posteriori/a priori* distinction is really a distinction between propositions containing empirical concepts, 'which can exist in parts of time' (1899, 187), and those which don't. He goes on to reject Kant's identification of necessity with apriority: *all* true empirical propositions, even those about occurrences of sensations, are necessary. The implicit argument rests on the nature of truth. The *existence* of an alternative to a proposition *P*'s being true consists of such *facts* as *P*'s being true at another moment of time *t*, or at another possible world *w*. But each of these facts is nothing more than a related but distinct proposition *P'*, about *t* or *w* being true *simpliciter*. Hence, fundamentally, there is no conception of any alternatives to a true proposition's being true.¹¹

From *The Philosophy of Leibniz* (1900) to *The Principles of Mathematics* (1903) Russell adopts Moore's position: 'there seems to be no true proposition of which there is any sense in saying that it might have been false', whence necessity marks no distinction among truths, every proposition is 'a mere fact' (1903, 454), and 'the notion of necessity is shorn of most of its importance' (1900, 24).

Moore was not satisfied with this view for long. In 'Necessity' (1900) he advances a new account on which 'no proposition is necessary in itself', but only in virtue of being 'connected in a certain way with other propositions' (302). The connection is called 'presupposition', 'implication', or 'logical priority' and, in typical Moorean fashion, elucidated by examples: 'when we say: Here are two chairs, and there are two chairs, and therefore, in all, there are four chairs ... we presuppose in our conclusion that $2 + 2 = 4$ ' (301). The arithmetical truth is logically prior to the particular inference. Strictly for Moore no proposition is necessary *simpliciter*, but one proposition is more necessary than another if it is logically prior to the other but not vice versa.

In an unpublished paper, 'Necessity and Possibility' (1994b [1905]), Russell rejects both of Moore's reductionist accounts of necessity and presents a nuanced and thoroughgoing critique of modality from which Russell never departed.¹² The main argument treats four modal intuitions or 'feeling[s] of necessity' (520). In each case

Russell proposes precise accounts of the intuition, in logical terms, and shows that they fail in one of three ways: they mark no logically significant distinction among propositions, they don't distinguish necessary from contingent truth, or, they don't accord with all our modal intuitions. Russell concludes that 'there is no one fundamental logical notion of necessity, [hence] the subject of modality ought to be banished from logic, since propositions are simply true or false, and there is no such comparative and superlative of truth as is implied by the notions of contingency and necessity' (520).

One of Russell's accounts is important for our subsequent discussion. It is an explication of the intuition that a proposition is necessary if its truth 'can be deduced from the laws of logic' (520). Russell's proposal for making the notion of 'deducibility' precise is: ' q is deducible from p if it can be shown by means of the [axioms of logic] that p implies q ' (515).¹³ He then defines *analytic* propositions as just those deducible from the axioms of logic; here analyticity has nothing to do with meaning or synonymy. A 'necessary proposition is an analytic proposition, and a possible proposition is one of which the contradictory is not analytic' (517). Russell rejects this account because propositions such as 'If a thing is good, it is not bad', are 'felt to be necessary', but 'are not analytic' since 'mere logic will never prove that *good* and *bad*' are incompatible (517).

36.2 C. I. Lewis Against Russell

Modern modal logic began with C. I. Lewis's criticisms of the propositional logic of Whitehead's and Russell's *Principia Mathematica* (1910).¹⁴ Lewis's critique is the first significant reversal of the attitude, just canvassed, that modal notions are to be explained away rather than used in philosophical explanations. I begin my account of Lewis with a sketch of the key background of his critique, some aspects of Russell's conception of propositional logic in the period from *Principles* to *Principia*.¹⁵

Russell held that logic is 'essentially concerned with inference in general, and is distinguished from various special branches of mathematics mainly by its generality.... What symbolic logic does investigate is the general rules by which inferences are made ...' (1903, 11). The generality of logic consists in the applicability of its principles of inference to *all* subject matters—they are universally applicable norms of inference.¹⁶ Let's call this feature of logic 'maximal generality of application'.

The part of logic that is the propositional calculus 'studies the relation of *implication* between propositions' (14).¹⁷ The context for this claim is the Moore–Russell theory of propositions mentioned in the [last section](#). Propositions are themselves entities, and one of the relations in which *these* entities can stand is the relation of implication.¹⁸ The relation of implication is just as indefinable as the properties of truth and falsity (§ 16), and is the basis of valid inference (33). A rule of inference is a general proposition about propositions standing in the relation of implication. Being a proposition, it is, of course, objectively true or false. When it is in fact true, inferences we draw in accordance with it are correct. Since logic is maximally general in application, it comprises those rules of inference that describe how propositions are related by implication, in virtue of being propositions, *simpliciter*, not in virtue of being about this or that subject matter.¹⁹

Note that implication is not the only relation among propositions figuring in logic. Propositions related by implication themselves have certain structures given by occurrences of logical constants. For example, axiom (5) of *Principles* § 18, ' $p \cdot q \supset p$ ', states that every proposition is borne the relation of implication by all those propositions in which it stands in the relation of conjunction to some proposition (§ 18, 6).

A consequence of this view of logic is that, since the principles of logic are themselves propositions, they can also stand in the relation of implication. Because logic is maximally general in application, i.e., because the principles of logic describe how propositions, purely in virtue of being propositions, are related by implication, they must describe the facts about how the propositions that are logical rules of inference are related by

implication to other propositions. That is to say, the rules of inference that comprise logic have to be applicable to those very rules, have to govern reasoning about those very rules.

Between *Principles* and *Principia*, Russell's conception of logic changed in a number of significant ways, only one of which is directly relevant to our concerns.²⁰ Russell no longer took the relation of implication to be indefinable, but " p implies q " is ... defined to mean: "Either p is false or q is true" (Whitehead and Russell 1910, 94). In spite of these changes, Russell continues to maintain the generality of logic; he describes Part I, the very beginning of *Principia*, as 'dealing with such topics as belong traditionally to symbolic logic ... in virtue of their generality' (87). Moreover, Russell continues to take valid inference to track implication. 'The Theory of Deduction', which opens Part I, is 'the theory of how one proposition can be inferred from another', and Russell tells us that 'in order that one proposition may be inferred from another, it is necessary that the two should have that relation which makes the one a consequence of the other. When a proposition q is a consequence of a proposition p , we say that p implies q . Thus deduction depends upon the relation of implication' (90).²¹

Russell sets out the following reasons for defining implication. He acknowledges that 'there are other legitimate meanings' of implication, but claims that his definition yields a more 'convenient' meaning (90). Russell's definition captures '[t]he essential property that we require of implication', namely, true propositions do not imply false ones (90). This property is essential to implication because it is 'in virtue of this property that implication yields proofs' (90). What Russell has in mind here depends on his conception of proof, which consists of establishing truths by inferring them from true premises²² by *modus ponens*: if p implies q and p is true, then, provided that true propositions do not imply false ones, q must be true. It follows that any non-empty relation R between propositions such that for any propositions p and q if

$$p \text{ is true and } q \text{ is false} \quad (1)$$

then p does not stand in R to q , 'yields proofs.' It should be clear that there are many (extensionally) distinct relations that satisfy these requirements, differing on which of the propositions p and q that fail condition (1) count as standing in that relation. Russell's definition of implication in essence picks out from among these relations the one which holds of the most propositions: whenever any propositions p and q fail to satisfy (1), p materially implies q . This is why Russell takes his definition to give 'the most general meaning compatible with the preservation of' the essential characteristic of implication. The definition is 'convenient' because it does not require distinguishing among ordered pairs of propositions that fail (1).²³

But Russell's justification of his definition of implication raises a question. How are the logical axioms of *Principia* selected? These axioms are supposed to describe which implications hold and so license deductions. Since in *Principia* Russell adopts material implication, one might expect that Russell's reason for thinking that, e.g. $q \supset q \vee p$, is an axiom is that, of any two propositions, q and $q \vee p$, either the first is false or the second is true. But if so, why does Russell not set forth these reasons when he presents the logical axioms? Why does Russell, in contrast to Frege, never give elucidatory arguments for accepting his axioms?²⁴ We will come back to this question below.

I turn now to Lewis. In his early writings on logic, Lewis was in many ways a faithful Russellian. Three points stand out. First, like Russell, Lewis takes the propositions of logic to be descriptive generalizations which 'state' 'implication relations' (1913, 428). Second, for Lewis as for Russell implication is 'that relation which is present when we "validly" pass from one assertion, or set of assertions, to another assertion' (428). Finally, Lewis holds that 'while other branches [of knowledge] find their organon of proof in ... logic, this discipline supplies its own' (429). That is, logic is *the* instrument of proof in all disciplines, including itself, which is to say that it is maximally general in application.

In 'Implication and the Algebra of Logic' (1912), Lewis presents his most well-known disagreement with Russell

over ‘the paradoxes of material implication’, $\sim p \supset (p \supset q)$ and $q \supset (p \supset q)$ —which Russell himself in *Principles* read as ‘false propositions imply all propositions, and true propositions are implied by all propositions’ (1903, 15). Lewis’s point is that, since we don’t ordinarily accept that every statement is a logical consequence of any false statement, or that any true statement is deducible from every statement, these theorems of *Principia* show that *Principia* does not correctly describe the relation of implication.

It’s unclear how much force this criticism has against Russell. Russell’s logicist project is to *prove* the truths of mathematics from the truths of logic, and for Russell, as we saw above, all genuine proof rests on truths. So, Russell is constrained *not* to use, in *Principia*, any of the implications from falsehoods that he accepts as perfectly valid. For the purposes of Russellian logicism, an implication relation need only be truth-preserving, and not reflect other aspects of our deductive practice.

But the ‘paradoxes’ are not the only basis for Lewis’s criticism. A less well-known argument against material implication is that it is *not useful* in inference. A material conditional can be established on the basis that its antecedent is false, but then one would not be able to use it in inferring the consequent by *modus ponens*. Alternatively, it can be established on the basis that its consequent is true, but then there would be no point in inferring the consequent by *modus ponens*.²⁵

Russell himself explicitly addresses this argument:

In fact, inference only arises when ‘not- p or q ’ can be known without our knowing already which of the two alternatives it is that makes the disjunction true. Now, the circumstances under which this occurs are those in which certain *relations of form* exist between p and q ... which enables us to *know* that the first implies the second, without having first to know that the first is false or to know that the second is true.

(1919, 153; emphases mine)

The ‘relations of form’ hold between p and q just in case q is deducible from p by the axioms of *Principia*,²⁶ in the sense of deducibility outlined in the [previous section](#).

Lewis’s counter-argument to this Russellian reply takes us to the heart of his objection to material implication.²⁷ Lewis asks, how do we know that the axioms of *Principia* can be known without first knowing the truth-values of their antecedents or consequents? Consider one way in which we can explain the truth of Russell’s fifth axiom, $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$, by giving the following argument. $q \supset r$ is either true or false. If $q \supset r$ is false, then by definition the implication $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$ is true. So suppose that it is true. Then either q is false or r is true. We have now to show that the consequent $(p \vee q) \supset (p \vee r)$ is true. If r is true, then $p \vee r$ has to be true, so $(p \vee q) \supset (p \vee r)$ is true. So now let’s suppose that q is false. It follows that $p \vee q$ is true if p is true, false if p is false. If $p \vee q$ is false, then $(p \vee q) \supset (p \vee r)$ is true. So suppose that p is true. Then $p \vee r$ is true, so again $(p \vee q) \supset (p \vee r)$ is true.

In this argument there are three steps in which we move from a supposition that some proposition is false to another claim. If these three steps are all inferences, and if our inferences are to be governed by facts about material implication, then, since a false proposition materially implies any proposition, each of the conclusions in these transitions can legitimately be the negation of the one actually stated. For example, an equally legitimate alternative inference to the first step of the argument would be: if $q \supset r$ is false, then $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$ is also false. But then, the truth of the fifth axiom is not established on this supposition. Nor can we argue that since it follows by material implication from the falsity of $q \supset r$ that $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$ is both true and false, we can, by *reductio*, conclude that $q \supset r$ is true. For, if we allow this form of argument, then we can establish the truth of every implication from the assumption of its falsity. So,

if we reason in accordance with material implication, then it's *not* clear that we can see that, or explain how, the (propositional) axioms of *Principia* are true. That is to say, the inferential resources required to demonstrate that the propositional axioms of *Principia* are true on the basis of Russell's definition of implication are in conflict with the principles of deduction that can be derived from these axioms. This incoherence internal to the logic of the *Principia* is the deepest source of Lewis's criticism of material implication. This is why Lewis says that one cannot demonstrate the logical connections articulated in the postulates of *Principia* 'without calling on principles outside the system' (1917, 356). But this then puts in question whether Russell's axioms and theorems can count as logic. Since logic is maximally general in application, it must be its own instrument of proof, and so it must supply any principles needed to establish or explain the correctness of its axioms. Thus Russell's system of material implication fails to be logic, and moreover, fails according to an aspect of his own conception of logic.

It is in response to this incoherence in Russell's logic that Lewis introduces modal notions, especially the notion of strict implication, into logic. Let's go back to our explanatory argument for the truth of Russell's fifth propositional axiom. The problem this argument poses for material implication is that one notorious purported rule of inference based on that implication allows too much to be inferred from assumptions of the falsity of some proposition. So, what we need, in order to describe the inferential standards that are implicit in this argument, are principles of implication that limit what may be inferred from such assumptions of falsity. Lewis tried out several formulations, settling eventually on ones based on the notion of impossibility.²⁸ That is, he construes, e.g., the first step in the argument as based on this fact: given the definition of material implication, it is impossible for $q \supset r$ to be false and $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$ not to be true. That is to say, the falsity of $q \supset r$ strictly implies the truth of $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$. This impossibility precludes the correctness of inferring, from the falsity of $q \supset r$, anything incompatible with the truth of $(q \supset r) \supset ((p \vee q) \supset (p \vee r))$.

In developing the systems of strict implication, Lewis did not provide much explanation of these modal notions. After *A Survey of Symbolic Logic* (1918), Lewis embraced a version of pragmatism, and developed a view of *thea priori* as based on meaning (see in particular Lewis 1923, 1929). He then took necessity to be based ultimately on the meanings that we associate with our inferential vocabulary. I here pass over the details of Lewis's views, noting only that it was assimilated, mainly by Quine, to the positivists' account of necessity in terms of analyticity, which will be treated below.

36.3 Wittgenstein's *Tractatus*

Wittgenstein's *Tractatus Logico-Philosophicus* (1922 [1921])²⁹ is one of the most enigmatic philosophical texts of the twentieth century, and there is controversy over just about every aspect of it. Here considerations of space preclude more than a sketch of an account of logical necessity shared by many opposed readings of the *Tractatus*,³⁰ which displays its connections with Lewis's critique of Russell and its influence on the conceptions of modality of the Vienna Circle and Carnap.

To begin with, just as Lewis was led to strict implication by criticism of Russell's logic, so the tautologousness of the propositions of logic in the *Tractatus* is motivated by dissatisfaction with Russell's view of logic.³¹ In particular, Wittgenstein rejected Russell's view of logic as descriptive generalizations for failing to square with the *inconceivability*, and so *impossibility*, of the falsity of any proposition of logic. The conception of tautology in the *Tractatus* accounts for this modal status of logic.

The conception rests on the picture theory of propositions.³² Propositions are pictures of facts, and what it is to be a picture is to agree or disagree with the facts, so it is essential to a proposition to be either true or false of the facts. There are two levels of picturing in language. At the most fundamental level are elementary propositions representing possible atomic facts. A non-elementary proposition is analysed into elementary

ones, and represents by agreeing or disagreeing with each of the combinations of possibilities for truth or falsity of the elementary propositions in question. So a non-elementary proposition corresponds to a class of truth-possibilities of elementary propositions.

There are two important features of non-elementary propositions. First, one and the same class of truth-possibilities of elementary propositions can be expressed in different ways, in which different 'logical constant' signs occur. So the logical signs make no difference to the picturing of the world by propositions, and are not representatives of anything in the world (4.0312). Second, for any set of elementary propositions there is a class that contains every truth-possibility. So for any set of elementary propositions there is a proposition that agrees with every truth-possibility. These propositions are tautologies (4.46).

A tautology is true no matter which elementary propositions are true; that is, it is true no matter what atomic facts obtain, no matter how the world is. So it is not true in virtue of correctly picturing the world, but in virtue of the mechanism of propositional representation. Hence tautologies 'lack sense' (4.461), and 'do not represent any possible situations' (4.462). It is inconceivable for a tautology to be false, for two reasons: to be a proposition is to agree or disagree with truth-possibilities of elementary propositions, and it makes no sense to think that it might not be possible to agree with all truth possibilities. The essence of propositional representation is prior to and determines the necessity of the propositions of logic.

I pause to note briefly the relation of Tractarian necessity to apriority and analyticity. First, tautologies are not in any obvious way true in virtue of the meanings of the logical constants, since for Wittgenstein the constants are not representatives of entities and have no sense.³³ Thus it is a fallacy to argue that since what makes Wittgenstein's tautologies true is not the world, it must be their meanings. Second, since tautologies are not analytic, *if* they are *a priori* their apriority does not rest on analyticity. In fact Tractarian tautologies *are a priori*, but what this comes to is that since they do not depict facts of any sort, knowledge of them doesn't depend on any kind of access to facts, be it sensory experience or rational intuition. In sum, the Tractarian conception of necessity has little if anything in common with the conception popularly attributed to logical positivism.

This sketch of the conception of necessity in the *Tractatus* is subject to a major caveat posed by Wittgenstein's say/show distinction. Terms such as 'fact' 'signify formal concepts' (4.1272), which are 'pseudo-concepts'; the use of such terms as 'proper concept word[s]' lead to 'nonsensical pseudo-propositions' (4.1272). The nonsensicality of pseudo-propositions differs from the senselessness of tautologies. Alongside formal concepts are formal properties, which also lead to pseudo-propositions if one attempts to ascribe them. The only legitimate expression of a formal property 'is a feature of certain symbols' (4.126) which shows itself in any adequate notation. The most important instances of formal properties for us are 'internal properties': '[a] property is internal if it is unthinkable that its object does not possess it' (4.123). We have taken one basis of the necessity of logic to be the inconceivability of an elementary proposition's failing to be either true or false. So we have attempted to ascribe an internal property of elementary propositions, and our words would then, by Wittgenstein's lights, be nonsense.³⁴

36.4 The Vienna Circle and Carnap's *Logical Syntax of Language*

There are, we now know, significant synchronic and diachronic differences among the doctrines held by members of the Vienna Circle.³⁵ Here my focus will be on the *Tractatus*'s influence on the Vienna Circle's, and in particular on Carnap's, views of modality.³⁶

Through the influence of A. J. Ayer's *Language, Truth, and Logic* (1936), logical positivism is nowadays frequently taken to be an updating of Humean empiricism with the techniques of modern mathematical logic. The Vienna Circle held that sense experience is the only source of genuine knowledge about the world, and

rejected metaphysics as, not false, but meaningless nonsense, on the basis of verificationism: a sentence can be meaningful only if it is associated with a method of verification ultimately based on sensory experience. The main problem that the Circle saw for empiricism is how to account for knowledge of logic and mathematics, both indispensable to modern science. Experience might always be different from the way it is, so any truth based on experience is contingent. In contrast, we have no clear conception of how logical and mathematical truths might be false. Thus, logico-mathematical knowledge seems *a priori*, and so to require some faculty of rational intuition, paving the way to metaphysics. Indeed, logic and mathematics seem no better able to pass the verifiability test than metaphysics.

The Circle saw, in the Tractarian view of logic as tautology, the key to a consistent empiricism. Since tautologies owe their truth, not to correct depiction of the world, but to the nature of linguistic representation, our knowledge of logic does not rest on the sensory sources of genuine knowledge of worldly facts. Rather, it rests on knowledge of how we represent the world in language. The apparent apriority and necessity of logic can now be taken to have a linguistic, rather than factual, origin. Of course the sentences of metaphysics also have no empirical content. The rejection of metaphysics is based on the Tractarian distinction between the senseless and the nonsensical. The nonsense of metaphysics results from violations of the rules of language, while the senselessness of tautologies is a by-product of rules of the language (see in particular Carnap 1931).

The view just outlined—call it classical positivism—was indeed briefly espoused by the Circle. But the positivists themselves were aware of an array of difficulties with these classical doctrines, and soon moved away in a number of diverging directions. For our purposes, the most salient problem of classical positivism is to show that *mathematics*, like logic, is tautologous,³⁷ that is, to carry out a type of logicist reduction of mathematics, to tautologies rather than Frege's or Russell's formulations of logic. Carnap attempted such a reduction, using David Hilbert's idea of meta-mathematics. Technical difficulties eventually led Carnap to abandon many details of the Tractarian framework.³⁸ Language becomes conceived as 'a system of rules' (Carnap 1937, 4) not explained in more fundamental terms of picturing extra-linguistic facts. The study of language thus conceived is 'logical syntax'. The notion of tautology, sentences true in virtue of the mechanism of representation, is replaced by *asyntactic* notion of *analyticity*, sentences formally derivable from the rules of language alone. Logico-mathematical sentences are analytic, mere auxiliaries for the confirmation of theoretical empirical sentences.

At first these changes still subserve the project of a consistent empiricism. By *Syntax*, Carnap has (mostly) abandoned classical positivism.³⁹ For our story, I focus on a form of criticism directed, not only at metaphysics, but at controversies over the foundations of mathematics among philosophers of an anti-metaphysical orientation, including members of the Vienna Circle. Carnap found these debates just as intractable and confused as traditional metaphysical disputes (1963, 45ff.; 1937, xiv–xv), and he seems to take their sterility to stem from a kind of illusion over the subject matter of philosophical sentences. These sentences 'seem to concern ... objects, such as the structure of space and time, the relation between cause and effect ... the necessity, contingency, possibility or impossibility of conditions, and the like', but they 'really concern linguistic forms' (Carnap 1935, 59–60).⁴⁰

One source of this diagnosis is the Tractarian notion of formal properties, ascription of which results in nonsense (4.124): '[t]he expression of a formal property is a feature of certain symbols' (4.126). Carnap rejects Wittgenstein's say/show distinction and takes what is shown in language to be features of expressions that can be described in a meta-language. So formal properties become syntactical properties of expressions that appear to be properties of objects. Carnap calls them 'pseudo-object' or 'quasi-syntactical' properties. Ascriptions of pseudo-object properties comprise 'the material mode of speech'. They are 'like object-sentences as to their form, but like syntactical sentences as to their contents' (Carnap 1935, 59–60).

In the case of foundational debates, 'in the material mode we speak about numbers instead of numerical expressions', and this tempts us 'to raise questions as to the real essence of numbers' (78–9). Once such questions arise, so does the possibility of such irresolvable disputes as that between logicians and formalists. The way out of such impasses is to translate pseudo-object-sentences into their syntactic correlates, sentences in 'the formal mode of speech'. The dispute just mentioned is then dissolved by transformation into two mutually compatible claims about numerical expressions in distinct formal languages.

Modal sentences are also 'veiled syntactical sentences' (73). We 'usually apply modalities ... to conditions, states, events, and such like' (73), using sentences like

That A is older than B, and B is older than A, is an impossible state.

The formal mode translation of this sentence is:

The sentence 'A is older than B, and B is older than A' is contradictory.

More generally, '[i]mpossibility is a quality to which there is a parallel syntactical quality, namely contradictoriness, because always and only when a state is impossible, is the sentence which describes this state contradictory'; hence it is a pseudo-object property. The translations of other modal expressions into syntactical terms are straightforward: 'As possibility is the opposite of impossibility, obviously the parallel syntactical term to "logically possible" is "non-contradictory" ... Analogously, we translate "logically necessary" into "analytic"' (77).

So far Carnap's diagnosis of philosophical illusion seems to presuppose that the material mode 'suggests something *false* ... and ... the formal mode ... tells the unvarnished *truth*' (Coffa 1991, 325; emphases mine). In particular, the claim that modal predicates are quasi-syntactical seems to be that necessity, for instance, *really is* analyticity, and that's precisely what, according to popular wisdom, positivism holds. But this view of Carnap's criticisms is problematic. Carnap uses phrases such as 'really about' and 'object' to formulate his criticism, but these are the very words that generate paradigmatic pseudo-object sentences.⁴¹ So these criticisms are, by Carnap's own standards, themselves in the material mode of speech, i.e., they contain pseudo-object sentences. Carnap takes no pains to hide this; he explicitly notes in Part V of *Syntax* that '[e]ven in this book, and especially in this Part, the material mode of speech has often been employed' (1937, § 81, 312). Carnap specifically characterizes his remarks about what pseudo-object properties really apply to and about philosophical illusion as 'informal', in contrast to the formal syntactic definition of quasi-syntacticality (1937, § 63). Thus when Carnap says that philosophical sentences are really about language, he recognizes that this is no less potentially misleading than those very philosophical sentences.

What then is Carnap's ground for preferring the formal mode? Note to begin with that according to Carnap the '*material mode of speech is not in itself erroneous*; it only readily lends itself to wrong use' (1937, 312). Indeed, 'if suitable definitions and *rules* for the material mode of speech are laid down and systematically applied, no obscurities or contradictions arise' (312; my emphasis). The reason why questions generated by material-mode talk lead to apparently irresolvable disputes is that they are posed in natural languages, which are 'too irregular and too complicated to be actually comprehended in a system of rules' (312).

This points to Carnap's view of 'controversies in traditional metaphysics': 'there seemed hardly any chance of mutual understanding, let alone of agreement, because there was not even a common criterion for deciding the controversy' (1963, 44–5). If indeed there are no common criteria for deciding metaphysical controversies, then it would be pointless, irrational, to continue these disputes in the form of trying to find out who is right. A 'question of right or wrong must always refer to a system of rules' (1939: § 4, 7), and logical syntax is the construction of languages as systems of rules. Thus the aim of syntax is to set out criteria that would rationalize

pointless philosophical debates. Specifically, Carnap offers the parties to philosophical disputes the possibilities of adopting a common set of rules for adjudicating their disagreement, or of reconceiving their opposition, not as a disagreement over the truth of a doctrine, but as different recommendations about what language, what system of rules, to adopt. Either way, the dispute would acquire a clear point. This is the reason for preferring the formal mode.

Now it is natural, at this point, to ask: what is the basis of Carnap's view of the rationality of disputes? It's a short step from such a question to intractable philosophical debates over the true nature of rationality. Thus, Carnap's conception of rationality is also not a theoretical claim but a practical proposal. We can take Carnap to ask his audience to compare the state of their philosophical debates with that of his precise syntactical investigations, and to offer philosophers a way out of the fruitless debates in which they are stuck. He in effect says to philosophers: you don't *have to* take yourself to be advancing a substantive thesis about reality against other such substantive theses, because I can offer you a way of looking at what you want, in which it will no longer be unclear what exactly getting it involves, because you'll be doing something other than what you took yourself to be doing. In the words of another philosopher, Carnap aims to 'shew the fly the way out of the fly-bottle' (Wittgenstein 2001 [1953], § 309). Thus, Carnap is not engaged in the same enterprise as traditional philosophy at all; rather, he proposes an activity, syntactical investigation, to *replace* traditional philosophizing; he urges philosophers to 'change the subject'.⁴²

The upshot of this radical pragmatism for Carnap's theory of modality is that any claim to the effect that, e.g., for Carnap the property of necessity is *really* analyticity is in the material mode and misleading. The significance of Carnap's theory consists in the philosophical perplexities displaced by the syntactic explication of necessity as analyticity. Let's look at two philosophical tangles that Carnap proposes to treat with his theory of modality in *Syntax*.

First, Carnap sees the dispute between Russell and Lewis on the nature of implication as similar to debates over the foundations of mathematics. He characterizes Russell's 'opinion' that implication 'is a relation between propositions' as a material mode claim that is correct if 'proposition' is understood as 'that which is designated by a sentence' (1937, 253). Once we think of implication in such a way, we are tempted to ask, what exactly is this relation? Since, "to imply" in the English language means the same as "to contain" or "to involve", we are tempted to take it to be 'the consequence-relation' (255). Succumbing to this temptation, 'Lewis and Russell—they are agreed on this point—look upon the consequence-relation ... as ... on the same footing as sentential connectives' (254). This leads to wrangles about which propositions containing the implication symbol correctly describe the logical consequence relation, i.e., which logical system is correct.

The dissolution of this dispute rests on Carnap's explications of ordinary imprecise conceptions of logical consequence in precise syntactical meta-linguistic terms. From the perspective of such explications, Carnap takes Lewis to be right in the following sense. If the consequence relation is to be expressed by a 'sentential connective', say '<', so that "A < B" is demonstrable if "B" is a consequence of "A", then neither 'Russell's implication' nor any 'of the so-called truth-functions ... can express the consequence-relation at all' (254). Thus, Lewis 'believed himself compelled to introduce intensional sentential connectives, namely, those of strict implication and of the modality-terms' (254). But, given Carnap's explications of consequence, one sees that Lewis's move is not compulsory. One can, instead, distinguish 'the consequence-relation [as] a relation between sentences' from '*implication [which] is not a relation between sentences*'; in the formal mode, "consequence" [is] a predicate of the syntax-language', while "⊃" is a symbol of the object-language' (253–4; emphases in the text). Thus, *pace* Lewis, we are not forced to 'think that the symbol of implication ought really to express the consequence-relation, and count it as a failure on the part of this symbol that it does not do so' (255). The language of *Principia* is perfectly 'adequate for the construction both of logic and of mathematics', and 'in it necessarily valid sentences can be proved and a sentence which follows from another can be derived

from the former' (253). While there is nothing objectionable in the 'requirement that a language be capable of expressing necessity, possibility, the consequence-relation, etc.', we do not, in the case of *Principia*, have to insist that to satisfy this requirement we need 'anything supplementary to [it]', because we can simply 'formulat[e its] syntax' (253–4).⁴³

Given this context for Carnap's theory of modality in *Syntax*, we can see that Carnap is *not claiming* that necessity is a syntactic property, but rather *proposing* the use of the meta-linguistic predicate 'analytic' in the place of the object language predicate 'necessary', in order to explicate our imprecise ideas of logical consequence. Carnap's aim is to show Russellian extensional logicians and Lewisian modal logicians that there is no need to argue over whose logic is the right one.⁴⁴

Second, Carnap addresses a problem deriving from what he takes to be Wittgenstein's notions of essential or internal properties. Expressed in the material mode, a 'property of an object *c* is called an *essential* property of *c*, if it is inconceivable that *c* should not possess it' (1937, 304). This problem is particularly significant in the subsequent history of modality:

Let us take as the object *c* ... the father of Charles. [B]eing related to Charles is an essential property of *c*, since it is inconceivable that the father of Charles should not be related to Charles. But being a landowner is not an essential property of the father of Charles. For, even if he is a landowner, it is conceivable that he might not be one. On the other hand ... it is inconceivable that the owner of this piece of land should not be a landowner. Now, however, it happens to be the father of Charles who is the owner of this piece of land. [Thus] it is both an essential and not an essential property of this man to be a landowner.

(304)

Carnap proposes to dissolve this apparent contradiction by translation of the second-order pseudo-object property of being an essential property to the syntactical property of *relative analyticity*: a predicate is analytic relative to a sequence of 'object designations' just in case the sentence resulting from filling the place-holders of the predicate with these terms is analytic. Applying this translation scheme to the problematic essential properties of the example, the contradiction disappears because "landowner" is an analytic predicate in relation to the object-designation "the owner of this piece of land", but it is not an analytic predicate in relation to the object-designation "the father of Charles" (304). We now see that the 'fault of' the material mode definition of essential property 'lies in the fact that it is referred to the one *object* instead of to the *object-designations*, which may be *different* even when the object is the same' (304).

36.5 Quine, I: The Carnapian Background

The roots of Quine's critiques of modality go back to the phase of his philosophical development when he was 'very much [Carnap's] disciple' (1976, 41). Specifically, in lectures in 1934 expounding Carnap's *Syntax* views,⁴⁵ Quine characterizes modal expressions as a 'quasi-syntactic' 'material idiom' whose use leads us to lose

sight of what we are talking about; ... we appear to be talking about certain nonlinguistic objects, when all we *need* be talking about is the ... signs ... used for denoting those objects. [T]he expressions of modality ... are for all the world properties not of names, or sentences, but of things or situations. These modality-properties or pseudo-properties then involve us in difficulties from which we turn to metaphysics for extrication.

(1990, 98)

In particular, use of modal expressions lead us to ‘talk of a realm of possibility as distinct from the realm of actuality’, and this raises ‘problems as to how fragments of the possible are actualized, and what it means for a possibility to be actualized, and why certain possibilities are actualized rather than others’ (94–5). The remedy, naturally, is syntax; when ‘the syntactic formulation is used, so that whatever *in effect* concerns language is made explicitly to concern language, these difficulties vanish’ (98; emphases mine). As we will see, Quine’s rejection of modality is decisively shaped by this Carnapian view that modal properties are pseudo-object properties, and by Carnap’s replacement of necessity by (syntactic) analyticity.

The idea of ‘losing sight of what we are talking about’ suggests that the problem is forming a *false* view of what we’re talking about. This suggestion seems confirmed by Quine’s going on to say, ‘in the quasi-syntactic idiom we *appear* to be talking about certain nonlinguistic objects’. At this point one expects Quine to go on to tell us what we are *really* talking about. But that’s *not* what Quine tells us. Instead, he says that we *don’t have to* betalking about what we might think we’re talking about. That is to say, there is an alternative to our conception of the subject matter of our modal discourse. Moreover, Quine urges that this alternative conception is better, because it does not lead to metaphysical difficulties. In other words, this alternative is better, *not* because it is correct, identifies the true subject of our talk, *but* because it keeps us out of trouble. This is confirmed by what Quine says at the end of the passage, that in syntactic formulation ‘whatever *in effect* concerns language is made explicitly to concern language’. Quine does *not* say that the quasi-syntactical idiom ‘in fact’ concerns language, but only ‘in effect’. That is, Quine suggests that we don’t actually know what quasi-syntactical sentences are about, but also that, given a syntactic translation, we can take them ‘in effect’ to be about language. Thus, Quine’s standard for favouring the syntactic over the quasi-syntactic alternative is a pragmatic one, just as Carnap’s is.

But Quine’s pragmatism is not quite the same as Carnap’s. Carnapian pragmatism, as we saw, operates at the level of a choice between pursuing traditional philosophical problems and constructing linguistic frameworks. The choice is: do we change the subject or not? The successor subject could be based on explications, in Carnap’s sense,⁴⁶ of notions figuring in the predecessor subject, but it needn’t be. Quinean pragmatism, in contrast, applies to the choice between competing scientific hypotheses. One hypothesis is that our talk of possibility and impossibility commits us to positing a realm of possibilia and impossibilia alongside actual things. The other hypothesis is that this talk only commits us to actual concrete and abstract entities, including the objects of syntactic claims. The first hypothesis not only multiplies entities, and so runs afoul of Occam’s Razor, but involves us in intractable issues about, *inter alia*, the properties and individuation of these entities. The second has neither the additional ontological commitments nor the burden of answering these additional questions. Thus, our best scientific methodology dictates that we adopt the second hypothesis over the first.⁴⁷

One of the metaphysical problems of modality Quine mentions is: what does it *mean* for a possibility to be actualized? Much of Quine’s critique of modality stems from this problem. Quine’s objection, at bottom, is that he doesn’t see any clear meaning in claims about what is possible or necessary. Quine divides such claims into two types, and his criticisms fall correspondingly into two groups. The first type consists of claims ascribing necessity or possibility to statements, in traditional terminology, ascriptions of necessity *de dicto*. The second type consists of claims ascribing modal properties to individuals, traditionally termed claims of necessity *de re*, and generalizations involving modal properties.

As I mentioned, the target of Quine’s critique rests on an account of necessity in terms of analyticity that he takes from Lewis and Carnap (1960, 195). The principal thesis of the account is that ‘the result of applying “necessarily” to a statement is true if, and only if, the original statement is analytic’ (Quine 1943, 121). Analyticity here is not Carnap’s syntactic conception but Quine’s well-known account: ‘a statement is *analytic* if

by putting synonyms for synonyms ... it can be turned into a logical truth', where a 'logical truth is ... deducible by the logic of truth functions and quantification from true statements containing only logical signs'.⁴⁸ In addition, note that although Quine rarely explicitly mentions it, there is a link between analyticity and apriority.⁴⁹ This goes through a view of the relation between synonymy and understanding: '[t]o determine the synonymy of two names or other expressions it should be sufficient to understand the expressions; but to determine that two names designate the same object, it is commonly necessary to investigate the world' (Quine 1943, 119). Let's call this view the synonymy thesis. Given this thesis and the account of analyticity, it follows that an analytic statement can be determined as true without investigating the world.

Quine argues, against *de dicto* modal claims, that there is no clear distinction between necessary truth and plain truth, because there is no clear distinction between analytic truth and plain truth. I will not discuss these Quinean criticisms, since they rest on Quine's rejection of a clear analytic/synthetic distinction, a topic with no specific connection with modality. The problem with *de re* modal claims is that if one tried to make sense of them in terms of the analyticity conception of necessity, then they either do not describe concrete material objects, or do not have determinate truth conditions. Moreover, to make sense of such claims one must abandon the analyticity conception of necessity, and adopt questionable non-trivial forms of essentialism, what Quine calls 'Aristotelian' essentialism.

36.6 Quine II: The Substitution and Quantification Arguments

As first presented in 'Notes on Existence and Necessity' (1943),⁵⁰ Quine's critique seems to be a two-part argument. The first part is based on two things. One is the logical law of the '*indiscernibility of identicals*' (1943, 113; Quine's emphases). The other is the notion of *purely designative* occurrences of a singular term, a 'name' in Quine's terminology. He writes, 'The relation of name to the object whose name it is, is called *designation*.... An occurrence of the name in which the name refers simply to the object designated, I shall call *purely designative*' (114). If a name occurs purely designatively in a statement, then that statement says something, truly or falsely, of the object designated by that name. Moreover, if an object is designated by two names, then 'whatever can be said about' it by a statement in which one of its names occur purely designatively is exactly the same as what is said about it by any statement that results from replacing that name by the other name. So if one of these statements says something true of the object, what the other statement says 'should be equally true of' the object.⁵¹ Quine assumes that if a statement of identity is true, then the names occurring in it designate the same object. The conclusion of this line of reasoning is the principle of substitutivity: '*given a true statement of identity, one of its two terms may be substituted for the other in any true statement [in which they occur purely designatively] and the result will be true*' (113; emphases in text).

On the basis of the substitutivity principle, Quine argues that whenever mutual substitution, in a statement, of names occurring on two sides of a true identity fails to preserve truth-value—whenever, as I shall put it, there is a substitution failure—'the occurrence to be supplanted is not purely designative, and ... the statement depends not only upon the object but on the form of the name. For it is clear that whatever can be affirmed about the *object* remains true when we refer to the object by any other name' (114).

Quine applies this general thesis to modality by arguing for a by-now famous case of modal substitution failure.

The identity:

The number of planets = 9

is a truth ... of astronomy. The names 'the number of planets' and '9' are not synonymous.... This fact is emphasized by the possibility, ever present, that (2) be refuted by the discovery of another planet.⁵² (119)

... The statement:

9 is necessarily greater than 7 (3)

is equivalent to

'9 > 7' is analytic

and is therefore true (if we recognize the reducibility of arithmetic to logic).

On the other hand the statement...:

The number of planets is necessarily greater than 7, (4)

[is] false, since ...

The number of planets is greater than 7

[is] true only because of circumstances outside logic. (121)

Hence 'the occurrence of the name "9" in (3) is not purely designative' (123). Let's call this first part of Quine's critique 'the substitution argument'.

The second part of Quine's argument also begins at a general level. He starts by arguing that existential generalization is justified only from purely designative occurrences of names: '[t]he idea behind such inference is that whatever is true of the object designated by a given substantive is true of something; and clearly the inference loses its justification when the substantive in question does not happen to designate' (116). It follows that whenever there is substitution failure, existential generalization is not warranted. At this point it seems that Quine can simply apply this general claim to the modal substitution failures that he had already established, to conclude that that existential generalization from singular terms in modal contexts is unwarranted. But this is not how Quine proceeds. Instead, he propounds a problem with specifying the object that makes true an existential generalization into a modal context:

[T]he expression:

$\sim (x) \sim x$ is necessarily greater than 7,

that is, 'There is something which is necessarily greater than 7', is meaningless. For, would 9, that is, the number of planets, be one of the numbers necessarily greater than 7? But such an affirmation would be at once true in the form (3) and false in the form (4). (123)

It's not immediately clear what role this problem plays in Quine's criticism, and so not clear how exactly the second part of the criticism works. Let's call the second part, however it works, 'the quantification argument'. Quine does eventually make more explicit that these apparently extra considerations are not superfluous, and that his objection to quantifying into modal contexts is *not* a straightforward application of the conclusion of the substitution argument. But before getting to that, let's survey the first responses to Quine's critique, which can be broadly divided into Fregean and Russellian objections.

36.7 Initial Replies to Quine

Fregean objections, first proposed by Alonzo Church in a review of 'Notes' (1943) claim that singular terms do not have the same references in modal contexts as they do in non-modal ones. Church specifically suggests

that in modal contexts singular terms designate, not their ordinary denotations, but their ordinary senses. Since the designations of singular terms in true identities differ from their designations in modal contexts, the indiscernibility of identicals no longer justifies the principle of substitutivity. Moreover, quantification into modal contexts is legitimate because the variable of quantification in such contexts ranges over intensional entities such as senses and attributes.⁵³

Russellian objections, also first advanced by Church (1942), are based on applying Russell's theory of descriptions to definite descriptions in identity and modal statements. Church points out that if one applies Russell's theory to eliminate the descriptions occurring in Quine's purported substitution failure, the result no longer has the logical form of a substitution inference. Moreover, as Smullyan (1948) observes, there are two possible scopes for the description 'the number of planets' with respect to the modal phrase 'necessarily' in the conclusion of Quine's example. Smullyan shows that when this description has wide scope, the result of eliminating it using Russell's theory is derivable, in the logic of *Principia*, from the premises of the example. Thus Quine's example is not unambiguously an invalid inference.⁵⁴

Neither objection is decisive. Quine argues, against the Fregean introduction of intensional entities, that it 'purifie[s the] universe' of material objects and leaves only intensional objects.⁵⁵ The argument is based on a theorem of quantified modal logic, as first formulated by Marcus,⁵⁶ a theorem that has come to be known as the necessity of identity:⁵⁷

$$(\forall x)(\forall y)(x = y \supset \Box(x = y)) \quad (5)$$

Quine argues that in order for (5) to be true, any distinct designations, *a* and *b*, of an element of the domain of quantification must be synonymous. For such terms, $\ulcorner a = b \urcorner$ is true, so $\ulcorner \Box(a = b) \urcorner$ must be true for (5) to be true. So $\ulcorner a = b \urcorner$ has to be analytic, which requires that *a* and *b* be synonymous. This condition is not, however, satisfied by 'concrete material objects'. Such objects, in general, may have distinct designations such that it takes empirical investigation for us to know that they refer to a single object. Hence, by the synonymy thesis, these terms are not synonymous.

Against Smullyan's Russellian objection, Quine points out that the Russellian analysis of the wide-scope reading of the conclusion is an existential quantification into a modal context (Quine 1969, 338).⁵⁸ So, Smullyan must presuppose that such quantifications are meaningful. But this assumption begs the question against Quine's overall conclusion that such quantifications are meaningless. Of course, if Quine's overall conclusion is based on the thesis that singular terms occurring in modal contexts are not purely designative, and so ultimately on the existence of substitution failures in modal contexts, then, from Smullyan's perspective, it is Quine who has begged the question. For Smullyan can take his argument to show that if modal quantifications are meaningful, then Quine's examples are not genuine cases of substitution failure. So, in order to take his examples as genuine substitution failures, Quine must already reject the meaningfulness of modal quantifications. Neither side, it seems, has provided an argument that is compelling for the other.

36.8 Quine III: The Quantification Argument Revisited

The standoff at the end of the last section assumes that Quine's only ground against quantifying in is substitution failure. In this section we'll see that this assumption is false.

Let's come back to the question we left hanging at the end of section 36.6: how exactly does substitution failure bear on the meaningfulness of quantification? A moment of reflection suggests a problem.⁵⁹ Suppose we accept that *if* both '9' and 'the number of planets' occur designatively in

9 is necessarily greater than 7 (3)

and

The number of planets is necessarily greater than 7 (4)

then these sentences do not differ in truth-value. Now, given that they do differ in truth-value, we can conclude that *not both* '9' and 'the number of planets' occur designatively, i.e., that *at least one* does not. However, it is compatible with this conclusion that one of these two terms *does* occur designatively. If that's the case, then the truth-value of *one of the two* affirmations of the predicate 'necessarily greater than 7', i.e., one of (3) and (4), is determined only by the object designated. Thus it doesn't follow that whether this predicate is truly affirmed of an entity is *invariably* determined by the terms used to single out those entities, and so it doesn't follow that there is no account of the truth conditions of existential generalizations from (3) or (4).

Recall that in 'Notes' Quine does not explicitly base the quantification argument on the substitution argument, but rather raises a problem of specifying the objects that satisfy the matrices of the quantifications. In a 1946 letter to Carnap Quine elaborates this problem:

I'm going to try to make the essential theoretical point of my article ['Notes'] without use either of the term 'designation' ... or of the formal theory of identity.

Let us agree ... to regard the following statement as true:

It is impossible that the capital city of Venezuela be outside Venezuela (6)

From this it would seem natural, by existential generalization, to infer ...:

$\exists x$ it is impossible that x be outside Venezuela (7)

Now just what is the object x that is considered, in inferring (7) from (6), to be incapable of being outside Venezuela? It is a certain mass of adobe et al., viz, the capital city itself. And it is this mass of adobe that is (*apparently*) affirmed, in (6), to be incapable of being outside Venezuela. Hence the *apparent* justice, intuitively, of the inference of (7) from (6). However, that same mass of adobe et al. is affirmed in the following true statement (*apparently*) to be capable of being outside Venezuela:

It is possible that the native city of Bolivar be outside Venezuela (8)

Justification of (7) by (6) is thwarted by (8), for (8) has just as much right to consideration as (6) so far as the mass of adobe in question is concerned. (Carnap and Quine 1990, 326; emphases mine)

Let's start with Quine's claim that in (6), it is a city, a mass of adobe, etc., that is *apparently affirmed* to have a certain modal property. That is, (6) *seems to be* an ascription of a property to a city. Moreover, if (6) is indeed such an ascription, then it *does warrant* the conclusion that something has that property, since that property *appears to be* a property which cities have. But, Quine asks, is (6) *in fact* the ascription of a property of cities to a city? If it is, then the correctness of this ascription should not be sensitive to 'the form of the name' of that object. However, if (6) ascribes a property to a city, is there any reason to think that (8) does not? If not, then (8) has 'as much' a claim as (6) to being an ascription of the very same property that is ascribed in (6) to the very same city mentioned by (8). But (8) has a different truth-value from (6). Since a single city is designated in these two sentences, this difference in truth-values cannot be accounted for if the truth conditions of the sentences consist in a single predicate's being true of that city. Some other features of the two singular terms must play a role; equivalently, the applicability of the predicate must be sensitive to those other features.

The obvious feature in which these terms differ is their syntactic form. Hence I take Quine to reason that, in the absence of a different account, we have to think that whether the predicate is true of an object is fixed by the syntactic form of designations of those objects. So the property ascribed in (6) is not a genuine property of cities after all.⁶⁰

Now, all this talk of what property *seems to be* ascribed, and what property *is in fact* ascribed should remind us of the notion of pseudo-object property, which *seems* to be a property of objects, but is in fact a property of linguistic expressions. Let's recall, furthermore, that according to Carnap what makes a property ϕ pseudo-object is that whether ϕ holds of an object is determined by whether a syntactical property correlated with ϕ holds of that object's designations, that is, it is determined by the syntactical *forms* of those designations. Thus, the difference in truth-value between (6) and (8), in spite of the identity of the object mentioned in these sentences, shows that they are ascriptions of a pseudo-object property. That is, the modal property of being possibly outside Venezuela is a pseudo-object property.

So what then is the problem with quantifying into modal contexts? The problem is an instance of a general problem of generalizing over pseudo-object properties. Affirmations of pseudo-object properties of specific objects are unproblematic; they can be eliminated in favour of translations into formal mode sentences.⁶¹ But with (objectual) quantification the situation is different. The truth-value of a quantification $\neg$ something is ϕ is determined by whether the predicate ϕ is truly affirmed of each member of the universe of discourse, independently of what terms, if any, designate that member. But, whether an object has a pseudo-object property can vary depending on how that object is designated *and* there is no account of how to determine whether a designation-less object has that property. So quantificational generalizations about pseudo-object properties have no determinate truth conditions.

The present quantification argument clearly is not independent of substitution failures. But it is not based on the conclusion of the substitution argument, namely, that the singular terms involved in a substitution failure are not purely referential. One might put the point in this way. According to the present argument, substitution failure shows, not that there is something non-standard about the functioning of the singular terms in question, but that there is something non-standard about the functioning of the predicate in question.⁶²

However, since the argument is still based on substitution failures, it is open to Church's and Smullyan's Russellian objections. In particular, since in Quine's sentences (6) and (8) the singular terms are descriptions, one might hold that neither of these sentences is an ascription of a property to a city. Hence the difference in their truth-values has no implications for the nature of the property expressed by the predicate occurring in these sentences.

In answer, Quine writes,

Whatever is greater than 7 is a number, and any given number x greater than 7 can be uniquely determined by any of various conditions, some of which have ' $x > 7$ ' as a *necessary* consequence and some of which do not. One and the same number x is uniquely determined by the condition:

$$x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x} \quad (9)$$

and by the condition:

There are exactly x planets (10)

but (9) has ' $x > 7$ ' as a necessary consequence while (10) does not. *Necessary* greatness than 7 makes no sense as applied to a *number* x ; necessity attaches only to the connection between ' $x > 7$ ' and the particular method (9), as opposed to (10), of specifying x .

(1953a, 149)

This is yet another version of the quantification argument. The conclusion, again, is that since whether an object has the property of being necessarily greater than 7 depends on which open sentence it satisfies, this property is pseudo-object.

Let's look at the quantification arguments in a slightly different way. As we saw, Quine began by accepting Carnap's explication of necessity, considered as a pseudo-object property of states of affairs, in terms of meta-linguistic predicates of sentences describing these states of affairs. *Modulo* doubts about analyticity, Quine never rejects this explication. His critique of modality relates to Carnap's explication of necessary properties of objects in terms of relative analyticity. As we saw above, Carnap explicates the claim that something has a necessary property by the (meta-linguistic) claim that a sentence formed by putting a designation of the object in the placeholder of a predicate expressing the corresponding non-modal property is analytic. Since different designations or specifications lead to different verdicts about the analyticity of the resulting sentences, and so different verdicts about whether the necessary property holds of the object, it follows from this Carnapian account that modal properties are pseudo-object properties as well. This is hardly a surprising conclusion to reach from the view that necessity is a pseudo-object property of states of affairs. Quine, however, goes on from this conclusion to argue that (objectual) quantificational generalizations over pseudo-object properties have no determinate truth conditions. But then there is no meaningful explication of modal properties of objects.⁶³

36.9 Quine IV: Anti-Essentialism

In face of the revised quantification arguments, how could one confer determinate truth conditions on a generalization involving a modal predicate, when different verdicts on whether this predicate is true or false of an object result from different specifications of that object? One way to accomplish this is, for each object, to retain all the positive verdicts and throw out all the negative ones, or vice versa. This is what Quine means by 'adopting an invidious attitude toward certain ways of uniquely specifying [the object], and favoring other ways' (1961b, 155). But, Quine asks, what basis is available for rejecting some specifications and retaining others? All these conditions are, after all, *ex hypothesi* satisfied by the object. It is at this point that Quine brings in 'Aristotelian essentialism': the favoured specifications are those 'somehow better revealing the "essence" of the object' (155).

What Quine has in mind is a feature of a traditional conception of essential properties: if an object loses an essential property then it ceases to exist.⁶⁴ Let's illustrate Quine's line of thinking with an example. Suppose the specification of 8 as the successor of 7 expresses an essential property of 8, and suppose that being even follows analytically from being the successor of 7. Consider now the claim that 8 is not even. Since being even follows analytically from being the successor of 7, it follows from this claim that 8 is not the successor of 7. But since being the successor of 7 is essential to 8, anything distinct from the successor of 7 is not 8. So we reach the logical contradiction that 8 is not 8. Thus the claim that 8 is not even is contradictory; hence being even is a necessary property of 8. Consider now, in contrast, the non-essential property of 8 of numbering the planets. Being a non-essential property of 8, failure to number the planets is not sufficient for diversity from 8, and so the claim that 8 does not number the planets fails to lead to any contradiction. Strictly this line of reasoning does not show that the notion of essential property is required to confer determinate truth conditions on quantificational generalizations over modal properties; essence merely suffices for determinate truth conditions. Quine's conclusion should then be a challenge to explain objectual quantification over modal properties without invoking the notion of essential property.

Of course the force of this challenge depends on whether there is anything wrong with essentialism. Quine's

most well known objection to essentialism is based on a version of the example motivating Carnap's explication of essential property:

Mathematicians may conceivably be said to be necessarily rational and not necessarily two-legged; and cyclists necessarily two-legged and not necessarily rational. But what of an individual who counts among his eccentricities both mathematics and cycling? Is this concrete individual necessarily rational and contingently two-legged or vice versa? (1960, 199)

The Carnapian background is key to understanding Quine's challenge. Recall that Carnap took the case of the landowning father, *c*, to lead to an apparent contradiction via Wittgenstein's account of essential property: *c* is both essentially a landowner and not essentially a landowner. Carnap resolves this contradiction by appeal to relative analyticity, so that *c* is essentially a landowner relative to one description but not relative to another. But essentialism abjures appeal to descriptions or conditions satisfied by objects for determining whether they possess essential properties. So the Carnapian method of resolving such apparent contradictions is no longer available. In terms of Quine's example, if, in accordance with essentialism, we are barred from appealing to the conditions of being a mathematician and being a cyclist, nothing stands in the way of inferring that mathematical cyclists are both necessarily rational and not necessarily rational.

This argument is hardly conclusive. An obvious essentialist response is that the supposed contradiction arises only because Quine's basis for claiming that a mathematical cyclist is necessarily rational is a condition—being a mathematician—which she satisfies only contingently.⁶⁵ So essentialists can resist the supposed contradiction, by claiming that mathematical cyclists are not necessarily rational, because not essentially mathematicians. But from Quine's perspective this response takes us to another question: what justifies, without any appeal to conditions that someone satisfies, the claim that she is not essentially a mathematician? This question has particular weight for Carnap. Obviously Carnap has no objection to the notion of essence so long as it is explicated in precise terms. But Carnap's explication of essence is precisely that which essentialism rejects. So, for Carnap, unless there is some way other than essentialism for providing modal quantifications with determinate truth conditions, it's unclear why the use of modal expressions should not simply be rejected altogether.

Quine's argument plausibly has force not only against Carnap. If one rejects Carnap's relative analyticity as the basis for predicating essential and contingent properties, what should be put in its place? Thus, at bottom, Quine is not claiming that essentialism is objectionable because it leads to contradictions. Quine is, rather, posing a challenge to essentialism: what coherent and non-arbitrary standards are there for determining the correctness of ascriptions of essential properties, and for doing so with no appeal to conditions satisfied by the object of the ascriptions?

36.10 Marcus and the Rejection of the Analyticity Conception of Necessity

Marcus's 'Modalities and Intensional Languages' (1961) marks the beginnings of a sea-change in our philosophical conception of modality. In particular, we can see, in her defence of the necessity of identity against Quine's criticism, a rejection of the conception of necessity as analyticity. As before, limitations of space enjoin a mere sketch of my reading with little explanation or argument.

Marcus begins by supposing that $\ulcorner a = b \urcorner$, with *a* and *b* distinct expressions, is a 'genuine' true statement of identity. It follows that *a* and *b* denote a single thing. But then $\ulcorner a = b \urcorner$ says the same thing as $\ulcorner a = a \urcorner$. But $\ulcorner a = a \urcorner$ is a tautology. Hence $\ulcorner a = b \urcorner$ is also a tautology, and thus is necessarily true.⁶⁶ For Marcus an identity is genuine just in case the expressions flanking '=' function like certain artificial singular terms she calls 'tags'.⁶⁷ Tags provide an idealized model of the referential aspect of ordinary singular terms: they are merely

correlated with objects, and have 'no meaning' (1961, 309).

In order to understand this argument, we have to grasp the notions of saying the same thing and of tautology. For Marcus what a statement says is the state of affairs that it represents. The two true identities $\ulcorner a = b \urcorner$ and $\ulcorner a = a \urcorner$ say the same thing because they both depict one and the same entity as self-identical. Since these identities are supposed to be tautologies, they obviously are *not* Tractarian tautologies, which do not represent anything.⁶⁸ Nor is the tautology $\ulcorner a = b \urcorner$ true in virtue of its meaning, because tags have no meanings,⁶⁹ and so it can't be turned into a truth of logic by substituting synonymous tags for one another. In other words, for Marcus tautologousness is not Quinean analyticity.⁷⁰ Rather, a statement is a tautology just in case the state of affairs it depicts holds as a matter of logic. In particular, the state of affairs depicted by a true identity statement is the self-identity of some object; since it is a logical law that every object is self-identical, this state of affairs holds as a matter of logic. Tautologies are necessary, then, not because they are true in virtue of meaning, but because they depict states of affairs that hold as a matter of logic. It follows, in particular, that statements concerning ordinary material objects can be tautologous, and so necessary, in virtue of describing facts involving such objects that hold as a matter of logic.

Since for Marcus the necessity of genuine identities does not rest on analyticity, she does not face the question why knowledge of certain identities requires empirical investigation, rather than mere knowledge of meaning or linguistic reflection. But if for her true identities between tags are necessary because logically true, she faces a variant of this objection. As Quine puts it, 'We may tag the planet Venus, some fine evening, with the proper name "Hesperus". We may tag the same planet again, some day before sunrise, with the proper name "Phosphorus". When at last we discover that we have tagged the same planet twice, our discovery is empirical' (1961a, 327). If this identity between two tags can be established only by empirical investigation, how could it be logically true? If it is logically true, wouldn't we be able to establish its truth by deductive reasoning alone, without appeal to empirical evidence?

Implicit in the text of (1961) is a reply to this objection.⁷¹ Marcus accepts that in Quine's scenario, 'we may both be surprised that as an empirical fact, the same thing is' tagged twice (1961, 310). But she insists that 'it is not an empirical fact that' Phosphorus = Phosphorus or that Phosphorus = Hesperus. That is, Marcus holds that what requires empirical investigation to establish is not the single, non-empirical fact—the self-identity of an object—described by two true identities, $\ulcorner a = b \urcorner$ and $\ulcorner a = a \urcorner$. *Rather*, what requires empirical investigation to establish is the fact that this self-identity is depicted by the statement $\ulcorner a = b \urcorner$, by establishing that *a* and *b* tag a single object.

36.11 Kripke and the Passing of Quinean Anti-Essentialism

Marcus's arguments in (1961) provide a conception of necessity not tied to analyticity, and a view of how objects as such, independent of conditions they satisfy, can possess necessary properties such as self-identity. But, as Quine makes clear in a letter to Carnap in 1943, these are not the properties existential statements about which are problematic: 'I had argued that ... the "N" of necessity ... could not govern matrices whose variables were quantified in a wider context. Naturally I did not hold that trouble would always arise, regardless of what matrix followed "N"; for, trivial and harmless cases could readily be got by letting the matrix contain its variable merely in such a manner as " $x = x$ "' (Carnap and Quine 1990, 371). The modal properties to which Quine objects are those whose ascriptions are fixed, not by logic, but by Carnapian relative analyticity. For these, as we saw in section 36.9 above, Quine propounds a dilemma: either existential statements purportedly about them have no determinate truth conditions, or there is no principled essentialist account of their ascription to objects. So Quine overstates his case by suggesting that his argument rules out *all* quantification into modal contexts.

Moreover, until Quine's contribution to the discussion on Marcus's 'Modalities', he did not make clear what he meant by claiming quantified modal logic is committed to essentialism. In that discussion Quine explicitly disavowed claiming that essentialist statements are theorems of quantified modal logic, either syntactically or semantically characterized (Marcus *et al.* 1962, 140). What Quine means, as we saw above, is that some quantifications into modal contexts can be furnished with determinate truth conditions by assuming essential properties.⁷²

Finally, as we saw in section 36.9 above, Quine's objection to essentialism is not that essential properties lead to contradictions and so are incoherent, but that without something like relative analyticity it's an open question what principled grounds underlie attributions of essential properties.

Quine's overstatements and unclarity led to the impression that he holds that all quantification into modal contexts require essentialism, that essentialist claims are theorems of quantified modal logics, and that essential properties, to use Kantian language, generate antinomies. This impression led to illuminating work by Marcus and Terence Parsons making precise and distinguishing clearly notions of essential property, and showing that essentialist claims are not theorems of systems of quantified modal logic as characterized by Kripke semantics.⁷³ This work, together with the contributions in the 1960s mentioned in my introductory remarks, made it increasingly plausible that essentialism is no minefield of antinomies. Of course the intelligibility of essentialism in *this* sense doesn't answer Quine's underlying demand for principled grounds for the ascription of essential properties that do not rely on conditions satisfied by the objects of these ascriptions. But it contributed to a growing sense that it's unclear *why* such Quinean questions *have to be* answered. As Marcus puts it, a 'sorting of attributes (or properties) as essential or inessential to an object or objects is not wholly a fabrication of metaphysicians', since the 'distinction is frequently used by philosophers and nonphilosophers alike without untoward perplexity' (1971, 187).

The most influential expression of the growing consensus against Quinean doubts about essentialism is in Kripke's 'Naming and Necessity' (1972):

[I]t is very far from being true that [the idea that a property can meaningfully be held to be essential or accidental to an object independently of its description] is a notion which has no intuitive content, which means nothing to the ordinary man. Suppose that someone said, pointing to Nixon, 'That's the guy who might have lost'. Someone else says 'Oh no, if you describe him as "Nixon", then he might have lost; but, of course, describing him as the winner, then it is not true that he might have lost'. Now which one is being the philosopher, here, the unintuitive man? It seems to me obviously to be the second.

(265)

Kripke here points to a pervasive pre-philosophical and intuitive agreement on ascriptions of essential and accidental properties to objects, independent of how they're described. Thus Kripke's answer to Quine's challenge is like Grice's and Strawson's (1956) reply to Quine's attack on the analytic/synthetic distinction. In the presence of systematic non-collusive agreement on essentialist claims, there is no need to specify the principles underlying these claims in order to justify their use.

Once essentialism is in place, Kripke advances familiar, much-discussed, arguments for a sharp distinction between, on the one hand, necessity as underwritten by essential properties, and, on the other, apriority and analyticity, neither of which characterizes our epistemic access to these essential properties.⁷⁴ The relationship between these arguments and Marcus's rejection of the analyticity conception of necessity is not straightforward, but it is matter for another occasion. With the absorption of Kripke's attitude towards Quine's challenge to modality and the acceptance of its consequences, the rehabilitation of modal concepts in analytic

philosophy is complete. Whether the attitude itself is indeed sufficient as a reply to Quine is also matter for another occasion.

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Notes:

- (1) A paradigm of this tendency is Soames (2003), chapters 12 and 13.
- (2) See Rosen (2001) for a clear account of this view.
- (3) Some further discussion of the works I do not treat can be found in Neale (1999). I am very much indebted to the historical section of this paper; in many cases it oriented my thinking, even where I disagree with Neale's emphases and conclusions.
- (4) The classic statement is Łukasiewicz (1930).
- (5) For instance, Austin (1979 [1956]).
- (6) If Frege's notions of universal judgment and of law have irreducibly modal components, then, of course, these accounts would not succeed in eliminating modal notions. But the consensus is that for Frege universal judgments and laws are simply universal quantificational generalizations understood purely extensionally. Danielle Macbeth argues against this consensus in *Frege's Logic* (2005); for critical discussion of her arguments see Shieh (2005).
- (7) Frege apparently changed his mind on the arbitrariness of definitions. See Shieh (2008).
- (8) For extensive discussion of this theory see Griffin (1980), Hylton (1990), and Cartwright (2003), on which the present account is based.

(9) A significant qualification for Russell on this point is his theory of denoting concepts, constituents of propositions which are not about those concepts but what they denote.

(10) On existence see [Moore \(1899, 180\)](#); on reality see [Moore \(1901, 717\)](#); on fact see [Russell \(1904, 523; 1994a \[1905\], 495\)](#).

(11) I give a full reconstruction of this argument in Shieh (forthcoming).

(12) Many aspects of Russell's position in (1994b [1905]) are sketched in (1904).

(13) Russell's use of letters '*p*', '*q*', etc. in formulas and of quotation marks is an especially controversial matter in view of Quine's accusation that he and Whitehead confused use and mention. I won't attempt a defensible Russellian usage, but my general policy is to use single quotes to reproduce Russell's text, and no quotes when using Russell's formulas in discussing his views, taking these formulas to be intended as expressing generalizations about non-linguistic (propositional) entities.

(14) Lewis is not alone in adopting modal notions in logic as a reaction to *Principia*; [Jan Łukasiewicz \(1930\)](#) is another. In a series of papers leading up to (1906), Hugh MacColl also formulated logical systems with modal implication connectives. See [Russell's \(1906\)](#) review of [MacColl \(1906\)](#), [MacColl's \(1908\)](#) criticism of [Russell \(1903\)](#), and Russell's reply (1908).

(15) Russell of course is famous for his many changes of mind, and so strictly speaking he did not hold a single view of logic even in this fairly limited period of philosophical development. I simplify in order to focus on what Lewis might have taken to be Russell's conception of logic. Moreover, my story does incorporate a significant change in Russell's views.

(16) Russell's conception of the generality of logic is similar to the normative sense in which Frege takes logic to be maximally general; see [MacFarlane \(2002, 35–7\)](#). Consider, e.g., Frege's claim that logical laws are 'the most general laws' because they 'prescribe universally the way in which one ought to think if one is to think at all' (1964 [1893], xv). If we gloss the phrase, 'if one is to think at all', as 'no matter what one is thinking about', then we have in essence Russell's view.

(17) The following account of Russell's view of logic owes much to [Hylton \(1990\)](#), especially Part II, Chapter 4, and [Griffin \(1980\)](#).

(18) Indeed, Russell in *Principles* holds that only propositions can stand in this relation; see [Russell \(1903\)](#), § 16, 15, § 18, axioms (2) and (3).

(19) I would like to situate my account with respect to a recent controversy over whether Frege or Russell held 'universalist' conceptions of logic which preclude semantic theorizing about logic: [van Heijenoort \(1967\)](#), [Ricketts \(1986\)](#), [Stanley \(1996\)](#), [Tappenden \(1997\)](#), and [Proops \(2007\)](#). It should be obvious that I'm *not* claiming that in order to be a principle of logic for Russell, a proposition must quantify over all items whatsoever in his ontology. It is clear that Russell takes some pains in *Principles* to formulate some principles of deduction as generalizations in which 'the variables have an absolutely unrestricted field: any conceivable entity may be substituted for any one of our variables' (§ 7). However, it is *not this* feature of those generalizations, but rather the fact that they range over *all propositions*, that is necessary for them to be principles of logic. The only sense in which Russell's logic is maximally general on my account is maximal generality of application as norms of inference.

(20) Two other major changes are the 'ramified' theory of types and the multiple-relation theory of judgment, on which propositions, like classes, are analysed away.

(21) It is not clear that the multiple-relations theory of judgment mentioned in *Principia* is compatible with this talk of implication as a relation among propositions. But of course it is a vexed question whether the multiple-relations theory is consistent with the quantification over propositions and propositional functions apparently required by the logic of *Principia*. For contrasting views see, e.g., [Ricketts \(2001, 101–21\)](#) versus [Landini \(1998\)](#) and [Klement \(2004\)](#).

(22) Thus, arguments by *reductio* are strictly speaking not proofs; but Russell thinks that all such arguments can be converted into genuine proofs.

(23) Is there an explanation of how Russell came to accept these reasons for the definability of implication? I argue in Shieh (forthcoming) that in fact there is less change in Russell's views than meets the eye.

(24) What I mean by 'elucidatory argument' is a line of reasoning by going through which one comes simultaneously to grasp a thought and to see that it is true. I follow [Burge \(2005\)](#) in holding that the arguments Frege sets out in discussing his basic laws are precisely such arguments.

(25) This argument is discussed in one of the best accounts of Lewis's strict implication, [Curley \(1975\)](#), at 521–2.

(26) In this text Russell calls these axioms 'formal principles of deduction' (1919, 149).

(27) The following argument is based on a reading of [Lewis's \(1917\)](#) response to [Norbert Wiener's \(1916\)](#) criticism of Lewis's rejection of the logic of *Principia*. I give a full account of this argument and its textual bases in Shieh (forthcoming)

(28) Lewis starts with 'intensional disjunction' in (1912), goes to 'strict implication' in (1913), and reaches 'impossibility' in (1914); he stays with 'impossibility' in (1918), and makes the slight change to 'possibility' in [Lewis and Langford \(1932\)](#).

(29) References to the *Tractatus* will be by remark number.

(30) For example, this view is discernible in both [Diamond \(1988\)](#) and [Hacker \(1986\)](#), which otherwise disagree completely about the *Tractatus*.

(31) This claim is relatively uncontroversial; see [Griffin \(1980\)](#), [Ricketts \(1996, 2002\)](#), and [Proops \(2002\)](#).

(32) The following sketch owes much to Warren Goldfarb's (amazingly still) unpublished paper, 'Objects, Names, and Realism in the *Tractatus*'. Note that on Goldfarb's view, the *Tractatus* seems to present what appears to be a conception of logic, but only in order to display its ultimate incoherence.

(33) An objection might be based on [Hylton's \(1997\)](#) argument that Tractarian logical symbols express operations mapping patterns of agreements with truth-possibilities to other such patterns. I cannot go into this issue here any further here than to say that operations are *our* means of recognizing that a proposition is a tautology, not that in virtue of which that proposition is a tautology.

In addition, although Wittgensteinian tautologies are not analytic in the sense popularly attributed to logical positivism, they can be understood as analytic according to the Leibnizian–Kantian conception of analyticity as conceptual containment. See [Dreben and Floyd \(1991\)](#).

(34) In Shieh (forthcoming) I argue against the more or less standard picture of Tractarian logical necessity sketched in this section. I hold that, in fact, in the *Tractatus* the necessity of logic is not a mode of truth at all. It is, rather, the non-arbitrary ('nicht willkürlich', 3.342, see also 6.124) identities and differences in any system of

representations of the world. These non-arbitrary *features* constitute what Wittgenstein calls 'logischen Syntax' (3.325, 3.327, 3.33, 3.334, 3.344, and 6.124) and show forth in our use of symbols.

(35) For discussion of some of them, see Uebel, in the present volume. See also, *inter alia*, Coffa (1991), Friedman (1999), Creath (1999), Richardson (2004), Goldfarb and Ricketts (1992), Awodey and Carus (2007), and Carus (2007).

(36) For a balanced and informative account of how the Vienna Circle received Wittgenstein's *Tractatus*, see Uebel (2011).

(37) This goes against the *Tractatus*. See Floyd (2005) for arguments against taking the *Tractatus* to espouse any form of logicism.

(38) For details see especially Awodey and Carus (2007) and Carus (2007).

(39) See Carus (2007) for a detailed examination of tensions in *Syntax*.

(40) Compare the title of chapter VII of Hacker (1972): 'Metaphysics as the Shadow of Grammar'.

(41) On 'about' see Carnap (1937, 290), example 12a; 'object' is a 'universal word' which, used in the material mode of speech, produces pseudo-object sentences, see Carnap (1937, 293–5).

(42) Rorty (1982, xiv). Carnap's attitude towards traditional philosophy is of a piece with his Principle of Tolerance (1937, § 17, 52).

(43) Carnap's view here bears comparison with Robert Brandom's (1994, 2000) view that logical vocabulary play primarily an expressive role in making inferential proprieties explicit. The syntactic correlate of Lewis's strict implication connective is the consequence predicate of the syntax language, and we have already seen what syntax language predicates are the correlates of Lewis's other modal connectives: the impossibility connective is correlated with 'contradictory', the possibility connective with 'non-contradictory', and the necessity connective with 'analytic' (Carnap (1935, 73–4, 77; 1937, § 69, 250–1)).

(44) I am very much indebted to discussion with Gary Ebbs for the formulation of this point.

(45) The significance of these lectures was brought to my attention by Hylton (2001).

(46) The classic statement of explication is in Carnap (1950).

(47) In one sense, this is also a charge of illusion. But the illusion is of the same kind as the illusion we were under when we thought that aether explains certain electromagnetic phenomena. From Quine's perspective the danger of the material mode is that it may lead us to commitments that are to be rejected as *false* on our best theory of the world. Quine's rejection of modality is a rejection of the apparent commitments of modal talk in the material mode, and so with it that material mode talk altogether.

(48) Quine (1947, 44, 3). Note that for Quine here deducibility 'can be expanded into purely syntactical terms by an enumeration of the familiar rules, which are known to be complete; and the reference to "logical signs" can likewise be expanded by enumeration of the familiar primitives' (Quine (1947, 43)). Note in addition that Quine later gave what he takes to be a more general characterization of logical truth in terms of substitution and grammar (1986, chapter 4).

(49) So far as I can tell, the term '*a priori*' appears only once in Quine's writings on modality, in (1953b, 159).

(50) This is Quine's first presentation of his critique in English; it was first put forward in Portuguese, but published later than the English translation, in (1944). In addition, a very compressed version of part of the argument appears in footnote 22 of Quine (1941, 16).

(51) Quine (1943, 114). On this construal the indiscernibility of identicals is used twice: first to show that the same thing is said by the two statements, and again to show that the single item that is said is true. Note also that here it is the (onto)logical law governing properties of identity that underlies the principle governing substitution inferences.

(52) Or by the adoption of a resolution: the identity sentence (2) came to express a falsehood on 24 August 2006, when the XXVIth General Assembly of the International Astronomical Union passed the final resolution on the definition of a planet.

(53) Carnap advances what seems to be a similar reply in (1947) in terms of the 'method of extension and intension'.

(54) Smullyan (1947, 140) advances another objection to Quine's arguments, based on what nowadays is called a Millian view of names: 'if "Evening Star" and "Morning Star" proper-name the same individual they are synonymous'. Unfortunately, with the notable exception of Marcus's review of Smullyan's paper, this early and prescient objection to Quine had little immediate influence.

(55) The argument appears in 'Reference and Modality', an essay that has three distinct versions, Quine (1953, 1961b, 1980; the quoted phrase appears at 150 in all versions. I present a reconstruction of Quine's argument.

(56) In Barcan (1946a, 1946b, 1947). Marcus provides extensions of two of the Lewis systems—S2 and S4—with axioms for quantification and identity, and an axiom governing quantifiers and modal operators now known as the Barcan formula. Three months after the first two of Marcus's papers appeared in print, Carnap (1946) sets out a quite different account of quantification and modality, based on a semantic construction whose relation to the Lewis axioms systems is not obvious.

(57) In Barcan (1947), Theorem 2.33 and an immediate corollary of it assert that material identity is strictly equivalent to both strict identity and the necessity of strict identity.

(58) Quine's initial replies to Smullyan are undermined by mistakes about the theory of descriptions in *Principia*. Quine claimed that Smullyan's solution requires an 'alteration' in the treatment of descriptions in *Principia*, because in *Principia* all wide and narrow scope eliminations of descriptions are provably equivalent (1953, 155; 1961b, 154). But in fact in *Principia* the equivalence is established only for extensional contexts; Quine's claim is removed from the third (1980) version of the paper. For more details see Marcus (1990) and Neale (1999).

(59) David Kaplan discusses a considerably more intricate version of this problem in (1986), section III.

(60) Plantinga (1974, Appendix) presents a closely related account of why, according to Quine, modalized predicates do not express genuine properties.

(61) Around the time that Quine formulated these arguments Carnap came to adopt semantics, and so to give up the notions of pseudo-object and quasi-syntactical property. Nevertheless Carnap continued to work with a successor notion, that of a quasi-logical property. A reformulation of Quine's arguments in terms of quasi-logical properties introduces a number of complications that I can't go into here.

(62) In Shieh (forthcoming) I show on the basis of this point that Quine's argument is not affected by the view

that variables are directly referential, or the view that the coherence of an account of the satisfaction of open sentences is independent of designative properties of singular terms.

(63) [Burgess \(1997\)](#) and [Neale \(1999\)](#) also argue that Quine's argument against quantifying in is independent of substitution failures. They do not discuss its connection to Carnap's notion of relative analyticity in *Syntax*.

(64) Many are sceptical of the Aristotelian pedigree of Quine's essentialism. But Aristotle would surely accept that a thing couldn't exist without having any of its essential properties. Now, on Aristotle's conception, this modal feature is not sufficient for the property to be essential, because essential properties have explanatory priority with respect to other properties with this modal feature. (See [Shields \(2007, 99–105\)](#) for a fuller account of Aristotle on essence.) So all Aristotelian essential properties are Quinean, but not vice versa.

(65) See in particular [Marcus \(1961, 317–19\)](#).

(66) Marcus's argument is closely connected to one advanced by [Russell \(1918, 212\)](#).

(67) Tagging is the result of putting some (finite) set of randomly generated natural numbers in a one-to one correspondence with 'all the entities countenanced as things by some particular culture through its own language', [Marcus \(1961, 310\)](#). If we take Marcus at her word here, we have to take tagging to be what Carnap calls a syntactic correlation, between the singular or descriptive referring expressions of the language of a culture with a set of numbers.

(68) Although I cannot discuss this here, it is a mistake to take Marcus's inference from the tautologousness of $\neg a = a$ to the tautologousness of $\neg a = b$ to be based on the view that since tautologies represent nothing, they all, vacuously, represent the same thing.

(69) Again, although I cannot go into it here, it is a mistake to think that Marcus's argument for the necessity of true identities between tags must after all depend on synonymy because if tags have no meaning they are all vacuously synonymous.

(70) Thus, one should not infer, from Marcus's claim that 'to say of an identity ... that it is true, it must be tautologically true or analytically true' (1961, 309–10), that she subscribes to the analyticity conception of necessity that Quine is attacking.

(71) It is arguable that, at the time Marcus presented this paper at the Boston Colloquium in the Philosophy of Science, she did not have a fully worked out reply based on the material in 'Modalities'.

(72) On this point compare [Ballarín \(2004\)](#).

(73) [Marcus \(1961, 1967, 1971; Parsons \(1967, 1969\)\)](#).

(74) That essentialism is the key premise in Kripke's defence of the existence of necessary truths not knowable *a priori* is very clear in (1971).