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Quine's Critique of Modal Logic and
his Conception of Objects



ACADEMIC DISSERTATION

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Abstract

In this study, I discuss W.V. Quine's critique of quantified modal logic and 'Aristotelian essentialism' from a novel perspective. The novelty of my approach consists in looking at Quine's critique in the broader context of his philosophical system, especially in the context of his naturalized epistemology. The main thesis of the present study is that Quine's epistemological conception of objects as theoretical posits supports his critique of quantified modal logic. Since neither Quine himself nor his commentators address the connections between his critique and the details of his epistemological model, the present study contributes to a better understanding of Quine's philosophical system by exposing a hitherto undiscovered connection between these two aspects of it.

I argue that Quine's epistemological conception of objects supports his critique of quantified modal logic in two ways. First, I use Quine's conception of objects in constructing a Quinean response to two strategies of answering his critique proposed in recent literature. The reference-theoretic strategy, whose main proponent is Dagfinn Føllesdal, offers the non-descriptivist theory of singular reference as a solution to Quine's problem concerning the interpretation of open sentences in the scope of a modal operator. The other strategy I discuss is proposed by John Divers, and is based on exposing a flaw in Quine's argumentation in connection with his critique of quantified modal logic. According to Divers, the flaw in Quine's argumentation consists in a confusion between semantic and metaphysical issues. Second, I argue that Quine's epistemology supports his critique of modal logic also in a more direct way. I propose an interpretation according to which Quine's epistemological model involves a conception of objects as objects-classified-under-predicates, objects-*qua*. The identity of an object is determined by the empirically meaningful part of the theory which posits the object, and there is no 'object in itself' in addition to the object-as-represented-in-a-theory. Because of this conception of objects, Quine's epistemology legitimizes the use of descriptive conditions in the example cases on which his critique of quantified modal logic rests.

In course of my discussion I also argue for a particular interpretation of what Quine's critique of quantified modal logic is about. Contrary to some commentators, I interpret Quine as arguing against quantified modal logic with the necessity operator read as a non-linguistic, 'metaphysical' notion of necessity instead of the metalinguistic notion of analyticity.

As a suggestion for a topic of further research, I consider Quine's views on *de re* propositional attitudes from the point of view of his conception of objects. As a hypothesis for future study, I propose that Quine's epistemological conception of objects sets a necessary condition for the ascription of a *de re* attitude to another subject which is so strong that it is unlikely ever to be fulfilled in practice.

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Chapter 1

Introduction

*Everything is what it is,
ask not what it may or must be.*
– W.V. Quine [32, 174]

1.1 Quine and Alethic Modal Logic

Willard Van Orman Quine (1908-2000) is perhaps the best known 20th century critic of the modal logic of necessity. Quine's printed remarks on modal logic span the period of time from the early 1940's to the posthumously published essay 'Confessions of a Confirmed Extensionalist'. In this late essay, he expresses his long-standing attitude towards alethic modal logic by saying that he doubts that he has ever fully understood anything that he could not explain in extensional language [51, 500]. A somewhat stricter formulation of this view is found in his last book *From Stimulus to Science*, where he cites extensionality as a necessary condition for a full understanding of a theory [30, 90-91]. Throughout his career, Quine held that the formulas of quantified alethic modal logic, that is, of classical first-order logic extended to include the sentential operator ' \Box ' for necessity, make no sense.

There are some sentential contexts involving the adverb 'necessarily' of which Quine says he is able to make sense. According to him, there are everyday uses of this adverb which are clear and convenient as communicative aids. As an example, he mentions the use of 'necessarily' as a means to mark a statement on which an interlocutor is presumed to agree with, in contrast to other state-

ments whose truth is under investigation.¹ A particularly clear case of this sort of use of the notion of necessity is as an indication that a statement follows logically from what has been accepted earlier.² This kind of use is unproblematically accommodated into extensional language by construing it as use of the metalinguistic predicate of logical validity. The construal of a use of the notion of necessity as a metalinguistic predication represents what Quine calls 'the first grade of modal involvement'. First-grade uses of the notion of necessity can be accommodated into extensional language as predications. Of course, the metalinguistic predicates into which the first-grade uses of the notion of necessity are paraphrased may turn out to be defective in other ways, for example in terms of clarity or applicability to sentences across the board. In the context of Quine's discussions, one conspicuous example of this sort of defectiveness is the predicate ' x is analytic'.

In general, Quine says that he is able to make sense of necessity as a context-relative notion. On the basis of his few remarks to this effect, a Quinean account of context-relative necessity is developed in the present study. However, regardless of his concessions to the notion of necessity, Quine always remained resolute in his rejection of alethic modal logic which involves quantification into modal contexts. In the present study, my purpose is to discuss and clarify the nature of Quine's argumentation against quantified modal logic. More specifically, I will defend an interpretation according to which Quine argues that open sentences in the scope of a modal operator expressing necessity, of the form

$$(1) \Box Fx$$

lack a coherent interpretation, that is, are meaningless (in other words, lack sense). According to my interpretation, Quine's argumentation is directed against a notion of necessity which is non-linguistic, *de re*, or, as he also says, *metaphysical*. This kind of non-linguistic notion of necessity is to be sharply distinguished from a (meta)linguistic notion which Quine attributes to the first grade of modal involvement. The purported non-linguistic notion of necessity is at work in attempts to say that an object has a trait necessarily. Quine thinks that commitment to the intelligibility of this kind of notion of necessity is a consequence of quantifying into modal contexts; in Quine's terminology of grades, the champion of quantified modal logic incurs the third grade of modal involvement.

Quine understands the statement that an object has a trait necessarily as saying that the trait is *essential* to the object. He sees quantified modal logic

¹See [58, 444], [30, 99].

²See [20].

as committed to a doctrine he calls Aristotelian essentialism. This doctrine consists in the thesis that the distinction between essential (necessary) and accidental (contingent) traits of an object makes sense. In this study, I take it as Quine's view that quantified modal logic provides the linguistic means for making Aristotelian-essentialist statements. Quine says that he makes no sense of this kind of essentialism, and his argumentation against quantified modal logic is in the present study seen as going equally against Aristotelian essentialism.

While the modal logic of necessity is a breach of extensionality which Quine repudiates 'without regret' [51, 504], there are other non-extensional linguistic constructions which he repudiates a bit more regretfully. These include sentences involving an ascription of a propositional attitude like perception or belief. In the *de dicto* case, Quine thinks that ascriptions of propositional attitude can be accommodated into extensional language by construing them as ascriptions of a relation between the attitudinist (the subject of the attitude) and a sentence, conceived as a string of phonemes or characters. The attitudinist need not be a competent member of the linguistic community to whose repertoire the relevant sentence belongs. Some attitudes *de dicto* may even be intelligibly ascribed to prelinguistic children and non-linguistic animals, on the basis of observed behavior and the psychological capacity which Quine calls empathy. In fact, Quine considers the (usually tacit) ascription of *de dicto* perceptions as playing a central role in the process of language acquisition.

In contrast to the *de dicto* case, Quine despairs of giving any coherent interpretation to ascriptions of *de re* propositional attitudes.³ In this respect, Quine's view of the idiom of *de re* propositional attitudes is similar to his view of quantified alethic modal logic, which is the idiom of *de re* necessity. However, unlike quantified modal logic, Quine thinks that the idiom of *de re* belief, for example, has important uses even though sentences involving this idiom are strictly speaking devoid of sense. A sentence like

(2) $\exists x(\text{Ralph believes that } x \text{ is a spy})$

sounds an alert to security agents, as Quine says [30, 97]. However, in spite of its capacity to mobilize relevant officials, a token of (2) gives only 'a lead'; it does not carry a coherent message. In Quine's eyes, quantified modal logic is thus even worse off than the idioms of *de re* propositional attitudes: in addition to being senseless it is also useless.

Quine's early discussions about modal logic were mostly in reaction to the work of C.I. Lewis, Rudolf Carnap and Ruth Barcan. Quine traces the incep-

³See e.g. [30, 96-98], [58, 443].

tion of modern modal logic to Lewis' dissatisfaction with the truth functional conditional as a supposed logical representation of the notion of implication. As Quine sees it, the resulting idea of strict implication was born out of a confusion between use and mention of expressions. ' $p \rightarrow q$ ' was seen by Lewis as too weak to capture the reading ' p implies q '. In particular, the so-called paradoxes of material implication suggest that a false sentence implies all sentences and that a true sentence is implied by all sentences. Lewis thought that ' p implies q ' expresses a connection of meaning between the sentences p and q , and that this connection holds if and only if it is impossible that p should be true and q false. Consequently, Lewis introduced the symbol ' \rightarrow ' for strict implication. In Lewis' 1918 book *A Survey of Symbolic Logic*, the strict implication holding between sentences p and q was written as ' $p \rightarrow q$ ', and this formula was explained in terms of the primitive symbol ' \sim ' for impossibility; in the primitive notation, ' $p \rightarrow q$ ' was written as ' $\sim (p - q)$ ', which Lewis read as 'It is impossible that p be true and q false' [110, 292-293].⁴ Quine points out that a statement of the form ' p implies q ' should be viewed as a metalinguistic statement which mentions object-language sentences p and q ; thus, ' p ' and ' q ' stand in the place of metalinguistic specifications of object-language sentences, for instance singular terms formed by using quotation marks. In ' $p \rightarrow q$ ', on the other hand, ' p ' and ' q ' stand in place of object-language sentences. According to Quine, Lewis conflated the metalanguage with the object language by adopting ' \rightarrow ' as an object-language sentence connective.⁵ However, Quine intends this point about the use-mention confusion at the inception of modern modal logic as a historical note only; his systematic critique of modal logic is not based on a claim that modal logic would inevitably have to turn on this confusion [10, 177].

Already before Lewis' *Survey*, steps towards modern modal logic were taken more than a decade earlier by Hugh MacColl. MacColl worked in the algebraic tradition, and formulated an extension of Boolean algebra which included modal operators and an operator for strict implication. Lewis' view of implication, and his idea of strict implication, were influenced by MacColl's work.⁶ In contrast to MacColl's algebraic approach, Lewis' development of modal logic took place in the Frege-Russell-Whitehead tradition of mathematical logic.⁷ MacColl's

⁴In Lewis' notation, the classical negation is written as ' $\sim p$ ' (which is read ' p is false') and the sign ' \wedge ' which is in the present study used as the symbol for the truth functional conjunction is reserved for strict logical sum: ' $p \wedge q$ ' is defined as ' $\sim (\sim p - q)$ '.

⁵Lewis' carelessness about the use-mention distinction is also noted by Fitting and Mendelsohn [79, 41-42]. See also [107, 532].

⁶Stephen Read gives an exposition of MacColl's algebra in comparison with later systems of modal logic, and notes Lewis' indebtedness to MacColl [124]. See also [106, 549].

⁷For this distinction between the algebraic tradition and the tradition of mathematical

and Lewis' work breaks with Frege's extensionalist approach, also assumed by Whitehead and Russell in *Principia Mathematica*, which involves excluding the alethic modalities from the province of logic.

Leila Haaparanta [96] argues that Frege's dismissive attitude towards the alethic modalities is due to the influence of Kant's philosophy. Kant's table of judgments in *The Critique of Pure Reason* contains modality as one of the four titles (Quantity, Quality, Relation, Modality) into which the form of a judgment is analyzed. However, modality differs from the other three titles in that its moments (problematic, assertoric, and apodeictic) do not contribute anything to the content of the judgment. According to Kant, the modal forms of judgment represent attitudes that the judging subject takes towards a judgment: a judgment is problematic if and only if the subject takes it to be logically possible, assertoric if and only if she takes it to be true, and apodeictic if and only if she takes it to be logically necessary [102, A74-76, B99-B101]. Although Kant includes modality as a title in his table of judgments and in this sense accepts modality as a logical notion, his conception of the moments of modality does not allow for logical relations in the manner of modern modal logic. For example, in Kant's logic an assertoric or apodeictic judgment does not imply the corresponding problematic judgment.⁸ According to Haaparanta, Frege followed Kant in considering the alethic modalities as expressing subjective attitudes towards judgments, and consequently placed them outside the contents of judgments and in the realm of psychology that is strictly separated from the objective realm of thoughts with which logic deals. For Frege, the alethic modalities, necessity and possibility, had to do with the attitude of the judging subject towards a proposition. For example, the possibility of a proposition means that as far as the judging subject knows, the negation of the proposition does not follow from general laws [96, 250]. Frege also thought that in some contexts the use of the notion of possibility simply amounts to existential quantification.⁹ According to Woleński, Russell took a similar approach by explaining the notions of necessity and possibility in terms of universal and existential quantification, and thus reducing the alethic modalities to quantifiers [135, 133-134].

During his graduate study at Harvard in 1930-32, Quine was in touch with both the Fregean tradition dismissive of modal logic and the approving line of MacColl and Lewis. He wrote his dissertation on *Principia*, with Whitehead as supervisor, while Lewis was one of his teachers [14, 82-86]. In time, Quine sided

logic, see e.g. [98, 7].

⁸This point is made by Korte, Maunu, and Aho in their account of the history of modal logic from Kant onward. See [107, 520-521].

⁹See e.g. [96, 251], [107, 529].

firmly with the Fregean tradition, arguing against modal logic and promoting extensionality. One can also discern a similarity between Kant's and Frege's way of placing modality outside the content of a judgment and Quine's preference for construing uses of the modal notions as metalinguistic predications. In the first grade of modal involvement, the necessity operator is paraphrased into a metalinguistic predicate and thus made external to the rest of the sentence in which it appeared before the paraphrase.¹⁰ As already mentioned, first-grade occurrences of the necessity operator are, for Quine, logically flawless because, being predications, they conform to extensionality.

Historically, an important issue regarding Quine's critique of modal logic has been the use of definite descriptions in some example cases he invokes in order to demonstrate the problematic nature of modal logic (see (13)-(15) in section 2.2). A classical answer to Quine's critique of modal logic, proposed by Arthur Smullyan [128], draws attention to the scopes of definite descriptions in modal contexts. In short, Smullyan's response consists in pointing out that an argument in Quine's early essay 'The Problem of Interpreting Modal Logic' [2] ignores a scope ambiguity, and that once this ambiguity is resolved the argument loses its force. Smullyan's answer led Quine to formulate his argument without reliance on definite descriptions, or on singular terms of any sort. In the 1980 version of the essay 'Reference and Modality', Quine gives an example case which does not involve the use of any kind of singular terms.

Aside from Smullyan's answer, another well-known strategy of responding to Quine's critique of quantified modal logic is based on the non-descriptivist theory of singular reference which rose to prominence in the 1970's with the work of Saul Kripke [108]. In brief, the main point in Quine's critique is that because the way we happen to linguistically specify an object affects our judgment as to whether or not an open sentence in the scope of a modal operator is true of the object, this kind of open sentences make no sense and consequently neither does quantifying in from the outside of the scope of the modal operator. On the basis of this point, Quine denies that it makes sense to speak of an object, independently of some particular way of linguistically specifying it, as being necessarily thus or so. The non-descriptivist theory of singular reference is proposed as a way of making sense of quantified modal logic and Aristotelian essentialism. Names as rigid designators, or genuine singular terms, are seen as providing a way of linguistically picking out an object without presupposing any descriptive classification of it. For it is the descriptive content involved in the linguistic specification of an object that, in Quine's example cases, is said to

¹⁰See section 2.1.

affect the truth value of modal predications. Perhaps it is not badly off the mark to say that a significant part of the philosophical community nowadays shares the view that the non-descriptivist theory of reference provides a satisfactory answer to Quine’s critique of quantified modal logic. This view is not only held by practicing modal logicians and essentialist philosophers looking to defend their theoretical foundations against the Quinean critique. It is also proposed by scholars of Quine’s philosophy, most notably by Dagfinn Føllesdal. However, Quine himself remained mostly unmoved by the reference-theoretic answer to his critique. At times, he seems to have misconstrued some fundamental points in non-descriptivist conceptions of singular reference, as I suggest in the present study. Perhaps at least partly due to such misunderstandings, Quine ended up not accepting the non-descriptivist solution to the problem he raises about quantified modal logic. Throughout his career, he held on to the view that quantified modal logic and Aristotelian essentialism make no sense.

1.2 Modality and Epistemology: The Aim of the Present Study

In the present study, I will discuss Quine’s critique of quantified modal logic from the perspective of his epistemological conception of objects as theoretical posits, a conception which he develops in several books and essays over many decades. The aim of this study is to argue for the thesis that Quine’s epistemological conception of objects supports his critique of quantified modal logic. This approach to Quine’s critique of modal logic is a novel one. As is well known, Quine’s general philosophy of logic, his conception of the nature of classical first-order logic and logical truth, is intimately connected with his epistemological framework. This connection has been well acknowledged and much discussed and debated. However, Quine’s critique of quantified alethic modal logic has until now been discussed, by commentators and by Quine himself, as isolated from his epistemological model which arguably lies at the heart of his philosophy. Much of recent discussion of Quine’s critique has centered on such issues as the *de dicto-de re* distinction [118], the distinction between descriptions and non-descriptive singular terms (section 3.1), or Quine’s general thesis that it is illegitimate to quantify into any kind of opaque construction (sections 2.2 and 2.4.1). Commentators have not paid much attention to the question whether there exist any theoretical connections between Quine’s critique of modal logic and his epistemological conception of objects. By exposing

the connection between the view of the nature of objects involved in Quine's epistemology and his critique of quantified modal logic, this study shows how the latter falls into place as part of his philosophical system.

Quine himself does not explicitly address the issue whether there are any theoretical connections between his critique of modal logic and his epistemological conception of objects. I do not attempt to argue that Quine would ever have had in mind any such connection between these aspects of his philosophy. The task of the present study is to look carefully at Quine's critique of quantified modal logic and the conception of objects that arises from his epistemological investigations, and to show, on the basis of textual evidence, that his epistemological conception of objects supports his critique of modal logic.

Quine sees the study of the relation between sensory evidence and theory as the main task of his naturalized epistemology. The main task of the Quinean epistemologist is to answer a kind of skeptical challenge that 'arises from within natural science' [22, 2-3]. Briefly, this challenge questions the ability of our science to account for the fact that we have our science, namely the fact that we have theories and beliefs about the world that are to some extent answerable to sensory evidence. Given the current understanding of our sensory access to the world as limited to the action potentials in our receptor cells, how, the challenge goes, could we have the beliefs and theories about the world that we do have? Quine adopts a genetic perspective in his answer to the challenge facing the epistemologist. He thinks that the challenge can be met by giving an account, in scientifically respectable terms, of how one might acquire a theory about the world on the basis of the 'meager input' [3, 83] consisting of the stimulation of our sensory receptors. This approach admits of a certain amount of simplification: an answer to the epistemological challenge need not take the form of a detailed description of the actual process of acquiring beliefs and theories. The epistemologist is allowed to disregard details which are irrelevant to the purpose of answering the challenge. Even though his investigation is cast in a naturalistic setting, Quine sees himself as occupied with the traditional epistemological question concerning the relation between sensory evidence and theory.¹¹

Quine pays particular attention to one aspect of the epistemological challenge, namely to the question how we can have beliefs and theories about the world that are about objects. Objects are not given to us in the neural intake that constitutes our sensory access to the world; how can it be that we have a conception of the world as consisting of all sorts of objects? Quine connects

¹¹See e.g. [24, 19], [3, 82-83].

the assuming of objects to linguistic reference. Because of his view of natural language as ontologically unclear, he focuses on the idiom of quantifiers and variables as the paradigmatic medium of speaking about objects. In his genetic account of reification, that is, of the assuming of objects, Quine explains how a theory of the world couched in his canonical notation (first-order logic with identity and without singular terms) might be acquired. In brief, Quine's genetic account of reification is an investigation into the relation between sensory evidence and the referential, object-positing aspect of a first-order theory. According to the model of the evidence relation that is supported by Quine's genetic account, theories are not evidentially connected to theory-independent objects. The connection between theory and sensory evidence is a 'holophrastic' one between observation sentences and ranges of sensory intake. Objects are theoretical posits, and what an object is, its identity, is determined by the whole empirically meaningful part of the theory in which it is assumed. Reference to objects is seen as contributing to the logical structure of a theory, and the epistemological importance of this structural contribution is seen in its effect on the predictive power of the theory.

The kind of support which Quine's epistemology affords his critique of quantified modal logic comes in two forms. First, Quine's epistemological conception of objects can be used in giving a Quinean response to some attempted resolutions of his critique. By considering two recent answers to Quine's critique, I explain how they can be countered from the point of view of Quine's epistemology. One of the answers discussed is the reference-theoretic reply noted in the previous section. In particular, I focus on Føllesdal's view that the non-descriptivist theory of singular reference provides a means of answering Quine's critique. The other answer, proposed by John Divers, claims that Quine's critique is based on a confusion between semantic and metaphysical issues, a confusion which Divers attempts to expose by means of setting up a dialectic between Quine's critique and David Lewis' counterpart theory. Briefly, the Quinean response to these answers to his critique of modal logic consists in pointing out that they presuppose a conception of objects as theory-independent that conflicts with the conception of objects as theory-dependent entailed by Quine's epistemology.

Second, I argue that Quine's epistemological conception of objects supports his critique of quantified modal logic directly. Quine's critique is based on examples which illustrate how the involvement of descriptive content in the specification of an object causes problems for the interpretation of open sentences in the scope of a modal operator. I attempt to show that Quine's epistemology entails not only that our cognitive relation to objects always involves descriptive classification but also that objects themselves are objects-classified-under-predicates,

objects-*qua*. On the basis of this point, I go on to argue that according to Quine's epistemological conception of objects, the involvement of descriptive classification which causes trouble with respect to modal predication cannot be eliminated. The main thesis of the present study is that Quine's epistemology supports his critique of quantified modal logic in the two ways just outlined.

In addition to considerations pertaining to the main thesis of this work I will also discuss Quine's views on *de re* propositional attitudes from the point of view of his epistemological conception of objects. This discussion is meant as an exploration of prospects for further research; a fuller development of the theme of propositional attitudes will be a task for future work. Analogously to his critique of quantified modal logic, Quine raises the problem whether it makes sense to say, for example, that a subject *s* believes *of an object* that *it* is *F*, that is, whether sentences of the form

$$(3) \exists x(s \text{ believes } x \text{ is } F)$$

have a coherent interpretation. The problem is that when object *x* is specified in one way, *s* may affirm the predicate *F* of it, but when the same object is specified in another way, *s* may deny *F* of it. From the point of view of Quine's epistemological conception of objects, it seems that this situation is nearly decisive against *de re* propositional attitudes. I suggest that Quine's view of objects as theoretical posits and his holistic conception of empirical content set a very strong necessary condition for an ascription of a *de re* attitude to a subject. My tentative hypothesis is that such an ascription is warranted only if the ascriber's and the subject's theories are empirically equivalent. The fulfillment of this condition in practice seems unrealistic. The notion of an object shared between an ascriber and the subject of a *de re* attitude is at best a purely theoretical notion according to Quine's epistemology.

1.3 The Structure of the Present Study

This study is structured as follows. In chapter 2 I discuss Quine's views concerning alethic modal logic. I explain Quine's distinction between what he calls the three grades of modal involvement. After that, I discuss the notions of extensional and referential opacity, and look at Quine's argument concerning the possibility of combining extensional opacity and referential transparency. It has been argued that this combination of features is required of the necessity operator in order for quantified modal logic to be possible. After considering reasons why Quine's argument about extensional opacity and referential transparency

is not entirely successful, I turn to a discussion of his argument directed exclusively against quantified alethic modal logic. Since there is no general consensus about the form and target of Quine's critique of quantified modal logic, the way Quine's critique is construed in the present study differs from reconstructions offered by some other commentators. Hence, I also consider some contemporary interpretations of Quine's critique that differ from mine, and defend the interpretation adopted in this study.

In chapter 3, I discuss the two recent strategies of answering Quine's critique of quantified modal logic already noted in the previous section. The first of these strategies is the reference-theoretic answer in terms of the non-descriptivist theory of singular reference. I start the discussion from Føllesdal's suggestion that the non-descriptivist theory of reference offers a resolution to the problem Quine raises in his critique, and provides a way to make sense of quantified modal logic and Aristotelian essentialism. After this, I take up Michael Devitt's reference-theoretic account of the influence of descriptive elements on the interpretation of sentences that involve the necessity operator. The second answer is by Divers. His strategy consists in an attempt to show that Quine's argumentation in connection with his critique of modal logic is based on a confusion between semantic and metaphysical issues.

Next, I put the topic of Quine's critique of modal logic aside for two chapters, and turn to a discussion of Quine's epistemological conception of objects. The task of chapters 4 and 5 is to give an account of Quine's conception of objects with a view to establishing the main thesis of this work. The nature of these chapters is mainly, though not exclusively, expository. The connection between Quine's conception of objects and his critique of modal logic will be drawn later, in chapter 6.

Chapter 4 focuses on the general features of Quine's naturalized epistemology, his conception of science in a broad sense of the word and the nature of objects as posits of science. I explain the central role Quine assigns to language and the process of language acquisition in his genetic investigation of the process of positing objects. I also discuss an objection to Quine's conception of reification which has arisen from the field of developmental psychology. Chapter 5 is a discussion of Quine's genetic account of reification. I begin by explaining the learning-theoretic foundations of Quine's genetic investigation, and then move on to discussing some details of his account of the process of acquiring a theory couched in his canonical logical notation. I do not attempt to give a fully detailed exposition; rather, I consider Quine's account only to the extent that I see it as having relevance for the task of establishing the main thesis of the present study. I end the chapter with an explanation of Quine's epistemological

model of the relation between sensory evidence and theory, a model which is supported by his genetic account.

The purpose of chapter 6 is to establish the main thesis of this study on the basis of the materials presented in the earlier chapters. As already mentioned, I argue that Quine's epistemology supports his critique of modal logic in two respects. First, in sections 6.1 and 6.2, a Quinean response to the answers discussed in chapter 3 is constructed by considering them from the point of view of Quine's epistemological conception of objects. Second, in section 6.3 I explain how Quine's epistemological conception of objects directly supports his critique of quantified modal logic.

Chapter 7 consists of a recapitulation of the arguments presented in support of my main thesis, followed by a suggestion for a topic of further research. In analogy with the approach taken in this study towards Quine's critique of quantified modal logic, I propose a way of looking at Quine's views on the idioms of *de re* propositional attitude from the point of view of his epistemological conception of objects. In section 7.2 I outline a tentative hypothesis about the relevance of Quine's conception of objects to his views on the propositional attitudes. My hypothesis is that Quine's conception of objects sets an unrealistically strong condition on ascriptions of *de re* attitudes and, consequently, on the application of the step of inference from *de dicto* to *de re* ascriptions known as exportation.

Chapter 2

Quine and Quantified Modal Logic

In this chapter, I discuss Quine's view on, and his critique of, alethic modal logic. In particular, I concentrate on his critique of quantified (first-order) alethic modal logic. In section 2.1, I explain Quine's conception of the three different grades of embracing the idea of necessity in modal logic, which correspond to three different levels of using the modal operator. In section 2.2, I define the notions of extensional and referential opacity. Having these notions at hand, I discuss Quine's argument concerning the possibility of extensionally opaque and referentially transparent linguistic constructions (section 2.3). The possibility of combining these semantic features may be seen as a necessary condition for doing quantified modal logic. Thus, if Quine's argument were successful, it would amount to a repudiation of quantified modal logic. However, like Smullyan in his discussion of Quine's early critical remarks (section 2.2), commentators have considered the use of definite descriptions in Quine's argument problematic.

In sections 2.4.1 and 2.4.2, I look at some interpretations of Quine's critique of quantified modal logic offered in the literature, and take up the question what kind of notion of necessity is the real target of Quine's critique. I defend the interpretation that Quine's critique is directed at a 'non-linguistic' notion of necessity which cannot be explained in terms of the notion of analyticity. In section 2.5.1, I propose a Quinean construal of necessity as a linguistic, first-grade notion. This construal is based on Quine's statement that he is able to make sense of the notion of necessity in a certain relative sense. In section 2.5.2

I contrast this Quinean relative construal of necessity with an absolute and non-linguistic construal which quantified modal logic requires according to Quine. In this connection, I will also discuss Quine's notion of Aristotelian essentialism. Finally, towards the end of section 2.5.2, I give an account of what I take to be Quine's 'master argument' against quantified modal logic.

2.1 Three Grades of Modal Involvement

Quine distinguishes three levels of using the necessity operator in modal logic and, corresponding to these levels, 'three different degrees to which we may allow our logic, or semantics, to embrace the idea of necessity' [11, 158]. In accordance with the title of Quine's essay 'Three Grades of Modal Involvement', these degrees are called *grades* in the present study.

The first grade consists in the use of ' \Box ' as the principal operator of a sentence, and in explaining such use in terms of metalinguistic predication. Here ' \Box ' is construed as a metalinguistic predicate such that if an object a satisfies ' $\Box x$ ', then a is a sentence of the object language to whose metalanguage the predicate ' $\Box x$ ' belongs. An example of a first-grade use of ' \Box ' is

$$(4) \Box(9 > 7)$$

which can be explained as the metalinguistic predication

$$(5) '9 > 7' \text{ is necessary.}$$

Quoting an object-language expression is one way of naming it. As Quine points out, quotation ('...') is a referentially opaque context, in the following sense: coreferential singular terms are not intersubstitutable *salva veritate* when they appear within quotation marks [11, 160-161] (the notion of referential opacity is discussed in more detail in section 2.2). Quotation, Quine says, is a referentially opaque context *par excellence*: occurrences of object-language expressions inside quotation marks constitute only an orthographic accident, like the occurrence of 'cat' in 'cattle' [11, 161]. There is no occurrence of '9' in " $9 > 7$ ", nor of ' $9 > 7$ ' in (5). Quine considers spelling a graphic way of making this point. We can adopt a name for each of the characters in our object language, and a function symbol for concatenation, and refer to an expression by spelling it instead of quoting it.

Understood as a metalinguistic predicate in the way just illustrated, the necessity operator ' \Box ' can be accommodated into extensional language. It does

not violate extensionality (understood as the principle that materially equivalent closed sentences, coextensional open sentences and coreferential singular terms are interchangeable *salva veritate*). In particular, when attributions of necessity are put in an explicitly metalinguistic form, the object-language sentence of which necessity is predicated may be referred to by any grammatically admissible means without affecting the truth value of the predication. Furthermore, in the metalanguage where object-language sentences belong to the range of the variables, quantification into the scope of the necessity operator, construed as a predicate, is admissible.

Various ways of explaining the metalinguistic predicate ' x is necessary' suggest themselves. Quine mentions logical validity as one example. Construed as the notion of validity, Quine does not consider necessity problematic. However, he observes that the first-grade notion of necessity is often explained as the notion of *analyticity*, which is meant to apply not only to sentences that are logically valid but also to further sentences, such as those purportedly true solely in virtue of meaning. A classic example of this kind of a sentence would be 'Bachelors are unmarried'. Even when first-grade necessity is explained as a philosophically controversial semantic predicate like analyticity, it nevertheless conforms to extensionality just like on less controversial readings.

Quine's treatment of the first-grade contexts of the necessity operator as metalinguistic predications amounts to elimination of the notion of necessity, in these contexts, from the province of logic: the necessity operator is paraphrased into a metalinguistic predicate and thus made external to the rest of the sentence in which it appeared before the paraphrase. For example, the first-grade construal of the sentence ' 9 is necessarily greater than 7 ' is (5) above, which has the form of a predication. As regards the different ways of explaining the predicate ' x is necessary', explanation in terms of the notion of analyticity is of course unacceptable to Quine since he famously rejects this notion. In section 2.5.1 I suggest a Quinean way of explaining the metalinguistic predicate ' x is necessary' as a gradualistic epistemological predicate.

The second grade consists in using ' \Box ' as an object-language operator which attaches to closed sentences only. This means allowing ' \Box ' to occur in other positions besides that of the principal operator, and also allowing for multiple occurrences in a sentence. Accommodating such uses of ' \Box ' in the first grade of modal involvement turns out to be very difficult. This difficulty is evident in cases of more than one occurrence of ' \Box ' in a sentence. In the first grade, once ' \Box ' has been applied, say to a name of an object-language sentence, it cannot be applied again to the resulting sentence. Such an application would result in an ungrammatical string of symbols. When ' \Box ' is construed as an object-language

operator on closed sentences, we can for example write grammatical sentences of the form

$$(6) \quad \Box(\Box(\forall xFx \rightarrow \exists xFx) \rightarrow \Box(\neg\exists xFx \rightarrow \neg\forall xFx)).^1$$

Representing sentences of this form in terms of ' \Box ' as a metalinguistic predicate would involve a further upward move in the language hierarchy to talk about the 'semantics of semantics', as Quine puts it. Further iteration would call for the introduction of further metalanguages, with new notions of necessity applicable to sentences of the language of the next lower level. Furthermore, it is not clear how we should interpret, for example, sentences of the form

$$(7) \quad \Box A \rightarrow A.$$

Since the instances of (7) include ' \Box ', they are sentences of a metalanguage which includes the predicate represented with ' \Box '. The second occurrence of the schematic letter ' A ' thus stands in place of a sentence of the metalanguage. However, the first occurrence of ' A ' is in the scope of ' \Box ', so this occurrence is to be replaced, in an instance of (7), with a name of the sentence which replaces the second occurrence of ' A '. This results in incoherence: we end up mixing levels of language. We would need some sort of convention which entails that in (7), the first occurrence of ' A ' is to be replaced by a name of that sentence which is the object-language translation of the metalanguage sentence standing in the place of the second occurrence of ' A '. Such a convention, in turn, would affect grammaticality since the sentence standing in the place of the second occurrence of ' A ' may contain an occurrence of ' \Box ' but we cannot allow sentences which include such an occurrence to have an object-language translation.

According to Quine, the second grade of modal involvement amounts to a departure from extensionality [11, 162]. This departure is reflected in the difficulty of construing ' \Box ' as a metalinguistic predicate, along the lines of the first grade of modal involvement. Of course, the proponents of modal logic usually do not intend their notation to be accommodated into extensional language. As Quine notes,

the modal logic typified in [(4)] is usually put forward as a corrective of extensionality, a needed supplementation of an otherwise impoverished logic. [11, 162]²

¹This is a schematic representation of Quine's example [11, 170].

²Quine refers in this passage to the example ' $\Box(9 > 5)$ '. The change of example makes no substantial difference here.

The use of ' \Box ' as an object-language operator on closed sentences also suggests taking the further step – which Quine considers a momentous one – of using ' \Box ' as an object-language operator on open as well as closed sentences [11, 168]. This means allowing quantification into the scope of a ' \Box ' by a quantifier lying outside that scope, for example in sentences of the form

$$(8) \exists x \Box Fx.$$

This kind of use of ' \Box ' amounts to the *third grade* of embracing the idea of necessity. According to Quine, the third grade involves a non-linguistic view of necessity. In this respect, it differs from first-grade necessity which is a metalinguistic trait truly attributed, if at all, to object-language expressions. As Quine puts it, in the first grade of modal involvement 'necessity resides in the way in which we say things, not in the things we talk about' [11, 176]. In contrast, the third grade involves the idea that an object may have some of its traits necessarily and some others contingently. In the third grade, it is a matter of whether (n-tuples of) objects in the domain of discourse of the object language satisfy object-language sentences of the form ' x is necessarily F '.

2.2 Referential and Extensional Opacity

The notion of *referential opacity* is central to Quine's discussion of quantified modal logic. Quine characterizes referential opacity as failure of *referential transparency* [45, 142-144]. According to him, referential transparency has to do with constructions, more specifically, modes of containment of singular terms or sentences in singular terms or sentences. A construction is understood as 'any fixed way of building a composite expression from arbitrary components of appropriate sort, one or more at a time' [45, 49]. For example the truth-functional connectives, predication, the modal operator \Box , and the ι -operator for forming definite descriptions qualify as constructions. Quine characterizes the notion of referential transparency by means of the notions of purely referential *position* and purely referential *occurrence* of a singular term. He explains that '[o]ne and the same occurrence of a term may have purely referential position with respect to its immediate surroundings and not with respect to a broader context' [45, 144]. The substitutivity of identity is a criterion for a position's being purely referential. For positions in sentences, this criterion says that 'the containing sentence keeps its truth value when the contained singular term is supplanted by any other having the same reference'; for positions in singular terms, this criterion says that 'the containing singular term keeps its reference

when the contained singular term is so supplanted' [45, 143]. In the case of a position in a sentence, Quine considers substitutivity of identity a necessary condition for the singular term's being used in the sentence 'purely to specify its object' [45, 142].

The discussion of referential opacity in the present section follows Dagfinn Føllesdal's exposition [83]. Besides Quine's notion of *referential* opacity, which has to do with individual variable positions in sentences and singular terms, Føllesdal defines a notion of *extensional* opacity [83, 3-5].³ On Føllesdal's account, referential and extensional opacity can be truly predicated only of constructions.⁴

The definition of opacity starts by characterization of the notion of *referential position of a singular term*. The following characterizations are to be understood as giving criteria (sufficient conditions) for the application of the notions characterized. In connection with these characterizations, it is convenient to think of the truth value of a closed sentence as the extension of that sentence. The word 'sentence' is in this connection used to cover both predicates and closed sentences.

- (9) a If a singular term a is substitutable in a singular term b *salva designatione* with a coreferential singular term, then the position of a in b is referential
- b If a singular term a is substitutable in a sentence S *salva extensione* with a coreferential singular term, then the position of a in S is referential.

The notion of *extensional position of a sentence* is characterized as follows:

- (10) a If a sentence S is substitutable in a singular term b *salva designatione* with a coextensional sentence, then the position of S in b is extensional
- b If a sentence S is substitutable in a sentence S' *salva extensione* with a coextensional sentence, then the position of S in S' is extensional.⁵

On the basis of these notions of referential position of a singular term and extensional position of a sentence, the notions of referential and extensional transparency are defined for constructions as follows:

³Føllesdal attributes the definition of extensional opacity to Quine too [83, 3, fn. 4]. According to Føllesdal, Quine used these notions in unpublished teaching material.

⁴Kazmi, on the other hand, gives a definition of referential opacity for individual variable positions first, and derives from this a definition of the referential opacity of constructions [105, 87].

⁵See [83, 3].

- (11) A construction φ is referentially/extensionally transparent if and only if for every expression e which may be an ingredient in expressions formed by applying φ : every position which is referential/extensional in e is referential/extensional in the expression which results from applying φ .⁶

The notions of referential opacity and extensional opacity of a construction are defined as follows:

- (12) A construction φ is referentially/extensionally opaque if and only if φ is not referentially/extensionally transparent.⁷

This definition of opacity picks out a subset of the set of all constructions in a first-order language. This subset may be empty, as in the case of classical first-order languages. In the criteria (9a)-(10b) on which the definition (12) of opacity rests, it is assumed that the singular terms succeed in referring. In so far as the above definition of extensional and referential opacity is meant to reflect Quine's terminology, definite descriptions as well as names qualify as singular terms.

Føllesdal considers the question which combinations of transparency and opacity are available in a first-order language [83, 132-134]. He gives the following results: (i) An extensionally transparent construction on sentences is referentially transparent; (ii) a referentially transparent construction on singular terms is extensionally transparent;⁸ (iii) if we treat all singular terms as descriptions, for example along the lines of Quine's method of elimination of singular terms (see section 5.3), then every extensionally transparent construction on singular terms is referentially transparent. As regards (iii), Føllesdal notes that the only way of obtaining an extensionally transparent but referentially opaque construction on singular terms is to assume a language which contains singular terms that are not treated as descriptions and that can flank the identity sign in true identity statements, but that do not obey the substitutivity of identity. Føllesdal then considers a prefabricated example, which he attributes to Quine, of such a language. However, he points out that no such language has ever been seriously proposed.

From the above considerations about the available combinations of extensional/referential transparency/opacity, Føllesdal concludes that only one case remains: referentially transparent constructions on sentences. If such constructions could be shown to be extensionally transparent, there would be no need to

⁶See [83, 5].

⁷See [83, 5].

⁸Føllesdal does not give the proof for (ii), but indicates a way it is obtainable from the proof of (i).

distinguish between referential and extensional opacity – these would coincide. However, he thinks that there are referentially transparent and extensionally opaque constructions, and that the constructions of quantified modal logic are among them. According to Føllesdal, this combination of transparency and opacity is a necessary condition for doing quantified modal logic, since it allows quantification into modal contexts but preserves modal distinctions.⁹ Føllesdal’s classification of modal contexts as referentially transparent is based on restricting the range of singular terms appealed to in the definition to what he calls *genuine singular terms*. (Føllesdal’s conception of genuine singular terms and the relevance of this conception for Quine’s critique of modal logic is discussed in section 3.1.1.) Quine does not impose this sort of restriction; he freely uses definite descriptions in demonstration of the referential opacity of a construction, as in the example (13)–(15) on page 25 below.

Quine calls the substitutivity *salva veritate* of coreferential singular terms a test for referential opacity of a sentential construction [43, 159]. He has also suggested another such test, namely the availability of the operation of binding a variable inside the construction by a quantifier that lies outside the construction. Quine says that referential opacity manifests itself in connection with variables of quantification as ‘unintended sense or nonsense’ when a variable inside an opaque construction is bound by an outside existential quantifier [43, 148]. According to him, this second kind of test is a ‘criterion having to do no longer with singular terms, but with the miscarriage of quantification’ [43, 149]. Quine considers these two criteria equivalent [17].¹⁰ However, when the legitimacy of quantification into a referentially opaque construction is at issue, the latter criterion simply begs the question. In discussing the legitimacy or intelligibility of having a free variable inside a referentially opaque construction, the former criterion is clearly more useful.

Quine adheres to the following thesis, which is sometimes called *Quine’s Thesis*¹¹ [45, 166]:

⁹See [83, 10, 134]. In the version of Føllesdal’s dissertation published in 1966, the relevant passage appears on p. 15. (See Føllesdal, Dagfinn: *Referential Opacity and Modal Logic* Universitets-førlaget, Oslo 1966.) In the 2004 edition, the changes made to the original text of the dissertation for the 1966 edition are included in an addendum.

¹⁰The quantification-based criterion mentioned also by Føllesdal, who says that there is no evidence that these criteria would not be equivalent [83, 6-7].

¹¹See e.g. [105], [85]. Forbes formulates Quine’s Thesis as saying that a position which resists substitutivity of identity cannot meaningfully be quantified. Since such a position is a non-referential one, and since an occurrence of an expression is always in a referential position with respect to itself, according to the definition (12) of referential opacity Forbes’ formulation amounts to (QT). (Forbes himself wants to avoid the term ‘referential opacity’, since he thinks

(QT) No variable inside a referentially opaque construction is bound by an operator outside the construction.

In short, (QT) says that one cannot quantify into a referentially opaque construction. According to Quine, when a variable ' x ' stands inside a referentially opaque construction and a quantifier ' $\forall x$ ' or ' $\exists x$ ' outside the construction,

the attitude to take is simply that that occurrence of ' x ' is then not bound by that occurrence of the quantifier. An example is the last occurrence of ' x ' in:

(1) $\exists x(x \text{ is writing } 'x > 9')$. [45, 166]

Changing the first two occurrences of ' x ' into ' y ' in (1) of the above quotation does not amount to a change in the truth condition of (1), but a corresponding substitution with respect to the last occurrence of ' x ' does. Quotation is an example of a referentially opaque construction, and an attempt at quantification into quotation marks from the outside produces unintended sense or nonsense. The last occurrence of ' x ' in (1) is simply not bound by the preceding quantifier ' $\exists x$ '. That occurrence of ' x ' is not a quantifiable variable at all but occurs simply as part of a name of a string of characters. In the case of quotation the inadmissibility of quantification is fairly obvious, and Quine suggests that we treat quantification into all referentially opaque constructions in a similar way.

Whether (QT) is true or not, or whether Quine's arguments for it are acceptable, will not be discussed in the present work. However, I will need to refer to (QT), and to Quine's attitude towards quantification into quotation, in my discussion of other commentators' reconstructions of Quine's critique of quantified modal logic in section 2.4.

According to Quine's substitutivity criterion for referential opacity, the modal operator 'necessarily', or ' \Box ', is a referentially opaque construction. As already mentioned, Quine allows the use of definite descriptions as singular terms in testing for opacity. In the case of modal contexts, referential opacity can be demonstrated by a simple example [43, 143]. The truth of

(13) $9 = \text{the number of planets}$

can be used to turn the true sentence

(14) $\Box(9 > 7)$

that the metaphor of opacity is not apt for every account of the mechanism at work in relevant cases of failure of substitutivity.) Kazmi's formulation of Quine's Thesis explicitly concerns opaque constructions.

into the false sentence

(15) $\Box(\text{the number of planets} > 7)$

by substitution of 'the number of planets' for '9'. In 'Reference and Modality', Quine uses this example to show the referential opacity of modal contexts only in the case where the notion of necessity is understood as the notion of analyticity. Thus, with this example Quine attempts to show the referential opacity of a first-grade notion of necessity which can be construed as a metalinguistic predicate, namely, the predicate ' x is analytic'. In this case, referential opacity is to be expected since the apparent occurrence of the term '9' in

(16) ' $9 > 7$ ' is analytic

is regarded as merely an orthographic accident that appears as a part of a name of a string of characters, as explained in section 2.1.

Quine's example of (13)-(15) is based on the use of definite descriptions as singular terms. The use of definite descriptions in this context is criticized by Smullyan [128]. Smullyan discusses Quine's 1943 paper 'Notes on Existence and Necessity' in which this example also appears [1, 119-121]. He argues that Quine's example does not show that modal logic involves the repudiation of Leibniz's principle, namely, the principle that if x and y are identical, then y has every property that x has [128, 31-34]. Smullyan's point was that in modal contexts, the scope of incomplete symbols such as class abstracts and definite descriptions affects truth value. He refers to theorem *14.3 of *Principia Mathematica* [134, 185], which asserts the indifference of the scope of a description in truth-functional contexts [128, 33]. At first, Quine failed to appreciate Smullyan's point about the restriction, in *Principia*, of theorem *14.3 to truth-functional contexts. In the 1980 edition of *From a Logical Point of View* Quine admits he was wrong in accusing Smullyan of propounding an alteration of Russell's logic of descriptions. Smullyan's critique of Quine's example is discussed by Stephen Neale, who explains its significance as follows:

Smullyan does *not* claim that substitutivity is restored by appealing to the scopes of descriptions. His position is that on Russell's account (i) descriptions are not singular terms and so do not appear in primitive notation, and (ii) the false reading of ['Necessarily the number of planets in our solar system > 7 '], viz. ['Necessarily $\exists x(\forall y(Py \leftrightarrow y = x) \wedge (x > 7))$ '], cannot be derived from 'necessarily $9 > 7$ ' [(14)] and ' $9 = \text{the number of planets}$ ' [(13)]. The putative existence and truth (cf. Smullyan) or unintelligibility (cf. Quine) of

$[\exists x(\forall y(Py \leftrightarrow y = x) \wedge \text{necessarily } (x > 7))]$ is completely irrelevant to *this* point. [119, 246]

The focus of the present study is on Quine's argument against the intelligibility of quantified modal logic. As Neale notes, Smullyan's point about scope distinctions and Quine's use of the substitutivity of identity in the inference from (13) and (14) to (15) is in itself powerless to counter Quine's argument against quantified modal logic. Smullyan's response only concerns the legitimacy of Quine's inference from (13) and (14) to (15).¹² As already noted, Quine's example only concerns necessity understood as analyticity. In the present study, Quine's argument against quantified modal logic is interpreted as an argument directed against a non-linguistic or metaphysical notion of necessity which cannot be construed as a metalinguistic predicate and thus cannot be accommodated into the first grade of modal involvement. That argument, discussed in section 2.5.2, does not depend on the use of definite descriptions or singular terms, nor on the notion of referential opacity. In the next section, I will look at another argument Quine presents, one which concerns the availability of the combination of opacity and transparency which Føllesdal considers a necessary condition for quantified modal logic.

2.3 Quine's Argument Concerning Transparency and Opacity

The main focus of this study is on Quine's argument which is directed at quantified modal logic of necessity. That argument will be discussed in section 2.5.2. Quine also has an argument with a more general aim, an argument which concerns the availability of the very combination of opacity and transparency which Føllesdal sees as a necessary condition for doing quantified modal logic. Unlike Quine's argument directed specifically at the logic of necessity, this more general argument concerns any logic which contains operators that purportedly produce extensionally opaque and referentially transparent contexts.

In the essay 'Three Grades of Modal Involvement',¹³ Quine presents an argument designed to show that

[g]enuine violation of the extensionality policy, by admitting non-truth-functional occurrences of statements within statements *without* referential opacity, is less easy than one first supposes. [11, 163]

¹²See also [72, 99].

¹³See [11, 163-164]. See also [43, 159].

The purpose of Quine's argument is to show that any construction ψ which is referentially transparent is also truth-functional, as long as logically equivalent formulas are interchangeable *salva veritate* in the scope of ψ (the 'logic' in the notion of logical equivalence in this argument involves set theory, too)¹⁴. The argument runs as follows:

- (17) Let ψ be a referentially transparent construction such that it allows interchange by logical equivalence (in this respect, ψ resembles ' \Box ')
 - (18) Let p be a closed sentence
 - (19) Let $\psi(p)$ be true
 - (20) $\{x|x = \emptyset \wedge p\}$ is \emptyset or $\{\emptyset\}$, depending on whether p is false or true, respectively
 - (21) ' $\{x|x = \emptyset \wedge p\} = \{\emptyset\}$ ' is logically equivalent to p
 - (22) Thus, $\psi(\{x|x = \emptyset \wedge p\} = \{\emptyset\})$
 - (23) Let q be any statement that has the same truth-value as p
 - (24) $\{x|x = \emptyset \wedge p\} = \{x|x = \emptyset \wedge q\}$
 - (25) $\psi(\{x|x = \emptyset \wedge q\} = \{\emptyset\})$
 - (26) ' $\{x|x = \emptyset \wedge q\} = \{\emptyset\}$ ' is logically equivalent to q
 - (27) Logical equivalents are interchangeable in the scope of ψ ; so, $\psi(q)$.

In the premisses (17)-(19) of this argument, it is not assumed that ψ is truth-functional – only that logically equivalent formulas are interchangeable in its scope. What the argument shows is that given the referential transparency of ψ , any closed sentence which coincides with p in truth value is interchangeable with p . Thus, ψ turns out to be truth-functional, thus extensionally transparent, after all.

Neale reconstructs an argument concerning belief constructions that Quine presents in *Word and Object* [45, 148-149] as a general argument to the same purpose as the one just presented [119, 267-270]. Neale's reconstruction does not

¹⁴In 'Reference and Modality', where this argument appears in a very similar form, Quine explicitly represents it as depending on the assumption that 'the logic of classes' is at hand.

require set theory and is on this account perhaps preferable to Quine's argument (17)-(27).¹⁵ The proof is based on defining the notation ' δp ' as short for the description 'the number x such that $((x = 1) \wedge p) \vee ((x = 0) \wedge \neg p)$ '. The proof shows how an allegedly non-truth-functional sentence connective ' \bullet ' in whose scope descriptions are substitutable like singular terms is a truth-functional connective after all. The proof goes as follows:

- (28) $p \leftrightarrow q$ (premiss)
- (29) $\bullet p$ (premiss)
- (30) $\bullet(\delta p = 1)$ (29, logical equivalence of p and ' $\delta p = 1$ ')
 - (31) $\delta p = \delta q$ (28, definition of ' δ ')
 - (32) $\bullet(\delta q = 1)$ (30, 31, ι -subs)
 - (33) $\bullet q$ (32, logical equivalence of q and ' $\delta q = 1$ ').

The rule of inference Neales calls ' ι -subs' [119, 263] licenses a substitution between definite descriptions or between a definite description and a singular term on the basis of sentences of the form $\iota x\phi = \iota x\psi$ or $\iota x\phi = \alpha$, where α is a singular term.

Neale shows that if definite descriptions are construed as Russellian, namely, as quantificational expressions and not as singular terms, then the logical equivalences appealed to in (30) and (33) hold, and the proof is valid; however, the rule appealed to in (32) has to be ι -subs; it cannot be a rule concerning the substitutivity of primitive-notation singular terms. When definite descriptions are treated as Russellian, as Quine does, this proof shows that there cannot be a connective such as ' \bullet ' in whose scope logical but not material equivalents would be interchangeable and ι -subs would be applicable. The proof shows that such a connective is bound to be a truth-functional one.¹⁶ Neale notes that it is unlikely that 'today's modal logician, who works with Kripke's metaphysical modality' would be troubled by this argument [119, 269]. If descriptions are

¹⁵As far as I understand, the use of the numerals '0' and '1' in the proof as singular terms is not essential – they can be replaced with free variables.

¹⁶Neale also discusses several non-Russellian approaches to definite descriptions in connection with the argument, and concludes that on some of these the argument goes through with the rule mentioned on line (32) being one of substitutivity of singular terms. However, Neale also points out that these non-Russellian approaches have other drawbacks as accounts of definite descriptions [119, 275-283].

treated in the Russellian way, the argument fails in proving the result which could potentially startle the contemporary modal logician: the unavailability of a sentence connective that allows substitutivity by logical, but not by material, equivalence and substitutivity of identity for *singular terms* as distinguished from descriptions. Neale points out that it is this combination of features that most modal logicians seem to want to ascribe to the necessity operator.

Neale shows that Quine’s general argument concerning the existence of extensionally opaque and referentially transparent constructions only proves that the combination of extensional opacity (admitting interchangeability of logical equivalents) and the \neg -subs rule is not available. Once a semantic distinction between descriptions and singular terms is made, as is customary in contemporary discussion, this argument seems insufficient to show the unavailability of extensionally opaque and referentially transparent constructions, such as those of quantified modal logic.

2.4 Reconstructing Quine’s Critique of Quantified Modal Logic

2.4.1 Opacity, Quine’s Thesis and Quine’s Critique

In this work, I follow Føllesdal in representing Quine’s argument for the unintelligibility of quantified modal logic in a form that does not depend on descriptions or singular terms. Quine presents the argument I focus on in section 2.5.2 as establishing the meaninglessness of open sentences in the scope of a modal operator, and he deliberately formulates the argument so as to avoid dependence on descriptions or singular terms.

An alternative way of representing Quine’s argument concerning the unintelligibility of quantified modal logic has also been proposed. This alternative construal makes Quine’s argument dependent on the use of singular terms. This dependence stems from the representation of Quine’s argument concerning quantified modal logic as based on (QT). Some commentators¹⁷ represent Quine’s argument for (QT) as depending on the use of singular terms. As explained in the previous section, Quine thinks that referential opacity can be equivalently characterized in terms of failure of substitutivity of coreferential singular terms (that is, in terms of the notion of (non)referential position), or in terms of mis-carriage of quantification. However, (QT) has also been seen as the result of an

¹⁷See e.g. [104], [105], [123].

argument, perhaps even a *proof*, that quantification into constructions already classified as opaque according to the substitutivity criterion, is inadmissible.

Greg Ray represents Quine's argument for the unintelligibility of quantified modal logic as dependent on (QT) [123]. Ray finds in Quine's writings an argument for (QT),¹⁸ which he considers valid. According to Ray, Quine's 'master argument on *de re* modality' is an argument which proves that quantification into modal contexts makes no sense. Ray presents Quine's argument as dependent on the use of singular terms. He calls the set of singular terms used in giving Quine's master argument the set of 's-terms'. According to Ray, we can formulate different variations of Quine's master argument for different purposes by varying the set of terms admitted as s-terms. The argument¹⁹ begins by a proof that modal contexts are referentially opaque. Ray defines referential opacity via the notion of a purely designative occurrence of a singular term.²⁰ In his definition of a purely designative occurrence, Ray utilizes the notion of an open sentence expressing a property. In Ray's terminology, an open sentence Φx expresses a property if and only if Φx has a definite extension, that is, there is 'a determinate fact of the matter whether an object *per se* does or does not satisfy Φx '. The occurrence of an s-term or variable α in $\Phi\alpha$ is purely designative if and only if for any s-term γ , $\Phi\gamma$ is true if and only if the denotatum of γ has the property expressed by Φx . Given this definition of a purely designative occurrence, modal contexts are said to be referentially transparent if and only if for every formula Φ , if an occurrence of a constant or a variable in Φ is purely designative, then that occurrence is purely designative also in $\Box\Phi$ and $\Diamond\Phi$. Modal contexts are said to be referentially opaque if and only if they are not transparent.

The proof of the referential opacity of modal contexts proceeds by showing that the contexts violate what Ray calls the restricted substitution principle, which says that if the occurrence of ' x ' in Φx is purely designative, then if

¹⁸Kaplan, too, reconstructs Quine's argument for (QT) in an explicitly deductive form [104, 234-235]. This reconstruction shows a fallacy that Kaplan finds in Quine's formulation of the argument. According to him, there is an unjustified shift in the course of the argument from talk about occurrences of singular terms to positions of singular terms. I need not go further into Kaplan's discussion of (QT) here. It should be noted that in his reply to Kaplan, Quine denies having attempted to prove the inadmissibility of quantification into opaque constructions *more geometrico*, as in Kaplan's reconstruction [17, 290].

¹⁹See [123, 350-355]. The numbering of the steps of the argument differs here from that of Ray's presentation.

²⁰For Quine's own characterization of the notion of purely designative occurrence, see [1, 144].

$\alpha = \beta$ and $\Phi\alpha$ are true²¹, $\Phi\beta$ is true.²² To prove the opacity of modal contexts, it remains to be shown that there are modal contexts in which substitution of co-referring s-terms does not preserve truth value. If such modal contexts are found, then we reach, by *modus tollens*, the conclusion that an occurrence of a variable in the s-term position under consideration is not purely designative. If, however, that occurrence of the variable is purely designative in the formula which lies in the scope of the modal operator, then we may conclude that modal contexts are referentially opaque. This is established by means of examples. Ray gives three different examples in this connection. The first and the third do not involve definite descriptions; the second example does. The first one involves two names '*H*' and '*P*':

(34) '*x*' is purely designative in '*H* is identical to *x*'

(35) '*H* = *P*' is true

(36) '*H* is necessarily identical to *H*' is true

(37) '*H* is necessarily identical to *P*' is false

Ray's second example is Quine's example (13)-(15) from section 2.2. The third example goes as follows: Assume a statue has been named '*Goliath*' and the lump of clay from which *Goliath* is formed is named '*Lump1*'.

(38) '*x*' is purely designative in '*x* is squeezed harmlessly (i.e. non-terminally) into a ball'

(39) '*Goliath* = *Lump1*' is true

(40) '*Lump1* could have been squeezed harmlessly into a ball' is true

(41) '*Goliath* could have been squeezed harmlessly into a ball' is false

The second step in Ray's reconstruction of Quine's master argument consists in establishing that quantification into referentially opaque contexts makes no

²¹ α and β are s-terms.

²²Ray gives a simple inference to the restricted substitution principle from 'two uncontroversial principles', namely, the principles that $\alpha = \beta$ is true if and only if the denotatum of α is identical to the denotatum of β and the 'property version of Leibniz' principle' which says that if a is identical to b , then for any property P , a has P if and only if b has P [123, 351-352].

sense. Ray gives a simple inference from the premise that $\exists x\Phi x$ is a meaningful existential sentence to the conclusion that the occurrence of ' x ' is purely designative in Φx [123, 352]. Since it has been shown by example that interchangeability of s-terms does not hold in modal contexts, there are occurrences of variables in modal contexts which are not purely designative. Thus, there are open sentences Φx in which a modal operator appears such that $\exists x\Phi x$ is not a meaningful existential sentence, and consequently quantification into modal contexts makes no sense.

Ray thinks that Quine's master argument is 'certainly valid' [123, 355]. According to Ray, his first and second examples work only against a reading of the necessity operator as expressing the notion of *analyticity*. Ray takes the target of Quine's master argument to be quantified modal logic with the necessity operator understood in this way, as expressing the notion of analyticity [123, 353, 355]. If the sentence mentioned in (37) is understood as involving a notion of *metaphysical* necessity, then (37) is controversial: Ray notes that there is considerable consensus among philosophers in favor of the thesis that true identity statements are metaphysically necessary [123, 353]. The failure of Ray's first example (34)-(37) against a metaphysical notion of necessity is based on the assumption that ' H ' and ' P ' are rigid designators. As regards the second example (13)-(15), in which definite descriptions are admitted as s-terms, Ray thinks that it too works in the case of necessity understood as analyticity, but not in the case of metaphysical necessity. However, he thinks that the second example is less secure than the first one.²³

Assuming that ' H ' and ' P ' in Ray's first example represent the terms 'Hesperus' and 'Phosphorus', this example can be seen as a version Quine's example involving the terms 'the Evening Star' and 'the Morning Star' in the essay 'Reference and Modality' [43, 143-144]. On the basis of the statement

(42) The Evening Star = the Morning Star

Quine demonstrates the referential opacity of the necessity operator: substitution of 'the Morning Star' for one of the occurrences of 'the Evening Star' in (43) on the basis of (42) turns the true sentence

²³One reason for this is that while the sentence 'The number of planets is necessarily greater than 7' (which is one of the natural-language readings of (15)) is not analytic, in order for this example to work one must assume that '9 is greater than 7' *is* analytic, which is not uncontroversial. But, if the relevant notion is metaphysical necessity, the statement 'The number of planets is necessarily greater than 7' is false' is not justified, according to Ray [123, 353]. Scope distinctions seem to make a difference here if the relevant notion is that of metaphysical necessity, but not if it is that of necessity as analyticity.

- (43) Necessarily if there is life on the Evening Star then there is life on the Evening Star

into a falsehood. Quine's demonstration of referential opacity in this connection is explicitly directed at necessity understood as analyticity, and Ray points out that the example Quine uses would not work in the case of metaphysical necessity because it begs the question about the status of 'the Morning Star' and 'the Evening Star' as rigid designators.

According to Ray, his third example (38)-(41) is the one that applies to metaphysical necessity. Quine does not give this example in his writings, but Ray nevertheless considers it Quinean [123, 356]. In a response to Ray, Quine expresses his dissatisfaction with Ray's third example (38)-(41) [39, 428]. Quine considers this example unproblematic from the point of view of his four-dimensional conception of physical objects as blocks of space-time. As four-dimensional physical objects, Goliath and Lump1 are not identical. Goliath, being a statue, is a proper part of the four-dimensional object Lump1. So Quine would reject (39). From Quine's point of view Ray's third example does not work.

The non-descriptivist theory of singular reference, which underlies Ray's claim that the first example (34)-(37) fails in demonstrating referential opacity in the case of metaphysical necessity, will be discussed in sections 3.1.1-3.1.3. In those sections, I explain how the non-descriptivist theory has been used in constructing an answer to Quine's critique of quantified modal logic in the form that I propose to construe this critique in section 2.5.2 of the present study. However, my construal of what I take to be Quine's master argument against quantified modal logic differs from Ray's reconstruction. For one thing, I do not see Quine's argument as depending on (QT) and the notion of referential opacity. I have already noted that Ray thinks that Quine's argument against quantified modal logic is *not* directed at modal logic with the necessity operator understood as expressing the notion of metaphysical necessity. Ray sees quantified modal logic with the necessity operator understood as expressing analyticity as the real target of Quine's critique: as he points out, Quine's most secure demonstration of referential opacity works in the case of necessity as analyticity but not in the case of metaphysical necessity. Ray gives his third example (38)-(41) as part of a Quinean – but not Quine's – critique of metaphysical necessity. In the next section, I take up the fundamental interpretive question what kind of notion of necessity really is the target of Quine's critique of quantified modal logic.

2.4.2 Necessity, Analyticity and Quantified Modal Logic

Quine's view on the three grades of modal involvement was explained in section 2.1. First-grade readings of ' \Box ' may include such predicates as ' x is logically valid' or ' x is analytic'. In 'Reference and Modality', Quine discusses the notion of necessity involved in C.I. Lewis' idea of strict implication [43, 143]. In his book *Symbolic Logic*, co-authored with C.H. Langford, Lewis defines strict implication by means of the primitive notion of possibility (\Diamond) [111, 124]: ' p strictly implies q ' is written in the primitive notation as

$$(44) \neg\Diamond(p \wedge \neg q).$$

Using propositional logic and the definitional equivalence between $\neg\Diamond A$ and $\Box\neg A$, (44) can be converted into

$$(45) \Box(p \rightarrow q).^{24}$$

Concerning the notion of necessity involved in Lewis' modal logic, Quine says:

The general idea of strict modalities is based on the putative notion of *analyticity* as follows: a statement of the form 'Necessarily ...' is true if and only if the component statement which 'necessarily' governs is analytic, and a statement of the form 'Possibly ...' is false if and only if the negation of the component statement which 'Possibly' governs is analytic. [43, 143]

On this construal of the Lewisian strict modalities, Quine thinks that sentences like '9 is necessarily greater than 7' ((14) of section 2.2) can be understood in terms of the first grade of modal involvement. (14) can be construed as

$$(16) '9 > 7' \text{ is analytic.}$$

In 'Three Grades of Modal Involvement' Quine gives five reasons why it is important to note that modal operators explained in terms of metalinguistic notions like analyticity can be represented as metalinguistic predicates [11, 168]. One of the reasons has to do with making explicit the difficulties involved in iteration of the modal operator (see section 2.1). Another reason is that the metalinguistic construal makes the referential opacity of the ' \Box '-construction explicit. Quotation is, according to Quine, the referentially opaque context *par excellence* [11, 161]. Quotation names the string of characters quoted.²⁵ As already noted,

²⁴See also [11, 166].

²⁵For Quine's account of the ontology of expressions as strings (sequences) of characters, see for example [30, 95-96]. A character type is the set of its tokens.

spelling is another way of forming names of strings of characters. Unlike a name formed by spelling, a quotation may have a 'deceptively systematic air which tempts us to think of its parts as somehow logically germane' [11, 161]. In (16), there is no occurrence of the expression '9' at all, only an orthographic accident of the appearance of the character '9' in a name of a sentence. In the same vein, there is no occurrence of the sentence ' $9 > 7$ ' in (16). Quine thinks that it is salutary to paraphrase quotations away by spelling, since this prevents us from paying undue attention to orthographic accidents which are not really occurrences of the expressions they seem to be.

A further reason is connected to the previous one, and has to do with quantification. According to Quine, quantification into a modal context is precluded when the modal operators are given a metalinguistic reading. Replacing the string of letters 'Cicero' with a variable in the sentence 'Cicero contains six letters', we come up with the false sentence ' x contains six letters', in other words, 'The 24th letter of the alphabet contains six letters'. The occurrence of ' x ' within quotation marks in the sentence ' $\exists x(x$ contains six letters)' is, according to Quine, 'as irrelevant to the quantifier that precedes it as is the occurrence of the same letter in the context 'six' [43, 147]. No character which occurs as an orthographic accident in a specification of a sequence of characters (for example, in a quotation) has anything to do with a quantifier occurring outside the specification [24, 70]. Performing existential generalization on the position of '9' in (16) results in a sentence with a vacuous quantifier:

(46) $\exists x(x > 7$ is analytic).

There is no occurrence of a free variable ' x ' in ' $x > 7$ '; the occurrence of ' x ' is just an orthographic accident which could be eliminated for example by referring to the string of characters by spelling. As explained in section 2.1, in the third grade of modal involvement ' \Box ' is an object-language operator which may attach to open and closed sentences to form further sentences. According to Quine, this kind of third-grade use of the necessity operator is incompatible with the explanation of that operator in metalinguistic terms, for example as expressing the semantic predicate of analyticity. From his consideration of cases like (46), Quine draws the following conclusion:

In a word, necessity as sentence operator does not go over into terms of necessity as semantical predicate. [11, 172]

When the necessity operator is explained in terms of a metalinguistic predicate such as logical validity or analyticity, binding a variable in the scope of a modal

operator by a quantifier outside that scope is vacuous – just like a quantifier prefixed to a closed sentence [11, 172]. When the necessity operator is given a first-grade reading, say in terms of the predicate ' x is analytic', all uses of the operator are assumed to be paraphrasable into metalinguistic predications. It is easy to illustrate how quantification into modal contexts precludes explanation of the modal operator in terms of a metalinguistic predicate like that of analyticity. For example, a sentence of the form

$$(47) \exists x(Fx \wedge \Box Gx)$$

cannot be paraphrased into a metalinguistic predication of analyticity – the last occurrence of x as a bound variable would simply be lost in such paraphrase.

In 'Intensions Revisited', Quine applies his idea of *multigrade predicate* to the necessity operator [31, 113-116]. A predicate's being multigrade means that it can have different arities. (Quine notes that the introduction of multigrade predicates does not involve an assumption of infinite lexicon: a multigrade predicate can be understood as a one-place predicate whose arguments are sequences.) Quine introduces the predicate 'Nec' as a multigrade predicate which can be used to give a metalinguistic explanation of certain suitable uses of ' \Box '. By using 'Nec', the terms '9' and '7' can be brought out of the quotation marks in (5):

$$(48) \text{Nec}(' > ', 9, 7).$$

(48) is to be read as "is greater than' is necessarily true of 9 and 7." This reading makes it possible to have variables in the positions of '9' and '7' in (48) without the occurrence of the metalinguistically explained necessity operator canceling their status as variables. The variable ' x ' can be substituted for '9' in (48):

$$(49) \text{Nec}(' > ', x, 7).$$

In (49), quotation marks do not obstruct quantification. By means of the multigrade predicate 'Nec' it can be asserted that there is an object which is necessarily greater than seven:

$$(50) \exists x \text{Nec}(' > ', x, 7).$$

The conversion of modal contexts into the form of a metalinguistic predication of the multigrade 'Nec' works only in the case of certain suitable uses of ' \Box ', as in the conversion of (14) of section 2.2 into (48). The conversion does not work in case of sentences like

(51) $\exists x(x \text{ is odd} \wedge \Box(x > 7))$

since it would result in a sentence that mixes the metalanguage with the object language, namely

(52) $\exists x(x \text{ is odd} \wedge \text{Nec}(' > ', x, 7))$.

The expedient of converting sentences involving ' \Box ' into metalinguistic predications of ' Nec ' works only in cases in which the resulting sentence can be taken as a sentence of the metalanguage. These are sentences in which the necessity operator is the main operator of a sentence which is at most embedded in a construction consisting only of prefixed quantifiers which can be interpreted as *metalanguage* quantifiers. If the necessity operator occurs in a sentence that is embedded in further constructions, as in (51), the conversion is not applicable.

Neale construes Quine's critique of quantified modal logic as targeting modal logic with the necessity operator understood as expressing the notion of analyticity [119, 302-303]. Neale thinks that the idea of *analytic satisfaction* is not incoherent. For example, open sentences of the form $Fx \rightarrow Fx$ are true of everything – moreover 'surely they are *analytically* true of everything (by virtue of being *logically* true of everything)' [119, 302-303]. According to Neale, in the case of logically valid open sentences it is intelligible to say that they are analytically true of an object. Neale construes Quine's critique of quantified modal logic as concerning the case of *atomic* open sentences: what is it for an atomic open sentence to be analytically true of an object? (As one problematic example, Neale gives the open sentence ' $x = \text{Phosphorus}$ ' [119, 303].) Assuming ' Fx ' is an atomic open sentence and a an object, Neale sees Quine asking the question what it means to say that ' Fx ' is analytically true of a , or, in other words, that a is F analytically.

In 'The Problem of Interpreting Modal Logic', which is the essay Neale is discussing²⁶ when he gives the above construal of Quine's critique of quantified modal logic, Quine does not express his critique the way Neale explains. The phrase 'analytically true of', or the related notion of analytic satisfaction, does not appear in that essay. With his idea of the metalinguistic multigrade predicate ' Nec ', Quine might at first sight seem to allow for a reading of the suitable occurrences of ' \Box ' as occurrences of a multigrade analyticity predicate which would be capable of expressing a notion of analytic satisfaction (or of being analytically true of). However, Quine does not discuss the possibility of construing ' Nec ' as a multigrade predicate of analyticity.

²⁶In part II of his paper, where the above construal of Quine's critique of quantified modal logic appears, Neale is proceeding chronologically, treating a year at a time.

Analyticity, as Quine understands it, is a one-place metalinguistic predicate which is true of object-language sentences, if anything. On this conception of analyticity, it makes no sense to say that an open sentence of the object language is analytically *true of* an object (or a sequence of objects) in the domain of discourse of the object language. Surely, given an analyticity predicate for sentences, one may easily define the notion 'a sequence s analytically satisfies A ' as simply another way of saying that the sentence A is analytic. But such a notion of analytic satisfaction would be trivial – it would only provide an alternative way of saying that a sentence of the object language is analytic. The notion of analyticity does not yield to a usage where an object is said to have some of its traits analytically. As Quine points out, if the necessity operator were explained in terms of analyticity, for example ' $\Box(x > 5)$ ' would be *trivially false* 'at least pending deliberate extension of usage' of the notion of analyticity [11, 172]. For Quine, analyticity means truth of a sentence solely in virtue of the meanings of expressions; an extension of this usage to attributions of analyticity somehow to satisfaction of open sentences by objects in the domain of discourse would simply amount to a deliberate change in what one means by 'analyticity' and 'is analytic'. In the context of his critique of quantified modal logic, Quine nowhere discusses the notion of analytic satisfaction (or the notion of being analytically true of). This is because the sort of metalinguistic predicates (validity and analyticity) in terms of which he sees the first-grade modal operator construed in 'Three Grades of Modal Involvement' do not admit of a multigrade reading – they are one-place metalinguistic predicates.

Even if the notion of analyticity were extended into a multigrade predicate, as Neale does, I do not see why the relation 'a sequence s analytically satisfies A ' would present a problem for *intelligibility* in the case A is an atomic open sentence. Just as ' s analytically satisfies A ' is assumed to be *true* when A is a logically valid sentence (for example, of the form $Fx \rightarrow Fx$), it may as well be assumed to be *false* (and not unintelligible) when A is an atomic open sentence (other than ' $x = x$ ' perhaps).

Neale thinks that Quine 'appears to have seen' that the problem concerning the interpretation of formulas of quantified modal logic can be avoided if the necessity operator is taken to express a metaphysical notion (instead of a metalinguistic notion like analyticity). Neale connects Quine's appreciation of the possibility of reverting to a metaphysical notion of necessity to his talk of Aristotelian essentialism. Neale summarizes his view of this aspect of Quine's discussion of modal logic:

Once Quine's remarks about essentialism are stripped of certain confusions, his basic position is correct and amounts to the following: (i) substitutivity and quantification fail where strict necessity is concerned because the notion of necessity in question is linguistic; (ii) restoring substitutivity and quantification requires construing modal operators such a way that objects themselves – rather than objects relative to modes of specifying them – have traits necessarily or contingently; and (iii) this means moving from a linguistic to a *metaphysical* construal. [119, 338, fn. 81]

In this statement, Neale does not specify what he sees as Quine's confusions about essentialism. He construes Quine's position as being that once we recognize a metaphysical reading of the necessity operator (necessity attaching to objects and their traits, independently of language), it becomes legitimate to quantify into modal contexts. Thus, Neale thinks that Quine does not challenge the intelligibility of quantified modal logic with a metaphysical reading of the necessity operator; Quine's argument that quantified modal logic is devoid of sense is directed only at modal logic with the necessity operator understood as expressing analyticity. In 'Reference and Modality', Quine states that a reading of the necessity operator in terms of analyticity can pretend to distinguish essential (that is, necessary) and accidental traits of an object only relative to how the object is specified, not absolutely [43, 155]. This point is further discussed and developed in section 2.5.1, where I explain how it fits with Quine's conception of necessity-as-analyticity as a one-place metalinguistic predicate. The view which Quine calls Aristotelian essentialism (see section 2.5.2), that some traits of an object may be essential and some accidental to the object irrespective of how the object is specified, is required in quantified modal logic: whether an object satisfies or does not satisfy a predicate of the form $\Box Fx$ cannot be relative to how the object happens to get linguistically picked out.

In 'Three Grades of Modal Involvement' Quine makes it clear that (i) the necessity operator as a sentential operator applicable to open sentences does not go over into a metalinguistic predicate of the kind he discusses (validity or analyticity) and (ii) Aristotelian essentialism (and the non-linguistic notion of necessity it involves) is simply a *consequence* of quantified modal logic [11, 175], not an option that one may, but need not, embrace in quantified modal logic. Quine's whole discussion of the third grade of modal involvement in that essay is based on the idea that the necessity operator in quantificational use expresses a notion of necessity which pertains to objects' being necessarily thus-or-so, independently of how they are linguistically specified. This is why he

says, for example, that one effect of the notion of necessity in quantificational application is that objects come to be necessarily identical if identical at all. (This point is, of course, widely accepted among modal logicians working with a metaphysical notion of necessity.) As far as I understand, Føllesdal embraces this interpretation of Quine's view of quantified modal logic when he writes:

Quine's basic point, early and late, is that quantified modal logic requires necessity to reside in things and not in the way in which we talk about things. (See e.g. the last paragraph of "Three Grades of Modal Involvement".) This is the key feature of what Quine calls essentialism[.]²⁷

Ray and Neale both offer a reconstruction of Quine's argument against quantified modal logic. Both see Quine's critique as targeted against modal logic with the necessity operator understood as expressing analyticity, not as expressing metaphysical necessity. In this section, I have been arguing against this interpretation of Quine's critique. In this study, I follow Føllesdal in interpreting Quine as arguing against quantified modal logic with the necessity operator understood as expressing metaphysical (non-linguistic) necessity. Quine's critique of quantified modal logic is in the present study understood as a challenge to the intelligibility of the non-linguistic, or metaphysical, notion of necessity involved in quantified modal logic and of the doctrine of Aristotelian essentialism, which Quine sees a consequence of quantified modal logic. To end this section with straightforward textual evidence in favor of my interpretation of Quine, I cite a passage where he first states his view that the champion of quantified modal logic is committed to Aristotelian essentialism, and then goes on to state that neither Aristotelian essentialism nor the metaphysical notion of necessity make sense to him:

My logical point about essentialism was that he who accepts quantification into modal contexts as making good sense should not balk at essentialism [...]. If you are going to take the one you must take the other. That was not an argument against essentialism. But it happens further that I do not myself make sense of essentialism, or of metaphysical necessity. [20]

²⁷[81, 104]. (Footnote omitted.)

2.5 Necessity and Essence

In the previous section I mentioned Quine's view that the appeal to analyticity in explanation of the necessity operator can pretend to distinguish essential and accidental traits of an object only relative to how the object is specified, not absolutely [43, 155]. Quine thinks that this sort of relativity to language is not compatible with quantification into modal contexts. He sees quantified modal logic as involving a notion of necessity that is not in this way language-relative. On Quine's view, quantified modal logic is intended to provide a way of stating that an object has certain traits necessarily and certain others contingently, independently of how the object happens to be linguistically specified. The connection between the notions of necessity and essence comes from the reading of a formula of the form $\Box Fx$ as saying that x is essentially F , or that the trait F is of x 's essence [31, 114].

Quine argues that the non-language-relative notion of necessity required by quantified modal logic makes no sense. His argument to this effect is explained in section 2.5.2. However, Quine says he does make sense of necessity as a context-relative notion. In the next section, I will develop a Quinean account of context-relative necessity. This context-relative notion is meant to cover also the use of the notion of necessity as 'an expository guide', a use which Quine accepts. The context-relative notion is a metalinguistic one, capturing a gradualistic semantic-epistemological trait of sentences. Although my development of the context-relative notion of necessity is based on Quine's remarks on the issue, it is not found in Quine's writings.

2.5.1 Relative Necessity and Essence

In *Word and Object*, Quine attempts to evoke an 'appropriate sense of bewilderment' towards quantified modal logic with the following example of a mathematician-cyclist [45, 199-200]:

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? Just insofar as we are talking referentially of the object, with no special bias toward a background grouping of mathematicians as against cyclists or vice versa, there is no semblance of sense

in rating some of his attributes as necessary and others as contingent.
[45, 199]

The last sentence of this passage expresses Quine's attitude towards quantified modal logic: it makes no sense to say of a thing, independently of a descriptive background grouping of that thing, that some of its attributes are necessary and some contingent. However, Quine also says that it is 'conceivable' to say, for example, that a thing *as a cyclist* is necessarily two-legged.

In the passage quoted above, Quine's attempt to evoke bewilderment towards quantified modal logic is unsuccessful, as Barcan Marcus shows. The sentence 'Mathematicians are necessarily rational' may be formalized as

$$(53) \quad \forall x(Mx \rightarrow \Box Rx)$$

or as

$$(54) \quad \Box \forall x(Mx \rightarrow Rx)$$

or

$$(55) \quad \forall x \Box (Mx \rightarrow Rx).^{28}$$

Analogously, the sentence 'Cyclists are not necessarily rational' may be formalized as

$$(56) \quad \forall x(Cx \rightarrow \neg \Box Rx)$$

or as

$$(57) \quad \neg \Box \forall x(Cx \rightarrow Rx)$$

or

$$(58) \quad \neg \forall x \Box (Cx \rightarrow Rx).$$

The sentences 'Cyclists are necessarily two-legged' and 'Mathematicians are not necessarily two-legged' may be formalized in corresponding ways. Marcus notes that while formalizations like (53) and (56) make the premisses in Quine's example mutually inconsistent, this is not the case with formalizations like (54) (or (55)) and (57) (or (58)). The premiss that there is an individual who is both a mathematician and a cyclist, namely,

$$(59) \quad \exists x(Mx \wedge Cx),$$

²⁸See [115, 237-238], [116, 19-20].

yields the contradiction

$$(60) \exists x(\Box Rx \wedge \neg \Box Rx)$$

together with (53) and (56), but not with (54) (or (55)) and (57) (or (58)). Marcus considers the latter kind of formalizations more plausible. The crucial difference in this connection is that between sentences of the form of (53) and (56) on one hand and those of the form of (54), (55), (57) and (58) on the other. The difference between (54) and (57) on one hand and (55) and (58) on the other is not so important for this particular answer to Quine's mathematician-cyclist argument. Moreover, the latter difference is rendered vacuous by Marcus' assumption²⁹ of the Barcan Formula, namely the schema

$$(BF) \forall x \Box A \rightarrow \Box \forall x A.$$

The assumption of (BF) allows the inference from sentences of the form ' $\forall x \Box A$ ' to ' $\Box \forall x A$ '.³⁰ According to Marcus, Quine appears to be assuming that modal logic allows the inference from a sentence of the form $\Box(A \rightarrow B)$ to a sentence of the form $A \rightarrow \Box B$, whereas such an inference is not licensed in systems of modal logic. Marcus notes that this argument about the mathematician-cyclist does not resurface in Quine's writings after she had addressed it in a talk in 1962 (which is published as [116]) [115, 238].³¹

In section 2.1, I looked at Quine's way of construing certain uses of the necessity operator as metalinguistic predications. Assuming a notion of analyticity, the sentence 'Mathematicians are necessarily rational' may be written as

$$(61) \forall x(Mx \rightarrow Rx) \text{ is analytic,}$$

which accommodates (54) into the first grade of modal involvement. (61) might perhaps be based on a view that ' x is rational' is in some sense part of the

²⁹See [116, 9], [115, 238].

³⁰The Barcan Formula can also be given in the form ' $\Diamond \exists x A \rightarrow \exists x \Diamond A$ ' which is equivalent to (BF) (see e.g. [79, 108-109]). In her 1946 pioneer paper on quantified modal logic, Marcus assumes the Barcan Formula as an axiom schema in the form ' $\Diamond \exists x A \rightarrow \exists x \Diamond A$ ' (see [68, 2], axiom 11). (BF) is provable in first-order systems whose propositional base is a system that includes all formulas of the form ' $A \rightarrow \Box A$ ' (the so-called Brouwerian schema) (see e.g. [99, 246-247]). The Converse Barcan Formula (CBF) ' $\Box \forall x A \rightarrow \forall x \Box A$ ' is provable already in the first-order system based on the basic propositional system **K**. In first-order systems with free logic quantifier rules, neither (BF) nor (CBF) is provable (see [88, 248-250]). Semantically, (BF) and (CBF) correspond to the contracting domains (anti-monotonicity) and expanding domains (monotonicity) conditions, respectively (see [79, 110-114], [88, 252-253]; there are also first-order systems for which this correspondence does not hold, such as Garson's system **G** [87, 642-643]).

³¹See also [120, 158-159].

meaning of ' x is a mathematician'. On this view, ' x is a mathematician' would perhaps be seen as synonymous with some conjunction of predicates in which ' x is rational' is one conjunct. So, *relative* to a classification of an individual x as a mathematician, it is necessary that x is rational, because of the meaning-theoretic relation which is assumed to hold between these predicates of the object language. On the other hand, it might be held that

(62) ' $\forall x(Mx \rightarrow Tx)$ ' is not analytic

on the grounds that ' x is two-legged' is not part of the meaning of ' x is a mathematician' in the way ' x is rational' is. So, classifying an individual as a mathematician is not a sufficient reason for claiming that she is necessarily two-legged. However, examined as a cyclist, a mathematician may well appear to be necessarily two-legged, if one holds for example that

(63) ' $\forall x(Cx \rightarrow Tx)$ ' is analytic.

In the example of (61)–(63) necessity attaches only to a connection between the predicates ' Mx ' and ' Rx ' (and ' Cx ' and ' Tx '). The necessity of the sentence quoted in (61) is based on metalinguistic traits of the object-language expressions ' Mx ' and ' Rx ', in this case semantic or meaning-theoretic traits. This way of accounting for Quine's mathematician-cyclist example from *Word and Object* follows his own account of another example in the essay 'Reference and Modality' [43, 149]: We can specify the number nine by means of two predicates which are uniquely satisfied by that number,

(64) $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$

and

(65) there are exactly x planets.³²

(64) is a mathematical predicate. When the number nine is specified by means of (64), the context is likely to be that of a mathematical inquiry. (65), on the other hand, may perhaps be called an astronomical predicate. When the number nine is specified by means of (65), the context is likely to be that of an astronomical inquiry. In the essay 'Intensions Revisited', Quine states his view that necessity makes sense to him only relative to context, and describes this sort of context relative notion of necessity as follows:

³²At the time Quine wrote, Pluto was still classified as a planet instead of dwarf planet. For the sake of preserving Quine's original example, I assume throughout this study that 'there are exactly x planets' is uniquely satisfied by the number nine.

Relative to a particular inquiry, some predicates may play a more basic role than others, or may apply more fixedly; and these may be treated as essential. [...] [T]he very notion of necessity makes sense to me only relative to context. Typically it is applied to what is assumed in an inquiry, as against what has yet to transpire. [31, 121]

Analyzing the case of (64) and (65) in Quine's terms, the predicate ' $x > 7$ ' plays quite a basic role and applies quite fixedly to the object x when x is specified by means of (64). *Relative* to a specification of the number nine by this mathematical predicate, greatness than seven appears as a necessary (or essential) trait of that number. However, relative to a specification of the same number by (65), greatness than seven does not appear in the same way necessary. In short, relative to a mathematical context, suggested by (64), nine is necessarily greater than seven; relative to an astronomical context, suggested by (65), it is not.

Quine uses this example to show that necessary greatness than seven makes no sense as applied to an object (in this case a number) x [43, 149]. He takes the example to illustrate how necessity attaches only to the connection between the open sentence ' $x > 7$ ' and the particular method (64), as opposed to (65), of linguistically specifying x . As in the example about the mathematician-cyclist discussed above, necessity is based on metalinguistic traits of the open sentences (64) and ' $x > 7$ '. The underlying idea might be that ' $x > 7$ ' is in some sense part of the meaning of (64), but not of (65). This idea might perhaps be expressed by saying that

(66) ' $\forall x(x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x} \rightarrow x > 7)$ ' is analytic

and that

(67) ' $\forall x(\text{there are exactly } x \text{ planets} \rightarrow x > 7)$ ' is not analytic.

The Quinean moral to be extracted from these considerations is that the notion of an object's having a trait necessarily (essentially) makes sense only relative to a context or a background set by some descriptive classification of the object. Necessity expresses a metalinguistic relation between a predicate which an object is said to satisfy necessarily and the predicate(s) used in some descriptive specification of the object. As long as this metalinguistic nature is properly observed, one may say that an object is necessarily thus or so while explaining the notion of necessity in terms of analyticity. In this case the notion of

necessity is a first-grade, metalinguistic notion that applies to certain object-language sentences. This is the reasoning that lies behind Quine's statement, noted already in section 2.4.2, that the appeal to analyticity in explanation of the necessity operator can pretend to distinguish essential (necessary) and accidental (contingent) traits of an object only relative to how the object is specified, not absolutely [43, 155].

On Quine's holistic model of empirical content and the evidence relation, an account of relative necessity can perhaps be given in terms of the maxim of minimum mutilation as a principle of theory revision (see section 5.5), without appealing to the notion of analyticity. Rejecting

$$(68) \quad \forall x(x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x} \rightarrow x > 7)$$

would result in a massive redistribution of truth values across the totality of our theories, as is in general the case with sentences of pure mathematics and logic. Such a rejection would go against the maxim of minimum mutilation. To use Quine's metaphor of periphery and center, (68) is fairly centrally located in our theory of the world. On the other hand, the rejection of

$$(69) \quad \forall x(\text{there are exactly } x \text{ planets} \rightarrow x > 7)$$

would be easier to accommodate in this respect. A similar account can perhaps be given in the case of the sentences 'All mathematicians are rational' ($\forall x(Mx \rightarrow Rx)$) and 'All mathematicians are two-legged' ($\forall x(Mx \rightarrow Tx)$). It might be considered as quite a basic part of our theory of the world that mathematicians (at least actively practicing ones) are in some sense rational, whereas it is not at all so firmly held that all mathematicians are two-legged. Perhaps this account can be developed as a Quinean alternative to analyticity-based explanations of relative necessity like (61)-(62) and (66)-(67). However, unlike an analyticity-based account, this Quinean alternative has to be gradualistic. In terms of Quine's periphery-center metaphor, (68) should perhaps be considered very centrally located, even more so than $\forall x(Mx \rightarrow Rx)$, which in turn is perhaps more centrally located than (69).³³ Quine himself gives this

³³Orenstein gives a somewhat similar account of the context-relative notion of necessity that Quine says he makes sense of [120, 164-165]. Orenstein describes this account as a way of accommodating modal claims in terms of non-modal background assumptions that one takes for granted while pursuing the subject at hand. (Orenstein uses different examples; he points to the basic role of the predicate ' x contains H_2O ' in the context of a laboratory study of the contents of a container filled with water. Similarly to my Quinean explanation of the context-relative necessity involved in (61)-(62) and (66)-(67), Orenstein explains the basic role of the predicate in his example as being due to the centrality of 'Water is H_2O ' to our belief system.

kind of account of necessity in the case of mathematics and says that he makes no deeper sense of necessity anywhere [49, 59].

2.5.2 Non-Relative Necessity and Essence

In section 2.4.2, I mentioned that Quine sees commitment to the doctrine he calls Aristotelian essentialism as a consequence of doing quantified modal logic. According to Quine, Aristotelian essentialism is

the doctrine that some of the attributes of a thing (quite independently of the language in which the thing is referred to, if at all) may be essential to the thing, and others accidental. E.g., a man, or talking animal, or featherless biped (for they are in fact all the same *things*), is essentially rational and accidentally two-legged and talkative, not merely qua man but qua itself. [11, 175-176]

In this passage Quine distinguishes the non-relative notion of necessity and essence that Aristotelian essentialism involves from the relative notion discussed in the previous section. Aristotelian essentialism is the doctrine that a thing may for example be essentially (necessarily) rational and accidentally (contingently) two-legged *independently* of the context or background set by some particular descriptive specification of the thing. On the relative understanding of necessity, a particular featherless biped might be said to be necessarily rational and contingently two-legged *as* a man, because it was held for example that

(70) ' $\forall x(x \text{ is a man} \rightarrow x \text{ is rational})$ ' is analytic

and that

(71) ' $\forall x(x \text{ is a man} \rightarrow x \text{ is two-legged})$ ' is not analytic.

In contrast to the relative notion of necessity and essence, Aristotelian essentialism is the doctrine that an object may for example be essentially (necessarily) rational and accidentally (contingently) two-legged irrespective of how it happens to be linguistically specified if at all, and independently of metalinguistic relations between object-language expressions.³⁴ In connection with his example of an Aristotelian-essentialist claim, Quine stresses this point by saying that the man is to be essentially rational and accidentally two-legged not merely

As another example, Orenstein takes up the centrality of 'Aristotle is a man', which might be taken for granted as a tacit premiss in reasoning to more interesting conclusions.)

³⁴See also [24, 74].

qua man but *qua itself*. Being essentially (necessarily) rational *merely qua man* would only be a case of metalinguistic relative necessity.

Quine thinks that the champion of quantified modal logic is in fact bound to admit that every object has at least one essential and one accidental trait, namely the traits expressed, respectively, by the predicates

$$(72) \ x = x$$

and

$$(73) \ x = x \wedge p,$$

where '*p*' stands in the place of a contingently true sentence [11, 176]. In 'Reference and Modality', Quine describes Aristotelian essentialism in a way that takes the situation illustrated by (72) and (73) into account by eliminating the 'may' which appears in the characterization quoted in the previous paragraph. Furthermore, in that essay Quine distinguishes Aristotelian essentialism from the relative notion of necessity explained in terms of analyticity. According to Quine, Aristotelian essentialism involves the view that an object may have a trait contingently even if its having that trait follows by analyticity from some way of linguistically specifying the object:

An object, of itself and by whatever name or none, must be seen as having some of its traits necessarily and others contingently, despite the fact that the latter traits follow just as analytically from some ways of specifying the object as the former traits do from other ways of specifying it. [43, 155]

In this study, I use the term 'Aristotelian essentialism' to designate the weaker doctrine which Quine formulates in 'Three Grades of Modal Involvement' and which was quoted in the previous paragraph. Some commentators take this characterization of Aristotelian essentialism simply as a statement of what quantified modal logic is about. For example Fitting and Mendelsohn say that Quine's notion of Aristotelian essentialism 'is just quantified modal logic' [79, 89, fn. 15]. In their view, the notation of first-order modal logic allows the expression of Aristotelian-essentialist claims. Fitting and Mendelsohn think that there is nothing Aristotelian about Aristotelian essentialism, but that it begins to look Aristotelian if one also holds that there are things which have non-trivial essential properties.³⁵ As Quine stresses in his reply to Barcan Marcus, his critique

³⁵In this work, I will not discuss the historical accuracy of calling Aristotelian essentialism 'Aristotelian'.

of quantified modal logic is independent of the issue whether there are things which have non-trivial essential properties [20, 244]. Quine's critique of quantified modal logic concerns the intelligibility (not the truth) of any Aristotelian-essentialist claim. In other words, Quine questions the meaningfulness of the *distinction* between the necessary (or essential) and contingent (or accidental) traits of an object (conceived as independent of how the object is linguistically specified).³⁶

In another reply to Barcan Marcus, Quine stresses the point that commitment to Aristotelian essentialism is a consequence of doing quantified modal logic:

This is how essentialism comes in: the invidious distinction between some traits of an object as essential to *it* (by whatever name) and other traits as accidental. I do not say that such essentialism, however uncongenial to me, should be uncongenial to the champion of quantified modal logic. On the contrary, it should be every bit as congenial as quantified modal logic itself. [10, 184]

Since Aristotelian essentialism involves the idea that an object's having a trait necessarily is not relative to how the object is specified, it is incompatible with the explanation of the necessity operator in terms of analyticity. Thus, in 'Reference and Modality' Quine reminds us that necessity construed as analyticity does not go together with quantified modal logic and its accompanying doctrine of Aristotelian essentialism:

Essentialism is abruptly at variance with the idea, favored by Carnap, Lewis, and others, of explaining necessity by analyticity. For the appeal to analyticity can pretend to distinguish essential and accidental traits of an object only relative to how the object is specified, not absolutely. Yet the champion of quantified modal logic must settle for essentialism.³⁷

In Quine's view, quantified modal logic is a logically regimented notation for speaking about the essential and accidental traits of objects, and thus already presupposes the meaningfulness of this distinction between essential and accidental traits. On the other hand, Quine connects Aristotelian essentialism specifically to quantified modal logic. He does not suggest any other way of explicitly committing oneself to this form of essentialism than the use of a language couched in the syntax of quantified modal logic. He says of essentialism

³⁶See [81, 104].

³⁷[43, 155], cross-reference omitted.

and quantified modal logic that one should be *every bit as congenial* as the other. Thus, I understand his argument against the intelligibility of quantified modal logic as equally an argument against the intelligibility of Aristotelian essentialism.

Some commentators have proposed a different interpretation of Quine's notion of Aristotelian essentialism. Discussing the open sentence ' $\Box(x > 7)$ ' in light of (13)-(15) of section 2.2, Orenstein explains 'the essential property versus accidental property distinction' which Quine finds 'difficult to accept' as follows:

[W]hile 9 possesses the property of being greater than 7 necessarily, the number of the planets does not necessarily possess that property. The explanation offered is that being greater than 7 is an essential property of 9 while being greater than 7 is only an accidental property of the number of the planets. [120, 158]

However, this is not the doctrine of essentialism that Quine finds the champion of quantified modal logic committed to. The doctrine Orenstein describes seems to grant the relativity of necessity to linguistic specifications and to end up in blatant nonsense or contradiction by holding that an object is both necessarily and contingently greater than seven. This doctrine is surely difficult to accept. The essentialism Quine actually finds quantified modal logic committed to says in this case rather that the number 9 is either essentially or accidentally greater than 7 independently of how it happens to be linguistically specified. If it is agreed that '9' and 'the number of planets' are just different ways of linguistically specifying the number 9, it is immediately false according to Aristotelian essentialism (as Quine construes it) that being greater than 7 is an essential property of 9 and an accidental property of the number of the planets.

Gibson, too, discusses Quine's example of (13)-(15). He quotes Quine's characterization of Aristotelian essentialism in 'Reference and Modality' [43, 155], and explains a problem presented by the open sentence ' $\Box(x > 7)$ ' as follows:

Are we to conclude, then, that the number 9 has the essential property *designated by '9'* and the contingent property *designated by 'the number of major planets'*? Such a doctrine seems absurd. [90, 15]

The doctrine that an object may have an essential property which is expressed by a predicate of the form 'designated by A ', where ' A ' stands in the place of some means of referring to a singular term or a definite description, is indeed absurd,

at least if the term ' A ' is understood as a specification of a string of characters or phonemes. This doctrine seems to suggest that in some cases the semantic relation between the string of characters or phonemes A and the designatum (referent) of A holds necessarily, that A could not have had a different use in the language community in which it is used. Aristotelian essentialism could be easily repudiated by a *reductio ad absurdum*, if it entailed this sort of a doctrine.

At first sight, Quine might seem to suggest that Aristotelian essentialism would involve this doctrine about objects' being necessarily designated by linguistic expressions. Immediately before introducing the notion of Aristotelian essentialism in the essay 'Reference and Modality', Quine points out that the only hope for quantified modal logic lies in insisting, for example, that *the object* x specified by the open sentences (64) and (65) of the previous section is necessarily greater than seven [43, 154-155].³⁸ This means simply overruling Quine's objection that the case of (64), (65) and ' $x > 7$ ' shows how necessity amounts at best to a metalinguistic connection between object-language expressions. This overruling of Quine's objection consists in embracing Aristotelian essentialism by claiming that an object is necessarily greater than seven independently of how we happen to linguistically specify that object. Meaning-theoretic features of linguistic expressions, like the non-analyticity asserted in (67) of the previous section, have no bearing on whether the object specified by (65) is necessarily greater than seven. However, Quine also notes that this overruling of his objection involves

adopting an invidious attitude toward certain ways of specifying x , for example [(65)], and favoring other ways, for example [(64)], as somehow better revealing the "essence" of the object. Consequences of [(64)] can, from such a point of view, be looked upon as necessarily true of the object which is 9 (and is the number of the planets), while some consequences of [(65)] are rated still as only contingently true of that object. [43, 155]

The relation of consequence Quine refers to in this quotation is the relation of 'following analytically' that appears in the quotation from 'Reference and Modality' on page 49. Thus, ' $x > 7$ ' is a consequence of (64) in this sense, if the truth of (66) is assumed. As Quine sees it, in this case the criterion for favoring certain ways of specifying the object over others is based on an independent recognition of some traits of the object as essential to it. Once it is decided that the number nine is necessarily greater than seven, (64) can be recognized

³⁸See also [10, 184].

as revealing, by virtue of (66), an essential trait of the number nine. Quine is not suggesting that the favoring of certain ways of specification as revealing the essence of the object means the recognition of these favored ways as essential to the object, in the sense that being the designatum (or denotatum) of these ways of specification would be an essential trait of the object.³⁹

Quine's argument against the intelligibility of quantified modal logic is based on the presentation of problematic example cases. In this study, I focus on the following example given by Quine [43, 149]: Specified by means of

$$(64) \quad x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$$

an object (the number 9) seems to satisfy the predicate

$$(74) \quad \Box(x > 7);$$

but, specified by means of

$$(65) \quad \text{there are exactly } x \text{ planets,}$$

the very same object does not seem to satisfy (74). Assuming a notion of analyticity, this situation may be explained in terms of (66) and (67) from section

³⁹Quine's view that this kind of favoring of certain ways of specifying an object already presupposes commitment to Aristotelian-essentialist claims can be seen in his reaction to a proposal to reduce certain cases of third-grade uses of the notion of necessity to first-grade uses explained in terms of analyticity. In a 1962 discussion [117] Kripke suggested to Quine that if we assume a special class of singular terms (names), sentences of the form 'There exists an x such that $\Box Px$ ' can be construed as sentences of the form 'There exists an object x with a name a such that P of a is analytic'. Quine answers that this approach is 'not very far from the thing I was urging about certain ways of specifying these objects being by essential attributes'. As far as I understand, Quine's response is based on the view that such favored ways of specifying an object as a have a descriptive connotation which consists of predicates F such that the object is necessarily F . Thus, this idea of names as privileged ways of specifying objects seems to Quine to presuppose the distinction between essential (necessary) and accidental (contingent) traits. After Quine's response, Kripke adds that such an assumption of names 'is equivalent to essentialism', using 'essentialism' in Quine's sense of 'Aristotelian essentialism'. (Burgess' [72, 119-120] account of this discussion has influenced my interpretation.) It should be noted that this discussion predates Kripke's ideas concerning names as rigid designators. In this connection Kripke does not assume names to be rigid in the sense he came to introduce in his 1970 lectures which are published as *Naming and Necessity*. Marcus' conception of 'tags', which is treated in the discussion too, also differs in important respects from contemporary non-descriptivist theories of singular reference (see section 3.1.2 below).

Burgess [70] construes Quine's critique of quantified modal logic as directed at this sort of a proposal to reduce certain third-grade uses of the notion of necessity to first-grade uses explained in terms of analyticity. According to Burgess, the problem Quine raises concerns the lack of criteria for favoring certain open sentences or singular terms over certain others.

2.5.1; or perhaps a Quinean account may be given in terms of his holistic conception of theory revision and the maxim of minimum mutilation, as suggested in section 2.5.1. For Quine, this example shows that necessary greatness than seven makes no sense as applied to an *object* (in this case a number) x . At best, necessity attaches only to a *connection between the open sentences* ' $x > 7$ ' and (64); this indicates a collapse of the presumed non-relative notion of necessity required in quantified modal logic into the relative notion.

Of course, one might simply insist that the notion of having a trait necessarily does apply to objects irrespective of how they happen to be linguistically specified, and thus embrace Aristotelian essentialism. However, Quine's example of the case of (64), (65) and (74) shows how ways of specifying an object affect judgments concerning the object's necessary traits. The notion of satisfaction, or the notion of being true of an object (or of a sequence of objects), does not seem to be applicable to open sentences in the scope of a modal operator. For example, the number nine's being necessarily greater than the number seven depends on how the number 9 happens to be linguistically specified. Quine takes this situation to show that open sentences like (74) are meaningless.⁴⁰ Since quantified modal logic provides the official notation for making Aristotelian-essentialist claims, this also means that Aristotelian essentialism makes no sense.

In *Word and Object*, Quine notes that illustrations of the referential opacity of the necessity operator 'depend on the existence of appropriately stubborn objects' [45, 197]⁴¹. This stubbornness consists in an object's being specifiable in ways that fail of necessary equivalence. One way to get rid of such stubborn objects is to narrow down the ontology so as to include only objects which fulfill the following condition:

- (75) Whenever each of two open sentences uniquely determines one and the same object x , the open sentences are equivalent by necessity.⁴²

'Equivalence' in (75) means material equivalence, sameness of extension. Schematically, (75) can be formulated as follows:⁴³

$$(76) \quad \forall y(Fy \leftrightarrow y = x) \wedge \forall y(Gy \leftrightarrow y = x) \rightarrow \Box \forall y(Fy \leftrightarrow Gy).$$

⁴⁰Quine describes the example given in the previous paragraph as a way of arguing for the *meaninglessness* of the sentence ' $\exists x \Box(x > 7)$ ', that is, of existential quantification into (74) [43, 149, 152].

⁴¹See also [43, 150-153].

⁴²See [45, 197].

⁴³See the next paragraph and (4) in [45, 198]. My (76) is just Quine's (4) written in logical notation.

Since (64) and (65) are not equivalent by necessity, it follows by (75) that they do not determine the same object. Adopting (75) strips Quine's argumentation of its force – any allegedly problematic case like that of (64), (65) and (74) may be dismissed by pointing out that the predicates which were supposed to pick out one and the same object are not necessarily equivalent and consequently do not pick out the same object after all.

Aside from repudiation of all objects which do not obey (75), for example material objects and sets, this strategy of narrowing down the ontology has a more serious drawback: the collapse of modal distinctions. Quine presents a proof from (75) to the conclusion that any true statement is necessarily true [45, 198]. He writes ' Fx and x only' as short for ' $\forall z(Fz \leftrightarrow z = x)$ '. Quine refers to (76) as '(4)', which he writes in the form

If Fx and x only and Gx and x only then (necessarily $\forall z(Fz$ if and only if $Gz)$).

I will here quote Quine's formulation of the collapse proof in full:

Let ' p ' stand for any true sentence, let y be any object, and let $x = y$. Obviously then

- (5) $(p$ and $x = y)$ and x only and
(6) $x = y$ and x only.

By (4), next, with its Fx taken as ' p and $x = y$ ' and its ' Gx ' as ' $x = y$ ', we can conclude from (5) and (6) that

- (7) Necessarily $\forall z((p$ and $z = y)$ if and only if $z = y)$.

But the quantification in (7) implies in particular ' $(p$ and $y = y)$ if and only if $y = y$ ', which in turn implies ' p '; so from (7) we conclude that necessarily p . [45, 198]

The assumptions in this proof are Quine's (4) (that is, (76)), ' p ', and ' $x = y$ '; what Quine shows is that under these assumptions the distinction between ' p ' and ' $\Box p$ ' collapses. Quine does not indicate any specific system of quantified modal logic in connection with his collapse proof, but the proof can easily be reconstructed for example in a first-order system based on the propositional system **M**.⁴⁴

⁴⁴The system known as **M** (or alternatively as **T**) is obtained from the basic system **K** by adding the axiom schema (M): $\Box A \rightarrow A$. In fact, a deduction of Quine's collapse result can be given already in a first-order system based on the basic propositional modal logic **K**.

Since the strategy of restricting the ontology fails, the modal logician needs another way of answering the problem Quine raises by his example of (64), (65) and (74). This is the problem of making sense of open sentences in the scope of a modal operator, and, given the connection Quine sees between Aristotelian essentialism and quantified modal logic, it is also a problem of making sense of Aristotelian essentialism. In fact, these are one and the same problem, as for example Føllesdal points out [83, 92]. Before discussing two recent answers to this problem in the next section, I need to note one rather superficial answer to it. On the basis of possible worlds semantics, it might be argued that Quine's example raises no problem at all. The object which uniquely satisfies (64) and (65) in the actual world is indeed necessarily greater than seven, that is, satisfies ' $x > 7$ ' in every possible world in which it exists. However, this is not really an answer to the problem Quine raises but just a statement, in the jargon of possible worlds, of one particular instance of the view that Quine wants to problematize, namely, the view that an object may have some of its traits necessarily independently of how it happens to be linguistically specified. Quine admits the utility of model theory, for example in giving consistency and completeness proofs; but the existence of formal semantics in which such proofs are given for a formal system does not suffice as an explication of the intended interpretation of the formulas of the formal system [32, 173-174].

Chapter 3

Two Answers to Quine's Critique

In this chapter, I discuss two strategies of answering Quine's critique of quantified modal logic. In section 3.1, I discuss a strategy based on the non-descriptivist theory of singular reference. In particular, I focus on discussions of Quine's critique by Føllesdal (sections 3.1.1 and 3.1.2) and Devitt (section 3.1.3), both of whom propose a non-descriptivist theory of singular reference as a solution to the problem Quine raises. In section 3.2, I look at Divers' strategy for exposing a flaw in Quine's argumentation. According to Divers, Quine's critique of quantified modal logic is based on a confusion between semantic and metaphysical issues.

This chapter does not involve a critical discussion of the two strategies of answering Quine's critique. My purpose is to lay out these strategies, with an eye to evaluating them from the point of view of Quine's conception of objects later, in chapter 6.

3.1 Quine's Critique and the Theory of Reference

3.1.1 Føllesdal's Reference-Theoretic Answer to Quine's Critique

As explained in section 2.2, Føllesdal considers it a necessary condition for doing quantified modal logic that the \Box -construction be extensionally opaque and referentially transparent. Quine's argument for the meaninglessness of quantified modal logic, as presented in section 2.5.2, does not directly concern referential transparency since this argument does not turn on the use of singular terms; the definition of referential transparency and opacity ((9)-(12) in section 2.2) depends on singular terms. This avoidance of the use of singular terms is in line with Quine's own view, explained in section 5.3, of singular terms as notational abbreviations that can be contextually eliminated from the primitive notation of first-order theories. The avoidance of the use of singular terms of any kind also makes Quine's argument immune to the objection raised by Smullyan (section 2.2). However, when singular terms are brought in as contextually defined notational abbreviations, showing the referential opacity of modal contexts is easy – one can simply use predicates like (64) and (65) to produce definite descriptions which are not intersubstitutable *salva veritate* in modal contexts. As noted in section 2.2, Quine allows the use of definite descriptions in demonstrations of referential opacity. Hence, Quine's example discussed in section 2.5.2 easily yields a demonstration of the referential opacity of modal contexts.

As an answer to Quine's critique, Føllesdal proposes what he calls a 'two-sorted semantics' which involves a notion of *genuine singular term* [82]. Føllesdal assimilates genuine singular terms to Kripke's rigid designators¹ with respect to semantic features [81, 109]. According to Føllesdal, a genuine singular term is a term which behaves semantically like a variable under an assignment, in that it refers to the same object in all possible worlds in which the object exists. Individual variables are, according to him, 'the archetypical kinds of genuine singular terms' [83, xiii].² However, Føllesdal's notion of a genuine singular term is not a fundamentally modal notion. The relation of 'pure reference' between a genuine singular term and its referent is independent of necessity and essence [81, 105].³

¹See section 3.1.2.

²Kripke, too, classifies free variables as rigid designators [108, 49, fn. 16].

³Kripke holds a very similar position concerning rigid designators [108, 49-53].

The reference relation between a genuine singular term and its referent is independent of any descriptive conditions, expressible by means of predicate terms, that may somehow be associated with the term by speakers. Føllesdal does accept that genuine singular terms may have what he calls a sense, that is, descriptive conditions associated with the term. But such a sense is secondary to reference: the reference relation does not hold in virtue of it. A genuine singular term affords a way of linguistically specifying an object without assuming any descriptive classification of the object. When an object is referred to using a genuine singular term, one can make sense of the object's being necessarily thus or so independently of an assumed background of descriptive classification of the object. The use of a genuine singular term removes the problematic interference of descriptive content and thus resolves the problem Quine raises. And, given that the problem of making sense of open sentences in the scope of a modal operator and of making sense of Aristotelian essentialism are one and the same, the non-descriptivist theory of singular reference also resolves the problem of the meaningfulness of the non-relative distinction between essential and accidental traits.⁴

Føllesdal regards genuine singular terms and pure reference philosophically important in other respects as well. According to him, pure reference is more basic than predication. In order to predicate something of an object, we have to be able to refer to the object without the use of any predicates [81, 101]. Furthermore, the possibility of revision of beliefs or theories depends on our having a means of referring to the objects of which our beliefs or theories can be true or false. Our views about an object may well be false, but they are nevertheless views *about that particular object*; by means of a genuine singular term, we can pick out that object as a topic of discussion which is independent of our (perhaps partly false) theory of that object [81, 106-107]. It is for these reasons, among others, that Føllesdal regards genuine singular terms as indispensable for language [81, 111].

In order to succeed as an answer to Quine's argument against quantified modal logic, a theory of singular reference must be fully non-descriptivist, as Føllesdal's theory of genuine singular terms is. If a theory of singular reference allowed any descriptive element to be involved in the reference relation, it would fall into the difficulty illustrated by Quine's argument. The descriptive element need not be such that it uniquely specifies an object. Quine's example about the mathematician-cyclist can be used to illustrate a difficulty analogous to that

⁴Føllesdal's latest statement that this reference-theoretic move resolves Quine's objections to first-order modal logic is in the Introduction to the posthumous collection of Quine's essays *Confessions of a Confirmed Extensionalist and Other Essays* [84, 2].

brought out by (64) and (65), but one in which the descriptive specification involved does not purport to uniquely specify an object. In section 2.5.1 I pointed out that Quine's mathematician-cyclist example does not succeed as an argument against quantified modal logic. However, the example can be successfully used in making the present point about singular reference. Let us assume that the predicate ' Cx ' (' x is a cyclist') contributes somehow to determining the reference of a singular term a . Now, when the referent of a is specified by means of a , the referent of a might be said to satisfy ' $\Box Tx$ ' (' x is two-legged'). On the other hand, if the referent of a were picked out by means of a singular term b to whose reference the predicate ' Mx ' (' x is a mathematician'), but not ' Cx ', contributes, the referent would perhaps not be said to satisfy ' $\Box Tx$ '. In this way, a not-uniquely-specifying descriptive element involved in determination of the reference of a singular term presents a problem analogous to the problem illustrated by (64) and (65).

3.1.2 Non-Descriptivism about Singular Reference

Føllesdal's conception of genuine singular terms and pure reference belongs to the tradition of non-descriptivist, or non-Fregean, theory of singular reference. The non-descriptivist theory of definite singular reference arose as a critique of the descriptivist theory. Frege is usually portrayed as the main historical source of the descriptivist theory; his theory of the *Sinn* and *Bedeutung* of a singular term in 'Über Sinn und Bedeutung' [86] can, in turn, be seen as a reaction to earlier non-descriptivist ideas.⁵ John Stuart Mill is commonly identified as the earliest proponent of something like a non-descriptivist view of names, and Frege's theory of sense and reference and Russell's theory of descriptions are considered as reactions to difficulties in the 'Millian' view.⁶ One central descriptivist idea, attacked by non-descriptivists, is that the reference of a proper name is determined by a description that is somehow associated with the name by speakers. Descriptivism with respect to singular reference can be divided into two distinct theses. The *reference-theoretic* thesis says that the reference of a proper name – what, if anything, the name refers to – is determined by a definite description which is associated with the name by speakers [131, 397]. The reference-theoretic thesis attempts to answer the question 'In virtue of what does a proper name designate, or refer to, its bearer?' [114, 255]. The *meaning-theoretic* thesis says that the meaning (or semantic content) of a proper name

⁵This was pointed out to me by Leila Haaparanta.

⁶See e.g. [108, 26-27], [75, 3-6], [72, 92-93], [114, 261-262].

is given by a description associated with the name by speakers [131, 397]. The meaning-theoretic thesis attempts to answer the questions 'What and how does a name mean or signify? What does it contribute to the meaning of a sentence in which it occurs?' [114, 255]. The reference-theoretic thesis is often taken to be entailed by the meaning-theoretic thesis, but not the other way around: descriptivism as a reference-theoretic doctrine does not entail a descriptivist view of the meaning of names. A modification of descriptivism, as a reference-theoretic as well as a meaning-theoretic thesis, was offered by John Searle, who argued that a proper name is associated by speakers with vague clusters of descriptions.⁷

For the theme of the present study, the reference-theoretic aspect of non-descriptivism is of more importance than the meaning-theoretic aspect. As Føllesdal's strategy of answering Quine's critique shows, the genuine singular terms are needed as a linguistic means of referring to objects without presupposing a descriptive classification of the objects. Perhaps the adoption of this kind of reference-theoretic strategy obliges one to answer the further question what such non-descriptivist singular terms mean (as distinguished from what they refer to) and how they contribute to sentence-meanings. In this study, I will focus exclusively on the reference-theoretic aspect of the non-descriptivist answer to Quine's critique of quantified modal logic. Thus, by speaking of the 'non-descriptivist theory', I mean non-descriptivism about singular reference as a theory of reference, not as a theory of meaning.

The non-descriptivist critique of descriptivism about names is commonly seen as having been initiated by Saul Kripke, although there has been a debate about whether this credit should instead be given to Ruth Barcan Marcus.⁸ Kripke presents arguments against the descriptivist theory (including Searle's cluster theory) in both its reference-theoretic and meaning-theoretic form [108]. As an alternative reference-theoretic account, he offers a causal-historical theory, but he does not present any positive meaning-theoretic account of names.⁹ The details of Kripke's arguments against descriptivism need not be discussed in the present study.¹⁰ Instead of the debate between descriptivists and non-

⁷See [127]. Searle introduced his cluster theory in order to meet certain difficulties involved in the standard description theory (see e.g. [114, 256-257, 265]).

⁸See the essays by Smith, Soames and Burgess collected in [100]. Although I refer to some of these essays in connection with my remarks about Marcus' view of names, I do not mean to take any stand on this historical debate.

⁹See e.g. [131, 401-402], [130, 5].

¹⁰For a sympathetic exposition of Kripke's arguments, see e.g. [75, 13-23]. Soames classifies Kripke's arguments into the semantic, the epistemic and the modal argument [130, 18-24]. Of these the semantic argument is directed at descriptivism as the reference-theoretic thesis; the

descriptivists, I will exclusively focus on non-descriptivist theory of singular reference as an answer to Quine's critique of quantified modal logic.

In discussions of Quine's critique of modal logic, the general idea of a distinction between descriptions and singular terms that are not (explicitly or implicitly) descriptions was expressed well before Kripke's attack on descriptivism and his introduction of the notion of a rigid designator. Burgess notes that Smullyan's discussion in 1948 ([128], see section 2.2) can be seen as containing a suggestion of the importance of this distinction [72, 99-100]. In the early 1960's, Marcus proposed a distinction between descriptions and proper names [116, 8-13].¹¹ According to her, the substitutivity of identity holds in modal contexts for proper names, but not for descriptions. Thus, modal contexts turn out referentially transparent if proper names only are admitted as singular terms in connection with the criterion (9a) on page 22. Marcus' view of proper names resembles in certain respects contemporary non-descriptivist views of singular reference. For example, she says that a proper name – which she also calls 'a tag' – has 'no meaning' and that it 'simply tags' the object whose name it is. And when a description comes to be used as a proper name through linguistic change, the descriptive meaning of the description is lost or ignored. However, her conception of proper names also differs in crucial ways from Kripke's conception of names as rigid designators and from contemporary non-descriptivist views inspired by Kripke's work. Most importantly, Marcus seems to have thought that if 'a' and 'b' are two proper names, then the identity statement ' $a = b$ ' is not empirical (*a posteriori*), but an *a priori* statement which, if true, is *analytically* or 'tautologically' true. In this, Marcus' conception of proper names markedly differs from contemporary non-descriptivist views according to which identity statements involving two different names are *a posteriori* (and, if true, metaphysically necessary) [129, 25].¹² In this study, I will focus only on non-descriptivist answers to Quine's critique of modal logic which are influenced by, or informed of, Kripke's views in *Naming and Necessity*. Føllesdal's and Devitt's answers are of this kind. Although earlier views such as Marcus' conception of names are historically intriguing, they will not be further discussed in the present study.

other two concern descriptivism as the meaning-theoretic thesis.

¹¹She does not base this distinction on grammatical form: according to her, singular terms that have the form of a description may be used in a language community as proper names.

¹²As Burgess points out, Marcus' view of proper names seems obviously wrong from the post-*Naming and Necessity* point of view [71, 128]. He also notes that in the 1962 discussion following the presentation of Marcus' paper [116], Quine objected to Marcus' claim that an identity statement between two proper names is *a priori* [72, 101-102].

As explained in the previous section 3.1.1, Føllesdal's reference-theoretic response to Quine's critique of quantified modal logic is based on a non-descriptivist view of singular reference which Føllesdal himself associates with Kripke's view of names as rigid designators. According to Kripke, proper names are rigid designators, that is, singular terms which refer to the same object in all possible states of the world in which that object exists. Kripke discusses two different ways in which the referent of a proper name n can be initially fixed:¹³ by an ostensive baptism or by description. In the latter case, the bearer of the name is stipulated to be the unique object which satisfies the description. Descriptive classification of the referent of a rigid designator may figure in the fixing of reference but not in the reference relation itself. The semantic fact which object a name refers to is distinguished from the pre-semantic fact in virtue of which the term refers to the object to which it, in point of semantic fact, refers.¹⁴ When the reference of a name is fixed by a description, the name comes to refer to the object which in fact fulfills the description (assuming the fixing is successful in the first place).¹⁵ In a footnote, Kripke suggests that reference fixing by means of ostension 'can perhaps be subsumed under the description concept also' [108, fn. 42]. Once the referent of n is fixed, n is passed from speaker to speaker in the language community by a historical chain in which each person who picks up the name intends to use it to refer to the same object to which the person from whom she picks n up refers to by n . The event in which the referent of n has been initially fixed is usually irrelevant to the historical transmission of n . The speakers in the historical chain need not possess uniquely identifying, or even correct, information about the referent of n in order to succeed in using n to refer to the object that has been initially fixed as its referent. What Soames calls Kripke's semantic argument against descriptivism about names (as a reference-theoretic thesis) is based on the observation that there are speakers who do not possess uniquely identifying, or even correct, information about the referent of a name they use, and yet these speakers are considered to be successfully talking about the referent by using the name.

Føllesdal thinks that Quine holds a 'relatively Fregean' (that is, descriptivist) view of reference, but says that the pure reference of genuine singular terms

¹³I am not sure what sort of theory of reference fixing and reference transmission in a language community Føllesdal holds; at least he does not accept the historical chain account of reference transmission which Kripke proposes [83, xxix-xxxi].

¹⁴Here, I use the phrase 'fixing of reference' in the pre-semantic sense. The term 'reference-fixing' is used also in the sense of *reference-determining*, in which sense a reference-fixing description is understood as having to do with the semantic facts about a term's reference. (The term 'pre-semantic', in this connection, is from [131, 418].)

¹⁵On Kripke's view of reference fixing in the pre-semantic sense, see [108, 96].

'seems to fit more naturally in' with Quine's philosophy [81, 106]. By saying this, he seems to suggest that his reference-theoretic answer could be regarded satisfactory also from the point of view of Quine's philosophical position. At one point, in his reply to Føllesdal's paper in the *Library of Living Philosophers* volume, Quine seems to make a concession to the reference-theoretic strategy of answering his critique. He notes that in making sense of rigid designation of singular terms he has found need to appeal to essential traits which are unique to the object designated. The descriptive content in virtue of which such a rigid designator refers to its object would, on this conception, be expressed by means only of predicates F such that $\Box F$ is true of the referent. Thus, Quine saw the notion of rigid designation as depending on the notions of essence and necessity. (In section 6.1, I discuss Quine's remarks on rigid designation and genuine singular terms in more detail.) In his reply, Quine comments on Føllesdal's reference-theoretic answer to his critique of quantified modal logic:

[Føllesdal's] own theory of reference offers an attractive alternative to essentialism, or should I say a congenial way of looking at essentialism, in that connection and in connection generally with quantifying in. [16, 114]

For Quine, Føllesdal's theory of reference amounts to an alternative to essentialism because it does not make the notion of genuine singular term hinge upon the notions of necessity and essence. In this respect Quine seems to get Føllesdal right on this occasion. However, as I will explain in section 6.1, in other writings, also ones which appeared well after the comment quoted above, Quine claims that the notions of rigid designator and genuine singular term do presuppose the notions of essence and necessity. By saying that Føllesdal's theory of reference offers a congenial way of looking at essentialism in connection with quantifying in, Quine seems to be saying that the theory succeeds in making sense of open sentences in the scope of a modal operator.

This apparent concession notwithstanding, Quine restates in his later writings his critical position on quantified modal logic and on the essentialism he thinks it requires. This is clearly expressed in his 1990 reply to Barcan Marcus, quoted in section 2.4.2, where he says that he makes no sense of essentialism or of metaphysical necessity. Further textual evidence of this view can be found elsewhere in his writings. In his last book *From Stimulus to Science*, Quine states that he makes no sense of the concept of necessity, except in the role of an expository guide – for example, as a means of saying that a sentence whose truth is under discussion follows logically from what has been previously accepted [30, 98-99]. Quine explicitly states that this excludes use of the necessity

operator in connection with quantifiers. This kind of use of the notion of necessity as an expository guide can be accommodated in the first grade of modal involvement, with the modal operator read as a predicate expressing the notion of logical validity. Let B represent the sentence whose truth is under discussion, and A a conjunction of sentences expressing what has been previously accepted. In this context, the sentence 'Necessarily B ' can be explained as

(77) ' $A \rightarrow B$ ' is logically valid.

In section 2.5.1, I suggested a Quinean account of necessity on the basis of his holistic view of theory revision and the role of the maxim of minimum mutilation. (Quine's epistemological model of test and revision of theory is discussed in sections 5.2, 5.4 and 5.5.) Along the lines of my suggestion, which is meant to follow Quine's own account of the so-called necessity of mathematics, the notion of necessity can be explained away on Quine's epistemological model. For Quine, necessity means relative immunity of a sentence to revision in accordance with the conservative maxim of minimum mutilation. He says he makes no deeper sense of necessity anywhere; in particular, he points out that metaphysical necessity has no place in his naturalistic philosophy [49, 59].¹⁶ Furthermore, modal contexts which are not construed as metalinguistic predications, and thus not accommodated into the first grade of modal involvement, are non-extensional. Especially in his later writings Quine is explicit that he makes no sense of a non-extensional theory. For example, he states that extensionality is for him a necessary condition for full understanding of a theory [30, 90-91].¹⁷

3.1.3 Devitt on the Effect of Descriptive Elements on Modal Predication

Some theorists of reference have proposed a theory for names which combines a descriptivist account of reference fixing and a non-descriptivist account of the reference relation itself. Here, I will look at Michael Devitt's (and Kim Sterelny's) view. According to Devitt, successful fixing of reference (Devitt also uses the term 'grounding') requires that the fixer is not mistaken about the kind of object being named. This amounts to what Devitt calls the *Qua*-problem for a *pure-causal* account of reference fixing [77, 79-81].¹⁸ Instead of a purely causal, thoroughly non-descriptive theory of singular reference, Devitt

¹⁶In an interview from 1992, Quine says that he is 'unsympathetic with metaphysical necessity' [61, 214]. See also [64, 310].

¹⁷See also [51, 500].

¹⁸See also [75, 61-63].

proposes a *descriptive-causal* account of reference fixing combined with a non-descriptive account of reference borrowing. In successfully fixing an object as the referent of a name, the fixer must correctly classify the object under a categorical term. (The classification involved may, according to Devitt, be conscious or unconscious [77, 80].) However, when other speakers (reference borrowers) acquire a competence to use the name from a fixer, the name is passed on in a network of 'designating chains' (d-chains) [77, 68]. Unlike the fixer, a reference borrower need not associate the name she acquires with any descriptive condition true of the referent. In particular, a borrower need not associate with the name the categorical term under which the referent has been classified by the fixer. A borrower may be counted as a competent user of the name despite her holding mistaken beliefs about the referent of the name. Thus, a speaker can for example use a name to designate a university even though she mistakenly believes that the bearer of the name is a river [77, 79]. Devitt's hybrid theory of reference for names makes the reference relation dependent on association of a name with a descriptive element only in the fixing of reference. As soon as the name gets passed on in a d-chain, the descriptive element ceases to contribute to the determination of the reference of the name. Thus, the reference relation itself is independent of any descriptive classification of the referent. Devitt uses the term 'designation' for the sort of reference relation between a name and an object which holds in virtue of a d-chain.

Underlying Devitt's view of grounding are theories of perception and thought. In brief, Devitt thinks that certain acts of perception of an object lead to *grounding thoughts* in which the object is correctly classified under a general category. (Devitt's theory of thought involves the assumption of a language of thought; he holds the view that public language expresses thought and that thought is prior to public language ontologically, explanatorily and developmentally.¹⁹) An example of a grounding thought is a thought which may be expressed by the sentence 'That cat is friendly' [75, 133]. A grounding thought involves a representation of the object brought about by the act of perception. A name comes to have an underlying d-chain grounded in an object in virtue of an *identity belief*. An example of an identity belief is the belief expressed by 'That cat is Nana', which links a representation associated with tokens of the name 'Nana' to the representation in the grounding thought. Such an identity belief grounds the d-chain of a name in an object.

According to Devitt, names are not the only type of singular terms which may refer in virtue of an underlying d-chain. Also descriptions may designate

¹⁹See, e.g., [75, 75-86], [76, ch. 8-9].

[75, 46-55]. Descriptions like 'the Devitts' cat', 'that book', or 'the book' may refer in virtue of a d-chain grounded in an object. (Devitt calls descriptions like 'the book' *imperfect* [75, 50].) Devitt distinguishes between designational and attributive tokens of a syntactic description type (designational and attributive tokens are tokens of a different *semantic* type, since they have different mechanisms of reference). In Devitt's terminology, an attributive singular term $\iota x\phi$ *denotes* the object, if any, which uniquely satisfies ϕ . A designational singular term, of course, designates the object in which the d-chain underlying it is grounded.²⁰ Devitt says that a singular term $\iota x\phi$ *identifyingly refers* to its object if the object is ϕ . A token of a description $\iota x\phi$ may become mistakenly grounded in an object which is not ϕ , and consequently all subsequent tokens of $\iota x\phi$ which rely on the same d-chain in fact designate the non- ϕ in which $\iota x\phi$ was grounded. Devitt thinks sentences involving such tokens are not true because of the failure of identifying reference [75, 54]. In this way, a descriptive element (an occurrence of an expression which is syntactically a predicate) in a designational singular term has semantic import although the term is designational, not attributive. However, this kind of descriptive element does not in any way affect the relation of reference – designation – between a designational singular term and its referent. This semantic relation holds independently of the occurrence of this kind of descriptive element in the term. In fact, the very question of whether or not a designational term token applies to its referent already presupposes that the term does designate its referent. In the case of designational names which do not have the form of a (definite or imperfect) description and consequently do not contain any descriptive elements, the question of application does not arise at all.

Devitt gives an account of the distinction between *de dicto* and *de re* modality on the basis of his theory of designation [75, 207-217]. He considers the case of two sentences about Joe, who is Mary's husband:

(78) Mary's husband is necessarily married

(79) Joe is necessarily married.

In sentences which involve descriptions, like (78), the modal operator can be given a narrow or a wide scope, as pointed out in section 2.2 in connection with the discussion of Smullyan's response to Quine. As Devitt explains, (78) can be read either as

²⁰ According to Devitt, a d-chain underlying a term need not always be grounded in an object. See e.g. his account of fiction [75, ch. 6].

(80) Necessarily, Mary's husband is married

or as

(81) The object which is Mary's husband is necessarily married.

(80) expresses the wide-scope, *de dicto* reading whereas (81) expresses the narrow-scope, *de re* reading. However, Devitt points out that no question of scope arises for (79) on the assumption that 'Joe' is a designational name. (79) can only be given a *de re* reading. Attributions of *de re* necessity are, according to Devitt, essentialist claims in the sense of Quine's notion of Aristotelian essentialism. The truth of such attributions depends on whether the object (Joe) has a property (being married) essentially – 'the necessity lies in the object' [75, 208]. (78), on the other hand, may be understood as (81), which is *de re*, but it may also be taken as an expression of the *de dicto* necessity (80). *De dicto* is a linguistic kind of modality which is based on semantic relations between linguistic expressions ('Mary's husband' and 'married') – as Devitt says, the necessity lies in our way of speaking about the object [75, 208, 215].

In section 2.5.2, Quine's critique of quantified modal logic was presented by means of the example of (64), (65) and (74) (page 53). The purpose of the example is to bring out how ways of specifying an object may affect judgments about whether or not the object satisfies an open sentence in the scope of a modal operator. The example is designed to show how necessity does not attach to the object, but at best only to a meaning-theoretic relation between open sentences of the object language. Thus, the purported non-relative, *de re* notion of necessity collapses into the relative linguistic notion which might be understood for example as (66) (page 46). The Quinean conception of relative necessity as a first-grade metalinguistic notion is thus similar to Devitt's conception of *de dicto* necessity as a linguistic modality.

According to Devitt, the distinction between *de re* and *de dicto* necessity is not drawn in terms of the designational-attributive distinction. The designational-attributive distinction does not explain the difference between terms which give rise to scope ambiguity (and hence admit of both *de re* and *de dicto* readings) and those which do not (and hence admit of only *de re* reading) [75, 213]. As explained above, according to Devitt's theory descriptions can – and often do – designate. Nevertheless, designational descriptions do give rise to scope ambiguities just like attributive ones. The reason why designational names do not give rise to scope ambiguity and admit only of the *de re* reading is that they do not contain a descriptive element. Descriptions, whether attributive or designational, always contain a descriptive element and, because

of this descriptive element, give rise to scope ambiguity and generate *de dicto* readings [75, 213-214]. The token of 'Mary's husband' in (80) may well be designational (refer in virtue of a d-chain grounded in Joe) and yet give rise to the phenomenon Quine illustrates with the example of (64), (65) and (74), namely, the phenomenon of a particular way of linguistically picking out an object affecting the truth value of a modal predication. In the *de dicto* sense, the truth of (78) depends on a meaning-theoretic relation between the linguistic expressions 'Mary's husband' and 'married'. It is judged true, given a conception of some meaning-theoretic relation which gives rise to this kind of linguistic necessity. The necessity is based, in this case, on the particular way of referring to Joe. On the other hand, (79) does not admit of a *de dicto* reading, and its truth depends only on whether or not the object which 'Joe' refers to (designates) is necessarily married. Taken *de re*, (78), like (79), is judged false, given that it is agreed that the object to which 'Joe' and 'Mary's husband' refer is not necessarily married. Both sentence tokens have the same truth condition. Thus, Devitt provides an explanation why ways of referring to objects can affect the truth value of modal predications. However, according to his theory of designation the *de re* readings present no problem, since an object may be picked out by means of a designational term without assuming any descriptive classification of the object. Thus, the truth conditions of attributions of *de re* modality are straightforward.

3.2 Semantic and Metaphysical Issues

Another recent response to Quine's critique of quantified modal logic comes in the form of a diagnosis of a crucial flaw in Quine's argumentation. John Divers sets up a dialectic between Quine's critique and David Lewis' counterpart theory in order to bring out the invalidity of Quine's argumentation. The 'mistake at the heart of the Quinean critique', which Divers exposes by means of the Quine-Lewis dialectic, is the sin of 'confusing or conflating the metaphysical with the semantic' [78, 52]. Quine's critique aims to establish, according to Divers, that the only metaphysical sense that might be made of *de re* modal predication is *idealist* sense: the putative *de re* modal properties emerge as radically, and hopelessly, inconstant and language-dependent [78, 41-42]. This lapse into idealism can be illustrated by the example of (64), (65) and (74). The Lewisian reply to Quine's critique consists in pointing out that changes in truth value of modal predications induced by different ways of picking out one the same object are changes in semantic content only, and that this kind of

semantic phenomenon should not be confused with a metaphysical one.

For the present purpose of explaining Divers' answer to Quine's critique, I need not go into very many details of counterpart theory, but I must mention some of its basic features. Lewis' theory is intended as a formalization of natural-language modal discourse that rivals quantified modal logic [112, 116]. Instead of adopting the usual modal operator ' \Box ' for necessity, Lewisian counterpart theory adopts four new primitive predicates, and contains postulates formulated by means of these predicates [112, 113-114]. The four primitive predicates of the theory are ' x is a possible world' (Wx), ' x is in possible world y ' (Ixy), ' x is actual' (Ax), and ' x is a counterpart of y ' (Cxy). The quantifiers in counterpart theory range over every possible world and every object in every possible world. An important feature of Lewis' theory of possible worlds and their inhabitants is that no thing exists in more than one world: there are no cases of transworld identity.²¹ The counterpart relation is a relation of similarity. Any object is a counterpart of itself, and if an object a is a counterpart of another object b , then a and b are in different worlds.²² The counterpart relation is not required to be symmetric or transitive. An object in a world w may have no counterpart, or may have several, in another world w' , and several objects in w may have a common counterpart in w' . Also, an object in w need not be a counterpart of any object in w' [112, 115-116]. Lewis explains how sentences of a language of quantified modal logic are translated into sentences of a language of counterpart theory [112, 116-119]. To take a simple example, the schema of quantified modal logic

$$(82) \quad \forall x(Fx \rightarrow \Box Fx)$$

is translated into the schema of counterpart theory

$$(83) \quad \exists x_1(\forall x_2(Ix_2x_1 \leftrightarrow Ax_2) \wedge \forall x_2(Ix_2x_1 \rightarrow (Fx_2 \rightarrow (\forall x_3\forall x_4((Wx_3 \wedge Ix_4x_3 \wedge Cx_4x_2) \rightarrow Fx_4)))))).$$

Lewis also points out that while all sentences of a language of quantified modal logic have translations in a language of counterpart theory, the converse does not hold: counterpart theory is a more powerful tool of expression than quantified modal logic [112, 117].

In the rest of this section, I will follow Divers' exposition of the Quine-Lewis dialectic. I will not address the question whether Divers' representation of the Lewisian reply to Quine is fully in line with the details of Lewis' theory. It

²¹This is expressed by Lewis' postulate P2: $\forall x\forall y\forall z(Ixy \wedge Ixz \rightarrow y = z)$.

²²Lewis' postulates P6 and P5: $\forall x\forall y(Ixy \rightarrow Cxx)$ and $\forall x\forall y\forall z(Ixy \wedge Izy \wedge Cxz \rightarrow x = z)$.

should be noted that Divers does not claim that a satisfactory way of meeting Quine's critique would require a commitment to Lewis' counterpart theory. Rather, Divers' strategy of answering Quine's critique is to use the framework of counterpart theory in order to expose the crucial mistake of conflating semantics and metaphysics in Quine's argumentation.

Divers discusses the following example [78, 46-47]: The term 'Possum-qua-cat' is introduced as another proper name for a cat that already bears the name 'Possum'. These two co-referential proper names have different counterpart-theoretic connotations. Each token of the sentence

(84) Possum-qua-cat is necessarily a cat

expresses a *de re* modal truth, irrespective of the context in which it is tokened. The choice of the term 'Possum-qua-cat' ensures that in every context in which (84) is tokened, all relevant counterparts of Possum are cats. The use of this term determines the interpretation of any token of (84) to the extent that any relevant counterpart of Possum is a cat. A term of a language may have a very deeply entrenched and a very specific connotation in every context of use. In virtue of such a connotation, the term has the power to invoke a specific counterpart relation in every context of use, as is the case with 'Possum-qua-cat'.

From this counterpart-theoretic point of view, Quine's example of (13)-(15) (page 25) is not diagnosed in terms of scope distinctions, but rather by pointing out that the definite description 'the number of planets' has a connotation which invokes a counterpart relation that is not invoked by the connotation(s) which '9' has. According to Divers, a counterpart-theoretic diagnosis of the problematic inference from (13) and (14) to (15) reveals the following invalid form [78, 48]:

$$\frac{\text{Every counterpart-1 of } x \text{ is } F \quad x = y}{\text{Every counterpart-2 of } y \text{ is } F}$$

Hence, (13) and (14) may unproblematically be declared true and (15) false. Similarly, the predicates (64) and (65) invoke different counterpart relations. The term '9-qua- $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$ ' has different counterpart-theoretic connotations than the term '9-qua- x numbers the planets'. According to Divers, our intuition concerning (64), (65) and (74) (and that concerning (13)-(15)) is a *semantic* intuition. It is an intuition concerning the truth conditions of sentences. Different ways of linguistically specifying an object select different counterpart relations as relevant in a context of utterance. Selection of certain

truth conditions for a token sentence over certain others may well be a mind dependent or a language dependent issue. The inconstancy of truth values of *de re* modal predications brought about by different ways of specifying an object is a semantic phenomenon only. On the basis of this phenomenon we cannot conclude that the underlying modal reality itself would be hopelessly inconstant and dependent on how we happen to specify objects in different contexts of discussion. Modal reality unmasked is objective and does not change at our referential whim. According to Lewis' counterpart theory, this modal reality consists in objective similarity relations between objects [78, 48-49].

Divers' point is that whether or not one accepts the Lewisian counterpart-theoretic account, the Quine-Lewis dialectic shows that we can accept the phenomenon illustrated by (64), (65) and (74) as real and yet deny that this phenomenon would threaten the intelligibility of quantified modal logic and Aristotelian essentialism. Quine is seen to commit the sin of confusing the semantic with the metaphysical:

In light of the Lewisian story, it is hard to resist the conclusion that there is a mistake at the heart of the Quinean critique which is, ironically, not so distant from that which is anathema to Quine and which Quine famously diagnoses as lying at the rotten heart of our modalizing [...]. For Quine's critique of *de re* modalizing, we might now observe, is conceived in sin which is at least akin to the original sin of conflation of use with mention. This kindred sin is that of confusing or conflating the metaphysical with the semantic – or at least the vice of reading off too readily metaphysical conclusions from features of the object-language before the resources of regimentation and paraphrase have been brought to bear. [78, 52]

Once sentences of *de re* modal discourse are regimented or paraphrased in the language of Lewis' counterpart theory, as in the above representation of an invalid form of inference, cases like those Quine presents no longer appear problematic.

Divers thinks that the failure to keep semantic and metaphysical issues apart affects other aspects of Quine's philosophy besides the critique of quantified modal logic. According to Divers' diagnosis, the conflation of the metaphysical with the semantic is evident also in the following passage from 'Reference and Modality':

One of the fundamental principles governing identity is that of *substitutivity* – or, as it might well be called, that of *indiscernibility of*

identicals. It provides that, given a true statement of identity, one of its two terms may be substituted for the other in any true statement and the result will be true. [43, 139]

According to Divers, this passage shows a 'non-negotiated shift' from talk about the semantic principle of substitutivity to talk about the metaphysical principle of indiscernibility [78, 52-53]. Identity is a relation between entities, and indiscernibility of identicals is a principle governing identity. Substitutivity, on the other hand, is a semantic principle governing terms and sentences of an object language. But in the quotation above, Quine seems to regard substitutivity and indiscernibility as one and the same principle, and his characterization of the principle of indiscernibility of identicals is given an explicitly semantic formulation. Quine seems to have no problem saying that the principle of substitutivity governs identity instead of, say, sentences. And if Quine is confused about the metaphysical-semantic distinction on such a basic point, Divers' diagnosis of the mistake at the heart of Quine's critique of quantified modal logic appears to gain plausibility.

Chapter 4

Objects in Quine's Epistemology

For this chapter and the next, I set aside the topic of Quine's critique of modal logic and focus on his conception of objects. In these chapters I give an account of Quine's conception of objects as theoretical posits in the context of his epistemology. I will resume the discussion of Quine's critique in chapter 6, where the critique and the strategies of answering it presented in chapter 3 are considered from the point of view of Quine's conception of objects.

In this chapter, I look at the background and some general features of Quine's epistemological conception of objects as theoretical posits. I begin by a brief description of Quine's approach in epistemology (section 4.1), and follow this by an account of how a view of the nature of objects falls into place as part of this general epistemological framework (section 4.2). In section 4.3, I explain the central role Quine attributes to language and the process of language acquisition in his conception of objects, and discuss behavioral evidence which has been argued to undermine Quine's conception especially as regards the role of language. In my view it is not uncontroversial that the behavioral data produced by developmental psychologists undermines Quine's conception of objects. Besides this point about psychological research, the nature of this chapter is expository rather than evaluative.

4.1 Quine's Conception of Epistemology

One of the basic ideas in Quine's epistemology is that the theory of knowledge is not a first philosophy whose task would be to justify scientific knowledge from outside of science.¹ In the essay 'The Nature of Natural Knowledge', Quine describes his approach to epistemology as follows:

Epistemology is best looked upon, then, as an enterprise within natural science. Cartesian doubt is not the way to begin. Retaining our present beliefs about nature, we can still ask how we can have arrived at them. Science tells us that our only source of information about the external world is through the impact of light rays and molecules upon our sensory surfaces. Stimulated in these ways, we somehow evolve an elaborate and useful science. How do we do this, and why does the resulting science work so well? These are genuine questions, and no feigning of doubt is needed to appreciate them. They are scientific questions about a species of primates, and they are open to investigation in natural science, the very science whose acquisition is being investigated. [47, 288]

In *The Roots of Reference*, which is an epistemological investigation into the relation between sensory intake and the referential (object-assuming) aspect of theories, Quine describes his starting point as follows:

[T]he epistemologist is confronting a challenge to natural science that arises from within natural science. The challenge runs as follows. Science itself teaches that there is no clairvoyance; that the only information that can reach our sensory surfaces from external objects must be limited to two-dimensional optical projections and various impacts of air waves on the eardrums and some gaseous reactions in the nasal passages and a few kindred odds and ends. How, the challenge proceeds, could one hope to find out about that external world from such meager traces? In short, if our science were true, how could we know it? [...] [The epistemologist's] problem is that of finding ways, in keeping with natural science, whereby the

¹Quine contrasts his approach to epistemology to that of 'the old epistemologists'; unlike these old epistemologists, Quine seeks no firmer basis for science than science itself [30, 16]. In this work, I will not discuss the metaphilosophical issue of naturalism in epistemology. Although Quine's systematic work in epistemology is one of the central concerns of this work, his arguments in favor of his naturalistic conception of epistemology, against that of the 'old epistemologists', will be left out of discussion.

human animal can have projected this same science from the sensory information that could reach him according to this science.[. . .]

[W]e can fully grant the truth of natural science and still raise the question, within natural science, how it is that man works up his command of that science from the limited impingements that are available to his sensory surfaces. [22, 2-3]

The central point in these passages is that epistemology studies the question how the human organism can have projected its science on the basis of the kind of sensory stimulation it receives. In such inquiry, we are relying on our knowledge about the external world, and especially about ourselves as denizens of this world, in settling the question how we can have such knowledge in the first place. Assuming this starting point means that we have already accepted that a part of our current science is true; we adopt a view about our 'source of information' which is itself a view about physical things in the external world. 'Cartesian doubt', representing an enterprise of laying a philosophical foundation for knowledge about the external world, is rejected. Quine thinks that the epistemological question he is posing can nevertheless be appreciated as a genuine one. This question is pressing because according to our current scientific view of the world, 'our ongoing cognitive access to the world around us is limited to meager channels' [25, 6], that is, to electromagnetic, chemical, or mechanical irritation of our sensory receptors. Somehow, we have managed to elaborate complex views about the world on this meager basis, and the question Quine addresses is, how this accomplishment of ours is possible.

Modal locutions play a prominent role in Quine's description of the task of epistemology. The question is how we *could* find out about the external world on the basis of the sensory stimulation which is, according to our best scientific views, our only source of information about the external world. How *can* we have projected our science about the world from this basis? In his study of reification, Quine focuses on the question how we can have come up with a theory about the world as consisting of objects on the basis of the kind of neural intake available to us. He describes himself as studying the *possibility* of reification: how we as a species or as individuals *could have* developed our concrete and abstract ontology [21, 291]. Quine's use of modal locutions in describing the task of epistemology has to do with the challenge he sees the epistemologist as facing: in short, if our science were true, how could we know it (i.e., know that science)? Given especially that part of our science which deals with our 'meager channels' of information about the world, how *can* our possession of science be accounted for by that science itself? The challenge is

that human knowledge, our systems of beliefs about the world, may not fit into the scientific world-view at all; that the scientific world-view *cannot* account for our having the knowledge or beliefs we take ourselves to have. Peter Hylton describes Quine's strategy of answering this challenge as follows:

This challenge is met if we can show, in naturalistic terms, how we *might* have acquired our system of beliefs; how that system, understood in that way, would genuinely be about the world; and how it would stand a chance of being, at least to some extent, true of the world. Whether Quine's suggestions fully correspond to the psychological realities of the situation is, from this point of view, not crucial. His claim is that the challenge would be met by an account, in purely naturalistic terms, of how cognitive language might be acquired. [101, 97]

Quine's genetic study in epistemology is thus an attempt at an account of how we could have acquired our theory of the world given our scientific world-view and especially our scientific view about our channels of information. This account must be given in terms which are respectable from the point of view of our best scientific theories. Such an account cannot take for granted notions like observation and linguistic meaning without showing how these notions are replaced by, or explained in, terms which meet scientific standards. In section 4.3 I discuss what scientific standards amount to in this case.

In his genetic answer to the challenge facing the epistemologist Quine abstracts from many details of the actual process of language acquisition which are not essential to his epistemological inquiry. Moreover, his account of reification focuses on the acquisition of a logically regimented language which no one learns as a first language. However, in spite of his abstract and speculative approach, Quine's genetic study is based on views about the actual features of the language-acquisition process. For example, Quine does think that expressions which he calls observation sentences really function as the entering wedge at the outset of language acquisition and that the rest of language is learned on the basis of the learning of some observation sentences. He also thinks that the psychological processes which he calls inductive learning and analogical synthesis are at work in actual language acquisition.

Although Quine talks about *knowing* in connection with his description of the epistemologist's task, it should be noted that an analysis of the notion of knowledge is not one of his concerns. Asking after sufficient and necessary conditions of knowledge is not part of Quine's theory of knowledge. Quine thinks that the theory of knowledge 'blushes for its name' [60, 322] – while

talk of knowing and knowledge is unobjectionable in everyday discourse, it is unsuited for more technical discourse because of its vagueness. Instead of asking what it is to have knowledge as distinguished, for example, from mere true belief, Quine asks how we can have developed science in the broad sense of a theory of the world, and why this science works. He also makes a similar case of the notion of *evidence* – he says there is no room for this notion as a technical term in his epistemology.² In spite of this, he often speaks of sensory evidence and the evidential relation in less technical contexts.

4.2 Science and Objects as Theoretical Posits

In the context of epistemological investigation Quine uses the word 'science' in a broad sense. Understood in this broad sense, science is something we find already in nonlinguistic species: prediction or anticipation of future experience in the light of past experience. All sorts of behavioral dispositions, whether the hereditary ones shaped by natural selection, or those acquired during the lifetime of an organism, count as science in this broad sense.³

Just as the primitive induction⁴ achieved by linguistic as well as nonlinguistic animals is a sort of rudimentary science, in the sense of prediction of future experience in service of survival, so the human organism's use of observation categoricals⁵ to express inductive generalizations is propagation of a rudimentary *theory* about the world [30, 26]. The innate standards of perceptual similarity⁶, on which primitive induction and all learning and habit formation are based, are, according to Quine, theoretic [28, 163]. They are part of science, in the broad sense of the word.

Focusing on the human organism, the scope of science in this broad sense extends from innate standards of perceptual similarity to common-sense views about external objects (our 'rudimentary science of common sense' [47, 290]),

²See e.g. [24, 2], [19].

³This broad sense of 'science' can be found, for example, in [47, 288-290]. See also [24, 20]. Quine's view of science as ultimately a tool for predicting future experience in the light of past experience is expressed in [44, 44]. Quine also uses the word 'science' as restricted to academic subjects, covering the human as well as the natural sciences, and calls this usage a broad construal of science. The even broader construal discussed in the present section sits well with the more restricted one which covers only academic subjects, since Quine sees science in this more restricted sense as continuous with common sense and the biological instinct of primitive induction and the learning based on primitive induction. See e.g. [101, 15-16].

⁴See section 5.1.

⁵See [30, 25], and section 5.2.

⁶See section 5.1.

and to all kinds of scientific theories, in the social, human, natural or formal sciences. And although our developed science is, in its linguistic expression, very unlike the primitive inductive instinct, it bears a fundamental similarity to its primitive counterpart:

An animal may learn to tell a cat from an owl. The ability to learn is itself a product of natural selection, with evident survival value. An animal's innate similarity standards are a rudimentary instrument for prediction, and then learning is a progressive refinement of that instrument, making for more dependable prediction. In man, and most conspicuously in recent centuries, this refinement has consisted in the development of a vast and bewildering growth of conceptual or linguistic apparatus, the whole of natural science. Biologically, still, it is like the animal's learning about cats and owls; it is a learned improvement over simple induction by innate similarity standards. It makes for more and better prediction.

[...] Science is a ponderous linguistic structure, fabricated of theoretical terms linked by fabricated hypotheses, and keyed to observable events here and there. Indirectly, via this labyrinthine superstructure, the scientist predicts future observations on the basis of past ones; and he may revise the superstructure when the predictions fail. It is no longer simple induction. It is the hypothetico-deductive method. But, like the animal's simple induction over innate similarities, it is still a biological device for anticipating experience. [47, 291]

The present study focuses on the process of reification, that is, the positing of objects in theories about the world. According to our knowledge of our sensory systems, objects are not immediately given to us: all we have to go on is the action potentials in our receptor cells, caused by physical and chemical forces. In accordance with this view about our sensory access to the world, Quine takes objects to be *theoretical posits*, posited by human organisms as part of their science understood as a biological device for anticipating experience.

Quine uses the word 'science' also in a metaphilosophical context. He describes his naturalistic orientation in epistemology by saying that epistemology is an enterprise within natural science. Susan Haack argues that in this metaphilosophical context, Quine is ambiguous in his use of the word 'science', at times meaning 'our empirical beliefs generally' and at other times meaning, more restrictedly, 'the natural sciences' [94, 339-343]. Haack argues that Quine

dubiously shifts between these two senses in his discussion of the nature of naturalized epistemology. This shifting, according to Haack, blurs a significant distinction between 'scientistic naturalism' and 'modest naturalism' in epistemology. Haack thinks that Quine sometimes embraces a scientistic position, according to which epistemology is seen as part of empirical psychology,⁷ but that in his argument for this position, he switches between the different senses of 'science' [94, 343]. The issue which Haack is addressing concerns the question of the place of Quinean naturalized epistemology within the totality of science. On this question, Quine may well be ambiguous. As already said, this is a metaphilosophical question concerning naturalism in epistemology. In distinction to Quine's (alleged) ambiguity in his use of 'science' in this metaphilosophical context, I think that his use of this word *within* his naturalized epistemology, in the broad sense just outlined, is clear enough. The metaphilosophical issue about the character of Quine's naturalism, and Quine's use of 'science' in this metaphilosophical context, will not be further discussed in the present study.

Quine expressed his conception of objects as theoretical posits well before presenting his more detailed genetic account of reification. In his classic essay 'Two Dogmas of Empiricism', Quine sees objects as theoretical posits which serve the prediction of future experience:

As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries – not by definition in terms of experience, but simply as irreducible posits, comparable, epistemologically, to the gods of Homer.⁸

Later, in 'Things and their Place in Theories' (from 1981), Quine expresses the same point:

Our talk of external things, our very notion of things, is just a conceptual apparatus that helps us to foresee and control the triggering of our sensory receptors in the light of previous triggering of our sensory receptors. The triggering, first and last, is all we have to go on.

⁷Quine is at times explicit on this point; see e.g. [22, 2-3], [3, 82]. But Quine also thinks that naturalized epistemology can be practiced at one or more removes from the laboratory of an empirical psychologist [22, 3], [24, 1-2].

⁸[44, 44] (footnote omitted).

In saying this, I too am talking of external things, namely, people and their nerve endings. Thus what I am saying applies in particular to what I am saying, and is not meant as skeptical. [...] But there remains the fact – a fact of science itself, that science is a conceptual bridge of our own making, linking sensory stimulation to sensory stimulation; there is no extrasensory perception. [34, 1-2]

In this quotation, Quine also restates the view about naturalized epistemology he expresses in the passage from *The Roots of Reference* quoted on page 75 above, namely, that science and epistemology *reciprocally contain* each other [3, 83]. Science tells us that there are physical objects and forces, such as humans, receptor cells, light rays, and air pressure. Epistemology is contained in natural science in that it studies a natural phenomenon, the human organism in its environment, and adopts the theories and theoretical posits of science where these theories and posits are relevant to the epistemological inquiry. On the other hand, natural science is contained in epistemology. Natural science itself tells us that whatever evidence there is for science is sensory evidence which consists in the action potentials of our receptor cells.⁹ Science itself is our own construction from the sort of sensory intake available to us, and epistemology studies the question how such construction can be achieved.

According to Roger F. Gibson, appreciation of the reciprocal containment between science and epistemology is important for understanding Quine's position.¹⁰ Gibson interprets Quine's idea of reciprocal containment as the view that there is no exclusively epistemological perspective. From the point of view of the process of constructing theory on the basis of sensory intake, everything to which existence is conceded is a posit; but from the point of view of the theory which is being constructed, the posits are real. And epistemology, which studies the process of theory construction, is itself a theory which includes sentences about such things as molecules, receptors and humans, and is thus connected to further theory about these sorts of things. Even in epistemology, we can never do better than occupy the standpoint of some theory or other [45, 22]. Quine's epistemological view of objects as theoretical posits, and his study of the reification process, should not be understood as an epistemological doctrine about the unreality of the objects of common sense or any field of science. When the Quinean 'scientific epistemologist' discusses the question how human animals

⁹Quine sees the dictum 'Whatever evidence there *is* for science *is* sensory evidence' as one of the two cardinal tenets of empiricism which 'remain unassailable' in his naturalistic setting [3, 75].

¹⁰See [91, 451], [90, 45].

can have managed to arrive at their science on the basis of the irritation of their sensory surfaces, he 'talks of how men posit bodies and hypothetical particles, but he does not mean to suggest that the things posited do not exist' [29, 72]. Quine says that one source of his naturalistic conception of epistemology is *unregenerate realism*: 'the robust state of mind of the natural scientist who has never felt any qualms beyond the negotiable uncertainties internal to science' [29, 72]. Quine's unregenerate realism arises from his view on the skeptic's challenge [90, 28-31]. The skeptical challenge arises from within science itself, from appreciation of such phenomena as dreams and sensory illusions. Since the skeptic relies on science in her assault on science, the epistemologist may as well assume science in her answer to the skeptic. A *global* skepticism which purports to challenge science from without is, from Quine's point of view, an illicit perspective, a result of a failure to acknowledge the presuppositions of one's own position.¹¹

One task of naturalized epistemology as the discipline that studies the relation between sensory evidence and theory is to answer the question to what extent our science is determined by evidence, and how much of it 'transcends all available evidence' [3, 83]. Thus we can subtract 'man's net contribution' to (some part of) science by looking into how much of (that part of) science is not determined by sensory evidence.¹² A central point in Quine's study of reification is that the conception of the world as consisting of objects is part of man's net contribution, not determined by sensory evidence. This point is expressed in the following passage from 'Structure and Nature':

Natural science tells us that our ongoing cognitive access to the world around us is limited to meager channels. There is the triggering of our sensory receptors by the impact of molecules and light rays. Also there is the difference in muscular effort sensed in walking up or down hill. What more? Even the notion of a cat, let alone a class or number, is a human artifact, rooted in innate predisposition and cultural tradition. The very notion of an object at all, concrete or abstract, is a human contribution, a feature of our inherited apparatus for organizing the amorphous welter of neural input. [25, 6]

Since the positing of objects is part of the science of the human organism, naturalized epistemology attempts to give an account of how we can have managed

¹¹See [91, 450]. For Quine's own discussion of skepticism, see e.g. [22, 2-3].

¹²[45, 5], see also [22, 3-4].

to come up with these posits on the meager basis of the irritation of our sensory receptors. Quine gives such an account from a genetic perspective. In his genetic program, he looks at the question how a human individual could acquire a referential language. It is mostly from this ontogenetic perspective that Quine approaches the question about the positing of objects. Alternatively, Quine's genetic program can be looked at from a phylogenetic, or evolutionary, viewpoint – as an attempt to answer the question how our species could have achieved the level of referential language. Quine has called the process of acquisition of the notion of an object 'the psychogenesis of reference'¹³ [22, 84], or 'reification' [30, ch. 3].

4.3 Reification and Language

Up to now, I have not addressed the question what Quine means by 'conceptual importing' of objects, or having a 'notion' of an object. What is to count as evidence that an organism has or does not have the notion of an object as part of its cognitive machinery of predicting future experience in terms of past experience? According to Quine, his approach to epistemology requires that the epistemologist maintain 'scientific standards' [22, 34]. Scientific standards have to do with a demand for intersubjective evidence. These scientific standards demand that evidence

must regularly be sought in external objects, out where observers can jointly observe it. Speculation is allowable if recognized for what it is and conducted with a view to the possible access of evidence at some further stage. [22, 34]

In the study of human science as a tool for predicting future experience in terms of past experience, one must deal with forms of cognition which are not reflected in observable behavior in the same simple way as primitive induction on the basis of perceptual similarity is (see section 5.1). Quine thinks that the sort of developed cognition involved in human science can only be studied by focusing on language:

We want to know how men can have achieved the conjectures and abstractions that go into scientific theory. How can we pursue such an inquiry while talking of external things to the exclusion of ideas and concepts? There is a way: we can talk of language. We can talk

¹³Also 'the ontogenesis of reference' [45, ch. 3].

of concrete men and their concrete noises. Ideas are as may be, but the words are out where we can see and hear them. [22, 35]

This point is based on Quine's insistence on scientific standards. Human cognition should not be studied in terms of unobservable ideas or concepts. We need something intersubjectively observable to go on, namely, the use of language. In particular, and of special importance to the theme of the present study, Quine considers the positing of objects a form of human cognition that can only be studied by focusing on language:

The assuming of objects is a mental act, and mental acts are notoriously difficult to pin down – this one more than most. Little can be done in the way of tracking thought processes except when we can put words to them. For something objective that we can get our teeth into we must go after the words. Words accompany thought for the most part anyway, and it is only as thoughts are expressed in words that we can specify them.

If we turn our attention to words, then what had been a question of assuming objects becomes a question of verbal *reference* to objects. [34, 2]

According to Quine, the epistemological question about the relation between evidence and theory can be approached by considering the acquisition of language. This is because Quine accepts 'the commonplaces of the verificationist theory of meaning', namely the view that 'the meaning of a sentence lies in the observations that would support or refute it' [22, 38].¹⁴ Combined with the idea that to learn a language is to learn the meaning of its sentences, this verificationist conception leads to the view that the 'evidence relation and the semantical relation of observation to theory are coextensive' [22, 38].¹⁵ The evidential relation between observation and theory is, according to Quine, 'virtually enacted' in the process of language acquisition [47, 294].

Quine considers the notion of an observation problematic insofar as observations are conceived as private mental states or acts. Such a conception makes observations mentalistic in a way unacceptable to Quine: attribution of one or another observation to a subject is beyond the reach of intersubjective verification. However, Quine does not drop the notion of observation in favor of construing empirical evidence in terms of external objects and events [24, 2].

¹⁴See also [3, 80]. Quine does not intend his verificationist conception as a positivist criterion of meaningfulness, as pointed out in footnote 8 on page 138 below.

¹⁵See also [45, 17], [89, 80-81].

He thinks his epistemological interest is best served by focusing on 'the flow of evidence from the triggering of the senses to the pronouncements of science' [24, 41]. Quine's solution to the problem presented by the notion of observation lies in focusing on the observable use of language. 'Observation' as a technical term, and the notion of evidence insofar as evidence consists in observations, can be dropped in favor of talk about observation *sentences* (see section 5.2). Thus Quine ends up talking about language at the observational end as well as at the theoretical end.¹⁶ However, Quine's methodological focus on language and verbal behavior is not to be understood as being due to a complete rejection of mentalistic terminology. Rather, it is based on Quine's demand for intersubjectively available evidence [18]. Mental acts or processes may well be posited, but only on the basis of intersubjectively available evidence or at least with a view to possible access of such evidence at a later stage, and this kind of evidence is obtained from observable behavior.

Given this methodological focus on language in Quine's genetic program, the study of reification amounts to the study of how a child could acquire referential language. Quine thinks that no kind of behavioral evidence short of the use of certain constructions of referential language suffices as evidence that the organism under observation has posited objects.

It has been argued that Quine is not justified in his claim that the positing of objects as a mental act can be studied only by studying the development of language and linguistic reference. The study of object representation in infants is an active field in developmental psychology. Research in this field focuses on different aspects of prelinguistic infants' representation of objects. The psychological investigation of infant object representation is evidentially based on *nonverbal* behavior of prelinguistic subjects. Next, I will briefly look at the critique against Quine's conception of reification that has surfaced from this field. I will also try to present some considerations why this critique may not be as fatal to Quine's program as it is sometimes claimed to be.

According to Sara Bernal, there is considerable agreement among researchers that as early as a few months of age infants have representations of solid and spatiotemporally continuous objects [69]. The view that infants represent their environment as containing objects at an early age is often contrasted with Jean Piaget's results in his pioneering work on the child's construction of reality [121]. The main complaint is that Piaget placed the emergence of representation of bodies as spatiotemporally continuous at too late an age.¹⁷ Quine's genetic

¹⁶See [22, 38-39], [24, 2-3].

¹⁷See e.g. [67], [66, 1244].

study of reification has also been criticized for placing the beginning of object representation at too late a stage in the cognitive development of the individual. Fei Xu mentions Piaget and Quine as representatives of 'the traditional view' which 'holds that the infant's world does not contain any objects persisting through time and space' [136, 388]. The critique of Quine's position is usually based on the general conception that infants represent objects from an early age on; the critique is not based on results from any particular experiment used in studying some particular feature of infants' object representation.¹⁸ The critique is based on several kinds of experiments in which infants are found to respond in ways that are not compatible with a view that they would only be responding to similarities in a 'Quinean quality space' without perceiving spatiotemporally enduring objects in the scenario (the phrase 'Quinean quality space' is used by Xu [136, 380], in reference to Quine's discussion in *Word and Object* [45, 83-84] of what he later came to call standards of perceptual similarity (see section 5.1)). On the basis of this general observation arising from different experiments, Bernal asserts that the data from experiments conducted in developmental psychology *falsify* Quine's view of the process of reification [69]. The basic point which seems to contradict Quine's view of reification is that experiments suggest that infants represent objects prior to acquiring any significant amount of language, whereas Quine ties the assuming of objects to the acquisition of rather sophisticated linguistic constructions.

In *The Roots of Reference* [22, 54], and in several later works,¹⁹ Quine gives an indication of his response to this kind of critique from developmental psychologists. He explicitly addresses the challenge based on experiments on object permanence in prelinguistic infants. Quine thinks that the experimental data which suggest, for example, that a child expects a moving object to reappear from behind an occluder can be accommodated by his own theory. According to Quine, humans are genetically predisposed to recognize by behavioral response a simple and unified figure with continuity of displacement and deformation. The action potentials in our receptor cells which are due to the presence of bodies (concrete objects) tend to be behaviorally efficient, or as Quine says, *salient*.²⁰ This kind of salience is evidence of the innate 'body-mindedness' of humans and other animals. Quine recognizes an early finding in the study of infant object

¹⁸Renée Baillargeon explains how different aspects of infants' representation of different types of events involving objects (such as occlusion, support or containment events) develops gradually over the first year, and how infants' early 'physical knowledge' systematically results in wrong expectations in some cases [65].

¹⁹E.g. [24, 24], [54], [56].

²⁰See [56, 278] and section 5.1.

perception:

[R]eadiness to recognize the persistence of an object in uniform motion, despite temporal interruption, is reported in early infancy: the baby will see an object pass behind a screen and show surprise when it does not duly emerge at the other side.²¹

For Quine, this is a manifestation of our innate body-mindedness. Our behavioral responses are often keyed to neural stimulation to the causing of which bodies contribute. Quine gives an evolutionary account of body-mindedness:

Man is a body-minded animal, among body-minded animals. Man and other animals are body-minded by natural selection; for body-mindedness has evident survival value in town and jungle. [22, 54]

Infants' expectation of a reappearance of a moving object from behind an occluder has been studied by means of the looking-time methodology, which is the most common method used in the empirical study of infant object representation, especially with very young subjects. A simplified, schematic characterization of the looking-time methodology goes as follows. By repeated presentation of a stimulus event, the infants are habituated to that event, and habituation is behaviorally manifested in a decrease below a specified level of the time the infants spend looking at the event. When some change is introduced in the stimulus event and the altered stimulus event is presented to infants, their looking-times may go up. If the looking-times come up to some specified degree, this is understood as evidence that the infants interpret the stimulus event as a novel one. Test events are novel to the subject in this sense. Experiments are so designed that some test events seem to violate some principle in the adult conception of the physical world, while control events incorporate only such changes to the habituation event which do not seem to violate any such principle. If infants' looking-times are reliably and significantly longer on the 'impossible' test events than on the 'possible' ones, this is taken as evidence in support of the view that there is some cognitive mechanism in infants which produces representation of the principle in question.²² For example, infants' expectation of reappearance of a moving object from behind an occluder, as manifested by a rise in looking-times, is interpreted as evidence for the view that infants

²¹[22, 54] (footnote omitted).

²²Scholl includes a short explanation of the looking-time methodology, and also an overview of some experiments [126]. Besides the looking-time methodology, manual reaching tasks are also used in studies of object representation in prelinguistic infants. See [133, 183-189] for an overview of experiments based on different methodologies.

conceive of material objects as permanent, that is, spatiotemporally continuous, also when the objects are momentarily out of sight. The 'impossible' test event, where the moving object does not reappear from behind an occluder, produces longer looking-times than another event where the object duly reappears from behind the occluder. By the looking-time methodology, researchers have acquired evidence of object permanence in very young children. The contemporary view, according to which infants of 2 and a half months of age exhibit a basic conception of object permanence and solidity²³, is supported by the sort of looking-time data which Quine refers to in the above quotation.²⁴ The question as to what sort of cognitive mechanism or architecture should be invoked to explain the data from object-perception tests on prelinguistic infants, and how wide a variety of such data can be explained by one and the same mechanism, are central theoretical issues in the field. However, these issues need not be discussed in the present study, since the critique of Quine's position arising from this field does not seem to be tied to any particular explanatory model.

For Quine the positing of objects amounts to more than just innate body-mindedness. According to him, the reactions observed in infants do not support the conclusion that the infants have posited the objects they are in fact observing. Reification, in the case of concrete observable objects, involves a conception of these objects as spatiotemporally continuous over prolonged absence and the capacity to speculate on their histories and the changes occurring in them. Quine's way of binding reification to this rather sophisticated level of conception of the physical world affects his take on the results of psychological experiments on object perception in infants:

True, an infant is observed to expect a steadily moving object to reappear after it passes behind a screen; but all this happens within the specious present, and reflects rather the expectation of continuity of a present feature than the reification of an intermittently absent object. [24, 24]

In the case of infants, the behavior which manifests expectation of continuity of a present feature is a matter of 'simple extrapolation' [23, 7]; it can be accounted for by infants' capacity for primitive induction. The capacity for primitive induction is, roughly, the capacity to expect similar occasions to have similar sequels. (Perceptual similarity and primitive induction are discussed in more detail in section 5.1.) Before the acquisition of the linguistic apparatus for referring to

²³Solidity in this context means the conception that two objects cannot occupy the same location at the same time.

²⁴See e.g. [65, 77-79].

objects, the notion of diachronic non-identity (or identity) between qualitatively very similar (or dissimilar) objects makes no sense, especially with respect to longer time intervals.²⁵ Quine uses the term 'perceptual reification' (as opposed to 'full reification') for this behavioral effect of innate body-mindedness [27, 350]. Some psychologists have taken notice of Quine's account of the data from looking-time experiments in terms of innate body-mindedness [132, 105-106]. However, they seem to misconstrue the idea of body-mindedness by thinking that Quine's notion of a body in this connection is not that of a body as a physical object. On the contrary, it is just that. The idea behind innate body-mindedness is simply that the action potentials which are behaviorally effective are likely to be among those to the causing of which bodies (understood as physical objects) contribute.

A more detailed look into the massive body of research on infant object representation is beyond the scope of the present study. What is of importance here is that the evidence produced in that field does not uncontroversially falsify Quine's view on reification, or render his genetic program obsolete. Quine's epistemology may be seen as capable of accommodating these results, for example in terms of innate body-mindedness.

²⁵See [24, 24], [30, 36].

Chapter 5

Quine's Genetic Account of Reification

In this chapter, I discuss Quine's genetic account of reification, the positing of objects in the course of the acquisition of declarative language. The character of this discussion is mainly expository. I begin by looking at the learning theoretic basis of Quine's genetic account and the processes of inductive learning and analogical synthesis which figure centrally in this account (section 5.1). Quine explains the earliest stage of language acquisition in terms of his conception of inductive learning. This early stage consists in the learning of observation sentences as holophrastic units, that is, as syntactically unstructured expressions. In sections 5.2-5.4 I explain some aspects of Quine's account of the language acquisition process from the first observation sentences to the focal observation categorical construction which Quine sees as achieving reference to objects. I will leave some details of Quine's account in *The Roots of Reference* aside, and focus only on those parts of his genetic story which are crucial to the purposes of the present study. In section 5.5, I discuss Quine's systematic view of the relation between sensory evidence and theory which arises from his genetic story. As in the earlier sections, I focus only on those aspects of Quine's view which are of importance for my present concerns.

As explained in section 4.1, the epistemological challenge that Quine is answering consists in the demand for an account of how we can have a theory about the world given our scientific conception of the nature of our sensory access to the world. In brief, the challenge is that our science may be incapable of

explaining our possession of that science. As Hylton points out in the passage quoted on page 77, the challenge is to be met by showing how we might have acquired our system of beliefs. The present chapter is an exposition of Quine's answer to this challenge as regards the question how we can have a theory of the world as consisting of objects.

At the end of this chapter, I will have presented all the material needed for the discussion of a connection I argue to exist between Quine's critique of quantified modal logic and his epistemological conception of objects. This discussion will be undertaken in chapter 6, where I will argue that Quine's conception of objects supports his critique.

5.1 Quine on Learning

I start the exposition of Quine's view on learning by introducing three central notions: global stimulus, receptual similarity, and perceptual similarity. The global stimuli of *From Stimulus to Science* closely correspond to what Quine calls 'episodes' in the earlier book *The Roots of Reference* [22, 16]. In *From Stimulus to Science*, a global stimulus consists of the sensory receptors of a subject's body that are triggered during a specific time interval.¹ In this study, I will use the notion of global stimulus, except in quotations from *The Roots of Reference* where I will retain the original word 'episode'.

Given a subject A , a *global stimulus* during a time interval $t_1 - t_2$ ² is the temporally ordered class of the subject's receptors triggered during that time interval [30, 17]. *Receptual similarity* is a similarity relation between global stimuli. It is a matter of 'mere physical similarity of impact on the sensory surfaces, regardless of behavior' [22, 16]. Global stimuli are receptually similar to the degree that the set of sensory receptors triggered on the one occasion approximates the set triggered on the other occasion. (Since the sets of triggered receptors are temporally ordered, the positions of the receptors in temporal ordering must also be taken into account in the evaluation of similarity here.) Receptual similarity is a triadic relation: global stimulus a is receptually more similar to global stimulus b than to global stimulus c .

In characterizing *perceptual similarity* Quine appeals to the notion of *receptual neighborhood*:

¹[30, 17], see also [24, 3-4].

²Quine simply speaks about a 'moment' or 'specious present' here. However, it is clear from his definition of the notion of global stimulus that this 'specious present' can be assigned a temporal ordering.

When we attribute some property to *all* points in the *neighborhood* of a point p , [...] we mean that there is a point q that is distinct from p and is such that every point nearer to p than q has the property. Applying this idea to receptual similarity, let us attribute a property to *all episodes in the receptual neighborhood* of an episode a when what we mean is that there is an episode d that is not receptually identical with a and is such that every episode that is receptually more similar to a , than d is, has the property in question. [22, 17]

With the help of the notions of receptual similarity and receptual neighborhood Quine gives a sufficient condition for the holding of the relation of a global stimulus a being perceptually more similar to global stimulus b than to global stimulus c for a subject A . A global stimulus a is perceptually more similar to global stimulus b than to global stimulus c for A if A has been conditioned to respond in some way to any global stimulus in the receptual neighborhood of b and to withhold that kind of response from any global stimulus in the receptual neighborhood of c , and then is found to so respond to any global stimulus in the receptual neighborhood of a .³ Quine extends this behavioral condition into a polyadic form: the relation of a 's being perceptually more similar to b_1, \dots, b_m than to c_1, \dots, c_n [22, 18-19]. Usually receptually very similar global stimuli are also perceptually similar; however, receptually very dissimilar global stimuli can be perceptually similar, as long as those receptors which are relevant for the behavioral response are triggered in the appropriate temporal order. Usually, most triggerings in a global stimulus are behaviorally ineffective. The receptors that a global stimulus a shares with other global stimuli perceptually similar to a are called the *salient* receptors of a [30, 18].

Perceptual similarity is connected to the notion of behavioral *disposition*.⁴ Learning by the conditioning of responses consists in the shaping of behavioral dispositions to respond in certain ways when exposed to members of a certain class of global stimuli. In order to be capable of thus becoming conditioned to respond at all, an organism has to have some *standards of perceptual similarity*. Without such standards, responses could not become keyed to any particular class of global stimuli. According to Quine, standards of perceptual similarity are second-order behavioral dispositions:

³See [22, 17-18], [54, 180], [38, 1].

⁴According to Quine, talk about dispositions can be explicated in terms of a physical state – known or unknown – of the thing to which a disposition is attributed. See e.g. [45, 222-225], [22, §§ 3-4], [46, 322-323]. In the case of a behavioral disposition, for example a disposition to utter an expression under some range of global stimuli, the physical state is a neurophysiological one.

Perceptual similarity is a question of the subject's disposition to submit to conditioning in one way and another; hence of his disposition to acquire or change his habits of response. These habits are themselves dispositions to behavior, and thus it is that perceptual similarity is a bundle of second-order dispositions to behavior. [22, 18]

In addition to standards of perceptual similarity, learning depends on there being within the subject *A* some sort of *traces* of past global stimuli [22, 24-25]. Standards of perceptual similarity relate traces of past global stimuli to present global stimuli. If *A*'s standards of perceptual similarity are to have any effect on *A*'s behavior, Quine argues, *A* must harbor some physical state that was brought about by a past global stimulus. The *strength* of a trace concerns its capacity to be *enlivened* by its perceptual similarity, according to an organism's standards, to any present global stimulus [22, 26]. According to Quine, the strength of a trace depends partly on its recency. Strength is an absolute value in the sense that it is not relative to the degree of perceptual similarity between the trace and a present global stimulus. The enlivening effect between a trace and a present global stimulus is reciprocal:

Between the trace of a past episode and the present episode, we see, the enlivening effect is reciprocal. Similarities enliven the trace [...]. And conversely [...] the trace enhances the salience of the present episode at its points of similarity to the past one. [22, 26]

The motivational effect of pleasure and discomfort depends on traces. Traces include an *index of pleasure or discomfort* [22, 28]. If a trace of a past global stimulus has an index of pleasure, and it is enlivened by a present global stimulus, the subject is impelled to increase the similarity of the present global stimulus to the past one. If a trace has an index of discomfort, the subject is impelled to decrease the similarity or at least hinder its increase. Besides recency, the strength of a trace also depends on the degree of pleasure or discomfort preserved in its index. *Vividness* of a trace depends on its strength and on the degree of the perceptual similarity of the global stimulus whose trace it is to the present global stimulus [22, 26]. The strength of a subject's drive to increase or decrease the similarity of the present global stimulus with one that has left a trace in the subject varies with the vividness of the trace [22, 28]⁵.

Standards of perceptual similarity are of central importance to Quine's theory of learning. He sees perceptual similarity as the basis of all learning. For

⁵See also [89, 16].

Quine, a basic kind of learning consists in a change in an organism's standards of perceptual similarity. However, this sort of change would not take place if the organism did not already have a propensity to expect perceptually similar global stimuli to have sequels perceptually similar to each other. Quine calls this propensity the capacity for *primitive induction*:

Perceptual similarity is the basis of all expectation, all learning, all habit formation. It operates through our propensity to expect perceptually similar stimulations to have sequels perceptually similar to each other. This is primitive induction. [30, 19]⁶

This propensity has the effect of setting the subject 'to trying to recapture pleasant episodes on which he already has a head start, or to avert unpleasant ones that have already begun to recur' [22, 28]. Through this effect, certain kind of global stimuli become perceptually more similar to each other, as evidenced by the subject's behavioral response (the attempt at recapturing or averting). In this study, I call the learning process in which standards of perceptual similarity change as a result of the operation of primitive induction *inductive learning*.

No learning could take place in the absence, in the learning subject, of some standards of perceptual similarity. According to Quine's theory of learning, all organisms capable of learning must have some standards of perceptual similarity innately:

If an individual learns at all, differences in degree of similarity must be implicit in his learning pattern. Otherwise any response, if reinforced, would be conditioned equally and indiscriminately to any and every future episode, all these being equally similar. Some implicit standard, however provisional, for ordering our episodes as more or less similar must therefore antedate all learning, and be innate. [22, 19]

Since it is presupposed in learning, moreover, perceptual similarity cannot itself have been learned, not all of it; some had to be innate, though it gets overlaid and changed as learning progresses. [38, 2]⁷

A present global stimulus is compared for similarity to past ones only through the traces left by the past global stimuli; without traces, there would be no standards of perceptual similarity. For this reason, Quine also postulates innate

⁶See also e.g. [56, 464].

⁷See also [30, 19], [5, 123].

traces in his theory of learning [22, 26]. Standards of perceptual similarity confer salience on some of the receptors in a global stimulus – the salient receptors are the behaviorally effective ones. Quine mentions some conditions of salience which are induced in humans by innate traces and innate standards of perceptual similarity. As regards objects which play a causal role in producing global stimuli, conditions of innate salience include focal position in the visual field, motion, brightness, boundary contrast and gaudy color [22, 26]. The innate body-mindedness discussed in section 4.3 is based on innate salience.

According to Quine, an organism’s standards of perceptual similarity constitute ‘a rudimentary instrument of prediction’ [47, 291]. Sometimes predictions produced by an organism’s capacity for primitive induction go wrong – an anticipated pleasure fails to materialize, or a response fails to save the organism from some unpleasant global stimulus or perhaps unexpectedly results in a pleasant one. Such failures may result in reshaping of the organism’s standards of perceptual similarity, that is, in inductive learning. Some failures of primitive induction may prove fatal. Quine sees here an answer to the question why induction works: natural selection favors those standards of perceptual similarity which result in successful prediction. As he puts it in a memorable sentence from ‘Natural Kinds’, creatures inveterately wrong in their inductions have a pathetic but praiseworthy tendency to die before reproducing their kind [5, 126]. Successful prediction has survival value, and those innate standards of perceptual similarity which produce successful predictions in the environment are passed on by natural selection:

[N]atural selection has endowed us with standards of perceptual similarity that mesh pretty well with natural trends, affording us better than random success in our expectations. Thus it is that induction has been serving us and other animals so well. [30, 20]⁸

Due to natural selection, the individuals of a species are genetically endowed with standards of perceptual similarity which are mutually harmonious in the following sense: if the global stimuli *A* receives when it is witnessing two different occasions are perceptually very similar for *A*, the global stimuli *B* receives when it is witnessing the same two occasions are likely to count as perceptually very similar for *B*. Quine calls this the *preestablished harmony* of standards of perceptual similarity.⁹

In Quine’s terminology, *ostensive learning* means inductive learning of language without reliance on antecedently acquired language on the learner’s part.

⁸See also [22, 19], [47, 289-290], [54, 177].

⁹See e.g. [30, 20-21], [28, 159-162], [38, 1-2].

According to his theory of language acquisition, the learning of language begins as ostensive learning:

Conditioned response does retain a key role in language-learning. It is the entering wedge to any particular lexicon, for it is how we learn observation terms (or, better, simple observation sentences) by ostension. Learning by ostension is learning by simple induction, and the mechanism of such learning is conditioning. [8, 57]

For Quine, ostensive learning is not restricted to situations where the learning of an observation sentence (or a word as an observation sentence) is accompanied by an ostensive gesture. Rather, 'ostensive learning' simply means inductive learning of language which does not depend on antecedently learned language. Observation sentences are the kind of linguistic expressions which can be learned ostensively, and, in virtue of this feature, they are the foundation of language acquisition [30, 22-23].

As explained above, salience can be independent of learning. Quine's conception of innate salience yields an account of the utility of ostension in the usual sense – the use of a pointing gesture – in the early stage of language learning. In this connection, pointing serves to enhance the salience of a particular portion of the visual field.¹⁰ The salience is conferred on the intruding finger, its immediate background and indefinitely on the region surrounding it. Although our innate capacities tend to confer salience more on the pointing finger than on the region pointed, Quine thinks that pointing nevertheless serves to facilitate ostensive learning:

Even in this primitive effect there is a gain: most of the irrelevant stretches of the scene are eliminated from attention, and much laborious elimination by induction is thus averted. Some limited induction may remain to be done, some reinforcement of the verbal response in the absence of the pointing finger and some extinction of it in the presence of the pointing finger, before the subject succeeds in eliminating the pointing finger in favor of the thing or feature for which the word is intended. [22, 45]

So, in Quine's extended sense of 'ostensive', ostensive learning does not require the occurrence of an ostensive gesture, although such a gesture may facilitate ostensive learning through the salience conferred on the pointing finger.

¹⁰In speaking thus, I extend the proper usage of 'salient' from receptors to features or portions of the 'visual field'. This extension of usage is Quine's.

The learning process which Quine calls *analogical synthesis* [45, 9] consists in learning novel sentences by building them up from parts abstracted from previously learned sentences by analogy with the ways in which those parts occur in the sentences already learned. After ostensive acquisition of some observation sentences, analogical synthesis becomes the prevailing process of learning – that is how most sentences are learned, according to Quine. (In *The Roots of Reference* Quine speaks of a learner’s coming to appreciate a language-dependent similarity between sentences [22, 60]. What is called analogical synthesis in *Word and Object* is language-learning based on acquisition of standards of similarity between sentences already learned.) Analogical synthesis is not explained in terms of Quine’s theory of inductive learning. To accommodate this further learning process, Quine ends up positing further innate capacities beyond those involved in inductive learning.¹¹

5.2 Observation Sentences and Observation Categoricals

Before defining the notion of observation sentence, I must clarify what is meant by ‘sentence’ in this connection. Being a sentence is not a matter of grammatical form. Verbal responses which are, from the point of view of grammatical form, utterances of single words, may count as utterances of sentences. The notion of a sentence is here understood in the sense of *sentence type*. A sentence type is a sequence of phonemes, phonemes being individuated for a single speaker. The criterion of individuation of a phoneme, however, cannot in this connection involve appeal to the notion of meaning. Quine formulates a criterion that he considers behavioral: two sounds count as allophones of the same phoneme if the substitution of a token of one for a token of the other in any token of a string of sounds has no effect on the speaker’s assenting to or dissenting from these tokens of strings of sounds [35, 44-45]. A type sentence that belongs to the speaker’s idiolect cannot be identified with the set of its tokened instances in the speaker’s (past or future) speech, since room must be left for sentences which the speaker is disposed to utter as a response to witnessing some occasion, but which she has never uttered or heard, nor ever will [42, 53-54]. So, a sentence type is here understood as an abstract object, a sequence of phonemes which in turn are sound types. A phoneme as a sound type is understood as the set of all past and future utterings of its tokens by the speaker; for the speaker has

¹¹See e.g. [8, 57-58], [92, 101-102].

presumably tokened each phoneme in her idiolect [45, 194-195].¹²

Observation sentences are *occasion sentences*. Quine defines the notion of occasion sentence as follows:

Occasion sentences, as against *standing sentences*, are sentences [...] which command assent or dissent only if queried after an appropriate prompting stimulation. [...] [S]tanding sentences contrast with occasion sentences in that the subject may repeat his old assent or dissent unprompted by current stimulation when we ask him on later occasions, whereas an occasion sentence commands assent or dissent only as prompted all over again by current stimulation. [45, 35-36]

Examples of occasion sentences are 'It's raining', 'A rabbit!' or 'He's a father of two children'. A speaker's verdict on occasion sentences depends on the stimulation of her sensory receptors (the global stimulus she undergoes) at the time of the passing of the verdict. Standing sentences such as 'The Times has come' and 'There are black dogs' contrast with occasion sentences. The first elicits the same verdict all day, once the newspaper has or has not been delivered, while the second elicits assent invariably. In the case of a standing sentence, the speaker's verdict is not dependent on present stimulation in the way it is in the case of an occasion sentence.

Acquiring further information may affect a speaker's verdict on an occasion sentence queried at different times, as in the case of 'He's a bachelor'. An occasion sentence may depend in this way on further information besides the global stimulus that the speaker presently undergoes. In order to screen out those occasion sentences which in this way go beyond the speaker's current global stimulus, Quine introduces an intersubjective criterion for observation sentences. In the essay 'In Praise of Observation Sentences', Quine gives the following definition:

Observation sentences are *occasion sentences*, true or false from occasion to occasion; sometimes it is raining, sometimes not. [...]

What I have said by way of definition of observation sentences is only half the story, the subjective or solipsistic half. We must also impose an intersubjective condition; for the sentences are learned from other speakers who are sharing the observations. [...] The further requirement for our definition, then, is that assent to the

¹²See also [30, 95-96].

sentence and dissent from it must command agreement of all competent witnesses. 'Competent' here means membership in the chosen community[.] [26, 109]

In his last book *From Stimulus to Science*, Quine gives the same definition:

They [observation sentences] are occasion sentences – true on some occasions, false on others. Furthermore they report intersubjectively observable situations, observable outright. That is to say, all members of the language community are disposed to agree on the truth or falsity of such a sentence on the spot, if they have normal perception and are witnesses to the occasion. [30, 22]

In brief, an observation sentence is *an occasion sentence on which all members of the language community are disposed to give an agreeing verdict (assent or dissent) when witnessing the same occasion*. This definition makes use of the notion of a language community. A sentence may, according to this characterization, qualify as observational for a particular group of specialists considered as a language community, but not for the wider language community to which those specialists belong. A sentence, perhaps involving some technical vocabulary, may thus be counted as observational for that community of specialists. Quine does not give a definition of the notion of a language community, but he does give a behavioral criterion: membership in a language community can be recognized by mere fluency of dialogue, which is something that can be witnessed even without any competence in the language which the speakers observed are assumed to be speaking [22, 39].

Quine's definition of observation sentence presupposes that we are able to say when two or more subjects are *witnessing an occasion*. According to Quine, humans have a capacity to *empathize with another's perceptual situation*. This is a capacity of *projecting oneself into the witness' position*, or of noting *how the scene would look* from the witness' position.¹³ Quine thinks that this capacity has been demonstrated to be innate and that it can be observed also in non-human animals. Our ability to tell what other subjects are perceiving is based on the capacity of empathy. In virtue of this capacity, we are able to say what other speakers are witnessing (perceiving), and whether two speakers are witnessing the same occasion. A statement about another's perceptual situation is of the form '*s* perceives that *p*', where '*s*' marks the place of an expression picking out the agent into whose position we are projecting and '*p*' marks the

¹³See [24, 42-43], [23, 3-4].

place of a sentence which states what the agent is perceiving. In terms of the stimulation of receptor cells, perceptions are private, and highly heterogeneous even for a single subject. As an example, Quine considers the perception that it is raining: an individual's perceptions that it is raining differ receptually not only in time of occurrence, but also because there are various indicators of rain, available in different sense modalities. The idiom 's perceives that it is raining' encapsulates every such subjective perceiving, and cuts through the neurological heterogeneity [24, 62].

Empathy is crucial to language acquisition. In the early stage of language acquisition, the instructor must get the child to utter (or to assent to) an observation sentence under appropriate circumstances, and to refrain from uttering it (or to dissent from it) in inappropriate situations. In order to manage this, the instructor has to be able to project herself into the child's perceptual situation: 'The parent assesses the appropriateness of the child's observation sentence by noting the child's orientation and how the scene would look from there' [24, 42]. Thus the handing down of language depends on the capacity of the instructors to empathize with the perceptual situation of the learners. In this way, mastery of observation sentences depends on mastery of the idiom 's perceives that *p*' [24, 61].¹⁴ This mastery may be only 'virtual', 'tacit' [24, 61], or 'inarticulate' [30, 89-90]. The 'knack' of empathy is, according to Quine, almost comparable to our capacity to recognize faces while unable to sketch or describe them [24, 43]. Quine thinks that the capacity of empathy is innate; he cites as evidence the capacity, observed in newborns, to imitate facial expressions. Quine thinks that imitation is an unlearned instinct in newborns and claims that the capacity of empathy underlies this instinct.

Only a small portion of the observation sentences mastered by a competent speaker has actually been learned ostensively; most of them are learned by analogical synthesis. Individual learning histories vary in this respect within a language community. What is distinctive about observation sentences from a learning-theoretic point of view is that they are the expressions which *can* be learned ostensively.¹⁵ In the beginning of language acquisition, the first observation sentences learned may be single words, such as 'Mama' or 'Milk'. From the point of view of competent speakers, such one-word observation sentences may be terms which refer, but one central point of Quine's account of language learning is that we cannot assume that the child learns them outright as referential expressions. The child is not to be credited with reification at the

¹⁴See also [63, 325-326].

¹⁵See [24, 5-6], [30, 22-23].

outset of language acquisition. For the child, these early acquisitions are on a par with 'It's cold' and 'It's raining': they are 'just things to say in distinctive circumstances' [30, 23].

In *The Roots of Reference* Quine discusses an example of ostensive learning of language involving the observation sentence 'red' [22, 29-30, 18-19]. A child produces a token of the expression 'red'; Quine pictures the child's utterance as a product of the babbling instinct in this connection, but the utterance might as well be attributed to the child's capacity for imitation which Quine in his later work came to see as a product of the innate capacity for empathy.¹⁶ On the occasion of the child's utterance, a red ball is conspicuously present. The parent rewards the child. Quine gives a description of some aspects of the child's global stimulus during this occasion:

Thus in a certain brief minute in the history of overall impingements on the child's sensory surfaces there were these features among others: there were light rays in the red frequencies, there were sound waves in the air and in the child's headbones caused by the child's own utterance of the word 'red', there were the impacts on the proprioceptors of the child's tongue and larynx occasioned by that utterance, and there were the impacts, whatever they were, that made the episode pleasant. [22, 29]

This global stimulus leaves a trace in the child. Now, the effects of a red rose on the rods and cones in the child's retina enlivens this trace provided that the trace has sufficient strength, as well as vividness with respect to the present global stimulus. The index of pleasure in the enlivened trace drives the child into contorting her speech muscles to utter 'red', to add what she can to the perceptual similarity of the present global stimulus to the pleasant one which left the trace. If the child is rewarded again, this occasion constitutes another step in shaping the child's standards of perceptual similarity towards a state in which global stimuli caused in part by light rays in the red frequencies and sound waves in the air and in the child's headbones caused by her own utterance 'red' count as perceptually similar for her. In brief, if the reward is included,

¹⁶In earlier works like *Word and Object* and *The Roots of Reference*, Quine argued that there is no need to postulate a separate innate capacity or instinct for imitation. At the time, he thought that imitation can be explained in his theory of learning; see e.g. [22, 30-31], [45, 81-82]. On the other hand, in 'Philosophical Progress in Language Theory' Quine takes notice of different trends in the psychology of language regarding the instincts of babbling and imitation [7, 6]. In this essay, he says he expects both of these innate aids to play a role in language acquisition. After introducing the notion of empathy, Quine came to see imitation as an innate capacity based on empathy.

this occasion constitutes one case of reinforcement of the child's behavioral disposition to utter 'red' in the presence of red.

I have already mentioned Quine's polyadic notion of perceptual similarity (section 5.1), schematically represented as the relation of a 's being perceptually more similar to b_1, \dots, b_m than to c_1, \dots, c_n . It might happen that the effects of a yellow rose upon the child's retina elicit the verbal response 'red' because of the vividness of the trace of the global stimulus caused (in part) by the red rose. When the child utters 'red' under the causal influence of a yellow rose, the reward fails to materialize. Quine imagines a case where this utterance is followed by some unpleasant occurrence, such as the slamming of a window; perhaps an index of discomfort could also be brought about solely by the failed anticipation of pleasure. When the child is afterwards confronted with a red shawl, the global stimulus enlivens the traces of the global stimuli involving the red ball and the red rose, both bearing an index of pleasantness, and also the trace of the global stimulus involving the yellow rose, bearing an index of discomfort. In this case, the child is likely to be impelled to utter 'red', because the global stimulus enlivens *two* pleasure-indexed traces, and only *one* discomfort-indexed trace. Herein lies the importance of the polyadic relation of perceptual similarity for Quine's theory of learning: the shaping of a subject's standards of perceptual similarity is facilitated by the sort of quantitative effect brought about by the accumulation of traces.

The learning of observation sentences is expedited by the acquisition of the linguistic devices of *assent* and *dissent* [22, 45-48]. The expressions of assent and dissent afford the child a way to react to adults' utterances of observation sentences otherwise than by repetition, and also afford the adults a means of linguistic instruction in language acquisition.

The device of assent can be learned on the basis of antecedent learning of some observation sentences. To take 'red' as an example again, suppose the child goes through global stimuli which are in part caused by a red surface, the sound of 'red' from her own mouth, and the sound of 'yes' from the parent's mouth. Now, suppose that a later global stimulus begins similarly, with action potentials in the child's receptors caused by a red surface and the sound of 'red', this time from the parent's mouth. The child is driven to heighten the perceptual similarity of this later global stimulus with the pleasant earlier one, and consequently utters 'yes'. Unpleasant global stimuli, and ones in which pleasure is absent, will contribute to the child's learning not to assent to 'red' in the absence of the color. At first, the child learns the expression of assent only in connection with particular observation sentences. Quine thinks that by acquiring a language-based second-order similarity standard between particular

cases, assent is acquired as a general linguistic device [22, 48].¹⁷

According to Quine, the learning of dissent must proceed along different lines. The child's global stimulus which is partly caused by her own utterance of 'red' and the parent's subsequent utterance of 'no' is not likely to leave a trace with an index of pleasantness. Hence the child is not driven to produce the expression of dissent herself. Given the learning of assent as a preliminary step, Quine speculates that dissent is learned directly through an acquisition of a standard of second-order similarity, without prior learning of dissent from specific observation sentences. It is a matter of 'coming to appreciate that dissent is rewarded where assent is penalized and vice versa' [22, 49].¹⁸ Quine's explanation of the learning of dissent in *The Roots of Reference* is rather brief and perhaps not very convincing. The question may appear less problematic if we take into account the child's innate drive to imitate. The child's parroting of the parent's dissent at some appropriate occasion probably does lead to reward and thus contributes to the acquisition of the proper second-order standard of perceptual similarity.

From the point of view of a developed theory of the world, observation sentences can be keyed to very different sorts of objects. A child's observation sentence 'mama' is correctly applied to one spatiotemporally continuous object; 'mama' is a name and thus *designates* a body. The observation sentence 'dog', on the other hand, is correctly applied to each and every dog; it *denotes* each body that is a dog. Observation sentences like 'red' or 'water' are applied to any part of the totality of the world's red surface, or water; they are *mass terms*. Despite these reference-theoretic differences between 'mama', 'dog', and 'water', each can be learned ostensively as an observation sentence. In *The Roots of Reference*, Quine speaks of 'observation terms' in connection with early language acquisition. By this choice of terminology, he wishes to convey that the purpose of his investigation is to study the development of reference [22, 52]. However, in the case of the child who is in the early stage of language acquisition, observation sentences cannot be thought of as referring terms – they are just verbal responses keyed to ranges of neural intake.

According to Quine, certain modes of composition can be learned by analogical synthesis on the basis of previous learning of some observation sentences. One example is a mode of composition which is called 'attributive compound' in *The Roots of Reference* [22, 59-61] and 'observational predication' in *From Stimulus to Science* [30, 24].

¹⁷See also [89, 46-47].

¹⁸See also [89, 47].

As explained in section 5.1, present global stimuli may enliven traces of past global stimuli, and through this enlivening effect, have salience conferred upon portions of themselves. Once the child has acquired the observation sentences 'yellow' and 'paper', hearing these words ('yellow paper') enlivens traces of past global stimuli where yellow and paper were salient.¹⁹ Via this enlivening effect, the sound of the words enhances the salience, for the child, of the yellow and the paper in the occasion she is presently witnessing. Those parts of the scene where yellow and paper coincide are thus 'enhanced doubly' in salience [22, 60]. This double enhancement helps the adult in training the child to produce the observational predication under appropriate circumstances and to respond to it properly – all the adult has to do is 'to discourage assent in those less striking cases where the yellow and the paper are separate' [22, 60].

In this way the child can learn to produce, and to respond to, particular instances of observational predication under appropriate global stimuli. However, this kind of mastery of instances does not amount to a mastery of the construction of observational predication. Mastery of this construction is manifested in the production of novel observational predications, ones the child has not previously encountered. Acquisition of the construction is achieved by analogical synthesis, by which the child comes to appreciate a language-dependent similarity between individual cases of observational predications:

The occasions for assenting to attributive compounds are similar to one another in that they share the following complex trait: always the two component terms heighten the salience of some one part of the present scene. [22, 60]

In cases where the salient receptors are located in the retina, Quine says that an observational predication expresses the compact clustering of visual qualities that is characteristic of a body [30, 24]. The learning of observational predication is a step toward reification of bodies: the global stimuli which prompt assent to an observational predication characteristically involve salient receptors such that a body contributes to the causing of their action potentials. It is in requiring a 'compact clustering' of sensory qualities that an observational predication differs from a *conjunction* of observation sentences. Occasions on which assent to 'yellow' and 'paper' is reinforced include ones in which yellow and paper

¹⁹As already noted, Quine sometimes speaks about the salience of features or objects in the environment, instead of salience of receptors. I will adopt Quine's way of speaking here, keeping in mind that strictly speaking salience is truly attributed only to sensory receptors. The salience of an object or a feature of the environment is a derivative notion, meaning that the object or the feature contributes to causing action potentials in the salient receptors.

are separate, but this does not hold for the observational predication 'yellow paper'.²⁰

According to Quine, compound observation sentences that are somewhat analogous to conjunctions, disjunctions and negations of classical propositional logic can be learned on the basis of antecedent learning of some observation sentences [22, 75-78]. By abstracting the constructions by analogical synthesis, the child can acquire negation, conjunction and disjunction as connectives of 'verdict logic' which she can then apply also to non-observational sentences. Thus, the child can learn 'no' as a 'postpositive negation sign' through learning the device of dissent – 'yellow no' is a compound observation sentence which is to be assented to under those global stimuli which prompt dissent to 'yellow'. Conjunction is to be assented to when both of the component observation sentences are assented to, and dissented from when either component sentence is dissented from. Disjunction is to be assented to if either component observation sentence is, and dissented from if both components are. However, negation, conjunction and disjunction as connectives of classical logic are not learnable in this way. Quine notes that the logical expressions thus learnable solely on the basis of some observation sentences belong to a three-valued logic in which conjunction and disjunction are not even functions over the three values [22, 76-77]. The third verdict on sentences besides assent and dissent is abstention, namely, the reaction of not assenting nor dissenting.²¹

The two-valued classical propositional logic is theoretical in the sense that its connectives cannot be learned on the basis of antecedently learned observation sentences in the way the connectives of non-truth-functional verdict logic can. According to Quine, the conception of each meaningful sentence being either true or false is a theoretical development which is learned in 'indirect ways', like other theory [22, 78]. The conception of each sentence as either true or false which classical two-valued logic involves requires for its acquisition the capacity to talk for example about sentences and their truth values, and this presupposes mastery of linguistic devices which the child has yet to acquire at the stage presently discussed.²² Quine does not speculate on the details of

²⁰See [22, 62], [30, 24].

²¹Negation as a connective of verdict logic is verdict-functional: when the verdict on an observation sentence is abstained from, so is the verdict on its negation. But this does not hold for conjunction and disjunction. See also [89, 54-56].

²²According to Quine, positing the true-false dichotomy across all sentences, irrespective of our possession of decision procedures, serves the simplicity of theory [36, 36], [15, 86]. Since the connectives of two-valued classical logic are not learnable in the direct way explained in the previous paragraph, Quine says there is nothing in the observable circumstances of our utterances that need persuade an intuitionist to consider classical logic meaningful [22,

the acquisition of expressions for the connectives of classical logic. However, the verdict logic learnable on the basis of antecedently learned observation sentences already does amount to a sort of rudimentary logic in that its constructions establish connections between sentences mastered by the child. For example, if the child assents to the negation of sentence *A* she will be disposed to dissent from the conjunction of *A* and *B*. At some later stage the child may refine these constructions into the connectives of classical logic on the basis of verbal explanation which relies on further theoretical language.

On the basis of prior acquisition of observation sentences a child is capable of learning standing sentences as well. Of special importance in Quine's epistemology are standing sentences called observation categoricals. Quine thinks that a *free observation categorical* can be learned on the basis of previous learning of its component observation sentences. A free observation categorical consists of two observation sentences compounded as for example 'raven' and 'black' in 'Ravens are black'. From the point of view of the child who has not mastered reification, there is no difference between 'Ravens are black' and 'When raven, black raven', which is more explicitly a compound of observation sentences 'black' and 'black raven' (the latter is an observational predication which is itself an observation sentence). As the form of 'When raven, black raven' suggests, a free observation categorical does not assume objects; in section 5.4, the free observation categorical will be contrasted with the *focal* observation categorical, which does assume objects.²³

The psychological process underlying the learning of free observation categoricals is *transfer of conditioning*. Once the child has learned 'dog' and 'animal' as observation sentences, the sound 'dog' enlivens traces of global stimuli acquired from perceptual contact with dogs. Because of this enlivening effect, the child is disposed to assent to the sound 'animal' when it follows the sound 'dog'. Having learned some free observation categoricals by transfer of conditioning, the child learns the construction by learning to appreciate the similarity involved in the process of being driven to assent to individual cases. In learning the constructions of these sentences, the child comes to appreciate a language-dependent similarity:

What [the child] senses, as common to each such pair of terms, is perhaps a tendency in the sound of the first term to dispose him to

78]. Classical two-valued logic is theoretical in the sense that it cannot be supported solely by appeal to observable verbal behavior. Rather, classical logic finds support from its contribution to the systematic aspect of theories, especially to simplicity.

²³The terms 'free' and 'focal', which Quine uses e.g. in [30, 27] and [24, 10-11], correspond to his earlier terms 'primitive' and 'objectual' [23, 9].

assent to the second. [22, 66-67]

The process of learning the free observation categorical construction proceeds by analogical synthesis: abstraction from learned instances on the basis of language-based similarity, allowing the construction of instances not previously encountered. By a process very similar to that of the acquisition of the free observation categorical construction, the child can also acquire the ability to form non-observational predications [22, 63-67].

While the free observation categorical construction is learned by first learning instances which may look like sentences traditionally considered analytic (like 'Dogs are animals'), acquisition of the construction makes possible the production of instances which are clearly more informative, or synthetic [22, 79]. Quine distinguishes between *analytic* and *synthetic* free observation categoricals. The analytic ones (for a speaker) are such that the range of global stimuli under which the speaker is disposed to assent to the antecedent observation sentence is included in the corresponding range for the consequent observation sentence.²⁴ Free observation categoricals are expressions of expectation, for example, 'When it snows, it's cold', where 'it snows' and 'it's cold' are observation sentences [30, 25]. The free observation categorical construction is a linguistic device of expressing what is non-linguistically achieved by the capacity of primitive induction: a free observation categorical is 'a direct expression of inductive expectation, which underlies all learning'. It is in itself 'a miniature scientific theory' [30, 25]. The free observation categorical plays a central role in Quine's view of the evidence relation. This role is further discussed in section 5.5.

5.3 Reification and Logical Syntax

According to Quine's theory, language acquisition starts off with ostensive learning of some observation sentences. On the basis of the ostensive learning of some observation sentences, a child can learn standing sentences, most notably observation categoricals, by transfer of conditioning. By analogical synthesis, the child acquires language-dependent standards of similarity, and abstracts constructions from compound sentences. Even though the child has learned to respond appropriately to features of the environment, and also to utter non-observational sentences, we are not yet entitled to attribute to him the capacity of referring to objects. Mastery of observation sentences is insufficient for attribution of reification, as Quine points out with the example of the observation

²⁴See [23, 9-10], [24, 16], [30, 45].

sentence 'red':

When can a child be said to have learned to refer to the color red? Suppose he has learned to respond, on demand, in distinctive verbal ways according as red is conspicuously present or not. Can we then say he has learned to refer to red? No, this is not enough for what I mean by reference. We can credit the child at this point with being able to *discriminate* red, to *recognize* red. We in conferring these credits do refer to the child and to the color; these references we will readily own. But to say that he refers to the color would be to impute our ontology to him. [22, 81-82]

Nor can the child's observation categoricals be taken as evidence for reification:

Even at this stage there is no denotation, no reference to bodies or other objects, to my way of reckoning. The observation categorical just asserts the concomitance or close succession of separately specified phenomena. The child's observation sentences 'Mama' and 'Doggy' at this stage still merely register repeatable features of the passing show, on a par with 'Cold' and 'Thunder'. Any difference here is only qualitative, not ontological. [30, 25-26]

According to Quine the learning of the linguistic device of objective reference consists in an 'irreducible leap' in the process of learning. This leap is achieved by analogical synthesis. However, the step of analogical synthesis which leads to the acquisition of the referential idiom differs from the ones discussed thus far. In Quine's view instances of the focal observation categorical are not learnable merely on the basis of prior ostensive learning of some observation sentences. The step of analogical synthesis which leads to the acquisition of the construction of focal observation categorical is not based on antecedent learning of instances of this construction. Before discussing the step which results in the mastery of the referential idiom of focal observation categorical I must clarify Quine's view on the connection between the positing of objects and logical syntax.

In Quine's view, bodies are our first reifications both evolutionarily and ontogenetically. Other sorts of objects, such as abstract ones, are reified in analogy to bodies.²⁵ Quine thinks that the reification of bodies is achieved in natural language. However, which objects exactly are posited in a discourse conducted in natural language is not fully clear: according to Quine, ontological commitments can be explicit only in a logically regimented discourse that conforms

²⁵See [30, 24], [22, 88].

to the syntax of first-order logic. Ontological clarity is not part of ordinary language, and consequently ontological studies should not be conducted by attempting to make explicit the ontological commitments of ordinary language:

The common man's ontology is vague and untidy in two ways. It takes in many purported objects that are vaguely or inadequately defined. But also, what is more significant, it is vague in its scope; we cannot even tell in general which of these vague things to ascribe to a man's ontology at all, which things to count him as assuming. Should we regard grammar as decisive? Does every noun demand some array of denotata? Surely not; the nominalizing of verbs is often a mere stylistic variation. But where can we draw the line? [34, 9]

According to Quine, this question about drawing ontological lines with respect to ordinary language is misguided. Various expressions can be used in ordinary language in ways more or less parallel to the use of terms for bodies, and it may be felt that the corresponding objects are 'more or less posited, *pari passu*' [34, 9]. But strict boundaries of ontological commitment and noncommitment are not part of ordinary language at all, so instead of looking at ordinary language, ontological concerns should be addressed at a logically regimented language:

[A] fenced ontology is just not implicit in ordinary language. The idea of a boundary between being and nonbeing is a philosophical idea, an idea of technical science in a broad sense. [...]

We can draw explicit ontological lines when desired. We can regiment our notation, admitting only general and singular terms, singular and plural predication, truth functions, and the machinery of relative clauses; or equivalently and more artificially, instead of plural predication and relative clauses we can admit quantification. Then it is that we can say that the objects assumed are the values of the variables, or of the pronouns. [34, 9-10]

Quine's logical framework of choice, his 'canonical notation', is classical first-order predicate logic with identity. In this logical framework, all constructions are extensionally and referentially transparent, according to (9)-(12) in section 2.2. As Quine states in the above quotation from 'Things and Their Place in Theories', in theories formulated in this logical framework the objects assumed are the values of the variables. Quine does not wish to give ontological weight to singular terms, primarily because singular terms may be empty, that is, may

fail to refer to any object, without thereby rendering the sentences in which they appear meaningless. Empty singular terms might require the admission of truth value gaps, which would preclude the assumption of classical two-valued logic. To take up Quine's own example of the mythological name 'Pegasus', the sentence 'Pegasus flies', of the form ' Fa ', as well as its negation 'Pegasus does not fly' (' $\neg Fa$ ') would be neither true nor false, if 'Pegasus' were understood as a primitive-notation singular term, since in this case there is no object for ' x flies' to be true or false of. On the other hand, there are also sentences involving empty singular terms that we would like to consider as true, for example 'Pegasus does not exist' (' $\neg \exists x(x = \text{Pegasus})$ '); yet we do not want to admit that the truth of such sentences somehow commits us to the existence of Pegasus. Quine handles singular terms by eliminating them from his canonical notation altogether. In brief, this elimination takes the form of introducing suitable predicate terms by means of which the singular terms can be replaced with definite descriptions and then contextually eliminating the descriptions using Russell's method [125]. Quine points out that the context ' $x = a$ ', where ' a ' is a singular term, can be construed as a primitive one-place predicate ' Ax '. A sentence of the form ' Fa ' can then be construed as a sentence of the form ' $F\iota xAx$ ', from which the description ' ιxAx ' can be eliminated so that we get a sentence of the form

$$(85) \exists x \forall y (Fx \wedge (Ay \leftrightarrow y = x)).^{26}$$

Sentences that involve singular terms can be considered as abbreviations of sentences in the primitive canonical notation. Quine's canonical notation has the effect of rendering false sentences that involve empty names, like 'Pegasus flies' and 'Pegasus does not fly' (if the scope of the negation is taken to be ' x flies').

Quine's criterion of ontological commitment, crystallized in the slogan 'To be is to be the value of a variable', says that a theory couched in his canonical notation is committed to the existence of those and only those objects that must be reckoned among the values of its variables in order for the sentences of the theory to be true. To take a simple example, if a theory includes the sentence 'Some dogs are white', namely,

$$(86) \exists x(x \text{ is a dog} \wedge x \text{ is white}),$$

²⁶On Quine's method of and reasons for eliminating singular terms, see e.g. [45, 176-186], [41], [15, 25-26], [13, 278-283]. Lieven Decock points out a tension between Quine's method of eliminating names and his proof procedure in *Methods of Logic*. Decock argues that Quine's proof procedure requires the assumption of name-like expressions (the instantial variables) that cannot be eliminated by Quine's method [74].

it is committed to the existence of dogs since at least one dog must be counted among the values of the variables in order for the theory to be true.²⁷

Quine does not claim that theories couched in natural language could be analyzed or translated into ones fitted in the framework of his canonical notation in the sense that there would be a unique correct way to logically regiment a theory. Quine stresses that the paraphrase of natural-language sentences into ones in logical notation does not carry a synonymy claim [45, 189]. Paraphrase is a pragmatic matter: for some purposes, such as philosophical investigation of the evidence relation or ontology, it may be beneficial to consider theories in the form of Quine's canonical notation. For example, it is not Quine's view that a natural-language sentence like 'Pegasus flies', which presumably lacks a truth value at least in some contexts of utterance, would really be false because a certain logical paraphrase of it turns out false. Nor does Quine claim that singular terms such as names are really descriptions, or that a predicate used in the elimination of a singular term (like ' Ax ' above) could somehow be understood independently of the eliminated singular term.²⁸

Because of his reservations concerning ordinary language and his conception of canonical notation as a framework for ontologically explicit language, Quine thinks that we can bypass the learning of ordinary English at some point in the genetic study of reification. According to him, his epistemological purposes are served by an investigation into how a child could learn the idiom of quantification directly in the process of language acquisition. Quine's genetic study of reification is, in effect, a study of how a child could learn a language couched in his canonical notation as a first language. This investigation is meant to shed light on the relation between sensory evidence and the referential aspect of science in the framework of canonical notation. Hence, Quine looks into how a child could learn the idiom of quantification on the basis of prior learning of non-referential language:

My concern with the essential psychogenesis of reference would be fulfilled in fair measure with a plausible account of how one might proceed from infancy step by step to a logically regimented language of science, even bypassing English. [22, 92]²⁹

²⁷See e.g. [4, 96], [41, 13].

²⁸For example Leonardi and Napoli [109] seem to interpret Quine as holding the view that predicates like ' Ax ' should be capable of being understood independently of explanation in terms of the name that is being eliminated.

²⁹See also [22, 100], and [30, 31]: 'Not that this is how existential quantification or its vernacular actually emerged, either in the race or in the child. But the interest in how it actually emerged dwindles when we see how in principle it could.'

This bypassing of ordinary English is manifested for example in Quine's way of dealing with relative clauses: he looks into how the child could learn relative clauses in the form which is apt for inclusion into a first-order language. The relative clause and the observation categorical are, on Quine's account, the two roots of reference. In the next section, I explain Quine's view on how these roots give rise to reference.

5.4 The Two Roots of Reference

One of the two roots of reference is the *relative clause*. Quine construes relative clauses with the help of the 'such that'-idiom. The relative clause enables us to put any sentence about an object into the form of predication in which the relative clause functions as a general term. Quine's example is 'I bought Fido from a man that found him': if we want to construe this sentence as a predication about Fido, we come up with 'Fido is such that I bought him from a man that found him' [22, 93]. The pronoun 'him' serves as a natural-language counterpart of the variable. When variables are introduced, the example sentence reads 'Fido is a thing x such that I bought x from a man that found x '.

Mastery of the relative clause does not in itself amount to reification. Predications formed by means of relative clauses can be learned as equivalent alternatives to ones formed without relative clauses. The child learns the equivalence by observing that people will assent to, say, 'Fido is wet' on all and only those occasions where they will assent to 'Fido is a thing x such that x is wet' [22, 94]. On the basis of learning instances of relative-clause predications the child learns, by analogical synthesis, the relative clause construction. Having learned the equivalence between relative-clause predications and ones without relative clauses, the child can now learn an *equivalence transformation* between relative-clause predications and predications formed without relative clauses.

The predications involving relative clauses are simply alternative formulations of predications without relative clauses – they do not increase the expressive power of the language mastered by the child. The relative clause construction contributes to progress in language learning when it is combined with the free observation categorical construction. A relative clause functions in predications as a general term. By an equivalence transformation, it can be substituted in a predication for a general observation term which is, for the child, an observation sentence. Thus the already mentioned equivalence transformation by substitution of ' x such that x is wet' for 'wet' in 'Fido is wet'. Such general observation terms also appear in free observation categoricals as

component observation sentences. By analogy with the equivalence transformation on predications, the child comes to substitute relative clauses for the general observation terms in the free categoricals, and thus acquires the focal observation categorical construction.

The child probably learns to assent to adults' utterances of some focal observation categoricals on the strength of transfer of conditioning. But this only amounts to learning to assent to the corresponding free observation categoricals. In making the grammatical analogy between the role of relative clauses in predications and in observation categoricals, the child learns to produce and respond to sentences whose conditions of assent and dissent do not reduce to those of observation sentences (as is the case with free observation categoricals). Quine characterizes the step of analogical synthesis which results in the acquisition of the focal observation categorical as an *irreducible leap* in language acquisition [22, 99]. By this characterization, he stresses the point that the conditions of assent and dissent cannot be learned for any instance of the focal observation categorical construction prior to the acquisition of the construction itself. In this, the focal observation categoricals contrast with the free observation categoricals which are learnable by transfer of conditioning.

The free observation categorical amounts only to an expression of expectation of concomitance or close succession of the kind of occasions on which assent to each observation sentence in the categorical is reinforced in the language community.³⁰ I have already noted the following example of an observation categorical in an explicitly free form:

(87) Whenever raven, black raven.³¹

As an eternal sentence compounded of observation sentences, (87) is 'compatible with albino ravens as long as they keep close company with black ones' [30, 27]. It is not refuted as long as each occasion on which the utterance of (or assent to) the observation sentence 'raven' is reinforced in the language community is also an occasion on which the utterance of (or assent to) the observation sentence 'black raven' is, too. In short, (87) only requires that each raven-occasion is a black-raven-occasion. Quine says that the free categorical (87) differs in strength from its focal version

³⁰See e.g. [30, 25-26], [24, 10].

³¹(87) is 'a generality compounded of observables', in the manner 'Whenever this, that' [24, 10]. It is a compound of two observation sentences. 'black raven' is an observational predication, which is itself an observation sentence. The formulation (87) is from [30, 29]. Quine points out that the formulation (87) is not meant to involve quantification over times.

(88) Every thing x such that x is a raven is a thing x such that x is black.³²

In its focal form, this observation categorical says that *each object* which is a raven is black. The focal observation categorical (88) is thus stronger than its free counterpart (87) in not being compatible with the existence of albino ravens.³³ Of course, one could make (87) come out false by somehow narrowing one's sight to the point where the only raven causing action potentials in one's rods and cones is one of the white specimens [50, 453]. Furthermore, obviously (87) can be falsified even without such a narrowing of sights once it is considered in connection with a few other compounds of observation sentences. The point of Quine's example is to emphasize the difference between (87) as a compound of observation sentences and (88) as a generalization concerning objects – as a free one, the observation categorical does not assume objects. A focal observation categorical like (88) includes no observation sentences as components [24, 10-11]. While (87) is of the form

(89) $F \rightarrow G$,

where ' F ' and ' G ' are schematic letters standing in the place of observation sentences, (88) has the form

(90) $\forall x(Fx \rightarrow Gx)$.

In the leap from the free to the focal observation categorical the relative clauses, which were learned as substituents of observation sentences in equivalence transformations on predications, turn into predicates which denote objects. In terms of the schemata (89) and (90), the observation sentences F and G turn into open sentences Fx and Gx . In the case of (87) and (88), the observation sentences 'raven' and 'black' turn into predicates ' x is a raven' and ' x is black'.

The pronoun 'it', or its logical counterpart the variable, begins as substitutional with the learning of the equivalence transformation on predications. 'Fido is such that it is a dog' (or 'Fido is a thing x such that x is a dog') is equivalent to 'Fido is a dog', where 'Fido' is substituted for 'it' in 'it is a dog' (or for ' x ' in ' x is a dog'). However, the pronouns or variables in the relative

³²See [22, 97].

³³Quine points out a problematic feature of this example. (87) may count as an analytic observation categorical for many speakers. The set of global stimuli which prompt a speaker's assent to 'raven' is a subset of the corresponding set for 'black'. Hence, it is likely that a supposed white specimen would not elicit assent to 'raven' [50, 453]. However, on the assumption that (87) is not analytic, the example of (87) and (88) serves to illustrate Quine's point.

clauses of a focal observation categorical are objectual. (88) says of each raven, specified or unspecified, that it is black. Once the child learns to produce focal observation categoricals by grammatical analogy, she moves from substitutional variables to objectual ones. The objectual variable arises from the synthesis of the free observation categorical and the relative clause constructions:

The relative clause and the categorical thus stand forth as the roots of reference. The objectual variable is an outgrowth of these two roots, not of one alone[.] [22, 101]³⁴

In view of Quine's criterion of ontological commitment which was briefly discussed in the previous section 5.3, a focal observation categorical, of the form (90), does not involve commitment to the existence of any kind of objects, for example ravens in the case of (88). The truth of (88) does not require the existence of ravens (or of black objects). Thus, after all it might seem that the child does not assume any objects merely by advancing to the stage of the focal observation categoricals. However, the predicates which are capable of appearing in a focal observation categorical are special in their relationship with the observation sentences of which the corresponding free observation categorical is compounded. Since the learning-theoretic feature peculiar to observation sentences is that they are learnable ostensively, the predicates into which observation sentences turn in the transition from the free to the focal observation categorical are guaranteed to have a non-empty extension. In this transition the child reifies portions of the environment that can be jointly witnessed by members of the speech community: as explained in section 5.2, an observation sentence is an occasion sentence on whose truth the members of the community agree when they are witnessing an occasion. If a sentence of the form (90) is an observation categorical, there are bound to be objects of which the predicates Fx and Gx are true of, since otherwise there would not be occasions on which the observation sentences F and G in the corresponding free observation categorical, of the form (89), could be ostensively learned.

According to Quine, the step from the free to the focal observation categorical construction does not yet amount to full-fledged reification: at this point the assuming of objects is still weak in the time dimension [30, 36]. Fully developed reification involves the schematism of space and time. An important difference between what Quine calls perceptual and full reification is the meaningfulness of the notion of two non-identical but qualitatively similar objects presented on two different occasions. This notion presupposes command of the space-time

³⁴See also [24, 24].

schematism. Quine notes that the command of this schematism involves the capacity to make conjectures and speculations about the unobserved trajectories of objects [30, 36-37].³⁵ He does not discuss the acquisition of the linguistic apparatus of diachronic identification in detail, but he envisages the notions of space and time and of diachronic identity as evolving interdependently.³⁶ He connects the expression of the space-time schematism in a theory couched in the syntax of first-order logic to a four-dimensional conception of physical objects [45, 170-173, 184].³⁷ On the four-dimensional conception any part of space-time counts as a physical object, or a time-slice of one. The part of space-time may be a scattered or disconnected one.³⁸ In this study, Quine's four-dimensional view of physical objects and diachronic individuation will not be discussed in more detail. For my present purposes, I need only pay attention to Quine's basic picture of the relation between sensory intake and reference to objects. This basic picture of the evidence relation already arises from Quine's genetic story as I have thus far presented it, irrespective of the issue of diachronic identification.³⁹

The point of Quine's genetic investigation is to answer the epistemological challenge how we could have a theory about the world as consisting of objects, given the nature of our sensory access to the world. It is an investigation into the relation between sensory intake and the referential aspect of a theory couched in the syntax of first order logic; it gives an answer to the question how such a theory could be related to sensory intake. In the next section, I look at the general epistemological picture that arises from Quine's genetic story.

³⁵See also e.g. [25, 7].

³⁶In 'Assuming Objects' Quine briefly mentions some aspects of the interdependence between the notions of space and time, diachronic identity and certain broad theoretical conceptions about the world [50, 454].

³⁷See also e.g. [30, 39].

³⁸Quine's example is a physical object part of which is a momentary stage of a silver dollar in his pocket at the time he wrote his essay 'Worlds Away' and the rest of which is a temporal segment of the Eiffel Tower through its third decade [37, 124].

³⁹In addition to presenting a genetic story of how a child could learn to refer to bodies such as ravens, Quine also considers how she could move on from these primordial reifications to positing abstract objects like properties [30, 39-40] or sets [22, 101-111]. Quine pictures the reification of abstract objects as occurring only after that of bodies, and the reification of abstract objects is based on the prior learning of predicate terms which apply to bodies. In this study, I need not go into Quine's ideas about the reification of abstract objects.

5.5 Objects and Sensory Evidence

As explained at the end of section 5.2, Quine considers the free observation categorical a verbal expression of the inductive expectation which underlies all learning. In the terminology of Quine's epistemology, a free observation categorical encapsulates a prediction that each occasion on which all (or nearly all) members of the linguistic community are disposed to assent to the antecedent observation sentence will be one on which they are so disposed also with respect to the consequent observation sentence. As explained in section 4.2, Quine sees science ultimately as a tool for predicting future experience on the basis of past experience; for him the ultimate objective of science is successful prediction [23, 11]. Our linguistic science, including specialized science and 'the rudimentary science of common sense', is continuous with primitive induction.

An observation sentence, according to Quine, is 'Janus-faced': it faces inward to a subject's neural intake in being keyed to a range of the subject's global stimuli, and outward to the subject matter of the theory [26, 109-110]. In its orientation towards theory, the sentence figures 'word by word'; it contains fragments (words) which 'recur in the theory to denote objects the very conception of which is pure theory' [26, 110]. From the point of view of theory, an observation sentence contains referential expressions, predicate terms which denote objects. From the point of view of sensory intake, an observation sentence is an unstructured whole keyed to a range of the subject's global stimuli [26, 109]. This point which Quine makes about observation sentences can also be made about observation categoricals, which can be considered Janus-faced in a very similar way. From the point of view of theory, an observation categorical, of the form ' $\forall x(Fx \rightarrow Gx)$ ', is focal and contains predicates that denote objects. Conceived as focal, the sentence faces outward to subject matter of the theory: it is a generalization concerning objects. From the point of view of sensory intake, an observation categorical is a free one, a compound of observation sentences, of the form ' $F \rightarrow G$ ', where F and G are observation sentences. Conceived as free, it faces inward to the subject's neural intake, since F and G , being observation sentences, are keyed to ranges of her neural intake.

Considered as free, an observation categorical is a direct expression of inductive generalization of the form 'Whenever F , G '. In virtue of its component observation sentences, the categorical receives direct inductive support or, if the predicted concomitance of occasions fails to materialize, becomes refuted. According to Quine's model of the evidence relation, a theory is ultimately tested by deducing synthetic observation categoricals from it, and testing these cate-

goricals to see if the predictions they express hold.⁴⁰ Quine calls the synthetic observation categoricals implied by a set of sentences the *empirical content* of that set. A sentence or a set of sentences has *critical mass* (in other words, is *testable*) if it implies a synthetic observation categorical. On this criterion, some single sentences, notably the observation categoricals themselves, are testable irrespective of which sentences they happen to be logically connected with.⁴¹

This picture of the empirical testing of a theory does not correspond to the actual practice of scientists, where for example the deductions of observation categoricals are to a large extent only implicit. The logical derivation of an observation categorical from a theory would require that all premisses needed in the derivation were made explicit. These premisses are likely to include, in addition to theoretical sentences in the field of inquiry, for example sentences of pure mathematics as well as various 'common-sense platitudes' [23, 12]. Quine notes that such explicit spelling out of deductions of observation categoricals would be impracticable to the point of being a Herculean labor. The point of his over-logicizing schematism is to clearly bring out the structure of the evidence relation:

[M]y concern is with the central logical structure of empirical evidence. The point of my schematism of observation categoricals is to suggest how, in principle, empirical science might proceed if, heaven forbid, all were explicitly set down. [23, 12]

Quine's model is *holistic*: it is only in combination with various other sentences that a sentence which is itself not an observation categorical is capable of logically implying observation categoricals. If an implied categorical fails to hold, the chunk of theory which implied the categorical is thereby refuted, and the task of the scientist is to deactivate the implication one way or another (in practice, the way of deactivating the implication is often to excise the hypothesis which was under investigation in the first place). On the other hand, if the observation categorical holds, the chunk of theory receives inductive support.⁴²

According to Quine, one central principle which guides the reconciling of theory with implied false observation categoricals is *the maxim of minimum mutilation*.⁴³ This is a principle of conservatism in theory revision. Once a sentence *S* which has contributed to the derivation of a falsified observation categorical has been excised, the theorist most likely has to excise some other

⁴⁰See e.g. [30, 44-45], [24, 12]

⁴¹See e.g. [30, 48-49], [24, 16-17].

⁴²On Quine's holism, see e.g. [24, 13-16], [30, 45-47].

⁴³See e.g. [24, 14-15]

sentences as well, namely some of those that contribute to the derivation of S . In determining which sentences to excise from the theory as a response to the theory's implying a false observation categorical, the maxim of minimum mutilation advises to opt for changes that are less disruptive of the theory as a whole. For example, a problematic logical implication might be deactivated by repudiating some sentences of pure mathematics. However, such a change would be very disruptive. A mathematical truth has an abundance of logical connections, so the excision of a sentence of pure mathematics would result in a very wide-ranging revision of the theory. Mathematics is applied in various fields of inquiry, and repudiating mathematical truths may have destructive effects on theories in these fields – several logical implications are likely to get cancelled. As Quine puts it, 'mathematics infiltrates all branches of our system of the world, and its disruption would reverberate intolerably' [24, 15].

A theory couched in the syntax of first-order logic does not normally imply observation categoricals of the free form (89). More plausibly, such a theory is seen as implying observation categoricals in the focal form (90). However, as already noted, this form is not a compound of observation sentences – its main operator is the universal quantifier which binds the variables of the antecedent and consequent predicate terms in the open conditional sentence which lies in its scope. Considered in the free form (89), an observation categorical is compounded of observation sentences which may be seen as specifying an experimental condition and a predicted outcome. (As Quine notes, the antecedent would often have to be an observational conjunction, for example 'When the sun rises *and birds are about*, birds sing' [62, 331].) Observation sentences, in turn, are those linguistic expressions which are most directly associated with ranges of global stimuli, and on which members of a linguistic community are very likely to agree when witnessing an occasion. Thus, the observation categorical as a free one is open to intersubjective testing for direct inductive support or refutation.⁴⁴ Considered as focal, an observation categorical is not in this way associated with ranges of global stimuli, since it contains no component observation sentences. Seen in the focal way, an observation categorical cannot function as an empirical checkpoint which would link the theory with sensory intake through observation sentences. It is only as free that the categorical confers empirical content on the theory by connecting the theory with neural intake via its component observation sentences.

So, from the point of view of a first-order theory, an observation categorical is a focal one, but from the point of view of empirical evidence (neural intake)

⁴⁴See e.g. [30, 44-45], [24, 12], [27, 349].

it is a free one. A theory takes on empirical content by implying predictions in the form of observation categoricals; and the observation categoricals, in turn, are connected with the sensory evidence that settles the predictions only as compounds of observations sentences, of the form (89). Quine summarizes this picture of the evidence relation in the following dictum:

Man proposes; the world disposes, but only by holophrastic yes-or-no verdicts on the observation sentences that embody man's predictions. [24, 36]⁴⁵

In Quine's genetic investigation into the relation between sensory intake and theory, the child starts by learning some observation sentences, associating them with ranges of global stimuli by ostensive learning. On this basis, the child goes on to learn constructions on observation sentences, notably that of the free observation categorical. In the step of analogical synthesis from the free to the focal observation categorical the observation sentences in the free categorical turn into predicates which denote objects. Sentences that refer to objects can be related to sensory intake only via the predicates appearing in these sentences, since it is the predicates in an observation categorical that are related to sensory intake as component observation sentences of the categorical considered as a free one. The predicates may appear in various sentences between which there are logical connections. If the theory has empirical content, some of its predicates appear in observation categoricals which are logically deducible from the theory. And it is in virtue of the predicates appearing in these observation categoricals, conceived as component observation sentences of free observation categoricals, that the theory is connected with neural intake. The observation categoricals are not connected with sensory intake as focal ones; in this sense, Quine's model of the evidence relation entails that there is no direct sensory evidence about objects. Reference to objects, even at the level of observation categoricals (focally conceived) transcends all evidence. This transcendence of evidence is brought out by the difference of strength between the free and the focal aspects of an observation categorical. It is in this sense that objects, concrete and abstract, are theoretical posits according to Quine's epistemology.

Quine's epistemological conception of objects as theoretical posits is a doctrine about the nature of our cognitive relation to objects: we can 'know objects', so to speak, only as objects-classified-under-predicates, objects-*qua*. However, it is not only that. As I will argue in the next chapter, on Quine's conception *objects themselves* are objects-*qua*. The idea of an object as independent of any

⁴⁵See also [27, 351].

theory is rejected in Quine's epistemology. On Quine's epistemological model, an object cannot be a theory-neutral 'subject matter' of which different theories may predicate different things. The identity of an object is dependent on theory: an object is what it is only in virtue of the theory in which it is posited.

Chapter 6

Quine, Objects, and Modal Logic

In this chapter, I consider Quine's critique of quantified modal logic as presented in section 2.5.2 from the point of view of his epistemological conception of objects as presented in chapters 4 and 5.

In section 6.1, I discuss the reference-theoretic strategy of answering Quine's critique. I argue that the reference-theoretic strategy is incompatible with Quine's epistemological conception of objects, since that strategy involves a 'realistic' conception of objects as theory-independent, a conception that is completely foreign to Quine's philosophy. While Quine adheres to a kind of realism about the external world and its objects, his position has also been characterized as 'anti-realistic' about objects. In section 6.1 I also discuss Quine's own statements about rigid designation and genuineness of singular terms, but I despair of attributing any coherent account to him on the basis of these printed remarks. Instead of focusing on these few explicit remarks, I try to demonstrate the incompatibility of the non-descriptivist view of singular reference with Quine's philosophy by looking at the issue from the point of view of his epistemological conception of objects.

Section 6.2 takes up Divers' answer to Quine's critique. I argue that the very distinction between semantic and metaphysical issues on which Divers' answer turns is not supported, but rejected, in Quine's epistemology. As explained at the end of section 3.2, Divers sees the conflation of the metaphysical with the semantic as affecting other aspects of Quine's thinking besides the critique of

modal logic, and refers in this connection to a passage on identity in Quine's essay 'Reference and Modality' [43, 139]. In section 6.2, I argue that according to Quine's epistemology there is no theory-independent metaphysical standpoint, as distinguished from a semantic one, from which the situation illustrated by his example of (64), (65) and (74) (on page 53) could be viewed. I also argue that Quine's apparent conflation of the metaphysical with the semantic in the passage on identity that Divers discusses is no conflation at all when viewed from the point of view of Quine's epistemology.

The discussions in sections 6.1 and 6.2 aim at establishing the first half of my main thesis, namely the claim that Quine's epistemology supports his critique of quantified modal logic indirectly by affording a means to construct Quinean responses to the two strategies of answering his critique discussed in sections 3.1 and 3.2.

In section 6.3, I attempt to establish the second half of my main thesis which says that Quine's epistemological conception of objects supports his critique of modal logic directly. In my view, this support stems from Quine's epistemological model, according to which objects are objects-*qua*, that is, objects-classified-under-predicates. There is no 'object itself' somehow beyond or in addition to the object as represented in the theory in which the object is posited. I argue that according to Quine's epistemology, the identity of an object is theory-dependent in the sense that what an object is is fully determined by the whole empirically meaningful part of the positing theory. Since objects cannot be separated from descriptive classifications within a theory, the effect of descriptive elements on modal predication, demonstrated by examples like that of (64), (65) and (74), cannot be eliminated.

6.1 Quine and the Non-Descriptivist Theory of Reference

Quine does not discuss the non-descriptivist theory of singular reference at length in any of his writings. He does make some remarks concerning rigid designation in a few essays, starting from the late 1970's. In the 1977 essay 'Intensions Revisited' Quine says that a rigid designator differs from other singular terms in that it picks out its object by essential traits [31, 118]. What he means by this is that a rigid designator refers to an object in virtue of a descriptive connotation which can be expressed by a definite description involving only predicates F such that the referent is necessarily F . In this essay, Quine

seems to think that rigid designation *presupposes* the idea of an object's having a trait necessarily (essentially). And the idea of possible worlds is of no help in this connection:

A rigid designator differs from others in that it picks out its object by essential traits. It designates the object in all possible worlds in which it exists. Talk of possible worlds is a graphic way of waging the essentialist philosophy, but it is only that; it is not an explication. Essence is needed to identify an object from one possible world to another. [31, 118]

The remarks Quine makes in this connection are directed equally to 'what Føllesdal called a genuine name and Kripke has called a rigid designator' [31, 118]. Quine expresses this kind of understanding of rigid designators and Føllesdal's genuine singular terms also in his later writings. For example, in the 1994 essay 'Promoting Extensionality' Quine notes Kripke's and Føllesdal's view that rigid designators, or genuine singular terms, obey substitutivity of identity and support inference by existential generalization even in modal contexts. When ' Fa ' is a sentence of a theory couched in the syntax of first-order modal logic and contains no occurrence of a modal operator, and ' a ' and ' b ' are rigid designators or genuine singular terms, given

(91) $\Box Fa$,

we may infer

(92) $\exists x \Box Fx$.

And given

(93) $a = b$,

we may infer

(94) $\Box Fb$.

On the assumption that only rigid designators (or genuine singular terms) are admitted as singular terms, ' \Box ' is a referentially transparent construction, according to (9b) and (11) on page 22. Quine, who does not make this assumption, notes that in modal logic the applicability of the inferences schematized by (91)-(94) is not a question of the referentiality of positions, but of the kind of singular terms used – not a question of where, but of what. So, for Quine,

the adoption of rigid designators or genuine singular terms makes all individual variable positions in modal logic 'potentially' referential. However, as in 'Intensions Revisited', Quine sees the notion of a rigid designator (a genuine singular term) as already presupposing the very distinction between essential (necessary) and accidental (contingent) traits of objects. These terms, according to Quine, name their objects 'on the score of essential traits, not accidental ones' [58, 444]. Another example of this way of understanding rigid designators and genuine singular terms can be found in Quine's Introduction to a Panel on Reference from 1986 [57, 339].

In the 1990 essay 'The Elusiveness of Reference', Quine takes a somewhat different line [53, 355-357]. Having dismissed accounts of rigidity in terms of possible worlds and necessary traits, he notes that he agrees with what he takes to be Føllesdal's position with regard to genuine singular terms. He understands this position as being that there are no absolute criteria for the rigidity of a term – one and the same term may be used as rigid or as non-rigid in one and the same sentential context. He gives the example

(95) The Babylonians discovered that the Morning Star is the Evening Star,

which is presumably true when 'the Morning Star' and 'the Evening Star' are treated as non-rigid, but false when these terms are treated as rigid. Rigidity, or genuineness, is just a matter of decision. Choosing to treat a singular term as rigid is a matter of temporarily *abstracting from the descriptive or connotational trappings* of the term [53, 356-357]. Quine speaks of the *impurity* of reference in this connection. Impurity consists in a singular term's picking out its object 'by means of descriptive content or other connotations, even when the term does not have the form of a singular description' [53, 356], and this descriptive factor is what is *abstracted from* when we choose to treat a term as rigid. So, in this essay Quine seems to hold the view that all singular terms refer in the first place in virtue of having a descriptive connotation. As regards variables, which Føllesdal considers the archetypical genuine singular terms, Quine says that they are rigid, *but not designators*, since they do not designate but rather take things as values [53, 357]. By admitting that variables are rigid Quine means that they do not pick out their objects by means of descriptive content associated with them. However, a variable does not pick out its value by referring to this object like a singular term does; rather, a variable is a linguistic device to which an object is assigned as a value. In this, variables differ from singular terms.

Føllesdal points out that the conception of the connection between rigid designators and essential traits which Quine expresses in the passage from 'Intensions Revisited' quoted above is mistaken with respect to genuine singular

terms [81, 104-105]. One purpose of Føllesdal's genuine singular terms and pure reference is to make sense of Aristotelian essentialism. They can serve this purpose because pure reference does not depend on any kind of descriptive connotation, not even a specification of essential (necessary) traits unique to the referent. The notion of a genuine singular term does not require an appeal to necessity or essence for its explanation or clarification. The fact that a genuine singular term refers to the same object in all possible worlds is due to the fact that the relation between the term and its referent is pure reference. Quine's representation of Føllesdal's view on genuine singular terms in 'The Elusiveness of Reference' also seems mistaken. It is not Føllesdal's view that genuineness would be a matter of choosing to treat a term as rigid by abstracting from the descriptive connotation in virtue of which the term refers to its referent in the first place. Rather, Føllesdal's view is that a genuine singular term does not refer to its referent in virtue of a descriptive connotation, and that this relation of pure reference can hold independently of speakers' decisions to abstract from descriptive connotations.

Quine's understanding of rigidity and genuineness as dependent on descriptive connotation which specifies necessary traits unique to the referent differs radically from the explanations provided by the theorists who introduced these ideas. This is also true of Quine's account in 'The Elusiveness of Reference' from 1990, which is based on the idea of temporary abstraction from the connotational trappings of a term. In addition to these writings, we have Quine's 1986 reply to Føllesdal, where he seems to get Føllesdal's basic point about genuine singular terms right (page 64). This basic point is that the reference relation between a genuine singular term and its referent is not determined by any descriptive elements that speakers associate with the term. Føllesdal's idea of pure reference is not dependent on the notion of a necessary (or essential) trait, and consequently this idea amounts to 'an alternative' to the essentialism which Quine sees as built into the notion of rigid designation. However, there is no trace of this charitable understanding of genuineness in Quine's 1986 Introduction to a Panel on Reference, or in his essays from the 1990's.

In light of his idiosyncratic and varying views on the issue, I despair of attributing any particular conception of rigid designation or genuineness of singular terms to Quine. Most of his discussions follow the lines of the 1977 essay 'Intensions Revisited', but then we have the 1986 reply to Føllesdal and the 1990 essay 'The Elusiveness of Reference', in which he takes a different stand. In what follows, I will ignore Quine's printed remarks on the topic, and look at the non-descriptivist strategy of answering his critique of quantified modal logic from the point of view of his epistemology. Quine himself does not dis-

cuss non-descriptivism about singular reference from this point of view. I will attempt to show that the non-descriptivist strategy of answering Quine's critique presupposes a conception of objects that is incompatible with Quine's conception.

In sections 3.1.1-3.1.3 I looked at the reference-theoretic strategy of answering Quine's critique of modal logic, focusing on Føllesdal's and Devitt's views. The gist of this strategy is to invoke a reference-theoretic view of a relation between a singular term and an object which does not depend on any description (definite or indefinite) that speakers may associate with the term. Like Føllesdal's genuine singular terms, Devitt's designational terms have this feature. Devitt also gives an account of how designational terms may give rise to an ambiguity between a linguistic kind of necessity which Quine would classify as a first-grade metalinguistic notion and a non-linguistic *de re* necessity. Assuming that the token of 'Mary's husband' in (78) is designational, Devitt's example

(78) Mary's husband is necessarily married

may be seen as (presumably) true when the modal adverb is given a wide scope. On the wide-scope reading, the truth of (78) is based on a semantic or meaning-theoretic relationship between 'husband' and 'married'. On the narrow-scope reading (78) is (presumably) false, and this falsity is based on the putative fact that Joe is not necessarily married. When the token of 'Mary's husband' in (78) refers to Joe in virtue of a network of d-chains grounded in him, and thus is designational, it may be used in picking out the object Joe without presupposing any descriptive background classification of him.

The non-descriptivist view of the relation of singular reference assumes that objects exist independently of any theory. The reference relation between a rigid designator (or a genuine singular term or a designational term) '*a*' and an object is a link between language and theory-independent reality. Once an object is fixed as the referent of '*a*' (once '*a*' is grounded in an object), this link between the term and the object holds independently of the theories that speakers who use '*a*' may hold. From this kind of reference-theoretic viewpoint, the referent of '*a*' is seen as theory-independent 'subject matter' about which statements can be made by predications involving the term '*a*'. No matter how thoroughly mistaken beliefs a speaker may hold, any predication of the form Fa she makes will nevertheless be about the theory-independent object which in fact is the referent of '*a*'. The meaningfulness of a sentence of the form $\exists x(x = a \wedge \Box Fx)$ is not vitiated by speakers' descriptive classifications of *a* or their associations of descriptions with '*a*'. The truth condition of such a sentence is not affected by whatever descriptive elements speakers may rely on in describing or identifying

a as the referent of ' a '. Once the reference of ' a ' has been fixed and the term has been passed on in a historical chain of reference borrowings, it may happen that a speaker has no correct beliefs expressed by a sentence involving ' a '. Yet the reference relation between ' a ' and its referent holds, and the speaker will succeed in speaking about a by using ' a '. As explained in section 3.1.1, the power of a genuine singular term to pick out an object as the common subject matter of both false and corrected beliefs or theories is considered by Føllesdal an indication of the importance of such terms. This point is also central to the Kripkean critique of description theories of reference, as Devitt points out [75, 19-20].

The distinction between objects as theory-independent subject matter and what is said about these objects in a theory is untenable according to the view of the evidence relation which arises from Quine's genetic investigation (see section 5.5). In Quine's epistemology, the identification of a particular object is always relative to predication. An object is identified only by what a theory says about it – that is, predicates about it. This point about identification of objects can be accommodated by the non-descriptivist theory of singular reference: even if we could not have cognitive relations to objects independently of descriptive classification, the relation of reference may hold irrespective of descriptive content involved in speakers' identifications of the referent. This independence of reference from descriptive classification is brought out by the case of error on the speakers' part discussed in the previous paragraph: after successful fixing (grounding), descriptive classifications made by speakers are irrelevant to the reference relation between the term and its referent. However, according to Quine's epistemology it is *not only* that we cannot have cognitive relations to objects and identify them other than through descriptive classification by predicates within a theory; *objects themselves* are theoretical posits, and there is no sense to the notion of an object as independent of any theory, as some sort of theory-neutral subject matter about which we can say (predicate) something in our theories. It is not only a matter of representation or identification of objects, it is also a matter of the *identity* of objects.

According to Quine's epistemology, linguistic content consists in what he calls empirical content (see section 5.5). An observation categorical is connected with neural intake as a free one, and sentences other than observation categoricals have empirical content in virtue of their logical connections with other sentences and ultimately with observation categoricals. Predicate terms have content only in virtue of appearing in sentences which belong to a theory that has critical mass. As noted earlier, Quine's epistemological model is holistic: empirical content attaches primarily to chunks of theory which have

critical mass, that is, which imply synthetic observation categoricals. Apart from observation categoricals, a single sentence does not have empirical content in isolation, but only as a part of a logically structured theory. In the context of Quine's epistemology, there is nothing to the content or meaning of linguistic expressions beyond empirical content.¹ In particular, reference is merely an auxiliary semantic phenomenon which is subordinate to empirical content. According to Quine's epistemology, the referential apparatus of language plays only a *structural* role: the referential idiom of quantifiers, variables and predicate terms contributes to the logical structure of a theory by establishing relations of logical implication between sentences.² By contributing to logical structure, reference contributes to the linking of theory with evidence by forging logical links which ultimately lead to observation categoricals. As explained in section 4.2, Quine sees the linguistic science of humans as continuous with the non-linguistic capacity of prediction (primitive induction) which he attributes to all organisms capable of learning. Quine understands science in the broadest sense, from the non-linguistic capacity for primitive induction to the most technical branches of theoretical science, in evolutionary terms as a tool for prediction whose ultimate value lies in the survival of the species and the individual. The referential idiom is part of the human organism's linguistic machinery of prediction, a part which has presumably proved useful in increasing the predictive power of our theories through its contribution to logical connections between sentences. Reference is the channel of assuming objects, and Quine says that objects themselves play the role only of 'nodes' in a network of sentences that connects sensory stimulations with other, future sensory stimulations [53, 361].³ In his reply to Føllesdal, Quine puts this point as follows:

I see reference, reification and ontology no longer as a goal of science, but rather as a spin-off of quantification and the variables, these being in turn a mere technical aid in forging logical links between observation sentences and theoretical sentences. [16, 115]

In Quine's epistemology, reference and ontology have the status of 'mere auxiliaries' [24, 31]. The primary sort of content for a theory is empirical content,

¹For a brief and rather clear statement of this conception of linguistic meaning, see e.g. [53, 361]: 'I have no definition of meaning, but whatever goes into meaning must be traceable ultimately to the associations of our linguistic forms with sensory stimulation and with one another'.

²See e.g. [24, 31-36], [53, 360-362], [25].

³Quine illustrates this structuralist view of ontology with his thesis of the indeterminacy (or inscrutability) of reference which he establishes by means of proxy functions. See e.g. [24, 50, 31-33], [30, 70-75].

implied predictions in the form of observation categoricals. Reference to objects is just a technical means of producing such predictions.

As already noted, the non-descriptivist theory of singular reference is able to accommodate the point about the role of descriptive content in our cognitive relationship to objects. However, the non-descriptivist view about the reference relation must assume objects as theory-independent entities to which singular terms may refer irrespective of what beliefs or theories any speaker holds about them. This kind of conception of objects is incompatible with the conception that arises from Quine's epistemology. In Quine's epistemology, an object is what it is only in virtue of the theory in which it is posited – there is no level of objects-in-themselves in addition to objects-as-represented-in-a-theory. On Quine's model, objects depend for their existence and identity on the theories held by speakers. Thus, the idea of a singular term that refers to (designates) a particular object independently of the theories held by the speakers who use the term is utterly foreign to Quine's philosophy.

Fogelin describes Quine's view of objects as theoretical posits as *anti-realist* [80, 38]. Perhaps Quine's position may well be so described, if one wants to emphasize his view of objects as theory-dependent. However, as explained in section 4.2, Quine sees his epistemology as based on a realistic conception of objects in the external world (and of abstract objects, too). As regards Quine's conception of the reciprocal containment between science and epistemology (section 4.2), epistemology is contained in science and consequently adopts the objects posited by the theories it draws on. However, the realism involved in the non-descriptivist theory of reference is very different from the realism espoused by Quine. It is in drawing the distinction between objects as theory-independent subject matter and beliefs or theories about this subject matter that the reference-theoretic position is realistic about objects, whereas Quine, who denies this distinction, is anti-realist. Quine discusses this distinction in *Word and Object*, where he considers an example about two theories in physics. One theory implies that neutrinos lack mass, and the other implies that neutrinos have mass. Quine considers two ways of seeing this situation: one is that both theories are about neutrinos and at least one of them involves a false view of this common subject matter, and the other is that although each theory posits objects which it calls 'neutrinos', the sentences about neutrinos in each theory are really about different kinds of objects – the theories do not share a subject matter in this respect. Quine claims that the distinction between these two ways of looking at the situation is absurd [45, 15-16]. This case brings out the status of microphysical particles as theoretical posits, and Quine thinks that in this respect such particles are on a par with 'the most ordinary physical objects'

– the truths about both sorts of objects are ‘less than determined by our surface irritations’ [45, 22]. By ‘surface irritations’, Quine means neural intake, which he came to speak of in terms of global stimuli in the later work *From Stimulus to Science*. As explained in section 5.5, the evidential relation does not hold between a theory and objects. A theory is connected with neural intake only via observation categoricals considered as free, that is, as compounds of observation sentences. The observation sentences in these compounds are ‘monolithic’ wholes – they do not involve any syntactic structure which would achieve reference to objects. As a focal one, achieving reference to objects, an observation categorical is stronger than as a free one. In this sense, sentences which involve reference to objects are theoretical and are not connected with neural intake as directly as observation categoricals as free ones.⁴ Quine’s anti-realism about objects derives from his vision of the containment of science in epistemology: according to Quine’s epistemology, all objects are theoretical posits, and the identity of an object is dependent on the theory in which it is posited.

In light of the considerations presented in the present section, I conclude that the non-descriptivist idea of a genuine singular term does *not* fit in with Quine’s philosophy, contrary to what Føllesdal claims. Quine himself does not discuss his critique of quantified modal logic in the context of his epistemological conception of objects. In this section I have constructed a response to the reference-theoretic strategy on the basis of Quine’s epistemology. This Quinean response consists in drawing attention to a presupposition concerning the nature of objects, and showing that this presupposition is incompatible with the conception of objects Quine’s epistemology involves. The presupposition in question is a conception of objects as theory-independent in a way that is foreign to Quine’s philosophy; in comparison with this sort of ‘realistic’ conception, Quine’s conception of objects as theory-dependent may be called ‘anti-realistic’. The discussion in the present section shows how Quine’s epistemological conception of objects indirectly supports his critique of quantified modal logic by providing Quinean grounds for rejecting the reference-theoretic strategy as a solution to his critique.

⁴Of course, in the following sense a focal observation categorical *is* determined by neural intake: if the prediction the categorical embodies as a free one fails, the categorical is (usually) falsified. In this case, a sentence which involves reference to objects becomes rather directly falsified.

6.2 Semantics, Metaphysics, and Quine's Epistemology

In the previous section I argued that according to Quine's conception of objects as theoretical posits, an object's identity depends on the theory in which the object is posited. A theory which posits objects by referring to them is perhaps likely to attribute some traits to all objects, for example the trait of self-identity: $\forall x(x = x)$. The theory may also contain certain 'principles' which govern all objects, for example the principle of the indiscernibility of identicals: it may involve, for each atomic predicate Fx which appears in the theory, an instance of the schema ' $\forall x\forall y(x = y \rightarrow (Fx \rightarrow Fy))$ '. In general, according to Quine's epistemology also the most fundamental principles that concern all objects come from the theory in which the objects are posited.

In section 3.2 I discussed Divers' strategy of exposing a flaw in Quine's argumentation. In his answer to Quine's critique of quantified modal logic, Divers makes a case of Quine's formulation of the principle of indiscernibility of identicals. Quine's formulation is an explicitly semantic one, concerning interchangeability *salva veritate* of terms in statements; yet, he considers it a formulation not only of the substitutivity of identity, but also of the metaphysical principle of the indiscernibility of identicals. Divers sees in this formulation a manifestation of Quine's tendency to confuse or conflate the semantic with the metaphysical: indiscernibility of identicals is a metaphysical principle which governs the relation of identity between objects, whereas substitutivity of identity is a semantic principle which governs linguistic expressions.

From the point of view of Quine's epistemological conception of objects, the distinction between indiscernibility of identicals and substitutivity of identity cannot be drawn in terms of the distinction between the metaphysical and the semantic, as Divers does. From the Quinean perspective, *if* a theory conforms to the semantic formulation of the substitutivity principle, then for that theory identical objects *are* indiscernible. For Quine, there is no theory-independent metaphysical side to this issue, because there is no distinction between objects as theory-independent subject matter and objects as represented in a theory, as I have argued in the previous section. All objects are objects as represented in a theory. I think the shift between the semantic and the metaphysical talk in the passage from 'Reference and Modality' quoted in section 3.2 does not appear so 'non-negotiated' once it is understood from the point of view of Quine's epistemological conception of objects.

The same kind of reasoning applies in the case of *de re* modality. Quine

argues that we have example cases which show that in a logically regimented theory which includes a modal operator expressing necessity, the satisfaction of a predicate in the scope of the necessity operator by an object depends on the way the object is linguistically specified. One such example case is that of (64), (65) and (74) of section 2.5.2. As far as I understand, Divers accepts this as a semantic point, but on the basis of his semantic-metaphysical distinction, he denies that this phenomenon shows modal reality itself to be dependent on our ways of linguistic specification of objects. Thus, Divers denies the conclusion Quine draws, namely, that the existence of such examples shows that open sentences in the scope of a modal operator are meaningless and that a variable occurring in such open sentences cannot be quantified from the outside of the scope of the operator, and that Aristotelian essentialism, the distinction between necessary (essential) and contingent (accidental) traits of an object, makes no sense. However, from the point of view of Quine's epistemology, *if* a theory is such that whether or not an open sentence of the form ' $\Box Fx$ ' is true of an object depends on the way the object is linguistically specified, then the so-called modal traits of objects *are*, for that theory, hopelessly inconstant and dependent on our linguistic specifications of objects, and consequently quantification into modal contexts makes no sense. From the Quinean perspective there is no sense to the idea that at a theory-independent metaphysical level objects would have their modal traits irrespective of how we happen to refer to these objects. For Quine, there is no 'unmasked' reality of objects and their similarity relations⁵ which would provide a stable metaphysical basis for the semantics of sentences involving the necessity operator.

This Quinean response to Divers' answer to Quine's critique of modal logic is perhaps likely to elicit a rejoinder concerning theory revision. If a theory according to which the satisfaction of open sentences in the scope of a modal operator is relative to linguistic specifications of objects were revised so that this sort of relativity were excised, the modal traits of the objects posited in the theory would no longer be relative to ways of specification. And in that case, it would be said that from the point of view of the revised theory, the modal traits of objects are, and have always been, non-relative; before the revision, the theory was false with regard to *de re* modal traits. To answer this rejoinder, I must begin by looking at Quine's conception of truth.

Quine's view of truth is that truth is internal to a theory. Here is one expression of this view:

Where it makes sense to apply 'true' is to a sentence couched in the

⁵See [78, 49].

terms of a given theory, and seen from within the theory, complete with its posited reality. [...] That the statements ['Brutus killed Caesar', 'The atomic weight of sodium is 23'] are about posited entities, are significant only in relation to a surrounding body of theory, and are justifiable only by supplementing observation with scientific method, no longer matters; for the truth attributions are made from the point of view of the same surrounding theory, and are in the same boat. [45, 24]

The idea that the truth of sentences could be evaluated from a viewpoint outside of any theory is senseless from the point of view of Quine's philosophy. Truth attributions are always made within a theory, and the sentences mentioned in truth attributions like "The atomic weight of sodium is 23' is true' gain their significance from being part of the theory. Quine does not consider this relativization of truth to a theory problematic. As he says, 'we can never do better than occupy the standpoint of some theory or other, the best we can muster at the time' [45, 22]. So, within 'our own evolving doctrine, we can judge truth as earnestly and absolutely as can be' [45, 25].

On the other hand, Quine would admit that the rejoinder envisaged one paragraph ago is correct with respect to truth in the following sense: the theory prior to the revision would be said to have been false all the time, though unbeknownst, and the theory which replaces it, assumed to be the best we can muster at the time, would be said to have been true all the time. The pre-revision theory would not have *become* false in the event of revision, just as the revised theory would not have *become* true. Since Quine admits this much about truth [30, 67]⁶, the notion of a theory-independent metaphysical reality might be argued to make sense after all – the revised theory could be said to capture a theory-independent modal reality more accurately than the pre-revision theory.

Of course, the particular revision of theory envisioned here would perhaps require a very extensive redistribution of truth values within the theory. Consequently, it may not be a very likely one. But if such a revision were to occur, it would occur as a response to some false observation categorical(s) implied by the theory. According to Quine's view of the evidence relation, a conflict with evidence consists in the falsity of an observation categorical implied by a theory, that is, in speakers' being disposed to assent to the antecedent observation sentence of the categorical, but to dissent from the consequent one, when witnessing an occasion. As explained in section 5.5, sensory intake bears on an observation categorical only as a free one, a compound of observation sentences. The evi-

⁶See also e.g. [56, 471].

dence comes in a holophrastic form – as Quine says, in the form of ‘holophrastic yes-or-no verdicts on the observation sentences that embody man’s predictions’. An observation categorical counts as focal from the perspective of the theory from which it is derived. But it is only as free that observation categoricals serve the testing of theories. A theory takes on empirical content only through the holophrastic association of observation sentences with ranges of global stimuli. As a free one, an observation categorical involves no reference to objects – in this sense, there is no direct sensory evidence about objects, the very conception of which is already pure theory, as Quine says [26, 110]. To invoke a theory-independent reality of objects in a philosophical account of the evidence relation and theory revision is to deny Quine’s whole epistemological model. For Quine, science is a tool for prediction of sensory intake, and the role of prediction is understood in terms of survival of the individual and the species. As Paul A. Gregory explains, in Quine’s epistemology the aim of theory is not seen as that of capturing or correctly representing a reality of objects which is independent of any theory [93, 108-117]. If the observation categoricals implied by a theory θ are not falsified by future neural intake, nor by any possible sequence of neural intake (assuming this way of speaking about possible neural intake makes sense at all)⁷, there is nothing more we can demand of θ . In addition to being a ‘perfect predictor’, there are no further criteria to be met for an ideally true theory. In particular, saying that θ is an ideally adequate representation of the traits of objects in an external reality is, in effect, to say nothing beyond the description of θ as a perfect predictor. To insist on something like this representational condition as a criterion for the success of theory stronger than the criterion of being a perfect predictor is senseless, according to Quine’s epistemology.

Divers’ answer to Quine’s critique of quantified modal logic seems to be based on a similar kind of realism about objects as the reference-theoretic answer was found to be in the previous section. This kind of realism sees objects as theory-independent entities which are capable of serving as referents of the referential expressions of a language. Expressions of a language refer to these theory-independent objects, thus picking them out as ‘subject matter’ about which statements can be made in theories couched in the language. The Lewisian reply to Quine is based on the idea that token expressions can also specify different objective similarity relations between objects, and thus contribute to the determination of the truth conditions of sentence tokens. Token expressions which refer to a particular object may also specify a similarity relation between the object and other objects, namely its counterparts with respect to this particular

⁷See [101, 190, fn. 4] for references to Quine’s varying views on this matter.

kind of similarity. In terms of the example already discussed in section 3.2, a token of the term 'Possum-qua-cat' selects as relevant to semantic evaluation only those counterparts of Possum which are similar to Possum in being cats. Because of this semantic feature of the term 'Possum-qua-cat', the sentence

(84) Possum-qua-cat is necessarily a cat

expresses a *de re* modal truth regardless of the context in which it is tokened. On the other hand, the sentence

(96) Possum-qua-cat is necessarily a persian

does not express a *de re* modal truth since not every relevant counterpart of Possum (that is, every cat) is a persian. In this way, counterpart theory allows descriptive elements (such as 'qua-cat' in (84) and (96)) to influence the truth value of sentences that involve the necessity operator. Thus, from this Lewisian point of view, Quine's example of (64), (65) and (74) may be seen as legitimately pointing out a semantic phenomenon: '9-qua- $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$ ' selects a different counterpart relation than '9-qua- x numbers the planets' as relevant to the semantic evaluation of sentences in which it appears. However, the number nine itself, and the similarity relations in which it stands to other objects, are independent of how we happen to refer to objects. Counterpart relations, as similarity relations between theory-independent objects, constitute the modal reality which does not change according to how we happen to linguistically specify objects, contrary to what Quine concludes. This Lewisian picture, which Divers uses to expose Quine's confusion between semantic and metaphysical issues, involves a conception of objects as theory-independent denizens of reality which are related to each other by certain similarity relations independently of our language and theory. Some linguistic expressions are linked to reality by referring to objects and invoking, in virtue of a descriptive connotation, similarity relations between objects. This conception is very different from Quine's conception of objects as theory-dependent posits and of reference to objects as auxiliary and subordinate to holistically distributed empirical content which is based on the association between neural intake and observation sentences as unstructured units.

The discussion in the present section amounts to a construction of a Quinean response to Divers' answer to Quine's critique of quantified modal logic. From the point of view of Quine's epistemological conception of objects, the very distinction between the semantic and the metaphysical issues on which Divers' answer is based is unacceptable, perhaps devoid of sense, and must consequently

be repudiated. The reasoning in this section provides Quinean grounds for rejecting Divers' diagnosis of the flaw of confusing the semantic with the metaphysical in Quine's argumentation. Like my discussion in the previous section, the present considerations bring out a case of the indirect support that Quine's critique of quantified modal logic receives from his epistemological conception of objects.

6.3 Quine's Critique of Modal Logic and his Conception of Objects

In the two previous sections, my discussion of the answers to Quine's critique of quantified modal logic illustrates how Quine's epistemological conception of objects can be used in constructing a Quinean response to these answers. If my argumentation has thus far been successful, I have in the present chapter established the first half of my thesis: Quine's epistemological conception of objects supports his critique of quantified modal logic indirectly, by affording a means of constructing a Quinean response to the two strategies of answering his critique presented in sections 3.1 and 3.2.

In this section, I argue that Quine's epistemology supports his critique of quantified modal logic directly. Quine's critique is based on the observation that whether or not an object satisfies an open sentence in the scope of a modal operator depends on how the object happens to be linguistically specified. This situation is illustrated by examples like that of (64), (65) and (74) of section 2.5.2. The gist of Quine's critique is how to make sense of the idea that an object, irrespective of how it happens to be linguistically specified if at all, may be necessarily thus-or-so. When the notion of essence is understood, as Quine does, in terms of necessary traits, this idea is the doctrine which he calls Aristotelian essentialism.

On Quine's epistemological model, theories are not evidentially related to objects, but rather to observation categoricals understood as free, that is, as compounds of observation sentences. Seen as focal, observation categoricals contain predicate terms which appear also in other sentences and thus contribute to logical connections that sentences which are not observation categoricals have to the observation categoricals. According to Quine, the only kind of content theories can have is what he calls empirical content. As explained in section 5.5, the empirical content of a theory is the set of synthetic observation categoricals the theory implies. Via the implied observation categoricals, empirical content

is holistically distributed to the sentences of the theory. Because of this holistic feature, any change in the fund of implied observation categoricals affects the content of all sentences of the theory, and consequently the content of all predicates appearing in the sentences of the theory. However, a small qualification is in order here. What I have just said does not apply to sentences that do not share in the empirical content of the theory in the first place. These are sentences which play no role in the implication of any observation categorical, that is, sentences which can be excised from the theory without any effect on its empirical content. Quine thinks that there are sentences that are in this sense empty of content, and it is no part of his program to repudiate these sentences on this score.⁸ So, on Quine's epistemological model an object is what it is only in virtue of the whole empirically meaningful part of the positing theory. It should be noted that this does not amount to a doctrine that renounces for example the abstract objects of mathematics on the score that theories of pure mathematics have no empirical content. Quine does indeed think that theories of pure mathematics lack empirical content, but according to him, the sentences of such theories take on empirical content through the applications of mathematics [30, 53].

The direct support which Quine's conception of objects affords his critique of quantified modal logic can be seen by considering his example case of (64), (65) and (74) from section 2.5.2 (page 53). When the number nine is specified *as* x such that $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$, it is necessarily greater than seven. But when the very same number is specified *as* x such that x numbers the planets, it is not necessarily greater than seven. This situation can be accounted for in terms of the relative notion of necessity discussed in section 2.5.1; however, this kind of account takes the notion of necessity as a first-grade metalinguistic notion, and precludes quantification into the scope of the modal operator. The relative notion of necessity pertains to language, the semantic or epistemological features of sentences. But, as explained in sections 2.4.2 and 2.5.2, Quine argues that quantified modal logic requires a non-relative and non-linguistic notion of necessity and involves a commitment to the view that there is an intelligible distinction between the essential (necessary) and accidental (contingent) traits of an object, a distinction that is independent of our linguistic specifications of the object.

A natural reaction to the situation illustrated by the example of (64), (65), and (74) is to appeal to the very idea of non-relative necessity: the idea that *the*

⁸See, e.g. [30, 48-49], [56, 467]. As Panu Raatikainen [122] points out, Quine does not wish to impose his notion of shared empirical content as a kind of positivist criterion of meaningfulness.

object itself, aside from its being that object *as* classified under certain predicates, may or may not be necessarily greater than seven. This general idea underlies the two strategies of answering Quine's critique discussed in sections 3.1 and 3.2. As argued in sections 6.1 and 6.2, both answers presuppose a conception of objects as theory-independent entities which may serve as the referents of linguistic expressions and consequently as theory-independent subject matter. However, from the point of view of Quine's epistemology, this idea of a theory-independent object-in-itself is senseless. An object is always an object-as-represented-in-a-theory, and an object is what it is only in virtue of the whole empirically meaningful part of a theory: *objects themselves* are objects-classified-under-predicates, objects-*qua*.⁹

From the point of view of Quine's epistemology, the object x such that x numbers the planets is the object x such that $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$, and there is no 'object-in-itself' somehow beyond, or in addition to, this object-such-that. The fundamental question about examples like that of (64), (65) and (74) does *not* concern the descriptive connotations that our linguistic means of referring to objects may or may not have. According to Quine's epistemological conception of objects, *every* way of referring to an object is bound to assume a descriptive background classification of the object because the object itself is an object-*qua*. Objects cannot be separated from their descriptive classifications, and hence the effect of the various descriptive classifications on the satisfaction of open sentences in the scope of the necessity operator cannot be eliminated. And, as explained in section 2.5.2, it is this effect of descriptive classifications that Quine sees as destructive to quantified modal logic. By using the open sentences (64) and (65) in his example, Quine is not begging any questions pertaining, for example, to descriptivism in the theory of singular reference, or to a distinction between semantics and metaphysics. His use of the open sentences in the example is fully legitimate when seen from the point of view of his conception of objects. The number nine is the object x such that $x = \sqrt{x} + \sqrt{x} + \sqrt{x} \neq \sqrt{x}$ and x numbers the planets and, according to popular belief, also numbers the total lives of a cat. And these descriptions are constitutive of what the number nine is: there is no number nine somehow beyond this object-such-that. In this way, Quine's epistemological conception of objects directly supports his strategy of arguing that open sentences in the scope of the modal operator expressing necessity make no sense.

⁹My reading of Quine as holding this epistemological view of objects as objects-*qua* has been inspired by a similar interpretation of Frege proposed by Leila Haaparanta. See e.g. [95], [97].

Chapter 7

Conclusions and Prospects

In this chapter, I state the conclusions of this study and discuss a proposal for a topic of further research inspired by the approach I have taken towards Quine's critique of quantified modal logic.

Section 7.1 is a recapitulation of the arguments that I have presented in support of my main thesis. In that section, I also explain what I see as the contribution of this work to the study of Quine's philosophy. In section 7.2, I propose an approach to Quine's discussion of the idioms of propositional attitude that is analogous to the one taken towards his critique of quantified modal logic in the present study. In the spirit of a suggestion for a topic of further research, I look at Quine's treatment of *de re* propositional attitude contexts from the point of view of his conception of objects. I think that Quine's repudiation of the idiom of *de re* attitudes as senseless can be clarified by this approach. As a tentative hypothesis for further research, I suggest in section 7.2.2 that Quine's conception of objects sets an unrealistically strong necessary condition for the truth of an ascription of a *de re* propositional attitude to a subject.

7.1 Conclusions

Quine himself does not connect his critique of quantified modal logic with his epistemological conception of objects. The connection between these aspects of his philosophy has not been thoroughly discussed in the vast literature on Quine's philosophy either. The aim of the present study has been to argue, on the basis of textual evidence, that there exists a connection between these

aspects in Quine's philosophical system. The nature of this connection is that Quine's epistemological conception of objects supports his critique of modal logic. This support is manifested in two ways. First, Quine's epistemological conception of objects affords a perspective from which to construct a Quinean response to some counterarguments or attempted solutions to his critique of quantified modal logic. Second, Quine's conception of objects supports his critique of quantified modal logic directly.

Besides my main thesis concerning the connection between Quine's epistemology and his critique of quantified modal logic I have also argued for a particular interpretation of Quine's critique. As attested by the discussions in chapter 2.4, there is no consensus among commentators as to the form and content of Quine's argumentation against quantified modal logic. Ray sees Quine's argument as being based on the notion of referential opacity and as involving a demonstration of Quine's Thesis (QT), namely the thesis that no variable inside a referentially opaque construction is bound by a quantifier outside the construction. Like Neale, Ray thinks Quine's argument is directed only against modal logic with the necessity operator read as expressing the notion of analyticity and is effective only against this reading, not against the metaphysical reading. In this study I have adopted a different interpretation according to which Quine's critique of quantified modal logic concerns a notion of necessity which is not understood as analyticity. In section 2.4.2 I attribute to Quine the view that quantification into modal contexts is incompatible with the explanation of the necessity operator in terms of analyticity. According to my interpretation Quine thinks that quantified modal logic requires a non-linguistic notion of necessity, the idea that objects in the domain of discourse may have some traits necessarily, independently of how these objects are linguistically specified. This is manifested in Quine's statement that a commitment to Aristotelian essentialism (section 2.5.2) is a consequence of quantified modal logic. In this study I have construed Quine's critique as an argument for the view that quantified modal logic and the accompanying doctrine of Aristotelian essentialism are unintelligible. Contrary to Ray's interpretation, I see this argument as independent of Quine's Thesis (QT) and the notion of referential opacity. I take my interpretation of Quine's critique to be in agreement with Føllesdal's.

As regards the main thesis of this study, the first kind of support was illustrated by considering two recent answers to Quine's critique: the reference-theoretic answer based on the non-descriptivist theory of singular reference and Divers' answer which is based on a distinction between semantic and metaphysical issues. As explained in sections 6.1 and 6.2, the two answers to Quine's critique discussed in sections 3.1 and 3.2 both assume a view of objects as

theory-independent, a view which is realistic in a way which is very different from Quine's realism. This realistic assumption is incompatible with Quine's epistemological conception of objects. In terms of Quine's view of the reciprocal containment between science and epistemology discussed in section 4.2, Quine's realism stems from the containment of epistemology in science. In his epistemological investigation, Quine assumes the existence of many kinds of objects assumed by the theories on which his epistemology draws. What sets his realism apart from that assumed in the two answers to his critique is the other direction of containment, namely the containment of science in epistemology. Quine's epistemology says that any object referred to in any theory is a posit, and that the contribution of objects as theoretical posits is a structural one, as explained in section 6.1. Of course, this also holds of the objects assumed in the epistemological investigation itself. The referential idiom of quantifiers, variables and predicates contributes to the capacity of a theory to logically imply observation categoricals. In contrast to the view of objects as theory-independent involved in the two strategies of answering Quine's critique of modal logic, this aspect of Quine's epistemological conception of objects may be called 'anti-realistic'.

The second, direct kind of support is based on the observation that Quine's epistemology entails a conception of objects as theoretical posits according to which objects cannot be separated from descriptive classification. As illustrated by examples like that of (64), (65) and (74) in section 2.5.2, the descriptive elements involved in our various ways of specifying an object affect the judgment about whether or not the object satisfies an open sentence in the scope of the necessity operator. From the point of view of Quine's epistemological conception of objects, it can be seen that this effect of descriptive elements cannot be eliminated. Epistemologically speaking, the object exists, and is the object it is, only in virtue of the theory in which it is posited. For Quine, objects themselves are always objects-classified-under-predicates, objects-*qua*. In his critique of quantified modal logic, Quine is pointing out that focusing on one or another way of specifying an object by means of a descriptive classification within a theory has an effect on whether or not an open sentence in the scope of a modal operator is true of the object, and that such an effect is not to be tolerated if we are to make sense of quantified modal logic. From the point of view of Quine's epistemology, the fundamental question is not whether our linguistic means of referring to an object carry a descriptive connotation or not: according to Quine's conception of objects, every way of referring to an object is bound to assume a descriptive classification of the object because the object itself, as a theoretical posit, is an object-*qua*. Since Quine's epistemology entails that the effect of descriptive classification is inescapable, his epistemology

supports his critique of quantified modal logic. The only sense that can be made of the notion of a necessary or essential trait on Quine's epistemological model is the relative, gradualistic construal developed in section 2.5.1.

In the present study, my task has been to show how two aspects of Quine's philosophy in fact hang together. Thus, my study contributes to a better understanding of Quine's philosophical system by exposing a connection between two parts of this system that has until now gone unnoticed. I have argued that Quine's epistemology, in particular the conception of objects it involves, supports his critique of quantified modal logic in the two ways just explained. Once this connection between Quine's critique of quantified modal logic and his epistemology is recognized, taking Quine's conception of objects into account becomes crucial for any attempt at answering his critique of quantified modal logic, at least if the answer is meant to address the critique as a part of Quine's philosophical system. The systematic character of Quine's philosophy has been emphasized by scholars. Hylton, for example, points out that Quine has something to say on almost every topic in theoretical philosophy that has engaged analytic philosophers. 'But', he continues,

anyone who approaches Quine's work primarily interested in one of those topics [...] is likely to miss the larger Quinean picture and thus also to miss the power of his thought. And examined in isolation, Quine's views on a particular topic may seem under-motivated or even arbitrary. [101, 2]

Perhaps Quine's critique of modal logic is one aspect of his philosophy that may seem unmotivated, perhaps even arbitrary, to many contemporary philosophers. The philosophy of language today offers theoretical resources which were not developed, or at least not sufficiently articulated, at the time when Quine published his central writings on modal logic. The non-descriptivist theory of singular reference is an example of such a theoretical resource: Quine's critique might seem a relic from the pre-Kripke stage of philosophical reflection on the relation between language and the world. Or, as regards Divers' answer to Quine's critique, the distinction between metaphysical and semantic issues is likely to seem quite innocuous to the contemporary analytic metaphysician who works on the premiss that the proper object of metaphysical investigation is the fundamental structure of reality itself instead of the structure of our thought (perhaps as revealed by philosophical reflection on language).¹ In the present study, I have attempted to motivate Quine's critique of quantified modal

¹See e.g. [113, 3-11].

logic and Aristotelian essentialism as a genuine component of his philosophical system, a component that is supported by his fundamental conception of the relation between language, theory and the world. As already mentioned, Quine himself does not explicitly give such a deep motivation to his critique. What I hope to have established in the present work is that the proper way of answering *Quine's* critique of quantified modal logic and essentialism is to focus on the supporting Quinean picture, namely his epistemological system and the conception of objects as theoretical posits which is an important aspect of that system.

7.2 Quine's Epistemology and the Propositional Attitudes

Quine's argument against the intelligibility of quantified modal logic rests on example cases such as that of (64), (65) and (74) of section 2.5.2. Such example cases are designed to bring out the way descriptive classification of an object affects our judgment as to whether or not an open sentence in the scope of a modal operator is true of the object. From the point of view of Quine's epistemology, it is not only that we cannot 'know' objects, or have cognitive relations to them, independently of descriptive classification within a theory; objects themselves are posits which do not have theory-independent existence or identity. And, as I have argued in section 6.3, an object is what it is only in virtue of the whole empirically meaningful part of the positing theory, since any change in the empirical content of the theory amounts to a change in the content of the predicates which occur in the sentences of the theory. One cannot isolate an epistemologically proper part of a theory which would suffice to 'identify' an object posited by the theory. Descriptive classification is thus inescapable – there is no way of picking out a 'pure' object 'as it is in itself', since there are no such objects-in-themselves but only objects-*qua*. This point about the inescapability of descriptive classification amounts to what I have called the direct support that Quine's epistemology affords his critique of quantified modal logic.

As mentioned in the beginning of this study (chapter 1), Quine rejects as senseless not only the idiom of *de re* necessity, but also that of *de re* propositional attitudes. A detailed account of Quine's views on the idioms of propositional attitudes, and the discussions pertaining to Quine's views, would require a separate study. Such an account cannot be undertaken in the present work.

However, since I think Quine's epistemological conception of objects has an important theoretical connection to his views on the propositional attitudes, I attempt to draw a rough sketch of this connection in the present section. My sketch is intended as a suggestion for a topic of further research.

7.2.1 The Problem of Exportation

As explained in section 5.2, Quine gives ascriptions of propositional attitudes a central role in his account of language acquisition. A range of important cases of exercise of the capacity of empathy is described by him in terms of (tacit) ascription of a propositional attitude of the form '*s* perceives that *p*'. Quine thinks that the idioms of propositional attitudes are not easily dismissed, since they play important roles in our theories. Unlike the case of *de re* necessity, Quine concedes that the idiom of *de re* propositional attitudes is sometimes useful. However, he also claims that strictly speaking, attributions of *de re* attitudes make no sense, just like attributions of essential traits.

In the 1955 essay 'Quantifiers and Propositional Attitudes' [9], Quine draws a distinction between the *notional* and the *relational* propositional attitude constructions. Quine takes up the following example:

(97) Ralph believes that Ortcutt is a spy.

What Quine calls the notional reading of (97) can be construed as an affirmation of a relation between Ralph and the sentence 'Ortcutt is a spy' (understood as a sentence-type, a sequence of phonemes or characters). The sentence need not be in a language which Ralph (the *attitudinist*) is competent in – it is the *ascriber's* way of describing Ralph's state of mind. Such a notional reading presents no special logico-semantic problems, considering the nature of quotation as an opaque context within which there are no genuine occurrences of component expressions (see section 2.4.2). Understood as an ascription of a notional attitude, (97) may be written as

(98) Ralph believes 'Ortcutt is a spy'.²

This kind of notional construal resembles the first-grade construal of the necessity operator in that it is also a metalinguistic predication with respect to an object-language sentence which lies in the scope of the operator (in this case, the belief operator) which is construed as a predicate. There is no occurrence of the term 'Ortcutt' in (98). Thus, Ralph's denial of spyhood of Ortcutt when the

²Quine also uses 'believes-true' instead of 'believes' in this connection [9, 194].

latter is specified by another name or by a description does not affect the truth value of (98). The referential opacity of belief contexts presents no problem in the notional case.

According to Quine, the criteria for the ascription of notional propositional attitudes lie in behavior, including verbal behavior. On the basis of observation of behavior and the capacity for empathy, propositional attitudes may be ascribed to linguistic as well as non- or pre-linguistic beings. As explained in section 5.2, Quine thinks that the capacity for empathy is an innate capacity of projecting oneself into the perceptual situation of another. As an example of an ascription of a notional attitude, Quine considers the ascription 'Tom perceives that the train is late'. We have learned what the typical manifestations of perceiving that the train is late are, and have acquired ourselves habits of acting in the typical way when the train is late. Tom's behavior thus functions as evidence on which we base a statement about Tom's perceptual state. Although the ascription is based on such evidence, Quine does not claim that the ascription is based on explicit inference from the observed behavior. Rather, the ascription of the perception 'comes naturally' as a product of the exercise of empathy:

The evidence is not assembled deliberately. One empathizes, projecting oneself into Tom's situation and Tom's behavior pattern, and finds thereby that the sentence 'The train is late' is what comes naturally. Such is the somewhat haphazard basis for saying that Tom perceives that the train is late. [24, 63]³

The basis for the ascription of this notional perception is, Quine says, haphazard: he does not claim that each ascription of a propositional attitude has a well defined range of behavioral criteria associated with it. On the contrary, in many cases the criteria may be indeterminate and inconclusive. Quine thinks that observation of utterances on the part of the attitudinist (that is, verbal behavior) may make the basis of ascribing a perception more conclusive. However, even taking verbal behavior into account, Quine does not mean to say that a sentence expressing an ascription of a notional propositional attitude could be analyzed or translated into a sentence (however complex) which would express the behavioral criteria for the ascription.⁴ I will not discuss Quine's view on the basis of ascription of notional attitudes in more detail in this study. What is of importance for the present discussion is that ascriptions of notional propositional attitudes can be accounted for by Quine's philosophy – they are not

³See also [30, 92-93].

⁴See e.g. [63, 324-325].

particularly problematic either from a logico-semantic or from a psychological-epistemological point of view.⁵ In fact, Quine thinks that this kind of mentalistic predications are indispensable for example in social science and in everyday life [24, 72-73].

The relational construal of (97), the statement that Ralph believes *of Ortcutt* that *he* is a spy, takes the following form:

(99) $\exists x(x = \text{Ortcutt} \wedge \text{Ralph believes 'spy' of } x)$.⁶

This relational construal affirms a relation between Ralph, a predicate term, and an object – it is an ascription of a *de re* attitude. (99) entails that there is someone *of whom* Ralph believes that *he* is a spy, namely,

(100) $\exists x(\text{Ralph believes 'spy' of } x)$,

which differs from the notional ascription which says merely that Ralph believes that *someone is a spy*:

(101) Ralph believes ' $\exists x(x \text{ is a spy})$ '.

Quine notes that (100), considered in isolation, is not very informative. Its truth can be derived from rather trivial premisses. Given that Ralph correctly believes that there are spies and that there is a unique shortest one among them (that no two spies are of exactly the same height), the belief that whoever is the shortest spy is a spy may be attributed to him. Now, it may be said that in a sense there is someone of whom Ralph believes that she is a spy, namely, the shortest spy, whoever she be. However, on the basis of these considerations Ralph cannot be said to believe of anyone in particular that she is a spy – the case of the shortest spy is not sufficient to establish (100) as true.⁷ A more informative kind of attributions of relational attitudes are ones in which statements like (99) are

⁵As regards ontology, Quine claims that the mentalistic predicates used in ascribing notional propositional attitudes do not conflict with his physicalistic stance. He endorses Davidson's anomalous monism [30, 87-88]. Quine construes anomalous monism as the doctrine which accepts token identity between mental and physical states but denies type-identity between them. Each mental state, specified by an ascription of a notional attitude to a subject, is a physical state, but there is no translating or analyzing ascriptions of mental states into ascriptions of physical states. The mentalistic predicates are 'irreducibly mental ways of grouping physical states and events' [24, 72]. The dualism between the mental and the physical is a linguistic one, a distinction between types of predicates. See also [55, 350], [63]. For Davidson's discussion of anomalous monism, see [73].

⁶Quine has also suggested expressing ascriptions of this kind in terms of the notion of satisfaction: $\exists x(x = \text{Ortcutt} \wedge \text{Ralph believes 'spy' satisfied by } x)$ [9, 194].

⁷Quine attributes this point to Robert Sleight. See [31, 119-120], [30, 96-97].

arrived at by an inference called *exportation*. A step from (98) to (99) would constitute an example of exportation. A central question concerning exportation is what, if anything, licenses the step from a notional ascription like (98) to a relational one like (99).

Quine considers, and rejects, the notion of knowing who or what someone or something is as a key to solving his problem concerning exportation. This kind of solution would involve the idea that the step of exportation from (98) to (99) is allowed if Ralph knows who Orcutt is. However, Quine thinks that the notion of knowing who or what someone or something is is too context dependent to serve as a criterion for exportation. In one case the criterion for ascribing knowledge of who or what someone or something is may be related to an ability to describe appearance, in another case it may be related to, say, the ability to specify a social status, and so on. According to Quine, a similar consideration also undermines David Kaplan's suggestion for a solution to the problem of exportation. Kaplan's solution is based on the notion of *vivid name*. A vivid name is a singular term which has the capacity to *represent* an object to a subject. For Kaplan, vividness has to do with the quality of the mental representations a subject associates with the term. In addition to vividness, a name which represents an object to a subject has to fulfill certain semantic conditions. It must for example have a certain kind of causal relation ('being-of') to its referent.⁸ For the subject, this sort of name enjoys 'a special intimacy' with its object which allows the name to go proxy for the object in the subject's cognitive states [103, 197]. Quine calls this kind of a name a 'vivid designator'. He interprets Kaplan as holding the view that a term *a* is a vivid designator for *s* if there is a specific thing *x* such that *s* believes that $x = a$, that is, if $\exists x(s \text{ believes } x = a)$ [31, 120].⁹ With respect to context dependence, Quine thinks the notion of knowing or believing who or what someone or something is is just like that of essence. Both make sense only relative to context. Taken absolutely, both are empty:

The notion of knowing or believing who or what someone or something is, is utterly dependent on context. Sometimes, when we ask who someone is, we see the face and want the name; sometimes the reverse. Sometimes we want to know his role in the community. Of itself the notion is empty.

⁸It is not my purpose here to go into the details of Kaplan's view. For Kaplan's theory of the representation relation **R** and the conditions for the representativeness of a name, see [103, 197-203].

⁹Whether or not this is a correct interpretation of Kaplan's view is not discussed in the present study.

It and the notion of essence are on a par. Both make sense in context. Relative to a particular inquiry, some predicates may play a more basic role than others, or may apply more fixedly; and these may be treated as essential. The respective derivative notions, then, of vivid designator and rigid designator, are similarly dependent on context and empty otherwise. [...]

Where does the passing of the vivid designator leave us with respect to belief? It leaves us with no distinction between admissible and inadmissible cases of the exportation that leads from [(98)] to [(99)], except that those cases remain inadmissible in which the exported term fails to name anything. [...] Thus it virtually annuls the seemingly vital contrast between [(101)] and [(100)]: between merely believing there are spies and suspecting a specific person. [31, 121]¹⁰

The utterly context dependent nature of knowing or believing who or what someone or something is defeats the attempt to formulate any general conditions for the legitimacy of exportation and the ascription of a *de re* attitude. Quine thinks that because of the lack of clear criteria for the application of exportation, purported ascriptions of relational propositional attitudes are senseless.

However, as already noted, Quine admits that ascriptions of relational, or *de re*, attitudes may be useful even though they are strictly speaking senseless. In this respect, the idiom of *de re* attitudes is better off than the idiom of *de re* necessity – in addition to being devoid of sense, the latter is not even useful. As Quine says, (101) and (100) make all the difference between a triviality and a concern with national security. Ascriptions of *de re* attitudes, like (100), are 'extraneous aids' [30, 98] or 'signals pointing a direction in which to look for informative ascriptions *de dicto*' [24, 71]. (100) sounds an alert to security agents, as Quine says [30, 97], but in spite of its capacity to mobilize relevant officials, a token of (100) gives only 'a lead', not a coherent message. Following the lead, Quinean security agents proceed to interrogate Ralph and to record some *de dicto* beliefs, which fall within the bounds of extensional language [58, 443].

¹⁰See also e.g. [30, 97].

7.2.2 Quine's Epistemology and the Relational Attitudes

For Quine, a notional attitude is a relation between the attitudinist and a sentence understood as a sequence of phonemes or characters.¹¹ Any change in the sentence specified as the content of a notional attitude will result in an ascription of a different attitude. There being strictly speaking no occurrence of any term in the quotations of sentences which serve as specifications of the content of notional attitudes, no question about reference to objects within such specifications of content arises.

According to Quine, on his conception of attitude ascriptions the quotation marks may be used to indicate the borderline between the ascriber's world and the world of the attitudinist as 'fancied' by the ascriber [30, 96-97]. The quotation marks which may be used in the specification of the content 'mark an opaque interface between two ontologies, two worlds: that of the man in the attitude, however benighted, and that of our responsible ascriber of the attitude' [24, 69-70]. In the notional case, the attitudinist's world is described by specifying a sentence as the content of her attitude. For example, the attitudinist may be represented as believing that Tully did not denounce Catiline, and that Cicero did. Although in the ascriber's world Tully = Cicero, this need not hold in the attitudinist's world: the belief relation need not hold between the attitudinist and the sentence 'Tully = Cicero'. What happens in an ascription of a relational attitude is that the barrier between the worlds of the ascriber and the attitudinist is breached. By means of sentences like (99), the ascriber of a relational propositional attitude 'interjects reality, by his own lights, into the attitudinist's world' [30, 96] by saying that her attitude is directed at an object or objects.

The attitudinist may assent to a sentence ' Fa ', and dissent from another sentence ' Fb ', even though ' a ' and ' b ' are both ways of specifying one and the same object o . The problem is that there is no 'privileged' class of specifications for each object such that if an attitudinist assents to all sentences of the form ' \dots is F ' for an object when ' \dots ' marks the place of a 'privileged' specification of the object, then she may be said to believe *of that object* that *it* is F . (The measure of a specification's being a specification of some particular object is, of course, the theory held by the ascriber.) This is, in effect, the problem with the notion of knowing or believing what/who as an absolute, non-context-relative

¹¹In 'Quantifiers and Propositional Attitudes' Quine complained about the need to add a specification of language to the specifications of sentences in this connection [9, 196]. However, in light of his later views concerning the identification of speech communities (see section 5.2), this point may have ceased to be a problem.

notion.

According to Quine's view of objects as theoretical posits, there is no sense to the notion of an object as theory-independent 'subject matter' of beliefs or theories. The identity of an object depends on the whole empirically meaningful part of the theory in which it is posited, as argued in chapter 6. Hence, the attitudinist's dissent from ' \dots is F ' with *any* specification of an object o in the position of ' \dots ' will cast doubt on the attitudinist's belief being about o at all, and consequently on the applicability of exportation. For example, assume that Ortcutt is rector of the university Ralph attends. Assume also that Ralph believes that Ortcutt is a spy (98), and that he also believes that the rector of the university he attends is not a spy. Thus, represented in Quine's canonical notation (see section 5.3), Ralph's theory includes the sentences

$$(102) \exists x \forall y ((Oy \leftrightarrow y = x) \wedge Sx)^{12}$$

and

$$(103) \exists x \forall y ((Ry \leftrightarrow y = x) \wedge \neg Sx).^{13}$$

Now, since the ascriber's theory includes the sentence

$$(104) \exists x \exists z (\forall y (Oy \leftrightarrow y = x) \wedge \forall y (Ry \leftrightarrow y = z) \wedge x = z),$$

that is

$$(105) \neg x O x = \neg x R x,$$

she cannot tell whether Ralph's beliefs are *about Ortcutt* – there is no ascribing to Ralph the relational belief (99), no matter how wide Ralph's agreement with the ascriber on other sentences happens to be.

These brief reflections on the importance of Quine's epistemological conception of objects with regard to relational attitude ascriptions give rise to the following question: in Quine's philosophy, what sense, if any, can be given to the notion of another subject having a belief or some other attitude about the same object as I do? In more metaphorical terms: in what sense, if any, can an object be common to my world and to the world of another? This is a difficult question whose treatment would require a study of its own. Here, I can only offer a hypothesis drawn from the brief considerations presented thus far.¹⁴

¹²The singular term 'Ortcutt' is eliminated by assuming the predicate ' Ox '.

¹³The predicate letter ' R ' stands for the complex term 'rector of the university Ralph attends'.

¹⁴The following treatment of *de re* attitudes from the point of view of Quine's epistemological conception of objects has been influenced by Haaparanta's discussion of the possibility of treating *de re* attitudes within the context of Frege's philosophy [97].

The so-called worlds of the ascriber and of Ralph (the attitudinist) may be identified with their respective total theories, that is their respective 'systems of beliefs'. For the sake of simplicity, assume that the ascriber and Ralph belong to the same linguistic community in the sense that verbal communication between them proceeds very fluently. Assume also that no 'conflict cases' with respect to Ortcutt like that of (102)-(105) exist between Ralph and the ascriber. In this case, it may *prima facie* seem that the ascriber is entitled to infer (99) from (98). Ralph's world seems to merge with the ascriber's real world with respect to Ortcutt. However, the assumption that there exist no conflict cases with respect to Ortcutt between Ralph's and the attitudinist's theories turns out to be a very strong one. For recall that according to Quine's epistemology, the only kind of content a theory may have is what he calls empirical content. The empirical content of a theory is the set of synthetic observation categoricals that can be logically deduced from the theory. The sentences of a theory share this empirical content only as the logically structured system which is the theory. And, as argued in chapter 6, the identity of an object depends on the whole empirically meaningful part of the positing theory. So, any difference between the empirical contents of the theories held by Ralph and the ascriber amounts to an obstacle to the ascription of a relational attitude, for example (99), to Ralph. If the theories differ in empirical content, no object can be common to them. The ascriber may legitimately make the relational belief ascription (99) by exportation from (98) only if her theory has exactly the same empirical content as Ralph's theory.

My tentative hypothesis is that Quine's epistemological conception of objects sets a very strong necessary condition for the ascription of a relational (*de re*) attitude and the inference step of exportation. This necessary condition is the identity of empirical content between the theories of the ascriber and the attitudinist. Perhaps it is plausible to think that because of differences in personal history, this condition is practically never fulfilled by two subjects; in this sense, the condition is unrealistically strong. A while ago I posed the question what sense, if any, can be made in Quine's philosophy of the notion of a propositional attitude of another subject being about the same object as that of the ascriber. In light of the discussion above it seems that if some sense can be made of this notion, it seems to involve a condition so strong as to make the notion inapplicable in practice. From the point of view of Quine's epistemological conception of objects, ascriptions of relational attitudes may turn out to make theoretical sense, but in practice we are not entitled ever to make such ascriptions. If my theory and yours do not have exactly the same empirical content, I am not entitled to ascribe a relational attitude to you, since

there is no answer to the question *which object(s)* the relational attitude I am ascribing to you would be about.

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