To Olya
Acknowledgments

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Abstract

This dissertation examines the Carnap-Quine debate on analyticity with the objective of identifying exactly what is at stake. Close scrutiny of Quine’s criticism of the definitions of analyticity reveals that most of his objections are convincing only if they are considered in relation to the definitions of analyticity in natural language. Carnap, however, defines analyticity in artificial languages. The dissertation also shows that Carnap can meet the objections to his definitions by using a perspective based within his own philosophy. After examining the presumptions of each party to the debate, the dissertation concludes that the disagreement between Carnap and Quine on the notion of analyticity is rooted in their different approaches to empiricism and that there is nothing said by either philosopher which proves that one approach has ultimate advantages over the other. It is thus impossible to identify a winner in the Carnap-Quine debate on analyticity.

The process of arriving at this conclusion starts with a discussion in the first three chapters of Carnap’s philosophy followed by a critical and detailed discussion of his syntactical and semantical definitions of analyticity and the advantages and disadvantages of each. Chapter Four examines Quine’s objections to Carnap’s definitions of essential predication and shows that his objections do not undermine Carnap’s definitions of this notion in artificial languages. It also shows how vital providing a proper definition of essential predication in natural language is for Carnap’s philosophy and examines whether or not he is able to do so. Chapter Five analyzes Quine’s objections to Carnap’s definitions of logical truth and demonstrates that Carnap is able to respond to all of them when the discussion is situated within his philosophical system. Again, Quine’s objections to definitions of logical truth are meaningful only if they are considered in relation to natural language, which is not Carnap’s concern. The dissertation concludes by showing that both Carnap and Quine arrived at their conclusions with respect to the nature of logical sentences, based not on the arguments in their debate on analyticity, but on their philosophical considerations regarding the principle of empiricism: for Carnap, logical sentences are out of the realm of knowledge and independent of matters of fact whereas, for Quine, these are as empirical as other sentences. Nothing either says in their debate can convince the other to accept a different viewpoint.
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Introduction

In their debate over analytic–synthetic distinction, to what extent are Willard Van Orman Quine and Rudolf Carnap arguing with each another? Since I was introduced to the Carnap–Quine debate on analyticity, this question has been my main one concerning the debate. Later on, in the course of my work on the debate as the topic of my dissertation, I have always been under the impression that Quine criticizes a Quinian version of Carnap’s definitions of analyticity, and Carnap replies to Quine’s objections based on a Carnapian understanding of the points. In other words, both Quine and Carnap engage in the debate firmly based on their very different points of view, and as a result, they cannot see the subject–matter from the other’s standpoint.

Carnap presents definitions of analyticity in artificial languages and deals with Quine’s objections as if they are about such languages, while Quine demands a proper definition of analyticity in natural language and objects to Carnap that his definitions do not work in natural language. Quine demands a definition of general analyticity in natural language, or a definition that is applicable to any sentence regardless of the language to which the sentence belongs. If we want to distinguish sentences as analytic and synthetic, then we must provide a general definition by which we can determine whether any given sentence is analytic, no matter to what language the sentence belongs. In contrast, Carnap sees analyticity as a language–relative notion and an analytic sentence as a linguistic phenomenon, not a piece of
knowledge. “Analytic in $L_1$” and “analytic in $L_2$” are two different notions, and it does not make sense to talk about a general notion of analyticity applicable everywhere. Carnap thus attempts to provide definitions for relative analyticity either in its general or in its indexed form. Therefore, in their debate over definitions of analyticity Carnap discusses different definitions of relative analyticity for various artificial language systems, while Quine objects to the definitions in that they are not applicable generally to all sentences in different languages. Thus, one might conclude that there is no real debate over the definitions of analyticity in the sense that two sides of the debate are arguing about different issues by using similar languages. This is a main point that this dissertation helps to establish.

The main disagreement between Carnap and Quine over analyticity is about the very need for this notion in philosophical discussions, and I believe that such disagreement is rooted in their different approaches to empiricism. For Carnap, although all knowledge is ultimately based on experience, logic and mathematics are not empirical because they are not knowledge of the world at all. Conversely, according to Quine, all sentences used in knowledge are parts of our knowledge of the world and all are empirical. Carnap needs the notion of analyticity to explain the different nature of logical and mathematical sentences, while Quine denies the need for such a notion because he sees no difference in kind between logico–mathematical sentences and scientific ones. Therefore, Quine thinks that Carnap’s attempt to define analyticity is pointless. Both Carnap and Quine take their stands with respect to analyticity based merely on their approaches to empiricism. In this work, I attempt to demonstrate that, based on what Carnap and Quine say in their dispute over analyticity, there is no basis for deciding whose approach to empiricism
is more adequate and, thereby, we cannot decide which side of the debate over analyticity is correct. The final conclusion of this dissertation is that, if we consider only their arguments in their debate over analyticity, there cannot be a winner in the Carnap–Quine debate over analyticity. But their dispute over analyticity can be settled if, by considering their philosophy in general, we decide whose approach to empiricism is more acceptable. This point, I think, has been overlooked in the scholarship.

The first chapter of this dissertation provides an overview of Carnap’s philosophy in general and locates the notion of analyticity within his philosophical system. Chapter One starts with a summary of Carnap’s philosophical background, followed by an examination of his philosophical program in general and his early work in the Aufbau, and finally by an explanation of the task and method of exact philosophy for Carnap. This chapter helps the reader recognize why Carnap needs the notion of analyticity and how rejecting this notion affects his whole philosophical system. Also, in this chapter, I introduce the fundamental concepts of Carnap’s philosophy—for example, his criterion of cognitive significance—that we must understand to comprehend Carnap’s arguments on analyticity.

Chapter Two examines Carnap’s philosophy in his syntax period, including an explanation of what he means by “logic is a calculus” and the role of his principle of tolerance. I first discuss Carnap’s syntactical definitions of analyticity, and then I demonstrate how he treats the problems of meaning and synonymy in a formal way in his syntax period. Finally, Carnap’s formal definition of analyticity in relation to the meaning of sentences is considered.
Chapter Three outlines Carnap’s theory of semantics and explains how a semantical system can be built. The chapter explains the main concepts of his semantics period, especially the concept of explication that has a central role in understanding his definitions of analyticity. Chapter Three then analyzes Carnap's semantical definitions of analyticity and compares them with his syntactical definitions. This chapter also shows how Carnap defines the concept of synonymy based on the concept of logical interchangeability. Chapter Three concludes with a comprehensive summary of the main points of the first three chapters, including a review of Carnap’s philosophical evolution in the three different periods of his work, an explanation of the role of analyticity in his philosophy in general, and a comparison between his four main syntactical and semantical definitions of analyticity.

The first three chapters provide the background for examining Quine's objections to Carnap's definitions of analyticity. Chapters Four and Five deal directly with Quine's criticisms of the definitions of essential predication and logical truth, respectively. Quine argues that essential predications can only be reduced to, and explained through, logical truths by virtue of the concept of synonymy. But, according to him, no proper definition of synonymy is available.

Chapter Four scrutinizes Quine's objections to Carnap's definitions of synonymy and shows that the objections either are irrelevant to Carnap’s definitions or can be met by Carnap when synonymy in artificial languages is concerned. Moreover, the chapter demonstrates that Carnap does not appeal to the concept of synonymy to reduce essential predications to logical truths, but rather uses the weaker notion of meaning postulate that is precisely definable within artificial
languages. The chapter also examines Quine’s criticism of the definition of meaning postulate and shows, again, that his objection is not relevant to this notion in artificial language, although it is substantial with regards to the notion of meaning postulate in natural language. Therefore, I conclude that Quine’s criticism does not undermine Carnap’s explanation of essential predication based on logical truth in artificial languages. Lastly, the chapter discusses how an explanation of essential predication in natural language is required for Carnap’s definitions of the similar notion in artificial language and whether he can fulfill this requirement.

Chapter Five is dedicated to an examination of Quine’s objections to Carnap’s definitions of logical truth. First, the chapter investigates how Quine interprets Carnap’s endeavor to define analyticity, and then it tries to make sense of Quine’s objections to Carnap’s definitions of logical truth from Quine’s viewpoint. Finally, the chapter scrutinizes how much Quine’s objections make sense when we change our viewpoint and look at Quine’s objections from a Carnapian point of view. I examine Quine’s objections to Carnap’s definitions of logical truth, one by one, in the same way, and show that Quine is wrong in his general interpretation of Carnap’s work and how he misconstrues the meaning of analyticity for Carnap. Ultimately, I conclude that none of Quine’s objections to the definitions of logical truth is valid if we situate his objections within Carnap’s philosophy and in relation to artificial languages.

In spite of the fact that Quine’s objections to definitions of analyticity are mostly irrelevant to Carnap’s work, Quine still insists on addressing Carnap in his objections. In the concluding chapter, I show that Quine’s insistence is because of their different approaches to empiricism and of how wide they consider the realm of
knowledge of the world to be. In fact, Quine’s main point is that there is no need for the notion of analyticity because there is no difference between sentences of knowledge: logical sentences and others are all the same and equally empirical. Therefore, according to Quine, Carnap’s attempt to define analyticity is in vain. Conversely, Carnap believes that logical sentences are different from empirical ones in that scientific sentences do not belong to the body of knowledge of matters of fact. Carnap thus argues that we need the notion of analyticity to explain the difference between the two types. The real debate between Carnap and Quine is, therefore, not about definitions of analyticity, but about whether the notion of analyticity is needed in philosophy. To take either side of this debate, I show that none of the arguments that either man makes in their dispute over analyticity helps.
Chapter One

Toward an Exact Philosophy

In his endeavour to develop what he calls the exact\(^1\) philosophy, Rudolf Carnap considers physics and mathematics as models of clarity and precision.\(^2\) As he sees it, in the course of history, physical knowledge develops progressively; at any stage, advances in physics are built on the basis of the achievements of its previous stages. This advancement shows continuity in the progress of physics and shows that physical theories are developing ceaselessly into more and more complete and precise theories.

In the history of traditional philosophy, however, Carnap sees no comparable progress. Fundamental problems have remained unresolved in philosophy since ancient times.\(^3\) Carnap is also impressed by the exactness of the laws of physics and by the fact that physics can describe and predict events by precise mathematical characterizations.\(^4\)

Furthermore, according to Carnap, the physical method represents the only way to obtain a well-founded and coherent knowledge of the world. Any statement that legitimately claims to contain knowledge of reality is of the nature of physical statements. In other words, only those statements couched within scientific

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1 See Rudolf Carnap, *Philosophy and Logical Syntax* (Bristol: Thoemmes, 1996 [1934c]), 38. By calling his desired philosophy exact, Carnap asserts the clarity and fruitfulness of his philosophical achievements against what he sees as vague statements in traditional philosophy.
(physical) language belong to the total system of knowledge. By the same token, Carnap does not think that philosophical statements express knowledge about reality.

The method of mathematics is the other source of inspiration for Carnap to revise the method of philosophical investigation. Mathematics, according to Carnap, does not represent the world, but it reveals the structure of (physical) knowledge in that it shows the deductive relations between elements—concepts and statements—of knowledge. Mathematics represents the highest precision in definitions and the specification of relations between concepts, whereas philosophical terms are so ambiguous that almost no two philosophers are in total agreement on their use. In addition, mathematical results can be proven exactly so that there is no further controversy about them, whereas endless controversies occur among traditional philosophers.

According to Carnap, “in philosophy, no less than in science, there is the possibility of cumulative insight and therefore of progress in knowledge.” Carnap attempts to reestablish philosophy in such a way that it gains the sort of precision and fruitfulness attained in mathematics and in physics. To achieve those goals, for Carnap, not only must the philosophical method be changed, but also the very task and the subject–matter of philosophy should be reconsidered.

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5 Ibid., 7.
6 Ibid., 64–65.
7 Ibid., 3–4.
8 Ibid., 41.
9 Ibid., 68.
Carnap’s Philosophical Background

In his “Intellectual Autobiography,” Carnap points to Gottlob Frege, Bertrand Russell, and Ludwig Wittgenstein as the philosophers who have influenced him most. Through Frege, Carnap came to appreciate the importance of language and linguistic analysis in philosophical investigation. He also learned from Frege the method of careful and clear analysis of concepts and linguistic expressions, as well as the distinction between the meaning \([\text{Sinn}]\) of expressions and their reference \([\text{Bedeutung}]\). Also, through Frege, he came to realize that mathematical statements are reducible to logical statements in the sense that “all mathematical concepts can be defined on the basis of the concepts of logic and that the theorems of mathematics can be deduced from the principles of logic.” Thus, the truth of mathematics is based on logical relations alone; in this sense, mathematical statements are analytic.

Moreover, Carnap recognized the role of logic in science through Frege’s works:

It is the task of logic and mathematics within the total system of knowledge to supply the forms of concepts, statements, and inferences, forms which are then applicable everywhere, hence also to non–logical knowledge. It follows from these considerations that the nature of logic and mathematics can be clearly understood only if close attention is given to their application in non–logical fields, especially in empirical science.

Carnap asserts that the most important idea that he gained from Frege is the exclusive role of logic and mathematics in the formation of concepts, statements,

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12 Ibid., 12.
13 Ibid., 46.
14 Ibid., 12.
and inferences within the total system of knowledge. This point of view is a key motivator for some of his important philosophical positions, such as his emphasis on the fundamental distinction between logical and non–logical knowledge.15

Finally, Carnap adds:

From Frege I learned the requirement to formulate the rules of inference of logic without any reference to meaning, but also the great significance of meaning analysis. I believe that here are the roots of my philosophical interest—on the one hand in logical syntax, and on the other hand in that part of semantics which may be regarded as a theory of meaning.16

This passage suggests that Carnap was under the influence of Frege throughout almost his entire philosophical career.

However, Carnap states that his general attitude toward philosophy was shaped mostly through the influence of Russell.17 In a passage near the end of Our Knowledge of the External World, Russell calls the study of logic the central study in philosophy, and compares the role of logic in philosophy with that of mathematics in science. He says that logic “gives the method of research in philosophy, just as mathematics gives the method in physics.”18 Russell claims that, by applying the logical method in philosophy, we can attain the same sort of revolutionary achievements that Galileo gained in physics by using mathematical methods. He believes that philosophers have to start again, just as Descartes did, by practicing methodological doubt on all achievements of traditional philosophy.

Russell invited philosophers to throw out all supposed knowledge of traditional systems of philosophy, and to establish a new school of philosophy based

15 Ibid., 13.
16 Ibid.
17 Ibid.
on new methods of logical studies. Carnap was greatly impressed by Russell’s suggestion, as he explains in his “Intellectual Autobiography”:

I felt as if this appeal had been directed to me personally. To work in this spirit would be my task from now on! And indeed henceforth the application of the new logical instrument for the purposes of analyzing scientific concepts and of clarifying philosophical problems has been the essential aim of my philosophical activity.

In fact, his whole philosophical career was dedicated to the clarification of philosophical problems by means of modern logic.

In cooperation with Alfred North Whitehead and based on Frege’s achievements in modern logic, Russell developed a comprehensive symbolic theory of logical relations in *Principia Mathematica* and claimed to have reduced mathematics to logic. Moreover, Russell sketched the possibility of using the same method to reduce scientific knowledge to logical constructs of sense–data. Russell’s theory of logical relations represented in *Principia Mathematica*, and his suggestion that knowledge can be reduced to sense–data, became the main sources of inspiration for Carnap’s early work.

Carnap was also inspired by two significant ideas of Wittgenstein’s early philosophy in the *Tractatus Logico–Philosophicus* (hereafter *Tractatus*). The first idea is that all logical truths are tautologies. Wittgenstein defines tautologies as follows:

Among the possible groups of truth–conditions there are two extreme cases.

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19 Ibid., 186.
In one of these cases the proposition is true for all the truth—possibilities of the elementary propositions. We say that truth—conditions are tautological.
In the second case the proposition is false for all the truth—possibilities: the truth—conditions are contradictory.
In the first case we call the proposition a tautology; in the second, a contradiction.25

In other words, a tautology is a proposition that is true independent of any state of affairs, and a contradiction is a proposition that is false whatever state of affairs may obtain. For Wittgenstein, tautologies and contradictions say nothing about facts or the way the world is. They lack sense—in Wittgenstein’s sense—because they are not bipolar: there are no conditions under which tautologies are false and no conditions under which contradictories are true. Wittgenstein continues to explain:

Tautologies and contradictions are not pictures of reality. They do not represent any possible situations. For the former admit all possible situations, and the latter none.26

In Wittgenstein’s view, the truth of a tautology does not depend on facts but merely on the rules governing the use of the symbols of the sentence. Wittgenstein calls sentences such as “it is raining or it is not raining” logical propositions and says they are examples of tautological propositions.27 For him, logical propositions do not assert anything about the facts of the world; they are empty of factual content. Logic shows the form of language. The truth of logical sentences is derived only from their logical structure; we can decide whether these sentences are both well—formed and true by applying only the rules regarding the use of the symbols in the sentences, no matter what facts obtain.

25 Wittgenstein, Tractatus, 4.46.
26 Ibid., 4.462.
27 Ibid., 6.1.
Although it was not clear whether the early concept of Wittgenstein’s tautological statements was broad enough to include statements of mathematics, Carnap, drawing on the results of Russell’s and Frege’s works, saw no difference in kind between logical and mathematical statements. Thus, he did not hesitate to consider mathematical statements to be tautologous as well—though his word is *analytic*. Carnap claims that, by considering mathematical statements as statements without content, for the first time it becomes possible to reconcile the *apriority* of mathematical knowledge—that is, its independence from matters of empirical fact—with the principles of empiricism. I explain this claim in what follows.

Empiricism is the view that all knowledge of facts is ultimately based on sense experience. Hence, for empiricists, there is no such thing as *a priori* knowledge of facts. Carnap says that, until his time, philosophers had two alternatives for justifying mathematical claims: either they could give up empiricism and, following Immanuel Kant, consider mathematical statements to be synthetic *a priori*, or they could follow John Stuart Mill’s view and regard mathematical statements as empirical.

Carnap found Mill’s view absolutely unsatisfactory, because Mill’s view “would lead to the unacceptable consequence that an arithmetical statement might possibly be refuted tomorrow by new experiences.” Following Frege, Carnap believed that one can grasp and justify a mathematical statement, such as two plus two equals

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29 Carnap asserts repeatedly that he uses the word “analytic” in the same meaning as Wittgenstein uses the word “tautological”. Among other places, you can see this in Rudolf Carnap, *The Logical Syntax of Language*, translated by A. Smeaton (London: Routledge & Kegan Paul, 1967 [1937c]), 28, 44, and 186; and Rudolf Carnap, *Introduction to Semantics* (Cambridge: Harvard University Press, 1942), 239.
31 *Ibid.*, 64.
four, without any reference to premises justified by experience. Also, even if someone claims to have found two objects combining with two other objects to produce five objects, his experience would be considered delusional, and no one would accept it as falsifying mathematics.\(^{32}\)

Carnap holds mathematical sentences to be \textit{a priori}; however, he claims that those sentences are analytic sentences, or tautologies in Wittgenstein’s terminology. That is, according to Carnap, mathematical sentences are not about matters of fact and do not involve any knowledge of the state of affairs; they are empty of factual content \textit{[inhaltsleer]}. As Carnap sees it, justification of mathematical sentences poses no difficulty for empiricism because the sentences are totally swept out of the realm of the statements of knowledge of fact. In other words, according to Carnap, empiricism—as a theory about factual knowledge—has nothing to do with mathematical sentences, which are \textit{a priori} but contain no knowledge of facts at all.\(^{33}\)

The second idea that Carnap drew from the \textit{Tractatus} was the principle of verifiability.\(^{34}\) According to this principle, the method of verification of a statement determines the meaning of the statement, and a statement is meaningful only if it is, in principle, verifiable.\(^{35}\) In other words, the principle of verifiability states that all factual statements are empirical statements, and that all empirical statements are, in principle, definitely decidable: They are either verifiable or falsifiable by means of empirical evidence. Therefore, if a statement is not, in principle, empirically

\(^{32}\) Carnap explains that, when he was representing his idea about the independency of mathematical statements from empirical observation during a conference in academic year 1940–1941 at Harvard, he got excited objections from audiences, especially from Willard Van Orman Quine. See Carnap, “Intellectual Autobiography,” 64–65.

\(^{33}\) \textit{Ibid.}, 47 and 64.

\(^{34}\) \textit{Ibid.}, 25 and 45.

\(^{35}\) \textit{Ibid.}, 45.
decidable, it does not belong to the statements of factual knowledge. Among non–
empirical statements, some are analytic and, thus, are truths and still a part of
science, of which logical or mathematical statements are the prime examples. The
remaining non–empirical knowledge claims, according to the principle of
verifiability, are meaningless pseudo–statements.36

Carnap explains that when he calls non–verifiable sentences meaningless, he
does not mean that they are necessarily gibberish. They can be sentences like “there
is a cause of causes,” that conform to the grammatical rules of natural language. In
calling them meaningless, he means that they lack cognitive meaning; they do not
have any cognitive content because they do not assert or deny anything about facts.
They are nonsensical because they are neither true nor false and, given the principle
of verifiability, neither verifiable nor falsifiable. There is not any conceivable
empirical way to examine whether “there is a cause of causes” is a true sentence or a
false one; therefore, this sentence is nonsensical. Nonetheless, some nonsensical
sentences may have other sorts of meanings,37 such as emotive meaning as in the
case of lyric poems, which have psychological effects on the hearer.38

Purification of Philosophy from Psychology and Metaphysics

Using what he learned from Frege, Russell, and Wittgenstein, Carnap
distinguishes three types of problems found in discussions of traditional philosophy:

36 Carnap first accepted the principle of verifiability as a criterion of significance, but later he came to the
conclusion that the principle of verifiability suffers from serious defects. Therefore, he introduced the concept
of confirmability as his criterion of significance. I will return to his modified principle of significance at the
end of this chapter.
38 To elaborate on this point, Carnap distinguishes two different functions of language, that is, the expressive
function and the representative function. The former function is concerned with the psychological state of the
utterer, and the latter with states of affairs. For detailed discussion of this distinction, see Carnap, Philosophy
and Logical Syntax, 27–29.
psychological, metaphysical, and logical. He proceeds to eliminate psychological and metaphysical questions from the realm of philosophy and to reduce philosophy to logical questions and doctrines.39

Carnap asserts that statements of traditional philosophy concerning mental events, sensations, feelings, thoughts, images, and so on are psychological statements.40 Such statements belong to the realm of experimental psychology, which is a branch of natural science. Conversely, philosophy, for Carnap, is clearly different from natural science both in its method and in its subject–matter; philosophy does not follow empirical methods and does not study matters of fact. Thus, philosophy has nothing to do with facts of empirical psychology.

According to Carnap, psychological questions have to be treated the same way as other questions of natural science. That is, they have to be investigated by means of experience in a scientific way. He explains that since ancient times, philosophy has been involved in all branches of science. Over time, physics, chemistry, and biology, one by one, got separated from philosophy and went their own way. Carnap claims that it is only recently that psychology has been recognized as a scientific discipline distinct from philosophy. This is why, he thinks, some philosophers have failed to realize the difference between psychological statements and philosophical ones.41

Carnap’s elimination of psychological questions from the realm of philosophy, and his restriction of philosophy to logical studies, might seem contradictory because psychology and logic might be considered to be inseparable. There is a view

39 See the first chapter of Carnap’s *Philosophy and Logical Syntax* and the last chapter of his *The Logical Syntax of Language*.
40 Carnap, *Philosophy and Logical Syntax*, 34.
that logic is concerned with thinking; that is, logic concerns either the actual operation of thinking or the rules governing the accurate way of thinking. On the basis of this view, which Carnap calls *psychologism*, logical questions are, by nature, psychological. Carnap agrees that an investigation of the actual process of thinking is a psychological investigation, but he insists that logic has nothing to do with this actual process. Nor does logic represent the rules according to which accurate thinking proceeds. Thus, according to Carnap, logic is not concerned with thinking at all.42

For Carnap, the concern of logic is language, specifically the relations among linguistic expressions.43 Logic does not deal with states of mind and thus has nothing to do with psychology. It should be mentioned that this view is grounded in his analytic–synthetic distinction, which is itself a philosophical distinction rather than an empirical one.

The elimination of metaphysics is a direct consequence of Carnap’s criterion of significance. Statements of metaphysics,44 such as ontological sentences that allegedly talk about the nature of reality or the way the world is as a whole, are clearly neither verifiable nor analytic. Therefore, according to the criterion of significance, statements of metaphysics are meaningless and can thus be understood as pseudo-statements.

Carnap identifies two kinds of meaningless sentences, both of which occur in metaphysics.45 The first is the kind of sentence that contains a meaningless word.

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42 *Ibid.*, 34.
44 Carnap defines a metaphysical statement as a statement that claims “to represent knowledge about something which is over or beyond all experience”; see Carnap, *Philosophy and Logical Syntax*, 15.
The meaning of a word can be determined in the following way: first, the syntax of the word (that is, the mode of the occurrence of the word in a sentence) must be given. To do so, the simplest form of sentence in which the word can occur must be determined. This form is called the elementary sentence of the word. Then it must be determined whether the elementary sentence is a verifiable sentence (that is, whether the truth conditions of it can be given). If the elementary sentence is a verifiable one, then the word is meaningful; otherwise it is meaningless. The meaning of the word would be established in this way.

For instance, “x is a stone” is the elementary sentence for the word stone. To determine the meaning of stone, we must determine what words can be substituted for x and then, under what conditions the resulting sentences are true and under what conditions they are false.46

For many words occurring in metaphysical sentences—such as “things in themselves,” “the being of being,” and “non–being”—there is no conceivable way to determine their meaning according to this process of elementary forms. For example, to determine the meaning of “thing in itself” we form its elementary sentence as “x is a thing in itself.” No one has succeeded in suggesting an empirical way to confirm or falsify the claim that an object is a thing in itself. Therefore, this term is meaningless, and all metaphysical sentences containing this term are meaningless too.47

In the second sort of meaningless sentences, all words occurring in the sentence are significant, but their combination in the sentence does not follow the

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46 Ibid., 62.
47 For the detailed discussion, see Carnap, “The Elimination of Metaphysics,” 65–67.
logical rules of the language, though the sentence may be well–formed according to the ordinary grammatical syntax of natural language.

In his early works, Carnap distinguishes between logical and grammatical syntax and states that the logical syntax of the language indicates what combinations of words are admissible, whereas the grammatical syntax of the language does not. For example, “Caesar is a prime number” contains meaningful words, and the sentence is grammatically well formed. However, according to the logical syntax of the language, the sentence is ill–formed, because “Caesar” and “prime number” cannot join together in a simple subject–predicate sentence; it is against the logical rules of the language. Neither “Caesar is a prime number” nor “Caesar is not a prime number” makes a factual claim, nor are they analytic. Therefore, such sentences are meaningless.

Carnap concludes that all sentences of metaphysics are meaningless sentences in either of these two ways: they either include nonsense words or do not follow the logical rules of the language. However, metaphysical and theological sentences have a particular feature that differentiates them from other meaningless sentences. Though these sentences are unverifiable and are, therefore, nonsensical, they appear to be assertions about the world and are intended by believers to be such.

Whereas other meaningless sentences, such as lyrical poems, do not claim to provide information about reality, metaphysical and theological sentences appear to make knowledge claims, thus demonstrating the deceptive nature of metaphysics and theology. Claims of these two disciplines are couched in sentences that Carnap

49 Ibid., 67–68.
50 Carnap, Philosophy and Logical Syntax, 30–31.
calls pseudo–sentences. For example, the sentence “the visible world is a manifestation of a spirit” appears to be talking about reality because it has the structure of a declarative sentence: it has a subject, a predicate, and the grammatical form of sentences in which claims are often made. Yet, this sentence is not empirically decidable—no evidence would confirm or falsify it. Therefore, it is simply a nonsensical sentence or, as Carnap calls it, a pseudo–sentence.

In building an exact philosophy, Carnap seeks to eliminate all metaphysical pseudo–sentences from the realm of philosophy. Those pseudo–sentences include all ontological statements—or those statements that claim to provide a theory about the nature of reality—as well as all statements of traditional philosophy concerning norms or the whole philosophy of value—which also are empirically undecidable and, hence, nonsensical.

For Carnap, metaphysical sentences lack any cognitive value. Like a piece of art, they merely express the attitudes of the utterer toward life, and they reveal his or her emotions. Yet even metaphysicians themselves are deceived by the declarative form of their sentences and think they are talking about the world. Carnap claims that because metaphysicians lack the ability of an artist to express their attitudes in an artistic way, they misleadingly express themselves through metaphysics instead.

By eliminating psychological and metaphysical questions from philosophy, logical questions are left as the only legitimate ones for philosophy to deal with. According to Carnap, philosophy encompasses only logical studies.
Again, it is important to notice that Carnap’s position here is a philosophical one; that is, his categorization of the statements of traditional philosophy is based on a logical analysis of the statements, not on empirical investigation. Thus, his theory about philosophy is a logical one, not a theory of the world; it lacks cognitive content and does not say anything about reality. Carnap’s statements about the nature of philosophy are nonfactual statements or, in his own terminology, analytic statements.

**Philosophy as the Logic of Science**

Influenced by Wittgenstein, Carnap confines the task of philosophy to the study of language. From Wittgenstein, he takes the idea that the ambiguity of ordinary language and its misleading grammar is the root of most philosophical questions. Though Carnap’s idea is deeply rooted in Wittgenstein’s work, he claims that in some important points he differs from Wittgenstein. Thus, to examine his point of view with respect to the study of language, I must first review briefly Wittgenstein’s position in this regard.

For Wittgenstein, most philosophical problems are, in fact, pseudo–problems, which will vanish if we clarify our language and the way it should be used. Most traditional philosophical problems indeed are not about matters of fact. They are meaningless pseudo–questions that are made up by misusing language. This passage from Wittgenstein exemplifies exactly what Carnap believes about philosophical problems and their relation to language:

Most of the propositions and questions to be found in philosophical works are not false but nonsensical. Consequently we cannot give any answer to
questions of this kind, but can only point out that they are nonsensical. Most of the propositions and questions of philosophers arise from our failure to understand the logic of our language.... And it is not surprising that the deepest problems are in fact not problems at all.54

As a result, philosophy for Wittgenstein is only a critique of language.55 Nonetheless, he asserts that we cannot talk about language and its logical form:

- Propositions cannot represent logical form: it is mirrored in them.
- What finds its reflection in language, language cannot represent.
- What expresses itself in language, we cannot express by means of language.56

And this is so because “[w]hat can be shown, cannot be said.”57 Thus, the natural result of Wittgenstein’s early philosophy is that philosophy should become totally silent, because “[w]hat we cannot speak about we must pass over in silence.”58

Carnap concludes from such assertions that on Wittgenstein’s early approach, it is impossible to discuss the logic of language. Carnap accepts the idea that language is the main source of philosophical problems, but he does not share Wittgenstein’s early belief that we cannot discuss or say things about language or logic. Carnap asserts that this is one of the most important points on which he differs from Wittgenstein.59 Carnap dedicated himself to the logical study of language in order to provide a comprehensive and exact language to be used in science and in philosophy.

For Carnap, philosophy does nothing but logical analysis. He sees philosophy as dealing only with the logical analysis of language in the following sense:

The function of logical analysis is to analyze all knowledge, all assertions of science and of everyday life, in order to make clear the sense of each such assertion and the connections between them. One of the principal tasks of the logical analysis of a given proposition is to find out the method of verification for that proposition. The question is: What reason can there be to assert this proposition; or: How can we become certain as to its truth or falsehood? This question is called by the philosophers the epistemological question; epistemology or the philosophical theory of knowledge is nothing other than a special part of logical analysis.

Here, Carnap explains that philosophy, unlike empirical science, does not provide us with knowledge of fact nor does it examine reality; thus, for him, philosophy does not deal with ontological questions. But philosophy still serves the pursuit of truth by providing tools to examine logically the factual statements of science and to determine their validity; thus, philosophical questions are simply epistemological ones.

Philosophy for Carnap differs from empirical science both in its subject–matter and in its method. Nonetheless, philosophers and scientists work in the same field in close cooperation, though with different methods and means:

He who wishes to investigate the questions of the logic of science must, therefore, renounce the proud claims of a philosophy that sits enthroned above the special sciences, and must realize that he is working in exactly the same field as the scientific specialist, only with a somewhat different emphasis: his attention is directed more to the logical, formal, syntactical connections.... All work in the logic of science, all philosophical work, is

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60 Carnap, *Philosophy and Logical Syntax*, 35.
62 This concept resembles somehow Quine’s idea about the relation between science and philosophy, which I shall examine in Chapters Five and Six.
bound to be unproductive if it is not done in close co–operation with the special sciences.\footnote{Carnap, \textit{The Logical Syntax of Language}, 332. The italics are mine.}

Thus, science studies the natural world, or the state of affairs; to investigate such things, it follows the empirical method. Philosophy, however, studies science itself and logically analyzes its statements.

Although Carnap calls philosophy the “logical analysis of the language of science” or, in short, the logic of science,\footnote{\textit{Ibid.}, 279. By the language of science, Carnap means any language that is used to make a statement about reality, including the language that we use in our daily lives.} his views about the sort of logical analysis involved in philosophy evolve throughout his career. Each shift in his view represents a distinct stage within his philosophical development. In the earliest stage in the 1920s, Carnap’s effort was to build what he called “constructional systems of concepts.” In his second stage in the 1930s, Carnap defined philosophy as the logical syntax of the language of science. And, finally, in his last stage from the 1940s on, Carnap came to believe that philosophy is the syntactical \textit{and} semantical study of languages. Here I shall briefly review the main ideas of Carnap’s early philosophy, leaving for later chapters the detailed discussion of his syntax and semantics periods.

\section*{Reductionism and the Criterion of Significance}

For Carnap, the main task of philosophy is to provide a logical method for the justification of knowledge. To complete this task Carnap, in his early days, followed the empiricist idea of providing knowledge with a certain basis.\footnote{Carnap, “Intellectual Autobiography,” 57.} Empiricists, for a long time, had been seeking a way to reduce all statements about our knowledge of
the external world to statements referring to sense–data or the immediately given—I shall call this the problem of reductionism. They believed that the knowledge of the given is certain, and that by reducing all statements of knowledge to statements about the given, knowledge would have a solid foundation.66

As noted earlier, Russell suggests that by following the same method that he used to reduce mathematics to logic, it would be possible to reduce all statements of knowledge of the external world to statements about sense–data. In his first serious attempt to apply modern logic to solve philosophical problems, Carnap seeks to carry out Russell’s suggestion. He applies logical analysis to the problem of reductionism so as to pursue the logical justification of knowledge.67

Carnap explains that to justify a particular knowledge claim, we must relate it to, or base it on, a justified piece of knowledge. In other words, the justification of a particular knowledge claim takes place by reducing or providing an epistemological analysis of the knowledge claim to its justified parts.68 To elaborate, Carnap states that the cognitive content of experience can be epistemologically analyzed into what he calls a nucleus and a secondary part.69 If $a$ and $b$ are two constituents of the cognitive content of an experience, $a$ is the nucleus and $b$ is the secondary part, assuming that $b$ is epistemologically reducible to $a$ (that is, the cognition of $b$ rests on the cognition of $a$). For Carnap, this condition happens only if $b$ can be scientifically justified on the basis of $a$, meaning that we can logically infer $b$ from $a$ by means of the laws of science.70 The following example helps to clarify this point.

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66 Ibid., 38 and 57.
67 Ibid., 16.
69 Ibid., 313.
70 Ibid., 314.
Consider the experience in which we cognize that a metal bar is heated and it expands. In this experience, “the metal bar is heated” is the nucleus, and “the bar expands” is the secondary part of the cognitive content of the experience; by cognition of “the metal bar is heated,” and by means of the scientific law that metal expands when heated, we can logically infer that “the bar expands.” The latter phrase becomes the secondary part because we cognize that “the bar expands” immediately after cognizing “the metal bar is heated,” and without any observation. In this way, the cognitive content of our experience can be reduced to and justified by its nucleus. Carnap believes that, by application of logical analysis, the nucleus of the cognitive content of our experience, in turn, can be reduced further until ultimately all statements of knowledge can be reduced to claims that can be justified by direct observation.

According to Carnap, to reduce a knowledge claim to other knowledge claims, the concepts occurring in the first one must be reduced to the concepts occurring in the latter. A concept is reducible to other concept(s) if we can translate any statement involving the concept into statements involving the other(s). Carnap gives the following example: the concept “prime number” is reducible to the concepts “natural number,” “1,” and “divisor,” because any statement containing the first concept can be translated into statements containing the other concepts. For instance, we can translate “$X$ is a prime number” into “$X$ is a natural number whose only divisors are 1 and $X$ itself.”

According to Carnap's early writing, the task of epistemology is to analyze concepts in order to find logical connections among them; epistemology specifies

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concepts to which any given concept can be reduced.\textsuperscript{73} Thus, for Carnap, the task of epistemology is to build a hierarchy of all concepts of knowledge in which any higher level concept can be reduced to lower level concepts.\textsuperscript{74} The concepts in the lowest level of the epistemological hierarchy are no longer reducible and are called fundamental or basic concepts.\textsuperscript{75} For early Carnap, the fundamental concepts are those that apply immediately to the given or the immediate impressions. Through such a reductionist system of concepts, Carnap thought it would be possible to justify all knowledge on the certain basis of the given.\textsuperscript{76}

In his \textit{Logical Structure of the World} (the \textit{Aufbau}), Carnap was following this project. Nonetheless, in the \textit{Aufbau}, instead of reducing higher level concepts to lower level ones, Carnap goes the other way around and starts from the lowest level of concepts and, step by step, constructs higher level concepts out of them. That is why he calls his hierarchical system of concepts in the \textit{Aufbau} the “constructional system” of concepts.\textsuperscript{77} In building his constructional system, Carnap’s goal is to define all concepts in terms of a few epistemologically unanalyzable concepts.

However, there is a serious defect in Carnap’s system in the \textit{Aufbau}. Although Carnap succeeded mainly in reducing the concepts of scientific knowledge into a few basic concepts, when he comes to show how a sentence of physics can be translated to a sentence about sense–data—which is the very idea of reductionism—he does not provide any suggestions. That is, Carnap is not able to demonstrate how we can base the concepts of the objective world of science upon the concepts of the

\textsuperscript{73} \textit{Ibid.}, xvi.
\textsuperscript{74} Carnap. \textit{Pseudoproblems in Philosophy}, 321–22.
\textsuperscript{75} \textit{Ibid.}, 306.
\textsuperscript{76} Carnap, “Intellectual Autobiography,” 50.
\textsuperscript{77} \textit{Ibid.}, 5–6, and 61.
subjective, psychological world of sense–data, which is the principal aim of reductionism. Carnap himself accepts that his project in the Aufbau falls short of providing the logical connection between psychological concepts of sense–data and physical concepts of knowledge. In conclusion, he accepts the failure of his attempt in the Aufbau to apply modern logic in building a constructive system of concepts of knowledge based solely on the concepts of the immediately given.

There is a close connection between reductionism and the principle of verifiability. As mentioned earlier, during the 1920s, Carnap takes the principle of verifiability as his criterion of significance for statements. That is, for him, statements are significant only if they are either verifiable or analytic; otherwise they are meaningless. To say that a statement is verifiable is to say that the statement is definitely decidable by means of experience; in the course of experience, we can absolutely decide whether the knowledge claim is true.

To verify a statement by testing it against experience, we need as a first step to analyze the statement and to break it down into its atomic constituents or protocol sentences (that is, sentences that are testable directly against observations). To do so, we must transform or reduce all concepts occurring in the statement into observable concepts—namely, the concepts that can be grasped by direct observation or the concepts of the given. Because the principle of verifiability claims that all statements of empirical knowledge are verifiable by observation reports that are immediately verified, that principle presupposes that all concepts of empirical knowledge are reducible to observable concepts. In other words, the principle of

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78 Quine points out this defect in the Aufbau; see W. V. Quine, “Two Dogmas of Empiricism,” in From a Logical Point of View, by W. V. Quine (Cambridge: Harvard University Press, 1953, 20-46), 39–40.
verifiability presupposes the idea of reductionism: that factual knowledge rests on the foundation of the immediately given. Because the immediately given is supposed to be indubitable, the principle of verifiability dictates that factual knowledge should be similarly certain.80

Since the theory of reductionism and the principle of verifiability are deeply intertwined, the failure of reductionism brings about the failure of the principle of verifiability. As we saw, Carnap’s attempt in the *Aufbau* to carry out reductionism by reducing all concepts of empirical knowledge to the concepts of the given ultimately failed. The failure of the *Aufbau* led Carnap to recognize that it is not always possible to explicitly define a highly abstract concept based on less abstract ones, and finally on the concepts of the given. Thus, the verification of statements through the reduction of their concepts to basic concepts of the given is not possible.

In addition, Carnap says that, through Popper’s criticism of verifiability in *The Logic of Scientific Discovery*,81 he recognized that there is no single protocol sentence that is absolutely verifiable by observation; any proposition about a matter of fact is always subject to revision in the course of experience.82 In other words, even if we succeed in reducing all empirical concepts to observation concepts and in breaking empirical sentences down to their atomic sentences, we would not be able to establish their truth definitely by testing them against observation. Thus, there is no rock bottom for empirical knowledge after all.

As a result of the failure of the *Aufbau*, Carnap abandoned both the ideas of reductionism and of verifiability, and also his belief in the certainty of empirical

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knowledge. In his later philosophy, under the influence of Henri Poincaré and Pierre Duhem, he came to the belief that natural laws are hypothetical in the sense that they cannot be verified completely by experience.

Having abandoned Wittgenstein’s principle of verifiability, during the 1930s, Carnap looked for an alternative criterion of significance for statements. In “Testability and Meaning,” published in 1936–37, he presented the results of his investigation and introduced the concept of confirmability as the replacement for the concept of verifiability. Briefly, Carnap states that a sentence is more or less confirmed, depending on the degree to which we can supply supporting evidence for it; the more supporting evidence we provide for a sentence, the higher degree of confirmation the sentence will achieve.

A confirmable sentence is a sentence that protocol sentences could, in principle, confirm or disconfirm. In Carnap’s words, a sentence is confirmable “if we know under what conditions the sentence would be confirmed.” Therefore, for Carnap a sentence is meaningful only if it is either a confirmable sentence or an analytic (or contradictory) one.

**Summary: The Task and Method of Philosophy**

We have seen that Carnap sees traditional philosophy engaged in endless controversies on the same problems since ancient times. In comparing traditional philosophy to physical science and to mathematics, Carnap sees the discussions of

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the former as trivial and showing none of the progress that we witness in scientific doctrines, and proofs in traditional philosophy lack the exactness that we see in proofs of mathematics. Even concepts and assertions of traditional philosophy are so ambiguous that philosophers can hardly achieve a common understanding of any of them. Carnap demands that philosophy be as productive as science and as exact as mathematics.

According to Carnap, traditional philosophy is unable to progress for two reasons. Firstly, traditional philosophers claim that they are investigating matters of fact, but in a non–empirical way. They claim theories about “the nature of reality” or “the way the world is as a whole,” and believe that such theories explain the world; they consider these so–called philosophical theories to be a part of our knowledge and even the most important part, because they are the most general doctrines of the world. Carnap, as an empiricist, believes that the only way to investigate matters of fact and to make assertions about reality is the empirical method, which is used in physical science. Formulating doctrines about the world in a non–empirical way does not make sense for him. Such doctrines cannot express truth claims about reality.

The second reason that, according to Carnap, causes traditional philosophy to be trivial and ambiguous is the fact that philosophers do not pay enough attention to the language that they use. Both the structure and the concepts of natural language are ambiguous and thereby give rise to pseudo–statements (that is, sentences that are grammatically well–formed but do not contain assertions because they are not structured logically). The grammatical structure of these sentences is deceptive in that it makes philosophers believe that they are factual when they are not. These
pseudo–statements are the main source of the endless controversies in traditional philosophy. Carnap’s philosophical program is to eliminate such ambiguities from our system of knowledge.

Moreover, since scientists use natural language in theoretical science, ambiguities arising in philosophy enter into scientific theories through the use of the same language, and seriously affect the whole body of our knowledge. I strongly believe that resolving the ambiguities in science, not in philosophy, was Carnap’s first priority. This can be seen from the fact that he calls his ideal philosophy “the logic of the language of science,” and that he sets the task of providing science with an exact and clear language as the only task of philosophy.

However, to resolve ambiguities in science, Carnap needs to clarify their source, which is the purpose of his discussion of traditional philosophy. Perhaps, Carnap was motivated to do this because he witnessed the heated metaphysical debates in the early decades of twentieth century amongst leading physicists—as in the Bohr–Einstein debates on quantum mechanics, for example.

Carnap believes that to make philosophy as productive and exact as physics and mathematics, one must revise both the task and the method of philosophy. For Carnap, the task of philosophy is to provide an exact language for use in science and in philosophy; exact enough that it does not raise metaphysical pseudo–questions, either in scientific theories or in philosophical discussions. Thus, language, not the world, is the subject–matter of philosophy.

The method of studying language is through the logical analysis of its structure and concepts; the empirical method does not apply to the logical study of language. Although philosophy is not empirical and does not study matters of fact, yet it serves
our knowledge of the world by providing an exact language to be used in scientific investigations that does not raise metaphysical ambiguities. Philosophical doctrines do not belong to the body of our knowledge of matters of fact, but they are vital for our knowledge in that they provide clarity and exactitude for statements of knowledge.

Therefore, according to Carnap, philosophy is distinguished from science both in its subject–matter and in its method: science studies the world, whereas philosophy studies the language of science; science uses an empirical method, whereas philosophy uses a logical one. Any interference with science in this regard will raise serious ambiguities in philosophical discussions. Therefore, enquiry about the world or using empirical methods must be avoided in philosophical investigations.

But, insisting on a difference in method and subject–matter between philosophy and empirical science does not mean that philosophers must work in isolation from scientists. To the contrary, according to Carnap, philosophers work in exactly the same field as scientists. The analysis and clarification of the structure and concepts used in the language of science needs the close collaboration of philosophers with scientists, because the way that scientists use the language shows philosophers where the ambiguities are and how they should be clarified. Without such collaboration, philosophers’ attempts to clarify the ambiguities of the language could be entirely in vain.

To work out an exact formulation for the basic idea of empiricism (namely, all knowledge of states of affairs is ultimately based on sense experience) Carnap formulated the principle of confirmability as his criterion of cognitive significance.
According to Carnap, a sentence has cognitive content if it is confirmable, and a confirmable sentence is one for which we know under what conditions it would be confirmed; that is, under what conditions it would have supporting evidence. A non-confirmable sentence contains no assertion and therefore is meaningless. Relying on these definitions, Carnap claims that we must get rid of metaphysical sentences—or the sentences of traditional philosophy that claim a non-empirical knowledge of matters of fact—because they have no cognitive meaning and therefore are not only useless, but also deceptive and a main source of error in knowledge.

By introducing the principle of confirmability as the criterion of significance, Carnap aims to purify science and eliminate pseudo-statements that falsely claim knowledge of the world. This criterion also implies that Carnap’s philosophical doctrines are themselves meaningless, because they are not confirmable empirical statements. To make sense of his philosophical doctrines, Carnap introduces the notion of analytic sentences: these sentences, although they lack cognitive content, are not pseudo-sentences, because they do not violate the logical rules of the language. Analytic sentences, in contrast to empirical sentences, do not say anything about matters of fact, but they represent logical relations amongst the concepts and expressions of the language and thereby clarify the structure of the language.

Metaphysical sentences and analytic ones are both meaningless, but metaphysical sentences are useless pseudo-sentences, whereas analytic sentences are useful (indeed essential) logical sentences. Whereas metaphysical pseudo-sentences must be eliminated totally, analytic sentences of philosophy deserve serious attention for their vital role in the clarification of the body of knowledge. Therefore, Carnap introduces his concept of analyticity to preserve philosophical
doctrines, while he is seriously committed to the empiricist doctrine of knowledge which states that cognitively meaningful sentences are empirical.

According to Carnap, philosophy is concerned only with epistemological questions about the grounds of the truth of sentences, but such grounds are investigated in philosophy only by the means of logical analysis. To investigate the truth grounds of a sentence, philosophers clarify the sense of the sentence, thereby revealing the logical connections of the sentence on the others. Therefore, philosophers determine whether and how the truth of the sentence is related to the truths of the others. This helps scientists find a method for confirming empirical sentences by recognizing what sort of evidence is logically relevant to their confirmation.

By the same token, a philosopher’s work clarifies whether a sentence is empirical, in other words, whether it has any logical connection with observable sentences. If a sentence has no connection to observations, scientists should not bother themselves about its confirmation; such a sentence is either analytic or merely a pseudo–sentence. The truth of an analytic sentence has nothing to do with evidence, but can be determined purely by the means of logical relations in the language to which the sentence belongs.

Therefore, for Carnap, the epistemological justification of the grounds of the truth of a sentence is not always a matter of finding empirical grounds for its truth. An analytic sentence is not true in the sense that it is true of some matters of fact; it has no cognitive content and thereby makes no factual assertion. An analytic sentence is true merely in the sense that it is in accordance with the grammar and
logic of the language. In order to avoid misunderstanding, Carnap sometimes uses the term “valid” for analytic sentences, instead of the term “true.”

Although the logical analysis of language was always the only task of philosophy for Carnap, he pursued this task differently at different stages of his philosophical career. In his early stage, Carnap thought that this task should be fulfilled by building a constructional system of concepts. Carnap’s aim in the Aufbau was to work out the idea of reductionism—or the idea that by reducing all empirical statements of knowledge to the statements referring to sense–data, we can ground the truths of empirical statements upon direct observation.

Carnap believed that sense–data provide certainty in knowledge of matters of fact, and that if he succeeded in working out the idea of reductionism, then he would gain certainty for empirical knowledge. Thus, Carnap tried to construct logically highly abstract concepts of empirical statements based upon the concepts of the lower levels of abstraction, and ultimately upon the concepts of sense–data. But his attempt in the Aufbau failed, because he could not provide logical connections between psychological concepts of sense–data and physical concepts of knowledge. Therefore, Carnap abandoned the doctrine of reductionism and the belief that in empirical knowledge certainty can be obtained.

Following the failure of the Aufbau, Carnap followed the idea of the logical analysis of language down other paths, namely syntactical analysis and, later, semantical analysis of the language. So far I have tried to explain the main ideas and purposes that motivated Carnap in his philosophical works to form the basis needed to understand the role of the concept of analyticity in his philosophy and, consequently, to gain a better understanding of his different attempts to define the
analytic–synthetic distinction. In the next two chapters, I shall examine various definitions of analyticity that Carnap presented over the course of his different philosophical stages, first in his syntax period, and then in his semantics period.
Chapter Two

Carnap’s Formal Study of Language and Analyticity

In the previous chapter, I explained Rudolf Carnap’s view of philosophy as the logic of science. During the 1930s, he held that all questions of logic are questions of “syntax” and, therefore, that philosophy is merely the logical syntax of the language of science and is composed of no other elements. These years are known as Carnap’s syntax period. Later, during his semantics period, Carnap developed the broader idea that philosophy comprises both logical syntax and semantics. Though Carnap moved away from the view that syntax is the sole component of philosophy, it is important to note that he continued to view syntax as a crucial contributing part of philosophy until the end of his philosophical career. In this chapter, I shall discuss his treatment of analyticity in his syntax period, and in the next chapter, in his semantics period.

In this chapter, my main aim is to introduce Carnap’s syntactical definitions of analyticity. However, certain aspects of his philosophy in the syntax period—such as his viewing a language system as a calculus, and his principle of tolerance—play crucial roles in understanding his position as regards analytic truth. I shall discuss these aspects as well. But, I will start with a general introduction of Carnap’s syntax.

The Logical Syntax of Language

In the syntax period, Carnap states that syntax is the formal study of language—that is, an analysis of language involving no reference to the meaning of
the expressions of the language—and is concerned only with the order of linguistic signs and the formal relations between expressions.¹ In a formal analysis of a sentence, we examine what type of words constitute the sentence and in what order. For instance, in a given sentence, we determine for each word whether it is an article, a noun, or a verb, etc.; also, we examine the order of the words to determine what sort of word follows another. Moreover, in a formal analysis of a sentence, we examine the logical relations of the sentence to other sentences to determine from which sentences it may be derived and which sentences can be derived from it.

The formal study of language does not deal with extra–linguistic objects.² In such a study, we do not assert, for example, that the sentence is concerned with a particular fact, or that the words in the sentence designate this or that object. In other words, the formal study of a language has nothing to do with the meaning of the words or sentences, but rather it considers linguistic signs as meaningless symbols.³

Carnap states that syntax and deductive logic used to be regarded as two fundamentally different disciplines. The syntax of a language is traditionally thought to prescribe rules for building expressions out of linguistic signs (for example, words out of strings of characters and sentences out of combinations of words). Thus, syntax was considered as a discipline that deals only with formal relations between language signs and shows the structure of sentences. Logic, conversely, used to be considered a discipline that formulates rules of inference—namely, rules by which

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conclusions are drawn from premises. Moreover, since sentences designate judgments and thoughts, it was believed that logic should reveal how different thoughts and sentences have inferential connections. Hence, on the traditional view, logic is concerned not only with the logical forms of the sentences, but also with their meaning, whereas syntax is concerned simply with the formal structure of sentences.4

In Chapter One, we observed that Carnap rejects the idea that logic is concerned with thoughts and judgments, and he argues that dealing with the process of thinking and making judgments is the task of psychology.5 He also claims that logicians since Aristotle, in practice, talked mainly about the kinds of relations between sentences and not those between thoughts.6

Thus, in his syntax period, Carnap argues that logic is solely a formal discipline and does not differ from syntax in this regard. That is, neither logic nor syntax has anything to do with the extra–linguistic objects to which expressions of the language may refer. Logic and syntax deal exclusively with the linguistic elements and the relations between the expressions of the language. The only difference between the logic of deduction and syntax is that syntax provides the formation rules of language (or the rules that determine how we can form sentences and other expressions out of different types of linguistic signs), whereas the logic of deduction provides the transformation rules of language (or the rules that determine how we can transform a set of sentences into other sentences). Therefore, logical rules are

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4 Ibid., 1.
5 See in Chapter One, the section “Purification of Philosophy from Metaphysics and Psychology,” 16–21.
6 Carnap, The Logical Syntax of Language, 1.
just as formal as syntactical rules, and neither has anything to do with the meaning of linguistic signs or expressions.\(^7\)

What Carnap calls *logical syntax* is a system that studies all the formal aspects of language; logical syntax includes both formation rules and transformation rules and, in fact, consists of both linguistic syntax and the logic of deduction. All logical characteristics of sentences and logical relations between sentences, according to Carnap in his syntax period, can be determined by the virtue of the formal study of logical syntax. He thought that by means of the syntactical structure of sentences, we can determine whether a sentence is, for example, analytic or synthetic, or we can determine equally whether two sentences are contradictory or compatible.\(^8\)

In his syntax period, Carnap tried to develop a method or a system of language, called the “logical syntax of language,” by means of which he was supposed to be able to make sentences about sentences and to talk about language itself. In other words, he tried to construct a “metalanguage” in which it would be possible to represent and define all logical characteristics of sentences.\(^9\)

Although Carnap, as we saw in Chapter One, speaks about the elimination of ambiguities of ordinary language to resolve philosophical pseudo–problems, he studies only artificial symbolic languages in his *The Logical Syntax of Language*. He takes this approach because he finds the ordinary word–languages, both natural and artificial, so logically complicated that he believed it impossible to set out exactly all of their formation and transformation rules.\(^10\) However, Carnap explains

\(^7\) Ibid., 1–2. Also see Carnap. *Philosophy and Logical Syntax*, 41, 43.

\(^8\) Carnap, *The Logical Syntax of Language*, 2.


that syntactical concepts and rules of symbolic languages are still applicable to analyze word–languages in the same way that “ideal” physical laws can be applied to analyze enormously complicated factual situations.  

To elaborate, real physical conditions are so complicated that it is impossible to determine all the physical elements pertinent to a particular state of affairs and to find out the exact relations among those elements. Thus, among a variety of elements in a given state of affairs, physicists single out those that they think are the most important. Using those selected elements, they construct an artificial state called “ideal conditions,” which is similar to the real state of affairs and from which physicists attempt to determine the relations between those selected elements. Physical laws that are obtained in this way are made to analyze those artificial ideal conditions. However, those laws, also, can be and are applied to analyze real physical states within a tolerable range of error.

Carnap claims that the concepts and the results of the logical study of symbolic languages can be applied to word–languages in the same way that physicists apply the results of their studies of ideal conditions to real natural situations. He believes that we may eliminate the ambiguities of ordinary language—which is his main concern—and provide an exact language for science with the help of the logical analysis of symbolic languages. Thus, according to Carnap, definitions resulting from the logical study of symbolic languages, including the definition of analytic truth, can more or less be applied to ordinary language as well.

In his syntax period, Carnap means by a language (or language system or logical system) “a system of formation and transformation rules concerning what

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11 Ibid., 8.
are called *expressions*, i.e. finite, ordered series of elements of any kind.”\textsuperscript{12} As such, a language, when only its formal structure is concerned, is a *calculus*.\textsuperscript{13} Thus, “logical syntax is the same thing as the construction and manipulation of a calculus.”\textsuperscript{14} Considering a language as a calculus has bearing on Carnap’s belief about the conventionality of the truth of analytic sentences. I shall elaborate on this point in detail later. First, I need to explain what the statement “a language is a calculus” means for Carnap.

**Language as a Calculus**

In his formal study of language, Carnap regards language systems as calculi.\textsuperscript{15} A *calculus* is a system of formal rules. It consists of a set of symbols, and conventional rules about symbols:

The rules of the calculus determine, in the first place, the conditions under which an expression can be said to belong to a certain category of expressions; and, in the second place, under what conditions the transformation of one or more expressions into another or others may be allowed. Rules of a calculus are either formation rules or transformation ones.\textsuperscript{16}

In other words, the *formation rules* of the calculus determine how to combine symbols to produce sentences, and *transformation rules* determine how to deduce sentences from sentences. That is, formation rules provide the definition of the term

\textsuperscript{12} Ibid., 167–68.
\textsuperscript{13} Ibid., 4.
\textsuperscript{14} Ibid., 5.
\textsuperscript{15} Apparently, by language systems, Carnap is referring only to artificial languages. However, one might also call natural language a calculus when only its formal structure is considered, although there is a significant difference in this regard between natural language and artificial ones. I clarify this in footnote 18.
\textsuperscript{16} Ibid., 4.
“sentences in the calculus,” and transformation rules provide the definition of the term “direct consequence in the calculus.”\textsuperscript{17}

Formation rules and transformation rules of a calculus are defined arbitrarily; that is, they are laid down by free choices and, in this sense, are simply adopted by agreement or convention.\textsuperscript{18} In defining the rules of a calculus, we generally consider the purpose for which we are devising the calculus in the first place, and then we choose the rules best suited to that purpose. Nevertheless, we are still free to choose the rules of the calculus among a variety of possibilities, all of which accord with our purpose of devising the calculus. Thus, the conventionality of the rules of the calculus is not affected by our pragmatic considerations in choosing them.\textsuperscript{19}

If we are to understand the nature of a calculus accurately, it helps to consider some examples. Any formal system that consists of a set of symbols and rules governing the use of those symbols—in the way mentioned earlier—is a calculus. For instance, mathematics is a calculus, in which number signs and mathematical operation signs constitute the set of symbols. The rules of mathematics are conventions that either specify the properties of mathematical signs and determine how to arrange them in series to form mathematical expressions, or relate the expressions to each other and determine what sort of inferential relations hold of them. Thus, we may transform some mathematical expressions into others by the means of mathematical rules.\textsuperscript{20}

\textsuperscript{17} Carnap, Philosophy and Logical Syntax, 42–44. Also see Carnap, The Logical Syntax of the Language, 27.
\textsuperscript{18} Here is the main point of difference between natural languages and artificial ones. In the case of natural language, the formation and transformation rules of the language are already there to be discovered. But, it may be claimed that still these rules are conventional, because they had been arbitrarily adopted, consciously or not, by the first inventors of the language, and have been arbitrarily modified later by the users of the language. However, this is a very controversial point that involves theories of the appearance and development of natural languages. The conventionality of the rules of natural languages is challenged by Quine. I will discuss his objections in Chapter Five.
\textsuperscript{19} Carnap, Foundations of Logic and Mathematics, 28.
\textsuperscript{20} See ibid., §§17–18.
Chess is another example of a calculus.\textsuperscript{21} Chess pieces constitute the set of symbols of the calculus. Different arrangements of the chess pieces constitute different expressions of the calculus, and the formation rules of the calculus can be seen in the conventions concerning the numbers and kinds of chess pieces, as well as in the rules about their eligible positions and movements. Also, the transformation rules of the calculus are those conventions that determine the permissible moves at any stage of the play.

Carnap’s formal system of language or logic discussed in the previous section is our last example of a calculus. In this calculus, (a) symbols are linguistic signs in either written or spoken forms, (b) formation rules categorize expressions and determine sentences, and (c) transformation rules determine conditions under which the inference of one sentence from another can take place.

Although in logical syntax, Carnap considers a language as having linguistic signs or words without any meaning attributed to them, he explains that language is not merely a calculus:

When we maintain that logical syntax treats language as a calculus, we do not mean by that statement that language is nothing more than a calculus. We only mean that syntax is concerned with that part of language which has the attributes of a calculus—that is, it is limited to the formal aspects of language.\textsuperscript{22}

In short, in his syntax period, Carnap thought that the study of the formal aspects of a language would suffice to analyze its logical characteristics and to clarify its ambiguities. Thus, the task that Carnap put forward for himself, in this period, was

\textsuperscript{21} Carnap, \textit{The Logical Syntax of Language}, 5.
\textsuperscript{22} \textit{Ibid.}, 5.
to construct various formal systems of language (or linguistic calculi) and to introduce their characteristics—including their truth-values—in a purely formal way.

Incidentally, the notion of a calculus plays a very important role in Carnap’s conceptions of analytic truth and science. This conception shall be discussed in later chapters when we examine Willard Van Orman Quine’s criticism of the concept of analyticity and its relation to the conception of science.

The Principle of Tolerance

I explained that a language system, according to Carnap, is a calculus and, thus, all its definitions and rules are set down by mere conventions or free choices. Consequently, according to Carnap, a language is a conventional system in the sense that “...we have in every respect complete liberty with regard to the forms of language; that both the forms of construction for sentences and the rules of transformation ... may be chosen quite arbitrarily.”

Thus, by our following different sets of conventions, it is theoretically possible to build up an infinite number of calculi as different language or logic systems. Since conventions are the exclusive grounds of the construction of such systems, none of the systems is the correct or the true one; rather each is on a par with the others.

To elaborate, when we claim the truth of a sentence or a system of sentences, we mean that the sentence or the system is in accordance with reality. Conventions do not necessarily represent reality but represent only our choices. Thus, we may not talk about the correctness or truth of systems that are made by conventions and that do not refer to reality. We may talk only about their usefulness for various

purposes. This is what Carnap calls the principle of tolerance, and he states it as follows:

*It is not our business to set up prohibitions, but to arrive at conventions.*

*In logic, there are no morals.* Everyone is at liberty to build up his own logic, i.e. his own form of language, as he wishes. All that is required of him is that, if he wishes to discuss it, he must state his method clearly, and give syntactical rules instead of philosophical arguments.

As we see, the principle of tolerance is based on the view that language systems are calculi and that calculi are conventional systems. Later, in his “Intellectual Autobiography,” Carnap suggests that it might perhaps be more exact to call this principle the “principle of conventionality of language forms,” because the tolerance that this principle prescribes with respect to different language systems is grounded on the fact that all languages are conventional. Consequently, different languages do not represent matters of fact and are thus on a par with each other.

We have discussed the claim that—in building a linguistic calculus or a language system—we should consider the purpose for which the language is going to be used and should decide accordingly what sorts of signs and rules are to be used in the language. Thus, in language building, we might follow such pragmatic guidelines in making conventional definitions and rules. Consequently, though there is no question of correctness or wrongness regarding a language system as the result of mere arbitrary choices, we may prefer one language over another according to our pragmatic purposes.

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24 Ibid., 51.
25 Ibid., 52.
Syntactical Definitions of Analyticity

As I explained, in his syntax period, Carnap believed that all characteristics and concepts of a logic or language system are syntactical and can be determined formally. Each language has its particular symbols (words) and rules governing the use of those symbols, and thus each must have its own particular logical syntax\(^{27}\) that defines logical concepts and relations within the language.

In other words, all syntactical concepts are language–relative; thus, when we define a concept of a language system, we must do so within the particular syntax of that language. That is, in the definition of a given concept, we must refer to the language that the concept belongs to, and the definition must be based on the rules of the same language.

In *The Logical Syntax of Language*, Carnap states that what he means by the term “analytic” is what Immanuel Kant and Gottlob Frege meant by this term.\(^{28}\) Frege defines an analytic sentence as a sentence proof of which requires only universal logical laws together with definitions.\(^{29}\) But Carnap does not believe in universal logical laws in the sense of laws that are valid in all systems and, thereby, cannot characterize analyticity in exactly the same way as Frege does.

According to Carnap’s principle of tolerance, there can be an infinite number of possible logics, each of which contains its particular set of laws. None of these sets of logical laws contradicts the others because, for him, each logical law is confined to a particular logic or language system and makes sense only within that particular

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\(^{27}\) From here on, following Carnap, for the sake of brevity, I shall mostly use the term “syntax” instead of the term “logical syntax.”

\(^{28}\) Carnap, *The Logical Syntax of Language*, 44.

framework. Therefore, according to the principle of tolerance, there is no such thing as a universal logical law. Thus, although Carnap says he follows Frege’s general idea in characterizing the term “analytic,” he makes the following amendment in light of his principle of tolerance: an *analytic sentence* in a particular language is a sentence proof of which requires only the logical laws of the language together with definitions of the language.

Drawing from the earlier arguments, we see that for Carnap in his syntax period, “analyticity” is inevitably a language–relative concept. Because of the differences among the logical rules for different languages, the same string of symbols might be analytic in one language but synthetic in another.

Incidentally, Carnap rejects the view—held by Moritz Schlick, for example—that merely by understanding a sentence we are able to determine whether it is analytic.\(^{30}\) Carnap says that this condition is true only for simple sentences. For example, we may decide on the status of the elementary sentences of arithmetic at the time we understand them, but for complicated sentences of arithmetic (say Fermat’s Theorem), after understanding the sentence, we may still wonder whether it is analytic.\(^{31}\) That is to say, we may wonder whether it can be derived using the definitions and transformation rules of the language alone. Thus, we need a criterion or a precise step–by–step procedure for every language to determine whether each of its sentences is analytic.

In Carnap's discussion of the concept of analyticity, we must distinguish between three notions of analyticity: (a) the general notion of analyticity as we find


it in the attribution that “... is analytic”; (b) the general relative notion of analyticity as we see it in the attribution that “... is analytic in language S,” where S is a variable; and (c) the indexed notion of analyticity, such as “... is analytic in $S_i$,” “... is analytic in $S_{II}$,” “... is analytic in $S_{III}$,” and so on, where “$S_i$,” “$S_{II}$,” “$S_{III}$,” etc., are labels of specific languages.\textsuperscript{32} According to Carnap, it does not make sense to talk about the general notion of analyticity and say, for instance, that a particular sentence is analytic, because analyticity is a logical notion and as such is language-relative: we must refer to a specific language when we talk about the property of being analytic as applied to a given sentence. That is, we may talk about being “analytic in language S,” where S is either a variable or a particular language, but not about being “analytic in general.” Therefore, when Carnap discusses the concept of analyticity, he means either the concept (b) or the concept (c), but never the concept (a). Following Carnap, whenever I use the term “analyticity” in discussing Carnap's works in this dissertation, I mean either the general relative or indexed notion of analyticity—which one I mean in each case will be clear from the context.

Based on what I noted earlier, according to Carnap, when we define “analytic in S,” we must do so by the means of the concepts and rules of the particular language S. We might conclude from this that, for Carnap, only an indexed notion of analyticity can be defined: we must define analyticity for each particular language separately because, firstly, analyticity is a syntactical, language-relative notion and, secondly, each particular language has its own specific syntax. However, Carnap believes that, in theory there can be a syntactical system that is so comprehensive

\textsuperscript{32} I owe the clarification of the three notions of analyticity to Professor Marian David.
that it is applicable to all languages. In such a system, all characteristics and definitions are built on the concepts and relations common to all languages. As such, those characteristics and definitions can be applied to all languages. Carnap calls such a system the “general syntax” of languages.\textsuperscript{33} In the general syntax, the definition of the \textit{general relative notion of analyticity} can be given. In other words, in general syntax, we can define “analytic in language $S$” in a way that $S$ is a variable for any language whatsoever.

For Carnap, the term “consequence” is the fundamental term in establishing any syntax. He says:

\textit{\ldots it [the term “consequence”] is the beginning of all syntax. If for any language the term ‘consequence’ is established, then everything that is to be said concerning the logical connections within this language is thereby determined.}\textsuperscript{34}

That is to say, if one is to establish the logical connections within the syntax of any language, the first step is to define the term “consequence” in that particular language. Thus, we can conclude that to establish a general syntax that discusses all languages, we need first to define the term “consequence” in a comprehensive way that makes the term applicable to all languages. But Carnap states that a comprehensive definition for \textit{consequence} had never been achieved in logic,\textsuperscript{35} thereby implying that a general syntax is impossible to establish.

Despite this obstacle, in \textit{The Logical Syntax of Language}, Carnap introduces two particular languages called Language I and Language II, and through the study of their syntax, he tries to make an outline of a general syntax. I shall not go through

\begin{footnotes}
\item[33] Carnap, \textit{The Logical Syntax of Language}, 167.
\item[34] Ibid., 168.
\item[35] Ibid., 27.
\end{footnotes}
every detail of the different syntactical systems that Carnap establishes in *The Logical Syntax of Language*; my aim here is to examine only his syntactical definitions of analyticity. Consequently, I will explore only those aspects of Carnap's syntactical systems that are the basis of his syntactical definitions of analyticity.

Carnap gives the *general characteristics* of analytic, contradictory, and synthetic sentences for any language as follows:

In material interpretation [namely, when the designations of the expressions are considered], an analytic sentence is absolutely true [within the language framework] whatever the empirical facts may be. Hence, it does not state anything about facts [not even facts about linguistic symbols]. On the other hand, a contradictory sentence states too much to be capable of being true; for from a contradictory sentence both every fact and its opposite can be deduced. A synthetic sentence is sometimes true—namely, when certain facts exist—and sometimes false; hence it says something as to what facts exist. *Synthetic sentences* are the *genuine statements about reality.*³⁶

Drawing on these characteristics, as we investigate whether a sentence is analytic³⁷ in a particular language, we do not need to refer to matters of fact. Rather, it suffices to see if we can decide whether the sentence is true or false merely by referring to the structure of the sentence and the rules of the language that the sentence belongs to. If we can do so, then the sentence is an analytic sentence. Otherwise, it is synthetic. This general characteristic of analytic sentences in all languages, according to Carnap, again reveals that analyticity is a purely formal feature.

I pointed out that Carnap regards the above consideration simply as a general characteristic of analyticity and not as a definition of that notion. To explain further,

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³⁷ Since by “contradictory” Carnap means analytically false, I will always use the term “analytic” in the wider sense to include both analytic and contradictory sentences and to distinguish them from synthetic ones, unless the context shows otherwise.
for Carnap, a definition of analyticity must provide us with a criterion use of which allows us to determine whether any given sentence is analytic within its framework. Because the above consideration does not give such a criterion, it cannot be considered as a definition of analyticity. To establish such a criterion, Carnap offers a loose syntactical definition of analytic truth that, for the sake of simplification, I may paraphrase as follows:

If a sentence is logically universally true [in its language], then it is called *analytic*; if a sentence is logically invalid (or logically universally false), then it is called *contradictory*; a sentence is called *synthetic* if it is neither analytic nor contradictory. 38

Here, by the term “logically,” Carnap means on the grounds of the rules of logic, and by the term “universally,” he means in all material conditions whatsoever. Thus, the term “logically universally true” means true based on logical rules alone and regardless of what matters of fact obtain. But this definition of relative analyticity is not sufficient, because it does not explain how we can determine whether a given sentence in a particular language is “logically universally true.”

In the first half of *The Logical Syntax of Language*, Carnap introduces the definitions of indexed notions of analyticity for languages I and II. The technical details of those definitions are not my concern here. But, it is crucial for my discussion to mention that each of those definitions is based on the definition of the concept of “consequence” in the pertinent language. I may rephrase those definitions in the following general form:

If sentence C of language S is the consequence of any sentence whatsoever of the language, then we call sentence C *analytic* in S; if every sentence of S is the

consequence of sentence C, then we call sentence C *contradictory* in S; if sentence C is neither analytic nor contradictory in S, then we call it *synthetic* in S.\(^{39}\)

If we define the term “consequence” for any particular language, we will make this general form a sufficient definition of “analytic in that particular language.” Following this pattern, Carnap provides definitions of indexed notions of analyticity in languages I and II: he defines the concept of “consequence” in languages I and II and, thereby, he gives the definition of analyticity in those languages. In theory, this pattern can be used even to define the general relative notion of analyticity (that is, “analytic in S” where S is a variable). To do so, Carnap first needs to define the concept of “consequence” in general syntax; he needs to show how we can determine a sentence is a consequence of another in any given language without specifying any particular language in his definition.

However, as we discussed before, Carnap claims that there is no general definition of consequence in logic, nor does he offer one. Consequently, he is not able to define the general relative notion of analyticity (that will be applicable to the sentences of all languages) by following the pattern noted above. However, Carnap's inability to provide a definition of general relative analyticity based on the concept of “consequence” does not prevent him from providing various specific definitions of analyticity for certain languages (or indexed analyticities) on the basis of the noted general pattern. I shall elaborate on this point as follows.

Carnap regards *consequence* as a chain of *direct consequences*.\(^{40}\) That is, \(C_m\) is a consequence of \(C_1\) if there is a series of sentences, such as “\(C_1, C_2, C_3 \ldots C_m\),” so that

each sentence in the series is the direct consequence of the sentence before it. Thus, if we are to define the term “consequence,” it suffices to define the term “direct consequence.”

Carnap explains that within every language system, the definition of “direct consequence” is given by the transformation rules of the language.\textsuperscript{41} Namely, transformation rules of every language determine, among the sentences of the language, what sentence can be inferred from the other sentence or sentences. As such, the term “direct consequence” is defined separately relative to each language by the time of the building of the language and the development of its transformation rules. This is all that Carnap provides regarding the definition of direct consequence.

Thus, Carnap does not define “direct consequence” in general or in a way that applies to all languages, but his definition is concerned merely with “direct consequence in a particular language S.” Therefore, the definition of the term “consequence” as a chain of direct consequences is also language-specific, and not general. As a result, Carnap is able to use the general pattern above to introduce definitions of indexed analyticities, but not to introduce a definition of the general relative analyticity. That is, when the general form of definitions of analyticity introduced above is attached by the transformation rules of any particular language, it serves as the sufficient definition of analyticity within that language. However, because there are no general rules of transformation applicable to all languages and hence no general definition of consequence, then Carnap is not able to apply the

\textsuperscript{40} Ibid., 118.
\textsuperscript{41} Carnap, \textit{Philosophy and Logical Syntax}, 44. Also see Carnap, \textit{The Logical Syntax of Language}, 168.
general form of definitions of analyticity to define the notion of general relative analyticity.

In short, in the first half of *The Logical Syntax of Language*, Carnap builds the definition of analyticity on the basis of his definition of consequence and, hence, on the grounds of the logical rules of the language. As such, he ends up only with language-specific definitions of analyticity, each exclusive to one particular language. However, in the second half of *The Logical Syntax of Language*, Carnap tries another approach to introduce a definition of the general relative analyticity: Carnap, first, introduces descriptive terms or those that refer to extra-logical objects [such as proper names and properties], and logical terms or those that have merely logical meanings [such as logical connectives and logical operators].\(^{42}\) Then, he claims that logical sentences or sentences containing only logical terms are logically determinate, that is, their truth and falsity can be established merely by logical investigation of the sentences without referring to matters of fact.\(^{43}\) Thereby, for Carnap, an analytic sentence [in the general relative sense] is a true or valid logical sentence, whereas a contradictory sentence is a false or invalid logical sentence.\(^{44}\) This definition is based on the demarcation between descriptive and logical terms. According to Carnap, descriptive and logical terms in each particular language can be demarcated by listing the terms of the language under either of two titles. This method is not applicable in general syntax in a way that it demarcates descriptive and logical terms in all languages. Since Carnap is not able to define sufficiently the demarcation between descriptive and logical terms based on other

\(^{42}\) Carnap, *The Logical Syntax of Language*, 177.

\(^{43}\) Ibid., 179.

\(^{44}\) Ibid., 182-84.
syntactical notions in general syntax, then Carnap’s definition of analytic sentences as valid sentences containing only logical terms is not a sufficient definition of general relative analyticity.

To summarize, during his syntax period, Carnap views the concept of analytic as a purely formal concept; he asserts that “[i]t is certainly possible to recognize from its form alone that a sentence is analytic; but only if the syntactical rules of the language are given.”45 Thus, for classifying sentences of any given language as analytic or synthetic, we must provide a criterion exclusive to that language. Carnap believes that such a criterion must be syntactical and must be based solely on the specific rules of the language. In his syntax period, Carnap provides no sufficient definition of general relative analyticity.

The Syntactical Treatment of Meaning and Synonymy

In logic, the role of the meaning of sentences cannot be easily overlooked. As Carnap states, there is a tendency among philosophers to believe that logical characteristics and logical relations between sentences, including analyticity, cannot be grasped entirely without appealing to the meaning of the sentences. Carnap agrees with this view to some extent, but, in his syntax period, he thinks still this requirement can be dealt with purely formally:

According to the usual view, all logical investigation comprises two parts: a formal inquiry which is concerned only with the order and syntactical kind of the linguistic expressions, and an inquiry of a material character, which has to do not merely with the formal design but, over and above that, with questions of meaning and sense. Thus the general opinion is that the formal problems constitute, at the most, only a small section of

45 Ibid., 186.
the domain of logical problems. As opposed to this, our discussion of general syntax has already shown that the formal method, if carried far enough, embraces all logical problems, even the so-called problems of content or sense.\textsuperscript{46}

Here Carnap claims that by using the syntactical method alone and without referring to extra-linguistic objects, we are able to determine what a sentence means. Thus he construes the meaning of a sentence in a specific way: the content—or the meaning, or the sense—of a sentence is identical with the class of non-analytic sentences that are the consequences of the sentence.\textsuperscript{47} In other words, the meaning or the content of a sentence represents its expressive power, and the expressive power or the amount of information that a sentence provides about reality is determined by the class of non-analytic sentences that can be inferred from the sentence. Thus the contents of the sentences of such a class compose the content of the given sentence.

Analytic sentences are excluded here because they lack content; as such, they cannot contribute to the content of the sentence. As we saw in Chapter One, Carnap explains that analytic sentences are not about matters of fact and do not state anything about reality. They lack any expressive power. Thus, according to Carnap, analytic sentences are without meaning or content. Consequently, an analytic sentence can be derived from any sentence, but a non-analytic sentence is not derivable from an analytic one.

In short, according to the syntactical definition of meaning, if we are to determine the meaning of a sentence, “... we must find out what sentences are the

\textsuperscript{46} Ibid., 281–82.
\textsuperscript{47} Ibid., 41–42.
consequences of that sentence”\textsuperscript{48} and must ignore among such sentences those that are analytic. The remaining sentences comprise the meaning of the given sentence. This definition does not refer to designations of symbols but is based only on the formal concepts of consequence and analyticity. As such, the definition treats the meaning of sentences formally.

The concept of synonymy is closely related to the concept of analyticity, and we shall see in the next chapters how definitions of these two concepts—especially in natural languages—are intertwined. Within the syntactical concept of meaning just defined, Carnap also gives a syntactic definition of synonymy for linguistic expressions. To do so, he first calls two sentences “equipollent” if they have the same content (meaning). He then defines \textit{synonymy} as follows: two expressions, \(x\) and \(y\), are synonymous when any sentence \(S\) in which \(x\) occurs is equipollent to the sentence \(S'\) that is produced by replacing \(x\) with \(y\).\textsuperscript{49} Thus, the syntactical definition of synonymy given by Carnap is again purely formal without any reference to extra-linguistic objects; it rests on the definition of content, and hence on the terms “analytic” and “consequence.”

In summary, in his syntax period, although Carnap limits the task of logic to the formal study of language, he acknowledges, in general, the role of meaning when he defines the logical characteristics of the expressions of a language, including the characteristics of analyticity and synonymy. However, he presents a formal definition of meaning and claims that this definition fulfills all the required roles of

\textsuperscript{48} Ibid., 41.
\textsuperscript{49} Ibid., 42. A few years later, Carnap gives a more simple definition of synonymy without the use of the concept equipollent: “[T]wo expressions are called mutually synonymous, if the content of any sentence containing one of them is not changed if we replace that expression by the other.” See Carnap, \textit{Philosophy and Logical Syntax}, 58.
meaning in logic. Carnap concludes that, contrary to the common view, even questions of meaning and interpretation can be dealt with in a purely formal way, thereby confirming his assertion that all questions of logic belong to syntax.\textsuperscript{50}

**Carnap and the Nature of Philosophical Statements**

Carnap explains that traditional philosophy is concerned with both object–questions and logical questions. Object–questions refer to objects of the domain under consideration, whereas logical questions refer to sentences, terms, theories, and so on.\textsuperscript{51} The object–questions are either “concerned with suppositious objects which are not to be found in the object–domain of the sciences”\textsuperscript{52} and thus are metaphysical and have to be abandoned,\textsuperscript{53} or are “concerned with things which likewise occur in the empirical science”\textsuperscript{54} and thus should be left for science to deal with. All remaining parts of traditional philosophy deal with logical questions, which can be answered by logical analysis. As we saw in Chapter One, Carnap calls these remaining parts of philosophy the questions of the logic of science.

But what exactly does Carnap mean by the logic of science? He explains that scientists engage in two very different kinds of activities. On the one hand, in their experimental activities, they make observations and conduct experiments to uncover facts; on the other hand, in their theoretical activities, they formulate reports of observations and develop theories and laws to explain known facts and to

\textsuperscript{50} Ibid., 233.

\textsuperscript{51} Logical questions are also object–questions in some sense: they refer to object of logic (linguistic objects). See Carnap, *The Logical Syntax of Language*, 277.

\textsuperscript{52} Ibid., 278.

\textsuperscript{53} In the previous chapter, I discussed why Carnap thinks metaphysical questions should be eliminated from the realm of philosophy; see in Chapter One, the section “Purification of Philosophy from Psychology and Metaphysics,” 16–21

\textsuperscript{54} Carnap, *The Logical Syntax of Language*, 278.
derive predictions. Carnap claims that all theoretical activities of scientists involve language. Scientists use natural languages in their theoretical activities, but natural languages are ambiguous, and using them can cause ambiguities in science as well. The task of the logic of science is to analyze the language used for science and to clarify its ambiguities in order to provide science with an exact and clear language—a scientific language—for its theoretical activities.

The logic of science analyzes the concepts used in science, translates them into clear and exact concepts, and provides rules of deduction that are essential for the theoretical activities of scientists. Overall, the logic of science shows how the language of science should be applied correctly. For Carnap, any sentence that refers to matters of fact is a scientific sentence: thus, most of the sentences we use in our daily life are scientific in this sense. Hence, according to Carnap, the logic of science also shows how, in extra–scientific contexts, natural language should be applied.\textsuperscript{55} Those tasks are the same tasks that, Carnap says, shall be left for philosophy to perform once it is purged of metaphysics and psychology.\textsuperscript{56} Thus, for Carnap, philosophy and the logic of science are identical.

In his early period, Carnap saw the formal study of language or syntactical study as the only method needed for the analysis of language. What logical syntax does is “to provide a system of concepts, a language, by the help of which the results of logical analysis will be exactly formulated.”\textsuperscript{57} The language that is the object of syntactical study is called the “object–language,” and the language in which we talk about the object–language and formulate the results of the study is called “syntax

\textsuperscript{55} Carnap, \textit{Foundations of Logic and Mathematics}, 1–3.
\textsuperscript{56} See Chapter One, the section “Purification of Philosophy from Metaphysics and Psychology,” 14–19.
\textsuperscript{57} Carnap, \textit{The Logical Syntax of Language}, xiii.
language”—or syntax, in short. Carnap distinguishes between two different sorts of syntax: pure syntax and descriptive syntax. He describes pure syntax as follows:

*Pure syntax* is concerned with the possible arrangements, without reference either to the nature of the things which constitute the various elements, or to the question as to which of the possible arrangements of these elements are anywhere actually realized. In pure syntax only definitions are formulated and the consequences of such definitions developed. Pure syntax is thus wholly analytic, and is nothing more than *combinatorial analysis*, or, in other words, the *geometry* of finite, discrete, serial structures of a particular kind.

Thus, pure syntax is concerned with the forms of expressions and deals only with linguistic symbols that do not refer to any objects at all. When Carnap says that pure syntax is concerned with the forms of sentences, he claims to use the term “is concerned with” in a figurative way. Pure syntax is a calculus and, as such, presents merely the signs of a language and their relations to each other. In other words, pure syntax does not discuss or say anything about signs in the way that empirical statements talk about objects. Rather, its statements show the relations held among signs. In this respect, pure syntax is like arithmetic, which is a calculus and does not discuss number signs; it simply shows the relations among them.

Carnap explains descriptive syntax as follows:

*Descriptive syntax* is related to pure syntax as physical geometry [is related] to pure mathematical geometry; it is concerned with the syntactical properties and relations of empirically given expressions (for example, with the sentences of a particular book). For this purpose—just as in the application of geometry—it is necessary to introduce so-called

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58 Ibid., 4.
59 Ibid., 6–7.
60 Ibid., 7.
61 Ibid., 76.
correlative definitions, by means of which the kinds of objects corresponding to the different kinds of syntactical elements are determined.62

Because descriptive syntax talks about syntactical relations of a particular language, it contains synthetic sentences whose subject–matters are signs and expressions of that given language. Descriptive syntax thus involves descriptive signs that refer to (linguistic) objects. Descriptive syntax applies the results of theoretical studies of pure syntax to study natural or artificial languages. Therefore, it is an empirical discipline. Pure syntax, however, does not involve empirical elements and is entirely analytic.

For Carnap of syntax period, philosophy or the logic of science, as the formal theory of language, comprises both pure and descriptive syntax. For him, there are no object–sentences in philosophy; philosophical sentences are either analytic and have no content, or synthetic and discuss only linguistic objects. In any case, no reference to extra–linguistic objects is made in philosophical sentences.

However, even in Carnap’s works, many philosophical sentences appear to refer to matters of fact. To clarify this, Carnap explains that logical sentences fall into two categories: syntactical sentences and pseudo–object–sentences. The latter ones are sentences that, because of their misleading formulations, appear to refer to objects, whereas in fact, they refer to syntactical forms such as sentences, terms, theories, and so forth. Thus, pseudo–object–sentences “are syntactical sentences in virtue of their content, though they are disguised as object–sentences.”63

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62 Ibid., 7.
63 Ibid., 285.
Pseudo-object-sentences can be reformulated in syntactical form, which demarcates them from genuine object-sentences. For instance, the sentence “five is not a thing” appears to talk about an object, namely, about the number five, but it does not, because this sentence does not express a property of the number five. We can transform this sentence into the sentence “'five' is not a thing–word” and can see that it is not about the number five, but about the word “five.” The sentence states to what type of signs the sign “five” belongs and, thus, the kinds of signs it can be combined with to make expressions. In contrast, the sentence “five is an odd number” cannot be transformed into a syntactical one, because it is genuinely concerned with the number five. The sentence expresses a property of the number five, and thus it is an object-sentence.64

Carnap concludes that, metaphysical and psychological sentences aside, the rest of the sentences of traditional philosophy, which comprise the logic of science, are logical (syntactical) sentences but that they are mostly formulated in the material mode of speech. Namely, they are pseudo-object-sentences that can be translated into the formal mode of speech as syntactical sentences. Carnap believes that the material mode of speech causes many misunderstandings in philosophy. He asserts that it makes us think that we are dealing with extra-linguistic objects in those sentences, when, in fact, we are not. By translating the sentences into the formal mode of speech, he says, this confusion can be eliminated.65

Carnap sums up the investigations of his syntax period in the following very strong statement, which appears at the last parts of The Logical Syntax of Language:

64See Carnap, The Logical Syntax of Language, 284–88. For more examples, see also Carnap, Philosophy and Logical Syntax, 58–67.

But the decisive point is the following: \textit{in order to determine whether or not one sentence is a consequence of another, no reference need be made to the meaning of the sentences.}... \textit{It is sufficient that the syntactical design of the sentences be given.}... It is theoretically possible to establish logical relations (consequence–relation, compatibility, etc.) between two sentences written in Chinese without understanding their sense, provided that the syntax of the Chinese language is given. (In practice this is only possible in the case of the simpler artificially constructed languages.)\textsuperscript{66}

Carnap believes that the relation of consequence is the basic logical relation on which all other logical relations and characteristics can be built. In his syntax period, Carnap defined the concept of consequence contextually as it relates to each language by means of the syntactical rules of each. Since Carnap defined analyticity and related logical concepts (such as synonymy) in terms of the concept of consequence, those definitions also are language–specific. He did not provide any definition of general relative analyticity based on the concept of consequence. Carnap continues:

Now, is it the business of logic to be concerned with the sense of sentences at all...? To a certain extent, yes; namely, in so far as the sense and relations of sense permit of being formally represented. Thus, in the syntax, we have represented the formal side of the sense of a sentence by means of the term ‘content’; and the formal side of the logical relations between sentences by means of the terms ‘consequence’, ‘compatible’, and the like. All the questions which it is desired to treat in the required logic of meaning are nothing more than questions of syntax.\textsuperscript{67}

At this stage, Carnap’s view was that all that we need in logic with respect to the meaning of expressions is fulfilled by defining the term “content” as the syntactical definition of the meaning of the sentences. The concept of analyticity traditionally

\textsuperscript{66} \textit{Ibid.}, 258–59.
\textsuperscript{67} \textit{Ibid.}, 259.
has been understood sometimes based on the concept of meaning or content of a sentence. Carnap believes that by the syntactical definition of content that he introduced he is also able to deal syntactically with the concept of analyticity thus understood: Carnap defines analyticity on the basis of the concepts of consequence and content, both of which are syntactical concepts for him. He considers an analytic sentence as one with no content and, thus, one from which no consequence can be derived. Finally, Carnap concludes:

Questions about something which is not formally representable, such as the conceptual content of certain sentences, or the perceptual content of certain expressions, do not belong to logic at all, but to psychology. All questions in the field of logic can be formally expressed and are then resolved into syntactical questions. A special logic of meaning is superfluous; ‘non–formal logic’ is a contradictio in adjecto. Logic is syntax.68

For Carnap, during his syntax period, there is nothing to philosophical investigations beyond the formal studies of language. However, just a few years later, he significantly modified his view on the role of meaning of expressions in logic. In the next chapter, I shall examine Carnap’s modified view regarding philosophical studies and his later definitions of analyticity and synonymy, which were developed in his final stage of philosophy: the semantics period.

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68 Ibid.
Chapter Three

Carnap’s Turn to the Semantical Notion of Analyticity

In Chapter Two, I explained how, in his early years, Rudolf Carnap argued that the logic of science can and must be formulated in a purely syntactical way, without any reference to the designata of the expressions of the language. During this time, for Carnap logic was syntax. He even called non–formal logic a “contradiction in terms.” Yet despite this conviction, shortly after the publication of his major works on syntax, Carnap significantly changed his point of view on logic and came to consider the study of the meaning relations between linguistic expressions and extra–linguistic objects as a crucial part of logical studies.

In his preface to *Introduction to Semantics*, published in 1942, Carnap declares that the “analysis of the signifying function of language” is just as important as the purely formal analysis of language. He calls a theory that furnishes such an analysis of language the theory of meaning and interpretation of language, or semantics. Alfred Tarski first directed Carnap’s attention to the importance of semantical studies of language. Following Tarski’s lead, Carnap adopts the idea that “truth and logical consequence are concepts based on the relation of designation, and hence semantical concepts.” He also believes that the

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3 Ibid., vi.
4 Ibid., 10.
distinctions between logical and factual truth—and, hence, between analytic and synthetic sentences—“have to be made primarily in semantics, not in syntax.”\textsuperscript{5}

This chapter examines Carnap’s definitions of analytic truth in his semantics period, and offers some insights as to why he changed his point of view on the nature of logic and considered semantics to have such a vital role. Since logical truth and logical deducibility are semantical concepts for Carnap, he believes that traditional logic, or logic in the sense of the theory of logical deduction, is a special branch of semantics.\textsuperscript{6}

It is significant that Carnap does not introduce semantics as a replacement for syntax, but that he considers semantics and syntax as parts of philosophy that supplement each other. Syntax and semantics are related systems, but a syntactical system is a purely \textit{formal} calculus, while a semantical system is an \textit{interpreted} language system. When we have a semantical system $S$, formalizing $S$ allows us to obtain a syntactical language system, or a calculus, corresponding to the semantical one. The corresponding syntactical system cannot represent all features of the semantical system; the designation relations between the signs of $S$ and objects, or the factual assertions of the sentences of $S$, cannot be represented syntactically, because those relations and assertions are semantic. But the truth of the sentences of $S$, and the implication relations among the sentences of $S$, can be represented in the corresponding syntactical system.\textsuperscript{7} Conversely, when we have a syntactical system $K$, we may build a corresponding semantical system for it by assigning designata to the expressions of $K$ and truth–conditions to its sentences by means of

\textsuperscript{5} \textit{Ibid.}, 247.
\textsuperscript{6} \textit{Ibid.}, 56.
\textsuperscript{7} \textit{Ibid.}, 216.
the semantical rules. In this way, the sentences of a syntactical language system become interpreted. Such points shall become clearer in subsequent sections.⁸

Carnap thinks that formalizing semantical systems, and interpreting syntactical ones, are both crucial for philosophy, which he understands to be the logic of science.⁹ Scientific theories—including mathematics, geometry, and physics—are usually introduced in the form of calculi. To apply scientific theories to matters of fact, scientists need first to interpret those theories and then to correlate them with realities by means of the logic of science; in other words, scientists need to build semantical systems that correspond to scientific theories. Without semantics, scientific theories are not applicable to objects or events.¹⁰ On the other hand, as we saw in the previous chapter, clarifying the ambiguities of many scientific claims, including claims made in daily life, requires us to reformulate these claims in logical form, which now include both syntactical and semantical sentences. To make an exact analysis, we often need to formalize the semantical sentences by ignoring the role of designation relations, thereby obtaining the corresponding syntactical sentences.¹¹ For Carnap, both syntax and semantics are vital parts of philosophy, and neither is dispensable within the logic of science.

I must point out that although Carnap believes that truth and deduction are primarily semantical notions, and that the logic of deduction is a special branch of semantics, he sees no contradiction in dealing with the logic of deduction in syntax.

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⁸ Ibid., 203.
⁹ Carnap discusses in detail how to interpret a calculus by forming a corresponding semantical language system and how to formalize a semantical system by building a corresponding syntactical system in his article “Foundations of Logic and Mathematics” (International Encyclopaedia of Unified Science, 1939). Although it is important here to pay attention to the relation between semantical and syntactical systems, it is out of the scope of this dissertation to examine this relation in detail.
¹¹ Ibid., 246.
We may construct a formal procedure in syntax corresponding to the semantical procedures of the rules of deduction. In this way, according to Carnap, we can formalize the logic of deduction and represent that logic in syntax.\textsuperscript{12}

\textbf{Semantics}

To see what exactly Carnap means by semantical studies, one must put semantics within the wider context of the whole study of language. Carnap calls the general science of language \textit{semiotic}, and he distinguishes within it three different areas of investigation:

In an application of language, we may distinguish three chief factors: the speaker, the expression uttered, the designatum of the expression, i.e. to which the speaker intends to refer by the expression. In \textit{semiotic}, the general theory of signs and languages, an investigation of a language belongs to \textit{pragmatics} if explicit reference to a speaker is made; it belongs to \textit{semantics} if designata but not speakers are referred to; it belongs to \textit{syntax} if neither speakers nor designata but only expressions are dealt with.\textsuperscript{13}

In Carnap's view, \textit{pragmatics} is the study of language that involves the user of a language; pragmatics may also include references to designata. Semantics is that part of the general study of language that ignores the user of the language and explicitly analyzes only the expressions and their designata. Carnap says that semantics not only contains a theory of the designation relation between expressions and their meanings, but also involves theories of truth and logical

\textsuperscript{12} Ibid., 10–11, 60. Carnap deals with this issue chiefly in his work \textit{Formalization of Logic} (Cambridge, MA: Harvard University Press, 1943). Again, to go through the detail of this discussion is far from the aim of my dissertation. I simply hint here that both syntax and semantics remain crucial for Carnap, having vital roles in his logic of science.

\textsuperscript{13} Carnap, \textit{Introduction to Semantics}, 8.
deduction; semantical concepts are particularly applied to the study of meaning, truth, analyticity, and deduction. Finally, in the general study of language, syntax is the part that ignores both the user of the language and the designata of the expressions; syntax analyzes only the formal or syntactic relations between expressions.

As in the case of syntax, Carnap distinguishes between pure and descriptive semantics. He explains the distinction as follows:

Both in semantics and in syntax the relation between the descriptive and the pure field is perfectly analogous to the relation between pure or mathematical geometry, which is a part of mathematics and hence analytic, and physical geometry, which is a part of physics and hence empirical.

Pure semantics is the construction and analysis of semantical systems and consists of providing definitions of semantical concepts—such as “true in S” where S ranges over languages—and their consequences. All the statements of pure semantics are analytic and, therefore, do not have factual content. Descriptive semantics, however, is an empirical science whose job is “the empirical investigation of semantical features of historically given languages” through the application of the theories developed in pure semantics. Descriptive semantics describes facts, though only linguistic facts, and contains synthetic statements as well as analytic ones.

Carnap calls the language under investigation the object–language, and he calls the language in which we talk about the object–language the metalanguage.

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14 Ibid., v.
15 Ibid., 12.
16 Ibid.
17 Ibid., 11.
The object-language and the metalanguage can be identical. For example, we can talk in English about English. However, the metalanguage must be rich enough to provide all the concepts needed to talk about the object-language.\textsuperscript{18} Sentences of a semantical system are about the logical relations among sentences of an object-language; thus, sentences of semantics are formulated in the metalanguage. Carnap explains a semantical system as follows:

By a \textbf{semantical system} (or interpreted system) we understand a system of rules, formulated in a metalanguage and referring to an object-language, of such a kind that the rules determine a \textbf{truth-condition} for every sentence of the object-language, i.e. a sufficient and necessary condition for its truth. In this way the sentences are \textit{interpreted} by the rules, i.e. made understandable, because to understand a sentence, to know what is asserted by it, is the same as to know under what conditions it would be true. To formulate it in still another way: the rules determine the \textit{meaning} or \textit{sense} of sentences.\textsuperscript{19}

Therefore, the chief task of a semantical system is to interpret or determine the meaning of the sentences of the object-language. To know the meaning of a sentence, we do not need to know its truth-value (that is, whether it is true or false). It is sufficient for us to know under what conditions the sentence is either true or false.

To determine the truth-conditions of the sentences of an object-language, we may lay down the rules of a semantical system in the following order:

\textbf{a) Classification of Signs}: By “signs,” Carnap means “the ultimate units of the expressions of the language.”\textsuperscript{20} The classification of the signs of a semantical system takes place in a similar way to the classification of the

\textsuperscript{18} \textit{Ibid.}, 3.
\textsuperscript{19} \textit{Ibid.}, 22.
\textsuperscript{20} \textit{Ibid.}, 4.
words of a historically given language in ordinary grammar; we may sort the
signs of the system into various classes—such as individual constants,
predicates of different degrees, connectives, and so forth.

b) **Rules of Formation**: The rules of formation of a system $S$ define the term
“sentence in $S$.” In other words, those rules determine in what order different
sorts of signs can be combined to form a sentence in $S$.

c) **Rules of Designation**: The rules of designation of a system $S$ define the
term “designations in $S$” through the definitions of the designations of the
individual constants and predicates of the system. The rules of designation do
not make factual assertions about the designations of the expressions of $S$;
the rules are simply arbitrary conventions governing the use of symbols.
Those conventions are usually made by the enumeration of the designation
relations.\(^{21}\) The rules of designation of a system state the meaning of the
constants of the system by translating the terms of the system into the terms
of the metalanguage, usually a natural language. For example, some of the
rules of designation of a system $S$ may be as follows: “$S$” stands for “Socrates,”
“$Hx$” stands for “$x$ is human,” “$Px$” stands for “$x$ is a philosopher,” and so
forth.\(^{22}\)

d) **Rules of Truth**: The rules of truth of a system $S$ define the term “true in $S$.”
Because the chief task of semantics is to interpret an object-language by
determining the truth-conditions of its sentences, the main aim of a
semantical system is to obtain the definition of “true in $S$,” and other
definitions simply serve as preparatory steps for this purpose.\(^{23}\) To give the

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\(^{22}\) For some detailed examples, see *ibid.*, 24.

definition of “true in $S$,” the rules of truth of the system $S$ first define the truth of atomic sentences$^{24}$ in $S$, which I shall discuss in detail later. Then, the rules of truth give truth conditions for molecular or compound sentences in $S$ through the definitions of logical connectives. For example, the disjunction of two sentences in $S$ is true if and only if at least one of the sentences is true.

For the purpose of this dissertation, I shall focus only on those aspects of semantics that are related to the definition of truth and on the consequences of this definition for Carnap’s semantical definition of analyticity.

Here we should mention that Carnap believes in the principle of tolerance in semantics as well as in syntax. He retains this principle in his semantics period in a form almost identical to that of his syntax period.$^{25}$ Based on the principle of tolerance, we arbitrarily lay down rules and definitions of a semantical system. We usually device a semantical system with a specific purpose in mind of analyzing a given language, say the language of science. Thus, in choosing the rules and definitions of the system we may be motivated by pragmatic considerations based on our specific purpose of building the system and may follow somehow historically given languages. Yet we are entirely free to choose among alternative rules and definitions that all suit our specific purpose. A semantical system based on such arbitrary definitions cannot be called right or wrong. The system is simply useful or not with respect to the purpose for which the semantical system is constructed.$^{26}$

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$^{24}$ Carnap explains that “[a]tomic sentences are those which contain neither connectives nor variables (e.g. ‘$R(a,b)$’, ‘$b=c$’); a molecular sentence is one not containing variables but consisting of atomic sentences (called its components) and connectives (e.g. ‘$\neg P(a)$’, ‘$A \lor B$’); a general sentence is one containing a variable (e.g. ‘$(\exists x)P(x)$’).” See ibid., 17.

$^{25}$ For a detailed discussion on the principle of tolerance, see Chapter Two of this dissertation, section “The Principle of Tolerance,”46–47.

$^{26}$ Carnap, Introduction to Semantics, 13.
Explication

Before getting into Carnap’s semantical definition of truth, we need to consider one important point. Carnap declares that his attempt to clarify familiar concepts, such as analyticity, is an attempt not to define them, but to explicate the concepts. He says, “Many concepts now defined in semantics are meant as explicata for concepts earlier used in everyday language or in logic.” To understand Carnap’s discussion on truth and analyticity, we therefore need to understand the notion of explication. In Meaning and Necessity, Carnap introduces this notion for the first time, but his most detailed discussion of the concept of explication comes later in his Logical Foundations of Probability. Here, based on Carnap’s discussions in those two works, I shall show exactly what he means by the term “explication.”

There are concepts used in everyday language, or in the language of the earlier stages of the development of science, that are more or less inexact. To use those concepts in the exact language of science, we need to clarify and render them precise. This clarification is, according to Carnap, one of the basic tasks of the logic of science. Carnap explains that point as follows:

The task of making more exact a vague or not quite exact concept used in everyday life or in an earlier stage of scientific or logical development, or rather of replacing it by a newly constructed, more exact concept, belongs among the most important tasks of logical analysis and logical construction.28

This task is what Carnap calls “explication.” To explicate, in Carnap’s terminology, means to replace a given inexact concept with an exact one. He calls the given

28 Ibid., 7–8. The italics are mine.
concept the “explicandum,” and calls the exact concept proposed to take its place the “explicatum.”29

Carnap observes that the problem of the explication of a concept has a puzzling feature. In solving a problem, the first step is usually to present the problem clearly, and then to search for a right and exact solution for it. But in the case of an explication, we cannot follow that pattern and, thus, we cannot attain an exact solution. Or, put another way: since the problem (the explicandum) itself is not given in an exact form, if a solution (an explicatum) for the problem is proposed, there is no way to decide exactly whether the solution (the explicatum) is right or wrong. Thus, Carnap says, instead of arguing about the rightness or wrongness of an explicatum, we should discuss whether the explicatum is satisfactory and, if so, whether it is the most satisfactory one among different alternatives.30 We shall see next how we can decide whether a particular explicatum is satisfactory.

Carnap states that the first step in giving an explicatum for an explicandum is to make it *practically clear* what the explicandum means. The following passage shows what Carnap means by “practically clear”:

> What $X$ means by a certain term in contexts of a certain kind is at least practically clear to $Y$ if $Y$ is able to predict correctly $X$’s interpretation for most of the simple, ordinary cases of the use of the term in those contexts.31

In other words, if we know how the utterer of a term often uses it in different contexts, then the term shall be practically clear for us. If the explicandum is not at least practically clear enough, all attempts at its clarification and at providing an

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explicatum for it will be futile, because in such a case, we will be completely ignorant about the explicandum, and then we will not be able to clarify the concept that is entirely unknown for us. To give an explicatum for an explicandum it is necessary that we have a relatively good common understanding of the intended meaning and the use of the explicandum. Such a common understanding, according to Carnap, can be reached practically as noted below.

To clarify practically the meaning of the explicandum, we may introduce examples of its intended use and some examples of its unintended uses. All of these examples are just explanations for the explicandum, or attempts to formulate the problem more clearly; the examples cannot be regarded as providing an explicatum for the explicandum, because they do not give us a clear and exact term to replace the explicandum. Carnap explains the use of examples to clarify an explicandum as follows:

By explanations of this kind the reader may obtain step by step a clearer picture of what is intended to be included and what is intended to be excluded; thus he may reach an understanding of the meaning intended which is far from perfect theoretically but may be sufficient for the practical purposes of a discussion of possible explications.\(^{32}\)

For instance, we may say that we want to explicate the term “true” in the sense that it is used in logic and science, which is close to the meaning of “correct,” but very different from the term as it occurs in the expression “true friend” or the like. With such examples, we illustrate what the explicandum is, and thereby provide proper grounds to search for a satisfactory explicatum for it. The examples do not provide a definition or an explicatum of “true”; they do not offer an exact term that can

replace it. Nonetheless, they do suffice to render the explicandum practically clear and, thus, the task of defining an explicatum for it can begin. For the term “true,” for example, Carnap thinks that the task of providing an explicatum was accomplished for the first time by Tarski’s definition of “true.”

Carnap says that the task of explication is to define an exact concept (an explicatum) to replace the inexact concept (the explicandum). Nevertheless, he insists that the explicandum and its explicatum are typically different in meaning:

Generally speaking, it is not required that an explicatum have, as nearly as possible, the same meaning as the explicandum; it should, however, correspond to the explicandum in such a way that it can be used instead of the latter.

Although the two concepts are not synonymous, the explicatum is a more precise rendering of the explicandum, and the latter can be replaced with the former in scientific statements. In this sense, the explicatum fulfills all the functions of the original term but is couched in a clearer, more precise language. The explicatum is precise in the sense that we know exactly in what conditions it can be used. In Logical Foundations of Probability, Carnap further explains that we cannot always replace the explicandum with the explicatum in various contexts, because the terms have different meanings. But the correspondence between an explicandum and its explicatum is such that, in scientific discussions, we need only to use the explicatum.

In the following quotation, Carnap summarizes four necessary requirements for a satisfactory explicatum:

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33 Ibid., 4–5.
34 Carnap, Meaning and Necessity, 8.
1. The explicatum is to be similar to the explicandum in such a way that, in most cases in which the explicandum has so far been used, the explicatum can be used; however, close similarity is not required, and considerable differences are permitted.

2. The characterization of the explicatum, that is, the rules of its use (for instance, in the form of a definition), is to be given in an exact form, so as to introduce the explicatum into a well-connected system of scientific concepts.

3. The explicatum is to be a fruitful concept, that is, useful for the formulation of many universal statements (empirical laws in the case of a non-logical concept, logical theorems in the case of a logical concept).

4. The explicatum should be as simple as possible; this means as simple as the more important requirements (1), (2), and (3) permit.\textsuperscript{36}

Thus, most importantly, a satisfactory explicatum is a term that is not a synonym for the explicandum, but a term that only fulfills similar uses (that is, the term is defined to be used on the occasions in science and philosophy that we intended to use the customary term of explicandum). Moreover, the explicatum must be formulated in such a precise way so that we know exactly how to use it in scientific contexts. These two points must be kept in mind when discussing a satisfactory explicatum for the term “analytic.”

**The Semantical Definition of Truth and Synonymy**

Carnap introduces the semantical term “truth” as an explicatum for the explicandum “truth,” as it is used in ordinary language. To explain this explicandum, he says that in ordinary language we use the term “truth” chiefly for sentences and in the following sense:

\textsuperscript{36} Ibid., 7.
To assert that a sentence is true means the same as to assert the sentence itself; e.g. the two statements “the sentence ‘the moon is round’ is true” and “the moon is round” are merely two different formulations of the same assertion.37

Carnap calls the foregoing the adequacy requirement for a semantical definition of truth; by “adequacy” here, he simply means “agreement with our intention for the use of the [ordinary] term.”38 According to Carnap, for any semantical definition of truth to be an adequate explicatum of the term “truth” in its customary usage, the definition must be in accord with our intended use of the ordinary term “truth.” That is to say, the definition must be such that the assertion of the (semantical) truth of a sentence and the assertion of the sentence itself are the same.39

Carnap believes that the concept of “truth of a sentence” is first and foremost a semantical concept, in the sense that it should be understood based on the accordance of the sentence with matters of fact. Carnap, therefore, builds his semantical definition of truth on the designation relation between sentences and their designata.40 In semantics, he applies the relation of designation not only to individual constants (object names) and predicates, but also to sentences; individual constants designate objects, predicates designate properties and relations, and sentences designate propositions. By a proposition, Carnap means a state of affairs (or a possible fact or condition);41 thus, any given sentence designates or declares a particular state of affairs, which may or may not obtain.42

38 Ibid., 53.
41 Ibid., 53. I shall discuss the nature of propositions from Carnap’s point of view at the end of the next section.
42 We have to notice that by “sentence” Carnap always means merely “declarative sentence.”
Based on the designation relation between sentences and propositions, Carnap gives the following definition (reformulated below) as a general relative definition of truth in semantics. This definition has the same form for all semantical systems. Therefore, the definition does not belong to a particular semantical system, but to general semantics, and it is applicable to all semantical systems:43

$$C_i \text{ is } \textbf{true} \text{ in } S \text{ if and only if there is a proposition } p \text{ such that } C_i \text{ designates } p \text{ and } p.$$44

The definition fulfills the adequacy requirement because it follows from this definition that, for instance, “Ottawa is the capital of Canada” is true if and only if Ottawa is the capital of Canada. According to this definition, an atomic sentence is true if its proposition, which is a state of affairs or a possible fact, holds. Furthermore, the truth of a molecular sentence is determined by the truth of its atomic components plus the semantical rules of the connectives introduced by truth–tables; the truth of a general sentence is determined by the truth of the atomic sentences that are deducible from the general sentence.

Carnap also defines the concept of synonymy for expressions, based on the relation of designation. His definition can be represented as follows:

Expression $E_i$ in $S_m$ is **synonymous** to expression $E_j$ in $S_n$ if and only if $E_i$ and $E_j$ designate the same entity.45

The definition of synonymy, like the earlier definition of truth, belongs to general semantics and is applicable to every semantical system. Furthermore, based on this definition, we can move from one language system to another and can compare the

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43 Carnap, *Introduction to Semantics*, 49.
terms and expressions of each language system with others. The movement and comparisons are important features of Carnap’s semantics, as I shall explain next.

In semantics, as in syntax, every term is primarily defined in relation to a particular system; each term is language-specific and, therefore, must be understood within the framework of the corresponding semantical system.46 However, because of the role of designation relation, there is a significant difference between semantics and syntax in this regard: the designation relation allows us to compare two terms that belong to two different semantical systems, while syntax lacks such a possibility. The point is that, by assuming designata for semantical expressions, Carnap can define some semantical relations generally in the sense that he defines the same concept for different language systems. Such a general definition allows him to compare the expressions of different systems. This becomes possible by referring to extra-linguistic entities as designata. Semantical concepts so defined are not confined to a given system, but belong to a general semantics47; they are general relative concepts that are applicable to all language systems. But in syntax, there is no way to compare expressions from different language systems, because syntax ignores designata and, thus, in syntax there are no extra-linguistic objects related to expressions that, for the purpose of comparison, can be considered as objective criteria (in the sense of being outside of the language systems and independent from them). The absence of objective criteria is perhaps the reason Carnap could not succeed in defining the concept of “truth” in general syntax, yet could give a definition for the concept in general semantics. However, regarding the general relative notion of analytic truth, Carnap still is not able to

46 Ibid., 34.
47 Ibid., 55.
define that concept in general semantics, because analytic sentences are supposed not to refer to extra-linguistic objects. This point shall become clearer by the end of this chapter.

**L–Concepts and the Explication of Analyticity**

Carnap distinguishes between two kinds of truths within semantics: truth for logical reasons and truth for empirical or factual reasons.

> [T]here is the concept of logical truth, truth for logical reasons in contradistinction to empirical, factual reasons. The traditional term for this concept is ‘analytic’; we shall use the term ‘L–true,’ for the sake of analogy. As a correlate to logical truth we have the concept of logical falsity, falsity for merely logical reasons, logical self-contradiction; for it, the term ‘contradictory’ is often used; we shall use here the term ‘L–false’.48

Carnap introduces *logical truth* or *L–truth* as the explicatum for the customary term analytic truth and *logical falsity* or *L–falsity* as the explicatum for the customary term contradictory. In *Meaning and Necessity*, Carnap also states that by logical truth he refers to what Gottfried Leibniz called “necessary truth” and what Immanuel Kant called “analytic truth,” and considers his notion as the explicatum for those notions.49

In the previous chapter I noted the difference between three notions of analyticity: the general notion of analyticity which is “… is analytic,” general relative notion of analyticity which is “analytic in language S” where S is a variable, and indexed notion of analyticity which is “analytic in particular language Si.” Also I

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noted that, in his discussion of syntax, Carnap always means either an indexed notion or the general relative notion of analyticity. However, as I shall clarify in this chapter, his semantical definitions of L–truth are always about an indexed notion of L–truth, but never about general relative notion of that concept.

In semantics, Carnap distinguishes a class of concepts as \textit{L–concepts}, and he claims that those concepts play a significant role in the logical analysis of science. He says about L–concepts that in the investigation of the theories of science, beyond the empirical questions, “there are questions of another kind, usually called logical questions, whose answers are not dependent upon the result of observations and therefore can be given before any relevant observations are made. These questions involve L–concepts.”\textsuperscript{50} \textit{L–concepts} are those whose applications are based on logical reasons alone.\textsuperscript{51} For most semantical concepts, Carnap introduces corresponding L–concepts, such as L–implication, L–equivalence, and so on; however, I shall focus here only on the concepts of L–truth and L–falsity, which are explicata for the concept of analyticity.

Carnap claims that L–truth is truth for logical reasons. He clarifies that by “truth for logical reasons,” he means “truth based on semantical rules alone”:

A sentence \(C_i\) is \textbf{L–true} in a semantical system \(S\) if and only if \(C_i\) is true in \(S\) in such a way that its truth can be established on the basis of the semantical rules of the system \(S\) alone, without any reference to (extra–linguistic) facts.\textsuperscript{52}

His explanation here is not a definition of L–truth because it does not give the truth of the sentences of \(S\); the explanation does not determine whether any particular

\textsuperscript{50} Carnap, \textit{Introduction to Semantics}, 61.
\textsuperscript{51} Ibid., 81.
\textsuperscript{52} Carnap, \textit{Meaning and Necessity}, 10.
sentence of language $S$ is logically true or false, but only explains a general characteristic of the definitions of $L$–truth. In other words, the explanation is a condition that must be fulfilled by any definition for “$L$–true in $S$,” whether constructed as indexed or general notion, if that definition is to be adequate (that is, to be a definition that introduces the term “$L$–truth” in accordance with the customary use of the term “analytic truth”).

Carnap sees no serious difficulty in defining $L$–truth for particular semantical systems or indexed notions of $L$–truth. Nonetheless, difficulties arise when we deal with the definition of general relative $L$–truth in general semantics, as follows:

As far as special semantics is concerned, the task of defining $L$–truth does not involve great difficulties. For each particular semantical system $S$ we can lay down a definition for ‘$L$–true in $S$’ beside that for ‘true in $S$’, and likewise definitions for the other $L$–concepts in such a way that they are adequate. Only in general semantics do serious difficulties arise. Here the problem is how to define $L$–concepts on the basis of other semantical concepts in a general way such that the application to any particular semantical system furnishes adequate $L$–concepts.

In his Introduction to Semantics, Carnap presents definitions of indexed $L$–truth for two different particular semantical systems, $S_3$ and $S_4$, as the examples of the definitions of $L$–truth in special semantics. Regarding the definition of $L$–truth in general semantics, however, Carnap faces serious challenges in providing a proper ground for such a definition. I shall examine the main challenges here.

As we saw in the last section, Carnap bases the definition of truth in general semantics on the agreement of the sentences of $S$ and the actual situation. But he

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53 Ibid., 10. See also Carnap, Introduction to Semantics, 83–84.
54 Carnap, Introduction to Semantics, 84–85.
55 Ibid., 81–82.
cannot do the same for the concept of L–truth, because L–truth refers to the truth of a sentence that is independent of matters of fact. Therefore, Carnap views the definition of L–truth as much more complicated than the definition of truth.

The problem lies in the fact that the natures of truth and L–truth are different: when truth is understood as a relation between sentences and matters of fact, we can find an absolute criterion, independent of the language, to determine the truth and falsity of sentences. That absolute criterion is objective reality, which is independent of all language systems, and to which the truth of the sentences of all languages can be referred. Objective reality is the basis of Carnap's general definition of truth.

Conversely, according to Carnap, L–truth is a relation between linguistic entities and has nothing to do with matters of fact; L–truth is merely a language–related concept. As such, the truth of L–truth is determined only by the semantical rules of its language. Different languages have different sets of semantical rules. The L–truth within each language system depends solely on the rules of that particular language, which are not necessarily the same as the rules of other languages. In other words, because the nature of L–truth is language–relative, there simply cannot be an objective criterion independent of the languages that determines in a general way whether any given sentence in any particular language is L–true. Therefore, the concept of L–truth can only be defined for each language specifically and must be based on the particular semantical rules of that language. This means that we can define only indexed notions of L–truth, but not the general relative notion of L–truth; it is pointless to request a definition for general relative notion of L–truth in general semantics. At most, we can say that L–truths in all languages
follow from the semantical rules of their corresponding languages and are independent of facts; nothing more can be said as to the general features of L–truths in different languages.

Nonetheless, as we shall see next, Carnap identifies some general features in all languages, and he takes those features as the proper grounds on which to base a definition of L–truth in general semantics applicable to all language systems. However, we should notice that concept–signs in this definition are, in fact, variables for special concepts of different languages; they are not general concepts or concepts applicable to all languages in the same way. In other words, when we apply this definition to a particular language, we must replace its concepts with corresponding specific concepts of the language and make the definition specific to that language. Therefore, this definition is not in fact a definition of general relative L–truth in general semantics, but is rather a common form in general semantics for various definitions of indexed L–truth.

In his *Introduction to Semantics*, Carnap gives some brief preliminary comments about three possible ways to define L–truth in general semantics; however, he declares that further investigations are needed to specify the features of each of those possible ways. In this book, Carnap elaborates only on one of those three proposed ways to build his definition of L–truth in general semantics and grounds this proposal in the concepts of “L–range,” “state–description,” and “L–state.” Before getting into his definition of L–truth in general semantics, I first need to explain those three concepts.

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56 For the details of his remarks, see Carnap, *Introduction to Semantics*, 85–88.
Every sentence C in a semantical system $S$ describes a possible state of affairs or a proposition that may or may not hold. If the proposition holds, then the sentence is true; otherwise, it is false. It is not true that every sentence may describe only one definite state of affairs; in many cases, the sentence might admit a number of possibilities. For instance, the sentence “my shirt is brown” admits an infinite number of cases, each concerning one particular shade of the colour brown. The class of all possible states of affairs or propositions that a sentence may admit is called the \textit{range} of the sentence. The sentence is true if one of the possible states of affairs in its range is true. Carnap believes that the range of a sentence can be determined by means of the semantical rules of the system $S$ alone and without any empirical investigation. He explains this determination as follows:

Whenever we understand a sentence we know what possibilities it admits. The semantical rules determine under what conditions the sentence is true; and that is just the same as determining what possible cases are admitted by it. Therefore, the L–range of a sentence is known if we understand it—in other words, if the semantical rules are given; factual knowledge is not required.\textsuperscript{57}

That is to say, because every possible state of affairs that a sentence of a semantical system admits is, in fact, a proposition that the sentence designates, and the semantical rules of the system determine what proposition each sentence of the system designates, then the semantical rules alone suffice to determine the class of the possible states of affairs or the range of each sentence of the system. Thus, according to Carnap, the concept of range is an L–concept; consequently, he uses the term \textit{L–range} for this concept.\textsuperscript{58}

\textsuperscript{57} \textit{Ibid.}, 96.
\textsuperscript{58} \textit{Ibid.}, 95–96.
Every semantical system \( S \) has a set of objects to deal with and contains a number of predicates. Any atomic sentence of \( S \) attributes one predicate of degree \( n \) of the system to \( n \) objects. Thus, if the number of the objects and predicates that a system \( S \) deals with is finite, then the number of the atomic sentences of the system is also finite. Carnap calls any collection of the atomic sentences of the system \( S \), which contains either every atomic sentence of \( S \) or its negation but not both, a state–description of the system; a state–description is a description of one particular possible state of affairs with respect to all objects and predicates that the system \( S \) deals with. In this definition, and in the following ones that are built on it, Carnap assumes that the system \( S \) contains only atomic and molecular sentences and that the atomic sentences of the system \( S \) are logically completely independent from each other, in the sense that their truth–values are not related to one another.\(^{59}\)

The number of the state–descriptions of a system \( S \) might be finite or infinite, depending on the number of the objects and predicates of the system and, thus, depending on the number of its atomic sentences. If a system has \( m \) atomic sentences, the number of its state–descriptions is \( 2^m \). If \( m \) is infinite, then the number of the state–descriptions is infinite as well; in this case, the number of the sentences of each state–description is also infinite. I mentioned earlier that a state description is a *collection of sentences*, but if the number of the atomic sentences of the system \( S \) is finite, we may rather consider each state–description as *one sentence* produced by the conjunction of the sentences of the collection.\(^{60}\)

\(^{59}\) *Ibid.*, 104–5. Quine objects the assumption of logical independency of atomic sentences of the language by claiming that this assumption presupposes the concept of analyticity and, thus, a definition of analyticity built on such assumption is circular. I will discuss this objection of Quine in the next chapter.

also calls the possible state of affairs or the proposition, designated by a state–description of a system $S$, an $L$–state of the system; because this possible state of affairs can be determined merely through semantical analysis without any empirical investigation, it is an $L$–concept.\footnote{Ibid., 105.}

Because any given two state–descriptions of a system $S$ are inconsistent with one another—in the sense that there is at least one atomic sentence that belongs to one of them, and its negation to the other one—then among the state–descriptions of a system $S$, one and only one must be true (that is, the true description of the actual state of affairs). Hence, the disjunction of all state–descriptions of a system $S$ is $L$–true; its truth can be established by logical analysis, without regard for whether any state of affairs obtains.\footnote{Ibid., 103.}

If a particular state–description of a system $S$ is true, then all atomic sentences that belong to it are true, and all atomic sentences whose negations belong to it are false. Thus, Carnap takes the class of those $L$–states of a system $S$ that make a sentence true to be the $L$–range of the sentence in the semantical system $S$; each of those $L$–states and only those $L$–states include one of the propositions (or the states of affairs) of the sentence.\footnote{Ibid., 104.}

I should emphasize two points based on what has been established so far. As we shall see shortly, these two points deserve special attention in our discussion. The first is that state–descriptions are sentences and, thus, of linguistic nature, whereas $L$–ranges and $L$–states are propositions, or states of affairs, belonging to the realm of designata and, hence, are extra–linguistic objects. The second point is

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\item \footnote{Ibid., 105.}
\item \footnote{Ibid., 103.}
\item \footnote{Ibid., 104.}
\end{itemize}
that if the atomic sentences of a semantical system $S$ are not mutually independent of each other (that is, truth of one implies the truth or falsity of another), some state–descriptions in $S$ will be contradictory or L–false. For example, if a language system includes terms “bachelor” and “married” as two incompatible predicators, then the atomic sentences “John is bachelor” and “John is married” will contradict each other in the language. Therefore, a state–description that includes both sentences will be contradictory. A state–description is defined as a description of one particular possible state of affairs with respect to all objects and predicates of the system $S$. Thus, a state–description must not be contradictory or L–false. Then, for a system whose atomic sentences are not logically independent, we need some slight modifications to the definition of state–description and the other definitions built on it. For instance, the selections of the atomic sentences of the system in the definition of state–description must be restricted to the ones that are not L–false.\footnote{Ibid., 105. Furthermore, Carnap explains that if a semantical system $S$ also includes general sentences (that is, sentences containing variables), then a state–description of that system does not always designate an L–state. See ibid., 107.}

In his *Introduction to Semantics*, Carnap suggests that the concept of L–range can be taken as the fundamental concept on which other L–concepts can be built. Moreover, the rules of L–ranges may have a very significant role in the construction of semantical systems and may indeed take the place of the rules of truth in this regard. He explains this suggestion as follows:

The rules of a semantical system $S$ have the purpose of stating the meaning of the sentences of $S$. So far, we have formulated the rules of $S$ as rules of truth, i.e. as rules stating for each sentence of $S$ a sufficient and necessary condition for its truth. To know the L–range of a sentence $C_i$ means to know what possibilities are admitted and what are excluded by $C_i$. This, however, is the same as knowing under what conditions $C_i$ would
be true and under what conditions it would be false. Thus, stating the L–ranges of sentences is in effect the same as stating their truth–conditions. Therefore, instead of laying down rules of truth we may lay down rules which determine the L–ranges of the sentences of S; we call them rules of L–ranges. This procedure is of especial importance if we intend to take the concept of L–range as basis for the definitions of the other L–concepts [including the concept of L–truth].

The rules of L–ranges in a particular semantical system S can be laid down based on the rules of designation of the system, in the same way as were the rules of truth in S. But because we do not have general rules of designation, we cannot lay down the rules of L–ranges in general semantics based on the rules of designation. Thus, in general semantics, Carnap takes the concept of L–range as primitive and defines the other L–concepts on that primitive basis.

To define L–true in semantical system S based on L–range, we must consider the adequacy requirement for the definition of L–true mentioned earlier: The definition must be such that it gives the truth of the sentences of the system simply by referring to the semantical rules alone, without referring to matters of fact. Semantical rules here are the rules of L–ranges in S. Based on those rules, we can determine what the L–range of each sentence in S is (or the class of those L–states of the system S that make the sentence true), without having factual knowledge relevant to the sentence. Nonetheless, because we do not know which of the L–states actually obtains, we do not know whether a given sentence in S is true. Carnap defines the universal L–range in a system S as the class of all L–states of system S.

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65 Ibid., 129–30.
67 Carnap, Introduction to Semantics, 134.
which, again, can be known independently of matters of fact. Hence, he gives a
definition for \(L\)-true in semantical system \(S\), which I have reformulated as follows:

\[C_i \text{ is } L\text{-true} \text{ in semantical system } S \text{ if and only if its } L\text{-range is the universal } L\text{-range in } S.\]^68

This definition states that a sentence is \(L\)-true in \(S\) if and only if it is true in all \(L\)-states of the system \(S\); it is true no matter which \(L\)-state is the real one. This definition fulfills the requirement of adequacy, because it allows us to determine if a sentence in \(S\) is \(L\)-true without referring to matters of fact. Next, Carnap defines the

*null \(L\)-range* in a system \(S\) as the null class of \(L\)-states of the system, or the class of \(L\)-states that has no member, and, hence, defines \(L\)-false in semantical system \(S\) in the same way, as follows:

\[C_i \text{ is } L\text{-false} \text{ in semantical system } S \text{ if and only if its } L\text{-range is the null } L\text{-range in } S.\]^69

Based on this definition, a sentence is \(L\)-false in \(S\) if and only if it is not true in any of the \(L\)-states of the system; the sentence is false whatever the real \(L\)-state is. This definition is adequate because we can decide on the \(L\)-falsity of a sentence based on the definition without referring to matters of fact. I must reemphasize here that these definitions, although general, are not definitions of general relative \(L\)-true and \(L\)-false, they are not definitions of “\(L\)-true in \(S\)” and “\(L\)-false in \(S\)” where \(S\) is a variable; because in those definitions Carnap does not use general concepts of semantical systems that are common in all systems—“universal \(L\)-range” and “null \(L\)-range” in these definitions are not general notions which are common to all semantical systems, but they are concept-variables for specific notions of each

^68 Ibid., 137.
^69 Ibid., 138.
system. Both the definitions of L–true and L–false in semantical system $S$ are definitions of indexed L–true and L–false, but they have the same form for all semantical systems; to produce specific definitions of L–true and L–false in any given semantical system, it suffices that the pertinent concepts of the system be replaced by the variables of these definitions (for example, the universal L–range in $S_1$ and the null L–range in $S_1$, and etc.).

Also, Carnap defines the concepts of true and false in general semantics based on the concept of L–range. I have rephrased the definitions as follows:

Ci is **true** in semantical system $S$ if and only if the real L–state belongs to its L–range.

Ci is **false** in semantical system $S$ if and only if the real L–state does not belong to its L–range.\(^70\)

The two definitions demonstrate that to determine whether a sentence is true or false, we need to know which L–state is the real one, or the one that actually holds. For this purpose, we must examine the relevant state of affairs.\(^71\)

In traditional discussions, such as those of Kant, it is customary to talk about the analytic–synthetic distinction among sentences based on the differences in their content. Thus, Carnap also tries to explicate the concept of the content of a sentence and, then, to formulate a definition of L–truth based on that concept. He explains the concept of content as follows:

The term ‘content’ is sometimes used in a loose way meaning something like *the strength of assertive power of a sentence*. We say sometimes that

\(^70\) *Ibid.*, 139.

\(^71\) Carnap proceeds to define other semantical concepts in the same way based on the concept of L–range and, hence, succeeds to make the concept of L–range, instead of the concept of truth, as the basis for the definition of all concepts of general semantics. For the details of his definition, see Carnap, *Introduction to Semantics*, § 20.
the content of a sentence includes that of another sentence but is larger than this, or that the first sentence is stronger than the second, meaning by this that the first asserts all that is asserted by the second and, in addition, something more.\footnote{Carnap, \textit{Introduction to Semantics}, 148. The italics are mine.}

He introduces the concept \textit{L–content} as the explicatum for the customary term “content,” as the explicandum. Carnap does so because he believes that we can determine the content of a sentence by means of the rules of semantics alone, regardless of facts.

Carnap suggests that, because we speak of a content containing another one, the \textit{L–content} of a sentence should be taken as a class.\footnote{\textit{Ibid.}, 149.} Following Ludwig Wittgenstein’s idea that analytic sentences (tautologies) have no content and, thus, say nothing about reality and that contradictory sentences, as Carnap puts it, contain too much to represent reality, Carnap takes the \textit{L–content} of \textit{L–true} sentences to be the minimum \textit{L–content} or the null \textit{L–content}, which is contained in any other \textit{L–content}. Carnap also takes the \textit{L–content} of \textit{L–false} sentences to be the maximum \textit{L–content} or the universal \textit{L–content}, in which all other \textit{L–contents} are contained.\footnote{\textit{Ibid.}, 150.} Based on those considerations, Carnap introduces a definition for \textit{L–content} that I have represented as follows:

\begin{quote}
The \textbf{\textit{L–content}} of a sentence \textit{C}_i in semantical system \textit{S} is the class of those \textit{L–states} that do not belong to the \textit{L–range} of the sentence.\footnote{\textit{Ibid.}, 151.}
\end{quote}

Here, the \textit{L–content} of a sentence is taken as a class of states of affairs, which are extra–linguistic objects. Carnap claims that this definition of \textit{L–content}, as the explicatum for the customary term “content,” accords with our intention about the

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\item \footnote{Carnap, \textit{Introduction to Semantics}, 148. The italics are mine.}
\item \footnote{\textit{Ibid.}, 149.}
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\item \footnote{\textit{Ibid.}, 150.}
\item \footnote{\textit{Ibid.}, 151.}
\end{itemize}
concept of the content of a sentence (that is, the assertive power of the sentence). He
cites Karl Popper to support his claim, saying that “the assertive power of a sentence
consists in its excluding certain states of affairs; the more it excludes, the more it
asserts.”\footnote{Ibid.} Finally, Carnap gives definitions for L–true and L–false based on the
concept of L–content, whose simplified forms follow:

A sentence $C_i$ is \textbf{L–true} in semantical system $S$ if and only if its L–content is
the null L–range in $S$ [or the null L–content in $S$].

A sentence $C_i$ is \textbf{L–false} in semantical system $S$ if and only if its L–content is
the universal L–range in $S$ [or the universal L–content in $S$].\footnote{Ibid.}

By the null L–range in $S$, Carnap means the null class of L–states, and by the
universal L–range, he means the class of all L–states in $S$.\footnote{Ibid., 108.} The two definitions here
are essentially similar to those of L–true and L–false earlier presented. In fact, we
may regard the two definitions as different versions of the same definitions already
given. The main point is that Carnap makes use of the concept of content in the
latter definitions and, thus, shows that his explication of analytic truth is also in
accordance with the other customary interpretation of analyticity based on the
concept of the content of sentences.

In summary, in his \textit{Introduction to Semantics}, Carnap notes that the concept
of truth is dependent on the meaning relation and should, consequently, be defined
based on the relation of designation. That is why he calls the concept of truth a
principally semantical concept and demands that truth be defined primarily within
semantics.\footnote{Ibid., v, 247.} Carnap defines a true sentence in semantics as one that designates a
real proposition or state of affairs, for whose discovery we must conduct empirical investigations. Yet to define “L–true” so as to be in accordance with the customary concept of analytic truth, Carnap may not refer to matters of fact, even though he is supposed to build his definition on the meaning relation—which, for him, can be understood only based on the relation of designation. Therefore, he introduces the concepts of L–range and L–state as classes of the possible propositions to be the basis of his definition for L–true. Concepts of L–range and L–state, which are determined by semantical rules alone, refer to extra–linguistic objects—namely, to propositions which are possible states of affairs, or possible facts—but not to matters of fact.

Earlier I pointed out that L–ranges and L–states are propositions or states of affairs, and belong to the realm of designata and, hence, are extra–linguistic objects. Therefore, Carnap’s definition of L–truth in Introduction to Semantics that is based on those concepts is not a linguistic definition; in this definition, he goes beyond the language side of semantical relations to the side of designata, which are propositions or possible states of affairs.80 Carnap’s use of designata may raise some metaphysical questions, which I shall elaborate on next.

What Are Propositions?

There are several objections against the application of the designation relation between sentences and propositions, two of which are examined by Carnap in his Introduction to Semantics. The first objection that Carnap examines is that a sentence does not designate but “describes or states that something is the case”;81 it

80 See ibid., 152.
81 Ibid., 52.
is not customary in languages such as English to apply the term “designate” to sentences. Carnap replies to this objection by saying that when we use an ordinary term in the language of science, we often “enlarge its domain of application” to include similar cases for the sake of expediency. Thus, by the same token, his enlarged application of the term “designate” is justified.82

The more serious objection against the application of the designation relation to sentences concerns the nature of propositions that are the designata of sentences. What are propositions? Are they always states of affairs, or are they sometimes thoughts, or other things? Does the assumption of propositions introduce abstract entities to the discussion and, thus, open the door for metaphysics in semantics? Carnap does not answer these questions in Introduction to Semantics saying only that a proposition is something “which is expressed (signified, formulated, represented, designated) by a (declarative) sentence.”83 With respect to the nature of a proposition, Carnap offers no explanation there. Nonetheless, since Carnap defines the truth of a sentence based on whether its proposition holds or fails to hold, to make this definition clear, he needs to clarify exactly what he means by a proposition of a sentence. In his later work, Carnap attempts to meet this problem by discussing the nature of propositions in detail.

In Meaning and Necessity, Carnap does not use the term “designate,” saying instead that a sentence “expresses” a proposition. This change in terminology does not appear to be a change in point of view, but rather shows a different terminological preference. Carnap states that he uses the term proposition “neither

82 Ibid.
83 Ibid., 235.
for a linguistic expression nor for a subjective, mental occurrence, but rather for something objective that may or may not be exemplified in nature.”84 To explain the various kinds of propositions, he distinguishes between propositions of different sorts of sentences. About true synthetic sentences, Carnap believes that their propositions are facts,85 because the sentences express matters of fact. But the issue is complicated in the case of false synthetic sentences:

The greatest difficulty in the task of explicating the concept of proposition is involved in the case of a false sentence. Since this piece of paper c is, in fact, blue, sentences like ‘c is not blue’ or ‘c is red’ are false. They cannot be regarded as meaningless, because we understand their meaning before we know whether they are true or false. Therefore, these sentences, too, express propositions. On the other hand, these propositions cannot have the same relation to facts as the proposition expressed by the sentence ‘c is blue’. While the latter proposition is exemplified by a fact, the former ones are not. What, then, are these false propositions? Are there any entities of which we can say that they are expressed by those false sentences, but for which we cannot point out any exemplifying fact?86

According to Carnap, if and only if a sentence is meaningful, then that sentence expresses a proposition. Thus, meaningless sentences do not have propositions. In the case of false synthetic sentences, because they are meaningful, they are supposed to have propositions, yet because the sentences are false, they do not represent matters of fact. Hence, Carnap faces here the dilemma of explicating the proposition of a false synthetic sentence as an “entity” which is expressed (or is designated, as he puts it in his earlier work), but is not there.

84 Carnap, *Meaning and Necessity*, 27. However, in his earlier work, Carnap says that a proposition is a state of affairs; see Carnap, *Introduction to Semantics*, 10.
86 Ibid., 29.
Carnap discusses the solution put forward by Bertrand Russell, who feels obliged to consider a proposition as a psychological entity and, thus, as something subjective. Carnap quotes Russell as follows:

Since a significant sentence may be false, it is clear that the signification of a sentence [the proposition] cannot be the fact that makes it true (or false). It must, therefore, be something in the person who believes the sentence, not in the object to which the sentence refers.87 Propositions ... are to be defined as psychological and physiological occurrences of certain sorts—complex images, expectations, etc.... Sentences signify something other than themselves, which can be the same when the sentences differ. That this something must be psychological (or physiological) is made evident by the fact that propositions can be false.88

Thus, Russell chooses a subjective, mental interpretation for the concept of proposition because he finds no other way to construe propositions of false sentences. But Carnap thinks that he can interpret the concept of proposition objectively so that it applies even in the case of false sentences. To do so, he analyzes “proposition” and discusses its constituents to show how the exemplification of a proposition should be understood:

Any proposition must be regarded as a complex entity, consisting of component entities, which, in their turn, may be simple or again complex. Even if we assume that the ultimate components of a proposition must be exemplified, the whole complex, the proposition itself, need not be.89

According to Carnap, a proposition is composed of objects, properties, and relations joined to each other with logical connectives. A proposition is objective if its constituents are exemplified. That is, a proposition is objective if its constituents can

88 Ibid., 237–38.
89 Carnap, Meaning and Necessity, 30.
be found among real entities, even though the proposition as a whole cannot be found there. For Carnap, false synthetic sentences also express objective propositions, even though they do not represent matters of fact. For example, “Ottawa is in France” is a false sentence that refers to no matters of fact. But the constituents of this sentence (Ottawa, France, and the relation of being a city in a country) can be found among real entities. Therefore, according to Carnap, this sentence expresses an objective proposition. However, in spite of his explanations about the objectivity of propositions of false synthetic sentences, Carnap cannot indicate what those propositions are, after all, whereas he determines propositions of true synthetic sentences as facts. Hence, Carnap leaves unanswered the question of the nature of propositions contained in false synthetic sentences.

Carnap does not talk about the proposition of an analytic sentence. Yet because Carnap states that a proposition is something that is expressed by a meaningful sentence, and also holds that analytic sentences are meaningless empty sentences that do not express anything,90 I may conclude that, in his point of view, analytic sentences do not have propositions. But in his discussion on false sentences, he adds that contradictory sentences do have propositions, in the same way as of factual false sentences:91 the components of a contradictory proposition can be found objectively, making the proposition objective as well. His position here looks paradoxical, because contradictory sentences are, in fact, analytically false ones; based on what was just explained, contradictory sentences should not have propositions.

90 See Chapter One, the section “Carnap’s Philosophical Background,” 9–16.
Even Carnap himself does not appear satisfied with his discussion of propositions. At the end of his discussion on the nature of propositions in *Meaning and Necessity*, he adds that if the reader is not satisfied with his explication of proposition and doubts that there can be any non–mental, extra–linguistic entity as a proposition, he can just regard a proposition as a linguistic entity.\(^92\) But I believe that if Carnap regards a proposition as a linguistic entity, he shall give up the very aim of considering a proposition for a sentence: the reason that Carnap assumes that a sentence has a proposition is to make a bridge between linguistic expressions and extra–linguistic objects and, thus, to explicate the meaning of a sentence. If Carnap regards a proposition as a linguistic entity, then there no longer be reason to assume a proposition for a sentence.

A few years after *Meaning and Necessity* was published, Carnap attempted again in “Empiricism, Semantics, and Ontology”\(^93\) to justify the use of ‘proposition’ as an abstract term in semantics. He claims that acceptance of the words referring to abstract entities in our language system does not commit us to a platonic ontology. His strategy is to divide the question of existence or being of a thing into two kinds: *internal* questions and *external* ones. Internal questions of the existence of entities are questions within a language framework. An internal question asks whether a certain entity fits together with other accepted things according to the rules of the framework. If the framework is a logical one, the response to the internal question is an analytic statement that reveals the specifications of the language just showing what framework, among different possible alternatives, we have chosen. If the

\(^{92}\) *Ibid.*, 32.

framework is a factual one, the answer is a synthetic statement and could be confirmed by empirical investigation. The result of the empirical investigation must be evaluated based on the confirmation rules that the language provides.

However, external questions of the existence of entities are questions about reality of the framework as a whole and as such, based on Carnap’s criterion of meaning, are devoid of cognitive content. As Carnap puts it, “[t]o be real in the scientific sense means to be an element of the system; hence this concept cannot be meaningfully applied to the system itself.”94 It is only a matter of choice whether to accept a particular language framework, and we make this decision based on our practical considerations and the purpose for which we plan to use the language. The question of the reality of the language system (as a system of certain entities) does not have any cognitive meaning; we only can ask whether the language is proper for the purpose in mind. When we choose the language in such an arbitrary way, then the question of the reality of an entity within the language framework becomes an internal question as just explained.

Based on this strategy, Carnap claims that acceptance of propositions in our semantical system does not commit us to believe that there are platonic or metaphysical entities as propositions. Even if we accept Carnap’s divisions of internal and external questions and that the acceptance of propositions in a semantical system does not raise metaphysical questions, still there remains the question of the nature of propositions that needs to be answered. According to Carnap, questions of the nature of propositions are internal questions. He asserts that the rules of the language show that propositions are not subjective things,

94 Ibid., 207.
mental events, or linguistic entities. Nonetheless, in “Empiricism, Semantics, and Ontology,” Carnap does not explain that what propositions are, after all; he leaves the nature of propositions unexplained claiming that such an explanation is not necessary for a semantical system. For me, when Carnap appeals to propositions and asserts that they are extra–linguistic and objective entities, it is certainly expected that he provides a sufficient explanation of the nature of such vague entities; otherwise the use of those entities in his theory is not justified.

However, in his final attempt to define L–truth in *Meaning and Necessity*, Carnap changes his approach and introduces a purely linguistic definition wherein no reference to propositions or other extra–linguistic entities is made. Thus, in his final formulation of L–truth (discussed in the next section), he avoids what he calls metaphysical questions connected to the propositions of sentences.

**State–Description and Analyticity**

Carnap’s most mature explication of analytic truth appears in his *Meaning and Necessity* where he simplifies the way that he introduced L–truth in *Introduction to Semantics*. In *Meaning and Necessity*, he restricts his definition of L–truth to the language side of semantics and avoids using the concepts dealing with designata, such as the concept of L–state. In so doing, he avoids metaphysical questions that might be raised by the use of such concepts. In what follows, I shall describe, step by step, his final construction of a general definition of L–truth.

Carnap’s final definition of L–truth is based on the concept of “state–description” and on the “range” of a sentence that is redefined by the means of the

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96 *Ibid.*, 211.
latter concept. First, following the ideas of Gottfried Leibniz and Ludwig Wittgenstein, Carnap introduces the concept of state–description as follows:

A class of sentences in $S_i$ which contains for every atomic sentence either this sentence or its negation, but not both, and no other sentences, is called a **state–description** in $S_i$, because it obviously gives a complete description of a possible state of the universe of individuals with respect to all properties and relations expressed by predicates of the system. Thus the state–descriptions represent Leibniz’ possible worlds or Wittgenstein’s possible states of affairs.\(^{97}\)

As we see, this definition of state–description is basically the same as the one Carnap introduced in *Introduction to Semantics*.\(^ {98}\) In this newer definition, $S_i$ stands for a system whose atomic sentences are logically independent.\(^ {99}\) A state–description, as defined here, is a collection of sentences and, hence, is linguistic in nature, while a possible world or possible state of affairs is extra–linguistic. Thus, when Carnap says that a state–description represents Leibniz’s possible world or Wittgenstein’s possible state of affairs, I assume he merely means that a state–description designates Leibniz’s possible world or Wittgenstein’s possible state of affairs. In fact, Carnap’s word for “possible world” or “possible state of affairs” is “L–state,” which was introduced in the last section. However, in *Meaning and Necessity*, Carnap does not deal with the L–state concept.

In the second step, Carnap defines the concept of the range of a sentence as follows:

The class of all those state–descriptions in which a given sentence $C_i$ holds is called the **range** of $C_i$.\(^ {100}\)

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\(^ {98}\) See page 88.

\(^ {99}\) The same objection of Quine’s mentioned in footnote 60 is effective here too.

\(^ {100}\) Carnap, *Meaning and Necessity*, 9.
This definition is based on the concept of state-description, which is a linguistic concept and represents sentences. Carnap’s previous definition of range (introduced in the earlier section) was based on the concept of L-state that represents propositions, which are possible states of affairs and extra-linguistic objects. In contradistinction to his previous approach, however, Carnap now constructs the definition of the concept of the range of a sentence so that it contains no reference to extra-linguistic objects. He suggests that it is possible to lay down the semantical rules that determine whether any given sentence holds in any particular state-description—that is, whether the sentence would be true if the state-description were true—and thereby establish the range of the sentence. The semantical rules that give the ranges of the sentences of a semantical system $S$ are called the rules of ranges.

Contrary to his previous work, Carnap does not use an L-term here for the concept of range. This change is due, perhaps, to the fact that in *Meaning and Necessity*, Carnap considers the rules of ranges as a part of the primary rules of the semantical systems alongside those of formation, designation, and truth.101 The rules of ranges are not introduced here by other semantical rules, but are conventionally laid down at the beginning of the construction of the semantical system, while L-concepts are introduced as those that are defined by the semantical rules of a system in latter stages of constructing the system.102 Here, therefore, the concept of the range of a sentence should not be regarded as an L-concept.

Carnap explains the connections between the concepts of state-description, range, and truth as follows:

102 See the earlier section “L-concepts and the Explication of Analyticity,” 83–97.
There is one and only one state–description which describes the actual states of universe; it is that which contains all true atomic sentences and the negations of those which are false. Hence it contains only true sentences; therefore, we call it the true state–description. A sentence of any form is true if and only if it holds in the true state–description.\textsuperscript{103}

There are numerous state–descriptions for each semantical system $S$ that form the class of the possible state–descriptions for the system. Among the members of that class, there can be only one state–description that represents the actual state of affairs. This state–description is the true one (that is, all of its sentences are true). However, a true sentence is a sentence that holds in the true state–description; a true sentence is a sentence whose range includes the true state–description.

Based on those definitions and considerations, Carnap bases the definition of indexed L–truth in general semantics upon the concept of state–description. As mentioned earlier, he proposes L–truth as the explicatum for the customary concept of logical or necessary or analytic truth. He explains that “[t]his explicandum has sometimes been characterized as truth based on purely logical reasons, on meaning alone, independent of the contingency of facts.”\textsuperscript{104} Inspired by Leibniz’s suggestion that a necessary truth holds in all possible worlds, Carnap introduces the definition of L–truth in a particular language, which I have reformulated as follows:

A sentence $C_i$ is $\textbf{L–true}$ in semantical system $S$ if and only if $C_i$ holds in every state–description in $S$.\textsuperscript{105}

Consequently, the range of an L–true sentence in semantical system $S$ is the same as the class of all possible state–descriptions, or the universal state–description, in $S$.

\textsuperscript{103} Carnap, \textit{Meaning and Necessity}, 10.
\textsuperscript{104} Ibid.
\textsuperscript{105} Ibid.
Whatever the true state–description of system $S$ is, it belongs to the universal state–description of the system and, hence, to the range of the $L$–true sentence in $S$. Therefore, an $L$–true sentence in system $S$ is true no matter which state–description of the system is the true one. This definition of $L$–truth in semantical system $S$ fulfills the condition of adequacy of the explication of analytic truth mentioned in the previous section: The semantical rules of system $S$ alone suffice to determine both the range of each sentence in system $S$ and the class of all possible state–descriptions of the system and, consequently, to show whether that range and class are the same. Thus, for $L$–truth in system $S$ as now defined, the semantical rules of $S$ alone determine whether a given sentence in $S$ is $L$–true, regardless of the matters of fact. Moreover, in this definition of $L$–truth in $S$, no reference to designata or propositions is made. It is a purely linguistic definition, with no reference to extra–linguistic objects, and, hence, does not raise any metaphysical questions with respect to $L$–truth in $S$.

Carnap similarly defines the concept of $L$–false in a particular language as the explicatum for the customary concept of logically or necessarily false (or self–contradictory):

A sentence $C_i$ is **$L$–false** in semantical system $S$ if and only if $C_i$ does not hold in any state–description in $S$.\(^{106}\)

In other words, an $L$–false sentence in semantical system $S$ is the one whose range includes no state–description in $S$; its range is the null range in $S$. Based on this definition, whatever the true state–description in system $S$ is, it does not belong to the range of an $L$–false sentence in $S$. Therefore, an $L$–false sentence in system $S$ is

always false, regardless of the matters of fact. Again, this definition is an adequate
definition, because by the semantical rules of the system alone, we can determine
whether the range of any given sentence in system $S$ is the null range.

Carnap also introduces the concept of factual sentence as an explicatum for
the concept of “contingent truth,” or what Kant calls a “synthetic truth.” Carnap’s
definition is as follows:

A sentence is factual if and only if there is at least one state–description in
which it holds and at least one in which it does not hold.\textsuperscript{107}

This definition accords with the customary concept of synthetic sentence because it
distinguishes clearly between factual sentences and L–true or L–false sentences in
semantical system $S$. Because there is at least one state–description in system $S$ in
which a factual sentence does not obtain, the sentence is not L–true in $S$; and
because there is at least one state–description in the system in which the factual
sentence obtains, it is not L–false in $S$. Furthermore, the truth conditions of a
factual sentence in system $S$ make reference to a state of affairs that may or may not
obtain. To elaborate further, the semantical rules of $S$ do not tell us whether a
factual sentence in $S$ is true or false, but merely state sufficient and necessary
conditions for its truth by determining what facts are relevant to the factual
sentence. The designation rules of the language determine what extra–linguistic
objects and relations are the designata of the signs and expressions of the sentence
and, thus, introduce the factual situations the sentence asserts to obtain. This is all
that we can learn from the semantical rules of a language about the truth–values of
its factual sentences. To determine actual truth–values of such sentences of the

\textsuperscript{107} Ibid., 12.
language, we must examine the relevant facts. By observation, we might determine whether the factual situation asserted by a factual sentence in a language actually obtains or fails to obtain. If the situation obtains, then the factual sentence in the language is true; otherwise, it is false.¹⁰⁸

The Explication of Interchangeability and Synonymy

Willard Van Orman Quine’s criticism of the concept of analyticity, in “Two Dogmas of Empiricism,” relates analyticity to the concepts of “synonymy” and “interchangeability salva veritate” and suggests that the definitions of the two concepts are intertwined. Therefore, I need here to look at Carnap’s explications of interchangeability and synonymy in Meaning and Necessity. In the next chapter, I shall examine how these explications accord with Quine’s conceptions of synonymy and interchangeability salva veritate.

Carnap bases his explications of interchangeability and synonymy on the concepts of equivalence, L–equivalence, extension, and intension. To examine Carnap’s semantical definitions of interchangeability and synonymy, I need first to briefly examine his definitions of these four concepts.

Carnap defines the concept of equivalence for different language expressions. For sentences, his definition is as follows:

**Two sentences are equivalent** if and only if both have the same truth–value, that is to say, both are true or both are false.¹⁰⁹

Thus, both equivalent sentences either hold in the true state–description or do not hold. This definition, as Carnap points out, merely stands for the relation of

agreement in truth–value between sentences, which is also called “material equivalence.” In ordinary language, equivalence refers to the agreement in meaning of sentences, which is much stronger than accidental agreement in truth–value. The relation of the agreement in meaning between sentences is called “logical equivalence,” for the explication of which Carnap introduces the explicatum of $L$–equivalence. To avoid technical details that are not of my concern here, I have paraphrased his definition as follows:

Two sentences are L–equivalent if and only if they both hold in the same state–descriptions.110

According to this definition, it cannot be the case that one of two L–equivalent sentences is true and the other is false; this impossibility distinguishes L–equivalent sentences from equivalent ones. For example, the two sentences “x is a human being” and “x is a featherless biped” are equivalent, but not L–equivalent, because only in the course of experience do we discover that a human being is always a featherless biped, and vice versa. In other words, observations show that both sentences hold in the true state–description; nonetheless, we can assume possible state–descriptions in which a human being is not a featherless biped. However, the two sentences “x is a human being” and “x is a rational animal” are L–equivalent, because in whatever state–description in which one of the sentences holds, the other sentence is also supposed to hold; there cannot be such a state–description in which just one of those sentences holds. Whether any given pairs of sentences are L–equivalent can be determined by means of the semantical rules alone, regardless of facts.

110 See ibid., 11.
Carnap defines the concepts of equivalence and L–equivalence for other sorts of linguistic expressions based on his definition of these concepts for sentences.\textsuperscript{111} I have reformulated his definitions, in less technical terms, as follows:

**Two expressions in semantic system \( S \) are equivalent** if and only if any two atomic sentences in \( S \), which are alike except that one contains one of the expressions and the other contains the second expression, are likewise equivalent.

**Two expressions in semantic system \( S \) are L–equivalent** if and only if any two sentences (of any form) in \( S \), which are alike except that one contains one of the expressions and the other contains the second expression, are likewise L–equivalent.

If we apply these definitions to predicators (predicate expressions), we can see that two predicators are equivalent or L–equivalent if and only if they both hold for the same individuals.\textsuperscript{112} In this regard, however, there is a significant difference between the cases of equivalent and L–equivalent predicators: in the previous examples, the predicators “human being” and “featherless biped” hold for the same individuals, and “human being” and “rational animal” are also true for the same objects. Nonetheless, the predicators in the first pair are equivalent, but not L–equivalent, because to determine whether they hold for the same individuals, we need to examine matters of fact. The predicators in the second pair, however, are L–equivalent, because their equivalency can be established merely by using the semantical rules, without referring to matters of fact. The predicators in the second

\textsuperscript{111} \textit{Ibid.}, 16.
\textsuperscript{112} \textit{Ibid.}, 14.
pair are understood as identical in the language to which they belong—which, here, is the English language.\textsuperscript{113}

Similarly, the application of the earlier general definitions to individual expressions demonstrates that “[i]ndividual expressions are equivalent if and only if they are expressions for the same individuals.”\textsuperscript{114} Thus, for example, “the author of \textit{Waverley}” and “Sir Walter Scott” are equivalent individual expressions; nonetheless, they are not L–equivalent, because the fact that they denote the same individual is an empirical fact. But, “Iran” and “Persia” are L–equivalent individual expressions, because they both denote the same individual, and this fact can be established merely by referring to designation rules of the language—the English language—without any empirical investigation.

The other main concepts in Carnap’s discussion of synonymy are the concepts of extension and intension. While he defines these concepts for different semantical expressions, he begins his discussion of extension and intension by explaining how the concepts apply to predicators. He suggests that by a predicator in a language, we mean both a \textit{property} and a \textit{class of entities} that have that property. For example, the predicator “human” refers to the property of being human as well as to the class of human beings. If we consider the classes and properties of two predicators “human” and “featherless biped,” we see that the class of humans and the class of featherless bipeds are the same, while the properties of being human and being a featherless biped are not the same; we apply both predicators to the same entities, but the predicators connote different properties and have different conditions of application. Yet, in the case of the predicators “human” and “rational animal,” both

\textsuperscript{113} \textit{Ibid.}, 14–15.  
\textsuperscript{114} \textit{Ibid.}, 15.
corresponding classes and properties are the same; not only do we apply both predicates to the same entities, but we also ascribe the same meaning to both predicates. These examples suggest that we may regard the classes of two predicates as identical if the predicates are equivalent, and we may also regard the properties of two predicates as identical if they are L-equivalent. In the latter case, we can show by semantical rules alone that the predicates apply to the same objects, while in the first case, we need to examine the matters of fact to determine whether two predicates have the same classes.

Drawing from these remarks on predicates and their properties and classes, Carnap introduces the semantical concepts of extension and intension of a predicate as the explicata for the customary usages of the terms property and class of a predicate, respectively. First, he forms the following conventions with respect to these new concepts:

Two predicates have the same extension if and only if they are equivalent.\(^\text{115}\)

Two predicates have the same intension if and only if they are L-equivalent.\(^\text{116}\)

Then, Carnap defines the concepts of intension and extension for predicates:

The extension of a predicate (of degree one\(^\text{117}\)) is the corresponding class.

The intension of a predicate (of degree one) is the corresponding property.\(^\text{118}\)

It is important to notice that by the property of a predicate, Carnap does not refer to a linguistic expression, but he means something physical, a characteristic that

\(^{115}\) Ibid., 18. The italics are mine.
\(^{116}\) Ibid., 19. The italics are mine.
\(^{117}\) A predicate of degree one attributes a property to one object, whereas a predicate of degree two and higher attributes a relation to two or more objects. See Carnap, Introduction to Semantics, 18.
\(^{118}\) Carnap, Meaning and Necessity, 19. The italics are mine.
things can have then, a property should not be understood to be something abstract and metaphysical. Nonetheless, the relation between a predicator and its property or intension is not something factual that should be discovered by empirical investigation, but something that is conventionally laid down by the rules of designation of the semantical system. Thus, the intension of a predicator is determined by the semantical rules alone, but to determine the extension of a predicator, we need to examine matters of fact.

Carnap then extends his definitions of extension and intension to all kinds of expressions. First, he introduces two general conventions that are rephrased as follows:

Two expressions have the same extension if and only if they are equivalent.

Two expressions have the same intension if and only if they are L-equivalent.

Carnap then defines the following entities as the extensions and intensions of sentences and individual expressions:

The extension of a sentence is its truth–value.

The intension of a sentence is the proposition expressed by it.

The extension of an individual expression is the individual to which it refers.

The intension of an individual expression is the individual concept expressed by it.

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119 Ibid., 20.
120 For Carnap’s broader views about so-called abstract entities, see Carnap, “Empiricism, Semantics, and Ontology,” in Meaning and Necessity (Chicago: University of Chicago Press, 1956), 205–21.
121 See Carnap, Meaning and Necessity, 23.
122 Ibid., 26. The italics are mine.
123 Ibid., 27. The italics are mine.
124 Ibid., 40. The italics are mine.
125 Ibid., 41. The italics are mine.
With respect to these definitions, we should note the following points. First, although it may look odd to call the true or the false the extension of a sentence—because, contrary to the case of a class as the extension of a predicator, there is nothing *extended* with respect to a truth–value—Carnap says that the truth–value is the only thing that all equivalent sentences have in common. Thus, truth–value is the most natural choice for the extension of a sentence based on the just mentioned convention.\textsuperscript{126} Next, by saying that a proposition is the intension of a sentence, Carnap does not refer to a linguistic expression, nor does he refer to a subjective, mental occurrence, but he does refer to something objective and physical that may or may not be demonstrated in nature.\textsuperscript{127} We discussed earlier how the assumption of propositions for sentences faces various difficulties and how this assumption may give raise to metaphysical questions.\textsuperscript{128} Third, by an individual concept, Carnap means what in the customary usage is vaguely called the meaning of an individual expression. By individual concept Carnap does not mean something objective, but merely a linguistic entity.\textsuperscript{129} Finally, the intensions of all types of expressions (sentences, predicators, and individual expressions) can be determined by the rules of semantics alone.

Subsequently, Carnap introduces the concepts of interchangeability and L–interchangeability. He explains that we may replace a subexpression E that occurs within the sentence C with another subexpression E´ and, thus, may construct C´ out of C. If the extension (or the truth–value) of C´ remains the same as that of C, then

\textsuperscript{126} See *ibid.*, 26.
\textsuperscript{127} *Ibid.*, 27. Carnap’s point of view on propositions is discussed in detail earlier in this chapter. See the section “What Are Propositions?”, 97–104.
\textsuperscript{128} See the section “What Are Propositions” in this chapter.
\textsuperscript{129} Carnap, *Meaning and Necessity*, 41.
Carnap calls the expressions E and E’ *interchangeable* expressions within the sentence C; and, moreover, if the intensions (or the propositions) of C’ and C are the same, he calls the two expressions E and E’ *L–interchangeable* expressions within the sentence C. But, instead of using the concepts “intension” and “extension” in his definitions of interchangeability and L–interchangeability, Carnap makes use of the concepts “equivalency” and “L–equivalency.” I have simplified his definitions as follows:

An occurrence of an expression E within a sentence C is (a) *interchangeable*, (b) *L–interchangeable* with another expression E’ in a semantical system S if and only if the sentence C is (a) equivalent, (b) L–equivalent to the sentence C’ constructed out of C by replacing the occurrence of E by E’.

Two expressions are (a) *interchangeable*, (b) *L–interchangeable* in a semantical system S if and only if any occurrence of one of them within any sentence of S is (a) interchangeable, (b) L–interchangeable with the other expression.\(^{130}\)

Nevertheless, the two definitions do not determine what types of expressions in a semantical system S are interchangeable or L–interchangeable, and under exactly what conditions; as such, they are not sufficient definitions. Thus, Carnap supplements those definitions with the following explanations.

Carnap calls a semantical system S *extensional* if the system has the following characteristic: if any subexpression occurring within any of the sentences of S is replaced with an expression with the same extension, the extension of the resultant

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\(^{130}\) See *ibid.*, 46–47.
sentence remains the same as that of the original sentence.\textsuperscript{131} From this characteristic and from the definitions of interchangeability, we may conclude that two expressions are (a) interchangeable, (b) \( L \)-interchangeable in an extensional semantical system \( S \) if (a) the extensions, (b) the intensions of the expressions are the same.\textsuperscript{132} By adding these conclusions to the definitions of equivalent and \( L \)-equivalent represented at the beginning of this section, we may achieve the following brief descriptions determining the type of expressions and conditions required for interchangeability in extensional systems:

Equivalent expressions are \textbf{interchangeable} within the sentences of the extensional systems.

\( L \)-equivalent expressions are \textbf{\( L \)-interchangeable} within the sentences of the extensional systems.\textsuperscript{133}

Based on the preliminary introduction of the preceding concepts, Carnap explicates the customary concept of \textit{synonymy} of linguistic expressions for all sorts (individual expressions, predicators, and sentences). For this concept, he introduces the explicatum \textit{intensionally isomorphic}, or \textit{having the same intensional structure}. Carnap suggests that two expressions of any kind are synonymous if they have the same intensional structure, explaining that if they are “built in the same way out of corresponding designators with the same intension, then we shall say that they have the same intensional structure.”\textsuperscript{134} To explicate the concept of “having the same intensional structure,” Carnap gives the following example:

\begin{itemize}
\item \textsuperscript{131} See \textit{ibid.}, 48.
\item \textsuperscript{132} See \textit{ibid.}, 47–48.
\item \textsuperscript{133} See \textit{ibid.}, 52. Carnap also discusses interchangeability in intensional systems, but this is not related to his attempts to define analyticity and, thus, is beyond the scope of this dissertation.
\item \textsuperscript{134} Carnap, \textit{Meaning and Necessity}, 56.
\end{itemize}
Let us consider, as an example, the expressions ‘2+5’ and ‘II sum V’ in a language $S$. Let us suppose that we see from the semantical rules of $S$ that both ‘+’ and ‘Sum’ are functors for the function Sum and hence are L–equivalent; and, further, that the numerical signs occurring have their ordinary meaning and hence ‘2’ and ‘II’ are L–equivalent to one another, and likewise ‘5’ and ‘V’. Then we shall say that two expressions are intensionally isomorphic or that they have the same intensional structure, because they not only are L–equivalent as a whole, both being L–equivalent to ‘7’, but consist of three parts in such a way that corresponding parts are L–equivalent to one another and hence have the same intension.\textsuperscript{135}

Thus, two expressions “2+5” and “2+4+1” are not intensionally isomorphic (and, thus, they are not synonymous) because, even though they are L–equivalent, the corresponding subparts “5” and “4+1” are not isomorphic. For two expressions to be isomorphic, it is required that “the analysis of both down to the smallest subdesignators lead to analogous results.”\textsuperscript{136}

Carnap suggests that it is possible to compare two expressions that even belong to two different language systems and to determine whether they are intensionally isomorphic. To do this, however, we need first to determine whether the expressions are L–equivalent. Hence, Carnap defines the concept of L–equivalency of two expressions that belong to two different languages:

\[\text{[A]n expression in } S \text{ is L–equivalent to an expression in } S' \text{ if and only if the semantical rules of } S \text{ and } S' \text{ together, without the use of any knowledge about (extra–linguistic) facts, suffice to show that the two expressions have the same extension.}\textsuperscript{137}\]

\textsuperscript{135} Ibid., 56.
\textsuperscript{136} Ibid., 57.
\textsuperscript{137} Ibid.
Since extensions of linguistic expressions are not linguistic entities but objective things, Carnap here finds the opportunity to use them as objective criteria independent of language systems to compare the expressions of different language systems with one another. Thus, two individual expressions or predicators of two different languages are L–equivalent if nothing except the rules of designation of the languages show that the expressions both stand for the same individual or apply to the same individuals. Also, two sentences of two different languages are L–equivalent if nothing but the semantical rules of these two languages show that the sentences have the same truth–values. From here, we can find whether the corresponding signs of two expressions that belong to two different language systems are L–equivalent and, thus, whether the two expressions are intensionally isomorphic and synonymous.

In the next chapter, we shall see how Quine relates the concepts of “interchangeability *salva veritate*” and “synonymy” to the concept of analyticity. I shall examine, then, whether Quine’s criticism of the definition of analyticity, through his criticism of the definitions of synonymy and interchangeability *salva veritate*, can be met by Carnap’s explication of the notion of synonymy.

**Philosophy, the Study of Language, and Analyticity**

In this section, I shall review Carnap’s understandings of philosophy during the different stages of his career to explain the importance of the analytic–synthetic distinction in his philosophy. Moreover, I shall summarize various definitions of analytic truth that he proposes in his different philosophical periods and shall review the limits of each definition.
As we saw in the first chapter, Carnap separates the discussions of traditional philosophy into three parts. The first part contains metaphysical questions, including questions of the way things exist (ontological questions), and questions of values and ethics. Carnap believes that sentences of metaphysics are not confirmable and, as such, are nonsensical; the sentences are pseudo–statements. Thus, he eliminates metaphysics from the realm of philosophy. The second part contains psychological questions, or questions about mental events, sensations, thoughts, and so on. Carnap claims that such issues should be investigated by empirical methods and, as such, the psychological questions belong to the field of empirical science. Thus, psychological questions should be removed from the discussions of philosophy. The last part contains logical studies of language. This part, according to Carnap, is the only part that should be preserved in strictly philosophical discussions.

Carnap believes that most of the problems of traditional philosophy are pseudo–problems that arise because of the ambiguities of language. Such ambiguities also cause misunderstandings in science. By the logical analysis of language, we may clarify its ambiguities and, thereby, eliminate pseudo–problems from philosophy while providing science with an exact language. Thus, Carnap asserts that the essential aim of his philosophy is the application of modern logic to analyze scientific concepts and, consequently, to clarify philosophical problems.\(^{138}\)

By the logical analysis of language, Carnap means the application of logic in the formation of concepts, statements, and inferences within the language of science; by the language of science, he means the language used in discussions of theoretical

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science and in representing scientific results, as well as the language we use in
everyday life—or any language that is used to discuss matters of fact.

When Carnap says that philosophy is merely the logical analysis of language,
he confines philosophy to what is traditionally called the theory of knowledge, or
epistemology. Philosophy, when understood as the logical analysis of language, first
makes no factual assertions and, second, provides us with exact tools to represent
inferential relations between statements. Thus, we can logically evaluate and justify
knowledge claims. For Carnap, this analysis is what in traditional philosophy is
considered to be the task of epistemology.

The use of logic as the exclusive tool for the formation of concepts, statements,
and inferences within the total system of knowledge motivates Carnap to emphasize
the fundamental distinction between logical and non–logical knowledge (that is, the
distinction between analytic and synthetic knowledge). Logical theorems, which are
analytic statements, are provided to serve synthetic statements of knowledge by
clarifying them and making them into exact statements. Conversely, synthetic
statements of knowledge, or scientific statements, present the results of empirical
investigations and represent matters of fact. Thus, analytic statements of logic serve
science by providing the exact scientific language, while synthetic statements of
science serve the pursuit of truth and the investigation of reality.

The analytic–synthetic distinction was always an important one for Carnap.
For him, this distinction represents the difference between philosophy and science. I
believe that Carnap introduces definitions of analyticity in his different
philosophical periods to formulate and establish his idea about the nature of
philosophy as the logic of the language of science. If one rejects the analytic–
synthetic distinction or denies that there is an adequate definition for the notion of analyticity, then one destroys Carnap’s view of the nature and task of philosophy: in the absence of such a distinction, philosophy cannot be regarded any longer as a discipline that does not deal with matters of fact. If one were to deny the analytic–synthetic distinction, one would remove the fundamental difference between philosophical and scientific claims; such a removal might prevent one from drawing boundaries between the subject–matters of philosophy and science.

While Carnap’s general attitude toward philosophy as the logical analysis of language remains the same throughout his philosophical career, his method of logical analysis differs in his various philosophical stages. In his early stage, Carnap construes the method of logical analysis of language as carrying out the idea of reductionism in the form of logically reducing the theoretical concepts of knowledge, which are of a higher level of abstraction, to less abstract concepts and, finally, to the concepts of the given. Carnap followed this idea in preparing the Aufbau, but his project failed, and as a result, he abandoned reductionism.

Next, Carnap interprets the method of logical analysis of language as the formal study of language and as establishing syntactical systems. In this syntax period, Carnap believes that philosophy, as the formal study of language, comprises both pure and descriptive syntax. Statements of pure syntax show the relations among linguistic signs and expressions, whereas descriptive syntax addresses the logical characteristics of a given language under investigation and applies theorems of pure syntax to that language. Thus, pure syntax contains only analytic sentences, while descriptive syntax contains both analytic and synthetic sentences. However, even synthetic sentences of descriptive syntax do not deal with objects, but merely
concern the linguistic entities of the object language. In short, for Carnap in the syntax period, the subject–matter of philosophy is language. A philosophical statement is either analytic or synthetic, but never an object–sentence or a sentence about extra–linguistic entities; philosophy does not talk about reality at all.

In his final stage of philosophy, Carnap still upholds the idea that philosophy is the logic of science, but now understands the logic of science in a much broader way. In the semantics period, Carnap develops the idea that philosophy or the logical analysis of language is the general theory of language, which is called semiotics, and consists of three parts:

[T]he task of philosophy is semiotical analysis; the problems of philosophy concern—not the ultimate nature of being but—the semiotical structure of the language of science, including the theoretical part of everyday language. We may distinguish between those problems which deal with the activities of gaining and communicating knowledge and the problems of logical analysis. Those of the first kind belong to pragmatics, those of the second kind to semantics or syntax—to semantics, if designata ("meaning") are taken into consideration; to syntax, if the analysis is purely formal.139

Thus, Carnap’s final standpoint is that philosophy comprises pragmatics, semantics, and syntax. Pragmatics is the factual, empirical part of philosophy that deals, for instance, with “the activities of perception, observation, comparison, registration, confirmation, etc., as far as these activities lead to or refer to knowledge formulated in language.”140 Pragmatics is mostly discussed in what are usually called “the theory of knowledge” and “the philosophy of science.” Even though pragmatics is the factual part of philosophy, pragmatics does not go beyond linguistic objects; it

139 Carnap, Introduction to Semantics, 250.
140 Ibid., 245.
empirically investigates languages that can be regarded as parts of reality, but, beyond this, it does not deal with matters of fact. Semantics and syntax, on the other hand, are logical parts of philosophy, and their task is the logical analysis of language; problems of semantics and syntax are combined with problems of pragmatics in the theory of knowledge and the philosophy of science. Therefore, Carnap concludes that the sole subject matter of all parts of philosophy is language.

In this chapter and in the previous one, I noted that, in his syntax and semantics periods, Carnap attempts to give different definitions of analytic truth. The general characteristic of analytic sentences for Carnap is as follows: “an analytic sentence is absolutely true whatever the empirical facts may be.”\footnote{Carnap, \textit{The Logical Syntax of Language}, 41.} Consequently, an analytic sentence does not say anything about matters of fact. For him, an analytic sentence is logically true; namely, its truth can be established based on logical rules alone and regardless of matters of fact. He characterizes an analytic sentence in a language as one whose truth can be established by the rules of the language to which the sentence belongs. Therefore, according to Carnap, the concept of analyticity must be understood and defined within each linguistic framework independently from other systems; we should not talk about “analytic truth,” but about “analytic truth in language $S$.” Thus, in Carnap’s discussions, the concept of analyticity is always a language–relative concept, but by this concept he sometimes means “analyticity in a particular language” (or indexed analyticity) and sometimes means “analyticity in language $S$” where $S$ is a variable (or general relative analyticity).

In the syntax period, Carnap considers a language as a linguistic calculus that comprises only a set of symbols (linguistic signs) and conventional rules about the
symbols. The rules of a language system or linguistic calculus consist of formation rules and transformation rules; the first set of rules defines “sentence in the language,” whereas the latter set of rules determines how a set of sentences can be transformed into others. Both formation and transformation rules of a language system are conventional (that is, the rules are laid down arbitrarily). Thus, according to Carnap, by following different conventions, we may establish numerous language systems, each of which is on a par with the others and none of which is the correct one; in effect, a language system is not subject to being correct or wrong. But for every specific purpose, one particular language form may be better suited than another. Yet, we are free to choose the form of the language that we want to use in our discussions. This freedom of choice is what Carnap calls “the principle of tolerance,” or “the principle of conventionality of language forms.”

In the syntax period, Carnap explains that the truth of an analytic sentence in a language can be shown merely by the formation and transformation rules of the language, and that these rules are conventional. Thus, we can conclude that, for Carnap, the truth of an analytic sentence in a language is conventional, in the sense that the sentence is true only because we already made specific agreements regarding the use and specifications of the linguistic signs of the language to which the sentence belongs. If we change the linguistic framework and construe the sentence in terms of another language system—one based on a different set of agreements—the truth of the sentence might be altered, because the rules of the new language system might not imply the truth of the sentence; thus, the same string of characters might be analytic in one language and synthetic in another. As a result the truth of an analytic sentence is language-dependent.
Consequently, in the syntax period, Carnap believes that we must define
analytic truth in each language based on the rules of the language under
investigation; this means that we can only provide language–specific definitions for
analyticity. In other words, we can define indexed notions of analyticity, or “analytic
in a particular language $S$.” Nonetheless, in the syntax period, Carnap believes that,
in principle, we can introduce general syntactical characteristics that are common to
all languages, and based on such general characteristics we can define analyticity for
all languages (that is, we can define the general relative notion of analyticity, or
“analytic in language $S$” where $S$ is a variable). However, we observed that Carnap's
attempts in the syntax period to provide a definition of general relative analyticity
failed.

In the syntax period, Carnap presents syntactical definitions of analyticity in
two different languages. His syntactical definitions of analyticity are based on the
concept of consequence. The general form of Carnap’s syntactical definitions of
analyticity is as follows: if a sentence is the consequence of any sentence
whatsoever, then we call it analytic; if every sentence is the consequence of a
sentence, then we call it contradictory; if a sentence is neither analytic nor
contradictory, then we call it synthetic. The concept of consequence on which this
definition is built is not a clear one and needs to be defined. Carnap cannot define
the concept of consequence generally so that it applies to all languages, and he
claims that such a definition has not been given in logic so far. However, he
introduces the concept of consequence for each particular language: transformation
rules of each language determine which sentences of the language can be inferred
from which other sentences and, as a result, give the definition of consequence
within that particular language. Hence, the general form of syntactical definition of analyticity together with the transformation rules of any language form the syntactical definition of indexed notion of analyticity in that particular language. Therefore, to give the definition of indexed analyticity for any particular language, Carnap needs first to lay down the transformation rules of the language. Yet as Carnap declares himself, the structures of word languages, especially that of natural languages, are so complicated that it is almost impossible to set down their rules in an exact way. Therefore, we cannot expect to have exact syntactical definitions of analyticity for word languages. However, the syntactical definitions of indexed analyticity are exact enough for symbolic languages, because the structures of symbolic languages are so much simpler that we can formulate their rules exactly.

Carnap attempts to provide a syntactical definition of general relative analyticity (or “analytic in $S$” where $S$ is a variable) by making a distinction between descriptive and logical terms. But I explained that, because he is not able to introduce that distinction in general syntax, his definition of general relative analyticity fails. However, in his semantics period, Carnap does not pursue a definition of general relative analyticity, but he aims only to provide language–specific definitions of analyticity, or definitions of indexed analyticity.

In the semantics period, Carnap says that definitions of concepts introduced in his philosophy are meant as *explications* for concepts used in traditional philosophy or in everyday language. By the explication of a concept, he means the introduction of a new exact concept (explicatum) to replace an unclear concept (explicandum) in the scientific language. He asserts that an explicatum and an explicandum need not be exactly the same. It is sufficient that the latter unclear concept can be replaced by
the former clear one in scientific discussions. That is to say, the explicandum and the explicatum must be sufficiently similar in their meaning so that the second term fulfills the scientifically important uses as the first term. Moreover, the explicatum must be formulated in a precise way so that we may use it in our discussions without any ambiguity. Accordingly, Carnap’s semantical definitions of analyticity should not be considered as definitions of the concept(s) of analyticity in the sense traditionally used in philosophy, but as explications of the concept(s). This means that we should not expect Carnap’s definitions of analyticity necessarily to fulfill all features ascribed to traditional concept(s) of analyticity; Carnap’s notion of analyticity is not a synonym for the concept(s) of analyticity used in traditional philosophy. Rather, the precisely formulated concept of analyticity, as proposed by Carnap, is supposed to fulfill all the features of the customary, but hitherto unclear, concept of analyticity needed in the discussions of the logic of science.

Since Carnap’s semantical notion of analyticity—or L–truth—is proposed to explicate the customary notion of analytic truth in philosophy, the intentions behind the two notions must be compatible. To assure this compatibility, Carnap first introduces a general characteristic for semantical definitions of analyticity, which can be summarized as follows: a sentence is L–true in a language if and only if its truth can be established by the semantical rules of the language alone, without any reference to facts.\textsuperscript{142} In other words, any sufficient definition of L–truth in a language gives a merely linguistic criterion for determining whether any given sentence of the language is an L–truth. Carnap introduces three different kinds of

\textsuperscript{142} Carnap, \textit{Meaning and Necessity}, 10.
semantical definitions of indexed analyticity, all of which accord with this general characteristic.

In the semantics period, Carnap still believes that logical concepts and expressions are language–specific and, as such, should be understood within their corresponding frameworks. However, as I explained in this chapter, the designation relation allows Carnap to compare expressions from different semantical systems. The designata of expressions play the role of independent criteria that stay out of linguistic frameworks and, as such, allow him to compare their corresponding expressions in different languages. The designation relation also enables Carnap to single out those characteristics of semantical concepts that are common to all semantical systems and, thereby, to define semantical concepts in general semantics. Because of this feature in semantics, Carnap succeeds in establishing a semantical definition of truth in a general way, something he was not able to do using syntax alone.

In semantics, Carnap defines the truth of a sentence in general based on the designation relation between the sentence and its designatum or proposition (that is, the possible state of affairs expressed by the sentence) as follows: C is true if and only if it designates \( p \) and \( \neg p \).

But when it comes to the semantical definition of analytic truth, the designation relation between the sentence and the matters of fact cannot be used, because analytic truth has no designatum, and is supposed to be defined without any reference to matters of fact. As a result, with respect to analytic truth, there is no extra–linguistic criterion independent of languages that can be used to define analytic truth in general or “analytic in \( S \)” where \( S \) is a variable.

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Therefore, in semantics Carnap uses language–specific notions to define analyticity and, hence, is able to provide only the definitions of indexed analyticity, not the general relative analyticity.

Carnap’s first semantical definition of analyticity is that a sentence is L–true in S if and only if its L–range is the universal L–range in S, and a sentence is L–false in S if and only if its L–range is the null L–range in S.144 This definition of L–truth is taken from the Leibniz definition: that a sentence is analytic if and only if it is true in all possible states of affairs, and a sentence is contradictory if and only if it is false in all possible states of affairs. Under this definition of L–truth in S, the term “L–range of a sentence” means the class of all states of affairs that the sentence may admit as its propositions. Carnap believes that this class can be determined by semantical rules of the language alone, with no need to investigate the matters of fact. Given this definition, we may decide whether a sentence is analytic merely by referring to the rules of the language. Consequently, this definition accords with the general characteristic explained earlier. Nonetheless, Carnap’s definition still makes use of the designation relation by using the concept of L–range, which is the class of propositions (designata) of a sentence. The importance of this point shall be clarified shortly.

Following Kant’s definition of analytic truth based on the meaning or the content of sentences, Carnap introduces his second semantical definition of analyticity as follows: a sentence is L–true in S if and only if its L–content is the null L–range in S, and a sentence is L–false in S if and only if its L–content is the

144 Ibid., 137–38.
universal L–range in $S$.\textsuperscript{145} Here he defines the L–content of a sentence in $S$ to be the class of those L–states that do not belong to the L–range of the sentence, or as the class of those L–states in which the sentence is not true; and he defines an L–state in $S$ as a possible universal state of affairs with respect to all objects and properties that the system $S$ deals with. Carnap’s second semantical definition of analyticity implies that an analytic sentence has no factual content and that a contradictory sentence has the most comprehensive content possible in the language system. Consequently, we can infer from this second definition that an analytic sentence is true in all states of affairs, because there is no possible fact that refutes a sentence that claims nothing, and further that a contradictory sentence is false in all states of affairs, because in every state of affairs we can find at least one fact that refutes the claims of the sentence that says everything, including the denial of that fact. Thus, we can see that Carnap’s first and second semantical definitions of analyticity are the same.

Both definitions are adequate semantical definitions of analyticity, in the sense that the definitions provide for analytic truth simply by using the rules of the language, with no reference to matters of fact. However, to establish analytic truth, the definitions both refer to extra–linguistic objects through using the concept of L–range, which stands for a collection of propositions. Carnap defines a proposition as something objective (a condition, a possible state of affairs, and so forth) that a sentence designates. But the nature of propositions is obscure, especially when it comes to the propositions of false sentences. I explained that this obscurity may open the door to metaphysical questions about the nature of propositions (as

\textsuperscript{145} Ibid., 151.
Russell assumed propositions to be mental, abstract entities). To avoid such metaphysical questions, Carnap tried to explain the nature of propositions without appealing to metaphysical abstract entities, but his attempt was unsuccessful. As a result, he introduced his final semantical definition of analyticity without making use of such extra-linguistic objects.

Carnap introduces his third and final semantical definition of analyticity in his most mature semantical work, *Meaning and Necessity*. Carnap’s third definition is a totally linguistic definition that avoids using designata of linguistic expressions, such as L-range and L-state. The simplified form of Carnap’s third semantical definition of L-truth is as follows: a sentence is L-true in S if and only if it holds in every state-description in S, and a sentence is L-false in S if and only if it does not hold in any state-description in S.\(^{146}\) Under this definition, the term “state-description” stands for a class of all atomic sentences of the language S that are consistent with one another. Therefore the term “state-description” is a complete description of a possible state of the universe of individuals with respect to all properties and relations that have expressions in the language S. In other words, a state-description is an expression that designates what Leibniz called a possible world. Contrary to L-state, a state-description is a linguistic entity, and no metaphysical assumption is needed to explain it. Thus, contrary to his previous semantical definitions of L-truth, the definition of L-truth based on state-description is purely linguistic and avoids metaphysical problems. Carnap’s final definition of L-truth also fulfills the adequacy condition of explicatum of analytic

truth in the sense that the definition gives the truth of sentences without referring to matters of fact.

In summary, after the failure of the Aufbau, Carnap pursued the idea that philosophy is merely the formal study of language or the logical syntax of language. In this period, he introduced definitions of indexed analyticity, and also tried to define general relative analyticity in general syntax in which he made no reference to the meanings of sentences. I examined those definitions in Chapter Two. Later, under Tarski’s influence, Carnap concluded that the truth of a sentence in general must be defined in relation to its meaning, and in particular, the analytic–synthetic distinction must be made primarily in semantics. Therefore, in the final stage of his philosophical career, Carnap concluded that philosophy not only includes logical syntax, but also encompasses semantics. In this stage of his philosophy, which is called the semantics period, Carnap introduced three different semantical definitions of indexed analyticity that I explained in this chapter.

According to Carnap, one of the main tasks of logical analysis in philosophy is to explicate the ambiguous concepts used in traditional philosophy and in science. By an explication of an ambiguous concept, he means an exact logical concept that, though not synonymous to the ambiguous concept, can take its place in scientific discourse. Because an explicatum must fulfill the same uses as the explicandum, the explicatum must be defined so that it is consistent with the intended use of the explicandum in traditional philosophy. The explicatum must also be formulated in a precise way (that is, its application in scientific discussions must be precisely determined). Carnap says that his discussion of logical truth in the logical analysis of language is an explication for the traditional concept of analytic truth in
philosophy. Based on what we discussed about the condition of an adequate explanation, logical truth, to be an adequate explicatum, must be defined in a way that is in accordance with the use of the notion of analytic truth in traditional philosophy: Logical truth must be defined based only on language, without referring to matters of fact. All syntactical and semantical definitions that Carnap provides fulfill this condition.

For Carnap, an analytic truth is language–specific because it is grounded on the rules of the language in which it is formulated. Because every language has its specific set of rules, a sentence that is a logical truth in one particular language may not be logically true one in other languages. Logical truth in each language, then, must be defined specific to that language and based on the rules of that same language. Analytic truth in general, and in the sense of being true in all languages, does not make sense for Carnap. For Carnap, languages with different sets of rules, as long as their rules are consistent in themselves, are all on a par. No single language is the correct or true one, though for each specific purpose a particular language may be best suited. This is what Carnap calls his principle of tolerance, under which all logical truths in different languages are equally true and valid—even those truths from different languages that appear to be inconsistent with one another—as long as they are considered within their own frameworks or languages.

Although logical truth must be defined specifically for each language, it is possible to formulate a common form of definition of indexed logical truth in general syntax or general semantics that is applicable to all languages, but concept–signs in this common form are variables for language–specific concepts. When we apply the definition to a particular language, we must substitute the concepts of the
language for the variables. As we observed in the previous two chapters, in his syntax and semantic periods, Carnap formulated a number of common forms of definitions of indexed logical truth. In the next two chapters, I shall present Quine’s criticisms of the notion of analyticity. I will examine how far his criticisms address Carnap’s definitions and, moreover, examine whether Carnap can meet Quine’s criticisms.
Chapter Four
Quine and Carnap on Essential Predication

There are two different approaches toward the debate over analyticity between Rudolf Carnap and Willard Van Orman Quine. Some readers interpret Quine’s arguments against the definitions of analyticity from a Carnapian point of view.¹ Such a reading argues that Quine accepts Carnap’s principle of tolerance and the possibility of different logics or frameworks, and then, within Carnap’s framework, criticizes the definitions and the use of the notion of analyticity presented by Carnap. It seems to me that, on some occasions, Carnap’s own replies to Quine agree with this interpretation; Carnap sees Quine as criticizing him from a Carnapian point of view and replies to Quine’s arguments based on Carnap’s own philosophical presumptions. Recent literature shows² that based on such interpretation, almost all of Quine’s arguments against Carnap’s definitions of analyticity can be met. Having considered Quine’s philosophy overall, however, I believe that the conception that Quine objects to Carnap from within Carnap’s philosophy is wrong. But Quine does not clearly state his position concerning the

principle of tolerance, making his way of arguing confusing in a number of places and perhaps even encouraging such misinterpretation of his arguments.

Conversely, Quine’s defenders interpret his arguments in a quite different way, to which I am more sympathetic. They consider Quine to be taking a standpoint outside of Carnap’s philosophy. They believe that, even before arguing against the definitions of analyticity, Quine has already decided that there are no such things as different frameworks. His defenders argue that Quine’s contributions to the debate should be considered instead from a Quinian standpoint, within which there is no place for the principle of tolerance, and consequently, there is only one true logic or framework. Thus, we cannot define analyticity in different ways for different frameworks.

If we accept that Quine objects to Carnap’s definitions of analyticity from a standpoint outside of Carnap’s philosophy, then I believe that there remains no place in Quine’s philosophy for the required terminology—a concept of analyticity that he shares with Carnap—for discussing Carnap’s definitions of analyticity. Prior to his arguments against the definitions of analyticity, Quine rejected Carnap’s concept of analyticity (language–relative analyticity). As a result, there appears to be no place within Quine’s philosophy for any argument against the technical aspects of Carnap’s definitions of analyticity. Rather, this shifts the debate to the debate about the intelligibility of talk of different frameworks or one logic. This point, however, requires more explanation.

I believe that the analyticity for which Quine claims that no sufficient definition yet exists is different from analyticity in the Carnapian sense. When

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3 Most notably are Peter Hylton’s works, especially “Analyticity and the Indeterminacy of Translation,” Synthese 52 (1982): 167–84; and Quine (New York: Routledge, 2007).
Quine objects to definitions of analyticity, he demands a definition of the general relative analyticity which is applicable to all languages, because he believes that defining a notion of analyticity is plausible only if the notion is applicable to explain differences between the statements of knowledge. Quine is out for a general theory of knowledge, and he starts with the picture of science as a logically related set of sentences that is somehow tied to experience, and then he tries to find a way within that web to separate analytic from synthetic in a way that actually explains something about how we come to hold sentences true. Carnap, conversely, talks about a notion of analyticity that is language–specific and needs to be defined within each language framework. This notion of analyticity is the indexed notion of analyticity which is specific to Carnap’s philosophy. Of course, Carnap’s specific concept of analyticity is similar to the ones that Quine considers in his criticisms, the ones by which Carnap is even inspired. But Carnap’s notion differs from those considered by Quine in at least one crucial respect: Carnap’s new notion is language–specific and must be defined only within a framework and based on the rules of the framework that are conventional. The notions with which Quine's arguments are concerned lack this key feature of language–specificity. In short, what Quine means by analyticity is quite different from what Carnap means by the same term; Carnap defends one notion and Quine rejects another notion, although they both use the same term for their different notions.

Consequently, I can see no genuine disagreement between Carnap and Quine over the technical definitions of analyticity; their debate, rather, concerns the reason or the motive for Carnap’s search for such definitions. To pursue his

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4 For the differences between general analyticity, general relative analyticity, and indexed analyticity, refer to Chapter Two, pp. 49-50.
program in logical analysis of science, Carnap introduces a new concept of analyticity (indexed analyticity) and then gives definitions for that concept. Quine shows that the traditional notion of analyticity has no sufficient definitions and, furthermore, challenges Carnap’s reason for introducing his new concept of analyticity claiming that the reason is not satisfactory. Quine does not clearly separate these two different courses of arguments. This ambiguity has caused huge misunderstandings to the point that it is commonly believed that Quine has rejected Carnap’s technical definitions of indexed analyticity, while as I will show, Quine’s criticisms of the definitions of analyticity do not concern Carnap’s definitions. As far as I can see, the Carnap–Quine disagreement over analyticity is basically a result of their disagreement over their alternative views of the nature and the task of philosophy. Their debate should be transformed into a debate over the boundaries of empiricism that demarcates the philosophy of Carnap from that of Quine, a point that I believe has been overlooked in discussions of the debate. I shall discuss this more in the concluding chapter of this dissertation.

In this chapter and the next one, I will assess Quine’s arguments against analyticity from the Carnapian point of view. In so doing, I shall emphasize a crucial notion of Carnap’s, the notion of “explication,” which most of the contributors to the debate have overlooked. By emphasizing explication, I will demonstrate how Carnap’s concept of analyticity differs from that of Quine.

In “Two Dogmas of Empiricism” (hereafter “Two Dogmas”), Quine claims that none of the definitions presented so far for analyticity is sufficient. Quine’s arguments against the definitions of analyticity should be divided into two parts. The first part, as presented in “Two Dogmas,” is related to the definition of essential
predication;\textsuperscript{5} the second part, dealt with in “Carnap and Logical Truth,” is concerned with the definition of logical truth. In this chapter, I shall examine, from Carnap’s point of view, Quine’s criticisms of the definitions of analyticity in terms of essential predication; in the following chapter, I will turn my attention to Quine’s criticism of the definition of logical truth.

To assess the debate over analyticity from Carnap’s point of view, we need to be familiar with Carnap’s philosophical system and his notion of analyticity. In the last chapters, I illustrated Carnap’s philosophical framework and how he sees the concept of analyticity. I explained most of his key philosophical notions, because a good understanding of those key notions is crucial to my discussion in this and the following chapters. As a result, whenever I refer to an aspect or a notion in Carnap’s philosophy, I will not need each time to explain the issue in detail, but I will instead refer to previous chapters for detailed discussions on certain subjects as needed.

**Analyticity and the Problem of Synonymy**

In “Two Dogmas,” Quine examines the principal definitions that have been presented so far for analyticity and tries to show how all of these definitions are insufficient. The notion of analyticity that Quine has in mind when he argues against the definitions of the analytic is, in effect, the notion of analyticity that has been discussed traditionally in the context of empiricism. This fact can be seen from the way that he starts his discussion in “Two Dogmas.” He begins his survey with definitions of analyticity from Gottfried Leibniz and Immanuel Kant and then

\textsuperscript{5} Following Aristotle, Quine calls “essential predication” what he already called “the second class of analytic truth” in “Two Dogmas”; see Quine, “Carnap and Logical Truth,” in *The Ways of Paradox and Other Essays* (Cambridge, MA: Harvard University Press, 1976), §IX.
continues to include Carnap’s definitions as well. But he never mentions that Carnap’s concept of analyticity differs from the concepts discussed in traditional philosophy.

Quine notes that Leibniz calls a certain sort of truth a “truth of reason” and claims that this truth of reason is true in all possible worlds; it could not possibly be false. In other words, a truth of reason is a sentence, the denial of which is self-contradictory. But as Quine adds, “self-contradictory” is a term as much in need of clarification as “truth of reason.” To explain the term “self-contradictory,” we apparently can say only that it is a sentence, the denial of which is a truth of reason. Thus, to explain “self-contradictory,” one needs to appeal to the notion of “truth of reason,” and vice versa. In other words, the two notions are interdependent and neither can be used to define the other. Therefore, Leibniz’s definition of “truth of reason” does not help to clarify this term. Quine’s objection to Leibniz’s definition of “truth of reason” is compelling, but, for the moment, Quine’s objection does not affect Carnap’s definitions of analyticity. In previous chapters, we saw that the importance of Leibniz’s notion of analyticity to Carnap’s philosophy lies in its role as the source of inspiration for Carnap’s own concept of analyticity, but the Leibniz notion of analyticity is not the same as the notion that Carnap discusses in his works.6

Quine maintains that Kant calls “analytic” the same type of truth that Leibniz refers to as truth of reason. According to Kant, what an analytic statement attributes to its subject is already contained in the concept of that subject. Quine next restates Kant’s definition as follows: “a statement is analytic when it is true by virtue of

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6 See Chapter Three, the section “State–Description and Analyticity,” 104–110.
meaning and independently of fact.”  

This definition is based on the concept of meaning. To clarify the concept of “meaning,” Quine reminds us of the distinction that Gottlob Frege made between the meaning (or the intension) of a term and its reference (or its extension). Based on this distinction, the meaning of a term has nothing to do with its reference or any extra-linguistic entity. We do not thus consider two linguistic forms that are true of the same entities to have the same meaning; we do not say, for example, that “Rudolf Carnap” and “the author of the Aufbau” have the same meaning. We take two expressions to have the same meaning (to be synonymous), if they have the same intension. But what exactly does it mean for two expressions to have the same intension? And what exactly does synonymy of linguistic forms mean? Those queries fall under what I call “the problem of synonymy.” When “analytic” is defined as “true by virtue of meaning,” the problem of the definition of analyticity becomes connected to the problem of the explanation of the relation of the synonymy of linguistic forms. To solve the problem of analyticity, Quine maintains that we first need to solve the problem of synonymy. I shall scrutinize the problem of synonymy later.

To elaborate on how Quine sees the problem of analyticity as connected to the problem of synonymy, we need to consider how he categorizes the different kinds of analytic truth. Quine sets “analytic statements” into two classes. He calls statements of the first class logical truths; he characterizes a logical truth as “a statement which is true and remains true under all reinterpretations of its components other than the logical particles.” By logical particles he means “no,” “un-,” “not,” “if,” “then,”

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8 Ibid., 22–23.
“and,” and the like.\textsuperscript{9} These particles have no meaning by themselves but merely relate concepts and sentences to each other.\textsuperscript{10} The typical example that Quine gives for logical truth is “no unmarried man is married.” If we reinterpret or replace “man” and “married” in this example with any other two terms, the statement will remain true. The rest of the components of this example are logical particles.

According to Quine, all non–logical analytic truths fall into the second class of analytic statements, called essential predications. Those analytic statements can be turned into logical truths by replacing synonyms with synonyms.\textsuperscript{11} Quine’s typical example for an essential predication is “no bachelor is married.” In this example, if we replace “bachelor” with its synonym “unmarried man,” the statement will turn into “no unmarried man is married,” which is logically true.

In “Two Dogmas,” Quine makes no objection to the characterization of the first class of analytic statements and apparently accepts, for the moment, that the characterization is a sufficient definition of logical truth. However, he explains that in characterizing essential predication, we use the notion of synonymy to show how such statements can be transformed into logical truths by substituting synonyms for synonyms. But for Quine, the notion of synonymy is also problematic; he argues that, as a semantical notion, synonymy itself needs to be defined precisely. So as long as the notion of synonymy is not clarified, the notion of essential predication

\textsuperscript{9} See \textit{ibid.}, 22.
\textsuperscript{10} As a matter of fact, this is not the way that Quine characterizes logical particles. In Quine’s view, so–called logical particles are in effect not distinct from other terms. In fact, Quine here borrows from Carnap’s terminology. Although Carnap believes that there are essential differences between logical terms and non–logical ones, he never explains this difference precisely. All that Carnap does in this regard is to give a mere enumeration of so–called logical terms in some particular language; see Carnap, \textit{Meaning and Necessity: A Study in Semantics and Modal Logic} (Chicago: University of Chicago Press, 1956), 86. Carnap also mentions that there is no satisfactory definition of “logical expression” that defines this concept based on other semantical concepts, such as “designation” and “true,” in general semantics; see Carnap, \textit{Introduction to Semantics} (Cambridge: Harvard University Press, 1942), §13.
\textsuperscript{11} Quine, “Two Dogmas of Empiricism,” 23.
remains unclear. In “Two Dogmas,” Quine criticizes the notion of essential predication based on his criticism of the notion of synonymy by attempting to show that there is no sufficient definition for the notion of synonymy and, thereby, no sufficient definition for essential predication. In Quine’s view, a correct definition of synonymy must be extensionally adequate, that is, it would identify all the classes of expressions with the same meaning. In the following sections, I shall examine Quine’s line of argument regarding the definitions of the concept of synonymy.

As we saw earlier, to show the relation between the problem of analyticity and the problem of synonymy, Quine starts with his interpretation of Kant’s definition of analyticity: that an analytic truth is true by virtue of meaning. It is true that Carnap, in his semantics period, was inspired by Kant’s notion of analyticity, but Carnap never defined analyticity in the same way as Kant did. Carnap discusses in his philosophy a new concept of analyticity that is language–specific, and always regards an analytic statement as one whose truth is based on the grounds of the rules of the language. This specific notion of analyticity is immune to Quine’s criticism of Kant’s definition of synonymy. This immunity shall become clearer in the next section.

Because Carnap’s concept of analyticity is language–specific, he does not worry about the definition of general analyticity or the definition of “statement $S$ is analytic in language $L$” where $S$ and $L$ are variables, as Quine demands.\footnote{\textit{Ibid.}, 33. Though Quine demands a definition of analytic in $L$ for variable $L$, based on the examples that he discusses from the traditional philosophy, as I understand, he asks for a definition of general analyticity not of general relative analyticity; for an explanation of these two concepts, see Chapter Two, section “Syntactical Definition of Analyticity,” 47–57.} For Carnap, the definition of general analyticity is a problem only for traditional philosophy, but not for his philosophy, because Carnap is not concerned with the
concept of general analyticity in his logical analysis of the language of science. My discussions of Carnap’s philosophy in the last two chapters showed how Carnap’s concept of analyticity differs from that concept in the traditional sense. However, I make a quick review here to highlight how a definition of analyticity in its traditional sense is not a concern for Carnap.

In Chapters Two and Three, I presented four definitions of analyticity that Carnap introduces in his syntax and semantics periods. My claim is that all four definitions concern a notion of analyticity—language-relative analyticity—that is specific to Carnap’s philosophy. In traditional discussions we always deal with a concept of analyticity that is general and applicable to sentences in any language. Such a general notion of analyticity is independent of languages. In traditional philosophy we talk about a sentence being analytic without any reference to the language that the sentence belongs to. But in Carnap’s discussions, such a general concept of analyticity makes no sense. For Carnap analyticity is a language-specific notion and can be understood only within a particular language system; we may talk about analytic in some particular language, but not about analytic in general.

Moreover, the traditional notion of analyticity is mostly concerned with statements of natural language, while Carnap’s definition of analyticity is not applicable in practice to natural language. All of Carnap’s definitions of analyticity rest on concepts such as “consequence,” “proposition,” “designation relation,” and “state-description.” These four concepts are logical concepts, and for them to be defined, the exact rules of the logical system, or the language, must be given. As we saw in earlier chapters, the rules of natural languages are so complicated that it is impossible to set out the rules exactly. Thus, the concepts used in Carnap’s
definitions of analyticity cannot be defined in practice for natural languages. Although Carnap’s definitions of analyticity are theoretically applicable to all languages, in practical terms, the definitions are useful only for artificial languages where the precise rules of the language are known. Carnap acknowledges this fact several times in his works, demonstrating that he intends only to define the concept of analyticity in artificial languages, especially in symbolic ones.

There is one other indication that Carnap does not intend to define the concept of analyticity in its traditional sense: his claim that the concept of analytic truth (or logical truth, or L–truth) discussed in his works is an *explicatum* for the concept of analytic truth studied in traditional philosophy.\(^\text{13}\) In Chapter Three, we saw that “explication” has a specific meaning in Carnap’s philosophy. In any explication, the explicatum is introduced not as a synonym for the explicandum, but as a replacement for it in scientific discourses; the explicatum fulfills all important roles of the explicandum in scientific discussions while it has a different meaning than that of the explicandum.\(^\text{14}\)

Carnap’s claim that “analytic” in his philosophy is an explicatum for the same term in traditional philosophy means that “analytic” in Carnap’s philosophy is a technical term that is intended to be used in Carnap’s discussions about logical systems. This term does not have the same meaning as that of its explicandum, which is the traditional concept of analytic truth. But Carnap’s concept of analytic truth corresponds to its traditional counterpart “in such a way that it can be used instead of the latter”\(^\text{15}\) in scientific contexts. For Carnap, the primary role of the

\(^\text{13}\) Carnap, *Meaning and Necessity*, 7–8.

\(^\text{14}\) For a detailed discussion on Carnap’s notion of explication, see Chapter Three, section “Explication,” 75–79.

concept of analyticity in science is to illuminate the boundary between science on one side and logic and mathematics on the other side. According to Carnap, the concept of analyticity was used vaguely in traditional philosophy to distinguish empirical science from non–empirical knowledge. But he thinks that by providing an exact explicatum for the vague traditional concept of analyticity, he succeeded for the first time in exactly demarcating empirical science from logic and mathematics.

In short, Carnap’s endeavour to define the concept of analyticity should be understood as an attempt to define his own technical terms (which was indexed analyticities and, in his syntax period, also general relative analyticity), not as a definition of the concept of analytic truth in its traditional sense (general analyticity). In the next two sections, I will illustrate that Quine’s discussion of the problem of the definition of the synonymy of expressions, and the relation between this problem and the problem of the definition of essential predication, mainly concern the traditional concept of analyticity, even though at some points, Quine’s criticisms of the definitions of synonymy do touch Carnap’s definitions of his technical concept of the analytic truth. Although Quine’s criticisms of definitions of essential predication in its traditional sense are destructive, Carnap is able to meet the criticisms, within his philosophical framework, when the criticisms become pertinent to his technical definitions. I will show his success in the following sections.

**Synonymy by Definition**

Quine states that a common way to explain the synonymy of expressions is to say that two expressions are synonymous by definition: cases of essential
predication reduce to logical truths by definition. For example, “bachelor” and “unmarried man” are defined as synonymous, and thus, the terms can replace each other in sentences. By definition, the essential predication “no bachelor is married” reduces to the logical truth “no unmarried man is married.” Quine explains that the clarification of synonymy by definition can be made in one of three ways: use of dictionaries; definition through explication; or definition by fiat. I explain these three methods in the following, while also examining how far each of the methods is applicable to Carnap’s works and whether Quine’s objection to the method of defining synonymy can be met within Carnap’s framework.

According to Quine, the first method of clarification of synonymy by definition is the use of dictionaries. One may appeal to the works of lexicographers and claim that two words are synonymous because they are defined as such in the dictionary of the common language. Quine rejects this way of defining synonymy by explaining that works of lexicographers are simply reports of preexisting relations of synonymy among words of the common language; two words are defined in dictionaries as synonymous because lexicographers believe that there is already a relation of synonymy between those words, and they discover this relation based on the usage of the language. The concept of synonymy is presupposed in lexicographers’ works. The works do not provide the ground of synonymy, they do not say why two expressions are synonymous, but merely put forward some instances of synonymous pairs in ordinary language. Putting forward some instances of synonymous pairs does not clarify the concept of synonymy. In other words, dictionaries identify which expressions are synonyms, but do not shed light on what it is in virtue of that the expressions are synonyms. As Quine correctly notes,
dictionary definitions cannot provide for the clarification of the alleged “interconnections” between words that, it is argued, “necessarily and sufficiently” make them synonymous.16

As we see, Quine’s objection to the definition of synonymy by dictionaries is strong and straightforward; there remains no doubt that such a definition is of no use in clarifying the relation of the synonymy of expressions and, thus, cannot assist in the clarification of analytic truth. Such a definition in a dictionary, which is a report on usage, may occur only in natural languages and has no application in artificial languages. Because Carnap’s concept of analyticity concerns merely artificial languages, he does not need to worry about the definition of synonymy in natural languages. If we look at the problem of the definition of analytic truth from within Carnap’s framework, Quine’s objection to the definition of synonymy by dictionaries is not relevant to Carnap’s definitions of analyticity, although Quine’s objection here can be regarded as a serious objection to definitions of analytic truth in its traditional sense.

The second method of clarifying the synonymy of words by definition, according to Quine, is what he calls definition through explication. Quine explains that in the explication of a word, one does not simply report a preexisting synonymy between the definiendum and the definiens; in explication, the definiendum is not merely paraphrased into a synonym, but is improved on by supplementing its meaning. According to Quine, the purpose of the explication of a word is to preserve its application in known contexts, while a new application in other contexts is attributed to it. In explication, we find alternative definientia that have similar

application contexts to that of the definiendum, even though none of the definientia may be synonymous to each other or to the definiendum, because the definientia may also have other application contexts that they do not share with one another. Among these alternative definientia, we choose one by fiat as the definiens and define the definiendum as synonymous to the definiens, thereby expanding and improving on the meaning of the definiendum. Although explication is not based on the preexisting synonymy between the definiendum and the definiens, Quine explains that explication rests on the preexisting synonymy between the corresponding application contexts of the definiendum and the definiens. Quine concludes, therefore, that because the concept of synonymy is presupposed in the definition of the form of explication, the method of explication cannot clarify the concept of synonymy.\textsuperscript{17}

In this objection, Quine directly addresses Carnap’s works. But the notion of explication that Quine attributes to Carnap is somewhat different from the notion of explication that Carnap introduces in his own works. As I discussed in detail in Chapter Three, Carnap means by explication the introduction of exact concepts to replace concepts that are not clear enough to be used in scientific contexts: the explicatum can be a completely novel term created just for the sake of the explication. Carnap never uses explication to introduce synonymous expressions; quite to the contrary, he insists that the explicandum and the explicatum need not be the same in their meanings (or be synonymous), and even says that the explicandum and the explicatum are \textit{typically} different in meaning.\textsuperscript{18} Carnap affirms that in various contexts, the explicandum cannot always be replaced with

\textsuperscript{17} Ibid., 25.

\textsuperscript{18} Carnap, \textit{Meaning and Necessity}, 8.
the explicatum because the two differ in meaning, but adds that the similarity between them is such that in scientific discussions we merely need to use the explicatum.19 When it comes to the notion of analyticity, Carnap’s notion, though is not synonymous with the traditional notion of analyticity, fulfills sufficiently the supposed role of traditional analyticity in scientific discussions: Carnap’s notion of analyticity sufficiently illuminated the boundary between scientific statements and logico–mathematical sentences.

However, according to Carnap, although the explicandum and the explicatum are not equivalent, the explicatum is still required to fulfill all the functions of the explicandum in what Carnap calls “scientific contexts.”20 Carnap’s claim here might be construed as if, in order to provide the explication, there is a need for a preexisting synonymy between the application context of the explicandum and that of the explicatum. Because Carnap’s concept of analyticity explicates the traditional notion of analyticity, one might argue that there is a notion of synonymy presumed in Carnap’s definition of analyticity as the explicatum for the traditional concept. One might, therefore, conclude that since Carnap did not already clarify the concept of synonymy, his definition of analyticity is not sufficient. I do not agree with this conclusion. It is correct to say that Carnap introduces his specific concept of analyticity as the explicatum for the traditional concept of analyticity and that he intends his concept to replace the traditional concept in so–called scientific contexts. Yet Carnap does not build his concept of analyticity based on synonymy between its application context and that of the traditional concept of analyticity.

20 For detailed discussion on the issue, see Chapter Three, section “Explication,” 75–79.
claims that he is going to use the new concept in exactly the same “scientific context.” Whatever this context, however, it is not used to define Carnap’s concept of analyticity. This can be seen from our discussions in Chapters Two and Three on Carnap’s definitions of analyticity. Thus, Carnap’s definitions of analyticity are not based on a hidden assumption of the notion of synonymy.

In short, as far as Carnap’s notion of explication is concerned, Quine’s argument against the application of explication to introduce synonymous expressions and to clarify the notion of synonymy is off-target because, first, Quine wrongly diagnoses Carnap’s purpose of using explication and, second, he detects presupposition of synonymy in a concept of explication that differs from Carnap’s notion of explication and, third, even if there is a hidden presupposition of synonymy in Carnap’s notion of explication, this notion is not used as a basis for the definition of analyticity in Carnap’s philosophy.

The third method of the clarification of the concept of synonymy by definition is definition by fiat, or what Quine calls “the explicitly conventional introduction of novel notations.”21 In this method, one simply creates synonymy between linguistic forms in which there is no previous connection between those forms, as when coinining a new term. This way of creating synonymy happens in the introduction of sheer abbreviations (for example, as we see in an introduction of a dictionary), as well as in the construction of artificial languages in both symbolic and word forms. In a symbolic language used in logical discussions, we may introduce any two arbitrary symbols as synonymous and as having exactly the same function. In an artificial word language, such as Esperanto, it is also possible to introduce any two

terms as synonymous absolutely arbitrarily. Quine acknowledges that in the method of the introduction of synonymous linguistic forms by fiat, there is no reliance on preexisting synonymy whatsoever; here, we merely define by fiat two linguistic forms with absolutely no previous connection as synonymous. In this sort of synonymy, Quine asserts, “we have a really transparent case of synonymy created by definition.”\textsuperscript{22} Therefore, unlike the previous two methods of explaining synonymy by definition, definition by fiat serves sufficiently to introduce and clarify the notion of the synonymy of linguistic forms.

The method of definition by fiat usually has no application in natural languages but is used only in scientific and technical fields. Definition by fiat thereby cannot be of any important help in explaining synonymous linguistic pairs in natural languages. However, the traditional concept of analyticity—the various definitions of which are the main objects of Quine’s arguments—is basically about the statements of natural languages. Even though definition by fiat, according to Quine, is the only “really transparent” case of introduction of synonymy by definition, because the introduction of synonymous linguistic forms by fiat is not applicable to natural languages, definition by fiat does not help to show how an essential predication in natural language can transform into a logical truth.

Nonetheless, the only kind of clarification of synonymy by definition that is pertinent to Carnap’s works is definition of synonymy by fiat. As I noted earlier, Carnap’s real concerns are the concepts of analyticity and synonymy in artificial languages. In such languages, there is no history of preexisting synonymous expressions already in use. In artificial languages, the composition of dictionaries to

\textsuperscript{22} Ibid.
report synonyms based on usage makes no sense, nor does the introduction of synonymous expressions by explication in the way explained by Quine. If there are synonymous expressions in artificial languages, the expressions are introduced by “the explicitly conventional introduction of novel notations,” to borrow Quine’s words. As Quine asserts, this sort of synonymy by definition is transparent and exact enough to clarify essential predication sufficiently. Thus, if there is any essential predication in Carnap’s object languages, the sentence can be reduced to logical truth through definition by fiat, with no ambiguity.

In his “Meaning Postulates,”23 which is his first reply to Quine’s criticisms, Carnap indeed uses definition by fiat to reduce essential predications to logical truths in semantical language systems, not by appealing to synonymous linguistic pairs in the systems, but in a different way. In this article, Carnap instead introduces the concept of a meaning postulate, which is a definition by fiat in a language system. Meaning postulates are general sentences and are conventional definitions of meaning relations among the expressions of a semantical system, but they do not necessarily introduce synonymous pairs in the system. In Chapter Three, we saw that Carnap defines logical truth semantically as a sentence in S that holds in all state–descriptions of S.24 Now consider the following example as an essential predication in language L: “If Jack is a bachelor, then he is not married.”25 To reduce this sentence to a logical truth in L, Carnap introduces a meaning postulate: “In language L, for every x, if it is a bachelor, then it is not married.”26

24 See Chapter Three, section “State–Description and Analyticity,” 104–110.
25 This is Carnap’s example; see Carnap, “Meaning Postulates,” 222.
26 See ibid., 224.
state–description of L where this postulate holds, the example holds as well. In other words, the example is logically implied by the postulate; thus, wherever the postulate holds, the example necessarily holds too. Since the postulate is a primitive definition of the system L that holds in every state–description of L, the example “if Jack is a bachelor, then he is not married” holds in every state–description of L as well, and is thus a logical truth.

A meaning postulate is a definition by fiat that the author of a semantical system adds to the system. To make a meaning postulate, the author of the system need not to appeal to designata, or the rules of designation of the system. One can even formulate the postulates of the system before laying down the rules of designation. In other words, as Carnap asserts, a meaning postulate does not explain the complete meaning relation between two expressions of the system. For example, the earlier postulate does not determine the exact meaning relation between the terms “bachelor” and “married” in language L, but the postulate states as much about logical relations between these two terms as is needed to turn the earlier example into a logical truth, namely that the two terms designate two incompatible properties in language L. Thus, although meaning postulates reduce essential predications to logical truths by determining logical relations (such as logical compatibility or implication) between expressions by definition by fiat, the postulates do not necessarily introduce synonymous expressions into the language system. In other word, by using meaning postulates to transfer essential predications to logical truths in a semantical language system, we do not necessarily need to define synonymy between expressions, but can instead merely determine

\[\text{Ibid.}\]
weaker logical relations between expressions. Quine argues that definition by fiat does not explicate synonymy and, therefore, cannot be used to reduce essential predications to logical truths. Despite the fact that Quine’s claim is correct only with respect to natural languages not to artificial ones, we see here that Carnap uses definition by fiat to serve the same end even without engaging in an explication of synonymy. In other words, while Quine claims that even appealing to definition by fiat cannot help to reduce essential predications to logical truths, Carnap shows that, at least in artificial languages, definition by fiat can be used to turn essential predications into logical truths without appealing to the notion of synonymy.

To better understand how a meaning postulate is a definition by fiat, one must note that to set a meaning postulate between predicates of a language system, the author of the system does not need any knowledge of matters of fact, but can create the postulate merely by decision. For example, the author may decide to make “bachelor” and “married” incompatible in language L by a postulate based on his own intention, even though his knowledge that English words “bachelor” and “married” are always incompatible may influence his decision. According to Carnap, authors of semantical language systems “are free to choose their postulates, guided not by their beliefs concerning facts of the world but by their intentions with respect to the meanings.”

Therefore, meaning postulates are simply definitions by fiat, in Quine’s sense of this term.

To reduce essential predications to logical truths by meaning postulates, Carnap appeals here to the concept of state–description: Carnap claims that an essential predication in language system $S$ is implied by a meaning postulate in $S$,

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and because the meaning postulate holds in every state–description in $S$, then the essential predication holds in every state–description in $S$ as well and, thereby, is a logical truth in $S$. Carnap defines a state–description in a language $S$ as a class of sentences in the language $S$ “which contains for every atomic sentence [in $S$] either this sentence or its negation, but not both, and no other sentences.”

In his definition of state–description, Carnap limits the range of language system $S$ to the languages whose atomic sentences are mutually logically independent; I discussed this earlier in Chapter Three.

Quine reminds us that in natural languages, where terms like “bachelor” and “married” could be found, the atomic sentences are not independent: for example, the atomic sentences “John is a bachelor” and “John is married” are logically dependent and the truth of one implies the falsity of the other. In natural language, a state–description so defined might include both atomic sentences “John is a bachelor” and “John is married” and, thereby, in such state–description the sentence “no bachelors are married” does not hold. Therefore, the sentence “no bachelors are married” does not hold in every state–description of natural language and thereby, according to Carnap’s definition just explained, the sentence turns out synthetic rather than analytic.

Carnap already recognized this problem and suggested that for a language in which atomic sentences are not logically independent, we must modify the definition of state–description. For example, he suggests that we might define a state–description in such a language as those classes of atomic sentences that are

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29 Carnap, Meaning and Necessity, 9. For a detail explanation of state–description, see Chapter Three, pages 88–90 and 103–104.

30 See page 88–90.

31 Quine, “Two Dogmas of Empiricism,” 23.
not contradictory. But, for Quine, the concept “contradictory” presupposes the concept of analyticity. Therefore, according to Quine, for a language whose atomic sentences are not logically independent, the concept of state–description presupposes the concept of analyticity and, thereby, a definition of analyticity built on the concept of state–description is circular.

Quine’s objection here is effective, but, again, only for natural languages. To determine whether two atomic sentences are contradictory we can appeal to the concept of synonymy. If two predicators B and ¬M are synonyms in language S, then we can conclude that two atomic sentences Bx and Mx are contradictory in S. We saw earlier that in artificial languages, or in logical systems, we can introduce synonymous pairs by fiat independently of the concept of analyticity. But, in natural languages the concept of synonymy is vague and cannot be used to define other concepts such as the concept of state–description. Quine admits that his objection is effective only for using the concept of state–description to define analyticity in natural languages:

Thus the criterion of analyticity in terms of state–description serves only for languages devoid of extra–logical synonym–pairs, such as ‘bachelor’ and ‘unmarried man’—synonym–pairs of the type which give rise to the “second class” of analytic statements [in natural language]. The criterion in terms of state–descriptions is a reconstruction at best of logical truth, not of analyticity [in natural language].

When Quine uses the term “extra–logical synonymy” for synonymous pairs in ordinary language, it shows that he notices the difference between synonymy in artificial languages and in ordinary language.
artificial languages and in natural language. Quine’s objection here again supports my claim that Quine is concerned only with definitions of analyticity in natural language, and his objections must not be construed as objections to Carnap’s definitions of analyticity in artificial language systems.

Incidentally, Quine noted that in formal works of logic and mathematics, all three kinds of definition of synonymy discussed in this section may occur. This may be the case with respect to logic in its broad sense, but as far as Carnap’s philosophical works are concerned, only the last kind of definition (definition by fiat) is used. Philosophy for Carnap is the logical analysis of the language of science, and its task is to construct language systems to explicate—in Carnap’s sense of this term—the concepts and methods used in science. In Chapters Two and Three, I have illustrated the kind of activity that Carnap calls philosophical. In his sort of philosophical activity, all that is involved is the study of artificial languages, and in such language systems, the only definition of synonymy that may occur is the one that Quine calls “the explicitly conventional introduction” of synonymy.

**Synonymy as Interchangeability Salva Veritate**

Another suggestion examined by Quine for the clarification of the synonymy of linguistic forms is the claim that synonymous linguistic forms are *interchangeable salva veritate* (that is, two linguistic forms are synonymous when they are interchangeable in all contexts, without change of truth value). Thus, essential predications reduce to logical truths by interchangeable linguistic forms.

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36 *Ibid.* Quine notes that interchangeability *salva veritate* does not apply to fragmentary occurrences of words: “bachelor” and “unmarried man” are interchangeable if they are used as complete words, not as parts of terms such as “bachelor of art,” “bachelor’s buttons,” or “bachelor”; see *ibid.*, 28.
Unlike the introduction of synonymy by definition as just discussed, the introduction of synonymy as interchangeability *salva veritate* is important to Carnap’s philosophy. Carnap deals with synonymy in three different ways throughout his main works. In his syntax period, Carnap defines synonymous expressions as follows: two expressions are synonymous if any sentence $C$ in which one of the expressions occurs has the same content [the explicatum of “meaning”] as the sentence $C'$, which is the production of replacing the expression with the other one in $C$. He also defines the content of a sentence as the class of nonanalytic sentences that are consequences of the sentence.\(^{37}\) Carnap’s syntactical definition of synonymy rests, therefore, on the concept of analyticity and, thus, cannot serve to clarify this concept. In his early semantics works, Carnap defines synonymous expressions as expressions that designate the same entity.\(^{38}\) Here, Carnap ignores the dichotomy between meaning and reference. Based on this definition, “the morning star” and “the evening star” should be considered synonyms, even though they are not considered synonyms generally. Finally, in his most mature semantics work, *Meaning and Necessity*, Carnap introduces synonymy in relation to the concept of interchangeability.\(^{39}\) Carnap’s final conception of synonymy might be considered analogous to Quine’s conception of synonymy as interchangeability *salva veritate* and might be used to clarify the concept of analyticity. I start with Quine’s explanation and criticism of synonymy as interchangeability *salva veritate* and will then proceed to examine Carnap’s treatment of the issue.


\(^{38}\) Carnap, *Introduction to Semantics*, 55. Also, see Chapter Three, the section entitled “The Semantical Definition of Truth and Synonymy,” 79–83.

\(^{39}\) Carnap, *Meaning and Necessity*, 56–57. Also, see Chapter Three, section “The Explication of Interchangeability and Synonymy,” 110–120.
Quine examines the claim that by using the concept of interchangeability \textit{salva veritate}, we clarify the notion of the synonymy of linguistic forms and, hence, clarify the notion of essential predication. This can be the case if two conditions are met: first, all pairs of synonymous linguistic forms are interchangeable \textit{salva veritate}, and no other pairs of linguistic forms are thus interchangeable; and second, the concept of interchangeability \textit{salva veritate} is sufficient to clarify analyticity (essential predication), in the sense that it can be explained clearly without appeal to the concept of analyticity, whether directly or indirectly. Quine explains, first, that the synonymy under investigation here is not “synonymy in the sense of complete identity in psychological associations or poetic quality”\textsuperscript{40} of expressions; such a synonymy, according to Quine, could never be found among the expressions. But, Quine states, the synonymy concerned in the discussion of analyticity is called “cognitive synonymy.”\textsuperscript{41} To show exactly what he means by cognitive synonymy, Quine states that cognitive synonymy could be explained by analyticity: to assert that “bachelor” and “unmarried man” are \textit{cognitively synonymous} is to assert that the following statement is \textit{analytic}:

(1) All and only bachelors are unmarried men.\textsuperscript{42}

But to use the notion of cognitive synonymy to elucidate analyticity, we first need to explain cognitive synonymy without referring to the concept of analyticity. The concept of interchangeability \textit{salva veritate}, according to Quine, is proposed to do this task. It allegedly can explain cognitive synonymy sufficiently, without

\textsuperscript{40} Quine, “Two Dogmas of Empiricism,” 27.
\textsuperscript{41} \textit{Ibid.}, 28.
\textsuperscript{42} \textit{Ibid.}, 28–29. Statements (1) to (3) used here are the same examples that Quine uses.
presupposing analyticity. To examine this claim, Quine gives the following example that is evidently true:

(2) Necessarily all and only bachelors are bachelors.

It is argued that “bachelor” and “unmarried man” are synonymous in the sense that they are interchangeable *salva veritate*. Thus, if we exchange the second occurrence of “bachelor” in statement (2) for its interchangeable pair “unmarried man,” the resulting statement must be true as well:

(3) Necessarily all and only bachelors are unmarried men.

But what do we mean by saying that something is “necessarily” the case? Quine claims that to analyze the concept of logical necessity we have no choice but to appeal to the concept of analyticity. For Quine, the adverb “necessarily” can be applied to sentences that are analytic, so that “necessary statement” has the same meaning as “analytic statement.” Thus, according to Quine, to assert that statement (3) is true is also to assert that statement (1) is analytic. In other words, when we say that “bachelor” and “unmarried man” are interchangeable *salva veritate*, we mean that the statement “all and only bachelors are unmarried men” is an analytic truth. Therefore, the notion of interchangeability *salva veritate* explains cognitive synonymy of linguistic forms by using the notion of analyticity. Thus, synonymy as interchangeability *salva veritate* cannot clarify the notion of analyticity itself.

To summarize, what Quine is saying is that in intensional languages, or in languages that are rich enough to include modal adverbs such as “necessarily,” (for example, in natural languages), such adverbs when applied to a sentence mean that the sentence is analytic. Modal adverbs can be explained only based on the concept
of analyticity. Therefore, we cannot apply such adverbs that presuppose the concept of analyticity to clarify the concept of analyticity itself. Thus, in intensional languages, analyticity cannot be clarified based on the concept of synonymy as interchangeability *salva veritate*, which, in its turn, is defined by modal adverbs.

If we choose extensional languages in which no modal adverbs are used, Quine believes that the interchangeability *salva veritate* of expressions does not assure us of the sameness of the meaning (synonymy) of the expressions, but may show just accidental agreements between the cases. In such languages, “the morning star” and “the evening star” are interchangeable *salva veritate*, as are the expressions “creature with a heart” and “creature with a kidney.” In neither of these examples do the pairs have the same meaning, but they are true of the same entities merely accidentally. In intensional languages, according to Quine, the definition of synonymy by means of the concept of interchangeability *salva veritate* does not clarify analyticity, because in those languages, the concept of interchangeability *salva veritate* does not define synonymy at all.44

To see how pertinent Quine’s criticism is to Carnap’s final definition of synonymy, here I review briefly our discussion on Carnap’s definition in the last chapter. In *Meaning and Necessity*, Carnap defines synonymy of linguistic forms based on the logical equivalence of expressions. As we saw in Chapter Three, Carnap defines materially equivalent and logically equivalent expressions as follows: two expressions in S are (a) materially equivalent, (b) logically equivalent, if and only if

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43 Carnap defines an extensional language as follows: if any subexpression occurring within any of the sentences of the language is replaced with an expression with the same extension, the extension of the resultant sentence (its truth–value) remains the same as that of the original sentence; see Carnap, *Meaning and Necessity*, 48.

any two sentences in $S$, which are alike except that one sentence contains one of the expressions and the other sentence contains the second expression, are likewise (a) materially equivalent, (b) logically equivalent.\textsuperscript{45} Carnap also defines materially equivalent and logically equivalent sentences as follows: two sentences are (a) materially equivalent, (b) logically equivalent, if and only if they both (a) have the same truth–value, (b) hold in the same state–descriptions.\textsuperscript{46}

Carnap explains that material equivalence of expressions refers to the agreement in the extensions of the expressions, whereas logical equivalence of expressions refers to the agreement in the intensions of the expressions (that is, two materially equivalent expressions have the same \textit{extension}, whereas two logically equivalent expressions have the same \textit{intension}). Thus, two materially equivalent expressions are equivalent accidentally, whereas two logically equivalent expressions cannot fail to be equivalent. To determine whether two expressions are materially equivalent, we need to investigate matters of fact; whereas, we can determine whether any two expressions are logically equivalent by consulting the rules of the language—the rules of designation—alone, and without any reference to matters of fact.\textsuperscript{47}

Using the concept of logical equivalence, Carnap defines synonymous expressions as those that are intensionally isomorphic, or those that have the same “intensional structure.” He calls two expressions synonymous if they fulfill two conditions: (a) they are logically equivalent, and (b) if they are composed of subexpressions, then their corresponding components are logically equivalent to

\textsuperscript{45} See Chapter Three, section “The Explication of Interchangeability and Synonymy,” 112.
\textsuperscript{46} Quine, “Two Dogmas of Empiricism,” 29–31.
\textsuperscript{47} Carnap, \textit{Meaning and Necessity}, 6–23.
one another. As we saw in Chapter Three, the expressions “2+5” and “7” are not synonymous, but the expressions “2+5” and “II sum V” are synonymous. Condition (b) in the definition is added to solve the problem of the fragmentary occurrence of words, as Quine mentions in “Two Dogmas.” For the sake of simplicity, let’s assume that we are dealing with simple one–word expressions, as Quine did in “Two Dogmas,” and ignore condition (b). According to Carnap, synonymous expressions thus become those that are logically equivalent.

Carnap distinguishes between *interchangeability* and *logical interchangeability* of expressions. His concept of interchangeability is the same concept as that which Quine calls interchangeability *salva veritate*. Carnap explains interchangeability and logical interchangeability of expressions within a particular sentence, as follows: when we replace a subexpression E that occurs within the sentence C with another subexpression E´, and thus construct C´ out of C, (a) if the truth–values (extensions) of C´ remains the same as that of C, then the expressions E and E´ are interchangeable expressions within the sentence C; (b) if the propositions (intensions) of C´ and C are the same, then the expressions E and E´ are logically interchangeable expressions within the sentence C.

Based on this explanation, as well as his definitions of material and logical equivalence, Carnap defines concepts of interchangeability [*salva veritate*] and logical interchangeability of expressions as follows: an occurrence of an expression E within a sentence C is (a) interchangeable [*salva veritate*], (b) logically interchangeable, with another expression E´ in a system S if and only if the sentence C is (1) materially equivalent, (2) logically equivalent, to the sentence C´ constructed

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48 Ibid., 56. Also, for detailed discussion on the issue, refer to Chapter Three, section “The Explication of Interchangeability and Synonymy,” 110–120.
out of C by replacing the occurrence of E by E’. Two expressions are (a) interchangeable \([\textit{salva veritate}]\), (b) logically interchangeable, in a system \(S\) if and only if any occurrence of one of them within any sentence of \(S\) is (a) interchangeable \([\textit{salva veritate}]\), (b) logically interchangeable, with the other expression.\(^{49}\)

As discussed thoroughly in Chapter Three, Carnap concludes from such considerations that, within extensional languages, equivalent expressions are interchangeable \([\textit{salva veritate}]\), and logically equivalent expressions are logically interchangeable.\(^{50}\) Since Carnap defines synonymous expressions as logically equivalent ones, then according to him, in extensional languages, synonymous expressions are those that are logically interchangeable, not simply interchangeable \([\textit{salva veritate}]\).

The logical interchangeability of linguistic forms, unlike the interchangeability \([\textit{salva veritate}]\) of expressions, guarantees that the linguistic forms have the same meaning, or intension. “Creature with a heart” and “creature with a kidney” are interchangeable \([\textit{salva veritate}]\); thus, even though whenever we find a creature with a heart, the creature has kidneys as well, and vice versa, it is not impossible for these two terms to refer to different entities. This possibility is because the meanings of the two terms, or their intensions, are different. By contrast, “bachelor” and “unmarried man,” as logically interchangeable expressions, are always the same entity and cannot be different under any circumstances; these two terms have the same meaning, or intension.

We saw earlier that, in “Two Dogmas,” Quine demonstrates how the definition of synonymy of linguistic forms in extensional languages, as terms that are

\(^{49}\) Carnap, \textit{Meaning and Necessity}, 46–47.
\(^{50}\) See Chapter Three, section “The Explication of Interchangeability and Synonymy,” 110–120.
interchangeable *salva veritate*, falls short of promising the same meaning for terms and, thereby, of providing a sufficient definition for synonymy. Nonetheless, because Carnap defines synonymous expressions in extensional languages as logically interchangeable expressions, Carnap's definition provides for synonymy (essential predication) in artificial languages successfully, unlike the definitions of synonymy (in natural language) that Quine criticizes.

**Essential Predication in Natural Languages**

So far in this chapter, I have been arguing that Quine's criticism of definitions of essential predication, for the most part, do not directly concern Carnap's definitions of this concept in constructed language systems. We have also seen that in those cases where Quine's arguments are so construed as to be applicable to Carnap's definitions of essential predication, the arguments can be met if we view them within Carnap's framework. However, as I pointed out earlier, Quine's criticisms are destructive if we consider them with respect to the customary concept of essential predication that basically applies to natural languages. Now I will examine whether Quine's rejection of definitions of essential predication in historically given languages affects Carnap's definitions of this concept in artificial languages at all.

Although Carnap declares that he is only concerned with a relative concept of essential predication, which can be defined within his philosophical framework for each particular artificial language separately, he still insists that this specific concept of essential predication is an explicatum for the explicandum of the general notion of essential predication in its customary sense. Indeed, Carnap claims that his
definitions of logical (syntactical or semantical) notions are meant mainly to *explicate* similar customary concepts in historically given languages.51 Thus, logical concepts in Carnap’s philosophy (including the concept of analyticity) are explicata for unclear concepts of traditional philosophy as explicanda. As we saw in Chapter Three, Carnap asserts that an explicandum, even though not exactly defined, must be at least “practically clear” for the explication not to be futile. That is, we must know how the utterer of the explicandum uses the term in different contexts. To know this use, we need to determine somewhat in what cases the utterer intends to apply the term and in what cases he does not intend to apply the term. If the explicandum is not practically clear in this specific way, then our attempt to explicate the explicandum will be entirely futile, because the clarification, or explication, of a concept that is entirely unknown to us does not make sense. The first step in providing an explication of a customary concept is to discover what the utterer of the term means by that concept; in other words, we must discover what the *intension* of that term is in ordinary usage.52

As I just noted, Carnap claims that the definition of his relative concept of essential predication is an explicatum for the general concept of essential predication in its customary sense. Therefore, to provide a sufficient definition for his relative concept of essential predication, Carnap must first *practically* clarify the concept of essential predication in its customary sense—which is about natural languages. Otherwise, as he asserted, Carnap’s whole attempt to define his specific concept in constructed language systems would be futile. Here is the point where

52 See Carnap, *Logical Foundations of Probability*, 4. Also, I discussed the importance of practical clarity of the explicandum at length in Chapter Three, section “Explication,” 75–79.
Quine’s criticism of the definitions of essential predication in natural languages can harm Carnap’s definition of the similar notion in constructed language systems; I believe that this is exactly the way that Carnap sees Quine’s criticism. The following quotation from Carnap clearly supports this interpretation:

... some of the objections raised against these semantical concepts concern, not so much any particular proposed explication, but the question of the very existence of the alleged explicanda. Especially Quine’s criticism does not concern the formal correctness of the definitions in pure semantics; rather, he doubts whether there are any clear and fruitful corresponding pragmational concepts [i.e., concepts of the natural language] which could serve as explicanda. That is the reason why he demands that these pragmational concepts be shown to be scientifically legitimate by stating empirical, behavioristic criteria for them. If I understand him correctly, he believes that, without this pragmational substructure, the semantical intension concepts [for example, the semantical concept of analyticity], even if formally correct, are arbitrary and without purpose.53

The quotation shows that Carnap believes that Quine’s criticism of the definitions of essential predication, and his criticisms of the definitions of the related notion of synonymy, is not aimed at Carnap’s definitions of those concepts in his logical works. Instead, Carnap believes that all that Quine is demanding is that Carnap provides clear explicanda for his logical concepts.

In spite of his strong emphasis in *Logical Foundations of Probability* on the significance of practical clarity of explicanda for the explication to be fruitful,54 here Carnap tries to downplay the importance of such clarity:

*I do not think that a semantical concept, in order to be fruitful, must necessarily possess a prior pragmatical counterpart. It is theoretically*


54 See Chapter Three, section “Explication,” 75–79.
possible to demonstrate its fruitfulness through its application in the further development of language systems. But this is a slow process. If for a given semantical concept there is already a familiar, though somehow vague, corresponding pragmatical concept and if we are able to clarify the latter by describing an operational procedure for its application, then this may indeed be a simpler way for refuting the objections and furnish a practical justification at once for both concepts.\textsuperscript{55}

As we see, Carnap tries to lessen the importance of the clarification of the customary concept of analyticity as the explicandum of his semantical concept of analyticity. Here, he apparently claims that semantical concepts should not be considered \textit{basically} as explicata for their counterparts in the natural language. Rather, the semantical concepts are fruitful concepts, even though they have no relation to customary terms. Thus, he wants to conclude that the clarification of customary terms as explicanda of semantical terms is not \textit{necessary} for definitions of semantical terms to be feasible. But if Carnap does not really offer his semantical concept of analyticity basically as an explicatum for the customary concept of analyticity, which belongs to natural language, then why does he choose the term “analyticity” for his semantical concept? The very fact that he calls “analytic” his intended notion in semantics strongly suggests that his notion and the concept of analyticity in natural language are somewhat connected in the first place. Thus, as he insists in his \textit{Logical Foundations of Probability}, he needs at least to clarify practically the notion of analyticity in natural language so that his definition of analyticity in semantics can be fruitful.

In spite of his attempt to lessen the significance of the need for the practical clarification of “analyticity” in its customary sense, Carnap still tries to solve this

\textsuperscript{55} Carnap, “Meaning and Synonymy in Natural Language,” 235. The italics are mine.
problem. In his quest for the practical clarification of the meaning (or the *intension*) of the concept of analyticity in natural language, Carnap aims to find an empirical (scientific) way to determine the meaning of this concept. For this purpose, he introduces the method of extension and intension in natural languages as a behavioristic procedure, as follows.

In his “Meaning and Synonymy in Natural Languages,” Carnap claims that, based on the observation of the linguistic behavior of a speaker of a natural language, we can determine whether the speaker applies a given predicate of the language to a given thing. Accordingly, we can also determine the following: first, the extension of the predicate for the speaker, or the class of the things that the predicate denotes for the person; second, the extension of the contradictory, or the class of the things for which the speaker denies the application of the predicate; and, finally, the intermediate class, or the class of the things for which he neither affirms nor denies the predicate. Carnap explains that the size of the intermediate class of a predicate determines the degree of its vagueness: a larger intermediate class means a higher degree of vagueness for the predicate.\(^56\) The same procedure can be followed for all terms of a natural language. This behavioristic procedure of determining the extensions of the terms of a natural language is an empirical and, thereby, scientific procedure.\(^57\)

\(^56\) Ibid.
\(^57\) In different places in his works, Quine challenges the behavioristic procedure of determining the extension of terms with his serious considerations on radical translation. See, for example, Quine, *Word and Object* (Cambridge, MA: MIT Press, 1960), Chapter Two: Translation and Meaning, 26–79. Carnap discusses Quine’s considerations very briefly, merely declaring that “Quine’s arguments to the effect that the lexicographers actually have no criterion for their determinations did not seem at all convincing to me”; see Carnap, “W. V. Quine on Logical Truth,” in *The Philosophy of Rudolf Carnap*, ed. A. P. Schilpp (La Salle: Open Court, 1963, pp. 915–922), 920. Carnap believes that, contrary to Quine’s arguments, he succeeded in showing the possibility of a behavioristic determination of the extensions of the terms as explained. In reply to Quine, at most Carnap gives him this recommendation: “If anyone is still skeptical about this possibility, I should like to
Next, Carnap tries to show also that “the analysis of intension for a natural language is a scientific procedure, methodologically just as sound as the analysis of extension.”58 When we determine, in the way just mentioned, the extension of a given predicate of a natural language in a given region, it is still possible to ascribe different intensions to the predicate because a possibly infinite number of properties may have the same extension within the given region. For example, the properties “human,” “featherless biped,” “rational animal,” and the like have the same extension (within the objects on the planet) as that of the predicate “homme,” but because the properties are different, they cannot all be intensions of the predicate “homme.” According to Carnap, Quine maintains that, even if the extension of a predicate were empirically determined, we would still be free to choose, as the intension of the predicate, any of those properties, that, even though different from each other, have the same extension as that of the predicate; there are no empirical criteria to specify which one of those properties is the exact intension of the predicate. On the contrary, Carnap asserts that assigning an intension to a predicate is an empirical hypothesis, one that can be tested scientifically by observations of the linguistic behavior of the utterer.59

To defend his thesis, Carnap considers the following example: According to Quine, we cannot decide empirically which of the properties “horse” and “horse or unicorn” is the intention of the German utterer of the term “Pferd.” The extension of “unicorn” is empty; “horse” and “horse or unicorn” both have thus the same extension as “Pferd.” Hence, either ”horse” or “horse or unicorn” can be chosen

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58 Carnap, “Meaning and Synonymy in Natural Languages,” 236.
59 Ibid., 237.
equally as the intension of “Pferd”; neither an affirmative nor a negative response of
the utterer with respect to any actual thing can make one prefer either of those
properties over the other. Carnap rejects Quine’s idea by proposing that we should
not only investigate the utterer’s response to actual cases, but also his responses to
logically possible cases. For example, we can describe a creature that is like a
horse, but has a horn on the middle of his forehead, and ask the utterer whether he
wishes to call such a creature “Pferd.” Based on his response to such possible, but
not actual, cases, we can limit possible intensions of the predicate further and
further and, ultimately, find the exact intension for it. Carnap believes that in this
way, we can investigate and determine the intensions of the predicates of natural
language scientifically. By the same token, we can determine the meanings or the
intensions of “synonymy” and “analyticity” in natural language by empirical
investigation of the linguistic behaviors of the utterers of the language and, thereby,
clarify the explicandum of the semantical term “analyticity.”

Carnap gives the following general definitions for the intensions of
“synonymous” and “analytic” in the natural language $L$:

Two expressions are synonymous in the language $L$ for $X$ at time $t$ if they
have the same intension in $L$ for $X$ at $t$.

A sentence is analytic in $L$ for $X$ at $t$ if its intension (or range or truth–
condition) in $L$ for $X$ at $t$ comprehends all possible cases.

As explained, the definitions provide us with the empirical means to investigate
cases of synonymy and analyticity (both logical truth and essential predication) in
natural language. The identity of the intensions of two expressions determines their

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60 That is, cases that do not contain contradictions.
62 Ibid., 243.
synonymy. To determine whether the intensions of two expressions are identical, we must investigate whether, according to the utterer of the language, the two expressions stand for the same individuals with respect not only to actual cases, but also to possible cases. For example, “human” and “featherless biped” stand for the same actual sets of individuals on the planet. Yet in some other world, there might be creatures that are featherless bipeds, but not human. Thus, the expressions “human” and “featherless biped” do not have the same intension and, hence, are not synonymous. In the case of the expressions “bachelor” and “unmarried man,” we can see that the expressions are ascribed by the utterer to the same individuals, both in the realm of actual and possible things. Thus, the two expressions have the same intension and are thus synonymous. In the case of analyticity, determining empirically whether a sentence in a given language is analytic for a given person at a given time requires us to investigate whether the person holds the sentence true in all actual and possible circumstances at the particular time. For example, to determine empirically whether the sentence “an object is the same as itself” is analytic for a speaker of English language at a particular time, we must examine whether the speaker believes this sentence in all actual and possible circumstances that we can make or describe for him. If the answer is yes, then the sentence is analytic for him; otherwise, the sentence is not analytic for him. Carnap believes his intensional theory provides an empirical (behaviouristic) method for determining synonymous expressions and analytic sentences in natural language and also to clarify the concept of essential predication in natural language. Although Carnap’s empirical method does not precisely determine the exact boundary between analytic and synthetic sentences in natural language, his method suffices to make this
boundary *practically clear*. Therefore, Carnap believes that his semantical notions of synonymy and analyticity in constructed languages have clear enough explicanda in natural language to be fruitful logical concepts. In the next Chapter, I shall elaborate this point more.
Chapter Five

Quine, Carnap, and Logical Truth

Logical truth may be considered the central controversy of the debate between Rudolf Carnap and Willard Van Orman Quine over the definitions of analyticity.\(^1\) In Chapter Four, I noted that an analytic truth is either an essential predication or a logical truth. We saw that essential predication is a category of analytic truth, which can be transformed into logical truth by substituting synonyms for synonyms and, hence, can be defined on the grounds of logical truth. Therefore, if one can define logical truth, then one might define essential predication as well; but if one cannot define logical truth, one cannot define essential predication, either. Thus, when definitions of logical truth are rejected, definitions of essential predication are left groundless too. In this chapter, I shall examine Quine’s objections to Carnap’s definitions of logical truth and Carnap’s replies to the objections. But before examining the Quine–Carnap debate over the definitions of logical truth, I will start with a brief discussion of Quine’s interpretation of Carnap’s ideas and motives for introducing logical truth into Carnap’s philosophy.

Quine and Carnap’s Endeavors for Logical Truth

Quine sees Carnap’s main motive for introducing logical truth to be an epistemological motive, in that Carnap does so to save *certainty* in knowledge. At

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\(^1\) As a matter of fact, objecting to the definition of essential predication in natural language is the core of Quine’s objections to Carnap’s definitions of the analytic. This shall be clear by the end of this chapter. Here, I assert only the logical priority of the definition of analytic truth to the definition of essential predication.
the beginning of each of his main works on the debate with Carnap, Quine mentions works on analyticity by Immanuel Kant and Gottlob Frege, implying that Carnap had picked up a project started by Kant and criticized by Frege and then tried to modify the project in such a way that it met Frege’s objections. The following is one example of such a Quine beginning:

Kant’s Question “How are synthetic judgments a priori possible?” precipitated the *Critique of Pure Reason* … some of Kant’s own clearest purported instances, drawn from arithmetic, were sweepingly disqualified … by Frege’s reduction of arithmetic to logic. Attention was thus forced upon the less tendentious and indeed logically prior question, “How is logical certainty possible?” It was largely this latter question that precipitated the form of empiricism which we associate with between–war Vienna—a movement which began with Wittgenstein’s *Tractatus* and reached its maturity in the work of Carnap.²

We must first consider what Kant’s idea was and how Frege objected to that idea and, then, show whether Carnap has anything to do with this project. Kant believed that there are synthetic *a priori* truths that one acquires and justifies independently of experience. Kant took statements of arithmetic and geometry as the prime examples of synthetic *a priori* judgment. Since a synthetic *a priori* judgment is immune to the errors of our sensory experience, such a judgment is the most exact and certain knowledge of matters of fact and is necessarily true. Thus, according to Kant, the statements of arithmetic and of geometry, as the prime examples of synthetic *a priori* judgments, are also the prime examples of the certain knowledge of the world. As a result, for Kant, our knowledge of matters of fact contains a considerable number of the statements that are necessarily true.

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Frege allegedly reduced arithmetic to logic\(^3\) that is commonly believed to be about relations among concepts, but not about matters of fact. Arithmetic thus could not be a branch of the knowledge of the world, because it does not contain factual assertions. In doing so, Frege disqualified one of Kant’s prime examples of synthetic \textit{a priori} judgments, or sentences that are supposed to be about matters of fact and independent of experience. Furthermore, Albert Einstein showed that the characteristics of real physical space can be illustrated better by the means of non–Euclidian geometry (which was introduced by Nikolai Lobachevsky, Bernhard Riemann, and others) than by the use of Euclidian geometry. Einstein’s theory of general relativity thus settled the question of which of the various geometries applied to physical space in favour of non-Euclidean geometry. As a result, Kant’s second prime example of synthetic \textit{a priori} judgment was disqualified as well.

In short, Kant believed that there are synthetic \textit{a priori} judgments that are certain and necessarily true of the world. But Frege and Einstein disqualified Kant’s prime examples of such judgments. In the lack of examples of synthetic \textit{a priori} judgments, serious doubts arose as to the very possibility of such judgments. This, in turn, casted doubts on the belief that certainty can be found at all in our knowledge\(^4\) of the world, because synthetic \textit{a priori} judgment was the only conceivable kind of certain assertions about matters of fact. The problem can be

\(^3\) Quine explains that to reduce mathematics to logic, Frege used set theory as well as elementary logic. There are controversies as to whether set theory can be considered a part of logic or a branch of mathematics. For Quine, one of the main reasons for these controversies is the fact that the truth of elementary logic is obvious, whereas that of set theory is otherwise. If one does not regard set theory as a part of logic, then Frege’s derivation of arithmetic would cease to be a derivation of logic. Quine concludes that “Kant’s readiness to see logic as analytic and arithmetic as synthetic, in particular, is not superseded by Frege’s work (as Frege supposed) if ‘logic’ be taken as elementary logic. And for Kant, logic certainly did not include set theory.” See Quine, “Carnap and Logical Truth,” 104.

\(^4\) I use “necessity of knowledge” and “certainty of knowledge” interchangeably, as Quine does in his debate with Carnap.
understood better if one considers the fact that empirical methods cannot bring about certainty in knowledge, because empirical knowledge is based on our sensory experiences and on generalizations based on those sensory experiences. Sensory experiences are not immune to error, and a generalization based on a limited number of observations—even if those observations are certain—is not logically certain, for there might always be further evidence that falsifies the general statement. In conclusion, certainty vanished from the realm of our knowledge of the world in the absence of synthetic a priori judgments.

My understanding is that, according to Quine, Carnap seeks a definition of logical truth in order to preserve certainty in knowledge. Quine interprets Carnap as follows: as the result of Frege’s and Einstein’s achievements, Carnap concludes that there is no synthetic a priori knowledge. Yet Carnap still wishes to find a solid and certain foundation—or, in Carnap’s own words, a “rock bottom”—for knowledge. Carnap sees logical statements as a priori and immune to errors of experience and thinks, or so Quine assumes, that this “rock bottom” is where it is plausible to establish certainty in knowledge:

What now of the empiricist who would grant certainty to logic, and to the whole of mathematics, and yet would make a clean sweep of other non-empirical theories under the name of metaphysics? The Viennese solution of this nice problem was predicated on language. Metaphysics was meaningless through misuse of language; logic was certain through tautologous use of language.

As an answer to the question “How is logical certainty possible?” this linguistic doctrine of logical truth has its attractions. For there can be no doubt that sheer verbal usage is in general a major determinant of truth.\(^5\)

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\(^5\) Quine, “Carnap and Logical Truth,” 101. The italics are mine.
Quine believes that, to establish truths of logic and mathematics as certain and immune to the errors of our sensory experience, Carnap proposed language as the ground of their truth. According to Quine, both logic and mathematics belong to the realm of our knowledge of the world. Hence, if Carnap shows that the truths of logic and mathematics are certain, in Quine’s view, Carnap will prove that our knowledge of the world contains portions that are certain. If Carnap succeeds, he will rescue Kant’s project that failed because of Frege’s and others’ works, according to Quine.

Quine’s interpretation of Carnap’s program appears problematic. Carnap believes that logical statements have no content and say nothing about matters of fact. Hence, for Carnap, logical statements cannot be regarded as part of our knowledge of the world at all. Therefore, even if Carnap proves that logical truth is necessarily true, for him this proof would not secure necessity for our knowledge of matters of fact. So how could Quine attribute such a program to Carnap?

To this end, I need to examine Quine’s perception of Carnap’s program in more detail. Perhaps the best resource is Quine’s “Lectures on Carnap,” delivered by Quine in 1934, as a young professor at Harvard University. Even though the lectures were delivered when Carnap was still in his earlier philosophical periods, I believe that Quine’s later reception of Carnap’s principal program remained mostly the same, even after Carnap developed his most mature philosophical works. I shall explain Quine’s interpretation of Carnap with the help of those lectures. I should also mention that at the time Quine delivered the lectures, he was broadly in sympathy with Carnap’s philosophical approach, even though he understood

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6 These lectures were published first in Creath, R., ed., Dear Carnap, Dear Van (Berkeley: University of California Press, 1990), 45–103.
Carnap’s approach in his own way. Later, of course, Quine distanced himself from Carnap’s position, especially from his standpoint regarding the analytic–synthetic distinction.

In “Lectures on Carnap,” Quine states that there are common sense sentences that are largely accepted without having a proper basis for their truth. Those sentences include logical and mathematical sentences, empirical sentences, and the so–called metaphysical sentences. Quine explains that, to ground the truths of such accepted sentences of the ordinary language, Carnap reconstructs natural language and defines the ordinary terms that have been in use vaguely and without precise definitions in natural language: the language so reconstructed provides the truth of commonly accepted sentences. In other words, the rules of the language and the definitions that Carnap provides are simply “linguistic conventions” concerning the use of the words of the language. His reconstruction of natural language and his definitions of the terms accord with our past use of the language. Meanwhile, the construction and definitions provide the proper grounds for the truth of the accepted sentences of the language, in the sense that the sentences become logical consequences of the rules and definitions of the language. If we accept the rules and definitions of the language, we must acknowledge the truths of the sentences as well; in this sense, the sentences are necessarily true. Thus, as Quine explains, Carnap bases the truth of the accepted sentences solely on the rules and the definitions of the language. The sentences then become direct consequences of linguistic conventions. According to Quine’s, in doing so, Carnap renders the
accepted sentences analytic. In “Lectures on Carnap,” Quine states that by rendering already accepted sentences analytic, Carnap makes the sentences into necessary truths and, thereby, provides a firm basis for our already strong belief in them.

The property of analyticity (and necessity) introduced in Quine’s lectures is not something objective that is true of some sentences and that needs only to be discovered. Analyticity is a property that we may or may not bestow on any given sentence of the language, even if that sentence was once an empirical sentence. In his illustration of Carnap’s project, Quine explains how Carnap believed it theoretically possible to render every accepted sentence of the language analytic in the way just mentioned, no matter whether the sentence is logico–mathematical, physical, or even metaphysical. All that is needed is to define the terms of the sentence in such a way that the sentence becomes the direct consequence of linguistic conventions concerning the use of the terms. According to Quine, however, there is no point in making all accepted sentences of the language into necessary truths. Sentences that are neither general nor important to the body of our knowledge do not deserve to become analytic. For example, Quine says we should not turn the accepted sentence “In 1934 a picture of Immanuel Kant was hanging in Emerson Hall” into an analytic sentence. According to Quine, even among general and important accepted sentences, there are those sentences one hesitates to render analytic—those sentences that one might revise in the future, for

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8 Ibid., 62.
9 Ibid.
example. New discoveries in science force us to revise old hypotheses and empirical laws. Quine believes that, for the most part, one can choose what sentences, or what part of our knowledge, to revise in light of the results of new experiences. One usually chooses for revision those parts of knowledge that alter the whole body of the knowledge the least. Hence, for Carnap as interpreted by Quine, it is more convenient not to make analytic any sentence that one intends to consider for further possible revisions based on future discoveries.10 According to Quine's interpretation, Carnap, as guided by the considerations of convenience, renders analytic only logico–mathematical sentences, and those empirical sentences that hold such key positions in empirical science that one is inclined to erect the sentences into principles.11 Quine calls such privileged sentences *a priori* and explains that *a priori* sentences “are those which we are not going to give up at all, so basic are they to our whole conceptual scheme.”12

In his interpretation of Carnap’s project, Quine adds that it is simply a linguistic convention whether to choose a given sentence to render analytic:

*We are equally free* to leave some of our firmly accepted sentences outside the analytic realm, and yet to continue to hold to them by what we may call deliberate dogma, or mystic intuition, or divine revelation: but what’s the use, since suitable definition[s] can be made to do the trick without any such troublesome assumptions? If we disapprove of the gratuitous

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10 Quine says that if one renders such sentences analytic, with future empirical discoveries, he would be compelled to constantly redefine terms to generate new analytic sentences to replace the old ones. See Quine, “[Lecture I] The A Priori,” 63. Quine’s claim here is ambiguous, and there are important points that he does not explain at all. What is, according to Quine, the relation between an analytic sentence and observation? How may observation compel us to revise an analytic sentence? If because of observation we need to amend analytic sentences, then is there any difference between an analytic sentence and a synthetic one at all?


12 *Ibid.*, 65. At least in this work, Quine uses the terms “analytic,” “*a priori*,” and “necessary” interchangeably, and true of the same sentences.
creation of metaphysical problems, we will provide for such firmly accepted sentences within our definitions, or else cease to accept them so firmly.\textsuperscript{13}

One should note here that, according to Quine’s interpretation, having the same sort of firm and fundamental beliefs, Carnap believes that it is only a matter of choice to avoid “deliberate dogma” or “mystic intuition” by rendering such beliefs analytic through linguistic conventions. Else, one falls into problematic metaphysical assumptions by following the other direction and holding on to the same beliefs but as synthetic statements that are true independently of experience. According to Quine, Carnap obviously chooses the first option. In this way, Quine sees that Carnap saves the necessity of the statements that Kant believed to be necessary synthetic \textit{a priori} sentences; but by a linguistic trick, Carnap has changed their label to analytic and, hence, avoided all the undesirable metaphysical problems that Kant faced.

Based on what Quine demonstrates in his “Lectures on Carnap,” the importance of the notion of analytic or logical truth for Carnap lies in the use of this concept in justifying our firm beliefs. Carnap uses the concept of analyticity to preserve necessity in knowledge by rendering analytic the accepted sentences of common sense, or what Quine calls \textit{a priori} sentences. However, I do not see any epistemological importance in Carnap’s work as interpreted by Quine. It is true that from Quine’s perspective, Carnap succeeds in preserving the necessity of chosen statements, but the “necessity” that Carnap supposedly obtains (in the way that Quine attributes to him) is a \textit{verbal necessity}, in that it has no ground in the states

\textsuperscript{13} \textit{Ibid.} The italics are mine.
of affairs, but only in the language. Such necessity is an arbitrary one; simply by playing with linguistic tools, any sentence can be changed into a necessary truth and, just as arbitrarily, can be changed back into a synthetic one.

I do not see how, according to Carnap, such a verbal necessity can justify the necessity of our firmly accepted sentences. The following example illustrates how trivial the notion of necessity that Quine attributes to Carnap is. Consider the example “all ravens are black” as an empirical fact. Based on what Quine sees as Carnap’s program, Carnap might redefine the term “raven” as “a so–and–so black bird” and, hence, render the sentence analytic. Thus, if someone finds a bird with properties exactly identical to those of a raven, except that the bird is not black, this new evidence cannot be regarded as recalcitrant evidence for “all ravens are black” because, by definition, the bird cannot be a raven at all. Simply by playing with the linguistic definitions, the sentence “all ravens are black” is elevated to necessary truth, immune from any empirical refutation. By the same token, based on Quine’s interpretation of Carnap, although we normally render analytic only those sentences that are central to the whole body of knowledge, theoretically we might save any sentence that we wish to save just by some alterations in linguistic definitions. One can arbitrarily turn any sentence into a necessary truth; hence, the label “necessary truth” becomes an empty one that says nothing vital about possible differences among truths.

I believe that Quine’s interpretation of Carnap’s program is wrong. This arbitrary kind of preservation of sentences is so trivial and epistemologically useless that I cannot accept that Carnap ever had such a program in mind. Turning desired
sentences into necessary (and a priori) ones by such linguistic tricks as Quine cites might be a tangential result of Carnap’s program, but I do not think that this was Carnap’s main agenda. Besides, as far as I know, Carnap never suggested that saving necessity in our knowledge of the world was a concern of his.\textsuperscript{14} Especially after his syntax period, Carnap has never mentioned that justifying our belief in sentences—as this may sound in traditional epistemology—is a problem he is concerned with.\textsuperscript{15} As he mentions in numerous places, his theory of confirmation and his interest in the philosophy of science should be understood as his attempt to provide science with a tool, an exact language, to facilitate scientific activities, not as an effort to solve traditional problems about justified beliefs. Thus, Carnap is not following Kant’s unfinished epistemological program of grounding our certain beliefs in necessary truths. Most important, when Carnap says that analytic sentences are empty and say nothing about states of affairs, then for Carnap, turning empirical sentences into analytic sentences means that the sentences will be emptied of their cognitive content and, thus, can no longer be a part of the knowledge of the world. Therefore, Carnap must not be understood as if he justifies our belief in the certainty of some parts of our knowledge of the world by rendering those parts analytic that makes them empty sentences.

To summarize, such considerations show that an epistemological justification of the firmly accepted sentences of common sense was not Carnap’s aim in his

\textsuperscript{14} It is true that Carnap explicated the notion of necessity, as he does so for many other notions used in traditional philosophy; but explicating the notion of necessity is one thing, saving the necessity in our knowledge of the world is another.

\textsuperscript{15} For a comprehensive illustration of how epistemology in its traditional sense is not a concern of Carnap’s, refer to Michel Friedman’s excellent introductory article “Carnap’s Revolution in Philosophy,” in \textit{The Cambridge Companion to Carnap}, ed. M. Friedman and R. Creath (Cambridge: Cambridge University Press, 2007, pp. 1–18).
endeavor to define the analytic. Not only is there no evidence in Carnap's works for such an interpretation, but this interpretation is also inconsistent with Carnap's main philosophical ideas. When Quine delivered his “Lectures on Carnap,” Quine claimed to be in agreement with the views that he ascribed to Carnap. In fact, Quine's interpretation of Carnap at that time reflects what Quine himself then believed, but wrongly attributing those beliefs to Carnap. Later, Quine realized how arbitrary and epistemologically useless the alleged program of justification of the firmly accepted sentences of common sense was. Even after Quine later rejected the program of justifying the firmly accepted sentences of common sense, he continued to ascribe this program to Carnap. Believing that Carnap introduced logical truth into his philosophy because of this program, Quine concluded that by rejecting the program, there would be no further need for the concept of analyticity in Carnap's philosophy.\footnote{See the last section of Quine's “Two Dogmas of Empiricism,” in \textit{From a Logical Point of View} (Cambridge, MA: Harvard University Press, 1953, pp. 20–46). I shall come back to this point again in the next chapter.} Thus, Quine's attack on the very ground of the analytic–synthetic distinction in Carnap's philosophy is based on a misinterpretation of Carnap's program.

So far in this section, I have argued that Quine's understanding of the role of logical truth in Carnap's philosophy is wrong, but I have not yet mentioned what I believe to be the true interpretation of this role. Based on what I explained about Carnap's philosophy in the first three chapters, I shall now elaborate on the role of logical truth in Carnap's philosophy. For Carnap, philosophy is a part of logic and is called “the logic of the language of science,” and the task of philosophy is to clarify the ambiguities of scientific language. Philosophy does not study matters of fact, but
it does study our knowledge of matters of fact; philosophy distinguishes pseudo-problems from genuine problems in science and eliminates pseudo-problems through clarification of the language of science. To clarify a language, both the syntactical and the semantical structures of the language must be investigated. Thus, philosophy for Carnap comprises both syntax and semantics—and also pragmatics. When I noted earlier that Carnap is not interested in traditional problems of epistemology, I did not mean that he does not practice epistemology at all; after all, in his Pseudo Problems in Philosophy, Carnap states that philosophy is epistemology. Although Carnap is not interested in epistemology in the sense of justifying certain knowledge by examining abilities of the mind or by developing metaphysical theories, he is advancing knowledge by providing linguistic tools to represent knowledge accurately. In this sense, he is doing epistemology.

Theories of syntax and semantics do not concern matters of fact, but only linguistic relations. On the other hand, according to Carnap, to be cognitively meaningful is to be about matters of fact. So, how can Carnap justify his commitment to philosophical theories that are cognitively meaningless for him? To solve this paradox and to make sense of his philosophical theories, Carnap appeals to the category of analytic sentences (logical truth). He divides the statements that are customarily considered to belong to the body of our knowledge—sentences of both philosophy and science—into three parts: synthetic sentences that have

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18 This is true of most parts of Carnap’s philosophy; but his very last works, in which he tried to formulate probability, may not fit exactly into this illustration.
cognitive meaning; *analytic sentences* that do not have cognitive meaning, but are of logically well–formed structures; and *metaphysical pseudo–sentences* that neither have cognitive meaning nor are logically well–formed. The sentences of the first category belong mainly to science, those of the second category to logic (that for Carnap includes philosophy) and mathematics, and those of the third category to metaphysics. For Carnap, the sentences of the first two categories have value for knowledge, while those of the third category must just be eliminated. Thus, by introducing the category of analytic sentences, Carnap saves the sentences of philosophy as valuable sentences. Although sentences of philosophy are not cognitively meaningful and do not belong to our knowledge of matters of fact, the sentences serve science by providing exact tools for its investigation in such a way that science does not follow pseudo–problems.

Although, for Carnap, the value of philosophical sentences is preserved by the concept of analyticity, according to him, the importance of analyticity mainly comes from its role in demarcating logic and mathematics from science. For Carnap, science is different from logic and mathematics in that statements of science are empirical and about matters of fact, whereas logical and mathematical sentences are empty sentences that provide no information about matters of fact. However, logic and mathematics illustrate inferential relations between statements of science, and provide thus necessary tools to advance science through inferring new statements and confirming scientific claims by evidence. According to Carnap, to analyze scientific claims accurately, it is crucial to recognize the different natures of empirical and logico-mathematical statements that are used in the theories of
science. Carnap thinks that the concept of analyticity, which was used in traditional philosophy to explain such a difference, is not an exact concept and cannot be used sufficiently to demarcate logic and mathematics from science. Therefore, Carnap introduces his specific concept of analyticity (relative analyticity or logical truth) to do this job properly.

Contrary to what Quine says, Carnap does not introduce analytic sentences to preserve certainty in our knowledge of the world; Carnap does so to save what he calls exact philosophy as a valuable enterprise and, more importantly, to demarcate logic and mathematics from science. I shall explain this further in the next chapter, where I examine the main differences between Carnap and Quine to provide a better ground for understanding Carnap’s program.

Briefly, according to Quine’s interpretation, to show how \textit{a priori} and necessary statements can be possible, Carnap needs to define logical truth as a kind of truth that is independent of matters of fact. To find grounds for logical truth independently of matters of fact, Carnap turns to the rules of the language. According to Carnap as viewed by Quine, a logical truth is true because it uses the words as it should, and a logical truth is necessary and certain because it is the logical result of the rules of the language that are firmly determined. This is what Quine calls “the linguistic doctrine of logical truth.” In what follows, I shall examine the objections that Quine raises to Carnap’s definitions of logical truth. In the course of the discussion, to understand Quine’s objections more fully, we need to keep in mind how Quine sees the role of analyticity in Carnap’s philosophy.
The Linguistic Doctrine of Logical Truth

Quine states the linguistic doctrine of logical truth, which he attributes to Carnap, as follows:

... the logically true sentence ... is a sentence which, given the language, automatically becomes true, whereas ‘Brutus killed Caesar’, given the language, becomes true only contingently on the alleged killing.\(^{19}\)

This doctrine states that a logically true sentence does not assert anything about states of affairs and its truth depends only on the language, while the truth of a factual sentence depends on both the language and some state of affairs.

Quine explains that there are considerations that make this doctrine look attractive. Suppose there are pre–logical people who do not follow logical principles, or that there is an alternative logic that consists of principles that are allegedly contrary to our logic. Quine claims that, by appealing to the obviousness of our logic, we are in principle able to deny that there are pre–logical people, or that two logics are contradictory: we might claim that in the sentences of allegedly pre–logical people, or of the alternative logic, familiar logical particles are just being used in other senses than ours. We might declare that if logical particles of the alternative logic are translated properly into logical particles of our system, then we can translate the alternative logic’s apparently contradictory principles into the familiar principles of our logic. Quine’s following example helps to clarify this point.

Consider the claim that there are pre–logical people who accept particular self–contradictions as true. Suppose these people accept the sentence “q ka bu q,” which apparently means “p and not p,” as true. Quine says that one is free to deny

\(^{19}\) Quine, “Carnap and Logical Truth,” 101.
that “q ka bu q” is a self–contradiction by claiming that the sentence is mistranslated into English. Quine does not explain his point here clearly, but my understanding of his claim is this: we might accept that the people are pre–logical because our studies of their behaviour show that by “ka” and “bu,” the people mean “and” and “not,” respectively, and thus, by “q ka bu q” they refer to some self–contradiction; otherwise, we might claim that this sentence does not contain any contradiction and that the behaviour of the people is just misunderstood when they are interpreted as accepting a self–contradiction. For this latter claim, Quine does not say why we might reject an interpretation of the behaviour that is against our logical principle. Based on what he says later in the same article on the obviousness of logical truth, I take his point here as follows: in rejecting such an interpretation of the people’s behaviour, we appeal to the obviousness of our logical principles in that we may declare that whatever empirical evidence that one might claim against our obvious logical principles is, inevitably, merely misconstrued. Quine puts it as follows:

If any evidence can count against a lexicographer’s adoption of ‘and’ and ‘not’ as translations of ‘ka’ and ‘bu’, certainly the natives’ acceptance of ‘q ka bu q’ as true counts overwhelmingly.20

My understanding of Quine’s point here is that if one points out any behaviour of the people, and claims that that particular behaviour provides empirical evidence that the people by “q ka bu q” mean “p and not p,” we might reject the evidence by claiming that the observer just misunderstood the behaviour of the people, because his interpretation of the behaviour is against our obvious logical principle. In other

20 Ibid., 102.
words, any such behaviouristic evidence against a logical principle can be deemed as misinterpreted simply because the evidence is against the obvious logical principle.

As Quine notes, Carnap might use the considerations about alternative logics and pre–logical people to support the idea that there is no fact that can determine truth or falsity of a truth of logic. In other words, Carnap might claim that because we cannot refer to any state of affairs in solving a dispute about the meaning of a logical truth—that is, there is no fact that can be used confidently to support either way of translating a logical truth—then logical truths cannot be falsified by facts, and thereby, logical truths have no factual content. As Quine says:

This reflection [on alternative logics] goes to support the view that the truths of logic have no content over and above the meanings they confer on the logical vocabulary.21

According to Quine, Carnap can claim that, since logical truth has no factual content, the truth of a logical truth can only be determined by its language (that is, merely by referring to the applications of its logical particles, which have no factual meanings and are merely linguistic entities). According to Quine, Carnap may say that the earlier considerations on alternative logics and pre–logical people support the linguistic doctrine of logical truth in that those considerations show that the truth of logical truth depends merely on the language. I believe Quine’s main point here is to show that Carnap might use the very possibility of rejecting any given sentence that is against our logic to claim that our logic is universally true, whatever matters of fact are.

21 Ibid. Explanations inside the brackets are mine.
Quine first reformulates the linguistic doctrine of logical truth in the form of an *empirical thesis* and then objects to the reformulated doctrine on the grounds that it is empirically empty. According to Quine, the doctrine can be reformulated empirically as follows:

*Deductively irresoluble disagreement as to a logical truth is evidence of deviation in usage (or meanings) of words.*

In other words, if we want to persuade somebody of the truth of a sentence, we will often deduce that sentence from other sentences that he accepts. The chain of deduction may go on to reach a sentence that either we both agree on or is such that we can easily come to an agreement on its truth or falsity by directly referring to matters of fact. If a disagreement on a sentence cannot be resolved in such a way, Quine calls this a deductively irresoluble disagreement. Quine’s above reformulation of the linguistic doctrine of logical truth suggests that a deductively irresoluble disagreement as to the truth of a sentence is rooted not in a disagreement over matters of fact, but merely in a disagreement over the usage of the words of the sentence.

Quine’s objection to the linguistic doctrine of logical truth, as just reformulated empirically, goes as follows: first, this doctrine says no more than the fact that logically true sentences are obvious, and second, obviousness has no epistemologically explanatory value. Thus, the linguistic doctrine of logical truth explains nothing about the truth of logical truth. To examine Quine’s objection, I shall first explain how according to Quine the linguistic doctrine of logical truth

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merely states that logical truths are obvious. Then I will consider whether by saying that a sentence is obvious, we say anything of epistemological value about that sentence.

As we saw earlier, Quine cites the examples of a pre–logical people and alternative logics to show how Carnap might appeal to the related considerations to support the claim that logical truths are independent of matters of fact. But Quine claims that those considerations support nothing more than the fact that logically true sentences either are obvious or can be obtained by obvious steps.24 We might deny that there is an alternative logic, since we might reject any translation of the sentences of the logic that contradicts our logical principles just because the translation violates obvious truth. We might also deny that there are pre–logical people, since we might reject as misconstrued any behaviouristic evidence that shows they believe in a non–logical statement merely because the behaviouristic evidence is interpreted against our obvious truths. Thus, we may deny alternative logics, and we may deny that there are pre–logical people, only because we consider our logic to be obvious, and hence, we do not tolerate any violation of obvious truths.25 The earlier claim was that, since based on such considerations one might reject any recalcitrant behaviouristic evidence against a logical statement by asserting that the behaviour is misunderstood, a logical statement cannot be falsified by empirical evidence. It was concluded thereby that a logical statement is independent of matters of fact, and its truth is grounded only on the meanings of its words. But Quine says that the rejection of such recalcitrant evidence happens only

24 Ibid.
25 Ibid., 105–6.
because we consider the logical statement obvious and we do not want to give it up. Therefore, according to Quine, considerations about alternative logics and prelogical people do not support any conclusion except that we take our logical truth to be obvious.

Because one sees logical truths as obvious statements, one is inclined to believe that such sentences are independent of matters of fact. In other words, one is inclined to accept logical truths right away as if there is no need to investigate matters of fact to see whether they are true. As Quine explains, because of the fact that truths of sentences ordinarily depend on both the language and the states of affairs, it might seem reasonable to assume that, in the case of logical truths, the truth is only dependent on the language.\(^{26}\) Thus, according to Quine, one's inclination to assume that logical truth is independent of matters of fact is rooted merely in the obviousness of logical truth; hence, the linguistic doctrine of logical truth can be replaced by the simple statement that *logical truths are obvious*.

For Quine, however, obviousness is a vague psychological attribution with no explanatory value.\(^{27}\) First, I shall explain what Quine means by “a vague psychological attribution,” and then I will examine whether obviousness has any “explanatory value.” Quine is extremely brief on his first point and does not elucidate what he means by “a vague psychological attribution.” I may interpret his point as follows: when we call a sentence obvious, we mean that we are ready to accept the sentence as true immediately. Our readiness to accept a sentence does not say anything about *the grounds* for accepting it as true; our readiness merely

\(^{26}\) See *ibid.*, 101.

\(^{27}\) See *ibid.*, 106.
describes our psychological state with respect to the sentence and, as such, is a subjective psychological attribution. Obviousness is a vague psychological attribution in the sense that the readiness to accept a sentence may vary from person to person or from situation to situation. Even two contradictory sentences may be considered as obviously true on two different occasions. Thus, when we call a sentence obvious, we are, in fact, saying nothing empirically meaningful about the characteristics of the sentence.

But Quine’s main point is that obviousness has no epistemological explanatory value. Quine means that one can equally attribute the obviousness to the subject–matter of a logical sentence, rather than to the sentence itself. In other words, one can claim that the sentence is true because its subject–matter is obviously the case. There is no empirical evidence to support the obviousness of a logical sentence itself against the obviousness of its subject–matter. Quine gives the sentence “everything is self–identical” as an example, and explains:

We can say that it depends for its truth on traits of the language ... and not on traits of its subject matter; but we can also say, alternatively, that it depends on an obvious traits, viz., self–identity, of its subject matter, viz., everything. The tendency of our present reflections is that there is no difference.\(^{28}\)

Quine’s point is that the truth of the logical sentence can be equally justified as an obvious truth by referring either to the form and meaning of the sentence or to its subject–matter. For Quine, there is no empirical difference in choosing one over another, and in attributing the obviousness either to the linguistic form or to the

\(^{28}\) Ibid., 106. The italics are mine.
subject–matter. When we call the sentence obvious, we do not provide any objective empirical evidence by which we may defend the claim; we are merely explaining our subjective psychological state with regard to the sentence. Quine’s point is that a similar psychological inclination may be found in another person as to the subject–matter of the sentence, rather than as to the sentence itself; the person may call the subject–matter obvious, not the sentence, and his claim is as justified as the claim that the sentence is linguistically obvious. As Quine asserts, there is no empirical difference between grounding the truth of the sentence “everything is self–identical” either on the obvious traits of the language or on the obvious traits of the subject–matter. The same thing can be said about the obviousness of any logical truth. Hence, according to Quine, there is no empirical evidence that determines whether a logically true sentence owes its truth merely to the obvious traits of its language. Thus, the claim that a logical sentence is obvious does not epistemologically explain the truth of the sentence.

Quine’s objection to the linguistic doctrine of logical truth can be summarized as follows: This doctrine is empty, in that the doctrine neither provides grounds for the truth of logical truth nor does the doctrine even have a definite empirical meaning. The doctrine says nothing more than that logical truth is obvious. But obviousness is a vague psychological term that has no explanatory value; the term refers only to an ambiguous subjective psychological state. The linguistic doctrine of logical truth, in effect, says nothing empirically meaningful about the characteristics of logical truth. Besides, the trait of obviousness can be equally attributed to a logically true sentence or to its subject–matter. This means that we might accept the
sentence as true because of the obviousness—whatever this term may mean—either of the sentence or of its subject—matter. By the same token, we may claim either that the sentence is obviously independent of matters of fact or that the pertinent facts are obviously the case. There is no empirical (behavioural) difference between these two claims, because we have no empirical criterion with which to choose one claim over the other. Thus, the property of obviousness, even if it has a concrete meaning, cannot be used to conclude decisively that the truths of logically true sentences are merely because of their linguistic forms; therefore, this doctrine cannot explain the difference between logical truths and other truths. According to Quine, the linguistic doctrine does not provide an account of the grounds for the truth of logical truth because the doctrine gives us no empirical criterion by application of which we may distinguish logical truths (those true by virtue of linguistic rules) from others (including those true by virtue of obvious facts). The doctrine is empirically empty, and epistemologically explains nothing.

It is interesting to see how Carnap reacted to this objection. In his reply to Quine in “W. V. Quine on Logical Truth,” Carnap says:

Quine says (in § II) that in a certain sense,

1. elementary logic is obvious.

I presume that he does not understand the word “obvious” here in the sense in which someone might say: “it is obvious that I have five fingers on my right hand”, but rather in the sense in which the word is used in: “it is obvious that, if there is no righteous man in Sodom, then all men in Sodom are non–righteous”. In this case, one merely has to think in order to recognize the truth; no observations of the men of Sodom are needed. If Quine has this meaning in mind, we are in agreement.29

In other words, Carnap assumes that Quine believes that a logical sentence is obvious because of the language, not because of the state of its subject–matter; in Quine’s terminology, obviousness is a trait of the language, not of the subject–matter. Carnap then argues that since Quine accepts that a logically true sentence is obvious because of its language, and also admits that the linguistic doctrine says no more than this, thus “Quine having accepted (1), must also accept LD [the linguistic doctrine].” Surprisingly, Carnap construes Quine’s point as though Quine has accepted that the truth of logic is obviously based on the language. But as I illustrated a few paragraphs earlier, Quine explicitly states that there is no difference whether obviousness is attributed to the language or to the subject–matter and that there is no reason to prefer one attribution over another. According to Quine, we do not have any empirical evidence to prove that the truth of logic depends only on the traits of the language. In fact, here Carnap foists onto Quine the very distinction that Quine is out to challenge. Carnap continues:

Indeed, I have the impression that Quine’s critical argument (2) [that the linguistic doctrine says no more than the fact that logical truth is obvious] is not meant as a refutation. He himself says soon afterward: “I do not suggest that the linguistic doctrine is false”. I presume that he wants to say that the doctrine is not false. (If so, I wish he had said so!) He nowhere says that the doctrine is meaningless.... Therefore, we may presume that he regards the doctrine as true.

I find Carnap’s conclusion here to be odd. It is true that Quine does not suggest that the linguistic doctrine is false, but this does not mean that he therefore thinks it is true. Quine’s claim here must be construed simply as that he does not know whether

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30 Ibid.
31 Ibid., 917. Explanations inside the brackets are mine.
the doctrine is true. Quine in fact asserts that he does not know whether logical truths are obvious because of their language or because of their subject–matter. Furthermore, Carnap argues as though obviousness is reason enough for Quine to accept the logical doctrine; while for Quine, obviousness is a vague psychological term with no explanatory value.\textsuperscript{32} Although Quine never says that the linguistic doctrine is meaningless, he does claim that it is empty of experimental content. Thus, even if Quine accepts that obviousness is a trait of the language, the linguistic doctrine is still experimentally (and thus epistemologically) empty for him, and it explains nothing about logical truth. Hence, Carnap’s representation of the arguments of Quine is clearly contrary to what Quine himself means.

It may be that Carnap misunderstands Quine’s arguments in part because of Quine’s way of argumentation. Carnap states the following:

\begin{quote}
... I shall sometimes be compelled to discuss Quine’s views hypothetically, that is to say, on the basis of presumptions about the meanings of his formulations, because I have not been able to determine their meanings with sufficient clarity.\textsuperscript{33}
\end{quote}

It is true that Quine is not always clear in his discussions; on occasions, he does not conclude a discussion and leaves it to the reader to reach his own conclusion. At times, there is a lack of clarity about how a particular argument of his is related to the subject–matter under scrutiny. But Quine’s style of writing is not the main source of misunderstanding for Carnap. The significant difference between their points of view is the basis for Carnap’s misunderstanding of Quine. This difference actually causes both of them to misunderstand each other’s arguments. After mentioning Quine’s similar errors, I shall clarify this difference more fully.

\textsuperscript{32} Quine, “Carnap and Logical Truth,” 106.
\textsuperscript{33} Carnap, “W. V. Quine on Logical Truth,” 916.
In his objection, Quine protests that the linguistic doctrine of logical truth has no “experimental meaning.” Yet Quine does not explain what he means by experimental meaning. In fact, he wraps up this objection between his discussions on obviousness of the linguistic doctrine and then quickly passes over the notion of experimental meaninglessness. Still, Carnap sees this objection as Quine’s main objection to the linguistic doctrine of logical truth; so do I. Earlier, I looked briefly at what Quine means by experimental meaninglessness, but since it is the core of his objection, I now need to elaborate further.

As I see it, by experimental meaninglessness of the linguistic doctrine of logical truth, Quine means that the doctrine does not provide us any experimental criterion with which we can determine whether any given sentence is a logical truth, in the sense that whether the sentence is held only by virtue of the rules of the language. If we look at this point from Carnap's standpoint, we shall see that Quine’s demand for empirical meaning for the linguistic doctrine has its roots in Quine’s misinterpretation of the linguistic doctrine, in that he considers this doctrine as Carnap’s definition of logical truth. In his reply to Quine, Carnap warns us that what Quine attributes to Carnap as the linguistic doctrine of logical truth—namely, that logical truth is true by virtue of the language—must not be regarded as Carnap’s definition of logical truth, but must be regarded as only an informal explanation of logical truth that Carnap basically provided before his development of semantic systems.

To explain Carnap’s point, we must consider the difference for Carnap between a “definition” and an “informal explanation” of logical truth. According to Carnap, a

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34 Quine, “Carnap and Logical Truth,” 105.
sufficient definition of analytic (logical truth) must provide us with an exact step–by–step criterion with which, when applied, we can determine whether any given sentence in a language is analytic. In this sense, the linguistic doctrine cannot be a definition of the notion of logical truth, but remains only an informal characterization of the notion that paves the road toward providing a definition for the notion. Indeed, the linguistic doctrine of logical truth formulated by Quine is a version of what Carnap calls the “general characterization of logical truth,” which functions as the condition of adequacy for definitions of logical truth. As I noted in Chapter Three, Carnap deems a definition of logical truth as adequate if that definition illustrates this general characterization for logical truth.

If we look at the discussion from Carnap’s point of view, to demand an experimental meaning for a doctrine about sentences, in the sense that it contains a concrete step–by–step empirical procedure applicable to sentences, might be plausible if the doctrine is a definition of logical truth; but the demand is definitely not acceptable if the doctrine is an adequacy condition of such a definition. Quine’s linguistic doctrine, when construed as a version of Carnap’s adequacy condition of definitions of logical truth, does not need such a step–by–step procedure to be applied to any given sentence. The doctrine as the adequacy condition does not deal with every sentence individually. Carnap sees the linguistic doctrine, or the adequacy condition, as an analytic philosophical doctrine; the doctrine does not concern matters of fact, but is merely a linguistic statement that represents the relations among linguistic signs and expressions. Thus, according to Carnap, the

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36 I discussed this issue in detail in Chapter Two, section “Syntactical Definitions of Analyticity,” 47–57.
37 For a detailed discussion on adequacy requirement for the definition of logical truth, refer to Chapter Three, section “L-Concepts and the Explication of Analyticity,” 83–97.
linguistic doctrine, when construed as the adequacy condition for definitions of logical truth, cannot have—and does not need—empirical meaning. The doctrine is meaningful as long as we can determine whether any given definition of logical truth refers to extra–linguistic objects when it defines truths of logic. Based on Carnap’s view, when we apply the linguistic doctrine as the adequacy condition, we do not need to use any experimental methods; linguistic inspection is sufficient. We have already seen in Chapters Two and Three how Carnap applies the adequacy condition to definitions of analyticity.

Conversely, there is no difference of kind between philosophical doctrines and scientific doctrines, for Quine. Any doctrine in any field must be empirical; otherwise, the doctrine is empty. More precisely, for Quine, knowledge is a natural phenomenon and must be explained in terms of our theory of the world; there is no difference of kind between epistemology and other natural sciences. The linguistic doctrine of logical truth, whether it is supposed to define logical truth or to be an adequacy condition for such definitions, must be an empirical thesis to explain something about knowledge, or else the doctrine is worthless. For Quine, it does not matter whether the linguistic doctrine is a definition of logical truth or just an adequacy condition for such a definition. To be of any explanatory value, the doctrine must have observational consequences. Since the logical doctrine lacks this characteristic, it says nothing explanatory about anything and, thus, as a doctrine, is scientifically worthless.

Both Quine and Carnap interpret each other’s arguments from their own philosophical perspectives, without paying attention to how the other one understands the linguistic doctrine; thus, their replies to each other are misleading.
For example, Carnap understands Quine’s demand that the linguistic doctrine of logical truth be experimentally meaningful in this peculiar way:

The main point of his [Quine’s] criticism seems rather to be that the doctrine is “empty” and “without experimental Meaning”. With this remark I would certainly agree, and I am surprised that Quine deems it necessary to support this view by detailed arguments. In line with Wittgenstein’s basic conception, we agreed in Vienna that one of the main tasks of philosophy is clarification and explication. Usually, a philosophical insight does not say anything about the world, but is merely a clearer recognition of meanings or of meaning relations. If an insight of this kind is expressed by a sentence, then this sentence is, although meaningful (as we would maintain in contrast to Wittgenstein’s view), not factual but rather analytic. Thus I would interpret, e.g., the principle of verifiability (or of confirmability), or the empiricist principle that there is no synthetic a priori, as consisting of proposals for certain explications (often not stated explicitly) and of certain assertions which, on the basis of these explications, are analytic. Such philosophical principles or doctrines are sometimes called theories; however, it might be better not to use the term “theory” in this context, in order to avoid the misunderstanding that such doctrines are similar to scientific, empirical theories.38

At the beginning of this quotation, Carnap claims that he agrees with Quine that the logical doctrine is not about matters of fact and that the doctrine only talks about sentences—that the logical doctrine is not synthetic, but is analytic. Here, Carnap fails to see why being devoid of empirical content is a problem for Quine when the claims involved are analytic (and philosophical) rather than synthetic. Carnap discusses Quine’s argument as if Quine already accepted both the analytic–synthetic dichotomy and the fact that philosophical and scientific doctrines are analytic and

38 Carnap, “W. V. Quine on Logical Truth,” 917. The italics are mine.
synthetic, respectively. Carnap sees Quine asking why Carnap uses an analytic doctrine rather than a synthetic one to explain logical truth (that is, why Carnap uses a philosophical doctrine instead of a scientific one). Carnap wonders why Quine would ask such a question, when Quine should know that the question of meaning is a philosophical one and requires an analytic answer. Then, in the rest of the quotation, Carnap goes on to clarify this issue for Quine again! I agree that Quine mentions only in passing that the linguistic doctrine is without experimental meaning, without explaining what he means by this term. I also agree that, in many cases, it is difficult to grasp the exact meaning of Quine’s arguments and that Carnap has no choice but to “discuss Quine’s views hypothetically,” as Carnap asserts. But the sort of interpretation of Quine’s arguments that Carnap provides here is certainly far from their context.

Even though Quine does call the linguistic doctrine “empty” and “without experimental meaning,” he does not mean the same thing as Carnap may understand by those terms. Quine calls the linguistic doctrine empty because he sees the doctrine as equivalent to the assertion that logical truth is obvious, and there is no way to determine whether it is obvious due to fact or to language. Quine calls the doctrine one without experimental meaning because this doctrine does not involve any process of empirical investigation of sentences to see whether they are held true merely by virtue of the language. Quine’s objection, therefore, is not that the doctrine is not synthetic or that it is not about matters of fact, Quine does not accept the analytic–synthetic distinction. He only cares whether the doctrine is empirical, that is, whether it provides us with an empirical criterion sufficient to
examine sentences. If such criterion is not provided, then the doctrine is empirically empty and worthless for Quine.

The Carnap–Quine discussion on the linguistic doctrine of logical truth is a good example of the fact that neither Carnap nor Quine is prepared to view the debate over the analytic–synthetic distinction from the other’s point of view. Neither construes the opponent’s argument in its relevant context, but each takes the opponent’s argument, imports it into his own philosophical context, and interprets it based on his own assumptions. In the discussion on the linguistic doctrine, Quine demands an empirical meaning for the doctrine, while at the outset, Carnap rejected such a possibility. For Carnap, discussion of analyticity cannot be empirical, but only analytic in its nature; thus, asking for the empirical meaning of the linguistic doctrine is just an error for Carnap. For Quine, by contrast, the analytic–synthetic distinction does not make sense, and epistemology must be empirical; thus, Quine is looking for an empirical justification of the linguistic doctrine. In other words, Carnap first accepts that there is an analytic–synthetic distinction and then argues on such assumption; whereas, Quine first questions the analytic–synthetic distinction and then engages in the debate in a way that agrees with the presumption that the distinction is either empirically well–founded or it is to be rejected as a dogma of empiricism. I believe that in many cases, both Carnap and Quine criticize each other’s ill–construed arguments on analyticity. Later in this chapter and in the next one, we shall see more instances of such misinterpretations on both sides.
Truth by Linguistic Convention

Quine says that the linguistic doctrine of logical truth can also be expressed as follows: logical truths are true by linguistic conventions. He attributes such a definition of logical truth to Carnap, and then he refutes that definition. Quine sketches out his early doubts about the sufficiency of defining logical truth by means of linguistic conventions in his article, “Truth by Convention.” In that article, he starts by stating that conventions in logic cannot be explicit and claims that this fact became evident in Lewis Carroll’s paradox. Then, Quine argues that if conventions cannot be represented in logic explicitly, then we cannot claim for sure that there are such conventions at all or that logic is built up on conventions. Finally, he claims that since the conventional basis of logic is not certain, then we cannot say that truths of logic are conventional. This argument is Quine’s first objection to the conventionality of logical truth, which is grounded on Carroll’s paradox. For the moment, I hold off on discussing Quine’s first objection, to which I shall return in the next section. In the same article, Quine’s main objection to the conventionality of logical truth is that we cannot create truth by linguistic conventions. Here I will focus on Quine’s main objection that achieves its maturity in Quine’s later work, “Carnap and Logical Truth.” However, I need first to elaborate in detail on what Quine means by truth by convention and on the position he attributes to Carnap on the role of convention in logic. Quine explains his views regarding generating truth by convention in his “Truth by Convention.” Here, I shall start by briefly

representing his ideas in this article. Then, I shall examine whether this view is true of Carnap’s philosophy and whether Quine’s objection to truth by convention affects Carnap’s definition of logical truth.

Quine’s “Truth by Convention” was originally published the year after he delivered his “Lectures on Carnap,” when he still considered himself a proponent of Carnap’s philosophical approach. In this article, Quine tries to explain Carnap’s points sympathetically, although some of his differences with Carnap are starting to show. In this article, as well as in his lectures, Quine sees the underlying points of Carnap’s philosophy in a very peculiar way, as I explained earlier; I noted there that I do not agree with such an interpretation of Carnap’s philosophical program.

At the beginning of his discussion in “Truth by Convention,” Quine makes it clear that truth by convention is not the same as truth by definition, although these two phrases are at times considered the same. A definition is a kind of convention, but not all conventions are definitions. A definition is a convention of notational abbreviation—two of Quine’s examples are “a kilometer is a thousand meters” and “tan x = sin x/cos x.” A definition translates a sentence into another through replacing expressions by expressions. In a translation, if the original sentence is true, then the sentence resulting from the translation is true too. In this sense, a definition merely transmits truth from one sentence to another through a translation; the definition does not generate the truth of the sentence. Quine explains, “What is loosely called a logical consequence of definitions is therefore more exactly describable as a logical truth definitionally abbreviated: a statement

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which becomes a truth of logic when definienda are replaced by definientia.” But the kind of convention in logic that might generate the truth of a sentence is a *postulate*, not a definition, as we shall see.

Suppose we introduce, by definition, a set of primitive notational abbreviations in a language system or in a logic. By virtue of those abbreviations, all statements of the system can be transformed and reduced to a primary set of a few sentences involving only those notational abbreviations. Through use of different definitions, we may introduce different notational abbreviations and, thereby, end up with different primary sets of sentences for a language system. Such a primary set is a set of most general sentences of the language system, from which all other sentences of the system, general or specific, can be inferred. Quine calls the sentences of such a primary set the postulates of the system. Since all statements of the language system are reducible to postulates by definition, the truth of the postulates can be transmitted to all the sentences of the language system. If the postulates are true, all the sentences of the language system will be true as well. This is where, according to Quine, truth by convention might take place. By linguistic convention, we might assign truth to the postulates of the system—that is, we simply accept them as true—and, hence, all the sentences of the logical system would turn true by convention.43

Quine’s explanation of the formation of a language system based on postulates is almost totally in accordance with Carnap’s exposition of the construction of a calculus (or an axiom system or a postulate system). In Chapter Two, I discussed

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42 Ibid., 72.
43 See ibid., Section II.
how a language system is a calculus for Carnap and how such a system can be built. Quine’s illustration of the construction of a postulate system is basically the same as Carnap’s explanation there, but in reverse. Carnap explains how one can build a new calculus from scratch, while Quine shows how one can reconstruct an existing language system as a calculus. In Carnap’s explanation, one first lays down the formation and transformation rules of the system and defines the signs of the system by means of conventions, and then one generates expressions of the system out of the signs by virtue of the formation and transformation rules of the language. But in Quine’s explanation, a complete system of a language is already at hand; one defines abbreviations and discovers the rules of the language (both the formation and transformation rules, in Carnap’s terminology) based on the pre–existing relations between expressions of the language at hand and, then, by virtue of the discovered rules of the system, reduces all sentences of the language system into the most general sentences that include only the defined abbreviations.

To create a new postulate system, the rules of the system are conventionally laid down, but to reconstruct a pre–existing language as a postulate system, the relations between expressions are discovered and represented as the rules of the language system. In the creation of a totally new language system, the role of convention is more dominant. As a matter of fact, Carnap tries both ways of constructing a postulate system, or calculus. In his syntax and semantics periods, when Carnap constructed artificial languages, he tried to construct languages from scratch by conventionally laying down the rules of each language, but in his earlier

44 See Chapter Two, section “Language as a Calculus,” 43–46.
attempt in the *Aufbau* to logically reconstruct our knowledge, Carnap tried to reconstruct the language of science according to Quine’s method.45

In “Truth by Convention,” Quine says that not only can we reconstruct logic and mathematics as postulate systems, and then by holding postulates as truths by convention, render logic and mathematics true by convention, but we can also do the same for geometry, physics, and even other branches of our knowledge. Carnap’s own works are the best examples of this. Hence, it is in principle possible to axiomatize all branches of human knowledge and turn them into conventional truths. But when we say that logic (or mathematics) is true by convention, how can this rendering provide a practical way of distinguishing logical truths from non–logical ones? As Quine puts it, the problem is as follows:

If in describing logic and mathematics as true by convention what is meant is that the primitives can be conventionally circumscribed in such fashion as to generate all and only the accepted truth of logic and mathematics, the characterization is empty; our last considerations show that the same might be said of any other body of doctrine as well. If on the other hand it is meant merely that the speaker adopts such conventions for those fields but not for others, the characterization is uninteresting; while if it is meant that it is a general practice to adopt such conventions explicitly for those fields but not for others, the first part of the characterization is false.46

To use “being true by convention” as a characteristic that defines logical truth and distinguishes it from non–logical truth, it must be a characteristic exclusive to logical truth. However, as Quine explains here, not only logical truth but also all

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45 For a concise explanation of Carnap’s logical reconstruction of the language of science in the *Aufbau*, see Chapter One, “Reductionism and the Criterion of Significance,” 24–30.
46 Quine, “Truth by Convention,” 95.
other truths of knowledge can be true by convention. Thus, being true by convention cannot be a distinguishing characteristic of logical truth. The question, then, is how being true by convention can be used to demarcate logical from non–logical truth? Quine responds to this question from Carnap’s point of view, but in doing so, Quine reflects the false conception of Carnap’s philosophical program that I discussed in detail earlier in this chapter:

Still, there is the apparent contrast between logico–mathematical truths and others that the former are a priori, the latter a posteriori. Viewed behavioristically and without reference to a metaphysical system, this contrast retains reality as a contrast between more and less firmly accepted statements. There are statements which we choose to surrender last, if at all, in the course of revamping our sciences in the face of new discoveries; and among these there are some which we will not surrender at all, so basic are they to our whole conceptual scheme. Among the latter are to be counted the so–called truths of logic and mathematics. Now since these statements are destined to be maintained independently of our observations of the world, we may as well make use here of our technique of conventional truth assignment and thereby forestall awkward metaphysical questions as to our a priori insight into necessary truths. On the other hand this purpose would not motivate extension of the truth–assignment process into the realm of erstwhile contingent statements. On such grounds, then, logic and mathematics may be held to be conventional while other fields are not; it may be held that it is philosophically important to circumscribe the logical and mathematical primitives by conventions of truth assignment but that it is idle elaboration to carry the process further. Such a characterization of logic and mathematics is perhaps neither empty nor uninteresting nor false.47

47 Ibid., 95–96. The italics are mine.
This passage shows that Quine had been interested in behaviouristic explanation of truth since his early period in the 1930s, when he considered himself an enthusiastic proponent of Carnap’s philosophy. Quine’s deep commitment to behaviouristic understanding of truth compels him to see Carnap following the same path; according to Quine, Carnap also sees the contrast between logical and non–logical truth as a contrast in human behaviour toward two kinds of truth, that is, as “a contrast between more and less firmly accepted” truths.

In the passage above, Quine argues that, although it is possible in principle to reconstruct every branch of knowledge as a postulate system and render it true by convention, we do this reconstruction only for logic and mathematics because only they are *a priori* doctrines. In other words, only statements of logic and mathematics are epistemologically so basic that we would never give them up, and they “are destined to be maintained independently of our observations of the world.” We stick to logical and mathematical statements by rendering them true by convention, and in this way, we preserve them in face of all evidence. Conversely, other statements of knowledge are *a posteriori*, in the sense that we do not find those statements epistemologically so basic to our body of knowledge and, thus, do not care if the statements are altered by observation. Therefore, we do not bother to reconstruct other branches of knowledge than logic and mathematics as postulate systems to render them true by convention.

To summarize, Quine interprets Carnap as follows: Although it is possible in principle to make all truths of knowledge truths by convention no matter whether they are logical or non–logical, in practice we make only logical truths, truths by
convention because we want these logical truths—and only these truths—to remain unchanged when facing observations. Quine believes that to be true by convention can be an exclusive characteristic of logical truths because our behaviour shows that we want only logical truths to be *a priori* and conventionally true, and we are inclined to consider other truths to be *a posteriori*.

In the quotation above from “Truth by Convention,” Quine repeats his behavioural interpretations of the notions “*a priori*” and “*a posteriori*” and of Carnap’s motives for introducing logical truth, as he discussed in his “Lectures on Carnap,” sometimes verbatim. In the first section of this chapter, I explained in detail how Quine’s interpretation of Carnap’s program is mistaken. I need only mention briefly that Carnap does not introduce logical truth to privilege the statements that we allegedly do not wish to surrender at all, by putting them in the experimentally untouchable position called *truth by convention*. To justify making true by convention as an exclusive and defining characteristic of logical truth, Quine appeals to the behavioural inclination for saving logical truths as *a priori*. But, as I noted earlier, Carnap does not care about such inclinations and he does not want to explain truth behaviourally. Therefore, *true by convention* as a defining characteristic of logical truth cannot have the same significance for Carnap as for Quine.

Let’s review the situation briefly. Quine says that Carnap defines logical truth as *truth by convention*. Quine then explains that the attribution “truth by convention” can be applied to all knowledge. To show how we are justified in calling *only* logical truths true by definition and, by so doing, how we can demarcate logical
truths from others, Quine presents the following justification. Since we are inclined to save only logical truths by rendering them true by convention, and we do not have such a motive with respect to other truths, then calling only logical truths “truth by convention” is behaviourally justified. Quine attributes such a justification to Carnap. However, we just saw that this was not Carnap’s view. Thus, the original question remains: how can Carnap justify the use of being true by convention as an exclusive and defining characteristic for logical truth? Perhaps there is no need at all for such a justification in Carnap’s philosophy, because Carnap does not define logical truth as truth by convention:

The term “linguistic convention” is usually understood in the sense of a more or less arbitrary decision concerning language.... Sometimes the fact that a certain concept is expressed in a certain language by a certain word is loosely said to be a matter of convention. Although in this case there is no explicit agreement, the term “convention” may nevertheless be employed to express the fact that the usage might be changed by a decision.... On the other hand, the logical truth of the sentence “all black dogs are dogs” is not a matter of convention even in the looser sense. Once the meanings of the individual words in a sentence of this form are given (which may be regarded as a matter of convention), then it is no longer a matter of convention or of arbitrary choice whether or not to regard the sentence as true; the truth of such a sentence is determined by the logical relations holding between the given meanings. (In the present example, only the meanings of “all” and “are” are relevant.)48

Carnap explains in this passage that logical truth is not created by conventional definitions. A few pages earlier, we saw that Quine agrees with this position; but, also we saw there that, according to Quine’s interpretation of Carnap, logical truth is

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48 Carnap, “W. V. Quine on Logical Truth,” 916. The italics are mine.
created by the *conventional assignment of truth to postulates*. But here, Carnap points only to the conventions involved in linguistic definitions; he does not even refer to the conventional assignment of truth to postulates. Contrary to Quine’s interpretation, then, Carnap does not see logic as a postulate system at all, but merely as a calculus.

A postulate system, as a particular sort of calculus,\(^4^9\) is fixed with matters of fact through its primitives or postulates that are made true by convention, while calculi in general have no connection with matters of fact. Although postulates in a postulate system are made pragmatically (that is, in making such postulates one has an eye on matters of fact to see if the postulates agree with the facts), the postulates are still said to hold true purely by convention. In other words, the difference between a calculus and a postulate system is that a calculus is an uninterpreted system, whereas a postulate system is interpreted. Physics and geometry are postulate systems for Carnap, but for him, logic is a calculus.\(^5^0\)

In a postulate system, such as geometry or a physical theory, the truth of a sentence might be conventional.\(^5^1\) But in logic as a calculus, there are no conventional assignments of truth to the basic sentences. When the term “true” is attributed to a logical sentence, it does not mean that the sentence is true of some matter of fact, but the truth of a logical sentence means that the sentence can be derived from logical (linguistic) definitions together with the rules of the system. In the passage from Carnap quoted earlier, we saw that Carnap admits that the

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\(^4^9\) In Chapter Two, section “Language as a calculus,” pp. 43–46, I explained in detail what a calculus is.

\(^5^0\) For Carnap’s distinction between a postulate or axiom system and a calculus, see Carnap, *Foundations of Logic and Mathematics*, 37–40 and 65–67, also to Carnap, *Introduction to Semantics*, 203–204.

\(^5^1\) This point shall become clearer in the last section of this chapter, where I discuss about the nature of science.
acceptance of a framework or a logical system (with all its definitions and rules) is conventional. This is indeed what Carnap’s principle of tolerance is all about. But when we accept a framework, then the acceptance of the truths of its sentences is no longer conventional; as long as we hold the framework, we must accept its truths. Therefore, within a logical system, we do not create truths by convention, but we derive them from the definitions and rules of the system to show that the sentence does not involve any contradiction—or that it is logically valid, or that it accords with the rules of the calculus. “Truth” of a sentence is commonly understood in the sense that what the sentence states is in accordance with the matters of fact. For Carnap, such accordance for the sentences of a calculus is meaningless; those sentences are empty, asserting nothing about the states of affairs. Since there is no truth in logic in this sense, there cannot be any truth by convention in logic either.

Quine also pays attention to the differences between a calculus and a postulate system and notes that a calculus contains neither truths of matters of fact nor conventional truths. This can be seen in the following important passage, where he compares Euclidian geometry to non–Euclidian geometry:

In the beginning there was Euclidean geometry, a compendium of truths about forms and void; and its truths were not based on convention.... Its truths were in practice presented by deduction from so–called postulates ... and the selection of truths for this role of postulate, out of the totality of truths of Euclidean geometry, was indeed a matter of convention. But this is not truth by convention. The truths were there, and what was conventional was merely the separation of them into those to be taken as starting point...and those to be deduced from them.

The non–Euclidean geometries came of artificial deviations from Euclid’s postulates, without thought (to begin with) of true interpretation.
These departures were doubly conventional; for Euclid’s postulates were a conventional selection from among the truths of geometry, and then the departures were arbitrarily or conventionally devised in turn. But still there was no truth by convention, because there was no truth.

Playing within a non-Euclidean geometry, one might conventionally make believe that his theorems were interpreted and true; but even such conventional make-believe is not truth by convention. For it is not really truth at all; and what is conventionally pretended is that the theorems are true by non-convention.

Non-Euclidean geometries have, in the fullness of time, received serious interpretations. This means that ways have been found of so construing hitherto unconstrued terms as to identify the at first conventionally chosen set of non-sentences with some genuine truths, and truths presumably not by convention. The status of an interpreted non-Euclidean geometry differs in no basic way from the original status of Euclidean geometry, noted above.52

Quine explains crucial points here. First, when we reconstruct a language system that is already at hand as a postulate system, we do not make the postulates true by definition, for they were already true before our reconstruction. We simply choose the postulates conventionally among other truths of the language to preset the others based upon them. I do not think that Carnap would object to this point at all.

Quine’s next claim is that when we construct a new language system (an artificial language or a calculus), the system contains no truths at all and, thus, no truths by convention, either; the system’s expressions are non-sentences. When we interpret an artificial language, in effect, we simply discover facts that fix to its non-sentences, thereby recognizing that non-sentence expressions indeed have empirical content and are sentences. Again, there is no truth by convention in an

interpreted artificial language system; its truths merely represent the truths that are already there. Thus, there is no difference in kind between the truths of a reconstructed language system and those of an interpreted newly constructed artificial language; both are non-conventional truths of facts. Again, I see no conflict here between Quine's point of view and Carnap's, although it is not exactly clear what Quine means when he says that there is no truth in an uninterpreted calculus, and when he calls the sentence of an uninterpreted artificial language a non-sentence. I can only construe Quine's meaning as follows.

First, when Quine says that there is no truth in a calculus, he does not mean that sentences of a calculus are false, but he only means that the sentences do not concern facts of matter and, therefore, it does not make sense to ask whether they are in accordance with facts. In other words, by truth here, Quine means to be in accordance with matters of fact, and in this sense we cannot find any truth in a calculus. This is a point that Carnap also agrees with. When Carnap sometimes uses the term “valid” instead of “true” for sentences of a language system, he wants to emphasize that we must not expect truth in a language system in the sense that the sentences are in accordance with states of affairs. Second, by a non-sentence, Quine means a series of linguistic signs that are ordered based on the grammar and logic of the language to form a sentence that makes no assertion at all. Construed in this way, Quine’s non-sentence is exactly what Carnap means by an analytic sentence. Thus, there is no substantive dispute here over the truth and kind of sentences of a calculus or of an artificial uninterpreted language system. There is only a

53 For example, see Rudolf Carnap, Foundations of Logic and Mathematics (Chicago, Ill, The University of Chicago press 1967), 18.
terminological difference: Quine calls them non–sentences, while Carnap calls them analytic. I believe there are many reasons to prefer Carnap’s terminology here over Quine’s: it is more familiar, it is well explained, its validity or truth has been explored and defined within different systems, and so forth.

The main difference here between Quine and Carnap is the conclusion that Quine draws: that logic is a postulate system, or an interpreted calculus. According to Quine, logical truths were already there representing matters of fact, just as the truths of any other branch of our empirical knowledge. To make the body of logical statements into a systematic doctrine, we reconstruct this body as a postulate system. To do this, we choose by convention a few statements as postulates out of the totality of logical statements and build the rest of the logical statements on those postulates. We do not assign truth to logical postulates by convention, but the postulates are already true; we just conventionally pick them up. Therefore, truths of logic are not epistemologically different from any other sentences, such as the truths of physics. For Carnap, by contrast, truths of logic were not there as were the other truths of our empirical knowledge; truths of logic do not belong to our knowledge of the world and are not factual. Logic is an uninterpreted calculus and comprises analytic sentences—or what Quine calls non–sentences.

Therefore, the dispute over logical truth is not whether the truths of postulate systems and those of uninterpreted calculi are of the same kind. Both Quine and Carnap agree that they are not. They also agree that the concept of truth in the sense of being in accordance with matters of fact is not applicable to an uninterpreted calculus. The dispute is about the examples of postulate systems and calculi and the
category into which logic falls. For Quine, logic, mathematics, Euclidian geometry, and physics are all postulate systems, and non–Euclidian geometries are uninterpreted calculi; conversely, for Carnap, logic, mathematics, and all kinds of mathematical geometry are uninterpreted calculi. The difference of opinion here results in different beliefs regarding the nature of logical sentences. Quine’s logical sentences are no different in kind than are the statements of physics, while for Carnap, logical sentences are analytic—or non–sentences, in Quine’s terminology.

In this section, I started with Quine’s objection to defining logical truth as truth by convention. I explained that Quine tries to prove not only that there is no truth in logic held by convention, but also that “being true by convention” has no concrete sense at all. All that Quine discusses in this regard relates to truths of postulate systems. The question of whether truth by convention makes sense in a postulate system is irrelevant to Carnap’s definition of logical truth, because Carnap does not consider logic to be a postulate system, but a calculus; he never defines logical truth as truth by convention. In their dispute, to conclude that logical sentences are empirical truths, Quine starts with the assumption that logic is an interpreted postulate system, thereby implying that logical sentences are ordinary empirical truths; conversely, to conclude that logical sentences are analytic, Carnap starts with the premise that logic is an uninterpreted calculus, thereby implying that logical sentences are analytic. Thus, both men had formulated their decisions regarding the kind of logical sentences before their argumentation. In conclusion, I do not see a real debate here over the kind of logical sentences; I see only each man
declaring his own position regarding the issue. Nothing that either Quine or Carnap says resolves their dispute here on the kind of logical truth.

**Carnap’s Definitions and Quine’s Objections**

In Chapters Three, we saw that Carnap defines logical truth in different ways in his works of semantics. To determine whether Carnap’s definitions of logical truth meet Quine’s objections, I will first summarize the most important of Carnap’s definitions here. Carnap’s first general semantical definition of logical truth is presented in his *Introduction of Semantics*. For ease of exposition, a less technical, but nevertheless faithful, version of this definition is as follows:

>A sentence is logically true in language $S$ if and only if its L–range is the universal L–range in $S$.54

The L–range of a sentence in language $S$ is the class of all possible states of affairs or propositions that the sentence may admit. In Chapter Three, we saw that because the semantical rules of language $S$ determine what propositions each sentence of the language designates, the semantical rules of the language $S$ alone determine what the L–range of each sentence of the language is, without any need for factual knowledge. In this definition, the universal L–range in $S$ refers to the class of all possible states of affairs that the sentences of the language $S$ altogether may describe. Again, this class is determined only by semantical rules of the language. Carnap then introduces his most mature definition of logical truth in his *Meaning and Necessity*. I rephrase that definition as follows:

A sentence is logically true in language $S$ if and only if it holds in every state–description in $S$.$^{55}$

A state–description in language $S$ is a class of sentences in $S$ that contains either every sentence of the language or its negation, but not both. A state–description in $S$ designates a possible world or a possible state of the universe of individuals with respect to all predictions with which the language deals. The semantical rules of language $S$ alone determine in what state–descriptions any given sentence of the language holds. Thus, without knowing any matters of fact, we can determine whether a sentence holds in every state–description and, thus, whether it is logically true.

In previous chapters, I discussed different aspects of Carnap’s definitions of logical truth and compared them to each other to show the advantages and disadvantages of each. Here I mention only that all Carnap’s definitions of logical truth fulfill his adequacy condition for a definition of logical truth in that all definitions define logical truth simply by referring to rules of the language alone, without referring to matters of fact. My purpose here is to see whether these definitions survive Quine’s criticism. So far in this chapter, I discussed Quine’s main objections to Carnap’s definitions of logical truth. I go through those objections one by one and examine whether each of the definitions of logical truth can meet the objections.

Quine’s first objection is that Carnap’s definitions of logical truth can be summarized as the doctrine that logical truths are true by virtue of the language

$^{55}$ See Chapter Three, section “State-Description and Analyticity,” 104–110.
alone, but this doctrine has no empirical content and does not contribute to our knowledge of matters of fact. Logical truths for Quine are true of matters of fact and are a part of our knowledge. Quine demands that Carnap’s definitions must explain the grounds of truth of logic in the sense that they must give us insights into why logical truths count as knowledge of the world. I argued earlier that Quine is right in asserting that this doctrine has no empirical value. Yet if we look at the issue from Carnap’s point of view, this fact causes no worries, because according to Carnap, the truths of logic are not true of matters of fact and are not factual knowledge at all, but are only logical consequences of the definitions and rules of the language system. I also explained that for Carnap, the linguistic doctrine is *philosophical*—in Carnap’s sense of this term—and it is thus not expected to have any empirical content. I discussed Quine’s objection and Carnap’s reply in detail earlier, but now I am trying to determine whether the premise of Quine’s objection is correct: that Carnap’s definitions of logical truth are reducible to the linguistic doctrine as Quine formulates it.

Each of the definitions of logical truth summarized earlier implies its own particular way to show whether a sentence is a logical truth. In their investigations, the definitions appeal to different concepts. Although both definitions of logical truth are similar, in that none appeals to matters of fact to determine whether a given sentence is logically true, each of the definitions definitely says much more than merely that logical truths are grounded only on the language. Each definition makes a different claim from that of the other. As I noted, each definition grounds the truths of logic on concepts that are different from those of the other definition;
thereby, each definition defines logical truth differently. The linguistic doctrine is not a definition of logical truth for Carnap but is only a catch-all label for Carnap’s different definitions of logical truth. In other words, the linguistic doctrine characterizes Carnap’s definitions of logical truth as purely logical theorems—in Carnap’s meaning of the term. As a consequence, objecting to the linguistic doctrine is not the same as objecting to Carnap’s definitions of logical truth.

Quine may, of course, reformulate his objection to the linguistic doctrine by saying that this doctrine, even as a philosophical doctrine that merely explains and characterizes Carnap’s definitions of logical truth, does not say anything empirically sound about Carnap’s definitions. For Quine, therefore, the linguistic doctrine has no explanatory value after all. Again, my earlier discussion shows that this objection is compelling if we accept Quine’s standpoint, that is, if we consider science and philosophy of the same nature in that we expect empirical import from philosophical doctrines, as we expect from scientific ones. Clearly this is not the case for Carnap. As I have already discussed, for him the nature and the task of philosophical doctrines differ from those of scientific doctrines. In fact, according to Carnap, philosophical doctrines cannot but be without empirical content (or analytic). Thus, even Quine’s reformulated objection to the linguistic doctrine, if viewed through Carnap’s philosophy, does not present any trouble for Carnap’s philosophical explanation of his definitions.

Quine’s second objection to definitions of logical truth, discussed earlier, is that Carnap’s definitions say only that logical truths are true by virtue of linguistic conventions; because we cannot create truth by linguistic conventions, Carnap’s
definitions of logical truth fail to provide proper grounds for the truths of logic. I mentioned earlier that Quine’s point holds of the truths of interpreted postulate systems. But for Carnap, a logical system is an uninterpreted calculus, not a postulate system. Truths of a calculus are logical consequences of the definitions and rules of the system, they are not held by conventions. While Carnap asserts that logical truths are not conventional, he defines them based on conventional definitions and rules of the language. The question is that if the logical rules of an artificial language are matters of conventions, and the truth of the sentences is determined by the logical rules of the language, then how can Carnap say that the truth of the sentences is not based on conventions? Obviously, if we change our conventions regarding the meaning of the expressions or the logical relations between them, the truth–values of the sentences may change. Carnap’s assertion must not be understood as if he claims that there is no element of convention in a logical truth. He says that choosing a language system is conventional: we can change the rules of our language as we wish and thereby change our language framework anytime. If we do so, we will come up with a different set of logical truths within the new language framework. But as long as we stick to the same language, within the language framework, truths are created only by the rules of the language. We cannot change a truth to falsity, or vice versa, by convention; we cannot create truth within a language system by convention.

As we have seen so far, Quine’s objections to Carnap’s definitions of logical truth are more about Carnap’s whole philosophy than they are about the definitions

themselves. Quine’s objections relate more to Carnap’s view of logic as an uninterpreted system and as a body of statements different from the statements of empirical knowledge and less to criticisms of Carnap’s technical definitions of logical truth. But as noted briefly in the last section, one of Quine’s objections could be interpreted as criticizing the technical aspects of Carnap’s definitions, rather than Carnap’s way of philosophizing. Quine presents this objection first in his “Truth by Convention,” and he later reaffirms it, without details, in his “Carnap and Logical Truth.” The objection is that to construct logic in the way that Carnap proposes, we must first lay down the rules of logic and introduce primitives by conventions; then, we must infer the truths of logic from the conventionally defined rules and primitives. Yet, to infer truths of logic from conventions in order to build up the whole system of logic, we need to use logic. In other words, logic is needed to build logic because the notion of inference or logical consequence that is used to construct logic must be at hand at the outset, and this can be the case only if we already have logic. Quine claims that any attempt to define the notion of inference or logical consequence by convention ends up in an infinite regress. As a result, it is not possible, in principle, to build logic based on conventions, and thus, we cannot base logical truth on the grounds of the so-called conventional rules of logic. Quine’s objection, in fact, is based on the paradox that Carroll introduced. To examine this objection, I will review Carroll’s paradox first.

The paradox of Carroll can be summarized as follows. Consider this argument:

(A) Things that are equal to the same are equal to each other.
(B) The two sides of this triangle are things that are equal to the same.
(Z) The two sides of this triangle are equal to each other.
Carroll says that one may accept \( A \) and \( B \) while denying \( Z \). To persuade him otherwise, we may argue that:

\( (C) \) If \( A \) and \( B \) are true, \( Z \) must be true.

One may agree with statement \( C \), but may still not accept \( Z \). Again, to persuade him otherwise, we may argue that:

\( (D) \) If \( A \) and \( B \) and \( C \) are true, \( Z \) must be true.

One may accept statement \( D \) too, but may still not accept \( Z \). We may continue the argument in the same way, but there is no end to this line of argument. One may accept every new statement that we introduce in this way, but may still insist on disagreeing with \( Z \). To persuade him to accept \( Z \), we shall be trapped in a vicious regress.\(^{57}\)

There have been different interpretations and explanations as to what Carroll’s paradox actually shows. Here, I am concerned only with Quine’s use of this paradox in his debate with Carnap. For Quine, the paradox shows that it is impossible for logic to be considered a closed system such that all primitives and rules of the system are defined explicitly within it. At least, the concept of inference or logical consequence is not definable within the system. We need this notion at the outset, and to have it at the outset, we need logic. Quine explains that need:

In a word, the difficulty is that if logic is to proceed \textit{mediately} from conventions, logic is needed for inferring logic from the conventions. Alternatively, the difficulty which appears thus as a self–presupposition of doctrine can be framed as turning upon a self–presupposition of primitives.\(^{58}\)


\(^{58}\) Quine, “Truth by Convention,” 97.
According to Quine, Carroll’s paradox shows that the definition of the notion of logical consequence cannot be put forward by a convention, or at least, it cannot be \textit{explicitly} defined by convention. Quine concludes from the paradox that since not all rules and primitives of logic can be \textit{explicitly} defined by convention, we cannot be sure at all whether all of the rules and primitives are conventional. Consequently, we cannot be sure if the truths of logic are grounded by conventional rules. Therefore, to claim that logical truths are truths by convention is pointless.

Quine’s objection here targets not only the conventionality of logical truth, but also the very possibility of the construction of a logical system on the basis of conventional rules, as Carnap explains it. I already examined Quine’s objection to the claim that “logical truth are conventional,” and I explained that Carnap does not defend such a claim. But Quine’s doubt regarding the possibility of the conventional construction of a logical system affects directly Carnap’s position. It appears to me that Quine’s objection can be met if we note that Carnap is concerned mainly with artificial language systems or logics and with the concept of logical truth within such systems. As I mentioned earlier, Carnap admits that the concept of logical consequence has not been defined in “The Logic,” or in the most comprehensive language system that can be considered the metalanguage for all logical systems\textsuperscript{59}— the English language, for example. However, according to Carnap, the concept of logical consequence can be defined explicitly in specific logical systems. In fact, he defines the concept of consequence in different language systems that he introduces in his works. Thus, if we talk about logic as “The Logic,” or as the logic of natural

\textsuperscript{59} See Chapter Two, page 48.
language—as Quine apparently talks—then Quine’s point might be correct. All rules of the logic cannot be explicitly defined by conventions, and therefore, it might be correct that logical truths in natural language cannot be based on conventional rules of the language. However, Carnap never claims that he can set forth the rules of natural language, and he never tries to define the notion of logical truth in natural language in his main works. Instead, as we have seen, he calls the concept of logical truth or analytic in natural languages the explicanda for his concept of logical truth in artificial languages.\(^6^0\)

Nonetheless, if we are concerned about artificial language systems or logics, as Carnap usually is, we can see that primitives and rules of different artificial language systems—including the notion of consequence in those languages—are already defined in Carnap’s works, and if not in the language itself, are defined at least in the metalanguage. Quine never objected to any of Carnap’s definitions of consequence in specific language systems. Therefore, Carnap’s way of constructing artificial language systems based on conventional definitions of rules and primitives in metalanguage is not a subject for Carroll’s paradox. Accordingly, Carnap’s definitions of logical truth in artificial language systems are not affected by the results that Quine draws from the paradox.

**Analyticity in Artificial, Natural, and Scientific Languages**

As I have pointed out several times, Quine’s criticisms of the definitions of logical truth cannot be regarded as objections to Carnap’s definitions of logical truth

\(^6^0\) See my discussion in Chapter Three, section “Explication,” 69–74, and in Chapter Four, section “Essential Predication in Natural Languages,” 153–61.
in artificial languages; rather, Quine’s criticisms are about the definition of this notion in natural languages. If this is the case, then why do Quine’s objections address Carnap at all? To clarify this issue, I will now examine how Quine sees the relation between the concepts of logical truth in natural language and artificial language and how he evaluates Carnap’s work based on his view of the alleged relation between two concepts. Then, I shall examine Carnap’s reaction to Quine’s evaluation.

According to Quine, Carnap creates artificial languages to show that metaphysical questions can be eliminated from the realm of scientific practice. Some metaphysicians claim that metaphysical questions are not dispensable in the sense that scientific theories presuppose metaphysical principles and raise metaphysical questions. According to those metaphysicians, in scientific practice, scientists must, therefore, have metaphysical concerns as well. As Quine rightly points out, to prove that metaphysical issues are not inherent in science and can be totally put aside in scientific practice, Carnap claims that metaphysical questions are rooted in the language that we use. Further, as Quine sees, Carnap attempts to support this claim with a hypothetical example of people speaking a language suitable for scientific discourse, such as Martian, but which is not capable of expressing metaphysical issues. To convince Quine, however, Carnap still needs to explain “what these Martians are to be imagined as uttering and what they are thereby to be understood to mean.”61 To explain this, Quine believes that Carnap provides formation and transformation rules of the language, but Quine objects:

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61 Quine, “Carnap and Logical Truth,” 120.
He is not representing his hypothetical Martians themselves as somehow explicit on formation and transformation rules. Nor is he representing there to be any intrinsic difference between those truths which happen to be disclosed to us by his partial specifications (his transformation rules) and those further truths, hypothetically likewise known to the Martians of his parable, which he did not trouble to sketch in.  

I am not sure exactly what proof Quine is demanding here. I assume that he is asking Carnap either to illustrate behaviourally how Martians might differentiate between logical truths and others or to show how logical and non–logical truths differ intrinsically. But why should Carnap care about the hypothetical behaviour of hypothetical Martians? And what exactly does Quine mean by an intrinsic difference between two sorts of truth? Carnap succeeds in showing that there can be a language—at least an artificial language—that does not allow metaphysical issues to arise. This much is enough to show that metaphysical problems are separable from scientific ones, and according to Quine, this is the purpose for which Carnap introduces his artificial languages. Thus, Quine should be convinced that Carnap’s construction of his artificial language serves its purpose sufficiently. That Quine still seems unconvinced and asks Carnap to explain the meanings of the language based on the hypothetical behaviour of Martians, is due, I believe, to the fact that Quine criticizes Carnap based on Quine’s own specific presupposition. Here is my understanding of Quine’s presupposition.

Quine believes that there are the so–called truths of logic already there among other truths of knowledge expressing matters of fact, and he believes that Carnap

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wishes to differentiate between those truths and the rest of our knowledge. For Quine, all truths are dependent both on the states of affairs and on what the sentences represent to be the case. Thus, according to Quine, if Carnap wants to differentiate kinds of truths from one another, Carnap must do so based on the characteristics of the truths themselves, not based on the characteristics of the sentences that represent the truths in some language. Carnap must show us either that there is something objective and observable in truths of logic that makes them intrinsically different from the rest or at least that there are behavioural indications that prove people believe in logical truths in a different way from the way they believe in other truths. Carnap claims that the reconstructed Martian language does not involve metaphysical problems because it clearly demarcates scientific truths from the rest (that is, from analytic truth and pseudo–sentences). Quine believes that to prove this demarcation, it is not enough for Carnap to merely illustrate the conventional rules of the language, but Carnap must also show by hypothetical experiences how Martians behave differently toward two different groups of truth or how Martians believe that truths of logic, contrary to other truths, are not grounded in matters of fact, but only in the language.

In my opinion, Quine believes that natural language represents people’s beliefs about truths; truths of natural language are natural representations of truths of matters of fact. So if Carnap is using an artificial language to demarcate between different groups of truths, all that he can reasonably demand from the conventional rules of the language, according to Quine, is that “they enable us to find corresponding to each of his sentences a sentence of like truth value in familiar
ordinary language.”64 In Quine’s view, Carnap cannot demarcate between different truths in terms of their content only by means of conventional rules of an artificial language, because for Quine, all truths are about matters of fact and, thus, we cannot differentiate between them based on their content merely by linguistic means. If Carnap can map the sentences of the artificial language into sentences of natural language, then the distinction between analytic and synthetic truths in the artificial language will mirror the same distinction in natural language; distinction of truths in natural language, in turn, represents an intrinsic difference between the truths of knowledge. Since Carnap was not able to map the sentences of artificial language into those of natural language, Quine thinks that Carnap does not succeed at all in showing that there is an intrinsic difference between analytic and synthetic truths.

Again, for Carnap, truths of logic are not already there among other truths of knowledge, and truths of logic do not belong to the body of our knowledge of matters of fact. But truths of logic are language–dependent. They are created by language and remain attached to the language; without a language, the logical truths of the language disappear. This difference between two sorts of truth (that logical truths are language–dependent and have nothing to do with matters of fact, while synthetic truths are all about states of affairs) is intrinsic enough for Carnap. Asking for an intrinsic difference in the sense of an objective empirical difference between truths of logic and other truths, as Quine does, does not make sense for Carnap, because he believes that truths of logic do not have objective identities at all, and

64 Ibid., 120.
they cannot be grasped by experience. Since truths of logic are independent of experience, such truths cannot be proved by experience as only language-dependent. In other words, similar to the case discussed in the second section of this chapter, Quine’s objection to Carnap is based on Quine’s presumption that there is no analytic–synthetic distinction and that all truths are about matters of fact; therefore, for Quine, experimental evidence is needed to show that some truths are different from others. Conversely, Carnap interprets Quine’s objection based on Carnap’s own presumption that there is an analytic–synthetic difference and that logical truth is simply independent of facts; for Carnap, asking for experimental evidence to show analyticity therefore makes no sense. Thus, Carnap interprets Quine’s objection based on Carnap’s particular presumptions, and replies to it with such an understanding. The following passage from Carnap is crucial in showing how he sees the core of his whole debate with Quine over analyticity:

"It seems to me that Quine’s criticism is not directed against the proposed semantical explicata. I believe that he would agree that, e.g., my rules of the above mentioned kinds, leading to the definition of “A–true”, are in themselves exact and unobjectionable. His criticism is rather that there is no clear explicandum, in other words, that the customary pre-systematic explanations of analyticity are too vague and ambiguous, and basically incomprehensible. This would make it understandable why he requires for analyticity an empirical criterion, while he does not require it for truth. In Quine’s view, there is the following basic difference. In the case of truth he recognizes a sufficiently clear explicandum; i.e., before an explication had been given, the use of this concept had been sufficiently clear, at least for practical purposes. On the other hand, Quine sees no

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65 In fact, Quine asserts, “Logical truth (in my sense, excluding the additional category of essential predication) is, we saw, well enough definable (relatively to a fixed logical notation).” Refer to Quine, “Carnap and Logical Truth,” 123.
sufficiently clear, pre–systematic concept of analyticity which could be taken as an explicandum. *If an empirical criterion for analyticity with respect to natural languages were given, then this concept could serve as an explicandum for a reconstruction of a purely semantical concept of A–truth.* This seems to me to be Quine’s real motivation in demanding such a criterion....

As I now understand Quine, I would agree with his basic idea, namely, that a pragmatical concept [i.e., a concept of natural language], based upon an empirical criterion, might serve as an explicandum for a purely semantical reconstruction, and that this procedure may sometimes, and perhaps also in the present case, be a useful way of specifying the explicandum. On the other hand, *I would not think that it is necessary in general* to provide a pragmatical concept in order to justify the introduction of a concept of pure semantics.66

The first sentences of this passage clearly show that Carnap sees his debate with Quine as turning not on the definitions of logical truth that Carnap provides, but on whether there is a clear notion of analyticity in natural language to explicate. This supports my claim that if one looks at the debate from a Carnapian standpoint, one would not see any direct relevance of Quine’s objections to Carnap’s definitions of analyticity. Carnap explains in the next sentences his idea regarding the relation between explicanda and explicata, and interprets Quine’s objection as a demand for a proper explicandum for logical truth in natural language. For Carnap, as I discussed earlier, the concepts that he defines in semantics are supposed to be explicata for similar but inexact concepts in natural language used in traditional philosophy. We have seen that for Carnap, explicata are not equal or synonymous to explicanda, but can replace explicanda in scientific discourse. However, to explicate

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66 Carnap, “W. V. Quine on Logical Truth,” 919. Italics and explanations inside brackets are mine.
an inexact concept in natural language, we need first to have a *practically clear* understanding of the concept so we can have an approximate idea about the concept. Then, we will be able to improve on it and to provide an explicatum for the explicandum. As I noted earlier, a concept is practically clear for Carnap when the different contexts in which the concept should or should not be used are roughly known.67 In his discussion of the concept of explication in his *Logical Foundations of Probability*, Carnap insists that practical clarity of the explicandum is vital for its explication; otherwise, we shall not know what we are talking about at all.68 Yet even though Carnap, in his major works, accepts the importance of having such an understanding of explicandum, he attempts, in the very last sentence of this passage of his reply to Quine, to deemphasize the role of practical clarity of the explicandum in an explication.

In response to Quine's objections, Carnap tries to clarify the concept of analytic truth in natural language as the explicandum for logical truth in artificial languages. In the last part of Chapter Four, I discussed the behavioural method that Carnap proposes to clarify the concept of analyticity in natural language. Carnap’s proposed method is ingenious, although he states that his proposal should be considered just a preliminary attempt, one that needs to be improved on. Quine seriously doubts that it is possible to determine behaviouristically exact meanings of the terms of natural language in radical translation.69 Carnap does not share Quine’s

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67 For detailed discussions on the relation between explicanda and explicata and on the practical clarity of explicanda, refer to Chapter Three, pp. 75–79, and 83, and also Chapter Four pp. 156–57.
69 Quine’s doubt regarding behavioural clarification of meaning of the terms of natural language is best couched in his famous theory of indeterminacy of translation. For the detail of this doctrine, refer to Quine, *Word and Object* (Cambridge, MA: The MIT Press, 1960), Chapter Two.
doubt, and instead he claims that his behaviouristic proposal to determine meanings of the terms of natural language shows sufficiently that Quine's argument regarding the indeterminacy of translation is not convincing. Quine's argument about radical translation is compelling, I believe, but Carnap's proposal for behaviouristic explanation of the concept of analyticity in natural language is still good enough for the purpose of "practical clarification" of the concept: in this case, Carnap is neither faced with radical translation nor with searching for an exact determination of the meaning of analyticity in natural language. All that Carnap needs for the practical clarification of analyticity is an approximate clarification of the use of analyticity in natural language.

Carnap also attempts to show that, even though one accepts Quine's view that there is no practically clear explicandum in natural language for the semantical concept of logical truth, this concept is still a fruitful concept capable of application to logical analysis of the language of science. Near the end of his philosophical career, by using so-called Ramsey-sentences, Carnap considers how the language of science comprises both analytic and synthetic sentences. I shall discuss this as follows.

Since his early works in syntax, Carnap constantly insisted that to logically analyze the language of science, one must to explicate the analytic–synthetic distinction. For Carnap, the logical analysis of the language of science is all philosophy is supposed to pursue, and for him, the application of the analytic–synthetic distinction to the language of science is a vital part of philosophy.

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70 Carnap, "W. V. Quine on Logical Truth," 920.
According to Carnap, the language of science is situated somewhere between artificial languages and natural language; the language of science comprises the formal language of logic and mathematics, as well as predicates and other descriptive terms of natural language that are necessary to describe physical facts. Although the application of analyticity to the language of science does not serve completely the same purpose as clarifying this term in natural language (that is, it does not provide the explicatum of logical truth with a clearer explicandum), it is still crucial because it shows how Carnap’s semantic concept of analyticity serves the main goal of philosophy, namely, the logical analysis of the language of science.

Carnap presented his proposal of demarcation between analytic and synthetic parts of scientific theories in a lecture delivered at the Santa Barbara conference in 1959. He did not publish that lecture; he apparently worked on revising it for publication, but never finished the revisions. The lecture was only recently published in its original form without revisions. I will briefly explain this final attempt of Carnap’s to apply the semantical notion of analyticity to demonstrate the analytic–synthetic distinction in scientific theories by virtue of Ramsey-sentences.

In his Santa Barbara lecture, Carnap divides the terms of the language of science into three categories: logical terms or $L$-terms; observational terms or $O$-terms; and theoretical terms or $T$-terms. O-terms and T-terms together comprise descriptive terms. But these two categories of terms differ from each other in that O-terms refer to things about which we can claim knowledge by direct observation, such as “green” and “soft,” while T-terms designate things that are not observable.

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directly but that we recognize through indirect indications, such as “electron” and “electro–magnetic field.” Carnap also distinguishes three kinds of sentences in the language of science: *logical sentences* that contain only logical terms; *observational sentences* that contain O–terms and perhaps also L–terms, but not T–terms; and *theoretical sentences* that contain T–terms and perhaps also L–terms and O–terms. Carnap claims that the analytic–synthetic distinction in the language of science can be demonstrated in all three kinds of sentences of science. Carnap thinks that he has demonstrated this distinction sufficiently for the logical sentences of scientific language by his definitions of logical truth.

With respect to the problem of defining the analytic truth in *observational language*, or the part of scientific language that comprises only observational and logical sentences, Carnap believes that the problem can be dealt with in exactly the same way that he dealt with this question in artificial languages. To define analytic truth in artificial languages, Carnap introduced meaning postulates by virtue of which analytic sentences can be reduced to logical truths. Meaning postulates are those semantical rules of the language that determine logical relations between the concepts of the language. In Chapter Four, I explained in detail how Carnap uses meaning postulates to reduce essential predications to logical truths in artificial languages.\(^\text{72}\) Although observational language uses descriptive terms from natural language, Carnap believes that these terms are completely interpreted in observational language: O–terms in observational language are clear terms without the ambiguities usually attached to them in natural language; O–terms are

\(^{72}\text{See Chapter Four, section “Synonymy by Definition,” 148–60.}\)

\(^{73}\text{Carnap, “Theoretical Concepts in Science,” 160.}\)
exactly defined in science and can be learned by direct observation of their application to matters of fact. Since O–terms in observational language are exact and clear, we can lay down the logical relations between different O–terms by meaning postulates and can thereby reduce analytic truths to logical truths in observational languages, as explained in Chapter Four.

Carnap asserts that it is possible to use meaning postulates to demonstrate analytic truth in observational language because he believes that O–terms in observational language are completely interpreted, in the sense that O–terms can be applied directly to objects and properties and that people are absolutely in agreement as to their meanings and applications. In Chapter Four, I discussed how, in order to use meaning postulates to determine logical relations between two concepts, the two concepts must be clear and exact, and this state is not possible unless the concepts are conventionally introduced in an artificial language. The ambiguity of the concepts of natural language does not permit us to claim that we can illustrate the exact logical relations between the concepts of natural language. Carnap claims that O–terms, which originally came from natural language, are as exact as the concepts of artificial languages, and we can, therefore, make meaning postulates about O–terms. Such a significant claim needs considerable elaboration. The fact that in science O–terms are used to refer directly to experiences does not make O–terms exact terms; O–terms are still attached to the ambiguities that natural language imposed on them. If Carnap claims that O–terms become totally interpreted and exact in the course of scientific use, he needs to supports this claim
with enough evidence from what he calls *pragmatics*. Carnap does not provide this evidence and, in this lecture, quickly passes over this claim. Therefore, I remain doubtful of the possibility of reducing essential predications to logical truths in observational language by means of meaning postulates.

Regarding the illustration of analytic truths in *theoretical language*, or the part of scientific language that involves theoretical sentences, Carnap believes that the situation is very different from the case of observational language. According to Carnap, theoretical terms are not completely interpreted because their meanings are not exactly defined. The meaning of theoretical terms cannot be grasped by direct observation, because the terms refer to unobservable entities. A theoretical term is introduced by a scientific theory that composed of two parts: a theoretical postulate, or *T–postulate*, which is a general physical law that relates the term to other theoretical terms, and a correspondence postulate, or *C–postulate*, which relates the term to observational language.75

To clarify Carnap’s point here, I will briefly review his theory regarding the nature of science. According to Carnap, physical science is primarily constructed as a calculus. Physical science becomes partially interpreted by connecting the lowest parts of it, or its least general claims, to observational facts, as follows:

The calculus [i.e., the scientific system] is first constructed floating in the air, so to speak; the construction begins at the top [i.e., at the most general level] and then adds lower and lower levels. Finally, by the semantical rules, the lowest level is anchored at the solid ground of the observable

74 To see Carnap’s definition of “pragmatics,” refer to Chapter Three, section “Philosophy, the Study of Language, and Analyticity,” 120–37.
facts. The laws, whether general or specific, are not directly interpreted, but only the singular sentences. For the more abstract terms, the rules determine only an *indirect interpretation*, which is ... incomplete in a certain sense.77

Sentences of science embody a calculus; they are introduced as a body of consistent but uninterpreted sentences, similar to other calculi, such as logical or geometrical systems. To apply the scientific system to matters of fact, scientists then lay down semantical rules to connect the least general laws of the system to observations. To do so, scientists introduce C–postulates to establish correlations between the uninterpreted abstract terms of science and observational terms. Laws of theoretical physics, or T–postulates, together with C–postulates, give a partial meaning for theoretical terms. The meaning is partial because the contents of theoretical terms are far richer than what can be illustrated by observational consequences through C–postulates.78 The following example helps to clarify this partial meaning.

Consider the theoretical term “temperature.” T–postulates connect this term to other theoretical terms by relating “temperature” to internal “energy,” the motion of “fundamental parts” or “atoms” of the material, and so forth. In accordance with those T–postulates, scientists introduce C–postulates to show how we can measure the temperature of a body and, thereby, give operational meaning to “temperature.” With C–postulates, scientists describe how we can build a thermometer and how, for example, by observing the expansion of the volume of the mercury in the glass

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76 I believe Carnap mentions “specific laws” by mistake here, unless he means by specific laws those that apply only in one limited domain of objects: no scientific law is specific in a logical sense, because a scientific law cannot be bound to a specific place and time. If a sentence is about a subject in a specific time–place situation, then it is not a law, but just a singular fact.

77 Carnap, *Foundations of Logic and Mathematics*, 65. Explanations inside brackets are mine.

tube, we can measure and compare the temperatures of different things. However, the theoretical term “temperature” means much more than the operational meaning provided by C–postulates. This larger meaning can be seen from the fact that the term “temperature” is not always substitutable for the operational meaning, because the procedure of measuring temperatures noted here is not applicable everywhere. For example, this procedure cannot be used on the surface of the sun or in the very cold situations created in a laboratory, but can be used for only a very limited range of temperatures. This is how Carnap claims that C–postulates can only partially interpret T–terms.

Because T–terms are not completely interpreted, we cannot demonstrate the exact logical relations that T–terms hold toward other terms by means of meaning postulates. Therefore, according to Carnap, analytic truths in theoretical language cannot be demonstrated by reducing them to logical truths by virtue of meaning postulates, contrary to his claim for analytic truth in observational language. Thus, Carnap takes a completely new approach to solving the problem of the demonstration of analytic truths in theoretical language. Carnap notes that scientific postulates, which give the meaning of T–terms, play a dual role simultaneously: “they give some meaning to the term and they give some factual information to us”.79 Scientific theories not only participate in giving meaning to “temperature,” for example, but also help us to make better sense of our observations and to predict temperatures in future events. According to Carnap, to demonstrate analytic truths in theoretical language, we must split up these two functions of scientific theories:

79 Ibid.
the analytic part that only gives meaning to T–terms and the synthetic part that contains factual assertions. Since those two parts of theories are intertwined, the task of demarcating between truths grounded on meaning and the rest of the truths in theoretical language is very difficult. To do this task, Carnap appeals to Ramsey–sentences.

A scientific theory is a conjunction of T–postulates and C–postulates; hence, Carnap uses TC as a short form to represent a theory. If there is a finite number of T–terms and O–terms in a theory, the theory can be represented by this function:

\[ TC(t_1, \ldots, t_n; o_1, \ldots, o_m) \]

Carnap replaces T–terms in this function by variables to form the Ramsey–sentence for the theory:

\[ RTC: (\exists u_1) \ldots (\exists u_n) \, TC(u_1, \ldots, u_n; o_1, \ldots, o_m) \]

According to Carnap, Frank Ramsey proved that this sentence is observationally equivalent to the theory because the same observational sentences follow from both. Now the problem is how we can split up TC into two parts: an analytic sentence that gives only partial meaning specifications for the T–terms of the theory and a synthetic sentence that represents the factual content of the theory. Carnap uses the sign P to refer to the synthetic part and the sign AT to refer to the analytic part of TC. He claims that the synthetic part of TC is equivalent to the Ramsey–sentence of the theory:

\[ P \equiv RTC \]

and that the analytic part of TC is equivalent to the following conditional sentence:

\[ AT \equiv RTC \supset TC \]
Both $P$ and $A_T$ contain something from the theoretical part ($T$) and something from the observational part ($C$) of the theory. In other words, $P$ and $A$ divide the whole theory, containing $T$ and $C$ parts, into two new parts, one of which is analytic and the other synthetic.

To prove that $P$ and $A_T$ encompass the synthetic and analytic parts of the scientific theory, respectively, first Carnap claims that $P$ and $A_T$ together are no more and no less than the theory:

$$TC ≡^{R} TC \cap (^{R} TC \supset TC)$$

This follows from the facts that we can derive from $TC$ any conditional that has $TC$ as its consequence, and that $TC$ implies its Ramsey–sentence (or $TC \supset^{R} TC$). Second, Carnap claims that Ramsey proved that the Ramsey–sentence of the theory is observationally equivalent to the theory. This means that $^{R} TC$ contains all empirical content of the theory and, therefore, is synthetic. As a result, $A_T$ that encompasses the rest of the theory, has no factual content; $A_T$ is analytic. Therefore, Carnap shows that a scientific theory can be split up into a synthetic part ($P$) that contains all empirical claims of the theory and an analytic part ($A_T$) that contains all meaning specifications that the theory makes for $T$–terms. Therefore, Carnap claims that he succeeded in applying his semantical concept of logical truth to the logical analysis of the language of science.

Carnap’s application of the semantical notion of logical truth to scientific theories (and thus his illustration of analytic and synthetic parts of scientific theories) advances his project by showing that his semantical concept of logical truth can be applied to analyze the language of science. Such an analysis is the main
aim of Carnap’s philosophy. However, with regard to his debate with Quine over analyticity, the illustration of analytic and synthetic parts of scientific theories does not solve anything for Quine. Quine asks Carnap for an empirical clarification of analyticity in natural language. What Carnap does here is to logically clarify this notion in scientific language. Therefore, for Quine, Carnap’s clarification would not change anything in the debate over analyticity. In one of his last works, Quine notes that Carnap’s use of Ramsey–sentences to demarcate analytic and synthetic parts of scientific theories is “ingenious”, but adds that this attempt is pointless because both parts, which Carnap demarcated in scientific theories, are revisable.\(^8\) Quine is still asking for behaviouristic evidence that we do not revise analytic sentences. In other words, Carnap’s demarcation between analytic and synthetic parts of scientific theories is as good as are his definitions of logical truth in artificial languages, but neither these definitions nor this last achievement are what Quine really objects to. Quine’s objections are aimed instead at the motive behind Carnap’s attempts. He does not consider what compels Carnap to look for such a distinction, convincing enough to bother with such a search.

However, Carnap sees Quine’s request for a behaviouristic clarification of analyticity in natural language as a request for the “practical clarification” of the explicandum for the semantical concept of logical truth. In Carnap’s view, Quine objects that if there is no practically clear explicandum, then Carnap’s concept of logical truth will be arbitrary and trivial. Therefore, Carnap believes that, by successful application of the semantical notion of logical truth to logical analysis of

the language of science, he proves that the notion of logical truth is still a fruitful notion, even though there is no clear explicandum for this notion in natural language. Again, on either side of the debate, Carnap and Quine each construe the other’s arguments based merely on his own philosophical presumptions.
Chapter Six

Conclusion: Analyticity in Two Approaches to Empiricism

Willard Van Orman Quine’s objections to the definitions of analytic truth have been seen by some to be effective criticisms that undermine all definitions provided so far for analytic truth, including Rudolf Carnap’s definitions. In this work, my primary aim has been to show that, although Quine addresses Carnap directly in his criticisms of the definitions of analyticity, his objections to the definitions rarely touch on the technical aspects of Carnap’s definitions. Quine’s objections must rather be understood in relation to definitions of general analyticity in natural language, while Carnap defines relative analyticity (logical truth) in artificial languages. When it comes to Carnap’s concept of logical truth, although Quine’s formulations of his criticisms may mislead us, Quine does not reject Carnap’s definitions because of technical defects. Instead, Quine finds Carnap’s reasons for introducing the new concept of analyticity to his philosophy to be invalid. Quine thinks that Carnap’s attempt to define relative analyticity is in vain, because there is no need for such a concept in scientific epistemology as he understands it (that is, in a physicalist explanation of our knowledge of the physical world). I believe that such a judgment arises in part because of Quine’s misconception of Carnap’s program and in part because of the different views of Quine and Carnap on the nature of philosophy. To clarify this claim, let us review briefly the results of the discussions from previous chapters.
In Chapters Two and Three, I explained Carnap’s definitions of analyticity in constructed language systems. He provided one main definition of logical truth in general syntax and three definitions in general semantics. In Chapters Four and Five, I examined Quine’s objections to various definitions of analyticity, one by one, and showed that the objections either are not relevant to Carnap’s definitions or can be met by Carnap, if we look at the objections from within Carnap’s philosophy. Quine demarcates two kinds of analytic truth: first, logical truths in which only logical terms occur essentially and that are true under all reinterpretations of their non–logical components (for example, no unmarried man is married); and second, cases of essential predication or sentences that can be turned into logical truths by replacing synonyms with synonyms (for example, no bachelor is married). Then, essential predication is defined based on logical truth by virtue of the concept of synonymy. In “Two Dogmas of Empiricism,” Quine does not challenge definitions of logical truth, but claims that Carnap cannot clarify essential predication based on logical truth by the means of the concept of synonymy. Quine argues that the notion of synonymy is a vague concept for which no sufficient definition is available. Since the concept of synonymy itself is not clear, then it cannot be used in clarifying the concept of essential predication.

As I noted in Chapter Four, in his attempts to prove that no extant definition of synonymy is sufficient, Quine examines different definitions of the term. According to Quine, the first way that Carnap may propose to clarify synonymy of expressions is through the use of dictionaries. Dictionaries can verify exactly what terms are synonymous to each other. Quine objects to definition of synonymy by dictionaries declaring that dictionaries report preexisting synonymy relations among
expressions, but they do not create synonyms. I explained that Carnap’s definition of essential predication primarily concerns this concept in constructed language systems. Defining synonymous expressions by virtue of results of lexicographers’ studies as reported in dictionaries has no application in constructed languages. So even if Quine’s objection is cogent with respect to the definition of synonymous expressions in natural language, the objection is not relevant to Carnap’s work.

The second method of clarification of synonymy that Quine ascribes to Carnap is explication. Quine claims that in an explication, Carnap defines a *definiens* as a synonym to the *definiendum*; the definiens already has application contexts similar to those of the definiendum, although before the definition, the definiens might not be synonymous to the definiendum, because both might also have other application contexts that they would not share with one another. Although defining synonymous terms by explication is not based on preexisting synonymy between the definiendum and the definiens, according to Quine, it does rest on preexisting synonymy between the corresponding application contexts of the definiendum and the definiens. Therefore, explication also presupposes the notion of synonymy and, thus, cannot define that notion. I showed how the notion of explication that Quine attributes to Carnap differs from the notion that Carnap introduces in his work. Carnap does not introduce an explicatum based on the preexisting synonymy relation between its application contexts and that of the explicandum; the explicatum has no previous application context at all, but is a novel semantical term that is defined to take the place of the explicandum in the exact same contexts. Moreover, Carnap never uses the method of explication to introduce synonymous
terms; rather, he asserts that explicandum and explicatum must not be considered synonyms. Therefore, this objection by Quine does not trouble Carnap, either.

The third method of clarification of synonymy that Quine criticizes is the definition of synonymous expressions by fiat. Although the synonymy between terms can be defined exactly by fiat, Quine says that this method is scarcely used in natural language and, therefore, cannot be useful in transforming essential predications to logical truths. As I explained, although definition by fiat is rarely used in natural language to introduce synonymous pairs, in constructed language systems, definition by fiat is the primary method used to introduce the relation of synonymy between expressions. Quine agrees that definition by fiat is a clear and exact method for defining synonymy. However, in artificial languages, Carnap uses definition by fiat to introduce a meaning postulate, not synonymous pairs. I shall come back to this concept later.

Finally, Quine claims that Carnap defines synonymous expressions as those that are interchangeable *salva veritate*. Quine shows that in intensional languages, interchangeability *salva veritate* can only be clarified with appeal to modal adverbs that, in turn, can only be defined in terms of analyticity. Hence, synonymy defined based on interchangeability *salva veritate* cannot clarify the concept of analyticity in intensional languages. In the case of extensional languages, Quine shows that interchangeability *salva veritate* does not explain synonymy at all. In extensional languages, expressions that are interchangeable *salva veritate* may be merely accidentally true of the same objects (for example, the expressions “the morning star” and “the evening star”) and need not have the same meaning. As I showed, Carnap does not introduce two synonymous expressions in an extensional language.
as those that are interchangeable *salva veritate*. Yet for Carnap, two expressions of an extensional language are synonymous if they are *logically* interchangeable. In an extensional language, the logical interchangeability of expressions, unlike their interchangeability *salva veritate*, guarantees that the expressions have the same intention or meaning. Therefore, Carnap’s definition of synonymy in extensional languages is sufficient.

As I noted, Carnap indeed does not make use of the notion of synonymy to transform essential predications into logical truths, but he introduces meaning postulates to do so. Meaning postulates are semantical rules that determine logical relations among the predicates in a constructed language system. Meaning postulates do not determine the complete meaning relations between the terms, so the postulates do not determine the synonymy in the language. But meaning postulates do state as much about logical relations between expressions of an artificial language as is needed to turn essential predications into logical truths in the language. Quine objects to meaning postulates saying that this is a mere label that makes no genuine assertion about relations between expressions. By listing some alleged semantical relations between expressions under the title of meaning postulates, we do not explain anything about the real relations between the expressions. Quine is right to the extent that we apply meaning postulates to the expressions of natural language that already stand in semantical relations to each other. Meaning postulates cannot explain anything about such relations. However, Carnap introduces meaning postulates to be used in constructed language systems in which expressions do not already stand in semantical relations to each other. In

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1 Examples of such postulates were discussed in Chapter Four.
constructed languages, however, all logical relations are conventional, and meaning postulates in such languages constitute the language alongside other semantical rules of the language, such as the designation rules or the formation and transformation rules. Again, Quine’s objection to meaning postulates, if considered from within Carnap’s philosophy, does not trouble Carnap.

Quine objects to what he perceives as Carnap’s definitions of essential predication by arguing that the concept of essential predication is defined based on the concepts of logical truth and synonymy. But synonymy is a vague concept and therefore cannot clarify the concept of essential predication. My discussion in Chapter Four of Quine’s objections to definitions of synonymy in natural language shows that most of his objections are convincing and therefore demonstrate that essential predication has not been sufficiently defined in natural language. I also showed that Quine’s objections do not touch definitions of synonymy and essential predication in artificial languages, while Carnap’s definitions are only about these concepts in artificial languages.

Later, Quine criticizes definitions of logical truth in his “Carnap and Logical Truth.” In Chapter Five, I examined Quine’s criticisms. In his first objection, Quine attributes to Carnap a definition of logical truth that Quine calls the “linguistic doctrine”: a logical truth is grounded only on the language, independently of matters of fact. I discussed how Quine concludes that this doctrine says no more than that logical truths are obvious. For Quine, obviousness is a vague psychological attribution because it may vary from person to person, and even two contradictory sentences may both be regarded as obviously true by different people. According to Quine, there is no empirical criterion that determines whether a sentence is obvious.
Hence, he sees the linguistic doctrine as empirically empty. For Quine, the claim that logical truths are obviously true does not give an epistemological account of the grounds of logical truths. I showed, first of all, that Carnap never refers to the linguistic doctrine as a definition of logical truth, but that, for him, this doctrine can only be a condition of adequacy for definitions of logical truth. In Chapter Three, I explained that, for Carnap, if a semantical term is supposed to be an explicatum for a customary term as its explicandum, the semantical term must be defined in a way that accords with the common conception of the explicandum in its ordinary usage. Otherwise, the term cannot be an explicatum for the customary term; it is merely a new and independent semantical term. Carnap introduces the semantical concept of logical truth as an explicatum for the explicandum of analytic truth in ordinary usage. Since analytic truths are commonly understood in traditional philosophy as being true by virtue of the meanings of their terms, independently of matters of fact, a semantical definition of logical truth should ground logical truth in a similar way.2

2 A few pages earlier, in reply to Quine’s objection that explication presupposes the concept of synonymy and therefore cannot be used to define analyticity, I claimed that Carnap’s notion of explication does not presuppose synonymy and thus Quine’s objection does not affect Carnap’s definitions. Here, by contrast, it seems that Carnap’s notion of explication also involves synonymy: the claim that the semantical term of logical truth must be defined in a way that accords with the common conception of analyticity in its ordinary usage can be construed as a partial synonymy between logical truth and traditional analyticity in that their intensions must be similar. That is, when we say a definition of logical truth, in order to be adequate, must ground logical truth in a similar way as traditional analyticity does (i.e., being true by virtue of the meanings of its terms and independent of matters of fact), a partial synonymy is presupposed in the methods of grounding truth in logical truth and traditional analyticity. This synonymy is used to define logical truth, and is used as an adequacy requirement. This synonymy occurs in natural language where we discuss the adequacy condition for definitions of logical truth in artificial languages. Thus, synonymy in natural language must be defined prior to the definitions of logical truth in artificial languages. Since Carnap does not do so, his definitions of logical truths are not sufficient, and involve unclear notion of synonymy in natural language.

There are a number of points that must be consider here: First, Quine objects that the unclear notion of synonymy is presupposed in defining essential predication based on logical truth and therefore definition of essential predication is not satisfactory. Even if we accept that the concept of synonymy is presupposed in Carnap’s adequacy condition and makes his definitions of logical truths insufficient, this is different from Quine’s objection at least in that: (a) Quine’s objection is about the definition of essential predication, not about definitions of logical truths, (b) Quine talks about synonymy between linguistic terms that supposedly makes two sentences equivalent to each other, not between contexts or intentions or situations that do not have the same effect on sentences. Second, the synonymy presupposed in Carnap’s adequacy condition does not
This grounding is what the adequacy condition of definitions of logical truth demands. Second, for Carnap, the linguistic doctrine as the adequacy condition is a logical condition for definitions of logical truth. To apply this condition to the definitions, linguistic investigation alone suffices, with no need for empirical investigation. Therefore, Quine is wrong, both in calling the linguistic doctrine to be Carnap’s definition of logical truth and in demanding an empirical meaning for the doctrine, when it is in fact a logical criterion of adequacy of definitions.

The second definition of logical truth attributed to Carnap by Quine is that logical truths are true by linguistic conventions. As Quine sees it, Carnap reduces all truths of logic by means of notational abbreviations into a set of few logical postulates. If the postulates are true, then all truths of logic are true because they follow from the postulates. According to Quine, Carnap holds the set of postulates to be true by convention (that is, Carnap simply accepts them as true, and all truths of logic thereby become true by convention). Quine objects to this truth by convention, stating that one can do the same with any branch of human knowledge—such as geometry, physics, and so on—and can turn its truths into conventional ones. Thus, to be true by convention cannot be a demarcating characteristic of logical truths. Quine then provides, on Carnap’s behalf, a behaviouristic response to this claim: because truths of logic and mathematics are so basic to our whole conceptual

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affect the definitions of logical truth directly, because such synonymy is not used in the definition itself, but is used to evaluate the definition. In other words, definitions are not based on such a synonymy and therefore are not affected by its vagueness. But when we discuss the definitions to evaluate whether they are sufficient, we use adequacy condition that involves vague concept of synonymy in natural language. Not only the concept of synonymy, but also most of the concepts of natural language are vague. Nonetheless, we have no choice but to use such vague concept in metalanguage when discussing logical definitions. The crucial point is that we must not use vague concepts to build logical definitions on them. Therefore, even though Carnap’s adequacy condition of the definitions of logical truths in artificial languages may presuppose the unclear notion of synonymy in natural language and thereby may not be exact, this does not affect the exactness of Carnap’s definitions of logical truths.
scheme, we maintain them independently of our observations of the world. Therefore, Quine claims, although in principle it is possible to turn truths of all branches of our knowledge into conventional ones, Carnap does this only to logical truths because it is behaviouristically justified to do so only to logical truths. Finally, Quine objects that Carnap cannot create truth by convention; Carnap cannot make sentences of logic true by simply accepting them, since truths of logic are all already there. Carnap merely chooses some of the truths by convention and then builds the rest of the truths on the chosen truths by means of logical abbreviations. The role of convention is limited to choosing the set of postulates, not to making those postulates true.

In Chapter Five, I made it clear how Quine here misinterprets Carnap. First, Carnap never defines truths of logic as true by linguistic conventions. Second, for Carnap, a logical system is not a postulate system; a logical system is not interpreted. A logical system is merely a calculus, which does not include any assertions of matters of fact; it is empty. Truths of a logical system are logical consequences of the rules and definitions of the system. Although the rules and definitions of the system are accepted conventionally, when we accept them we have no choice but to accept the truths of the system as well. In this sense, truths of a logical system are not created by conventions, but they are there independent of our choice. Finally, Carnap does not choose a primary set of logical truths among the truths of a logical system to build the rest of the truths of the system on such a primary set. Prior to his building of a logical system, the logic is not there and, thus, no sentences of the logic either. As I explained in Chapters Two and Three, contrary to Quine’s explanation, Carnap starts from scratch by first laying down a set of
definitions and the formation and transformation rules and then by building the rest of the sentences of his logical system on those definitions and rules. The procedure that Quine proposes—choosing a set of primary sentences from among the sentences that are already there and rebuilding the whole system upon them—would be applicable only if Carnap wanted to reconstruct natural language. But all definitions of logical truth that Carnap provides in his works concern artificial, not natural language.

Quine’s last objection to Carnap’s definitions of logical truth, which I considered in Chapter Five, is that, to build logic, Carnap claims that truths of logic are logical consequences of its primary rules. But to infer truths from the primary rules of logic, Carnap must first define “inference” or “logical consequence.” According to Quine, this means that Carnap must have logic in advance (that is, Carnap needs logic to build logic). Following Lewis Carroll’s lead, Quine sees this leading to a vicious regress. Therefore, according to Quine, Carnap’s claim that logical truths are logical consequences of primary rules of logic is pointless. In Chapter Two, I explained that Carnap accepts the importance of the definition of logical consequence in building language systems; for him, establishing the term “consequence” is the beginning of all syntax (logics). Carnap accepts that there has not been a comprehensive definition of consequence nor a definition of this concept for the logic of natural language. But he believes that it is possible to define the concept of consequence for an artificial language, either within the language or in the metalanguage. In Chapters Two and Three, I discussed how Carnap defines the concept of consequence in his syntax and semantics works. Therefore, Quine’s last objection does not undermine Carnap’s definitions of logical truth in artificial
languages, though that objection might be convincing in relation to natural language.

My discussions in Chapters Four and Five established that Quine’s objections to Carnap’s definitions of essential predication and logical truth can all be met if we consider the definitions in the context of Carnap’s philosophy. Quine’s objections are often compelling when Carnap’s definitions are construed as definitions of analyticity in natural language. Since Carnap has never defined analytic truth in natural language in his works, he understands Quine’s objections to Carnap’s logical notion of analyticity as the demand for a clear explicandum for this notion in natural language. Earlier I noted that Carnap introduces the notion of logical truth in constructed language systems as an explicatum for the notion of analytic truth in its customary usage in natural language. In Chapters Three and Four, I explained Carnap’s belief that an explicandum must be a \textit{practically} clear notion. According to Carnap, a notion is practically clear for us, if we know how the notion is often used in different contexts. In other words, to practically clarify a notion, we must determine the class of the things that the notion denotes, and the class of the things that the notion does not denote, and also the intermediate class or the class of the things that we do not know whether the notion denotes. A smaller indeterminate class means a practically clearer notion. Carnap agrees that the clarification of the notion of analyticity in natural language (as the explicandum) helps to show that his semantical concept of analyticity is useful in analyzing the language of science. But Carnap does not agree with Quine that such a clarification is vital for his semantical work. Even though Carnap cannot clarify the explicandum of analyticity in natural language, though that objection might be convincing in relation to natural language.

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language, he thinks that his semantical concept of logical truth can be proven fruitful by applying it to the semantical studies of the language of science.

However, Carnap accepts Quine’s challenge, trying to find an empirical (behaviouristic) clarification of the concept of analyticity in natural language. I discussed the results of Carnap’s work in Chapter Four. I also noted in Chapter Five that, according to Quine, in a radical translation, it is not possible to behaviouristically determine the *exact* meaning of a term in natural language. Even though we accept Quine’s point of view in this regard, I believe we might still find Carnap’s proposal to clarify the notion of analyticity in natural language acceptable. Carnap is not facing an instance of radical interpretation and, moreover, is not required to determine the *exact* definition of analyticity in natural language. Instead, an approximate determination of the explicandum’s use in natural language is enough to *practically* clarify the explicandum.

Nevertheless, we might interpret Quine’s and Carnap’s different points of view regarding the clarification of analyticity in natural language somewhat differently: Quine and Carnap do not debate on the possibility of *practical* clarification of analyticity in natural language, but on the adequacy of such clarification for Carnap’s program. We might say that Quine finds Carnap’s clarification of analyticity in natural language inadequate, not because Carnap is not able to *practically* clarify [in Carnap’s sense of this term] analyticity, but because practical clarification of analyticity in natural language is not enough for Quine. According to Quine, all Carnap’s attempts to define indexed logical truth are valuable only if Carnap is able to provide an *exact* behaviouristic clarification of analyticity in natural language. However, Carnap tries to show that, contrary to Quine’s opinion,
in the absence of an exact clarification of analyticity in natural language, still his
notion of logical truth is fruitful enough. Near the end of his philosophical career,
Carnap attempts to illustrate analytic–synthetic distinction among the sentences of
the language of science. At the end of Chapter Five, I discussed how if we should
find this last attempt to be a successful demarcation between analytic and synthetic
sentences of science, such a finding would support Carnap’s claim that even without
clarification of its explicandum in natural language, semantical studies alone prove
that the notion of logical truth is a fruitful notion in logically analyzing the language
of science.

So far, I have established that all Carnap’s definitions of analyticity relate to
the notion of logical truth in artificial languages. Quine’s objections, conversely,
must be understood largely in relation to the definitions of analyticity in natural
language. Therefore, we cannot see any genuine conflict between them over

3My arguments leading to the conclusion that Quine and Carnap discuss different notions of analyticity might
be construed as if I broke the link of Carnap’s artificial languages to ordinary language, so that I was able to
conclude that Quine’s criticisms never touch Carnap. One thereby might conclude that my strategy makes
Carnap’s concept of analyticity a useless concept with no connection to the language of science and, therefore,
Carnap’s analyticity turns out to be a completely trivial notion from the point of view of ordinary language,
including the language used in scientific communication. Such understanding of my arguments is not correct,
because there is a link between Carnap’s artificial languages and ordinary language. To illustrate how such a
link exist, I explained that the study of an artificial language can facilitate the study of ordinary language
and that in building an artificial language one usually has one eye on ordinary language [see pp. 40–41, 43, 59–60,
and 73, as well as in other places]. We are not always free to set out the rules of an artificial language however
we like; if the study of the language of science is our primary goal, then pragmatic concerns regarding such a
study guide us in our choice of various ways of laying out the rules of the language. Since, in semantical
studies, Carnap constructs his object language in a way that facilitates the study of the language of science (that
is, he chooses definitions and rules of the object language so that the language resembles those features of the
language of science that Carnap wants to focus on), the result of his semantical study of the artificial language
serves to analyze the language of science. More importantly, there is a key notion in Carnap’s philosophy, the
notion of explication, on which I have emphasized in different places. This key notion clearly shows that
Carnap’s discussion of analyticity in artificial languages is related to the traditional concept of analyticity:
Carnap introduces his term “logical truth” as the explicatum for analyticity in traditional philosophy and in
the language of science. The relation of explicatum–explicandum demonstrates the connection between analyticity
in artificial languages and analyticity in its traditional sense; I discussed this relation in detail, among other
places, on pp. 74–78, 82, and [136–37]. Also, the adequacy requirement for a definition of logical truth in
artificial languages preserves the connection between Carnap’s concept of analyticity and traditional
analyticity. The adequacy condition demands that the definition of logical truth in an artificial language must
be such that it gives the truth of the sentences of the system simply by referring to the semantical rules alone,
definitions of analyticity. So why does Quine insist on addressing Carnap in his objections? In order to provide an answer, I discussed the roots of disagreements between Quine and Carnap over analyticity. In my discussion of Quine’s “Lectures on Carnap” and “Carnap and Logical Truth” in Chapter Five, I showed that Quine believes that Carnap’s reason for introducing analyticity into his philosophy is that Carnap wants to preserve certainty and necessity in our knowledge of the world. First, Carnap sees that works of Gottlob Frege and others prove that there is no a priori synthetic knowledge, or knowledge of matters of fact which is independent of experience. Second, Carnap believes that empirical knowledge is not immune to errors of experience and cannot, thus, sustain certainty and necessity. But third, Carnap wants to base our knowledge of the world on a solid and certain basis. Since all synthetic knowledge is based on experience, Carnap seeks certainty of knowledge in analytic statements. Therefore, according to Quine, Carnap attempts to define analytic truth as a priori truth, which is immune to the errors of experience, and believes that he can thus preserve necessity in our knowledge of the world. According to Carnap, as construed by Quine, every firmly accepted truth, including those of logic and mathematics, must be rendered analytic to achieve the status of certain truth that is not refutable by experience. Quine believes that to do so, Carnap reconstructs (natural) language in such a way that firmly accepted sentences of knowledge become consequences of the rules of the language, and their truths are thereby grounded merely on the language. The sentences become true by linguistic conventions.

without referring to matters of fact [see pp. 79, 83–84, 91, 131, and 133–34]. This condition guarantees that the intended use of analyticity in artificial languages is in “agreement with our intention for the use of the [ordinary] term” [Carnap, Introduction to Semantics, 53].
According to Quine, knowledge is a natural phenomenon and must be explained scientifically in terms of our empirical theory of the world. If Carnap wants to distinguish between the truths of knowledge, therefore, then he must do this scientifically (i.e., empirically). In other worlds, Carnap must show empirically how analytic and synthetic knowledge are different. This empirical method is a behaviouristic one, because knowledge is about human belief and must be explained in terms of human behaviour. To establish that there is an analytic–synthetic distinction among truths of knowledge, Carnap must show empirically that we behave differently toward these two kinds of truth. Quine believes that Carnap shares with him the idea that knowledge is a natural phenomenon and must be explained behaviouristically. Therefore, Quine tries to interpret Carnap’s definitions of analyticity in a behaviouristic way. As I discussed in detail, Quine sees Carnap as grounding the truths of only analytic sentences on language and making only them true by linguistic conventions—even while able to do the same to all sentences of knowledge—because Carnap sees only analytic sentences as obvious to us and so basic to our conceptual scheme that we are destined to keep them, no matter what. When Quine criticizes Carnap’s definitions, Quine criticizes the empirical meaning that he sees in those definitions, and objects to the definitions as not empirically sufficient to explain analyticity.

Quine is at first sympathetic to what he sees as Carnap’s program, because he believes that there are firmly accepted sentences that we would not give up, no matter what. Quine sees Carnap as out to provide a firm ground for such sentences. In “Truth by Convention,” Quine supports Carnap’s total program as thus understood, but demands an exact and clear empirical meaning for Carnap’s
definitions of analyticity. Following Pierre Duhem, Quine later comes up with the holistic idea that there is no such thing as firmly accepted truth that we do not give up at all; rather all truths of knowledge are subject to possible change. Based on this approach, all sentences of knowledge or beliefs are logically interconnected, and together form a unique web of knowledge. A contrary experience makes us readjust our body of knowledge. The readjustment can be made in any part of the web of knowledge, and we may change any statement of knowledge—no matter whether it is physical or logico–mathematical or something else—so that the body of knowledge may accord with the observation. There is no statement of knowledge that is immune to revision. Although we may revisit any accepted statement to readjust our body of knowledge, for the sake of ease and simplicity, we prefer first to revisit statements that are closer to the boundary of the field of knowledge, in the sense that they are more connected to observation. Since logical and mathematical statements are deeply connected with other statements of the web of knowledge, revisions of logical and mathematical statements will require adjusting a considerable number of other statements and, ultimately, will end in a radical readjustment in our knowledge. For the sake of simplicity, therefore, logical and mathematical statements are usually considered the last to be revised.

Even after embracing a holistic view of knowledge, Quine still believes that the reason Carnap introduces the analytic–synthetic distinction is to anchor firmly accepted truths of common sense on such a basis that no experience may refute them. Based on his holistic approach, Quine believes that there is no firmly accepted sentence that we would never give up. He therefore concludes that Carnap’s whole
program is in vain, and there is no need to maintain the analytic–synthetic distinction.

In Chapter Five, I argued that Quine misunderstands Carnap’s program and thus Quine’s objections to the program are irrelevant. Quine says that Carnap wants a definition of analyticity to build certain or necessary knowledge on this notion. I provided two reasons to support my claim that Quine’s understanding cannot be correct: First, although Carnap followed the idea of gaining certainty for knowledge in the Aufbau by reducing knowledge claims to sense–data, he insists that he abandoned this idea after the failure of the Aufbau. During his syntax and semantics periods, and whenever he discusses the notion of analyticity, he never shows any concern for achieving certainty. Second, Quine’s interpretation of Carnap’s program is inconsistent with Carnap’s philosophy. For Carnap, an analytic sentence is not knowledge at all; it has no factual content and is not about matters of fact. For Carnap, if analytic sentences do not belong to the realm of factual knowledge, then the sentences cannot be necessary truths of fact either. Quine’s conception of Carnap’s program is indeed based on his philosophical presumption that logico–mathematical sentences are no different from physical statements and are all about matters of fact. Thus, Quine interprets Carnap’s work based on Quine’s own philosophical presumptions, not based on Carnap’s philosophy. This misinterpretation is the root of Quine’s misunderstanding of Carnap’s work.

I believe that Carnap introduces analyticity (logical truth) to his philosophy for two reasons. First, as I explained in Chapter One, Carnap provides the principle of confirmability as a criterion of cognitive significance in order to formulate exactly the basic idea of empiricism, namely that all knowledge of the world is ultimately
based on experience. The principle of confirmability states that a non-confirmable sentence makes no assertion and is therefore meaningless. By virtue of this principle, Carnap gets rid of pseudo-statements of metaphysics and makes the body of knowledge purely empirical. But the principle of confirmability also implies that Carnap’s own philosophical doctrines are meaningless. Carnap therefore introduces the notion of analyticity into his philosophy to rescue his philosophical doctrines. He defines sentences of philosophy as analytic ones, which have no cognitive meaning, but not as pseudo-sentences, because sentences of philosophy do not violate the logic of the language. Neither metaphysical nor analytic sentences belong to the realm of knowledge, but in contrast to metaphysical sentences, analytic sentences are vital to knowledge, because they illustrate the logical relations between knowledge claims and prevent scientists from getting trapped in logico-linguistic errors. Therefore, Carnap introduces analyticity in part to preserve cognitively meaningless philosophical doctrines—not to preserve necessary truths—while he remains strongly committed to empiricism, believing that all knowledge is ultimately based on experience.

Second, Carnap sees the sentences of logic and mathematics used in scientific discourse as not empirical and somehow different from physical sentences. By using the concept of analyticity, he wants to explain how different the two types of sentences are. When Carnap says that logical and mathematical sentences are not empirical, he does not mean that these sentences are unchangeable, only that they are irrefutable by experience. We may change our logic or mathematics, not because experience shows that they are wrong, but simply if we wish to do so (i.e., if some better language comes along). According to Carnap, logic and mathematics do not
assert anything about the world; they are merely tools for talking meaningfully about matters of fact. As tools, logic and mathematics cannot be right or wrong, but they may or may not be useful tools. We may change our logic or mathematics if we find either of them insufficient to our scientific purpose, and our experience might lead us to such a choice. But to show by experience that our logic and mathematics are insufficient is not the same as to show that they are not true; showing our logic and mathematics insufficient does not make them empirical. Quine claims that Carnap believes that logico–mathematical sentences are unchangeable and that Carnap appeals to the notion of analyticity to explain how that can be the case. Quine believes that logic and mathematics are not immune to change and, thus, concludes that there is no need for the concept of analyticity to ground them. But Carnap insists that we can change our logic and mathematics even more easily than changing our scientific statements; we are entirely free to choose our language system. Yet he still asserts that sentences of logic and mathematics are not empirical and, thus, he needs the concept of analyticity to explain what kind of sentences they are. For Carnap, the primary role of the concept of analyticity in science is to demarcate non–empirical sentences of mathematics and logic from the empirical statements of science. In other words, analyticity is used to illuminate the boundary between science and logico–mathematical issues. For him, this concept was used vaguely in traditional philosophy. But he thinks that by providing an exact explicatum for the vague traditional concept of analyticity, he succeeded to demarcate exactly between empirical and non–empirical knowledge for the first time.
The difference between Carnap’s and Quine’s positions is not that Quine holds a holistic view toward knowledge while Carnap does not. In fact, many years before Quine advocates holism in “Two Dogmas of Empiricism,” in the last pages of *The Logical Syntax of Language*, Carnap explicitly endorses holism saying that all statements of science and mathematics are subject to possible alteration, with the only difference being that some statements are more difficult to revise than others.\(^4\) Carnap might even agree with Quine that knowledge is a natural phenomenon and must be explained behaviouristically. Yet Carnap and Quine do differ with respect to the nature of logic and mathematics. Carnap holds logic and mathematics to be beyond the realm of knowledge and independent of matters of fact, while Quine believes that logic and mathematics are as empirical as any branch of science, even though logic and mathematics might be situated most remotely from observation. Carnap does not hold logical and mathematical sentences to be independent of matters of fact because of his belief in the analytic–synthetic distinction; rather he defines analytic truths because he has already accepted that logic and mathematics are different from empirical truths and, thus, wants to explain this difference. Quine does not view logical and mathematical sentences as empirical because of his denial of analyticity; instead he rejects the analytic–synthetic distinction because he has already concluded that logical and mathematical sentences are as empirical as other sentences and, therefore, there is no need for the analytic–synthetic distinction.

Simply put, Carnap’s and Quine’s stands regarding analyticity do not shape their theories of the nature of logic and mathematics; to the contrary, each man’s belief about the nature of logic and mathematics frames his views on analyticity.

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Both Carnap and Quine had already made their minds up with regard to the nature of logical and mathematical sentences before engaging in their debate over analyticity. As I showed in Chapters Four and Five, their replies to the opponent’s arguments proved that Carnap and Quine both often conceived the opponent’s arguments based on his own presumptions and rejected such misconstrued arguments. As I noted, this often makes the reader feel as if Carnap and Quine are not talking to each other; nothing that Carnap or Quine says in their debate on analyticity will change the other’s view on the nature of logical and mathematical sentences.

I noted that there is no genuine conflict between Carnap and Quine over the technical definitions of logical truth. This must not be understood as if I claim that they do not disagree on analyticity at all. To the contrary, Carnap and Quine completely disagree on the very need for analyticity. Quine’s arguments against Carnap have been usually understood as arguments against Carnap’s technical definitions of logical truth. In this work, I have demonstrated that such understanding of Quine’s arguments is wrong, though Quine’s form of arguing might mislead us to such a wrong interpretation. Quine’s core objection to Carnap is that Carnap is supposed to justify that we do believe that there is a difference of kind between logico-mathematical issues and empirical science and, thereby, to prove that we need the concept of analyticity to explain such a difference. According to Quine, Carnap must prove this empirically (behaviouristically). Quine thinks that, as long as Carnap does not provide such a justification, his attempt for defining analyticity is groundless. For Carnap, however, the belief that logic and mathematics are empirical and can be refuted by observation is against commonsense and unacceptable. According to him, we clearly believe that logic and mathematics are
situated beyond empirical knowledge, and to ground such a belief Carnap is out to introduce and define the semantical concept of logical truth.

However, both Carnap and Quine take their stands on the nature of logic and mathematics to defend the principle of empiricism, albeit from two different approaches. Carnap sees the justification of truth of logic and mathematics as a crisis for empiricism. Empiricism asserts that all knowledge is based on experience, and some empiricists have concluded that this assertion must include knowledge in logic and mathematics. But Carnap finds it against commonsense to believe that logic and mathematics are contingent truths of facts and that, for instance, a simple equation of arithmetic might be falsified tomorrow by experience.\(^5\) His solution is to place logic and mathematics entirely out of the realm of knowledge and to explain their nature as analytic sentences. Carnap believes that the concept of analyticity is indispensable in scientific and philosophical discussions and claims that even Quine could not avoid using this notion in his discussion.\(^6\) Conversely, Quine sees no absurdity in putting logic and mathematics beside physical science and considering them refutable by experience. In fact, he believes that holism supports this point of view. Quine promotes a more thoroughgoing empiricism in which all sentences found in scientific discourse are empirical and subject to be examined by experience. Therefore, Carnap’s and Quine’s different points of view about analyticity go back to their different approaches towards empiricism. I cannot see any ground provided in their debate on analyticity on which to decide which approach to empiricism is more adequate.


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