Introduction

1. The Call for a Theory

Properties, relations, and propositions permeate the world. They fix its logical, causal, and phenomenal order, and they structure our thoughts and words about it. So a theory of properties, relations, and propositions (PRPs) should unify a great many topics central to logic, metaphysics, psychology, and theory of language. A theory of PRPs also should handle all topics, including those in mathematics, previously thought to be the province of set theory. It is therefore ironic that by comparison with set theory the theory of PRPs has been relatively neglected over the past century. To be sure, significant advances have been made by Frege and Church, by Russell, and by Carnap and his followers. Yet in spite of the elegance and historical significance of these efforts, each suffers from many interrelated difficulties. Because these are often profound, it is little wonder that research on the theory of PRPs has been held back. The theory has never been adequately formulated.

In this work I try to develop a more nearly adequate formulation of the theory. I attempt to take a fresh look at the subject and to avoid preconceptions that shaped earlier efforts. I hope that my formulation can be applied easily and naturally in each of the above disciplines. To the extent that it can, this formulation will contrast sharply with some of its precursors, which are known for their excessive complication. Ease and naturalness in practice are, however, not the only tests that the theory must pass. At least as important is that it should come up to the high standard of rigor established by axiomatic set theory.

Two underlying tenets shape the work. The first is that properties, relations, and propositions are real, irreducible entities. In spite of the now dominant trend in modern mathematical thought, we should not be enticed into treating them as some special kind of set or function. If anything, sets and functions should be treated as surrogates for certain properties and relations. The second tenet is that the theory of PRPs, unlike set theory, is a full-fledged part of

logic as traditionally conceived. So in the theory of PRPs we find a purely logical theory that is simultaneously a foundation for philosophy, psychology, theory of language, and mathematics. What emerges in the course of this work is a philosophy of logical realism, the view that solutions to foundational problems in metaphysics and science are to be found not in empiricism, naturalism, or idealism but rather in logic and, specifically, in a logic that embraces metaphysical realism.

2. Two Traditional Conceptions of Properties, Relations, and Propositions

Historically, there have been two fundamentally different conceptions of properties, relations, and propositions. On the first conception intensional entities are considered to be identical if and only if they are *necessarily equivalent*. So on this conception there are no constraints on what is to count as a correct definition beyond the requirement of necessary equivalence. For example, both of the following sentences taken from contemporary philosophy:[1]

   (a) x is grue *iff* x is green if examined before t and blue otherwise.
   (b) x is green *iff* x is grue if examined before t and bleen otherwise.

qualify as correct definitions on this conception.

On the second conception, by contrast, each definable intensional entity is such that, when it is defined completely, it has a *unique, non-circular definition*. (The possibility that such complete definitions might in some or even all cases be infinite need not be ruled out.) Hence, on this conception there are severe constraints on what is to count as a correct definition. For example, in view of its stipulative character, the original definition (a) of grue in terms of green (and blue) is certainly correct even if green should itself be definable. On the assumption that there is a unique way to spell out completely the correct definition of grue, it follows that, since green appears in *a* correct definition of grue, green must show up in *the* correct definition of grue as a defined or undefined term. Consequently, on the assumption that correct definitions cannot be circular, green cannot in turn be defined in terms of grue. Thus, although (a) and (b) above both express necessary truths, (a) alone

is a correct definition on the second conception of intensional entities. Although necessary equivalence is a necessary condition for identity, it is not a sufficient condition.

Consider another example:

(c) x is a trilateral *iff* x is a closed plane figure having three sides.

(d) x is a trilateral *iff* x is a closed plane figure having three angles.

On the first conception both (c) and (d) count as correct definitions since they both express necessary truths. On the second conception, by contrast, (d) does not count as a correct definition; only (c) does. To see why, notice that because of the Latin roots of 'trilateral', (c) is surely correct. (This is not to say that it cannot be carried further.) Yet (c) and (d) are exactly alike except that 'angle' occurs in (d) where 'side' occurs in (c). Therefore, on the assumption that there is a unique way to spell out completely the definition of trilateral, (d) cannot also be a correct definition. for that would require the property of being an angle and the property of being a side to be identical. However, they are not even contingently equivalent; in fact, their instances are necessarily different.

The first conception of intensional entities is built into the possible-worlds treatment of PRPs. Indeed, this conception is commonly attributed to Leibniz; whether Leibniz actually subscribed to it, however, is open to doubt. This conception also underlies Alonzo Church's "Alternative (2)" formulation of Frege's theory of senses.[2]

The second conception of intensional entities has a far livelier history. Perhaps the clearest instance of it is to be found in Russell's doctrine of logical atomism. (On this doctrine it is required that all complete definitions be finite as well as unique and non-circular.) Traces of this conception are also evident in Leibniz's remarks on the distinction between simple and complex properties. Moreover, if concepts (ideas, thoughts) are identified with PRPs, evidence of this conception can be found in the writings of modern philosophers from Descartes and Locke, through Kant, and on to even Frege. Yet in spite of its lively history, this conception has to my knowledge never been invoked as the intuitive motivation for a formal theory of PRPs. Even though Russell's informal doctrine of logical atomism provides us with perhaps the clearest instance of

this conception, *Principia Mathematica* itself is, ironically, neutral with regard to the two conceptions. And despite what one might expect, Alonzo Church does not intuitively motivate his "Alternative (0)" formulation of Frege's theory of senses with this conception of PRPs; instead, the intuitive motivation that Church explicitly invokes is a problematic conception of synonymy based on the notion of synonymous isomorphism.[3] A careful study of Church's axioms[4] reveals, however, that it is the second conception of PRPs that implicitly underlies this formulation of Frege's theory.

The first conception of PRPs is ideally suited for treating the modalities—necessity, possibility, impossibility, contingency, etc. However, it has proved to be of little value in the treatment of intentional matters—belief, desire, perception, decision, assertion, etc. Indeed, it has led its major contemporary proponents to construct theories that provide strikingly inadequate treatments of them. The second conception, on the other hand, while ideally suited for the treatment of intentional matters,[5] has only complicated the treatment of the modalities. The relevance of the first conception to modality and the relevance of the second conception to intentionality suggest that we should, at least provisionally, develop both conceptions side by side. This dual approach has a special advantage. For between these two traditional conceptions there are any number of intermediate conceptions, and one should leave open the possibility that in actual contexts of thought and speech any of these conceptions might be at work. What is unique about the two traditional conceptions is that they determine limits between which all other natural conceptions conveniently fall. If the two traditional conceptions can be successfully formulated, then it will be a straightforward affair to adapt the resulting theories to capture any of the intermediate conceptions.[6] So a dual approach that succeeds in capturing these two conceptions may be thought of as a prism that indirectly captures the entire spectrum of intermediate conceptions. The success of the dual approach, thus, does not ride on the correctness of either traditional conception; rather it rides only on the correctness of some conception or other lying in this spectrum.

The value of both traditional conceptions of PRPs is evident. Therefore, in what follows I propose to develop both conceptions side by side. Along the way I will treat each topic in our general subject area—intensionality, predication, class, number, meaning,

truth, necessity, analyticity, intentionality, and consciousness. Near the end of this work this dual development will culminate in a synthesis of the two conceptions. The result will be a unified theory of qualities and concepts. It is in terms of this theory that non-circular definitions of truth, necessity, analyticity, intentionality, and consciousness will be framed. However, before I get too far ahead of myself, allow me to sketch in some of the details.

3. Preview of the Theory of Qualities and Concepts

The work is divided into three parts. Briefly, the first part builds a complete logic for modal and intentional matters. This intensional logic provides a foundation for the subsequent study of PRPs. Then in the second part this intensional logic is extended by the addition of the fundamental logical relation of predication. This forces the theory of PRPs to look for the first time upon the spectre of incompleteness and paradox. Yet the theory also benefits from this extension, for now it is able to provide a natural account of number independent of artificial set-theoretical constructions. Finally, unification is sought in the third part. To start with, intensional logic is derived within an extensional logic. Next the semantic theory of truth and the theory of meaning are both constructed within a semantical theory based upon one underlying meaning relation. And then the two traditional conceptions of PRPs are synthesized into a theory of qualities and concepts. With these three unifications accomplished, it is possible to complete the final movement of the work—a solution to an array of outstanding problems from classical modern philosophy.

The first substantive chapter of the work, 'Intensionality', begins at the beginning: using a very small number of methodological assumptions, I retrace the intuitive motivation for the theory of PRPs. As I have said, one tenet of the work is that the theory of PRPs is part of logic. Specifically, it is part of natural logic, i.e., logic in the broad sense that includes the logic of natural language as a part. This tenet is defended in chapter 1, where I argue in particular that the best representation of intensionality in natural language is provided by a first-order intensional language that is just like a first-order extensional language except that it is fitted out with an intensional abstraction operation. This approach to intensional logic differs from the now prevalent one in that it locates the origin of intensionality in a single underlying intensional abstrac-

tion operation, rather than in an eclectic, open-ended list of operators such as modal operators, epistemic operators, deontic operators, etc.

In the next chapter, 'Intensional Logic', such an intensional language (called L_ω) is constructed. The semantics for L_ω, however, requires a new semantic method, one which harks back to the work of Boole, Peirce, and Schröder. This algebraic semantic method does not appeal to possible worlds even as a heuristic. The heuristic that is used is simply that of properties, relations, and propositions, taken at face value, and fundamental logical operations on properties, relations, and propositions. Using this new algebraic method, I define two notions of validity, one for the first traditional conception of intensional entities and one for the second traditional conception. Then, surprisingly as it might seem, the logics for L_ω relative to these two notions of validity are found to be both sound and complete. In this way I obtain two complete theories of PRPs, one ideally suited for modal matters and the other for intentional matters.

Chapter 3, the last chapter in part I, is devoted to the paradox of analysis, a particularly recalcitrant problem in the logic for intentional matters and one that has deep implications for philosophical method, philosophical psychology, and cognitive psychology. The problem may be put as follows: how, if correct, can a definition (or analysis) be informative? In recent years this important problem has been all but ignored. After a critical examination of Alonzo Church's resolution of the paradox, I show how to extend my new approach to intensional logic to include a more acceptable resolution.

Why is it that complete theories of PRPs are possible in the setting of first-order logic but not higher-order logic? The answer lies in the treatment of predication. The first-order approach, much like the approach taken by traditional logic in centuries past, treats the copula in natural language as a distinguished (2-place) logical predicate that expresses the fundamental logical relation of predication. The first-order logic for PRPs without the predication relation is complete. However, once the copula is singled out as a distinguished logical predicate, the logic for PRPs is rendered incomplete. (This can be proved by an application of Gödel's theorem that number theory is essentially incomplete; for once the logic for PRPs is equipped to represent the predication relation, it

can then model number theory.) In this sense, then, it is not the infinite abstract ontology of logic—i.e., the ontology of PRPs—that is responsible for the incompleteness in logic; rather, it is a fundamental logical relation on that ontology—namely, the predication relation. This fact is hidden in the higher-order approach to logic since the notation for the predication relation is built into higher-order syntax right from the start. In spite of this, a popular thesis among modern logicians is that higher-order logic is a natural generalization of first-order logic. I take issue with this thesis in the first chapter of part II, 'Predication', where reasons are given for thinking that the first-order approach is the more natural and general of the two. It is in this context that the logical, semantical, and intentional paradoxes are considered. For not only is the predication relation responsible for the incompleteness in logic, but in addition it lies at the heart of these perplexing paradoxes. (Consider for example the analogue of Russell's paradox based on the predication relation.) Because of this, the logical, semantical, and intentional paradoxes can in the first-order setting be avoided, not by imposing restrictions on the existence of intensional entities, but rather by modifying what one would naively take to be the extension of the predication relation.

But what about set theory? Paradoxes arise there too. However, I argue in the next chapter, chapter 5, that set theory, unlike the theory of PRPs, is not rooted in natural logic and that it is instead born of certain confusions about natural logic. Of course, set theory, which is a relative newcomer on the intellectual scene, has proved to be very useful in both pure and applied mathematics. However, it is shown in this chapter that everything that set theory can do can be done equally well by the theory of PRPs. (Since this result holds for first-order pure set theory, which countenances sets of sets, sets of sets of sets, etc., it goes well beyond Russell's no-class construction, which works only for sets of non-sets.) The conclusion, then, is that there is no good logical or pragmatic reason for set theory. This shows that entities grounded in natural logic— namely, ordinary aggregates and their properties—may permanently take over the functions that were served on an *ad hoc* basis by the artificial abstract aggregates of set theory.

Now as far as the philosophy of mathematics is concerned, this is no mere changing of the guard. Since set theory is a poorly justified, artificial construct falling outside of logic proper, one may safely

say that during its regime there has been no satisfactory philosophy of classical mathematics. However, since the theory of PRPs is a full-fledged part of natural logic, it can support a well justified logicist philosophy of mathematics. In chapter 6, 'Number', it is argued that this version of logicism is free from the standard criticisms of logicism, even those that proved fatal to the original logicism of Frege and Russell. This completes part II.

Up through this defense of logicism I assume a free and easy pragmatic posture toward three general issues—the relationship between intensional and extensional logic, the relationship between the semantic theory of truth and the theory of meaning, and the relationship between the two traditional conceptions of PRPs. Doing so considerably simplifies the investigation of several highly complex topics. However, these issues must be addressed before a fully unified theory can be attained. This is the first task of part III.

In chapter 1 it is concluded that intensionality in language can be traced to a single underlying intensional abstraction operation. For pragmatic reasons this operation is then treated as if it were a primitive, undefined operation. With matters left this way, one would conclude that there is a permanent bifurcation of logic into the extensional and the intensional. However, in chapter 7, 'Extensionality and Meaning', I show that it is formally possible to define the underlying intensional abstraction operation in a first-order extensional language for the theory of PRPs. This means that, if one wishes to, one may treat intensional sentences as mere syntactic transformations from fully extensional sentences. Doing this would enable one to conclude that intensionality in language is a mere surface phenomenon, that there is not really a bifurcation of logic into the extensional and the intensional, that logic is at bottom extensional logic. This conclusion, indeed, is just Carnap's thesis of extensionality.

In the study of the completeness and soundness problem for intensional logic it also proves convenient to characterize the semantics for intensional language by means of a theory of truth. But this approach to semantics altogether neglects the theory of meaning, as if the theory of truth were an autonomous domain. This situation also calls for remedy. Intuitively, a sentence is true if and only if what it means is true, i.e., if and only if it expresses a true proposition. At the same time, the concept of a true proposition is properly defined within the theory of PRPs quite

independently of semantics (see §45). Therefore, the question of
how to treat truth in language reduces to the question of how to
characterize meaning. My discussion of this question centers
around the classical Frege/Russell controversy about meaning.[7]
Frege's theory is that there are two quite distinct meaning relations,
expressing and naming. For Frege, every meaningful expression not
containing free variables is a name, and every name expresses a
sense (*Sinn*) and, in an ideal language at least, names a nominatum
(*Bedeutung*). Russell's theory, on the other hand, is that there is
only one fundamental meaning relation. Basically, naming is mean-
ing restricted to names, and expressing is meaning restricted to
predicates and sentences. For Russell, in contrast to Frege, pred-
icates and sentences are not genuine names. Names do not express
anything; they only name. And predicates and sentences do not
name anything; they only express. Russell's theory certainly comes
much closer to the commonsense theory of meaning than Frege's
does, but is it as adequate? In chapter 7 I argue that it is. And this
conclusion stands independently of the outcome of the Frege/Mill-
Kripke controversy concerning the semantical properties of or-
dinary names in natural language. For this controversy deeply
affects neither the Frege/Russell dispute over the general form a
theory of meaning should take nor the general character the theory
of PRPs should have.

Now predicates and open-sentences express properties and
relations, and sentences express propositions. But which type of
PRPs are these, which type of PRP is relevant to the theory of
meaning? Do they conform to the first traditional conception or the
second? Given Paul Grice's intentionalist analysis of meaning, it
is easy to establish that the second traditional conception of PRPs
is the one relevant to the theory of meaning, for it is this conception
that is suited to intentional matters to begin with. But how, then,
does the first traditional conception fit in? This question is taken up
in chapter 8, 'Qualities and Concepts', whose content I will now
describe in some detail.

Properties and relations play a primary role in the objective, non-
arbitrary categorization and identification of objects, and in the
description and explanation of change, and also in the constitution
of experience. But not just any properties and relations can play
these important roles; the ones that can are said to be *qualities*
and *connections*. Among the myriad properties and relations, it is

qualities and connections that determine the logical, causal, and phenomenal order of reality. Now when qualities and connections are combined by means of appropriate fundamental logical operations, sooner or later one comes to *conditions*. Conditions are the sort of things that can be said to obtain.

Intensional entities that are neither qualities, connections, nor conditions are ones that pertain primarily, not to the world, but instead to thinking taken in the broadest sense. Such PRPs are called *concepts* and *thoughts*. Consider the example of green and grue mentioned earlier. Whereas green is a genuine quality (specifically, a sensible quality), grue is only a concept (i.e., the concept expressed in English by the expression 'green if examined before *t* and blue otherwise'). As such, grue plays no primary role in the objective, non-arbitrary categorization and identification of objects; nor does it play a primary role in the description and explanation of change; nor does it play a primary role in the constitution of experience. Nevertheless, like other concepts, grue can play a role, even if a silly one, in thinking about the world. Now, from a purely logical point of view, the difference between qualities, connections, and conditions, on the one hand, and concepts and thoughts, on the other, is that the former conform to the first traditional conception of intensional entities; that is, qualities, connections, and conditions are identical if and only if they are necessarily equivalent. However, though necessary equivalence is a necessary condition for the identity of concepts and thoughts, it is not a sufficient condition. For concepts and thoughts conform to the second traditional conception; they must have unique, non-circular definitions (analyses). In this way, then, qualities, connections, and conditions pertain more to modal matters (necessity, possibility, etc.), and concepts and thoughts pertain more to matters of intentionality.

Just as conditions are the sort of things that can be said to obtain, so thoughts are the sort of things that can be said to be true. According to the commonsense theory of truth, a thought is true if and only if the condition to which it corresponds obtains. But what is this relation of correspondence that holds between thoughts and conditions? Concerning this question modern philosophy from Descartes and Locke onward has been dominated almost exclusively by doctrines of representationalism. However, representationalism leaves the relation of correspondence veiled in mystery

and metaphor: at most, thoughts and concepts give way to other thoughts and concepts, *ad infinitum*; one never gets to the real thing. The alternative to representationalism is realism, a doctrine whose origins may be traced back to certain works by Plato and Aristotle. According to realism, we are not forever caught in a net of representations. On the contrary, when a thought or concept is fully and properly analysed, we eventually come, not to still further representations, but instead to the kind of properties and relations that actually give the world and our experience its structure; that is, we eventually come to genuine qualities and connections. To put the point the other way around, according to realism, there are certain fundamental logical operations such that, when qualities and connections are combined by means of them, what we get are concepts and thoughts; all concepts and thoughts are obtained from qualities and connections (plus perhaps subjects of singular predications) by means of these fundamental thought-building operations. Now consider a given thought, and consider the procedure by which this thought is built up from genuine qualities and connections by means of fundamental thought-building operations. Next suppose that the same qualities and connections are combined using the very same procedure except that this time the use of fundamental thought-building operations is replaced by the use of the fundamental condition-building operations. The result is, of course, a condition. But what condition is it? The answer seems plain: it is none other than the condition to which the original thought *corresponds*. And in this way, realism attains something that seems forever out of reach of representationalism, namely, a purely logical analysis of the relation of correspondence.

This realistic synthesis of the two traditional conceptions of PRPs is formalized at the close of chapter 8. Then in the final two chapters, 'Logic' and 'Mind', the resulting theory of qualities and concepts is used to obtain solutions to a number of outstanding problems in classical modern philosophy, problems that have resisted solution to a large extent because they are typically thought of in terms of representationalism rather than realism. The first three problems concern the definitions of truth, necessity, and analyticity. Given the realistic analysis of the correspondence relation and given the fact that qualities, connections, and conditions conform to the first traditional conception of PRPs (i.e., they are identical if and only if they are necessarily equivalent), it is possible

to give purely logical definitions of what it is for a thought to be true, necessary, analytic, or valid. Furthermore, it is possible to give a purely logical definition of what it is to be a necessary connection, something Hume vigorously denied could be done. And given this, we are perhaps a step closer to a purely logical analysis of causation.

The final three problems to which the theory of qualities and concepts is applied are intentionality, mind, and consciousness, the very hallmarks of modern philosophy. According to Franz Brentano, an intentional phenomenon is one that is *about* something else, even if that something else does not exist. Notice, however, that thoughts and concepts are exactly the sort of thing that can be about something else, even if that something else does not exist. Beginning with this insight, I define an intentional connection as one that can hold in a certain way between an individual particular and a thought or a concept. And generalizing on this definition, I define a mental connection—intentional or experiential—as one that can hold in a certain way between an individual particular and a thought or concept or a quality, connection, or condition. According to this definition, then, mental connections are different from physical connections, for the latter can hold only between particulars and particulars, or perhaps between particulars and locations, particulars and times, particulars and stuffs, etc. The intuition behind this definition is that thoughts and concepts play a special role in thinking, and qualities, connections, and conditions play a special role in experience. And none of them plays any such role in exclusively physical processes. Those who hold otherwise would seem to have forgotten a category distinction between physical and mental connections.

Now suppose that one day we should design and build a machine that performs physically as we do, behaviorally and mechanically. A natural question to ask is whether the machine has a mind. According to behaviorism and materialistic versions of functionalism, this question is identical to the question of whether the machine behaves or functions physically as we do. But *ex hypothesi* we know that it does; *that* is not our question. We want to know something else, but what is it? What we want to know is whether the machine actually functions mentally. But this is to say, we want to know whether it stands in genuine mental connections to things. For intuitively, a thing functions mentally if and only if it really

does stand in mental connections to things. (Connections, it will be recalled, are the fundamental kind of relations which, together with genuine qualities, serve to fix the logical, causal, and phenomenal order of reality.) It is not enough that the machine should merely behave or function *as if* it is mentally connected to things. This difference is what makes all the difference. Yet by using the theory of qualities and concepts we are able to give a purely logical definition of what a genuine mental connection is. And in fact this definition can be used to give a purely logical definition of consciousness itself.

The overall movement in the work is thus toward a unified logical realism. Solutions to fundamental metaphysical problems are found in neither empiricism nor naturalism nor idealism but rather in logic, which underlies the very exercise of reason.

4. Critical Survey of Alternate Approaches*

In developing this theory of qualities and concepts I have been guided by several desiderata, which I will now simply state.

Desiderata

(a) It is desirable that the theory should provide at least a framework for solving the following family of classical puzzles in the philosophy of logic and language:

Classical Puzzles

(1) substitutivity failures involving co-extensive expressions in modal and intentional contexts (§§8, 39)

(2) substitutivity failures involving necessarily equivalent expressions in intentional contexts (§16)

(3) the paradox of analysis (§§18–20)

(4) Mates' puzzle concerning substitutivity failures for synonyms in intentional contexts (§§18, 39)

(5) quantifying-in, i.e., the external quantifiability of certain singular terms in modal and intentional contexts (§§7, 11)

(6) anomalies involving indexicals in intentional contexts (§39)

(7) Geach's puzzle about intentional identity (§39)

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* Knowledge of the material surveyed in this section is not required for an understanding of the rest of the book. Discussions of the various desiderata may be found in the sections indicated.

(8)   the logical paradoxes, e.g., the property-theoretic analogue of Russell's paradox (§26)

(9)   the semantical and intentional paradoxes, e.g., the semantical and intentional versions of the liar's paradox (§26)

(10) Frege's puzzle, i.e., how can '$a = b$' be true yet different in meaning from '$a = a$'? (§38).

(b)   It is desirable that the theory should in its formal statement constitute an idealized representation of natural language having the following programmatic features:

Programmatic Features

(11) it has sound and complete logics for modal matters and for intentional matters (§§15–17)

(12) it passes the Langford-Church translation test (§8)

(13) it satisfies Davidson's finite-learnability requirement, i.e., it has a finite number of undefined constants (§§8, 12, 37)

(14) it has no *ad hoc* existence restrictions imposed by stratification according to logical type (§§10, 22)

(15) it makes no ontological commitment to non-actual possibilia (§§13, 39, 46)

(16) it represents 'believes' as a 2-place predicate, 'is true' and 'is necessary' as 1-place predicates, and 'that'-clauses as singular terms (§6)

(17) it is syntactically first-order (§§10, 21–6)

(18) it has a Russellian semantics, i.e., its semantics specifies only what the genuine names name and what the predicates and sentences express (§38)

(19) it is consistent in its semantics with Mill's theory of ordinary names (§§38–9)

(20) it is consistent with Carnap's thesis of extensionality (§37).

(c)   It is desirable that the theory should yield the following applications:

Applications

(21) an analysis of number (§32)

(22) a definition of truth for propositions (§45)

(23) a definition of necessity (§46)

(24)   a definition of analyticity (§47)

(25)   an analysis of intentionality (§48).

It is, of course, understood that these analyses and definitions are to be non-circular.

Some of the desiderata might appear tendentious. Each one, however, will be discussed in some detail elsewhere in the book, and I hope that such discussion will help to resolve objections.

Before I launch into the work proper it should be helpful to have an overview of the various leading approaches to our general subject area and the success that these approaches have in satisfying the desiderata. The most efficient way to provide such an overview is in chart form. Of necessity, such a chart will be provisional in character: the material to be represented is very complicated and many of the entries will obviously be arguable. Nevertheless, since a thorough discussion of past approaches would easily comprise a book of its own, and since my purpose here is to advance a new approach and not to review the merits and defects of past ones, the use of a provisional chart would seem to be the best way to meet the present need. The chart is intended only as a tool to be used in obtaining an overview of a complicated family of problems and attempted solutions.

The following are the approaches represented on the chart; salient features of the approaches are mentioned where that is necessary in order to distinguish one approach from another:

Approaches

(1)   the theory of qualities and concepts

(2)   Frege's approach (*Die Grundlagen der Arithmetik*, 'Funktion und Begriff', 'Über Sinn und Bedeutung', *Grundgesetze der Arithmetik*)

(3)   Church's Alternative (2)—all and only necessarily equivalent expressions are counted as synonymous ('A Formulation of the Logic of Sense and Denotation', 'Outline of a Revised Formulation of the Logic of Sense and Denotation')

(4)   Church's Alternative (0)—all and only synonymous isomorphic expressions are counted as synonymous ('A Formulation', 'Outline', 'Intensional Isomorphism and Identity of Belief')

(5) Russell's approach ('On Denoting', 'Mathematical Logic as Based on the Theory of Types', *Principia Mathematica*, 'The Philosophy of Logical Atomism')

(6) Carnap's approach—'is necessary' is treated as an operator, not a predicate; in both the object language and the metalanguage quantification over non-actual possibilia is avoided in favor of the wholly syntactical state-descriptions approach (*Meaning and Necessity*)

(7) Hintikka's approach—'believes' and 'is necessary' are both treated as operators, not predicates; *à la* Davidson, the theory of meaning is equated with the theory of truth; possible-worlds semantics is used, but explicit quantification over non-actual possibilia is avoided in the object language (*Models for Modalities*)

(8) Montague's approach—'believes' and 'is necessary' are both treated as predicates; possible-worlds semantics is used, but explicit quantification over non-actual possibilia is avoided in the object language ('Pragmatics', 'Universal Grammar', 'The Proper Treatment of Quantification in English'; it will be assumed here that the axiomatic theories given by Daniel Gallin in *Intensional and Higher-Order Modal Logic* are part of Montague's approach)

(9) David Lewis' approach—propositions are explicitly treated in the object language as functions from possible worlds onto truth values; properties, with functions from possible worlds onto sets of possible individuals; etc.; it will be assumed here that Lewis wishes to quantify explicitly over non-actual possibilia in the object language ('General Semantics', *Counterfactuals*, etc.)

(10) Scheffler's inscriptional approach—$\ulcorner x$ says that $A\urcorner$ is analysed as $\ulcorner(\exists y)(y$ is-an-A-inscription & x utters $y)\urcorner$, where $\ulcorner$is-an-A-inscription$\urcorner$ is a primitive 1-place predicate that is satisfied by all and only inscriptions synonymous to A ('An Inscriptional Approach to Indirect Quotation')

(11) Davidson's approach—$\ulcorner x$ says that $A\urcorner$ is parsed as $\ulcorner x$ says that: $A\urcorner$, where 'that' is a demonstrative referring to what follows it; the theory of meaning is assimilated to the theory of truth ('On Saying That', 'Truth and Meaning', etc.)

(12) Quine's syntactical approach—$\ulcorner x$ believes that $A\urcorner$ is analysed as $\ulcorner x$ believes-true $\ulcorner A\urcorner\urcorner$ (§44 *Word and Object*)

(13)   Quine's primitive-predicate approach—$\ulcorner x$ believes that $A\urcorner$ is analysed as $\ulcorner x$ believes-that-$A\urcorner$, where the latter is a primitive 1-place predicate that is satisfied by all and only things who believe that A (§44 *Word and Object*).

I will include under (12) and (13) Quine's familiar approaches to definite descriptions, names, number, and truth (*Word and Object*, *Mathematical Logic*, 'On What There Is', 'Notes on the Theory of Reference', etc.).

In evaluating these approaches relative to the desiderata, I will use the following five grades:

Yes   No   ?   —   +

To see the force of these grades, suppose that a desideratum D concerns some classical puzzle and that an approach A explicitly contains a candidate solution to the puzzle. Then, if successful, A receives the grade 'Yes'; if unsuccessful, A receives the grade 'No', and if it is uncertain whether the solution is successful, A receives the grade '?'. On the other hand, suppose that A does not explicitly contain a solution to the puzzle. Can A be supplemented with a successful explicit solution to the puzzle? If there seems to be a barrier to doing this, then A will receive the grade '$-$'. If there does not, then A will receive the grade '$+$'. The '$+$' grade does not imply that a barrier does not exist; it only means that one is not in evidence. In the event that desideratum D concerns, not some classical puzzle, but rather one of the programmatic constraints on A or one of the applications of A, the five grades are used analogously. Thus, we have the following:

Key

Yes: explicit stance taken—outcome successful
No: explicit stance taken—outcome unsuccessful
?:   explicit stance taken—outcome uncertain
— :   no explicit stance taken—evident barrier to success
+ :   no explicit stance taken—no evident barrier to success.

In grading the various theories I will make use of another convention. Many of the approaches presuppose the doctrine that ordinary names are synonymous with definite descriptions. This descriptivist doctrine, of course, contradicts Mill's theory of ordinary

Desideratum	1. Quality and concept	2. Frege	3. Church: alt. 2	4. Church: alt. 0	5. Russell	6. Carnap	7. Hintikka	8. Montague	9. D. Lewis	10. Scheffler	11. Davidson	12. Quine: syntactical	13. Quine: prim. pred.
1. Substitutivity failures: co-extensives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Substitutivity failures: nec. equivalents	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes
3. Paradox of analysis	Yes	-	-	No	-	No	-	-	-	+	+	-	-
4. Mates' puzzle	Yes	+	+	?	+	+	+	+	+	+	+	+	+
5. Quantifying-in	Yes	-	No	No	Yes	-	Yes	Yes	Yes	+	-	No	-
6. Indexicals in intentional contexts	Yes	No	-	-	?	+	+	-	-	+	+	+	-
7. Intentional identity	Yes	+	+	+	+	+	+	?	+	+	+	+	+
8. Logical paradoxes	Yes	No	Yes	Yes	Yes	Yes	+	Yes	Yes	+	+	Yes	Yes
9. Semantical and intentional paradoxes	Yes	+	+	Yes	Yes	+	+	+	+	+	+	+	+
10. Frege's puzzle	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	+	No	-	-
11. Sound and complete logics for modalities and intentional matters	Yes	No	No	No	No	-	+	No	-	-	?		-
12. Langford-Church translation test	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes
13. Davidson's learnability requirement	Yes	No	No	No	No	Yes	Yes	-	-	No	Yes	Yes	No
14. Not a type-theory	Yes	No	No	No	No	No	Yes	No	No	Yes	Yes	Yes	Yes
15. No commitment to non-actual possibilia	Yes	Yes	Yes	Yes	Yes	Yes	?	?	No	Yes	Yes	Yes	Yes
16. 'Necessary', 1-ary predicate; 'believe', 2-ary predicate; 'that'-clause, sing. term	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	+	No	No	No
17. Syntactically first-order	Yes	No	No	No	No	No	Yes	No	No	Yes	Yes	Yes	Yes
18. Russellian semantics	Yes	No	No	No	?	No	No	No	No	+	No	No	No
19. Consistent with Mill's theory of names	Yes	No	No	No	No	No	+	No	No	+	Yes	No	No
20. Thesis of extensionality	Yes	Yes	Yes	Yes	No	No	No	No	?	Yes	Yes	Yes	Yes
21. Definition of number	Yes	Yes	Yes	Yes	Yes	+	+	+	+	+	+	Yes	Yes
22. Definition of truth for propositions	Yes	+	Yes	Yes	+	-	-	+	+	-	-	-	-
23. Definition of necessity	Yes	-	Yes	-	-	No	-	-	-	-	-	-	-
24. Definition of analyticity	Yes	-	-	-	-	No	-	-	No	-	-	-	-
25. Analysis of intentionality	Yes	-	-	-	-	-	-	-	-	-	-	-	-

APPROACHES

names. In grading those approaches that presuppose the descriptivist doctrine, I will proceed as if this doctrine were correct, but I will give a 'No' grade on desideratum 19, consistency with Mill's theory. Incidentally, this sort of interdependence, which occurs at numerous points in the chart, is one reason for the chart's provisional character.[8] Finally, the grades given to the theory of qualities and concepts are surely tentative since, unlike the other approaches, this one has not yet been subjected to critical scrutiny.

As I have indicated, I feel uncertain about several of the grades. However, a number of the more controversial ones will be discussed in succeeding chapters. Readers with misgivings might find some satisfaction there.

5. Epistemological Note

I wish to say a word about those epistemological attacks on theories of PRPs made from the point of view of naturalistic empiricism. Although this is not the place to attempt a thorough rebuttal, I will sketch the general line of defense that I am inclined to take.

I believe that the theory of qualities and concepts has a traditional *a priori* justification: the theory is part of logic, and logic is knowable *a priori*. I believe that the theory in addition has a traditional *a posteriori* justification: at least some of one's own conscious states—uninterpreted experiental states or conscious intentional states—are directly evident, and the theory of qualities and concepts constitutes the best formulation of the logic for these directly evident matters. Yet unless worked out in detail, these two replies are unlikely to persuade philosophers with deep naturalistic empiricist convictions. This is no worry, however, for the empiricist attack can be answered within its own ground rules without invoking a competing rationalist or Cartesian-foundationalist theory of knowledge.

The naturalistic empiricist holds that a theory is justified if it belongs to our best composite theory of the world. However, if our best composite theory includes a mentalistic psychology and an intensional theory of meaning, then it will include the theory of qualities and concepts. The reason for this is twofold. First, as before, the theory of qualities and concepts constitutes the best formulation of the logic for psychological matters; secondly, it provides the best background theory for constructing theories of

meaning. Up to now a mentalistic psychology and an intensional theory of meaning have always found their way into our best composite theory. To think that this situation will ever change looks more like an article of faith than like a rational belief. Therefore, unless unreasonable double standards are invoked, it appears that such theories—and, in turn, the theory of qualities and concepts—are justified from the naturalistic empiricist point of view.

In closing I should like to turn the tables on naturalistic empiricism. The very vocabulary in which its doctrines are stated— 'justification', 'best theory', etc.—simply cannot be explained satisfactorily outside a logical framework like that provided by the theory of qualities and concepts. Thus, if naturalistic empiricism is wedded to the attack on theories of PRPs, epistemologically it is radically self-defeating. Epistemologically self-approving theories may all be expected to use a logical framework like that provided by the theory of qualities and concepts.[9]

The theory of qualities and concepts achieves a level of conceptual clarity uncommon in the special sciences endorsed by naturalistic empiricists. According to naturalistic empiricism even the most basic logical concepts must be explained in naturalist and empiricist terms. However, the natural order of explanation is certainly in the opposite direction at least for the most general naturalistic concepts such as cause, matter, mind, species, nature, etc. These concepts will remain obscure until they are explained in terms of still more fundamental logical concepts, concepts used simply in the exercise of reason.