## THE LIMITS OF LOGICAL EMPIRICISM

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VOLUME 334

# THE LIMITS OF LOGICAL EMPIRICISM

## SELECTED PAPERS OF ARTHUR PAP

with an Introduction by Sanford Shieh

Edited by

ALFONS KEUPINK University of Groningen, The Netherlands

and

SANFORD SHIEH Wesleyan University, Middletown, U.S.A.



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## Preface

We would like to begin by telling a bit of the somewhat complicated story of how this volume came into being.

Several years ago, one of us—Keupink—stumbled across some of Arthur Pap's major publications<sup>1</sup> in a secondhand bookstore in Groningen. As a Ph.D. student in philosophy of science with a special interest in the history of logical positivism, he was taken by the fecundity of Pap's thought. Here was some-one who, to him at least, seemed equally well-versed in all kinds of different philosophical traditions (notably ordinary language philosophy and logical empiricism), yet always with something original to say. Keupink quickly made a decision to compile a list of Pap's writings. He discovered, to his surprise, that Pap had written well over fifty papers during an extremely productive but all too short life. Gradually Keupink formed a plan to edit this material, in order to make it more accessible to a wide philosophical audience. He contacted Kluwer and in the Spring of 2003 submitted a manuscript entitled *Arthur Pap: Collected Papers*. It contained all of Pap's papers and Keupink hoped that they could be published in two volumes.

Kluwer asked Shieh to review Keupink's manuscript. Nowadays Pap's work is relatively unknown in Anglo-American analytic philosophy. Mostly he is read only by philosophers interested in the history of the analytic tradition. Indeed, it is because one of Shieh's main research interests is in the development of modal logic and the concept of necessity in analytic philosophy that he knew parts of Pap's *magnum opus*, *Semantics and Necessary Truth*, before Kluwer contacted him. As he read through the papers in the proposed collection, he became more and more impressed by the historical and philosophical significance of Pap's work.

The principal criteria that the two of us share for historical-philosophical assessment are:

1 Did the work play an important role in the development of the tradition to which it belongs?

<sup>&</sup>lt;sup>1</sup>Pap 1946b, Pap 1949b, Pap 1955a, Pap 1958c, and Pap 1962.

#### Preface

- 2 Did it anticipate prominent subsequent developments?
- 3 Did it provide distinctive solutions or perspectives on problems of contemporary concern, perhaps by pointing out unnoticed problems in contemporary work, perhaps by proposing arguments that are more cogent than contemporary ones, perhaps by allowing us to see the significance of the problems differently?

Shieh's suggestion was that the best way of making Pap's work more visible and easily available to the philosophical community is to make a smaller selection of Pap's papers that best satisfy these criteria, and provide an introduction that clarifies their significance. Shieh was very happy to be asked by Keupink (via a letter written by Prof. Theo Kuipers and Dr. Jeanne Peijnenburg of the University of Groningen), to make the small selection and write the introduction.

We hope that the present edition will have the effect of furthering interest in Arthur Pap's thought and contributing towards a reevaluation of his highly original and stimulating contribution to the development of 20<sup>th</sup>-century (analytic) philosophy (of science).

> ALFONS KEUPINK Groningen, the Netherlands, 2005

Sanford Shieh New York, USA, 2005

## Acknowledgments

We would like to thank Arthur Pap's wife, Mrs. Pauline Pap, for her confidence and support; Keupink would like also to thank her for her help with his Intellectual Biography of Pap. We are also very grateful for the help and advice of Prof. Dr. Theo Kuipers, and Dr. Jeanne Peijnenburg. Our other colleagues in Groningen made various constructive remarks on earlier versions of the Intellectual Biography of Pap and the Introduction. In addition, Dr. Peijnenburg carried out the unenviable task of tracking down the copyright holders of the essays herein reprinted, and securing permission for this reprinting; without her help this volume would not have been possible. Acknowledgments are also due to the Netherlands Organization for Scientific Research (NWO), which partly sponsored the research for this project. We would like to thank Andrew Catalano of Wesleyan University and Julia Perkins of *History and Theory* and Wesleyan University for their invaluable editorial assistance.

#### **Origin of the Essays**

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- 22 "Are Physical Magnitudes Operationally Definable?," in C. West Churchman & P. Ratoosh (eds), *Measurement: Definitions and Theories*. New York: John Wiley, London: Chapmann & Hall (1959), pp. 177-91. (Publications of contributions to the symposium of the American Association for the Advancement of Science, 1956.) The editors were unable to trace or contact the copyright holder.

#### A Note on this Edition

Minimal editorial changes have been made to the originally published versions of the essays reprinted in this volume. Typographical mistakes are corrected; references, spelling, and punctuation are made uniform throughout the volume.

Details of original publication of the essays are given both in chapter 25, a bibliography of Pap's publications, and in the relevant entries for Pap in the References, starting on page 387 below.

All citations of Pap's works in this volume are exclusively by the entries in the References.

THEMES IN PAP'S PHILOSOPHICAL WRITINGS

Ι

Sanford Shieh

#### 1. Overview of Pap's Philosophical Work

There are, of course, many styles of philosophizing; but it is sometimes illuminating to think of philosophers as divided into two broad types: the Socratic and the Platonic. The former are the critics, the ones who never cease questioning the grounds of accepted opinions and turning over the details of arguments; the latter are the systematizers, the ones who have a sweeping vision that they take more seriously than the details. On this division Arthur Pap is a Socratic philosopher. As he himself says in describing Semantics and Necessary Truth (Pap 1958c, cited in this Introduction as SNT), "It will hardly escape the reader's notice that very few definitive conclusions are reached in this book, that perhaps more problems have been formulated than have been solved" (SNT, Preface, xiv). Although Pap was very much an analytic philosopher, a good part of his most philosophically rewarding work are critiques of two prominent strands of analytic philosophy in the 1940s and 1950s. One of these is logical positivism or logical empiricism, the movement stemming from the Vienna Circle of Moritz Schlick and Rudolf Carnap and the Berlin school of Hans Reichenbach, which dominated analytic philosophy, especially in the USA, from the end of World War II through most of the 1960s. The other is ordinary language philosophy, deriving from the work of Gilbert Ryle and the followers of Ludwig Wittgenstein,<sup>1</sup> which played a significant and in certain ways oppositional role, in post-war British analytic philosophy until the end of the 1960s. There were many differences and disputes between positivism and ordinary language philosophy, yet in certain respects their central, as it

<sup>&</sup>lt;sup>1</sup>Interestingly, J. L. Austin's work never made much of an impression on Pap. Of course, Austin's work also failed to make much of an impression on the rest of analytic philosophy until after the period in which Pap was active, when Austin's ideas about speech acts were taken up in philosophy of language.

were popular, ideas converged. In order to understand Pap's work and appreciate its relevance to contemporary philosophy, it will be useful to begin with a brief sketch of some major preoccupations of the analytic philosophy of this period that included this convergence. The doctrines I will outline characterize logical empiricism and ordinary language philosophy as philosophical movements, and so should not be confused with the much more nuanced views of, e.g., Carnap and Wittgenstein.

## 1.1 Intellectual Background: Logical Empiricism and Ordinary Language Philosophy

One of the fundamental motivations of positivism is a perceived contrast between traditional philosophy and the natural sciences. Whereas the sciences seem to display steady if not uninterrupted progress and continued general agreement on results, philosophy seems mired in endless irresolvable disputes. Positivism thus started from the idea that the paradigm of genuine knowledge is empirical scientific knowledge, and from a distrust of metaphysical concepts and theories outside the natural sciences. Positivism pursued two closely related projects. One was an attempt to arrive at criteria for distinguishing genuine procedures for assessing claims to knowledge from spurious ones. Since natural science was the model, these criteria all turned on the existence of impersonal standards, formulated in terms of objective experience, for acceptance and rejection of statements. The other was an attempt to offer a diagnosis of where traditional metaphysics had gone wrong. Perhaps the most well-known thesis of positivism, the verificationist theory of meaning, subserved both of these projects. The principle of verification is a formulation of the shared and objective standards governing the acquisition of knowledge in the sciences: a statement is accepted only on the basis of sensory experiences that establish it as true. This principle goes naturally with an account of meaning: the cognitive meanings of statements are given by the sensory experiences that would verify or falsify them; a statement for which there is no method of verification has thus no objective meaning at all. The language of science was taken to abide by this principle, while that of traditional metaphysics did not. Thus science deals only with cognitively significant statements, while metaphysics trafficked in (cognitive) nonsense.

The principle of verification came to grief in all sorts of ways,<sup>2</sup> of course, but one important problem spurred the formulation of another central tenet of positivism. (Yet another crucial problem will be discussed in section 5 below.) This is the problem of the *a priori*, as A. J. Ayer called it (Ayer 1952b). Logic and mathematics are indispensable to the practice of modern science; yet nei-

<sup>&</sup>lt;sup>2</sup>See Hempel 1951 for a detailed account of the problems faced by this principle.

ther the laws of logic nor the axioms and theorems of mathematics seem to be justified on the basis of experience. The solution adopted by positivism was to hold that logic and mathematics are not based on experience for their truth *because* they rest, at bottom, on the meanings of our words, the rules governing the use of our language. These meanings or rules are conventional, at least in the sense that their adoption is not constrained to reflect empirical reality, and this explains why it is possible for us to know the truth of whatever is based solely on them without reference to experience. Necessary truth, then, is just truth based on features of language. It should be stressed that, for the most reflective positivists, such as Carnap, meaning rules *cannot be* constrained by empirical reality, because it is only when the rules are in place that we have a conception of what it is for our acceptance of statements to be responsible to empirical evidence. Thus, not only is necessity of logic and mathematics consistent with the empirical status of science, but they have to have this modal status in order for there to be such a thing as empirical science at all.

The solution also represents the principal point of convergence between positivism and ordinary language philosophy. The latter differed from positivism in rejecting science as the paradigm of knowledge and of philosophical method. But, ordinary language philosophers, especially the followers of Wittgenstein, agreed with positivism in taking traditional philosophy to be deficient in (cognitive) meaning. In addition, they went beyond the positivists' characterization of traditional metaphysics as nonsense. The grand metaphysical theories of traditional philosophy from Plato to Hegel all claimed to provide insight into *necessary* structures of reality. Armed with its version of the linguistic theory of necessity, ordinary language philosophers took themselves to have exposed these pretensions as mistaking merely conventional features of our language, the rules (of philosophical grammar) that regulate what it is to make sense, for the ultimate truth underlying reality.

The linguistic theory of necessity goes naturally with a sharp distinction between the analytic and the synthetic. The meanings of our words, the rules governing their sensical use, are supposed to be unconstrained by empirical reality. As Pap puts it, if these rules are formulated in the guise of statements, "they express stipulations concerning the use of symbols and thus cannot significantly be said to be refuted by facts"<sup>3</sup> In contrast, the sentences governed by these rules "are empirically refutable statements 'about reality' " (19, 308). Ordinary language philosophers tend to be suspicious of the notion of analytic truth, since, in their view, a rule of language is strictly speaking neither true nor false, but defines what it is for something to be true or false. But they nevertheless maintain an analytic-synthetic distinction, primarily in the form

<sup>&</sup>lt;sup>3</sup>Chapter 19 below, page 308. In this Introduction, unless otherwise noted, references to Pap's papers in the present volume will be given in the text, by chapter number and page number.

of Wittgenstein's distinction between criteria and symptoms. In the end, their disagreement with the positivists over whether there are analytic truths is a merely verbal one. Both accept a distinction between that which sets the rules for empirical justification and that which, given the rules, are susceptible of being empirically justified.

When the shared doctrine is formulated in this way, we can see that what underlies these two major strands of postwar analytic philosophy is a deeplyrooted conception of rationality. The fundamental idea is that participation in rational inquiry presupposes acknowledgment of shared and objective standards for what investigatory results counts in favor of accepting or rejecting what statements. Without this prior agreement on standards, there is no way to separate genuine agreements and disagreements from merely verbal ones; it is unclear whether participants in inquiry even understand one another. Thus a distinction between the rules for conducting empirical inquiry and the results of such inquiry appears inescapable if one is to be rational; this is why the analytic-synthetic distinction appears inescapable.<sup>4</sup>

### **1.2** Two Main Themes of Pap's Work

Although Pap is a Socratic philosopher, it would be false to say that his work consists only of piecemeal and incisive criticisms with no overarching philosophical unities. Two broad themes stand out in his papers, call them anti-reductionism and intuitionism. The first theme is connected to Pap's critical relation to the analytic philosophy of his time. Pap's critiques attempt to show, over and over again, the failure of positivism's and ordinary language philosophy's attempts to reduce or explain away the categories of traditional metaphysics. Below I will discuss a number of philosophically significant instances of this type of criticism.

The second theme emerges from the moral that Pap repeatedly finds in his critiques of reductionism. For example, from his critique of the linguistic theory of necessity he concludes that "the concept of necessity involved in such statements as 'the conclusion of a valid syllogism follows necessarily from the premises' and 'the relation of temporal succession is necessarily ... asymmetrical' is *not analyzable at all*" (*SNT*, Preface p. xv; emphases mine). Rather, we have to accept that we have some form of irreducible intuition of these concepts and their applications. Another example of Pap's intuitionism is his argu-

<sup>&</sup>lt;sup>4</sup>In his "Intellectual Autobiography" Carnap explicitly associates the lack of progress in traditional philosophy with the lack of shared standards therein: "most of the controversies in traditional metaphysics appeared to me sterile and useless... I was depressed by disputations in which the opponents talked at cross purposes; there seemed hardly any chance of mutual understanding, let alone of agreement, *because there was not even a common criterion* for deciding the controversy" (Carnap 1963, 44-5, emphases mine). My view of the deeper motivations underlying the analytic-synthetic distinction is indebted to Ricketts 1982.

ment that the relation of logical consequence or entailment cannot be reduced either to syntactic logical form or to model theoretic semantics, so that we have to accept that we have irreducible intuition of material (i.e., non-formal) deductive validity. As we will see, Pap takes this to support the ineliminability of synthetic *a priori* truths. (As this reference to Kant's views suggests, the name "intuitionism" refers, not to the mathematical principles of Brouwer, but to the philosophical ideas which he claims to be the basis of his revision of mathematics.)

This last point brings me to a general observation. These two broad themes in Pap's work can be traced to his early training. Pap was a student of Cassirer at Yale, and although his main philosophical works do not fall within the tradition of Cassirer's neo-Kantianism, they nevertheless manifest an affinity with the kind of pragmatically oriented Kantianism developed by Cassirer. Pap's most important works applied the best ideas of neo-Kantianism to the logical empiricist tradition, resulting in an internal critique of the latter that revealed its limits.

### **1.3** The Contemporary Significance of Pap's Work

In order to indicate the contemporary significance of this work, let me begin by noting that, even to this day, positivism is often taken by many scholars, outside and inside philosophy, to be the very core of analytic philosophy. And, although the identification of analytic philosophy and positivism is a mistake, it is a revealing mistake that contains a substantial grain of truth. Many of the themes of positivism are still with us, in all sorts of surprising ways. For example, perhaps the most prominent contemporary interpreters of Wittgenstein are the British scholars Peter Hacker and Gordon Baker. (See their four volume commentary on the Philosophical Investigations, Baker and Hacker 1980, Baker and Hacker 1988, Hacker 1990, Hacker 2000, as well as Hacker 1986 and Hacker 1996.) Although they strenuously deny that Wittgenstein was a positivist, the views, especially about necessity, that they attribute to Wittgenstein are in the end essentially no different from the views of the positivists that Pap criticized. And, to my mind at any rate, Pap's criticisms apply equally forcefully to the views they attribute to Wittgenstein.<sup>5</sup> For another example, the positivists' distrust of claims outside the natural sciences survive in contemporary attempts to "naturalize" all sorts of things: the mind, ethics, mathematics, truth. Here again, Pap's criticisms raise serious doubts that fund a plausible skepticism about these naturalization programs.

In addition, as we will see in more detail below, Pap's arguments anticipate a number of contemporary philosophical positions. Pap's version of Russellian

<sup>&</sup>lt;sup>5</sup>I should say that I take this to cast doubt on Hacker's and Baker's interpretations of Wittgenstein.

logicism, I will argue in section 10, may be understood as a version of the neo-Fregean philosophy of mathematics championed by Crispin Wright and Bob Hale. (See, *inter alia*, the articles collected in Hale and Wright 2001.) Pap's critique of the semantic account of logical consequence and his argument for the indispensability of material entailment arrive at positions held by John Etchemendy (Etchemendy 1988a, Etchemendy 1988b, and Etchemendy 1990) and Robert Brandom (Brandom 1994), but by rather different routes.

Finally, as I will argue in section 9, Pap's positive views of necessity constitute a defensible alternative to the conceptions of necessity prevalent in contemporary analytic metaphysics.

#### **1.4** Pap in the Analytic Tradition

Let me now say a word about the place of Pap's work in the history of analytic philosophy. In contemporary Anglo-American analytic philosophy (perhaps especially in America), it is generally thought that two fundamental changes occurred in this philosophical tradition after World War II. First, in the 1950s, W. V. Quine's critique of the analytic-synthetic distinction led to the waning of logical positivism. Second, in the mid to late 1960s, Saul Kripke made modality philosophically respectable. Pap's work complicates this picture considerably. As we will see in section 4, Pap had rejected the analytic-synthetic distinction nearly a decade before Quine's "Two Dogmas of Empiricism" (Quine 1951), for reasons very similar to Quine's. In addition, Pap's Semantics and Necessary Truth, published in 1958, was something of a standard reference on necessity in analytic philosophy. This shows how far the analytic tradition had already gone away from the positivist/empiricist reduction or denigration of necessity, some 10-15 years before 1972, when Kripke gave the lectures later published as Naming and Necessity (Kripke 1980). Of course, Pap's work is not the only significant lacuna in the standard picture of modality in analytic philosophy. Another is Carnap's Meaning and Necessity, first published in 1947 (Carnap 1947, second edition Carnap 1956a). (It should be noted that Carnap's interest in modal logic was in many ways a reductionist one, whereas Pap's views of necessity are just the opposite.) Yet another is the work on the logic, semantics, metaphysics, and epistemology of modality that Ruth Barcan Marcus, Pap's fellow student at Yale, published from the mid-1940s to the late 1960s (Marcus 1946b; Marcus 1946a; Marcus 1947; and Marcus 1993, chapter 1, esp. appendix 1A, 3, and 4), which advanced many of the theses for which Kripke argued in Naming and Necessity. Finally, there is the work of Jaakko Hintikka, also published in the same period as Marcus's papers.

Indeed, the historical picture appears even more perplexing if we ask: what is the basis of Kripke's view of necessity? Kripke explicitly says that it is intuition. For example,

When you ask whether it is necessary or contingent that *Nixon* won the election, you are asking the *intuitive* question whether in some counterfactual situation, *this man* would in fact have lost the election... [S]ome philosophers think that something's having *intuitive* content is very inconclusive evidence in favor of it. I think it is very heavy evidence in favor of anything, myself. I really don't know ... what more conclusive evidence one can have about anything. (Kripke 1980, 41-2; second and fourth emphases mine)

Indeed, Kripke's fundamental argument for the coherence of modal notions proceeds by appealing to our intuitive judgment that statements such as "Bush might have won the popular vote in the 2000 US presidential election" and "Weapons of mass destruction might have existed in Iraq in 2003" make sense, even if we're not sure how we would establish their truth or falsity.<sup>6</sup> How, then, is this different from Pap's intuitionism and anti-reductionism? Clearly more work needs to be done if we are to have an accurate history of the analytic tradition.

## **1.5** Plan of the Introduction

In the remainder of this Introduction, I will discuss the most philosophically interesting and historically significant aspects of Pap's work represented in the papers of this volume. They are the following:

- Necessity: sections 2-7
- The Analytic-Synthetic Distinction: sections 4 and 5
- Dispositional and Open Concepts in Science: section 5
- Logical Consequence and Material Entailment: section 7
- Logicism: section 10
- The Semantic Concept of Truth: section 8.1
- The Problem of Other Minds: section 8.2

This is by no means an exhaustive list of the topics of philosophical interest treated by Pap in the papers of this volume. Some other topics which I do not have the space to discuss in this Introduction are listed below in the concluding section 11, at page 42.

<sup>&</sup>lt;sup>6</sup>For a more detailed account of the intuitive bases of Kripke's arguments, see Shieh 2001.

## 2. Necessity as Analyticity

In this section I will begin a discussion of Pap's views of necessity. I will focus on Pap's critique of one version of the positivists' linguistic theory of necessity, the thesis that necessity is reducible to analyticity.

An extremely familiar formulation of the linguistic theory holds that, e.g.,

is necessarily true because it is analytic, i.e., true by definition. Specifically, since 'sister' is defined as, and so synonymous with, 'female sibling', and since the mutual substitution of synonymous expressions in a sentence surely doesn't change its meaning, (1) is synonymous with

This sentence is logically true; it is a substitution instance of a valid schema of first-order logic:

$$(\forall x)(Fx.Sx \supset Sx) \tag{3}$$

Thus the obscure notion of a statement's being *more than simply true*, but *necessarily true*, is clarified by reducing it to two notions with no metaphysical baggage: that of meaning, and that of logical truth.

The first of Pap's criticisms of this theory that I will discuss is given in chapters 3 and 4 below. Pap claims that this account of necessity simply fails to cover all truths which we intuitively recognize as necessary. For Pap the basic notion of necessity is independence from empirical facts: "a necessary condition which any adequate analysis of 'necessary' must satisfy is that the *truth-value* of a necessary proposition does not depend on any empirical facts" (4, 92). Pap asks us to consider the following statement:

If A precedes B, then B does not precede A 
$$(4)$$

He argues,

I assume that few would regard this statement as factual, i.e., such that it might be conceivably disconfirmed by observations... [But t]o see that [it] is not analytic, in the sense defined, we only need to formalize it, and we obtain " $(\forall x)(\forall y)[xRy \supset \sim yRx]$ ," which is certainly no principle of logic. This statement, then, is not deducible from logic; hence if we want to call it necessary (nonfactual), we have to admit that there are necessary propositions which are not analytic. (4, 96)

It will not do, of course, to respond to this argument by claiming that in such cases we simply don't know the definitions of the key terms, such as 'precede'. Such a response presupposes that any necessary truth must be analytic,

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but this presupposition is precisely the linguistic theory of necessity that is being challenged by a putative counter-example. The burden of proof is thus on the defender of the linguistic theory. Note, moreover, a point Pap does not make: if indeed we *know* that truths such as (4) are necessary without knowing the definition of 'precede', then it is plausible that analyticity is *not* the *epistemic* basis of necessity; hence the linguistic theory should, at least, offer some explanation of why it is that while ontologically, as it were, necessity is based on analyticity, our epistemic access to necessity does not go through analyticity.

Pap's first argument is clearly not conclusive; it amounts in the end to a challenge to the linguistic theory to meet the burden of proof by coming up with the required definitions. Pap goes further and argues that attempts to meet this burden of proof must overcome a general difficulty. One could, of course, give any definition one pleases to any expression. But, if there are no constraints on what definitions may be given for demonstrating analyticity, then it is not clear that there are any true statements that cannot be shown to be analytic and so necessary according to the linguistic theory. It follows that, in meeting the burden of proof, one must abide by criteria of adequacy for definitions. The question then becomes, what are these criteria? What makes a definition a good one? What, in the case of (4), would be an adequate definition of 'precede'? According to Pap, "most philosophers would agree that no definition of 'xPy' (to be used as an abbreviation for 'x precedes y') could be adequate unless it entailed the asymmetry of P" (4, 97). There are clearly other commonly agreed constraints: P should, e.g., also be irreflexive and transitive, and it can hold only of events and of whatever other entities there may be with temporal location, etc. Suppose that these et ceteras are sufficient to guarantee that a unique relation satisfies them. Let's write "Q(R)" for the claim that a relation R satisfies these further constraints. Then, one might offer this definition of *P*:

$$xPy \equiv_{df} (\exists R)[(\forall x')(\forall y')(x'Ry' \supset \sim y'Rx') . Q(R) . xRy]$$
(5)

From this definition it is obvious that in second-order logic we can derive  $(\forall x)(\forall y)(xPy \supset \sim yPx)$ . But, Pap writes,

is it not obvious that acceptance of the definition from which the asymmetry of temporal succession has thus been deduced presupposes acceptance of the very proposition 'Temporal succession is asymmetrical' as self-evident? This way of proving that the debated proposition is, in spite of superficial appearances, analytic, is therefore grossly circular. (4, 98)

More generally, the problem for finding definitions to demonstrate analyticity is that if a definition is selected only because it allows for the derivation, from logic alone, of the necessary to be established as analytic, then the analysis of necessity in terms of analyticity is circular. Hence, in order for the linguistic theory to work, the criteria of adequacy for definitions must not be based on the necessity of truths expressed using the defined terms.

Pap is skeptical of the prospects of avoiding this problem. This is not, it seems to me, because he has an argument which establishes the impossibility of finding adequate definitions independently of recognizing necessary truths. Rather it is because, over and over again, he finds proposed definitions and analyses, especially those of the positivists, turning out, upon examination, to rest on prior recognition of necessary truths. The reader will notice this pattern of argument throughout Pap's work. When faced with a reductive explanation of *X* in terms of *Y*, Pap examines the basis on which we identify *Y*s, and finds that we do so by recognizing *X*s. Pap's conclusion is then that we have a primitive and irreducible capacity for intuitive knowledge of *X*s.

It should be clear that a crucial assumption underlying the foregoing considerations is that there are clear instances of truths which we unproblematically recognize as non-factual. One may well ask here: why should an empiricist accept this assumption? Indeed, one way of seeing how Pap differs from Quine is to see that for the latter there are no clear cases of non-factual truths. This thesis is, of course, closely connected with Quine's rejection of the analyticsynthetic distinction. But the interesting point here is that Pap, as we will see in section 4, also rejects the analytic-synthetic distinction. We will be in a position to understand why Pap's empiricism goes with the recognition of non-factual truths only by section 6.

#### 3. Necessity as (Implicit) Linguistic Convention

In this section I turn to Pap's attack on another version of the linguistic doctrine of necessary truth, one which persists in contemporary philosophy in Hacker and Baker's version of Wittgenstein. I focus on Pap's paper "Necessary Propositions and Linguistic Rules" (chapter 5 below, cited in this Introduction as *NPLR*), which summarizes the major themes of *SNT*.

The problem that Pap raises here follows on the one that we discussed in section 2 above, and applies even if it is possible to overcome the problem of successfully attaining definitions or analyses for certifying the analyticity of intuitively necessary truths.

As we saw on page 10 above, part of the linguistic theory's explanation of the necessity of (1) is the fact that (2) is a logical truth, an instance of the valid schema (3). But, then, even if the notion of analyticity is unproblematic, the linguistic theory doesn't yet suffice as an explanation of necessity, since so far nothing has been said about why a logical truth is necessary or what makes instances of valid schemata necessarily true. So the linguistic theory requires supplementation. Moreover, this supplement had better demonstrate that the

necessity in question is a matter of linguistic conventions; otherwise necessity will depend on factors other than language.

The account of logic that Pap attacks holds that the "primitive" truths of logic are necessary because they *implicitly define* the meanings of the logical constants. For example, the schemata corresponding to the elimination rules for 'and'— $\lceil p.q \supset p \rceil$  and  $\lceil p.q \supset q \rceil$ —partly define the meanings of 'and' and 'if ... then'. But now the question is, what is implicit definition? Since these implicit definitions are supposed to be conventional, are they not *proposals* to use the words 'and' and 'if ... then' in certain ways? But are proposals even *candidates* to be true or false? Do we not think that we can propose any way of using words we like? Surely in making proposals we are not constrained to be faithful to anything.

Now, of course this argument by Pap is hardly conclusive. A supporter of the linguistic theory of necessity could reply that Pap has missed the point, because the proposal is precisely that we accept certain statements as true. Moreover, it is precisely because this proposal is unconstrained by empirical evidence that the truth in question is *a priori* and so necessary. What makes the statement true is just that we have agreed to take it to be true, and nothing we discover about the world need force us to give up this agreement. For the time being, let's leave this reply and go on to a second version of the linguistic theory.

This version holds that the linguistic conventions underlying necessary truths describe, or are based on, the ways in which speakers of a natural language use the words involved in expressing those truths. But then, Pap argues, these conventions are empirical truths about, say, speakers of English. It might be replied that these conventions are not facts about English speakers but rules that constitute what it is to speak English, so failure to follow them results in speaking a language other than English. But, Pap argues, this can't be right, since natural languages undergo changes. I have heard it said that in Elizabethan England, 'meat' was more or less synonymous with 'groceries'. But if natural languages change, then, intuitively, people in Elizabethan England still spoke English, even though they don't use the word 'meat' in the same way that it is used in contemporary English. It follows then that the way in which words are used at any given time can't constitute or define what it is to speak a language, and so how a term of the language is used at some given time is an empirical question.

The problem that Pap raises for this version of the linguistic theory is that if linguistic conventions are empirical facts about usage then it becomes very unclear how they "can be a *reason* for the necessity of any statement" (5, 114) As Pap puts the point: "Nobody would say 'any father must be a parent *because* there are nine planets', although undoubtedly 'there are nine planets' entails 'any father is a parent'. Would it be any less absurd to say 'any father must

be a parent because, at least according to present linguistic conventions, it is incorrect to apply "father" to an object to which "parent" is inapplicable'?" (5, 114).<sup>7</sup>

This rhetorical question is unlikely to move adherents of the linguistic theory. Consider again the analytic truth 'All sisters are female'. Given our present linguistic usage, no experience is relevant to its truth or falsity because the rule for correctly applying the predicate '\_\_\_\_ is a sister' to anything in experience is that it is also correct to apply the predicates '\_\_\_\_ is a sibling' and '\_\_\_\_ is female' to it. There could be no empirical counterexamples to this statement because to recognize anything *correctly* as a sister requires recognizing it correctly as female. So, to revert to Pap's example, if it is incorrect to apply 'father' to an object to which 'parent' is inapplicable, how could anything that is a father fail to be a parent? The only way seems to be that being a father is different from being *correctly* described as a father. But how could that be?

The answer to these replies, and the heart of Pap's argument, is contained in the following passage:

Consider [the] necessary proposition: there are no fathers that are not male. If we are *a priori* certain of it, i.e. *in advance* of having observed all fathers, past, present, and future, it is surely because we see that fatherhood entails malehood. This is to say that we see *a priori* the truth of the modal proposition 'father(x)  $\neg$ male(x)' ... and hence derive the corollary '( $\forall x$ )(father(x)  $\supset$  male(x))'.... The point is that since it is our knowledge of the entailment which is the ground of our certainty with regard to the universal proposition, the universal proposition would itself have only the status of an inductive generalization if the entailment were not known *a priori*. The argument 'there are at no time fathers who are not male, because fatherhood entails malehood' has the form 'p, because N(p)': for ' $p \neg q$ ' is definable as ' $N(p \supset q)$ .' Therefore our acceptance of p would be based on empirical evidence if our acceptance of N(p) were based on empirical evidence. Therefore one cannot consistently hold that p is necessary and N(p)contingent. (5, 116)

The crux of this argument is that there is a tension between characterizing a truth as *a priori* and what the linguistic theory, according to Pap, must take to be its ultimate grounds. Whether the theory takes necessity to be based on proposals or on facts about norms of usages, it implies that one cannot be

<sup>&</sup>lt;sup>7</sup>It's worth pointing out that sometimes the terms in which Pap formulates this argument are misleading. For example, he characterizes a linguistic convention by stating that "people who understand English *never* apply" certain predicates in certain ways. One might take this to be a description of actual language use, and then object to it on the ground that the conventions or rules that make up a language are normative—they state how words *ought to be* used, not how they invariably *are* used. But acknowledging the normative character of rules of usage ("grammar" in Baker's and Hacker's Wittgensteinian terminology) doesn't invalidate Pap's argument. For the standards of correct use in force for a *single* language at a given time is an empirical fact, or, at the very least, it is a contingent feature of that language which we cannot ascertain merely by reflecting on, e.g., the concept of the English language.

justified in asserting a statement that is supposed to rest on *a priori* grounds, unless one is sure that certain facts obtain about the language one is speaking—facts about what proposals for usage have been accepted, what conventions are in force, what norms of usage govern the language. But then whatever knowledge one might express by the statement is not arrived at by reflection on meanings alone. How, then is it *a priori*? And if it is not *a priori*, has the linguistic theory explained how it is necessary? This line of argument is the fundamental basis underlying Pap's objection to the linguistic theory of necessity.

None of this criticism, of course, answers the question what makes the laws of logic necessary, or indeed whether they are necessary. Pap does maintain that they are necessary; I discuss his reasons in sections 6 and 7.

## 4. The Analytic-Synthetic Distinction: Hypothetical or Functional Necessity

The rejection of the analytic-synthetic distinction is a constant theme in Pap's philosophical work. It appears as early as 1943 and 1944, in chapters 1 and 2 respectively, and as late as 1963 in the posthumously published "Reduction Sentences and Disposition Concepts" (Pap 1963b). The dates of the early papers points to their significance for the history of analytic philosophy: they are eight years earlier than Quine's "Two Dogmas of Empiricism" (Quine 1951) and seven years earlier than Morton White's less well-known "The Analytic and the Synthetic: An Untenable Dualism" (White 1950).

In the early papers, which derive from the first part of his dissertation, Pap develops a theory of a type of necessity and apriority which he calls "hypothetical" or "functional" necessity. (I will use these two terms interchangeably.) This is a *pragmatic* notion of necessity—necessity of means for accomplishing certain purposes—traced ultimately back to Aristotle. The fundamental idea is that, in the course of empirical inquiry, certain statements are *taken to be*, or *treated as*, necessary, for the purpose of "systematizing facts, of rendering the body of factual knowledge coherent" (1, 49). Underlying this idea is an abstract picture of scientific inquiry:

If a conjunction of traits *a*-*b* is found to be repeated without exception, we generalize it into a "universal," a definitional connection: if *A*, then *B*. If, then, experience should one day disclose a contradictory instance, *viz.*, '*a* and not-*b*,' we will have the choice between refusing to identify *a* as an instance of *A*... and considering our law ("if *A*, then *B*") as refuted .... (1, 54)

Thus in science we are "free ... to *make* empirical truths ... necessary and thus to deprive them of their intrinsic contingency" (1, 54). But if an empirical law that we have made into a "prescriptive definition" or "rule" comes into conflict with experience, we are equally free to decide it is no longer "good for conducting inquiry," and start looking for a rule of inquiry "*better than* it." In

Pap's picturesque language, "experience is free to *unmake* our makings again" (1, 55).

Anyone at all familiar with Quine's much better-known "Two Dogmas" will have been reminded of its concluding section. Pap's idea that the *a priori* is *made*, in order to perform certain functions, finds an echo in Quine's claim that "the conceptual scheme of science [i]s a *tool* ... *for* predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries ... irreducible posits comparable, epistemologically, to the gods of Homer" (Quine 1951, 41).

In addition, Quine also sketches an abstract picture of scientific inquiry:

[T]otal science is like a field of force whose boundary conditions are experience. A conflict with experience at the periphery occasions readjustments in the interior of the field.... [T]he total field is so undetermined by its boundary conditions, experience, that there is much latitude of choice as to what statements to re-evaluate in the light of any single contrary experience.

... Any statement can be held true come what may .... Even a statement very close to the periphery can be held true in the face of recalcitrant experience by pleading hallucination or by amending certain statements of the kind called logical laws. Conversely, by the same token, no statement is immune to revision. Revision even of the logical law of the excluded middle has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle? (Quine 1951, 39-40)

Similarity is not identity, and there are two important differences. First, one way in which, in my view, Pap's critique of the analytic-synthetic distinction is more persuasive than Quine's is the fact that from his dissertation to his later papers Pap engages much more deeply with actual examples of scientific practices, and so offers more than a highly abstract account of science. These later papers focus on dispositional and what Pap calls "open" concepts in science; I discuss Pap's views in the next section. The second difference is that unlike Quine Pap does not hold that the laws of logic are open to revision;<sup>8</sup> I discuss this difference in section 6.

## 5. The Analytic-Synthetic Distinction: Dispositional and Open Concepts

As I noted above, one of the fundamental ideas of positivism is that what distinguishes the sciences from metaphysics is acknowledgment of shared empirical standards for the acceptance and rejection of statements; in the verificationist phase of positivism, these standards are given by methods for establishing the truth of statements on the basis of sensory experience. I mentioned

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<sup>&</sup>lt;sup>8</sup>Of course in writings later than "Two Dogmas" Quine was a staunch defender of classical logic. It is, to my mind, a very difficult question whether this represents a genuine change of mind.

earlier the challenge for the verificationist criterion of meaning posed by the problem of the *a priori*. Dispositional concepts in science present a less obvious, but more radical, challenge. Indeed, giving a satisfactory account of these concepts is one of the main motivations of Carnap's "Testability and Meaning" (Carnap 1937; cited in this Introduction as *TM*), a paper which constituted a pivotal development in positivism.

#### 5.1 Carnap's Theory of Dispositional Predicates

As Carnap puts it, the verificationist theory of meaning "led to a too narrow restriction of scientific language, excluding not only metaphysical sentences but also certain scientific sentences having factual meaning," and he argues in TM for "a requirement of confirmability or testability as a criterion of meaning" (TM, 421).

Let's begin by saying what dispositional concepts are. Carnap characterizes them as expressed by "predicates which enunciate the disposition of a point or body for reacting in such and such a way to such and such conditions, e.g. 'visible', 'smellable', 'fragile', 'tearable', 'soluble', 'indissoluble' etc" (TM, 440). The question about these predicates, for a positivist, is: on the basis of what experiences do we correctly ascribe them, i.e., should we accept that something has such a property? Clearly if an object, say a lump of sugar, is observed to be placed in water, and we see that it dissolves, then we would be correct in claiming that it is soluble. This might lead one to think that the meanings of disposition terms can be specified conditionally. In the case of solubility, for instance, we might take the meaning of 'soluble' to be given by: '\_\_\_\_ is soluble' is correctly applied to x just in case if x is placed in a liquid, then x dissolves.

But there are two problems with this idea. First, intuitively we think that lumps of sugar which at no time are placed in a liquid are still soluble, and, to use Carnap's example, a match burnt up completely before it is ever placed in water is "rightly" said to be "not soluble in water" (TM, 440). Second, if the conditional expressions 'if ... then' used to specify the meanings of dispositional predicates are understood truth-functionally, then any forever-untested object would falsify the antecedent of the conditional, rendering the entire conditional true, and the dispositional predicate correctly ascribed to it. This does imply that the forever-untested lump of sugar is soluble; but, at the same time, the forever-untested match would also be soluble. This problem is sometimes called "Carnap's paradox" in the literature on dispositions.

Carnap's response to these problems is a retreat from the principle of verification. Dispositional predicates are meaningful, but not in virtue of being associated with necessary and sufficient observable conditions of application. Rather, they are meaningful in virtue of being associated with a set of sufficient conditions of application, and a set of conditions sufficient for applying its negation. For example, associated with solubility in water are

If x is placed in water and x dissolves, then x is soluble 
$$(6)$$

#### If x is placed in water and x does not dissolve, then x is not soluble (7)

Carnap calls statements of these conditions "reduction sentences." Two reduction sentences which, as in the present example, provide sufficient conditions for applying the predicate and its negation is called a "reduction pair." In general, a dispositional predicate ' $Q_3$ ' is associated with the following reduction pair:

$$Q_1 \supset (Q_2 \supset Q_3) \tag{8}$$

$$Q_4 \supset (Q_5 \supset \sim Q_3) \tag{9}$$

(*TM*, 441. Note Carnap's notational convention at *TM*, 434: "If the sentence ' $(\forall x)[---]$ ' is such that '---' consists of several [open] sentences which are connected by [truth-functional connectives] and each of which consists of a predicate with 'x' as [variable], we allow omission of the [quantifier] and the [variables]. Thus e.g. instead of ' $(\forall x)(P_1(x) \supset P_2(x))$ ' we shall write shortly ' $P_1 \supset P_2$ '.")

The present example has the feature that the reduction pair involves the same test condition, i.e.,  $Q_1$  is the same as  $Q_4$ , and the defining reaction for the negative ascription  $Q_5$  is just the negation of the defining reaction of the positive ascription,  $Q_2$ , i.e.,  $Q_5$  is ~  $Q_2$ . In this case the reduction pair is jointly equivalent to

$$Q \supset (R \equiv Q_3) \tag{10}$$

where  $Q = Q_1 = Q_4$ ,  $R = Q_2$  and  $\sim R = Q_5$ . This is called a "bilateral reduction sentence." For our example, the bilateral reduction sentence for solubility is:

If x is placed in water, then, x dissolves just in case x is soluble (11)

The move from verification conditions to reduction sentences does not disturb the basic positivist idea that cognitively significant scientific language is governed by impersonal experiential standards of correctness. The difference is that reduction sentences do not provide standards of application for objects which don't fulfill the test conditions. That is, there is an area of indeterminacy where ascriptions of dispositional predicates are not governed by reduction sentences, and so have no truth-values. For this reason, Carnap holds that in these cases reduction sentences do not give the empirical meaning of the dispositional predicate; it follows that reduction sentences are *partial* meaningspecifications. We will see shortly that this is only one sense of 'partial'.

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