

Quine on "Alternative Logics" and Verdict Tables

Alan Berger

The Journal of Philosophy, Volume 77, Issue 5 (May, 1980), 259-277.

Stable URL:

http://links.jstor.org/sici?sici=0022-362X%28198005%2977%3A5%3C259%3AQO%22LAV%3E2.0.CO%3B2-1

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at http://www.jstor.org/about/terms.html. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

The Journal of Philosophy is published by Journal of Philosophy, Inc.. Please contact the publisher for further permissions regarding the use of this work. Publisher contact information may be obtained at http://www.jstor.org/journals/jphil.html.

The Journal of Philosophy ©1980 Journal of Philosophy, Inc.

JSTOR and the JSTOR logo are trademarks of JSTOR, and are Registered in the U.S. Patent and Trademark Office. For more information on JSTOR contact jstor-info@umich.edu.

©2003 JSTOR

T32 translates T30 into the material mode, and tells us that types are just nonempty categories that are minimal in a straightforward manner.

Like T3 and T18, T32 is plausible on the basis of more or less naive considerations, and their derivation from the deeper formal theory helps confirm that theory. But the theory uncovered here finally comes to stand on its own, and to radiate its own light both behind and ahead: it furnishes a standard for judging the merit of naive notions, and indicates lines for wider and deeper study of its own structure.

STEPHEN H. VOSS
Australian National University and San Jose State University
CHARLES SAYWARD

University of Nebraska

QUINE ON "ALTERNATIVE LOGICS" AND VERDICT TABLES *

N writings prior to *The Roots of Reference*, W. V. Quine holds that there can be no "alternative logics" in the sense of logics that reject any of our logical truths as not true at all. This contention I shall call *thesis A*.

If sheer logic is not conclusive, what is? What higher tribunal could abrogate the logic of truth functions or of quantification?¹

In Quine's view, to deny a logical truth is simply "to change the subject." Discussing the hypothetical case of a people who supposedly reject the law of noncontradiction and accept on occasion a sentence of the form 'P and not P', he writes,

They think they are talking about negation, 'not'; but surely the notation ceased to be recognizable as negation when they took to regarding some conjunctions of the form ' $P \land \sim P$ ' as true, and stopped regarding such sentences as implying all others. Here evidently is the deviant logician's predicament: when he tries to deny the doctrine he only changes the subject (ibid.).

* I would like to thank Albert E. Blumberg, Gilbert Harman, James Higginbotham, Saul Kripke, Charles Parsons, and W. V. Quine for helpful discussions and Dr. Blumberg for editorial assistance and moral support. I especially want to thank Andrzej Zabludowski for valuable discussion and suggestions.

† La Salle, Ill.: Open Court, 1974; hereafter, RR.

¹ Philosophy of Logic (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p. 81.

0022-362X/80/7705/0259\$01.90

© 1980 The Journal of Philosophy, Inc.

Thus it makes no sense to attribute to a foreign speaker the acceptance of a sentence that translates into a contradiction in English, or the denial of a statement whose translation into English is a logical truth.

In Quine's early writings, he seems to regard thesis A as a plausible condition on any acceptable view of the nature of logic. But his later writings, as we shall see, reveal his awareness that he cannot effectively defend thesis A, and so he modifies this thesis.

My own view is that thesis A in general is reasonable and that it may indeed be set as a condition on any acceptable account of logic. My quarrel with Quine concerns not thesis A, but the modified thesis and its defense.²

T

Quine's defense of thesis A is based on his notions of language and translation. In Word and Object,³ Quine maintains that language is a complex of community-wide speech dispositions to "verdictive behavior" (dispositions to assent to or dissent from sentences).⁴ These dispositions are exhibited in observable verbal responses to socially observable stimuli. Such responses are inductively determinable causal regularities of the speech community. Translation rests solely on causal correlations with nonverbal stimulation, and the objective meaning of a sentence is what that sentence shares with its translations. Thus, semantic criteria for determining the meaning of a linguistic expression are based solely on (community-wide) dispositions to respond verbally in a uniform manner when prompted by the same nonverbal stimulations. Semantic criteria, then, are merely causal regularities within the linguistic community.

Among the speech dispositions are dispositions to assent to certain sentences on any occasion regardless of the current stimulations. These sentences Quine calls *stimulus-analytic*. The stimulus-analytic sentences of a foreign speech community are preserved in translation by matching them with English sentences that we are disposed to

² In a subsequent paper, I argue that Quine's defense of thesis A or his modified thesis succeeds only if recourse is had to semantic notions which, on his own criteria, are not available to him.

³ Cambridge, Mass.: MIT Press, 1960; hereafter, WO.

⁴ More accurately, what Quine claims is that language is a complex of community-wide speech dispositions to *verbal* behavior. This obviously includes more than just dispositions to *verdictive* behavior. However, for Quine, to show that a linguistic notion is legitimate it does suffice to show that we can *define* it behaviorally in terms of dispositions to verdictive behavior and inductively determinable regularities (regardless of what criteria we use in practice to determine the notion). Professor Quine, in conversation, drew my attention to the need for introducing this qualification into my presentation. The same qualification should be made wherever else it applies.

assent to regardless of the current stimulation. In addition, there are correlations between speech dispositions to assent to or dissent from some sentences and dispositions to assent to or dissent from other sentences constructed from the former by means of sentential connectives. Some of these correlations determine the meaning of truth-functional idioms: semantic criteria, based on observable correlations among a speech community's dispositions to verdictive behavior, can be given for determining whether a given idiom expresses the truth function in question. Truth-functional idioms are preserved in translation by matching observable correlations that hold for a foreign speech community's dispositions to verdictive behavior with correlations that hold for our own dispositions.

In Word and Object Quine offers three semantic criteria that allegedly fully determine the meaning of the logical connectives—negation, conjunction, and disjunction.

Now by reference to assent and dissent we can state semantic criteria for truth functions, i.e., criteria for determining whether a given native idiom is to be construed as expressing the truth function in question. The semantic criterion of negation is that it turns any short sentence to which one will assent into a sentence from which one will dissent, and vice versa. That of conjunction is that it produces compounds to which (so long as the component sentences are short) one is prepared to assent always and only when one is prepared to assent to each component. That of alternation is similar with assent changed twice to dissent (WO 57/8).

Quine maintains that "When we find that a native construction fulfills one or another of these three semantic criteria, we can ask no more toward an understanding of it We have settled a people's logical laws completely, so far as the truth-functional part of logic goes, once we have fixed our translations by the above semantic criteria" (WO 58, 60).

Quine further contends that these semantic criteria alone, without appeal to any linguistic doctrine of logical truths, or any theory that accords them privileged epistemic status, suffice to establish thesis A. He writes, "To take the extreme case, let us suppose that certain natives are said to accept as true certain sentences translatable in the form of 'P and not P'. Now this claim is absurd under our semantic criteria" (WO 58).

But these criteria fail to establish thesis A, because Quine never intended assent and dissent to be completely exhaustive categories of verdictive behavior. His intention in this regard is revealed by his definition of stimulus meaning. In *Word and Object* the stimulus meaning of a sentence is defined in terms of two notions: affirmative

stimulus meaning and negative stimulus meaning. The affirmative stimulus meaning of a sentence for a speaker is defined as the class of all the stimulations that would prompt the speaker to assent to the sentence. The negative stimulus meaning is the class of all stimulations that would prompt the speaker to dissent from the sentence. The stimulus meaning of the sentence is then defined as the ordered pair of the two. Had Quine intended assent and dissent to be completely exhaustive verdictive categories, there would have been no need for him to define the stimulus meaning of a sentence in terms of both affirmative and negative stimulus meaning. He could have simply identified the stimulus meaning of a sentence with the affirmative stimulus meaning outright, since the negative stimulus meaning would have been, obviously, the class of all other stimulations.⁵

What is missing from Quine's verdictive categories in *Word and Object* is that a speaker, besides assenting or dissenting, may also abstain or suspend judgment when queried about the truth of a sentence. Suspension of judgment, which, as we shall see, Quine adds in *Roots of Reference*, forms, together with assent and dissent, a completely exhaustive set of verdictive categories.

TT

In The Roots of Reference, Quine offers revised semantic criteria for the logical connectives. There, however, not all the semantic rules governing logical connectives are still viewed as inductively determinable from a community's verdictive behavior. Some of these rules are still viewed this way. For example, in discussing the rules governing conjunction, Quine says, "one of the rules of dissent is simple enough: the conjunction commands dissent whenever a component does. This is a uniformity which, though language-dependent, would be quickly learned" (RR 76). But there are no inductively determinable semantic rules to govern the case where both components of the conjunction are abstained from. For these component sentences, there is no uniquely determined verdict on the conjunction. Quine illustrates:

Where the components are "It is a mouse" and "It is a chipmunk,"

⁵ Moreover, in "Existence and Quantification," in Ontological Relativity and Other Essays (New York: Columbia, 1969), Quine adds to his semantic criterion for disjunction (alternation): "The requirement is that the natives be disposed to dissent from any compound statement, formed by the connective in question, when and only when disposed to dissent from each of the component statements, and that they be disposed to assent to the compound whenever disposed to assent to a component" (p. 103/4; my emphasis). This emendation suggests that assent and dissent are nonexhaustive verdictive categories. Otherwise, the emendation would already be implied by his semantic criteria in Word and Object.

and neither is affirmed nor denied, the conjunction will still be denied. But where the components are "It is a mouse" and "It is in the kitchen" and neither is affirmed nor denied, the conjunction will perhaps be left in abeyance (RR 77).

Quine concludes from the above that our verdictive behavior does not impose a truth-functional interpretation on all the standard classical connectives. Recall that, for him, inductively determinable community-wide regularities among dispositions to verdictive behavior are all he regards as relevant to the objective meaning of a logical connective. But the above illustration shows that, at least where both components of a conjunction are abstained from, there are no such regularities to which the verdictive behavior of a community conforms. It follows that the meanings of truth-functional connectives are, at least in part, theoretical and that these meanings cannot be inductively determined.

It is at this point that Quine introduces a contrast "between truth functions and something more primitive, verdict functions." A verdict function is a mapping from the three verdicts: assent, dissent, and suspension of judgment, into these three verdicts. Thus, if a verdict on a compound sentence is determined for each assignment of verdicts to the component sentences, then the compound sentence is a verdict function of those component sentences. Verdict functions "can be learned by induction from observation of verdictive behavior," and their meanings are thus fully determinable inductively.

In Word and Object Quine assumed that truth functions "can be learned by induction from observation of a speech community's verdictive behavior" (RR 78), and thus there is no need to contrast them with verdict functions. In Roots of Reference Quine discards this assumption, and shows indeed that not all truth functions are verdict functions.

Negation turns out to be both a truth function and a verdict function. Its verdict table may be represented as follows:

Negation:

ASSENT
$$(P) \rightarrow \text{DISSENT } (\sim P)$$

SUSPEND $(P) \rightarrow \text{SUSPEND } (\sim P)$
DISSENT $(P) \rightarrow \text{ASSENT } (\sim P)$

So, for example, whenever a speaker assents to 'P', he will dissent from $\lceil \sim P \rceil$.

But conjunction and disjunction are truth functions that, as Quine points out, are not quite verdict functions. The verdictive regularities that hold for speakers using these truth functions are summed up in the following tables:

Conjunction:					Disjunction:			
q ⊅	A	S	D	q P	A	S	D	
A S D	A S D	S S or D D	D D D	A S D	A A A	A S or A S	A S D	

We see that, if both components of a conjunction or a disjunction are assigned the verdict of suspension of judgment, then not all values are uniquely determined in the verdict tables. In the case of conjunction, we may suspend judgment or we may dissent; in the case of disjunction, we may suspend judgment or we may assent. Thus, in these cases there is no unique assignment that can be inductively learned. Hence, the meanings of these connectives are not completely fixed by the verdictive behavior of the community.

In fact, Quine suggests that our verdictive behavior fails to impose a truth-functional interpretation on the connectives even when we assign unique values to all places in the verdict tables.

Verdict functions approximating to conjunction and alternation could be forged by specifying abstention at the center of the tables. These are more primitive than the genuine truth-functional conjunction and alternation, in that they can be learned by induction from observation of verdictive behavior Truth values represent a more advanced, more theory-laden level of linguistic development (RR 78).

In fact, Quine goes so far as to say that both an intuitionist and a classicist interpretation of the connectives are compatible with the verdict tables. "Some theorists, notably the intuitionists, favor another logic, and there is nothing in the observable circumstances of our utterances that need persuade them to assign meaning to our two-valued scheme" (RR 78). It follows that Quine should be committed to the claim that those who advance these theories assign the same verdict as classicists do to the inductively determinable part of the verdict tables and that here the intuitionists' logical vocabulary shares the same meanings as the classicists'.

Although in Roots of Reference Quine changes his views regarding the extent to which verdictive behavior fixes the meanings of logical particles, he still maintains that the meanings of particles, in his sense of community-wide dispositional meaning, determine the (propositional) logical laws and logical truths of the community. He has, in effect, been saying this all along since Word and Object

(see 57/8, 60), and in *Roots of Reference* he still maintains this. Thus in discussing the doctrine that the laws of logic are true in virtue of the meanings of logical words, or that they are analytic, Quine says:

But now in terms of the learning process can we perhaps find some sense for the doctrine? We learn the truth functions, I just now suggested, by finding connections of dispositions, e.g., that people are disposed to assent to an alternation when disposed to assent to a component. The law that an alternation is implied by its components is thus learned, we might say, with the word 'or' itself, and similarly for the other laws (RR 78).

Accordingly, in *Roots of Reference*, Quine accepts truth by virtue of the meanings of the words, or a notion of analyticity, though of course not an epistemic notion accepted by Carnap and others:

Language is social, and analyticity, being truth that is grounded in language, should be social as well. Here then we may at last have a line on a concept of analyticity: a sentence is analytic if *everybody* learns that it is true by learning its words. Analyticity, like observationality, hinges on social uniformity (RR 79).

Ш

These two claims—that classicists' and intuitionists' logical vocabulary share the same (dispositional) meanings where the verdict tables are inductively determinable, and that the meanings of connectives determine the (sentential) logical laws and logical truths of the community—have important implications for thesis A. Together they suggest that Quine's semantic criteria for logical connectives expressed in the verdict tables determine the class of all logical truths and principles in sentential logic accepted by both classicists and intuitionists. This class is identical with the class of intuitionist logical truths and principles in sentential logic. Quine should thus hold that assent to these intuitionist truths is governed by the verdict tables.

Accordingly, we may interpret Quine in *Roots of Reference* as reformulating thesis A as follows (hereafter also to be called thesis A'). The notion of an "alternative logic" in the sense of a logic that denies some logical truths accepted by both classicists and intuitionists as untrue, is absurd. For the meanings of the logical vocabularies of an "alternative" logic cannot be expressed in the verdict tables. So-called "alternative logics" are no more than changes in the usage of the logical vocabulary; hence there is no conflict between such logics and our own.

Applied to translation, thesis A' yields the following: It makes no sense to attribute to a foreign speaker the acceptance of a statement whose translation into English is a contradiction dissented from by both classicists and intuitionists, or the denial of a statement whose translation into English is a logical truth for both. For translation would proceed by matching up idioms that have the same verdict tables. But such translation precludes the possibility of interpreting a foreign speaker as assenting to an intuitionists' contradiction, or dissenting from an intuitionists' logical truth.

Quine is certainly aware that he must modify thesis A, and hints at thesis A' in the following passage:

In making analyticity hinge thus on a community-wide uniformity in the learning of certain words, we reopen the question of analyticity of logical truths; for what about disagreement over logical truths, e.g. on the part of intuitionists? We should find perhaps that some logical truths are analytic and some not. I suggest in particular that we do learn that an alternation is implied by its components, with the very learning of the word 'or'; and this is all very well, for it is a logical law that the intuitionists do not contest. I suggest that the law of excluded middle, which they do contest, is not similarly bound up with the very learning of 'or' and 'not'; it lies rather in the blind quarter of alternation. Perhaps then the law of excluded middle, though true by our lights, should be seen as synthetic (RR 80).

In other words, the verdict table for disjunction is uniquely determined and assigns the value of "assent" in the case where we assent to one of its components. Apparently, Quine is suggesting that any logic rejecting the logical principle that a disjunction is implied by its components is ruled out if we conform to the verdictive regularities expressed in the verdict tables. And indeed, intuitionists accept this principle. On the other hand, Quine suggests that contesting the law of excluded middle, as do the intuitionists, is not precluded by conforming to the verdict tables.

In my view, one drawback to thesis A' is the following: by permitting speakers to reject some classical logical truths and accept some classical contradictions, thesis A' deviates significantly from the constraints that, according to Quine in "Carnap and Logical Truth," lend "initial plausibility to the linguistic doctrine of logical truth." That is why Quine, before *Roots of Reference*, forbade any such rejections and acceptances, and imposed these constraints upon any thesis concerning the grounding and trans-

lation of logic. Since I agree with Quine's initial constraints, I have little sympathy for a thesis such as A'.

Nevertheless, thesis A' has some attraction. It offers a non-arbitrary basis for including intuitionists as members of "our" linguistic community. In Quine's writings prior to Roots of Reference differences in logic between intuitionists and classicists were attributed to differences in verbal usage. Now, he holds that intuitionists share with the community that which is objective in learning the (dispositional) meaning of "our" logical vocabulary, but differ in theory about that which is not. If thesis A' is correct, intuitionists agree with classicists on precisely those truths assent to which is allegedly determined by conforming to the verdict tables. This agreement would tend to justify including intuitionists and classicists as members of the same linguistic community, sharing "our" objective language learning experience.

But this inclusion of intuitionists as members of the same speech community as classicists leads to conflicts involving Ouine's semantic criteria. For example, in Quine's view, there are clear behavioral criteria by which we may inductively determine a speaker's disposition to assent to stimulus-analytic sentences. Such sentences have objective empirical (dispositional) meaning and thus are to be preserved in any adequate translation. Obviously Ouine cannot construe two sentences as having the same empirical meaning if one is stimulus-analytic and the other is not. But suppose we take some stimulus-analytic sentence S of a linguistic community of classicists and translate this as S^* in a language spoken only by intuitionists. Now since, for Ouine, the verdict tables for negation and disjunction (alternation) are the same for both intuitionists and classicists, these tables yield the following result. The sentence 'S $v \sim S$ ', which is stimulus-analytic for the community of classicists. gets translated into the intuitionists' language as ' $S^* \vee \neg S^*$ ' (where the hook '¬' symbolizes the intuitionists' negation as distinct from the classical tilde '~'), which is not stimulus-analytic for the intuitionists. By Quine's semantic criteria, then, a stimulus-analytic sentence gets translated into a sentence that is not stimulus-analytic. These criteria, which are based on dispositions to correlate verdictive behavior, thus come into conflict with Quine's requirement that translation preserve a speech community's dispositions to assent to stimulus-analytic sentences.

IV

In this section I propose to examine the defensibility of thesis A' and to offer a refutation.

It is part of thesis A' that the verdict tables fully determine that intuitionist logical truths will be assented to and intuitionist contradictions will be dissented from. But it can readily be shown that people may conform to the verdict tables and still not be required to dissent from sentences of the form $\lceil P \land \sim P \rceil$. The reasoning is the same as the reasoning Quine offers to explain why sentences of the form $\lceil P \lor \sim P \rceil$ need not be assented to even while conforming to the verdict tables. The two lie in the blind quarter of conjunction and disjunction, respectively. Thus the speaker may choose to suspend judgment on both 'P' and its negation. This is an unfortunate consequence for Quine. For it already contradicts thesis A', since sentences of the form $\lceil P \land \sim P \rceil$ are regarded as contradictions by both classicists and intuitionists. Thus, according to thesis A', any speaker conforming to the verdict tables allegedly must dissent from sentences of the form $\lceil P \land \sim P \rceil$. Moreover, other examples, such as sentences of the form $\lceil P \rightarrow (P \lor O) \rceil$, show that conforming to the verdict tables need not assure our assent to all logical truths accepted by both classicists and intuitionists. Simply assume that the speaker suspends judgment on both 'P' and 'O' and then assigns the value of suspension of judgment to the disjunction. With these assignments, $\lceil P \rightarrow (P \lor Q) \rceil$ lies in the blind quarter of the verdict table for the conditional.

The two examples above, in which conformity to the verdict tables determines neither assent nor dissent, suggest the following question: Are there any (compound) sentences of any form whatsoever for which conformity with the verdict tables commands our assent or else dissent? It is a simple matter to prove that we may suspend judgment on all sentences while consistently conforming to the verdict tables.

Informally speaking, suppose someone were to suspend judgment on all sentences of his language. Can he do so consistently with the verdict tables? To be consistent with the verdict tables, if the speaker suspends judgment on any sentence ϕ , then, according to the verdict table for negation, he must suspend judgment on $\Gamma \sim \phi^{\gamma}$. Indeed this is so, since he suspends judgment on all his sentences. Again, since he assigns only a verdict of suspension of judgment to all his sentences, even when taken conjointly, he suspends judgment on any two sentences ϕ and ψ . According to the verdict tables for disjunction, conjunction, and the conditional, whenever he suspends judgment on each component, he may consistently with the corresponding verdict tables suspend judgment on the resulting compound. Again, this is precisely what he does. This completes the informal proof that consistently with the verdict

tables we may suspend judgment on any statement, even a tautology or a contradiction.⁶ This refutes thesis A'.

This result can be strengthened. As I shall now show, we may dissent from logical truths accepted by both classicists and intuitionists, and we may assent to statements that both classicists and intuitionists consider to be contradictions.

To establish this fact, all one need do is take some logical truth accepted by both classicists and intuitionists. We have already shown that we may suspend judgment on any statement, and yet conform to the verdict tables. Therefore, consistently with the verdict tables, we may suspend judgment on this logical truth. Next, take the conjunction of this statement with itself. This conjunction is also a logical truth accepted by both classicists and intuitionists. However, according to the verdict table for conjunction we may dissent from a conjunction whenever we suspend judgment on each of its components. Thus, consistently with the verdict tables, we may dissent from this conjunction, which is an accepted logical truth by both classicists and intuitionists alike.

For an example of a statement that both classicists and intui-

⁶ For a formal proof, the following should suffice. Let v be a valuation function of a language L if v assigns to each sentence of the language a unique verdict A, S, or D; i.e., v: {sentences} \rightarrow {A, S, D}, such that the following conditions are met:

(1)
$$\forall \phi : v(\sim \phi) = \begin{cases} A & \text{if } v(\phi) = D \\ S & \text{if } v(\phi) = S \\ D & \text{if } v(\phi) = A \end{cases}$$

$$\begin{cases} A & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ S & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$(2) \quad \forall \phi, \psi : v(\phi \land \psi) = \begin{cases} A & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ S & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = S \text{ and } v(\psi) = A \\ S & \text{or } D & \text{if } v(\phi) = S \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = S \text{ and } v(\psi) = A \\ C & \text{of } v(\phi) = D \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = D \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = D \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \\ C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{cases}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{aligned}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{aligned}$$

$$\begin{cases} C & \text{if } v(\phi) = A \text{ and } v(\psi) = A \end{aligned}$$

$$\begin{cases} C & \text{if } v(\phi) = A$$

Completing the proof merely requires verifying that the function w, which assigns S to every sentence on the language, is a valuation function. Looking at the appropriate rows reveals that w is a valuation function.

tionists consider to be a contradiction but to which we may assent while conforming to the verdict tables, take the negation of this conjunction. Since we have dissented from the conjunction, the verdict table for negation determines that we assent to its negation.⁷

It might be thought that this last result—that speakers may dissent from some intuitionist logical truths and assent to some intuitionist contradictions—depends on the previous result—that speakers may suspend judgment on all statements while conforming to the verdict tables. But suppose Quine excludes languages in which speakers suspend judgment on all sentences. Would not such an exclusion invalidate the two results?

But the second result does not depend on the previous one. All we need assume is that there is at least one sentence of the language, call it S, on which a speaker suspends judgment. It then follows from the verdict tables that the speaker suspends judgment on its negation $\lceil \sim S \rceil$. Therefore, consistently with the verdict tables, the speaker may suspend judgment on the conjunction $\lceil S \land \sim S \rceil$. Taking the disjunction of this contradiction with itself, we get $\lceil (S \land \sim S) \lor (S \land \sim S) \rceil$, another intuitionist contradiction. Now since a speaker suspends judgment on each disjunct, he may consistently with the verdict tables assent to this disjunction. For an example of an intuitionist tautology that a speaker may dissent

⁷ We can prove formally that this construction works for establishing the results above. We must prove that we can construct a valuation that assigns 'A' to some contradiction for classicists and intuitionists alike, and assigns 'D' to some logical truth for both classicists and intuitionists. I offer the following valuation, defined inductively by means of the *rank* of our sentences.

We can define the rank of a formula inductively as follows:

```
1. For every atomic sentence \phi, r(\phi) = 0
2. r(\neg \phi) = r(\phi) + 1
3. r(\phi \lor \psi) = r(\phi \land \psi) = \max(r(\phi), r(\psi)) + 1
```

Let function v assign S to all formulas ϕ or rank r less than or equal to 2; i.e., $v(\phi) = S$ if $r(\phi) \leq 2$.

Let $r(\chi) = 3$. If χ is a disjunction, then $v(\chi) = A$; otherwise let $v(\chi) = S$.

We can extend this partial function as follows: If $r(\chi)=4$, then, since all formulas of rank 3 or less have been assigned a verdict consistent with the verdict tables, we may extend the valuation as the verdict tables dictate or, where there is a choice, assign either value. We should note that this implies that $v(\neg(\phi \lor \psi))=D$ where $r(\phi \lor \psi)=3$. Thus, in particular, $r((P \land \sim P) \lor (P \land \sim P))=A$, and its negation (a tautology) is assigned D. Now continue extending the valuation rank by rank as we did in going from sentences of rank less than or equal to 3, to sentences of rank 4.

To complete the proof, it remains to show that the function we defined above is, indeed, a valuation. Since every sentence is a member of some rank n, where n is finite, and composed only of sentences of rank less than n, and, furthermore, since the valuation is consistent for any finite rank, it must be consistent everywhere. This completes the proof.

from consistently with the verdict tables, simply negate this contradiction. Since we may assent to the contradiction, the verdict table for negation determines that we must dissent from its negation.

V

In discussing what *truths* can be learned by adhering to the verdict tables, Quine writes, "I suggested in particular that we do learn that an alternation is *implied* by its components, with the very learning of the word 'or'; and this is all very well, for it is a *logical law* that the intuitionists do not contest" (RR 80, my italics). He says of the *law* of excluded middle that "it lies rather in the blind quarter of alternation." But we have already seen that, although it is certainly true that intuitionists accept all instances of the schema $\lceil P \rightarrow (P \vee Q) \rceil$, assent to any such instance is not assured by the verdict tables.

This passage, in my opinion, reveals certain unclarities in Quine's notion of logic. Quine views logic as a class of statements. But it is more natural to view logic in terms of the deductive interconnections that hold among statements. Although Quine, in the passage quoted above, speaks of the acceptance and rejection of logical laws (and statements), perhaps he does not mean to suggest by this that he views implication as simply the validity of the conditional. Nor may he even be suggesting that implication is the verdictive validity of the conditional, which we may define (in analogy to the validity of the conditional) as follows.

A verdict-functional schema is verdictively valid if it is assented to under every interpretation of its (sentential) letters.

What then can Quine mean when he suggests that, by conforming to the verdict tables, "We do learn that an alternation is *implied* by its components, with the very learning of the word 'or'."? Perhaps this. Inferring (implying), for Quine, is a behavioral notion; it consists of correlations of speech dispositions (to verdictive behavior). These correlations are uniformities that can be learned by induction and are expressed in the verdict tables. Intuitionist and classical logicians establish inductively that our speech community accepts certain inferences, e.g., that whenever we accept (assent to) a disjunct 'P', we accept (assent to) the disjunction $\lceil P \vee Q \rceil$. This suggests that a weaker claim than A' may be defended, namely that the inferences (correlations of a speaker's verdictive behavior) expressed in these tables establish the valid inferences accepted by both intuitionists and classicists, i.e., the intuitionist-valid inferences.⁸

⁸ Quine, in conversation, has indicated that, in fact, this was not his claim.

We should not confuse Ouine's notion of inference—correlations of dispositions to verdictive behavior—with a more standard notion of inference or with the notion of implication. First, on the more standard notion, implication is a deductive relation that holds among sentences regardless of whether a speaker recognizes the corresponding inference as valid or even draws the inference. In this sense, a speaker may be committed to drawing a certain deductive inference regardless of what correlations actually exist among his dispositions to verdictive behavior. Second, even if we are concerned with the notion of inference in the sense of how speakers actually infer, we should not confuse correlations among dispositions to verdictive behavior with dispositions to infer. For example, we all may exhibit the following verdictive regularity. Whenever we assent to (1) 'there have been black dogs', we assent to (2) 'The earth is round'. Yet, presumably, we do not hold that there is any inferential relation—semantical, deductive, or other between these two sentences. Thus having certain verdictive regularities does not imply or determine having the corresponding inferential behavior. Quine apparently believes that his behavioral surrogate notion of inference suffices to capture all that is objective about speakers' inferential behavior in language, at least with regard to their use of connectives that have the above verdict tables. But as we shall see shortly, this simply is not true.

VI

This new claim, then, is that the inferences (in Quine's sense) exexpressed in the verdict tables are just those accepted by intuitionists. But if we distinguish verdictive regularities from valid inferences and from speakers' (dispositions to) inferential behavior, a preliminary question arises in evaluating this claim. Does mere conformance with the verdict tables *determine* that a speaker has the corresponding dispositions to infer?

This question surely requires a negative response once we assume that speakers can, in general, recognize analytic, or entailment, connections among sentences and can base their inferential behavior upon their judgments of these connections. With this assumption, the example above illustrates that correlations among dispositions to verdictive behavior do not determine the corresponding inferential behavior. Indeed, even restricting the correlations among (dispositions to) verdictive behavior to those expressed in the verdict tables still requires a negative response. The problem is that, although dispositions to infer determine correlations among dispositions to verdictive behavior, the converse does not hold. For we can

define special connectives that have the same verdict tables as the connectives of classical logic, yet speakers using these special connectives do not exhibit the inferential behavior corresponding to the correlations expressed in these tables. Consider, for example, the logical connective defined as follows:

(1)
$$\lceil P \circ Q \rceil = _{\text{def}}$$
 { There have been black dogs' if one of its components is assented to, 'There have not been black dogs' if both components are dissented from, $\lceil P \vee Q \rceil$ otherwise (i.e., if a speaker suspends judgment on both components).

(Where 'P', 'Q' are place holders for arbitrary sentences other than the sentences 'There have been black dogs' or 'There have not been black dogs'.)

The verdict table for this connective is the same as that for disjunction. But a speaker using the above defined connective does not infer $\lceil P \bigcirc Q \rceil$ from 'P', even though whenever he assents to 'P' he assents to $\lceil P \bigcirc Q \rceil$. But since speakers using this special connective exhibit the same verdictive regularities as those expressed in the verdict tables for classical disjunction, this special connective would, according to Quine, share the same dispositional meaning as classical disjunction, and thus be a satisfactory translation of it.

This objection of course does not bother Quine, since it too is based upon speakers' recognizing "analytic" or "entailment" connections between sentences, notions that Quine, of course, rejects. Still, there are other objections that Quine must recognize. In *Philosophy of Logic*, Quine realizes that not all logical truths (be they classical or intuitionist) are obvious, i.e. immediately assented to. Some logical truths, perhaps because of complexity, are even rejected. Since he still wants to hold to his thesis A (or A') despite this fact, Quine introduces the notion of a potentially obvious statement. To call a statement *potentially obvious* is to say that the statement can be "reached from obvious truths by a sequence of individually obvious steps."

One immediate problem is that the correlations expressed in the verdict tables must be interpreted as transitive with respect to speakers' verdictive behavior. (For example, if, whenever a speaker assents to 'P' he assents to 'Q' and if, whenever he assents to 'Q' he assents to 'R', it follows that whenever he assents to 'P' he assents to 'R'.) But in fact, not all correlations "expressed in the verdict

tables" are transitive. A potentially obvious statement may not be assented to at time t, even though its obvious premises are.

Furthermore, Quine cannot interpret "individually obvious steps"—inferential relations—as simply correlations among dispositions to verdictive behavior. For these correlations, as we have just seen, are transitive whereas individually obvious steps are not. Were these inferential steps to be transitive the distinction between obvious and potentially obvious truth would disappear.

The point is that, although Quine recognizes inferential relations for speakers among sentences in a language, he is restricted in how he can interpret (define) these relations. Verdictive regularities fail, as we have shown above, and he is committed to rejecting outright a deductive nexus among statements. Nor are there behaviorally acceptable relations that capture "immediate inference" or are coextensive (or nearly enough) with the deductive nexus. So much for the preliminary question.

VII

We consider now the new claim itself—that the verdict tables express all and only the verdictive regularities corresponding to intuitionistically valid inferences. To begin with, it can be shown that not all such regularities are expressed in the verdict tables. Regularities corresponding, say, to the associative law for disjunction—when these laws are viewed as inferences from either side of the biconditional to the other—are not expressed in the verdict tables. For example, we may assent to sentences of the form $\lceil (P \vee Q) \vee R \rceil$ without assenting to the corresponding $\lceil P \vee (Q \vee R) \rceil$, and still conform to the verdict tables. (Simply assign the value of suspension of judgment to P, Q, and R.)

This example also shows that we can define special connectives that have the same verdict tables as the connectives of classical logic, yet speakers using these special connectives do not exhibit the same inferential behavior as classicists—even in Quine's sense of inference as correlations among dispositions to verdictive behavior. Simply define a connective as having the same verdict table as disjunction, but, as not being associative. Yet, on Quine's view, since this connective has the same verdict table as disjunction, it is an acceptable translation for classical disjunction.

It may appear that this objection can be circumvented in the

⁹ For details concerning Quine's defense of thesis A (or A') by making use of the distinction between obvious and potentially obvious truths, see my "The Inadequacy of Quine's Notation of Language in Accounting for Logic," to appear. See this paper also for various interpretations and criticisms of how Quine can interpret the notion of "inference."

following way. Suppose Quine defines a behavioral surrogate for the notion of *entails*, call it *stimulus-entails*. By analogy to his notion of stimulus-analyticity, we may define 'stimulus-entails' as follows:

P stimulus-entails Q if and only if the conditional whose antecedent is P and whose consequent is Q is stimulus-analytic.

For example, $\lceil (P \lor (Q \lor R)) \rceil$ stimulus-entails $\lceil (P \lor Q) \lor R \rceil$ if and only if $\lceil (P \lor (Q \lor R)) \rightarrow ((P \lor Q) \lor R) \rceil$ is stimulus-analytic.

One might then claim that the verdictive regularities expressed in the verdict tables, if supplemented by community-wide stimulusentailment relations, correspond to all and only intuitionist inferences. But the difficulty is that we began originally with thesis A' that the verdict tables ground the class of (statements expressing the) community-wide logical truths. This thesis, if correct, gives us a nonarbitrary criterion for including intuitionists as members of the same linguistic community as classicists—they both accept all statements grounded by these tables. Moreover, these tables are based, allegedly, upon regularities taken in a community without intuitionists. (In particular, Quine introduced the gaps in verdict tables by appealing to only classicists' verdictive behavior under certain circumstances.) But now we must supplement the verdict tables with a class of statements expressing community-wide logical truths. This is in conflict with thesis A', according to which the verdict tables—unsupplemented—ground the class of community-wide logical truths. We no longer have a nonarbitrary criterion for including intuitionists as members of the same community as classicists. For example, if we supplement the verdict tables with sentences of the form $\lceil P \lor (Q \lor R) \rightarrow (P \lor Q) \lor R \rceil$, what criteria that do not beg the question of thesis A' prevent us from supplementing these tables with sentences expressing logical truths of the form $\lceil P \lor \sim P \rceil$ or $\lceil (\sim P \lor Q) \rightarrow \sim (P \land \sim Q) \rceil$, and thus excluding the intuitionists who reject these sentences?

Quine might decide to reject thesis A', and instead adopt the proposal that the verdict tables supplemented with communitywide stimulus entailment relations correspond to all and only intuitionist inferences. But this new proposal fails also. The problem is that not all verdictive regularities that are expressed in the verdict tables correspond to intuitionist-valid inferences. For example, according to the verdict tables, whenever a speaker assents to a statement of the form $\lceil \sim P \rceil$ he dissents from $\lceil \sim P \rceil$ and, therefore, assents to 'P'. But the inference from $\lceil \sim P \rceil$ to 'P' is not intuitionistically valid. Therefore, even this new proposal fails, because the verdict

tables do not express only verdictive regularities that correspond to intuitionistically valid inferences.

It is interesting to examine, especially in light of the last example, how to interpret what 'assent' and 'dissent' mean for an intuitionist.¹⁰ The relation between classicist 'assent' or 'dissent' and 'truth' has already been shown to be more subtle and problematic for Quine than initially appears.¹¹ This is no less the case with respect to the relation between intuitionist 'assent' or 'dissent' and 'provability'.

One natural interpretation of 'assent' and 'dissent' for an intuitionist is the following. We take 'assent' to signify the assertibility of what is assented to, or its provability in the case of a mathematical statement. We take 'dissent' for the intuitionist to imply commitment to the absurdity of what is dissented from, or the provability that it leads to a contradiction. Suppose on this interpretation one assents to $\lceil \sim \sim P \rceil$; i.e., suppose that $\lceil \sim \sim P \rceil$ is provable. Hence it is provable that $\lceil \sim P \rceil$ leads to a contradiction and therefore we must dissent from $\lceil \sim P \rceil$. But, as the above example shows, an intuitionist dissenting from $\lceil \sim P \rceil$ need not assent to 'P'. For, even though $\lceil \sim P \rceil$ may lead to a contradiction, still, 'P' may not be provable, and thus he will suspend judgment on 'P'. Thus on this interpretation of assent and dissent, intuitionist negation fails to satisfy the condition in the verdict tables that suspension of judgment on 'P' implies suspension on $\lceil \sim P \rceil$.

An alternative interpretation is to take 'dissent' to signify simply refusal to assent to the statement dissented from; i.e., there is no proof of this statement. We would then take 'suspension' to mean that we do not know whether we can prove what is suspended on. With this interpretation of 'dissent', intuitionist negation fails (for the same reason as the first interpretation) to satisfy the condition in Quine's verdict tables that suspension of judgment on 'P' implies suspension on $\lceil \sim P \rceil$. Also, it fails to satisfy the condition in Quine's verdictive table that whenever we dissent from 'P', we assent to $\lceil \sim P \rceil$. Although, on this second interpretation of dissent, assent to 'P' implies dissent from $\lceil \sim P \rceil$ and assent to $\lceil \sim P \rceil$ implies dissent

¹⁰ It was Charles Parsons who pointed out to me that there are two natural interpretations of 'dissent' for the intuitionist, as discussed below, and that neither interpretation satisfies the verdict tables. I had not thought about how to interpret 'dissent' for the intuitionist, since my example suffices to show that intuitionist inferences are not captured by the verdict tables, given the above interpretation of 'assent'. Parsons also suggested that I further examine the relation between the interpretation of 'dissent' for an intuitionist and the verdict tables. I am grateful to him for these suggestions.

¹¹ See Michael Dummett, "Language, Intentionality, and Translation Theory," Synthese, XXVII, 3/4 (July/August 1974): 413-416.

from 'P', yet any verdict on $\lceil \sim P \rceil$ is compatible with our dissent from 'P'. First, we may have a proof of $\lceil \sim P \rceil$ and, therefore, assent to it. Second, although I may know that 'P' is not provable (perhaps I have a consistency proof of $\lceil \sim P \rceil$) and thus dissent from 'P', I still may not know whether $\lceil \sim P \rceil$ is provable and thus suspend judgment on $\lceil \sim P \rceil$. Third, I may dissent from both 'P' and $\lceil \sim P \rceil$ because I have an independence proof of both 'P' and its negation.

Both interpretations of dissent for the intuitionist require that some conditions in the verdict table for negation be changed. The first interpretation suggests that the condition for suspension of judgment be that whenever we suspend judgment on 'P' we may either suspend on or dissent from $\lceil \sim P \rceil$. The second interpretation requires that, in addition to the above condition, we also have the condition that whenever we dissent from 'P', the verdict on $\lceil \sim P \rceil$ be left open.

But Ouine cannot just alter the conditions in his verdict tables merely in order to include only intuitionistically valid inferences. He cannot, first, because these conditions will not capture only classically valid inferences, assuming the classicist understanding of assent and dissent (i.e., believed true or false) presupposed in Roots of Reference. For example, a classicist cannot dissent from $\lceil \sim P \rceil$ whenever he suspends judgment on 'P'. For, if he does not know that 'P' holds, he cannot be committed to the falsity of $\lceil \sim P \rceil$. Otherwise, contrary to our assumption, he would also be committed to the truth of 'P'. This shows that, in terms of verdictive behavior, classical logic cannot be thought of as merely an extension of intuitionist logic; but it is precisely this that is presupposed in thesis A', where logic is viewed merely as a class of sentences. The intuitionists' treatment of negation must be different from that of the classicists. Second, Quine cannot alter the conditions expressed in the verdict tables for the expressed purpose of capturing certain truths or inferences. For these conditions are supposed to be observable generalizations of a speech community's verbal behavior and not a priori conditions placed on that behavior.12 Imposing a priori conditions would defeat the whole purpose of Quine's type of empiricist philosophy.

ALAN BERGER

Johns Hopkins University

 $^{^{12}}$ See my "The Inadequacy of . . . ," op. cit., for arguments that these conditions are not observable generalizations.