



Two Dogmas of Empiricism by W. V. Quine

Review by: John G. Kemeny

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Earlier mechanizations of the truth-table method (see XV 138(1), XVII 77 (2, 3)) have all required equipment designed especially for that purpose. The present paper gives a method for evaluating truth-functional schemata on the Caldic, a general-purpose electronic large-scale automatic computer operating in the decimal system.

The primitive operations of the Caldic which are required in the present problem are defined. The problem language must be imbedded in the machine language; this constitutes programming and coding. The former includes the general planning of the calculation and layout of the recursion cycles, the latter the detailed determination of the exact input data to be inserted in the machine. Both are considered in the present paper. The coding for evaluating \sim , \wedge , \vee , \rightarrow , \leftrightarrow , is given, and the intermediate results shown for all values of the variables. The basic principle is to let 0 correspond to falsity and 1 to truth. The coding for the biconditional, although longest of all, is shorter than could be obtained by building up from the other connectives. The coding would have been more straightforward if the machine operated directly in the binary system, biconditional becoming especially simple since it is the negation of addition modulo 2.

The truth-value distributions are assigned serially; the necessary binary counting is programmed using a simple theorem of the reviewer's. Here again the binary system would have been more satisfactory; advocates of binary machines will be pleased to note the awkwardness of a decimal machine when used on an essentially binary problem.

Detailed coding is given for evaluating a schema containing four variables and twelve connectives. The program is built around a constant portion designed to evaluate schemata with an indefinite number of connectives and nineteen or fewer variables. There is no reason, other than machine time, for not having made this number substantially larger (nineteen variables is estimated to require six days). A time-estimate formula is given which amounts to roughly two seconds per truth-value distribution. This is rather slower than existing special-purpose evaluators.

The paper is recommended to those interested in an account of the techniques used in applying modern calculating machinery to non-numerical problems and, in particular, to decision procedures. It appears to the reviewer that on page 126, line 14, ' $2^{n+1} - (n + 2)$ ' should be replaced by ' $2^n - 1$ ' and that operation G is performed $2^{n+1} - 1$ times rather than 2^n times. Misprint: p. 123, line -9, for '01' read '00'. GEORGE W. PATTERSON

W. V. QUINE. *Two dogmas of empiricism*. *The philosophical review*, vol. 60 (1951), pp. 20-43.

The two dogmas in question are that there is a sharp distinction between analytic and synthetic propositions, and that each meaningful statement can be reduced to statements about immediate experience.

The author considers several different methods of defining analyticity, and finds all of them inadequate, which leads him to conclude that there is no way of making a sharp distinction between analytic and synthetic propositions. First he introduces the notion of *logical truth*, which he considers a perfectly sound concept. A statement is logically true if it is true, and if all reinterpretations of the extra-logical constants leave it true. All logically true statements are analytic, but there are also other kinds of analytic propositions, propositions whose analyticity depends upon the meaning of the extra-logical terms.

The first definition of analyticity is that a statement is analytic if replacing synonyms by synonyms changes the statement into a logical truth. But this definition requires a definition of synonymy which, we are told, cannot be given without making use of the concept of analyticity. As an example, Quine considers the definition of synonymy as interchangeability without change in truth-value. He succeeds in showing that this criterion is inadequate for the usual extensional language, because extensional agreement is no guarantee of synonymy. In an intensional language the condition is sufficient, but we are told that intensional languages cannot be understood without a prior knowledge of analyticity.

Definitions cannot be used as a basis for the concept, because many definitions presuppose synonymies. Carnap's state descriptions are adequate for a definition of logical truth, but not of analyticity. As a matter of fact Carnap has to restrict his language so that the atomic sentences are logically independent, in which case all analytic sentences

happen to be logical truths. Finally, it is admitted that one could give semantical rules for analyticity, but in that case we cannot understand what a semantic rule is, without first knowing what analyticity is.

We are led to consider the verification theory of meaning, because it offers a new criterion: If the meaning of a statement is the method of confirming or infirming it, then an analytic statement is one that is confirmed, no matter what. Quine points out that the early, radical form of the verification theory has been abandoned, but it is still held that statements can be confirmed or infirmed in isolation, a doctrine that he refuses to accept. This is the second dogma of empiricism, and it supports the first dogma: If it makes sense to speak of the confirmation of an isolated statement, then it also seems to make sense to speak of statements confirmed vacuously, which are the analytic statements. (The reviewer certainly concurs in the rejection of this second dogma.)

The motivation for the rejection of the two dogmas is supplied in the last section (which the reviewer finds most puzzling). If there is no sharp difference between analytic and synthetic propositions, then we can compare the acceptance of irrational numbers or of classes of classes with the acceptance of any scientific theory. The difference is only one of degree. Ontological questions acquire the same status as scientific questions, and we are led to the most thoroughgoing pragmatic standpoint with respect to epistemology.

Many of the points raised by the author lie outside the scope of the *JOURNAL*, and will not be considered. But there is no need for considering these, if the main thesis, that there is no sharp distinction between analytic and synthetic statements, is incorrect; and it is the reviewer's opinion that Quine is mistaken in considering this an unfounded dogma.

There are two separate problems raised by this paper concerning analyticity. One is to give a criterion for analytic statements in a given language, as Tarski gave a criterion for true statements. Secondly we are required to define 'analytic' in complete generality. The reviewer would like to point out that no such general definition exists for 'true,' indeed it is impossible to give one. Nevertheless, Quine is satisfied by the concept of truth, but rejects the concept of analyticity. The reviewer is certain that the author is well familiar with the fact that if one pretends ignorance of a term, and of all terms which can possibly be used to define it, then one is led to an infinite regress of definitions. Surely, one cannot require a "better" definition of analyticity, than the one for truth (which the author accepts).

Thus the real problem is to give an adequate criterion for analytic sentences in a given language. This can be done easily, but only if we have semantic rules indicating how different words are used. E.g., the terms 'man' and 'featherless biped' may or may not be used synonymously, and we shall never be able to decide the question, unless we are explicitly told the intended usage of these terms in the language. If they are intended to be synonymous, as a biologist may intend, then a biconditional asserting their equivalence should be added to the semantic rules. But how are we to know what the semantic rules are? The answer is that this is a pragmatic question, the man constructing the language must supply these rules, otherwise we do not have a completely determined language. The situation is quite analogous to that of logical truth. Unless we are given the logical axioms and rules of the language, we cannot determine which propositions are logically true. A statement is logically true, if it is valid in every model of the language—but this is the case only if the logical structure of the language is specified. Just as the logical axioms and rules specify the meaning of the logical terms, the semantic rules (or "meaning postulates," a good name suggested by Carnap) specify the meaning of the extra-logical terms. A statement is analytic if it is valid in every model of the language extended by adding the meaning postulates.

In XVII 214(3) the reviewer showed how, making use of meaning postulates (there called axioms of dependence), the concept of a state-description can be applied to languages with dependent atomic sentences. We must simply restrict the concept of a state-description to those which satisfy the meaning postulates. Then we can define an analytic statement as one satisfied by all state-descriptions. The definition given above is a generalization of this, by generalizing the concept of a state-description to that of a model. Leibniz's defini-

tion of an analytic statement as one true in every possible world thus takes on the modern form of validity in every possible model; but a possible model must conform not only to the meaning of the logical terms (as expressed in axioms and rules) but also to those of the extra-logical terms (as expressed in the postulates).

Let us apply this to a statement whose status puzzles the author. "Everything green is extended." The author is unable to say whether there is a connection between the meanings of 'green' and 'extended.' It seems to the reviewer that 'everything' is the key word. Let us symbolize the statement by ' $(x)[G(x) \supset E(x)]$ '. Then it is analytic just in case ' $(x)E(x)$ ' is a meaning postulate (or if it follows from the meaning postulates). The other "puzzling" examples have similar solutions. It must, however, be pointed out that there is no way of finding the meaning-postulates of an ordinary language, because no ordinary language is a uniquely defined language. Most of the examples considered by the author point up the vaguenesses of everyday usage, not any intrinsic difficulty in the use of meaning postulates.

The reviewer agrees with the author that there is no way in general of splitting a statement up into its analytic and factual components, but neither can the logical component be split off. By drawing the extreme conclusion that analyticity is a matter of degree, the author is led to startling results, e.g., that the law of the excluded middle has a status analogous to that of Kepler's laws. The reviewer is still convinced that the former is a convention as to the use of the logical constants, while the latter has factual content and must be judged through observations. He fails to see how the difference between a pure convention and a factual assertion is one of degree.

Errata supplied by the author: Page 24, line 5, omit the term 'falsity,' and in the following line change 'All' to 'No.'

JOHN G. KEMENY

BENSON MATES. *Analytic sentences*. Ibid., pp. 525-534.

This article is an answer to the criticisms of the term 'analytic' brought forth by White (XVI 210) and Quine (in the article just reviewed). The author presents an excellent summary of the main arguments of these two papers, and gives a series of reasons why he cannot agree with their conclusion.

First of all a careful distinction is made between the intension and extension of the term 'analytic,' and the two corresponding problems of defining its meaning and giving a criterion for recognizing analytic sentences. It is pointed out that Quine requires a solution of both problems, while White would be satisfied with the solution of the second problem.

The author presents strong arguments to show that any complete definition of 'analytic' must be circular in a sense; but he points out that circular definitions are far from useless, "it often happens that after being subjected to such definitions people are able to make the various decisions which we regard as indicative of the psychological phenomenon called 'understanding'."

The author points out that not being able to decide whether particular statements are analytic does not prove that this word is not understood, any more than not being able to decide whether Fermat's conjecture is a theorem casts doubt on the term 'theorem.' Mates gives various ways of showing that there is a definite intuitive difference between analytic and synthetic statements, no matter how vague; and hence he sees the problem as one of explication. He concludes that Quine's and White's pessimism as to the possibility of this explication is unwarranted, a conclusion in which the reviewer concurs.

JOHN G. KEMENY

R. M. MARTIN. *On 'analytic.'* *Philosophical studies*, vol. 3 (1952), pp. 42-47.

This paper considers the relation of Quine's (paper reviewed above) and White's (XVI 210) attacks on the concept of analyticity to the work done by Carnap in this field. The remarks are directed to Quine, though they apply to White as well.

First of all the author criticizes Quine for seeking a definition for 'analytic in L ,' with the variable L ranging over all languages. Strong reasons are given why natural languages should not be considered. Quine's claim that there is no essential difference between natural and artificial languages as to the difficulty in defining analyticity is shown to be incorrect: All natural languages are only vaguely formulated, and we have every reason to believe