READINGS IN
PHILOSOPHICAL
ANALYSIS

SELECTED AND EDITED BY

HERBERT FEIGL AND WILFRID SELLARS

UNIVERSITY OF MINNESOTA   UNIVERSITY OF PITTSBURGH

1949

New York
APPLETON-CENTURY-CROFTS, INC.

Truth and Confirmation *

RUDOLF CARNAP

The difference between the two concepts 'true' and 'confirmed' ('verified', 'scientifically accepted') is important and yet frequently not sufficiently recognized. 'True' in its customary meaning is a time-independent term; i. e., it is employed without a temporal specification. For example, one cannot say "such and such a statement is true today (was true yesterday; will be true tomorrow)" but only "the statement is true." 'Confirmed', however, is time-dependent. When we say "such and such a statement is confirmed to a high degree by observations" then we must add: "at such and such a time." This is the pragmatical concept of degree of confirmation. The semantical concept of the degree of confirmation of a statement *with respect to other statements* which formulate the evidence is again independent of the temporal aspect; in using this concept we are merely asserting an analytic or logical truth which is a sheer consequence of the definition of 'degree of confirmation' (weight, strength of evidence) presupposed.

As is well known, the concept of truth, when used without restrictions (as in conversational language), leads to contradictions (the so-called antinomies). For this reason some logicians in recent times have been rather diffident in regard to this concept and have tried to avoid it. At times it was considered altogether impossible to establish an exact and consistent definition of truth (in its customary meaning); this has brought it about that the term 'true' was used in the sense of the entirely different concept 'confirmed'. But this leads to considerable deviations from the common usage of language. Thus one would find it necessary to abandon, e. g., the principle of the excluded middle. This principle maintains for every statement that either it or its negation is true. But as to the vast majority of statements, neither they nor their negations are confirmed or scientifically accepted. Tarski,[1] however, succeeded in establishing an unobjectionable definition of truth which explicates adequately the meaning of this word in common language (but of course is also bound to restrict its employment, as compared with common usage, in order to eliminate the contra-

[1] Cf. Tarski's article in this collection.

dictions). Hence the term 'true' should properly no longer be used in the sense of 'confirmed'. We must not expect the definition of truth to furnish a criterion of confirmation such as is sought in epistemological analyses. On the basis of this definition the question regarding the criterion of truth can be given only a trivial answer, which consists in the statement itself. Thus, from the definition of truth we can conclude only, e. g.: The statement "Snow is white" is true if and only if snow is white. This conclusion is surely correct; which shows that the definition was adequately established. But the question of the criterion of confirmation is thereby left unanswered.

The neglect of the distinction between truth and knowledge of truth (verification, confirmation) is widespread and has led to serious confusions. Perhaps the following analysis will help towards a clarification.

Let us consider the following four sentences:

1. "The substance in this vessel is alcohol."

2. "The sentence 'the substance in this vessel is alcohol' is true."

3. "X knows (at the present moment) that the substance in this vessel is alcohol."

4. "X knows that the sentence 'the substance in this vessel is alcohol' is true."

First a remark concerning the interpretation of the term 'to know' as it occurs in (3) and (4), and generally as it is applied with respect to synthetic propositions concerning physical things. In which of the following two senses (a) and (b) should it be understood?

a. It is meant in the sense of *perfect knowledge*, that is, knowledge which cannot possibly be refuted or even weakened by any future experience.

b. It is meant in the sense of *imperfect knowledge*, that is, knowledge which has only a certain degree of assurance, not absolute certainty, and which therefore may possibly be refuted or weakened by future experience. (This is meant as a theoretical possibility; if the degree of assurance is sufficiently high we may, for all practical purposes, disregard the possibility of a future refutation.)

I am in agreement with practically everybody that sentences of the kind (3) should always be understood in the sense (b), not (a). For the following discussion I presuppose this interpretation of the sentences (3) and (4).

Now the decisive point for our whole problem is this: *the sentences (1) and (2) are logically equivalent*; in other words, they entail each other;

they are merely different formulations for the same factual content; nobody may accept the one and reject the other; if used as communications, both sentences convey the same information though in different form. The difference in form is indeed important; the two sentences belong to two quite different parts of the language. (In my terminology, (1) belongs to the object part of the language, (2) to its meta-part, and, more specifically, to its semantical part.) This difference in form, however, does not prevent their logical equivalence. The fact that this equivalence has been overlooked by many authors (e. g., C. S. Peirce and John Dewey,[2] Reichenbach,[3] and Neurath [4]) seems to be the source of many misunderstandings in current discussions on the concept of truth. It must be admitted that any statement of the logical equivalence of two sentences in English can only be made with certain qualifications, because of the ambiguity of ordinary words, here the word 'true'. The equivalence holds certainly if 'true' is understood in the sense of the semantical concept of truth.[5] I believe with Tarski that this is also the sense in which the word 'true' is mostly used both in everyday life and in science.[6] However, this is a psychological or historical question, which we need not here examine further. In this discussion, at any rate, I use the word 'true' in the semantical sense.

The sentences (1) and (3) obviously do not say the same. This leads to the important result, which is rather obvious but often overlooked, that *the sentences (2) and (3) have different contents*. (3) and (4) are logically equivalent since (1) and (2) are. It follows that (2) and (4) have different contents. It is now clear that a certain terminological possibility cannot be accepted. "If we constantly bear in mind that the acceptance of any proposition may be reversed," in other words, that we have always to use interpretation (*b*), not (*a*), "then we might instead call an accepted proposition a true proposition." This usage, however, would be quite misleading because it would blur the fundamental distinction between (2) and (3).

Felix Kaufmann [7] comes to the conclusion that my conception, although

---

[2] See John Dewey, *Logic: The Theory of Inquiry*, 1938, p. 345, footnote 6, with quotations from Peirce.

[3] Hans Reichenbach, *Experience and Prediction*, 1938; see §§22, 35.

[4] Otto Neurath, "Universal Jargon and Terminology," *Proceedings Aristotelian Society*, 1940–1941, pp. 127–148; see especially pp. 138 f.

[5] For this point and the subsequent discussion compare Alfred Tarski, "The Semantic Conception of Truth, and the Foundations of Semantics," in this volume, where a number of common misunderstandings are cleared up. Compare also my *Introduction to Semantics*, 1942; see p. 26: "We use the term ['true'] in such a sense that *to assert that a sentence is true means the same as to assert the sentence itself.*"

[6] Arne Ness has expressed doubts in this respect; but he has admitted that in 90% of the cases examined by him the persons questioned reacted in the sense of the equivalence. See Tarski, with reference to Ness.

[7] *Philosophy and Phenomenological Research*, Vol. II (1942), pp. 457–471; and, especially Vol. IV (1944), pp. 267–284.

in agreement with "the traditional view", "is incompatible with the principle of inquiry which rules out the invariable truth of synthetic propositions. It is impossible for an empirical procedure to confirm to any degree something which is excluded by a general (constitutive) principle of empirical procedure. *Knowledge of invariable truth of synthetic propositions (whether perfect or imperfect) is unobtainable, not because of limitations of human knowledge, but because the conception of such knowledge involves a contradiction in terms.*" This reasoning seems to me based on the wrong identification of truth with perfect knowledge, hence, in the example, the identification of (2) with (3) in interpretation (*a*). The principles of scientific procedure do indeed rule out perfect knowledge but not truth. They cannot rule out (2), because this says nothing else than sentence (1), which, I suppose, will be acknowledged by all of us as empirically meaningful. When Kaufmann declares that even imperfect knowledge of truth is unobtainable, then this means that even imperfect knowledge of (2) is unobtainable and hence that an event as described in (4), even in interpretation (*b*), cannot occur. However, as soon as the event (3) occurs (now always assuming interpretation (*b*)), which nobody regards as impossible, the event (4) thereby occurs too; for the sentences (3) and (4) describe merely in different words one and the same event, a certain state of knowledge of the person X.

Let us represent in a slightly different way the objection raised against the concept of truth, in order to examine the presupposition underlying its chief argument. The objection concerns the concept of truth in its semantical sense; Kaufmann uses here the term "invariable truth" because truth in this sense is independent of person and state of knowledge, and hence of time. (Incidentally, the word "invariable" is not quite appropriate; it would be more correct to say instead that truth is a "time-independent" or "non-temporal" concept. The volume of a body *b* may or may not change in the course of time; hence we may say that it is variable or that it is invariable. The sentence "the volume of *b* at the time *t* is *v*" is meaningful but without the phrase "at the time *t*" it would be incomplete. On the other hand, the formulation "the sentence S is true at the time *t*" is meaningless; when the phrase "at the time *t*" is omitted we obtain a complete statement. Therefore, to speak of change or non-change, of variability or invariability of truth, is not quite correct.) Now Kaufmann, Reichenbach,[8] Neurath,[9] and other authors are of the opinion that the

---

[8] Reichenbach, *op. cit.*, footnote 20, p. 188: "Thus there are left no propositions at all which can be absolutely verified. The predicate of truth-value of a proposition, therefore [!], is a mere fictive quality, its place is in an ideal world of science only, whereas actual science cannot make use of it. Actual science instead employs throughout the predicate of weight."

[9] I agree with Neurath when he rejects the possibility of absolutely certain knowledge, for example, in his criticism of Schlick, who believed that the knowledge of certain basic sentences ("Konstatierungen") was absolutely certain. See Neurath, "Radikaler Physikalismus und 'Wirkliche Welt,'" *Erkenntnis*, Vol. IV (1934), pp. 346–362.

semantical concept of truth, at least in its application to synthetic sentences concerning physical things, ought to be abandoned because it can never be decided with absolute certainty for any given sentence whether it is true or not. I agree that this can never be decided. But is the inference valid which leads from this result to the conclusion that the concept of truth is inadmissible? It seems that this inference presupposes the following major premise P: "A term (predicate) must be rejected if it is such that we can never decide with absolute certainty for any given instance whether or not the term applies." The argumentation by the authors would be valid if this principle P were presupposed, and I do not see how they reach the conclusion without this presupposition. However, I think that the authors do not actually believe in the principle P. In any case, it can easily be seen that the acceptance of P would lead to absurd consequences. For instance, we can never decide with absolute certainty whether a given substance is alcohol or not; thus, according to the principle P, the term "alcohol" would have to be rejected. And the same holds obviously for *every* term of the physical language. Thus I suppose that we all agree that instead of P the following weaker principle P* must be used; this is indeed one of the principles of empiricism or of scientific inquiry: "A term (predicate) is a legitimate scientific term (has cognitive content, is empirically meaningful) if and only if a sentence applying the term to a given instance can possibly be confirmed to at least some degree." "Possibly" means here "if certain specifiable observations occur"; "to some degree" is not meant as necessarily implying a numerical evaluation. P* is a simplified formulation of the "requirement of confirmability" [10] which, I think, is essentially in agreement with Reichenbach's "first principle of the probability theory of meaning," [11] both being liberalized versions of the older requirement of verifiability as stated by C. S. Peirce, Wittgenstein, and others.[12] Now, according to P*, 'alcohol' is a legitimate scientific term, because the sentence (1) can be confirmed to some degree if certain observations are made. But the same observations would confirm (2) to the same degree because it is logically equivalent to (1). Therefore, according to P*, 'true' is likewise a legitimate scientific term.

We shall now examine more closely the concept of confirmation. This will require that we describe the procedure of scientific testing and that we specify the conditions under which a statement, as a result of such

But I cannot agree with him when he proceeds from this view to the rejection of the concept of truth. In the paper mentioned earlier (in footnote 21) he says (pp. 138 f.): "In accordance with our traditional language we may say that some statements are accepted at a certain time by a certain person and not accepted by the same person at another time, but we cannot say some statements are true today but not tomorrow; 'true' and 'false' are 'absolute' terms, which we avoid."

[10] Compare my "Testability and Meaning", *Philosophy of Science*, Vol. III (1936), pp. 419–471, and Vol. IV (1937), pp. 1–40; see Vol. IV, p. 34.

[11] See Reichenbach, *op. cit.*, footnote 20, §7; he formulated this principle first in 1936.

[12] See the references in Reichenbach, *op. cit.*, footnote 20, p. 49.

testing, is considered as more or less confirmed, i. e., scientifically accepted or rejected. The description of that procedure is not a matter of logic but is itself empirically-scientific (psychological and sociological). One might call it 'methodological', especially if it is presented in the form of proposals and precepts. Only the essential features of the scientific procedure will here be schematically outlined; what matters here are not so much the details but rather a clear emphasis upon the distinction between the two most important operations of the procedure.

The statements of (empirical) science are such that they can never be definitively accepted or rejected. They can only be confirmed or disconfirmed to a certain degree. For the sake of simplicity we may distinguish two types of statements which are, however, not sharply separable (i. e., differing only by degree): the directly testable and the (only) indirectly testable statements. We shall speak of 'directly testable statement' when circumstances are conceivable in which we confidently consider the statement so strongly confirmed or else disconfirmed on the basis of one or very few observations that we would either accept or reject it outright. Examples: "There is a key on my desk". Conditions for the test: I stand near my desk, sufficient illumination is provided, etc. Condition of acceptance: I see a key on my desk; condition of rejection: I don't see a key there. Indirect testing of a statement consists in directly testing other statements which stand in specifiable logical relations to the statement in question. These other statements may be called 'test-sentences' for the given statement. Occasionally an indirectly testable statement may be confirmed by confirming statements from which it is deducible; this is the case, e. g., with existential statements. Scientific laws, however, have the form of universal statements. A universal statement (of simplest form) can be confirmed to ever higher degrees by confirming more and more statements derivable from the law and thereby accepting them (while none are rejected). There are important questions as to the logical relations between such statements which are to be tested and their respective test-sentences. We shall however not examine these any further but rather attend to the analysis of the confirmation of directly testable statements. Here we must distinguish mainly the following two operations:

1. *Confrontation of a statement with observation.* Observations are performed and a statement is formulated such that it may be recognized as confirmed on the basis of these observations. If, e. g., I see a key on my desk and I make the statement: "There is a key on my desk", I accept this statement because I acknowledge it as highly confirmed on the basis of my visual and, possibly, tactual observations. (The concept of observation is here understood in its widest sense; "I am hungry" or "I am angry" in this context are also taken as observation statements.[13] Ordi-

---

[13] It is a matter of convention as to whether these directly established statements (protocol statements) are to be taken as referring to observed things and processes

narily no definite rules are expressly stipulated as to how a statement may or must be formulated when certain observations have been made. Children learn the use of common language, and thereby the correct performance of the operation described, through practice, imitation, and usually without the benefit of rules. These rules, however, could be specified. But if no foreign language or the introduction of new terms is involved, the rules are trivial. For example: "If one is hungry, the statement 'I am hungry' may be accepted"; or: "If one sees a key one may accept the statement 'there lies a key' ". In this context the definition of the concept of truth enters into the question of confirmation; the rules we mentioned originate from this definition.

2. *Confrontation of a statement with previously accepted statements.* A statement established on the basis of the first operation is held as (sufficiently strongly) confirmed as long as in the second operation no statements are found which were previously established by confirmation but are incompatible with the statement under consideration. In the event of such an incompatibility either the new statement or at least one of the previously accepted statements must be revoked. Certain methodological rules have to be stipulated; they tell us which of the two decisions is to be made in a given case (see Popper, *loc. cit.*). This sheds light upon the relation of the two operations to one another. The first one is more important. Without it there could be nothing like confirmation. The second one is an auxiliary operation. Its function is mostly negative or regulative: it serves in the elimination of incongruous elements from the system of statements in science.

Closer attention to these two operations and their mutual relations will help to clarify a number of recently much discussed questions. There has been a good deal of dispute as to whether in the procedure of scientific testing *statements must be compared with facts* or as to whether such comparison be unnecessary, if not impossible. If 'comparison of statement with fact' means the procedure which we called the first operation then it must be admitted that this procedure is not only possible, but even indispensable for scientific testing. Yet it must be remarked that the formulation 'comparison of statement and fact' is not unobjectionable. First, the concept 'comparison' is not quite appropriate here. Two objects can be compared in regard to a property which may characterize them in various ways (e. g., in regard to color, size, or number of parts, and so on). We therefore prefer to speak of 'confrontation' rather than 'comparison'. Confrontation is understood to consist in finding out as to whether one object (the statement in this case) properly fits the other (the fact); i. e., as to whether the fact is such as it is described in the statement, or, to express it differently, as to whether the statement is true to fact. Further-

("there is on the table . . .") or to the act of perception ("I see . . ."). Cf. Carnap, "Ueber Protokollsaetze", *Erkenntnis*, 3, 1933; also K. Popper, *Logik der Forschung*.

more, the formulation in terms of 'comparison', in speaking of 'facts' or 'realities', easily tempts one into the absolutistic view according to which we are said to search for an absolute reality whose nature is assumed as fixed independently of the language chosen for its description. The answer to a question concerning reality however depends not only upon that 'reality', or upon the facts but also upon the structure (and the set of concepts) of the language used for the description. In translating one language into another the factual content of an empirical statement cannot always be preserved unchanged. Such changes are inevitable if the structures of the two languages differ in essential points. For example: while many statements of modern physics are completely translatable into statements of classical physics, this is not so or only incompletely so with other statements. The latter situation arises when the statement in question contains concepts (like, e. g., 'wave-function' or 'quantization') which simply do not occur in classical physics; the essential point being that these concepts cannot be subsequently included since they presuppose a different form of language. This becomes still more obvious if we contemplate the possibility of a language with a discontinuous spatio-temporal order which might be adopted in a future physics. Then, obviously, some statements of classical physics could not be translated into the new language, and others only incompletely. (This means not only that previously accepted statements would have to be rejected; but also that to certain statements—regardless of whether they were held true or false—there is no corresponding statement at all in the new language.)

The scruples here advanced regarding the assertion that statements are to be compared with facts (or reality) were directed not so much against its content but rather against its form. The assertion is not false—if only it is interpreted in the manner indicated—but formulated in a potentially misleading fashion. Hence, one must not, in repudiating the assertion, replace it by its denial: "Statements cannot be compared with facts (or with reality)"; for this negative formulation is as much open to objection as the original affirmative one. In repudiating the formulation one must take care not to reject the procedure which was presumably intended, viz., the confrontation with observation. Nor must the significance and indispensability of such confrontation be overshadowed by exclusive attention to the second operation. (Besides, the phrase 'Comparison of statements with each other', instead of 'confrontation', seems open to the same objections.) He who really repudiates the first operation—I do not think that anyone in scientifically oriented circles does—could not be considered an empiricist.

The result of these considerations may now be briefly summarized:

1. The question of the definition of *truth* must be clearly distinguished from the question of a criterion of *confirmation*.

2. In connection with confirmation two different operations have to be performed: the formulation of an observation and the confrontation of statements with each other; especially, we must not lose sight of the first operation.

LITERATURE

Popper, K. *Logik der Forschung*, Vienna, 1935.
Neurath, O. "Pseudo-Rationalismus der Falsifikation", *Erkenntnis*, 5, 353 ff. 1935.
Carnap, R. "Testability and Meaning", *Philosophy of Science*, Vols. III (1936) and IV (1937).