

e trino. An appellation of God employed in Trinitarian theology, used to express the tri-personality of the one divine substance. See TRINITARIANISM (also for literature). (A.T.O.)

Trivium [Lat. a cross-road, public square; in scholastic Latin the three arts of grammar, logic, rhetoric]. A term used throughout the scholastic period (for example, by Dante) for the three arts, grammar, logic, and rhetoric. Cf. PHILOSOPHY, *passim*. (C.S.P.)

Trophism [Gr. τροφή, nourishment]: Ger. *trophische Funktion*; Fr. *influence trophique*; Ital. *trofismo*. That power or control which the nervous system exercises over growth and metabolism in various parts of the body. The term trophic nerves was first used by Samuel.

Permanent changes are produced in the structure of the body by changes in or suppression of the nervous influence. Such are atrophy, aplasia, hypertrophy, hyperplasia, paraplasia, and various neuropathies. The classical experiment is the section of the ischiatic nerve, which not only produces paralysis of the leg, but is followed by swelling, inflammation, and spontaneous ulceration and decubitus. At the same time an irritable zone develops upon the neck, the mere touch of which is sufficient to bring on an attack of epilepsy (in rodents).

The effects of nervous weakness or excitement upon the hair and skin, and a long list of diseases of neurotic origin, illustrate the perversions of trophic action (erythema, erysipelas, urticaria, herpes, prurigo, eczema, pemphigus, pityriasis, acne, furunculi, &c.). Even embryonic development seems to be largely under nervous control, at least in later stages. The power of self-repair is lost upon the section of the nerve supplying a muscle.

Gaule reports that he has been able to produce within five or ten minutes a localized sore on the surface of the exposed biceps by electrically irritating the corresponding spinal ganglion. These and other facts discredit the idea of special trophic nerves, but accrue to the theory that all nerves are trophic in their action upon the part which they innervate. Cf. END-ORGAN.

Literature: ARNDT, *Über trophische Nerven*, Arch. f. Anat. u. Physiol. (1891); J. GAULE, *Deutsch. med. Wochenschr.*, xx (1894); *trans.* of same, in *Brain*, xvii (1894); and *Congrès Int. d. Sci. Méd.*, Arch. Ital. de Biol., xxii (1895); SCHIFF, *Deutsch. med. Wochenschr.* (1888); VIRCHOW, *Handb. d. speciellen Pathol. u. Therapie* (1854). (H.H.)

Tropism [Gr. *τρέπω*, to turn]: Ger. *Tropismus*; Fr. *tropisme*; Ital. *tropismo*. The property possessed by certain organisms (plants), or their organs, of turning, in whole or part, towards a source of stimulation in the environment, as towards the sun (heliotropism), towards the earth (geotropism), &c.

It is often used in compounds. On certain of the tropisms and the terminology of the subject see Roux, *Arch. f. Entwicklungsmech. d. Organismen*, viii. 2 (1899), 355. (J.M.B., E.B.P.)

Trust: see FAITH, and RELIGION (psychology of, 'dependence').

Trust (corporate) [ME. *trust* and *trist*]: Ger. *Verband*; Fr. *syndicat*, (3) '*trust*'; Ital. *sindacato*. (1) A device by which stockholders put their shares in the hands of trustees, to secure permanence of management.

(2) The practice of putting shares of companies which might compete into the hands of the same trustees, so as to secure harmony of action.

(3) Any device for the permanent restriction of competition. This is the current sense of the word to-day.

A trust differs from a pool chiefly in the element of permanence. A pool is a contract, and being in restraint of trade, has in America little or no legal sanction. It is therefore precarious. A trust agreement is in the nature of things permanent until the trust itself is dissolved. But the legislation against trusts has in recent years so far endangered their existence that it is difficult to find in America any means of permanently restraining competition, or even the abuses of competition, short of actual consolidation. (A.T.H.)

Truth and Falsity (1) and (2) **Error** [AS. *treowth*, Lat. *falsus*, false, and *error*, wandering]: Ger. (1) *Wahrheit und Falschheit*, (2) *Irrthum*; Fr. (1) *vérité et fausseté*, (2) *erreur*; Ital. (1) *verità e falsità*, (2) *errore*. 'Truth' and 'falsehood' are used in two main senses, according as (a) our belief in some proposition, (b) the proposition which we believe, is said to be true or false. True and false belief may be defined, respectively, as belief in propositions which are true or false: and *error* denotes false belief. Further, true and false propositions may be called, respectively, *truths* and *errors*. *Falsehood*, however, or *falsity*, and not *error*, is used to denote that property of a false proposition in virtue of possessing which it is called an error.

'True' and 'false,' as applied to proposi-

tions, denote properties attaching to propositions which are related to one another in such a way that every proposition must be either true or false, and that to every true proposition there corresponds a false one, and to every false proposition a true one, differing from it only as being its negation. There are, properly speaking, no degrees of truth or falsehood, but one error may be said to be truer or more erroneous than another, according as a greater or smaller number of the propositions it implies are true.

The following proposed definitions call for notice, both because of their wide acceptance, and because a notice of them will serve to isolate the properties which the terms really denote.

(1) It is commonly supposed that the truth of a proposition consists in some relation which it bears to reality; and falsehood in the absence of this relation. The relation in question is generally called a 'correspondence' or 'agreement,' and it seems to be generally conceived as one of partial similarity; but it is to be noted that only propositions can be said to be true in virtue of their partial similarity to something else, and hence that it is essential to the theory that a truth should differ in some specific way from the reality, in relation to which its truth is to consist, in every case except that in which the reality is itself a proposition. It is the impossibility of finding any such difference between a truth and the reality to which it is supposed to correspond which refutes the theory. For:—

(a) It is now generally agreed that the difference does not consist in the fact that the proposition is a mere grammatical sentence or collection of words; but that the popular sense, in which a *statement* may be said to be true or false, is merely derived from that in which what it signifies may be so.

(b) It is, however, generally held that the difference consists in the fact that the proposition is a *mental* copy of the reality, or an 'idea.' This view seems to be solely due to the almost universal error, whereby the *object* of a belief or idea is regarded as the attribute or content of such belief or idea; an error which is refuted by the fact that it denies the existence of that unique relation which we mean by knowing, and is therefore never consistently held: e.g. those who hold this view must, in consistency, deny any difference between those senses of truth in which it is

applied to a belief and to the object of such belief—a difference which in practice they cannot fail to recognize; for no one ever consistently held that when two persons are said to know the same truth, all that can be meant is that their states of mind are similar.

(c) No other difference has ever been proposed; and, indeed, once it is definitely recognized that the proposition is to denote, not a belief or form of words, but an *object* of belief, it seems plain that a truth differs in no respect from the reality to which it was supposed merely to correspond: e.g. the truth that I exist differs in no respect from the corresponding reality—my existence. So far, indeed, from truth being defined by reference to reality, reality can only be defined by reference to truth: for truth denotes exactly that property of the complex formed by two entities and their relation, in virtue of which, if the entity predicated be existence, we call the complex real—the property, namely, expressed by saying that the relation in question does truly or really hold between the entities. [Cf. the section *Psychological*, below, which states somewhat similar reasons for rejecting the 'correspondence' view. In the following, '*Logical*,' section, however, the 'correspondence' view is presented.—J.M.B.]

(2) It seems to be frequently implied that the truth of a proposition may consist in its relation to other propositions—in the fact that it 'fits into a system.' This view, however, simply neglects the admitted fact that any logical relations which hold between a set of true propositions will also hold between a set of false ones; i.e. that the only kind of system into which a true proposition will fit, and a false one will not, is a system of true propositions. The view derives its plausibility merely from the fact that the systems of propositions considered are ones to which we are so thoroughly accustomed that we are apt to regard their contradictories as not merely false but self-contradictory.

The Greek and Latin equivalents for 'true' and 'false' are respectively *ἀληθής*, *verus*; *ψευδής*, *falsus*. Error has the equivalents *ἀμαρτία* or *ἀμαρτήμα*, and *error*; but 'falsehood' as distinguished from 'error,' i.e. as denoting the property of a false proposition, has no corresponding abstract noun in Greek nor in classical Latin. There is, properly speaking, no history of the terms, since they have always been used in philosophy and always in very much the same senses. That truth consists

TRUTH AND FALSITY

in some relation of words to what they signify, or even to one another, has indeed been seriously held at various times; and the fact that it seems scarcely necessary any longer to discuss that view, perhaps marks some progress in the conception of the terms. The view that truth consists in relation to a system owes its vogue to Kant's theory of experience, which appears to make the objectivity of a judgment consist in the fact that its subject is related to other subjects, and does not clearly distinguish objectivity from truth. It should, perhaps, be noted that error or false belief has been frequently held to consist, not in consciousness of something different from the truth, but merely in absence of consciousness of the truth or of the whole truth—a view which naturally follows as one of the alternative inferences from the premise that false = not-true, and from the premise that consciousness of the truth = true consciousness. (G.E.M.)

Logical. (1) Truth is a character which attaches to an abstract proposition, such as a person might utter. It essentially depends upon that proposition's not professing to be exactly true. But we hope that in the progress of science its error will indefinitely diminish, just as the error of 3.14159, the value given for π , will indefinitely diminish as the calculation is carried to more and more places of decimals. What we call π is an ideal limit to which no numerical expression can be perfectly true. If our hope is vain; if in respect to some question—say that of the freedom of the will—no matter how long the discussion goes on, no matter how scientific our methods may become, there never will be a time when we can fully satisfy ourselves either that the question has no meaning, or that one answer or the other explains the facts, then in regard to that question there certainly is no truth. But whether or not there would be perhaps any reality is a question for the metaphysician, not the logician. Even if the metaphysician decides that where there is no truth there is no reality, still the distinction between the character of truth and the character of reality is plain and definable. Truth is that concordance of an abstract statement with the ideal limit towards which endless investigation would tend to bring scientific belief, which concordance the abstract statement may possess by virtue of the confession of its inaccuracy and one-sidedness, and this confession is an essential ingredient of truth. A further explanation of what this

concordance consists in will be given below. Reality is that mode of being by virtue of which the real thing is as it is, irrespectively of what any mind or any definite collection of minds may represent it to be. The truth of the proposition that Caesar crossed the Rubicon consists in the fact that the further we push our archaeological and other studies, the more strongly will that conclusion force itself on our minds for ever—or would do so, if study were to go on for ever. An idealist metaphysician may hold that therein also lies the whole reality behind the proposition; for though men may for a time persuade themselves that Caesar did not cross the Rubicon, and may contrive to render this belief universal for any number of generations, yet ultimately research—if it be persisted in—must bring back the contrary belief. But in holding that doctrine, the idealist necessarily draws the distinction between truth and reality. [Cf., however, the section *Psychological*, below.—J.M.B.]

In the above we have considered positive scientific truth. But the same definitions equally hold in the normative sciences. If a moralist describes an ideal as the *summum bonum*, in the first place, the perfect truth of his statement requires that it should involve the confession that the perfect doctrine can neither be stated nor conceived. If, with that allowance, the future development of man's moral nature will only lead to a firmer satisfaction with the described ideal, the doctrine is true. A metaphysician may hold that the fact that the ideal thus forces itself upon the mind, so that minds in their development cannot fail to come to accept it, argues that the ideal is real: he may even hold that that fact (if it be one) constitutes a reality. But the two ideas, *truth* and *reality*, are distinguished here by the same characters given in the above definitions.

These characters equally apply to pure mathematics. Projective geometry is not pure mathematics, unless it be recognized that whatever is said of rays holds good of every family of curves of which there is one and one only through any two points, and any two of which have a point in common. But even then it is not pure mathematics until for points we put any complete determinations of any two-dimensional continuum. Nor will that be enough. A proposition is not a statement of perfectly pure mathematics until it is devoid of all definite meaning, and comes to this—that a property of a certain icon is

TRUTH AND FALSITY

pointed out and is declared to belong to anything like it, of which instances are given. The perfect truth cannot be stated, except in the sense that it confesses its imperfection. The pure mathematician deals exclusively with hypotheses. Whether or not there is any corresponding real thing, he does not care. His hypotheses are creatures of his own imagination; but he discovers in them relations which surprise him sometimes. A metaphysician may hold that this very forcing upon the mathematician's acceptance of propositions for which he was not prepared, proves, or even constitutes, a mode of being independent of the mathematician's thought, and so a reality. But whether there is any reality or not, the truth of the pure mathematical proposition is constituted by the impossibility of ever finding a case in which it fails. This, however, is only possible if we confess the impossibility of precisely defining it.

The same definitions hold for the propositions of practical life. A man buys a bay horse, under a warranty that he is sound and free from vice. He brings him home and finds he is dyed, his real colour being undesirable. He complains of false representations; but the seller replies, 'I never pretended to state every fact about the horse; what I said was true, so far as it professed to be true.' In ordinary life all our statements, it is well understood, are, in the main, rough approximations to what we mean to convey. A tone or gesture is often the most definite part of what is said. Even with regard to perceptual facts, or the immediate judgments we make concerning our single percepts, the same distinction is plain. The percept is the reality. It is not in propositional form. But the most immediate judgment concerning it is abstract. It is therefore essentially unlike the reality, although it must be accepted as true to that reality. Its truth consists in the fact that it is impossible to correct it, and in the fact that it only professes to consider one aspect of the percept.

But even if it were impossible to distinguish between truth and reality, that would not in the least prevent our defining what it is that truth consists in. Truth and falsity are characters confined to propositions. A proposition is a sign which separately indicates its object. Thus, a portrait with the name of the original below it is a proposition. It asserts that if anybody looks at it, he can form a reasonably correct idea of how the original looked. A sign is only a sign in

actu by virtue of its receiving an interpretation, that is, by virtue of its determining another sign of the same object. This is as true of mental judgments as it is of external signs. To say that a proposition is true is to say that every interpretation of it is true. Two propositions are equivalent when either might have been an interpretant of the other. This equivalence, like others, is by an act of abstraction (in the sense in which forming an abstract noun is abstraction) conceived as identity. And we speak of believing in a proposition, having in mind an entire collection of equivalent propositions with their partial interpretants. Thus, two persons are said to have the same proposition in mind. The interpretant of a proposition is itself a proposition. Any necessary inference from a proposition is an interpretant of it. When we speak of truth and falsity, we refer to the possibility of the proposition being refuted; and this refutation (roughly speaking) takes place in but one way. Namely, an interpretant of the proposition would, if believed, produce the expectation of a certain description of percept on a certain occasion. The occasion arrives: the percept forced upon us is different. This constitutes the falsity of every proposition of which the disappointing prediction was the interpretant.

Thus, a false proposition is a proposition of which some interpretant represents that, on an occasion which it indicates, a percept will have a certain character, while the immediate perceptual judgment on that occasion is that the percept has not that character. A true proposition is a proposition belief in which would never lead to such disappointment so long as the proposition is not understood otherwise than it was intended.

All the above relates to *complex truth*, or the truth of propositions. This is divided into many varieties, among which may be mentioned *ethical truth*, or the conformity of an assertion to the speaker's or writer's belief, otherwise called *veracity*, and *logical truth*, that is, the concordance of a proposition with reality, in such way as is above defined.

(2) The word *truth* has also had great importance in philosophy in widely different senses, in which it is distinguished as *simple truth*, which is that truth which inheres in other subjects than propositions.

Plato in the *Cratylus* (385 B) maintains that words have truth; and some of the scholastics admitted that an incomplex sign, such as a picture, may have truth.

But *truth* is also used in senses in which it is not an affection of a sign, but of things as things. Such truth is called *transcendental truth*. The scholastic maxim was *Ens est unum, verum, bonum*. Among the senses in which transcendental truth was spoken of was that in which it was said that all science has for its object the investigation of *truth*, that is to say, of the real characters of things. It was, in other senses, regarded as a subject of metaphysics exclusively. It is sometimes defined so as to be indistinguishable from reality, or real existence. Another common definition is that truth is the conformity, or conformability, of things to reason. Another definition is that truth is the conformity of things to their essential principles.

(3) *Truth* is also used in logic in a sense in which it inheres only in subjects more complex than propositions. Such is *formal truth*, which belongs to an argumentation which conforms to logical laws. (C.S.P.)

Psychological. The psychological criticism of the notion of reality seems to be reducing it to that of truth, and in so far as to making it difficult to put the 'correspondence' theory of truth in any tenable form. If in its essential, no less than in its genetic, meaning reality = is that which consciousness somewhere and somehow finds it possible to believe or accept as true, then it is a vicious circle to define truth as that which corresponds to or that which approximates to reality. The reality-coefficient, it seems safe to say, can be attached to this or that mental content only through the acceptance of the latter by consciousness for practical or other purposes; and when we come to ask for something which can be considered the irreducible character of truth, we find it to be, so far as the conscious recognition of it is concerned, also its acceptance for practical or other purposes. The fundamental difficulty with a 'correspondence theory' is this: it assumes a reality with which that which claims to be true may be compared, in order to find out whether it really be true or not. This is to say that we have a system of realities which have not been derived through the processes of selection in which alone just those tests arise which constitute them truths. Genetic analysis shows that by our active accommodations to whatever there is to accommodate to we select out bits of workable experience, hypostatize them under the name of reality, and thus, through gradual accretion to the store—both the individual and the racial store—we en-

large the range of truth with the reflection of it *pari passu* which constitutes reality. It would then be necessary to say, as the present writer (*Psychol. Rev.*, Jan., 1898, 1 ff.) has said in common with a German writer (Simmel, *Arch. f. syst. Philos.*, i. 34 ff.): 'truth is not selected because it is true (to reality): it is true because it has been selected.' And it might be said with equal justification: reality is not that to which truth must correspond; truth, on the contrary, is that to which reality must correspond.

The genetic reasons for the common-sense view—and also for the logical view (see above, *Logical*)—that goes by the term 'correspondence' appear to be plain. By the historical growth of tradition, authority, science, &c., and by the reflection of great standard formulations in the congenital equipment of individuals, a system of realities is recognized into which all are educated and to which all minor statements and beliefs are made to conform. This body of established truths has certain characters—permanency, consistency, compelling quality, &c.—which in our hypostatizing of reality come to be criteria of truth. According as new formulations, items, reported facts stand tests by these criteria, they are brought into correspondence with the reality of which such tests are functions; so that they are said to be, and they are able to remain, *true*. In so far, therefore, the correspondence view has grounds to rest upon, and in this sense it applies to a very wide series of cases. But it still remains that, if these considerations be true to psychology, for purposes of definition, truth is the ultimate and reality the derived term.

Literature: that of EPISTEMOLOGY, and LOGIC; BIBLIOG. B, 1, d, and C, 2, g; citations under SELECTIVE THINKING. (J.M.B., C.L.F.)

Truth (in theology): Ger. *Wahrheit*; Fr. *vérité*; Ital. *verità* (*di Dio*, &c.—E.M.). Truth as a divine attribute is to be understood as the exact correspondence between the divine thought and reality; or the exact correspondence between the divine promise and its fulfilment. Cf. ATTRIBUTE (of God).

The former constitutes God's thought the ultimate ground and criterion of truth, while the latter constitutes his word the ultimate standard of faithfulness. (A.T.O.)

Tschirnhausen, Graf von, Walther Ehrenfried, Herr von Kisslingwalde und Stolzenberg. (1651-1708.) Studied at Leyden, chiefly mathematics. Volunteer in Holland, where he met Huyghens and became

THIS PAGE LEFT BLANK INTENTIONALLY