

Indeed, it is seldom that reflective emotion such as this is not complicated with special feelings and attitudes toward the object.

Literature: see SHYNESS. (J.M.B., G.F.S.)

Modification (in biology) [Lat. *modificatio*]: Ger. (*individuell erworben*) *Abänderung* (Wundt); Fr. *modification*; Ital. *modificazione*. A structural change wrought during the individual's lifetime (or acquired), in contradistinction from variation, which is of germinal origin (or congenital).

The term was used sometimes, but not consistently, in this sense by Darwin. In the Darwinian phrase 'descent with modifications' the ambiguity is evident as between what is congenital and what acquired.

The distinction indicated in the definition has been rendered necessary by the discussion as to the inheritance of acquired characters. Modifications are acquired by the individual; whether they can be transferred to the germinal substance and thus become hereditary as variations is the problem under discussion. See ACQUIRED CHARACTERS, and HEREDITY. Organisms capable of extensive modification are termed plastic; and this PLASTICITY (q.v.) may be subject to selection. The term ACCOMMODATION (q.v.) is reserved by some writers for the moulding of behaviour to environing circumstances on the part of organisms, referring to function rather than to structure. On the hypothesis of ORGANIC SELECTION (q.v.) modifications of structure may serve to foster COINCIDENT VARIATIONS (q.v.) of like nature, and accommodations of behaviour may thus set the direction of congenital variation, and so of evolution under the action of natural selection.

Literature: LLOYD MORGAN, *Habit and Instinct*; J. MARK BALDWIN, *A New Factor in Evolution*, Amer. Natural., June-July, 1896; HEADLEY, *The Problems of Evolution* (1901). (O.L.M.—J.M.B.)

Modification and Variation (mental). The same distinction between these terms is recommended as that given under MODIFICATION (in biology). Cf. VARIATION. (J.M.B.)

Modulus [Lat. *modus*, a mode]. (1) Proposed by Schröder (Ger. *Modul*; Fr. not in use; Ital. *modulo*, suggested—E.M.) for the four relative terms upon which the logic of dual RELATIVES (q.v.) hinges; namely, 'Not,' 'Same-as,' 'Excluded from a universe containing,' and 'With, or within a universe containing.'

These terms were first called by Peirce the 'definite dual relatives of second intention';

he now thinks it might be well to term these the four 'cardinals,' or four cardinal dual relatives.

Literature: PEIRCE, in *Studies in Logic* by Members of the Johns Hopkins University, 191, and Amer. J. Math., iii. 47; SCHRÖDER, *Algebra d. Logik*, iii. 117.

(2) See ERRORS OF OBSERVATION. (C.S.P.)

Modus ponens and Modus tollens [Lat.]

Two ways of reasoning from a conditional proposition or consequence. The *modus ponens* from the consequence and the antecedent infers the consequent; the *modus tollens* from the consequence and the falsity of the consequent infers the falsity of the antecedent, thus:

Modus Ponens. *Modus Tollens.*

If A is true, C is true; If A is true, C is true;

A is true; C is false;

∴ C is true. ∴ A is false.

A third way of reasoning, namely, from the truth of the antecedent and falsity of the consequent, to the falsity of the consequence, is generally overlooked. See HYPOTHETICAL (syllogism). (C.S.P.)

Mohammed, or Mahomet, or Mahoméd, or Muhammed. (cir. 570–632 A.D.) An Arabian prophet, born at Mecca. His father died about the time of Mohammed's birth, and his mother in his sixth year. He was raised by a grandfather and an uncle.

The latter, Abu Talib, was his faithful friend and protector all through life. Accounts of Mohammed's youth are legendary: he probably tended flocks until his twenty-fifth year, when he entered the service of a rich widow named Chadidja, whom he married. In his fortieth year Mohammed saw his first 'vision' and received his 'message.' In four years he made forty proselytes, and it was revealed to him that he must preach openly. As his followers increased in numbers, he was forced to the most careful watchfulness to save his life. About 622 he moved to the friendly city of Medina, and the Mohammedan era dates from the first month of the following Arabic year. Mohammed now became the law-giver, judge, and ruler of Medina and of two powerful Arabian tribes. In the first year of the new era, he assumed hostilities against his enemies. War followed, and in the sixth year of the new era the first pilgrimage to Mecca was announced, but not carried out until the following year. The Meccans concluded peace with him, however, and he had become an equal power. His missionaries passed throughout Arabia, and even beyond its borders. Mohammed's forces being de-

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German trans. by HAARBRÜCKER (1850); Dabistân (a Persian work composed in India about the middle of the 17th century; several Oriental editions), trans. by SHEA and TROYER (1843); GOBINEAU, *Religions et Philos. dans l'Asie Centrale* (2nd ed., 1866; 3rd ed., 1900). (E.G.B.)

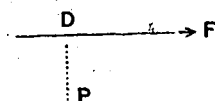
Molecule and Molecular Force: see MATTER.

Molinus: see QUIETISM.

Moment: see PRESENT, and TIME PERCEPTION.

Moment [Ger.]: an element or FACTOR (q. v.). It is coming into use in English. (J.M.B.)

Moment (of force) [Lat. *momentum*, movement]: Ger. *Kraftmoment*; Fr. *moment*; Ital. *momento* (*della forza*). The product of the intensity of a force acting along a line *DF* by the perpendicular *DP* from that line to some given point *P*. The amount of the moment therefore depends on the position of *P*, which



may be any position required by the special problem in hand. Cf. MOMENTUM. (S.N.)

Momentum [Lat.]: Ger. *Moment*, *Bewegungsmenge*; Fr. *quantité de mouvement*; Ital. *momento*. The product of the mass of a moving body into its velocity.

Moment of momentum. In the case of a particle moving along a line *DF* (see MOMENT of force) by the perpendicular distance *DP* from the line to a given point. It differs from the MOMENT (q. v.) of force only in that the momentum of the particle is used instead of the force acting upon it.

In the case of a body or any other system of particles, the sum of the moments of momentum of the different particles. The following is a fundamental property: the moment of momentum is a minimum when for *P* we take the centre of gravity of the system, and remains constant so long as the system is not acted upon by any force but the mutual action of its own parts. (S.N.)

Monad (Monadism, Monadology) [Gr. *monás*, unit]: Ger. *Monade*; Fr. *monade*; Ital. *monade*. In ancient philosophy, the unit in arithmetic, or unity as opposed to plurality; it figures in this sense in the numerical speculations of the Platonic school and the later Pythagoreans. The special case of the number two, considered as unit or constituent of being, was known to the Pythagoreans as the

Dyad (for Zenocrates' doctrine of the Dyad see ONE). (A.S.P.P.—J.M.B.)

(1) With the Pythagoreans, the monad was the number one considered, as well as we can make out, as the first creative deity (Zeller).

(2) In other Greek schools a monad is simply an individual. With the Atomists, an atom.

(3) In the philosophy of Leibnitz a monad is a being pursuing its development according to an inward law, in pre-established harmony with other beings. The idea may be illustrated by two pendulums, each moving according to a formula of its own. This illustration is used by Leibnitz himself. This theory has been resuscitated by Renouvier (*La Nouvelle Monadologie*, Paris, 1898).

(4) In the logic of RELATIVES (q. v.), a proposition with one term left blank, to be filled in if the proposition is to be completed. In chemistry: a radicle with one free bond. (C.S.P.)

In its modern signification the term appears to have been first made current by Giordano Bruno, who uses it, in conscious opposition to the atoms of Democritus, to denote the individual imperishable elementary substances in which the divine essence of the universe manifests itself. Each monad combines form and matter; it is at once spiritual and corporeal. The universe is thus living throughout its minutest parts, and each monad is a microcosm or mirror of the whole. God is called the *Monas monadum*. Bruno's conception of the monads thus combines an intense individualism with a thorough-going pantheism. The analogy of Bruno's conception with the later doctrine of Leibnitz is obvious, and it has been supposed that Leibnitz was indebted to the earlier thinker both for the doctrine and the term. Ludwig Stein, however, who traces very carefully the development of the doctrine of monads in Leibnitz's writings, adduces good grounds for the conclusion that Leibnitz worked out his doctrine of individual substances independently of Bruno, and that the term itself, which he first used in 1696, was suggested to him not by Bruno, but by a contemporary of his own (Van Helmont the younger), with whom he was in correspondence, and who visited him in that year. Had Leibnitz taken his view from Bruno, he would have taken the term at the same time; but the term is used for the first time in 1696, some years after the doctrine had taken definite shape in his mind, and is constantly used thenceforward as the technical term by which he desires to indicate the peculiarity of his own position.

Leibnitz's *Monadology* is the result of his revision of the Cartesian doctrine of substance. Substance, he maintains, is to be conceived as activity or active force; and whereas, according to the abstract definition of substance as the self-existent, it follows that there can be only one substance, room is left, according to the new definition, for an infinite variety of individual substances. These are the monads, not material or extended like the atoms of the physicists and the mechanical philosophers, but 'metaphysical points' or immaterial centres of force, their inward force or life being conceived, after the analogy of mental life, as a grade of 'perception' or ideation, though the grade of mentality may be so low as not to be properly spoken of as conscious. Each monad is entirely self-contained, developing all its experience from within, but each mirrors or 'represents' the universe from its own particular point of view. The system or hierarchy of monads, rising continuously from the lowest to the highest grade of perfection, constitutes the pre-established harmony in which the universe consists. God is represented as the creator of the monads, in so far as he conferred real existence on what pre-existed ideally in the divine thought. At other times, however, God would appear to be, in metaphysical consistency, only an expression for the harmony of self-subsistent monads.

Monadism, in accordance with the foregoing, might be defined as spiritual atomism or spiritual individualism. If the individual substances are supposed to be metaphysically self-subsistent in their isolation, monadism would be a doctrine of ultimate pluralism, at variance with the monistic impulse in which speculation has its rise and by which it is maintained. But a thinker like Lotze, who has his roots in the *Monadology*, conceives the monads or spiritual substances not as absolute or unrelated reals, but as organic members of one world, moments in the life of one Being, which conditions them all and makes reciprocal interaction possible.

The doctrine of MIND-STUFF (q. v.) or the theory that every atom or material fact has its inner side—its atom of sense or consciousness—presents a monadic character; but, in the form originally given to it by Clifford, it dissolves the unity of consciousness into bits or ultimate units of mind-stuff which compound themselves into what we call a mind. It is simply atomism done into terms of mind. (A.S.P.P.)

Literature: EISLER, *Wörterb. d. philos.*

Begriffe, sub verbo; LEIBNITZ, *Monadology* (Eng. trans., in J. of Specul. Philos., II (1867) 129, or in ed. by Latta); DUNCAN, *Philos. Works of Leibnitz* (trans.); LOTZE, *Microcosmus*, and *Hist. of Philos.*; L. STEIN, *Leibnitz and Spinoza*. (J.M.B.)

Monasticism: see ASCETICISM.

Monergism [Gr. *monos*, alone, + *ergon*, work]: Ger. *Monergismus*; Fr. *monergisme*; Ital. *monergismo*. The doctrine of those Augustinians who deny the co-operation of the human will in the work of regeneration, and hold that it is wholly the work of the Holy Spirit, the human will being passive. See SYNERGISM. (A.T.O.)

Moneron [Lat. *monus*, alone, single]. A name given by Haeckel to the simplest known organisms, including naked Protozoa, such as Amoeba, Protomyxa, and Vampyrella. See E. Haeckel, *Gen. Morphol.* (1866); *Hist. of Creation*. Cf. AMOEBIA, and PROTOZOA. (E.S.G.)

Money [OF. *monnaie*, Lat. *moneta*]: Ger. *Geld*; Fr. *monnaie*, *argent*; Ital. *moneta*. A thing which, by common consent of the business community, is used as a basis of commercial obligations.

There are two quite distinct purposes for which supplies of money are needed by the business community and its individual members: (1) as a reserve to secure solvency; (2) as a medium of exchange.

The latter function seems at first sight much more important than the former; so much so, that most writers have made it the basis of the definition of money. It was so in large measure with Smith and Mill; it is much more explicitly so with some modern writers. 'Money is the medium of exchange,' says Walker. 'Whatever performs this function is money.' To this view there are two objections. First, the actual medium of exchange for important transactions is the bank cheque; and Walker himself shrinks from calling this money, though it is a legitimate consequence of his own definition to do so. Second, the thing which a man must have in order to do business is not a convenient medium, but an acceptable reserve. If he has this, he can transfer title in any way he pleases. To lay stress on the means of transfer instead of that which is behind it, opens the way for fallacies both theoretical and practical.

Literature: JEVONS, *Money and the Mechanism of Exchange*; treatises on political economy and finance. (A.T.H.)

Monism [Gr. *monos*, alone]: Ger. *Monismus*; Fr. *monisme*; Ital. *monismo*. Monism is, in