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ences which excited similar emotions are supposed to issue in the same expression; that of 'antithesis,' whereby opposite emotions show opposite expressions, although only one of the expressions may have utility; that of 'direct nervous discharge,' according to which stimulations, mainly of an excessive character, would discharge themselves in muscular activity. This principle has taken formulation in later writers in the principle of 'hedonic expression' (Spencer, Bain; the expression is from Baldwin), which recognizes the facts that pleasure increases muscular movement in certain muscles, and that pain lessens it; the same principle being used by the last-named writer to explain 'antithesis.' Darwin assumed that the state of emotion preceded the expression and caused the latter: the so-called CAUSE THEORY (q.v.) of emotion. Recently the theory has been advanced—called the 'James-Lange Theory'—that the emotion is the mental indication of the changes which constitute the so-called 'expression'; that is, the actions of utility or other take place, and these are reported in the brain, giving rise to the qualitative experiences which we call emotions. The recurrence of a certain emotion, or its artificial stimulation, in the absence of its appropriate object, is the incipient revival of the earlier expressions—an 'organic reverberation' (James). This, called variously the 'effect theory,' the 'peripheral theory,' &c., of emotion, is still under discussion, in opposition to the 'cause theory,' noted above.

*Literature:* see under EMOTION, also BIBLIOG. G. 2, e; DARWIN, Expression of the Emotions; BELL, Anatomy of Expression; LANGE, Die Gemüthsbewegungen; JAMES, Princ. of Psychol., ii. chap. xxv; and Psychol. Rev. (1894), i. 516; PIDERIT, La Mimique et la Physiologie (1888); MANTEGAZZA, Fisionomia e Mimica (1878); IRONS, arts. in Mind and Philos. Rev. (since 1893); DEWEY, The Theory of Emotion, Psychol. Rev., i. 553, ii. 13; STOUT, Manual of Psychol.; SOLIER, Rev. Philos. xxxvii. (1894) 24; WORCESTER, Monist, iii. (1893) 285; LEHMANN, Hauptgesetze des Gefühlslebens; BALDWIN, Ment. Devel. in the Child and the Race, chap. viii; STUMPF, Begriff der Gemüthsbewegung, Zeitsch. f. Psychol., xxi. 47 ff.; the general works on psychology, especially those of WUNDT, LADD, JODL. (J.M.B., G.F.S.)

**Empedocles.** Greek philosopher, who lived in the 5th century B.C. Born at Agrigentum in Sicily. His talents and scientific attainments led his countrymen to offer him a crown,

which he refused, using his influence to found a republic in Sicily. Fragments of a poem on Nature remain from his works.

**Empire:** see GOVERNMENT.

**Empirical** [Gr. *ἐμπειρία*, experience]. Based upon (empirical views), guided by (empirical medicine), derived from (empirical knowledge) EXPERIENCE (q.v.). (J.M.B.)

**Empirical Logic:** Ger. *empirische Logik*; Fr. *logique empirique*; Ital. *logica empirica*. The treatment of logic on the basis or from the point of view of a sensationalist or other markedly empiricist theory of knowledge.

(R.A.—C.S.P.)

The latter term, however, is very indeterminate. The defining marks of an empiricist theory of knowledge can hardly be assigned with theoretical accuracy; and, on the historical side, theories of knowledge that are rightly described as empirical have not always exhibited the same features. In its extreme form, the empirical theory of knowledge identifies knowing with the immediate process of sense perception, and represents all connection in the content known as identical in kind with such connection as it is assumed may be apprehended in sense perception. From this point of view, the problem of empirical logic becomes the description of the ways in which a transition is made from the restricted, individualized basis of sense perception to the elaborated, generalized representation of experience constituting science, together with an explanation or justification of the admitted difference between the primary and the derived aspects of knowledge. It is easily seen that in such an inquiry the central question is that of the universal, whether in the form of the general notion, general idea, concept, or in that of the general proposition; for it is universality that stands most sharply in conflict with the features assigned to the primary, fundamental type of knowledge. One or other of the aspects of this universality may be the more prominent, as e.g. the rather psychological feature of generality, as in notions or terms, in the discussion of which empirical logic tends towards extreme nominalism; or the more comprehensive aspect of knowledge as involving truth, objective validity, in the treatment of which empirical logic becomes a theory of inductive inference. The questions entering into the fundamental discussion regarding knowledge are so varied, some being psychological, some metaphysical, and empiricism has been so much determined in

scope and direction by the counter-theory to which it has been opposed, that historically empirical logic has been presented in many degrees of completeness. The distinguishing features of knowledge on which it proceeds—(1) rejection of the universal, or explanation of it by reference to the psychological mechanism of association and language; (2) restriction of necessity in thought to analytical connections; with (3) the correlated denial of any absolute value in matters of fact; (4) restriction of the import of judgments, i.e. of the kind of relations known, to such connections as are within the range of immediate perceptive experience, e.g. similarity, co-existence, sequence—may not all in conjunction be used as the basis of a logical theory. Historically, there have been combined views of a strictly rational character regarding mathematical knowledge with those strictly empirical regarding matters of fact. So, too, a thoroughly empirical logic in respect to physics may be combined, as by the Scottish philosophers, Reid and Stewart, with assumptions as to first principles altogether irreconcilable with strict empiricism.

Empirical logic may be said to begin with the first attempts to describe the rise and formation of knowledge from the basis of sense perceptions. In any such description there is involved something of the specifically logical question, the question as to the worth of a form or way of knowing, as to the justification of its obvious claim to give insight into objective reality. Even prior to the definite formulation of the logical problem by Aristotle, indications are to be found of the beginnings of an empirical logic. Probably nothing contributed more to determine the question as to the method by which we gather generalized knowledge from particular facts of experience than the rapid development of the one physical science in which the Greek mind holds the same place that it has assured for itself in philosophy and in the formal sciences of mathematics and astronomy, viz. medicine. Alcmaeon of Crotona, whose empirical description of knowledge is referred to in the *Phaedo* (96 B), was a physician, and in the works that can be assigned to Hippocrates there occur the first discussions as to method in relation to matters of experience (see Chauvet, *La Philos. des Médecins Grecs*, 1886, 8–42; Gomperz, *Griech. Denker*, i. Bk. III. chap. i; and Galen, *De Placitis Hippoc. et Platonis*, Bk. IX). Unmistakable traces of the empirical strain are to be found in

the imperfectly recorded speculations of Antisthenes, who first definitely advanced some of the characteristic marks (v. sup.) of an empirical view of knowledge (cf. Dümmeler, *Antisthenica*, and Gomperz, loc. cit. ii. Bk. IV. chap. ii. 7. 9). It is quite possible that from his acquaintance with and interest in medical work, Aristotle was led to formulate, as Hippocrates had already done, some of those very general precepts as to comparison of like and unlike cases, division of a problem into parts, ascent from particulars and descent thereto which make up his otherwise unimportant contribution to empirical logic (see Eucken, *Die Methode d. Aristot. Forschung*, 1872, esp. § iv). The Aristotelian logic is in itself dominated by a conception of nature so profoundly opposed to empiricism as above defined, that it may rather be taken as a typical representation of the rationalist doctrine. It proceeds under the guidance of an ideal of knowledge so definite, and it describes in such methodical detail the forms of knowing, that it determined for all later times the lines along which an empirical logic must be elaborated.

The Stoic logic, owing to the new point of view, that of monism, from which the Stoics worked over the Aristotelian material, presents in several of its features a pronounced empirical colouring. Their extreme nominalism, dependent on their metaphysical individualism—a doctrine in which they anticipate Leibnitz—involved as natural consequence an equally mechanical mode of explaining the formation of higher types of knowledge than simple sense apprehension. With individualism, however, which is the root-principle of all empirical theories of knowledge, the Stoics managed to combine the representation of a teleological connection of all things, and the influence of this counter-thought is reflected in their theory of knowledge, and forbids us to describe that as through and through empirical (see Nikolai, *De logic. Chrysippi libris*, 1859; Heinze, *Erkenntnislehre der Stoiker*, 1880; Stein, *Erkenntnislehre der Stoa*, 1868; Bonhöffer, *Epiktet u. die Stoa*, 1890). To induction and inductive methods, the Stoics contribute nothing; though Philodemus informs us that they were absolutely opposed to induction.

All the characteristic features of empiricism are represented, with perfect consciousness of their significance, though without due recognition of the problems they raise, in the unfortunately scanty remains of the Epicurean

doctrine of knowledge. It is evident that the Epicureans did attempt to work out some general representation of the ways in which the mind passes from the immediately given, the isolated phenomena, which serve as signs, to the inferred realities underlying them and signified by them; and the dominating conception of nature under which they worked was adapted to a strictly empirical, almost mechanical, account of these processes. But we have only imperfect knowledge of their labours (see Gomperz, *Herkulanische Studien*, i, 1865; Bahnsch, *Des Epikureers Philodemus Schrift* *περί σημείων και σημειώσεων*, 1879; Marquand, in *Johns Hopkins Studies in Logic*, 1883).

Undoubtedly the speculations of the academic and sceptical schools, particularly of Arcesilaus and of Carneades, the Hume of the Hellenic world, had the view of knowledge from which the only logic possible is that we have called empirical, but of their doctrine of probability we have very scanty information (see Brochard, *Les Sceptiques Grecs*, 1887). Galen's large work on scientific proof is lost (see J. Müller, *Galen's Werk v. wiss. Beweise*, 1896), but in his minor philosophical and in his medical works there is much to show how he strove to elaborate a general theory of method (cf. Chauvet, *op. cit.*, 109-70). What he has to offer, however, is of much the same generality as the corresponding part of Aristotle's work. In truth the development of empirical logic from this time onward is dependent mainly on the advances made in detailed knowledge of nature, on the alteration gradually brought about in general conceptions of reality, and therewith on the changes introduced in human ideals of knowledge.

Within mediaeval times, it is to be said that there is little or no development of empirical logic. Some features of empiricism are of course to be detected wherever nominalism or mysticism is found, but for the most part they failed to produce effect on logical theory. The strong current in Renaissance times towards first-hand knowledge of nature could not be without effect on doctrines of knowledge and so on portions, more or less extensive, of logic. Among the revived systems of antiquity, Epicureanism was not overlooked, and a new theory of induction was from Bacon's time a problem for the logician and philosopher. The philosophical basis of empirical logic in modern times was laid by Locke, who otherwise contributed little to

the discussion of the more specifically logical questions. So far as knowledge of external nature is concerned, no theory of knowledge can be more empirical than that of Berkeley, whose nominalist views are pronounced, and who at the same time supplied, from another side of his speculative view, the universal factor otherwise wanting on the empirical theory of knowledge. In all essentials his view is that accepted by the Scottish school—Reid, Stewart, Brown—for as regards the logical problem, it is indifferent whether the external world be regarded as an orderly congeries of perceptions or as having a mode of independent existence.

A special and a more resolutely consistent strain of empiricism than Locke's takes its start in Hobbes, whose work, even more than that of Locke, finds continuation in Condillac, De Tracy, and the ideologists. Hume's strongly empirical interpretation of knowledge leads him to dismiss the logical problem as of small value. The omission was made good in J. S. Mill's *Logic* (1893), which, with some inconsistencies of language, may be said to present logic from the point of view of the empirical theory of knowledge. In essentials the same account of logic, but with much improvement in detail, and a deeper recognition of the philosophical interests involved, is given in Venn. The important works on method by Jevons, Wundt, Sigwart, though in no case founded on the strictly empirical interpretation of knowledge, agree in so many points of general principle with Mill that they might without injustice be reckoned among empirical logics. Finally, positivism, which emphasizes one characteristic of the empirical doctrine, and shares its ideal of knowledge, is, as regards its method or logic, strictly empirical.

*Literature*: as representing ways in which the new ideas of the Renaissance were brought to bear upon logic, may be instanced VALLA (1415-65), VIVES (1492-1540), and particularly NIZOLIUS (1498-1576), whose remarkable attack on the notion of universality deserves notice. His work *De veris Principiis et vera Ratione philosophandi* (1553) was re-edited by Leibnitz (1670). See also BACON, *Novum Organum* (1620; best edition, with full commentary and introduction, by T. Fowler, 1878); JOS. GLANVILL, *Vanity of Dogmatizing* or *Seipsis Scientifica* (1661), *Plus Ultra* (1668); GASSENDI (1592-1655), *De doctrina Epicuri* (1647); *Logica*, in *Opera*, v. i (1655) (see THOMAS,

La Phil. de Gassendi, 1889); J. B. DUHAMEL, *De Mente Humana*; MARRIOTTE, *Essai de Logique*, contenant les Principes de la Science (1678); HOBBS, *Computatio sive Logica* (1655); CONDILLAC, *La Logique* (1780), *L'Art de Penser* (1755), *L'Art de Raisonner* (1755), *La Langue des Calculs* (1798), forming vols. xxii, xxvi, xxviii, and xxiii of Condillac's *Œuvres*; DESTUTT DE TRACY, *Él. d'Idéologie*, Pt. III. *La Logique* (1805); DE GERANDO, *Des Signes et de l'Art de Penser* (4 vols., 1800); LEIDENFROST, *De Mente Humana* (1793); LOCKE, *Human Understanding* (1689); P. BROWNE, *Procedure, Extent, and Limits of Human Understanding* (1728); BERKELEY, *Princ. of Human Knowledge* (1710); HUME, *Treatise* (1739), *Human Understanding* (1748); BEDDOES, *Obs. on the Nature of Demonstrative Evidence* (1793); TH. BROWN, *Inquiry into the Relation of Cause and Effect* (1804; 3rd ed., 1818); HERSCHEL, *Discourse on the Study of Nat. Philos.* (1831); J. S. MILL, *Syst. of Logic* (1843); OPZOOMER, *De Weg d. Wetenschap* (1851); W. S. JEVONS, *Princ. of Sci.* (1873; 2nd ed., 1877); R. SHUTE, *Discourse on Truth* (1877); K. PEARSON, *Grammar of Sci.* (1892); L. T. HOBLHOUSE, *Theory of Knowledge* (1896); VENN, *Logic of Chance* (1866; 2nd ed., 1876), *Empirical Logic* (1889); COMTE, *Cours de Philos. Positive* (1839), and *Synthese Subjective*, i (1856). (R.A.)

**Empiricism**: Ger. *Empirismus*; Fr. *empirisme*; Ital. *empirismo*. (1) The doctrine that truth is to be sought in immediate sense experience. Opposed to RATIONALISM (q.v.) and usually a reaction from extreme idealism.

(2) In EPISTEMOLOGY (q.v.) the opposite of nativism in any form. With the English empiricists the doctrine took the form of denying innate ideas. See NATIVISM AND EMPIRICISM.

The tendency shows all grades of radicalness, from a wholesome reaction against unbridled speculation to the purest SENSATIONALISM and MATERIALISM (see those terms). See also EXPERIENCE, and EMPIRICAL LOGIC. (H.R.S.—J.M.B.)

**Empirio-criticism**: Ger. *Empiriokriticismus*; Fr. *empirio-criticisme*; Ital. *empirio-criticismo*. The philosophical system of Richard Avenarius. Besides the works of Avenarius, see Willy in *Vuljisch. f. wiss. Philos.*, xx. 57 ff.; and on the term, *ibid.*, xxii. 53 ff. The system is criticized by Wundt in *Philos. Stud.*, xii, xiii (1896-7). A new exposition and further development of the system

is J. Petzoldt's *Einführung in d. Philos. d. reinen Erfahrung* (1900-). (J.M.B.)

**Employer** [Fr. *employeur*]; Ger. *Prinzipal, Brodherr*; Fr. *employeur, patron*; Ital. *padrone*. A man who pays wages from funds which he either owns or borrows, as distinct from a superintendent who hires labourers at others' expense; especially one who hires large bodies of workmen on these terms.

The root 'employ' in this word does not have the simple meaning 'use'; it has the more complex meaning, 'give employment to.' There is no force in Henry George's remark, 'It is not capital that employs labour, but labour that employs capital.' (A.T.H.)

**Emulation** (in education): Ger. *Wetteifer*; Fr. *émulation*; Ital. *emulazione*. Desire and effort to equal or surpass another; imitative rivalry.

The Jesuits, who made the most extensive use of emulation as a principle of instruction, called it the 'whetstone of talent, the spur of industry.' In the lower schools they arranged the boys in pairs of rivals, each boy being constantly on the watch to catch his rival tripping, and instantly to correct him. Each class also was divided into two hostile camps called Rome and Carthage, which had frequent pitched battles (concertations) on set subjects. Remains of this system are still seen in competitive exercises between pupils, classes, and literary societies. Emulation as a principle should be much restricted, because of its powerful tendency to divert the mind from the real ends of study, and to direct it to unworthy personal ends.

*Literature*: HUGHES, Loyola and the Educ. Syst. of the Jesuits, 208-17; PAINTER, Hist. of Educ., 171-3; SCHMIDT, Gesch. d. Päd., 245. (C.D.E.G.)

**Enactment** [Lat. *en* + *actus*, from *agere*, to do]: Ger. (1) *legislative Genehmigung einer Acte, Gesetzzerlassung*, (2) *Verfügung, Verordnung*; Fr. (1) *action de passer une loi*, (2) *loi*; Ital. (1) *decretare una legge*, (2) *atto legislativo*. (1) The act of enacting a law. (2) The law enacted; a legislative act.

The form of English legislation is the preparation of a bill for an act, its approval by the Lords and Commons, and its presentation by them to the Crown for the royal assent. The American form is generally the same, the final act being the approval by the executive. The general style of the commencement of the bill is *Be it enacted*, that is, may it be enacted. The executive assent first makes it an enactment. (S.F.B.)