for a short time at a resting.light (method of Brücke, 1851), or that of fixating. a point while a light moves through the field of view (method of Purkinje), is employed. (C.L.F.)

Literature: E. Brücke, Pogg. Ann. d. Phys. u. Chemie, lxxxiv. 418; J. Purkinje, Beobacht. u. Versuche zur Physiol. d. Sinne; Hess, Pflüger's Arch., xlix. 190; Bosscha, Arch. f. Ophthal., xl. 1; Bidwell, Proc. Roy. Soc. Lond., lvi. 132; v. Kries, Zeitsch. f. Psychol., ix. 81, xii. 181, xix. 175; and v. Graefe's Arch., xlii. (3) 95; Hess, v. Graefe's Arch., xl. (2) 259, xliv. 445; Hamaker, Zeitsch. f. Psychol., xxi. 1; Young, Munk, as cited above. Also see Sanford, Course in Exper. Psychol., expt. 160; Charpentier, Comptes Rend. (1891), cxiii. 147 (referring to communication to the Soc. de Biol., Mar. 10, 1900, 217, 278); and Arch. de Physiol. (1892), 541, 629; Titchener, Exp. Psychol. (1901), expt. 4. (C.L.F.–E.B.T.–J.M.B.)

Redeemer [Lat. *redimere*, to redeem]: Ger. *Erlöser*; Fr. *Rédempteur*; Ital. *Redentore*. The term applied to Jesus Christ as the rescuer and saviour of men from sin and its effects. Applied in a. secondary sense to religious prophets in general. (A.T.O.)

Redemption [Lat. *redemptio*, from *redimere*, to redeem]: Ger. *Erlösung*; Fr. *rédemption*; Ital. *redenzione*. In Christian theology, salvation from sin and its effects through the atoning work of Jesus Christ.

Redemption is a name for the scheme of Christian salvation as a whole.

Literature: see Atonement, and Conversion. (A.T.O.)

Redintegration [Lat. *re + integratio*, from *integer*, whole]: not in use in Ger. and Fr.; Ital. *reintegrazione*. The reinstatement of a total presentation by a partial constituent of it.

Hamilton first introduced this term. He recognizes two fundamental laws of reproduction. The first is that of 'repetition,' which he states as follows: 'Thoughts coidentical in modification but differing in time tend to suggest each other.' The second is that of redintegration: 'Thoughts once coidentical in time are, however different as mental modes, again suggestive of each other, and that in the mutual order which they originally held.' He adds by way of explanation that unity of time involves a totality of thought, 'and that the partial thoughts included in the totality tend immediately to suggest each other as co-constituents of this former whole, and mediately that whole itself.'

When Hamilton says that the whole is only mediately reproduced because the parts are immediately reproduced, he seems to deprive the term redintegration of all distinctive meaning. It is not clear from this point of view that there is any advantage in substituting it for the more familiar 'association by contiguity.' On the other hand, there is a clear gain if the term be taken to denote the tendency of the part to reproduce the whole *as such*, including not merely the other partial constituents, but also their special mode of combination with itself and with each other.

The term redintegration is used by Shadworth Hodgson for associative reproduction in general. He does not, like Hamilton, recognize a distinct law of repetition.

Literature: Hamilton, Ed. of Reid, ii. Notes D**, D***; S. Hodgson, Met. of Exper. (Index, sub verbo). (G.F.S.)

Reductio ad absurdum [Lat. trans. of Aristotle's ἀπαγωγὴ εἰς τὸ ἀδύνατον]. The disproof of a proposition by showing that among its consequences there is one which is impossible or simply false.

This mode of proof is generally considered to be unsatisfactory, as not showing on what general principle the proposition disproved is false. But it is very easy to convert any such proof into a direct proof. Take, for example, the seventh proposition of the first book of Euclid, that on the same side of the base AB two triangles ABC and ABD cannot exist having $AC = AD$ and $BC = BD$. Euclid proves this by showing that if there were two such triangles it would follow that the angles BDC and BCD were equal and also that they were unequal. But precisely the same steps of reasoning show that if there are two triangles ABC and ABD on the same side of AB, and if $AC = AD$, then BC is unequal to BD, which shows that there are not two triangles having $AC = AD$ and $BC = BD$, since things unequal are not equal. (C.S.P.)

Reduction [Lat. *re + ducere*, to lead]: Ger. *Zurückführung*; Fr. *réduction*; Ital. *riduzione*. (1) The process of bringing an object from its given form into some standard form or state, for purposes of clearness, certainty, or use.

(2) In logic, the process of bringing a syllogism into the standard form of the first figure.

Thus a syllogism of the second figure, such as

> No P is M
> No S is P,
> ———————
> No S is M

may be reduced to the first figure by simply converting the first premise.

In dealing with the syllogism (*Anal. Prior.*, Bk. I), Aristotle regards the first figure as the complete or 'perfect' type of syllogism. The two other figures of syllogism recognized by Aristotle require, in order to make perfectly clear their actual force, the addition of immediate inferences from the premises, or other alteration of their structure, whereby they come to be stated in the first figure. These additions Aristotle states at some length. The devices for the reduction of the incomplete syllogisms, or of those of other figures, to the form of the first figure, were later developed in the textbooks of logic into a series of rules, kept in mind through mnemonic devices. Recent psychology has very generally tended to vivify these formal rules for reduction by efforts at new statements of the fundamental nature and of the true form of the syllogism. (J.R.)

Reduction has been recognized as necessary by Aristotle and almost all logicians; and before Kant it was generally recognized as proving that indirect syllogisms involved two or more steps of inference. But Kant from the same premises inferred that reasoning in the first figure is the only reasoning; and this extraordinary conclusion is reached by simply not calling immediate inferences reasoning, because they have not two premises. On that ground, nothing ought to be called reasoning except uniting two propositions into one copulative proposition. Cf. Syllogism.

Reduction is either *ostensive* or *apagogical* (*per impossibile*). Ostensive reduction proceeds directly from the premises of the syllogism to be reduced to its conclusion, by means of conversions and a direct syllogism. Apagogical reduction proceeds indirectly by showing by direct syllogism that from the denial of the conclusion of the syllogism to be reduced and one of the premises the denial of the other premise would follow. Any syllogism of the second figure and any of the third except Darapti and Felapton (which are not valid if the universal be taken in the Philonian sense) can be apagogically reduced.

Ostensive reduction is either short or long. Short reduction involves the conversion of one proposition only; long reduction the conversion of two propositions; and, except in the fourth figure, the transposition of the premises.

In order to ascertain that which reduction is intended to ascertain, the nature of the different moods of syllogism, the first requisite is to recognize that we do not seek to trace out the process of reasoning; but what we seek to do is to analyse the precise logical conditions which render each mood valid. When this is recognized, it becomes easy to see and to generalize the relations expressed by the premises and note just at what point they cease to be cogent. For this purpose, appeal must be made to the logic of Relatives (q. v.). De Morgan has worked out the moods (*Cambr. Philos. Trans.*, x. 350). (C.S.P.)

Reduction-division: Ger. *Reduktionstheilung*; Fr. *division réductionnelle*; Ital. *divisione riduttiva*. The special form of Cell Division (q. v.) which results in the formation of gonads (male or female elements).

As gonads have half the number of chromosomes found in the somatic cells of a given species, whenever gonads arise from cells there must be effected a reduction of the number of chromosomes. This reduction is completed during the final division of the cells, hence the term reduction-division. When the male or female nuclei fuse in the process of fertilization, the chromosomes are again brought up to their usual number. See Sex, Chromosome, and Fertilization.

Literature: Henneguy, La Cellule; E. B. Wilson, The Cell in Devel. and Inheritance; Hertwig, Die Zelle. (C.S.M.)

Reduplication: see Recurrent Resemblance under Resemblance.

Reduplication (in biology): see Segmentation.

Reflection [Lat. *reflectio*, from *re + flectere*, to bend]: Ger. *Reflexion*; Fr. *réflexion*; Ital. *riflessione*. (1) In popular language, any train of thought following a first impulse to believe or act, and reversing, modifying, or confirming it.

(2) Its technical meaning in psychology may be stated in the words of Locke: 'That notice which the mind takes of its own operations and the manner of them' (*Essay*, i. 78, § 4).

Reflection, in its psychological use, has a narrower application than 'self-consciousness,' and a wider than 'introspection.' All awareness of the self with its states comes under Self-consciousness (q. v.). But such awareness is not reflection unless interest and attention is predominantly directed to the self and its state. When I fail to hit a mark with a missile I become aware of myself as disappointed, and to that extent I am self-conscious. But I may not stay to think about my subjective state. On the contrary,