'In experiments carried on at the Woods Holl Biological Laboratory, Loeb finally succeeded in rearing large numbers of perfect larvae from eggs which, without fertilization, are first treated with a weak solution of magnesium chloride and then transferred to normal sea-water. Carried out under rigidly controlled conditions, these decisive experiments show that the egg is capable of complete development, without union with a spermatozoon, as a result of chemical stimulus; and they indicate that even in normal fertilization we must regard the stimulus to development as being given by a specific substance or substances carried by the spermatozoon. Loeb's highly interesting further experiments, together with the slightly earlier ones of Herbst, indicate that the normal equilibrium of the egg depends upon an equilibrium of chemical conditions in the protoplasm which is maintained by the conditions of the environment. The experiments give ground for the remarkable conclusion that the substances dissolved in the sea-water are individually poisonous to the egg, but are normally so balanced as to neutralize one another's injurious effects and maintain the equilibrium of the egg. If this armed neutrality be disturbed the egg responds, undergoing degenerative changes, and dying if the change be too violent, passing through an abnormal development and giving rise to monstrous embryos if the new conditions be less unfavourable, but under appropriate stimulus being, as it were, released from bondage, and rendered free to run its normal course of development.

'It is certain that new results of the highest interest, relating to the chemical conditions in living matter, may be looked for along the lines of research thus opened. One of the most interesting specific problems in this direction is the long-standing one of sex-determination. Experiments on insects, frogs, and rotifers have already given good ground for the conclusion that sex is in these cases determined by conditions of nutrition, which again in the long run are reducible to chemical conditions. The possibility is thus opened that we may yet succeed not only in fertilizing the egg by chemical means, but also in rendering the organism male or female by analogous methods. A highly interesting question, still undetermined, is whether organisms produced by artificial parthenogenesis, as above, are capable of reaching the adult condition and of further reproduction. Individuals thus produced lack the paternal nuclear material, and must possess but half the normal number of chromosomes. What the ultimate result of this deficiency may be is still a matter of conjecture.'

The statement ventured just above that 'individuals thus produced must possess but half the normal number of chromosomes,' has since been experimentally demonstrated by Wilson (*Proc. N. Y. Acad. Sci.*, 1901). (J.M.B.)

*Literature*: R. Owen, Parthenogenesis (1849); A. Brauer, Zur Kenntniss der Reifung des parthenogenetisch sich entwickelnden Eies von Artemia Salina, Arch. f. mikr. Anat., xiii (1893); von Siebold, Wahre Parthenogenesis (1856); T. H. Huxley, On the Agamic Reproduction of Aphis, Trans. Linn. Soc., xxii (1858); Y. Delage, Structure du Protoplasma, Biol. Gén. (1895). (C.Ll.M.)

**Partial** [OF. *parcial*, borrowed from the L. Lat. *partialis*]: Ger. *partiell*; Fr. *partiel*; Ital. *parziale*. Incomplete, or affecting a part.

*Partial abstraction*: the abstraction of one integrant part from others.

*Partial cause*: a cause which is joined with others of its own species in causing that which is caused.

*Partial conversion*: Aristotle's ἀντιστρέφειν ἐν μέρει is the conversion of a proposition, whether universal or particular, into a particular proposition.

*Partial method*: a method applying to a part of a science.

*Partial term*: a term of a proposition, such that not every object it denotes need be examined to verify the proposition (De Morgan, *Syllabus*, § 17). The *Century Dictionary* defines it as an undistributed term, which seems to come to the same thing. (C.S.P.)

**Partial Tones**: Ger. *Partialtöne*; Fr. *tons partiels*; Ital. *suoni parziali*. The simple constituents of a Compound Tone (q.v.), inclusive of the fundamental. Cf. Overtone, and Timbre. (E.B.T.)

**Particular** [Lat. *particularis*, singular]. In untechnical language, applied to single cases coming under general heads and occurring, or supposed to occur, in experience; in this sense it is also a substantive. The particulars are the experientially known circumstances of general nature, but as they appear in the individual case.

A particular Proposition (q.v.) is one which gives a general description of an object and asserts that an object to which that description applies occurs in the universe of discourse, without asserting that it applies to the whole universe or to everything in