paroxysmal insanity is sometimes applied to a cerebral disturbance, probably epileptic in nature, in which attacks of insanity come on suddenly and are followed by variable intervals of almost normal mental conduct. Cf. EPILEPSY, HYSTERIA, and PERIODICITY. (J.J.)

Parsimony (law of) [Lat. *parsimonia*, frugality]: Ger. *Sparsamkeit*; Fr. *parcimonie*; Ital. *parsimonia*. Ockham's razor, i. e. the maxim 'Entia non sunt multiplicanda praeter necessitatem.' The meaning is, that it is bad scientific method to introduce, at once, independent hypotheses to explain the same facts of observation.

Though the maxim was first put forward by nominalists, its validity must be admitted on all hands, with one limitation; namely, it may happen that there are two theories which, so far as can be seen, without further investigation, seem to account for a certain order of facts. One of these theories has the merit of superior simplicity. The other, though less simple, is on the whole more likely. But this second one cannot be thoroughly tested by a deeper penetration into the facts without doing almost all the work that would be required to test the former. In that case, although it is good scientific method to adopt the simpler hypothesis to guide systematic observations, yet it may be better judgment, in advance of more thorough knowledge, to suppose the more complex hypothesis to be true. For example, I know that men's motives are generally mixed. If, then, I see a man pursuing a line of conduct which apparently might be explained as thoroughly selfish, and yet might be explained as partly selfish and partly benevolent, then, since absolutely selfish characters are somewhat rare, it will be safer for me in my dealings with the man to assume the more complex hypothesis to be true; although were I to undertake an elaborate examination of the question, I ought to begin by ascertaining whether the hypothesis of pure selfishness would quite account for all he does. (C.S.P.)

Part: see WHOLE AND PART.

Parthenogenesis [Gr. *παρθένος*, a virgin, + *γένεσις*, production]: Ger. *Parthenogenese*; Fr. *parthénogénèse*; Ital. *partenogenesi*. Development of a new individual from an ovum which has not been impregnated. It is a special form of asexual reproduction, and has been observed chiefly among arthropods (insects and crustacea). (C.S.M.)

The facts of parthenogenesis have long been known, and were discussed by Richard Owen, to whom we owe the term. They are illustrated by the male (drone) of the hive bee, which develops from an egg which is not fertilized, but otherwise resembles the eggs from which queens (fertile females) and workers (generally infertile females) are developed. Its origin and its connection with the phenomena of the maturation of the ovum and of the extension of the polar bodies have occupied much attention of recent years. Cf. ALTERNATION OF GENERATIONS, POLAR BODY, and AGAMOGENESIS. (E.S.G.)

The term 'artificial parthenogenesis' has been applied to recent results of artificial fertilization. E. B. Wilson (*Int. Monthly*, July, 1900) describes these results as follows:

'Foremost in interest stands the recent discovery of Loeb that the egg may be fertilized by chemical stimulus, without participation of the male element. The first definite experiments on the effect of chemical solutions on the egg were made by the Hertwig brothers thirteen years ago, and have been continued especially by Herbst, Richard Hertwig, Morgan, and Loeb. The experiments of Herbst, in particular, gave an almost startling revelation of the profound effect upon the egg produced by apparently insignificant alterations in the chemical environment. If, for example, the eggs of sea-urchins be allowed to develop in sea-water containing a very slight excess of potassium chloride, the development of the embryo is greatly altered, no skeleton is formed, and a larva results which, though living and vigorous, is of widely different form from the normal ones. If, in place of potassium chloride, lithium chloride be added to the water, the changes are still more remarkable, the embryo never infolding the cells which normally give rise to the alimentary canal, but developing, as it were, inside out. These monstrous forms are of course incapable of nourishing themselves, and ultimately perish; but the result is of high interest as opening the possibility of creating wholly new organic forms by varying slightly the conditions of development. The way for Loeb's discovery was paved by the experiments of Richard Hertwig and Morgan, who showed that if unfertilized eggs be treated by weak solutions of various substances, such as sodium chloride, magnesium chloride, or strychnine, they undergo some of the preparatory changes of division, and Morgan showed that they might actually divide, though without producing an embryo.