

rt (1883–1971), who argued was almost entirely under id that inherited intelligence rson's social position. In methods have been revived psychologist Arthur Jensen ted in 1969 that American over average scores in cer- an whites because of genetic s claims made a tremendous where there was much con- ts, and where *behaviourist a new version of Enlighten- lism, based on the teachings 78–1958) and B. F. Skinner ne well established in psy- ucational circles. Jensen's long-standing disagreement hools into a raging con-

en's claims, critics of e pointed out that continuity does not entail a negative a) above, nor even a positive and that the hereditarians' etics is open to various em- logical objections.

differences.

BIOGRAPHY
1 (eds), *The I.Q. Controversy* (New 977).

BJN

See environment; environ- troversy.

ery of enzymes (or 'soluble rtant in prompting chemi- ological phenomena in the 33 Payen (1795–1871) and ind that an alcohol precipi- xtract of malt retained the rch paste. In the following hat an extract of stomach stion *in vitro*, and in 1836 These biological examples ositions effected by ap- materials were linked to a chemical *reactions of the the 'contact' action of and the effect of sulphuric ion of alcohol into ether rzelius (1779–1848) in- talysis to include all such explaining the mechanism

involved. An explanation of ferment action was provided by Liebig (1803–73), who argued a decomposing nitrogenous substance could transfer this change to the substrate via transmitted vibration. Despite Berthelot's (1827–1907) discovery of the intracellular enzyme invertase in 1860, soluble ferments were normally considered to play only a small part in *metabolism, being especially involved in digestion. Although a few workers main- tained the primacy of enzymes in general metabolism, the late 19th century paid more attention to theories based on *protoplasm and the intactness of the living *cell. Such con- siderations found support in Pasteur's (1822–95) work on alcoholic *fermentation. Buchner's (1840–1917) discovery of cell-free fermentation encouraged the possibility of dissecting out the metabolic processes in terms of enzyme chemis- try. This impetus could be capitalized on only after improved techniques for *purification and isolation became available (the first *crystalliza- tion of an enzyme was that of jackbean urease by Sumner (1887–1955) in 1926), facilitating study of individual enzymes. However, even before this numerous valuable contributions were made, including early studies of chemical kinetics, and Emil Fischer's (1852–1919) work on the 'lock and key' stereospecific interaction of enzyme and substrate.

NM

ephemerides. See Babylonian and Egyptian astronomy.

epicycle. See *Ad hoc* hypotheses; Kepler's laws; Ptolemaic astronomy.

epidemic constitutions. See contagion.

epigenesis/preformation. William Harvey (1578–1657) first used 'epigenesis' in his *De Generatione Animalium* (On the Generation of Animals, 1651) to argue the *germ material gains form gradually. Harvey believed that all animals must have a uniform pattern of *generation which must begin with the egg, or 'ex ovo omnia'. This egg begins to develop when the male semen activates it by exerting some immaterial or vital influence, resulting in epigenetic *development.

Late 17th-century naturalists responded with versions of preformation, which urged that the organism exists preformed in the germ. Mar- cello Malpighi (1628–94) advocated that

development involves an unfolding of the pre- existent form. Then the *ovists and animalculists developed rival theories of *en- capsulation, or preformation, prevailing until the late 18th century when Caspar Friedrich Wolff (1734–94) called for a return to epigenesis.

Karl Ernst von Baer (1792–1876) provided a detailed discussion of general principles and a description of early stages of development. He demonstrated form emerges only gradually. With corroboration from studies of different organisms by the mid-19th century, epigenesis was accepted.

In the late 19th century the debate shifted. Microscopic studies of cytology led to theories that development was directed by the *germ plasm and that form pre-existed in the inherited material – but only in a potential way [*heredity]. The form itself was not seen as ex- isting in the germ; rather the information was there. Form emerged gradually as the inherited information directed development. The debate gave way to specialized efforts by embryologists and geneticists [*genetics] to analyse the way in which inheritance and embryonic development mutually contribute to the resulting organism.

JM

epilepsy. A group of disorders characterized by episodic seizures and disturbances of *con- sciousness. Its dramatic *symptoms led the Greeks to call it the 'sacred disease', the *Hipp- ocratic treatise of that name aggressively claim- ing it an ordinary disease, caused by a blockage of phlegm (one of the *humours) and treatable by drugs and *diet instead of prayers and incan- tations [*therapeutics]. Epilepsy was thus a *brain disease, the brain being the source of pleasure and pain, *sensation, thought and madness. Despite the treatise's critical *natural- ism, attitudes to epileptics continued am- biguous. Commonly *classified with insanity [*mental disease] (the Greeks stressed the ten- dency of *melancholia to lead to epilepsy), epilepsy attracted a rich Mediaeval saints' lore. Paracelsus (c1493–1541) invoked the *microcosm–macrocosm analogy, comparing epilepsy to a thunderstorm. Doctors from the 17th century interpreted it within more general theories of *nervous system function. By the 19th century epileptics were commonly incar- cated in lunatic asylums, J. E. D. Esquirol (1772–1840) counting 389 in the Salpêtrière in