

ogy. See community; evolution and society; functionalism;ocosm.

In the late 18th century, including Johann Blumenbach, L.-M. Daubenton (1716–1800), de Jussieu (1748–1836) and (1748–94) concluded the marshing living from inanimate *ization*, possessed by only the believed this difference more the *animal/vegetable disating the division of *Nature rable kingdoms. Emphasis on al similarity of plants and 19th-century naturalists to a pt of *life, the study of which gy.

omical investigations did not organizational complexity for als, botanical functions such th, and reproduction seemed particular to demand some nization in plants. Plants as ere presumed to have organs nt functions.

8th century organization was to the *natural order of Jussieu used the idea of f characters for classifying rges Cuvier (1769–1832) otiste Lamarck (1744–1829) the key to his classificatory g the natural order of both was in each case best repre- of increasing complexity of er's major systematic treatise, *Animal distribué d'après son Animal Kingdom Arranged*, 1817, denied animals could ries, identifying instead four plans of animal organization.

RWB

id 1900 embryologists asked l *development depends only e *fertilized *egg cell or also rs. Within *developmental estion became: is the organ- ating or dependently dif- development *epigenetic or

s (1869–1941) classic experi- ese questions. Transplanting

pigmented tissues from one embryo to another he traced the relative contributions of each. In 1924, with Hilde Mangold, he discovered that the dorsal lip of the blastopore transforms the material it touches, serving as an organizer for development. Each stage of development is thus necessary to direct the next.

JM

orogenesis. See mountains.

Orsted's effect. See electricity and magnetism.

orthogenesis. An evolutionary term coined by Wilhelm Haacke (1855–1912) and used by T. G. H. Eimer (1843–98) to describe and account for rectilinear trends in *evolution over long periods of time. Such trends, exemplified in cases like the hypertrophy of antlers of the *extinct 'Irish elk', were variously explained as due to the steady interaction of the organism with the *environment, the effect of *natural selection on spontaneous *mutations, or the existence of an internal, perfecting principle [*teleology]. The idea of steady progressions in the *fossil record explicable by orthogenesis was criticized by George Gaylord Simpson (b 1902) and now has little support.

RWB

osmosis. The passage of solvent into a *solution through a barrier impermeable to *molecules of the solute. This phenomenon, though previously noted, was first investigated scientifically by Jean Nollet (1700–70) in 1748. More systematic experiments by René Dutrochet (1776–1847) in the 1820s and 1830s, and by Thomas Graham (1805–69) and Justus Liebig (1803–73) in the 1840s and 1850s did not lead to a satisfactory theory. In 1877 Friedrich Pfeffer (1845–1920) published measurements of osmotic pressure, showing it directly proportional to *concentration (and hence inversely to absolute temperature, i.e. $PV = kT$). In 1885, Jacobus van't Hoff (1852–1911) related this constant, k , to the universal *gas constant R , and further demonstrated other gas *laws were quantitatively applicable to dissolved substances after allowing for their tendency to *dissociate into *ions, as suggested by Svante Arrhenius (1859–1927) in 1887. Osmosis could now be explained by a general physicochemical theory of solutions, while its crucial role in animal and plant physiology became better understood

following the parallel studies of Hugo de Vries (1848–1935) and others [*transpiration].

MAS

ostensive definition. Definition by showing or pointing. So, to define 'red' ostensively is to provide samples of red things. The theory of ostensive definition was proposed to escape the circle of defining words in terms of other words, where the definiendum can be understood only by someone already understanding the definiens, and misunderstanding of the latter must lead to misunderstanding of the former. Ostensive definition was once widely accepted as the most basic kind of definition, and as inherently uncomplicated and unambiguous. However, since the work of Ludwig Wittgenstein (1889–1951) many philosophers believe ostensive definition itself presupposes much prior understanding, without which it is by no means unambiguous, ostensive definitions being as open to misunderstanding as any other kind. See also metalanguage v object language.

JRR

oviparous generation. See generation.

ovism/animalculism. Ovists maintained, in the late 17th and 18th centuries, the offspring of an organism exists *encapsulated in that organism's egg. The view arose after Regnier de Graaf (1641–73) discovered what he thought was the mammalian *egg. In fact he had not seen eggs (very small and discovered only in the 19th century), but the supposed egg gained considerable attention. Since it was passed on from parent to offspring, it was assumed that the offspring's form exists *preformed in that *germ.

In 1677, when Antony van Leeuwenhoek (1632–1723) discovered *spermatozoa, emphasis shifted to the male germ as the site of preformation. The spermatozoa, or animalcules, were thought by Animalculists to contain in miniature future generations. Nicolaas Hartsoecker (1656–1725) propounded the idea of the homunculus, a tiny man supposed to be embodied in the sperm.

Debate between Ovists and Animalculists continued through the 18th century. Only around 1800 did such preformationism receive serious challenges from *epigenesists.

JM