

STIMULUS AND MEMORY.

Die Mneme als erhaltendes Prinzip im Wechsel des organischen Geschehens. By Richard Semon. Pp. xiv+353. (Leipzig: Wilhelm Engelmann, 1905.) Price 6s. net.

LITTLE as it may appear from the title, this work is really an inquiry into some of the remoter effects of stimulation. Thus, every stimulus applied to organic substance—whether that substance be nervous, or not nervously differentiated—produces not only its appropriate reaction, but also an altered condition of the substance itself, so that even when the immediate effect of the stimulation has subsided, the second “condition of indifference” is different from the first. The substance may now, for example, readily react to stimuli which before were insufficient to produce any appreciable effect, or it may respond to a stimulus connected only by association with the stimulus usually necessary. It pleases this author to read and group these facts anew, and to apply to them a terminology that will correspond with the novelty of the grouping. Hence he calls the enduring effect of the stimulus an *engramm*; the stimulus is said to operate *engraphically* on the substance, or to produce an engraphic alteration. Again, when stimulus B, differing in quality or quantity from stimulus A, still succeeds with the aid of the *engramm* in producing a reaction appropriate to A, it is said to operate *ecphorically*, or the new state of excitation is said to be produced by the *ecphory* of the *engramm*. Obviously ordinary memory may be brought under this wide class of phenomena, and the author might have used the term memory to describe these facts; but, to avoid misunderstanding, he has chosen the term *mneme* instead. Hence we read of such things as *mnemic* excitation, e.g. in the case mentioned above when stimulus B is applied.

The situation is well summed up on p. 89:—

“We recognise the presence of an *engramm* by the circumstance that for the discharge of the appropriate reaction the appearance of the original unaltered stimulus is no longer necessary, but the appearance either of the original stimulus altered quantitatively or qualitatively, or of a stimulus which works *ecphorically* on an associated *engramm*, or the expiration of a definite period of time (*chronogenous ecphory*), or finally the appearance of a definite phase of development in the continuous series of successive generations (*phasogenous ecphory*).”

Herr Semon on these lines proceeds to discuss the facts of acclimatisation and instinct, the inheritance of acquired characteristics, and the like, and to translate them into his peculiar language. Thus, when according to Mr. Claypole (as reported by Prof. Lloyd Morgan) young ostriches hatched in an incubator pick up food thrown before them only after someone has “dabbed” with his finger on the ground in their presence, our author’s interpretation is that we have here the *ecphory* of an inherited *engramm*, an *engramm* the appropriate reaction of which is pecking; the *ecphoric* stimulus in this case is the return of the primary stimulus (pecking on the part of the mother hen) altered to some extent qualitatively.

The limits of space forbid a full account or discussion of many interesting questions raised by Herr Semon. In the second part of the book he deals with the mutual relations of *engramms*, their localisation, the *mnemic* conditions of excitation, and *mnemic* homophony. By *mnemic* homophony is meant “the process by which *mnemic* excitation and fresh original excitation are, so to speak, made to coincide, and by which each disagreement between the two produces a perceptive reaction.” The third part discusses the reality of *mnemic* processes in “*ontogenesis*.” In the fourth the author deals with various objections, and claims for *Mneme* that it is a necessary preservative principle which protects the transformations continually produced by the external world. He claims, also, that it helps us to an understanding of the law of which Haeckel is the unwearrying exponent, viz. that the individual passes through the same stages of development as the whole species to which it belongs.

The author seems a competent reasoner and observer. His work is interesting and suggestive, and opens a fruitful field for discussion.

ECONOMY IN THERMAL POWER PLANTS.

Commercial Economy in Steam and other Thermal Power Plants as Dependent upon Physical Efficiency, Capital Charges, and Working Costs. By Prof. Robert H. Smith. Pp. xxiv+291; with numerous diagrams by H. Malcolm Hodson. (London: Constable and Co., Ltd., 1905.) Price 24s. net.

THE aim of this work is to deduce sufficiently accurate laws for determining the most efficient power plant when all-round economy is taken into account. For this purpose it is necessary to determine a standard of economy, and this is fully discussed in the opening chapter, where a coefficient is defined depending upon the value of the product directly and on the cost and time inversely. The application of this standard to measure the efficiency of production is applied to some examples, and the results of the analyses are considered in detail. After a discussion of the properties of steam, the efficiencies of engines and boilers, and questions of a kindred nature, the author proceeds to deal with the interesting question of the cost of various forms of thermal power plant.

The data for this chapter have been drawn from various sources, principally from makers’ catalogues, and are exhibited in graphical form for heat engines by plotting capital or annual costs as ordinates against final cylinder volumes or brake horse-power as abscissæ. In this way very interesting relations are established, which can generally be approximately represented by straight-line laws with sufficient accuracy to form a fair estimate of cost. Thus for Crossley gas engines up to 500 horse-power with Dowson gas producers, the capital cost, including the building, is given as $300+10.8T$, where T is the