physical stimuli from various regions of a growing embryo are thought to determine the formation of the parts of its nervous system. Kappers says: "In the case of material alterations in the nervous system, only simultaneously associated influences cause the selection . . . simultaneous (or immediately successive) stimulations bring about not only mental associations but also material connexions in the nervous system" ("Three Lectures on Neurobiotaxis and other Subjects", p. 19).

It appears from the experimental work of Pavlov, Kappers, and other workers, that both the development of the nervous system and the function of its highest part, the cerebral cortex, are dependent fundamentally upon the occurrence of physical stimuli associated with each other in space and time. The importance of this conception for science is obvious. Since the mind is dependent upon the activity of the cerebral cortex, these recent theories of its development and function may not be below the consideration of philosophers.

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The Neon Lamp as a Glow Relay.

THE ordinary 'Osglim' neon lamp as made by the General Electric Co., Ltd., forms a convenient and sensitive glow relay if furnished with a third electrode which may take the form of a strip of metal foil 1½ in. wide, pasted on the outside of the lamp to surround the internal electrodes. The type of 'Osglim' lamp most suitable is that known as the beehive, in which the electrodes take the form of a disc and spiral.

This form of glow relay is sometimes conveniently used in conjunction with a photo-electric cell, to indicate when a required light intensity is falling upon the cell.

The disc electrode of the lamp is connected to the negative end of a battery, and the voltage adjusted on the spiral until the glow discharge is just avoided; usually about 132 volts is sufficient.

The external electrode of the neon lamp is connected to the cathode of the photo-electric cell, and the anode of the cell to a suitable positive tapping on the same battery. Illumination of the cell will then promote discharge within the neon lamp passing sufficient current to operate a magnetic relay.

The glow relay with the external third electrode enables two circuits to be kept entirely separate from one another. Not every 'Osglim' neon lamp is suitable, due to variations in the insulation resistance and probably also to less suitable gas pressure.

These neon lamps also exhibit a photo-electric property; if the voltage on the third electrode is just raised sufficiently to produce the discharge, illumination of the electrodes by, say, a gas-filled lamp will prevent but not discontinue the discharge.

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'Digging' in Rowing.

IN most cases where a solid moves through a fluid, the total force of the fluid on the solid is nearly opposite to the direction of relative motion. There is an exception in the case of a flat body such as an aeroplane wing, with its plane at a small angle to the direction of relative motion, and provides the means of keeping the aeroplane up. If, however, the plane is too steeply inclined to the direction of motion, the force is again, as in ordinary cases, nearly against the motion, and we have the condition of 'stalling'.

In rowing, the object is the opposite one, to keep the force as far as possible against the relative motion; but it seems to be worth while to point out that an oar can be turned into an aeroplane. Imagine the blade inserted thus, and moved from right to left, the blade being slightly inclined to the surface of the water. Then the same theory applies as for an aeroplane wing, except that the leading edge is now the lower one. Hence the force due to the water is *downwards*. But the force due to the oarsman's pull is in the direction of motion, and no steady motion in a horizontal direction is possible. If, on the other hand, the blade descended vertically, the force due to the water would become a resistance acting upwards. It will be seen on a little consideration that the only possible motion is an accelerated one nearly in the plane of the blade, and resisted almost only by skin friction. Thus the oar will rapidly shoot down to a considerable depth, while doing little to propel the boat.

The phenomenon is, I understand, not unfamiliar to oarsmen, especially when the blade is left near the 'feathered' position when reinserted in the water.

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The Accuracy of a Moth.

THE square case made by the female of *Amicta quadrangularis* for pupation offers a good example of the ability for accuracy. The case is about 1·1 inch long, and 0·2 to 0·3 square, formed of bits of grass stem broken off, and built in courses around the larva. The diagram (Fig. 1) shows the mean size of the

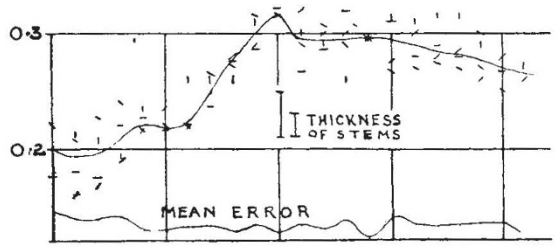

FIG. 1.

pieces beginning at 0·2 inch, widening to 0·32, and tapering to 0·27. The lengths of stem used on different sides are distinguished by four directions of the cross strokes. It will be seen that the mean error, separately drawn below, begins at 0·02 and diminishes to 0·01, while the thickness of the stems varies from 0·04 to 0·02 inch. The larva, therefore, makes an average error of only one-half the thickness of the stem, and estimates the required length for the position usually to 0·01 inch, including the error of cutting; this precision is kept up for nearly a hundred repetitions. A few layers near the beginning are omitted, as they overlap so that the ends are not clear. The habitat is in the desert of South Palestine about ten miles south of Gaza.

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