SCIENTIFIC APPARATUS AND LABORATORY METHODS

A KYMOGRAPH TIME-INTERVAL RECORDER

A KYMOGRAPH time-interval recorder is a valuable but not always available asset to any physiology laboratory. It is possible, however, to construct such an instrument at almost no cost. The device which we will describe possesses the decided advantage of recording one-half second intervals.

All extraneous parts such as case, face and alarm mechanism are removed from an ordinary alarm clock. It is not entirely necessary to remove this last. The mechanism is mounted by its frame to a wooden base with the balance and escape mechanisms at one end of the frame of the clockwork and not at the top or bottom.

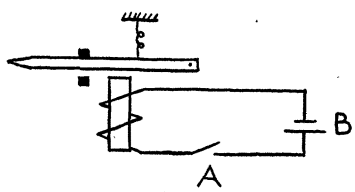

FIG. 1.

A brass wire about 0.2 mm in diameter is manipulated in the following manner: Wind it in from 3 to 5 coils, each having a diameter of about 5 mm, leaving 2 cm at one end and 10 cm at the other; bend the short end along the axis of the coil for 1 cm and the rest at right angles to this; bend the long end at right angles to both the coil and the last length of the short end. The arrangement of this wire is shown diagrammatically in Fig. 2.

Next, fasten the long end of the brass wire by means of a screw driven into the wooden base so that the straight part of the long end rises vertically and the last length of the short end just escapes the cogs of the escape wheel and is parallel to its axle in a horizontal plane. See Fig. 2.

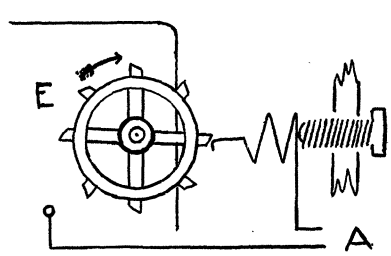

FIG. 2.

Mount a wooden panel to the base in such a manner that it rises vertically, is parallel to the axle of the escape wheel, and lies 1 cm from the coils of the brass wire. Drive a bolt through a close-fitting hole in the panel along the axis of the brass coil.

Wire the apparatus according to Fig. 2. (A) represents two terminals of the clockwork. One of these is taken from the brass wire where it is fastened to the base; the other is taken from the frame of the clock. These two terminals are wired in series with a signal magnet and a battery of sufficient electromotive force to operate the magnet (Fig. 1).

Now, if the bolt through the panel is used to spring the coil of the brass wire close enough to the escape wheel (E, Fig. 2) so that a light contact is made with each cog as it passes, a circuit will be closed regularly, causing the stylus of the signal magnet to make a stroke each time. Also, if the alarm clock used is constructed as most alarm clocks are, this circuit will be closed each one-half second.

Other panels can be used to enclose the clockwork in a box leaving one side hinged for winding. The terminals of this unit of the circuit can be wired to posts through a panel.

It will probably be necessary to calibrate the instrument by adjusting the hair spring.

The apparatus may be placed in some inconspicuous place and any number of signal magnets wired from it to remote parts of the laboratory.

Except for a periodic winding, this instrument requires no care and should record accurately for ordinary purposes.

GEORGE POUCHER, JR.
C. P. HICKMAN

DEPAUW UNIVERSITY

A MECHANISM FOR THE CONTINUOUS CIRCULATION AND AERATION OF WATER IN SMALL AQUARIA[1]

IN biological experimentation with aquatic organisms it is frequently necessary to keep the water agitated and aerated for considerable periods of time. Generally air is bubbled into the water while a stirring motor functions. This method is often unsatisfactory when the experiment is to continue for some time, for oil vapor is liable to enter the water with the air current; also, the stirrer tends to create strong currents which may interfere with the experiments. The mechanism here described eliminates these difficulties. It has been used by the author during two years with entire satisfaction. It may be kept in operation for weeks or months with little attention.

The aerating and circulating device consists of a small, motor-driven, centrifugal pump made of transparent celluloid $\frac{1}{8}$ inch thick (Fig. 1). The pump is similar in design to ordinary pumps of this type save that it is enclosed within a chamber from which it

[1] Published by permission of the Commissioner of Fisheries.