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Ciliary Currents in Oviducts of Turtles in Relation to Transportation of Spermatozoa.

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The oviduct of the painted turtle, *Chrysemys picta* (Schneider), measures about 15 cm. in length. The proximal two-thirds of it are concerned with the formation of the egg albumen, and the distal third with the production of the egg shell. The whole interior of the duct is ciliated. These cilia form 2 systems, one that covers most of the inner face of the duct and whose direction of stroke is toward the oviducal outlet—that is, away from the ovary (abovarian system), and a restricted system in the form of a narrow tract extending throughout the length of the duct with cilia beating toward the ovary (proövarian system). Living spermatozoa can make no headway up the oviduct against the beat of the abovarian cilia. Hence there is no ground for assuming that rheotaxis plays any part in the migration of the sperm. Neither does the muscular activity in the oviducal wall nor ciliary reversal contribute to this end. The spermatozoa are apparently transported from their region of deposit by the male near the oviducal outlet to the neighborhood of the ovary solely by the system of proövarian cilia, and this transportation of the sperm is doubtless the function of the proövarian cilia. The abovarian cilia keep the oviduct clear and help in part to move the eggs. Whether a proövarian system of cilia occurs in other reptiles than turtles, in birds or in mammals remains to be ascertained.

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An Automatic Drop Recorder.

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This drop recorder was designed to meet the requirements of perfusion and excretion experiments where a continuous record of outflow is desired. It differs in principle from the mechanical type of drop recorder in that the conductivity of the solution itself is employed to close the electrical circuit, thus avoiding completely the uncertain response produced by impact of the falling drops with a weighted or spring lever. It operates with solutions containing electrolytes even in low concentrations, *f. i.*, with Cleveland tap water, but it is not suitable for use with distilled water.

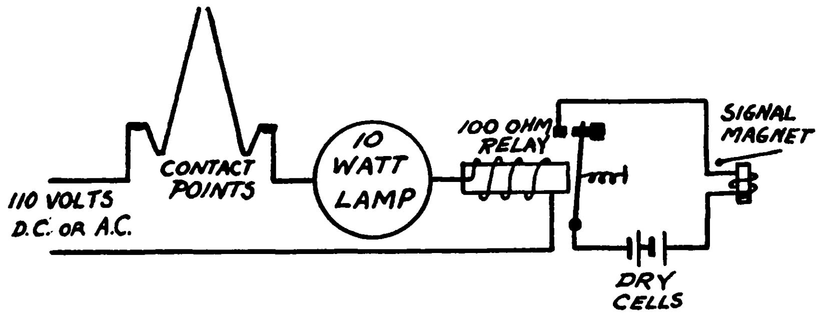

FIG. 1. Diagram of electrical circuit.

Fig. 1 illustrates the electrical circuit. The drops, as they pass the tips of 2 contact points, close a primary circuit which works a 100 ohm "pony" relay (*f. i.*, Cat. No. 573, J. H. Bunnel and Co., New York). A signal magnet is activated through the relay by 2 dry cells.

The relay is best operated by a direct current of 110 volts; but alternating current may be used if the height from which the drops fall is so adjusted that the latter make contact at the points for a time which is less than a half-cycle of the current (usually 1/120th second). A fall of 3 to 4 cm. will be found satisfactory if the points are properly adjusted. The 10 watt lamp is placed in the primary circuit to protect the relay in case the points should accidentally become short-circuited. If the solution used contains electrolytes equivalent to 0.9% NaCl or over, a 22½-volt current (from a radio "B" battery) may be used instead of the 110-volt current (in which case the lamp may be omitted) but the use of 110 volts as standard affords an apparatus of wide adaptability.

Fig. 2 shows a convenient holder for the contact points. The points (1) which are preferably of platinum wire (0.020 in. dia., No. 25 B & S gauge) are fixed by 2 machine screws in a bakelite shell (2) and are connected by means of insulated No. 18 copper wire through a brass tube (4) of optional length (*f. i.*, 5 cm.) to 2 binding posts (5) set in a bakelite disc on the end of the brass tube.

It is important that the points (1) be bent as shown in the diagram with the tips about 1 mm. apart; otherwise the fluid may produce a permanent short-circuit either at the tips or around the base

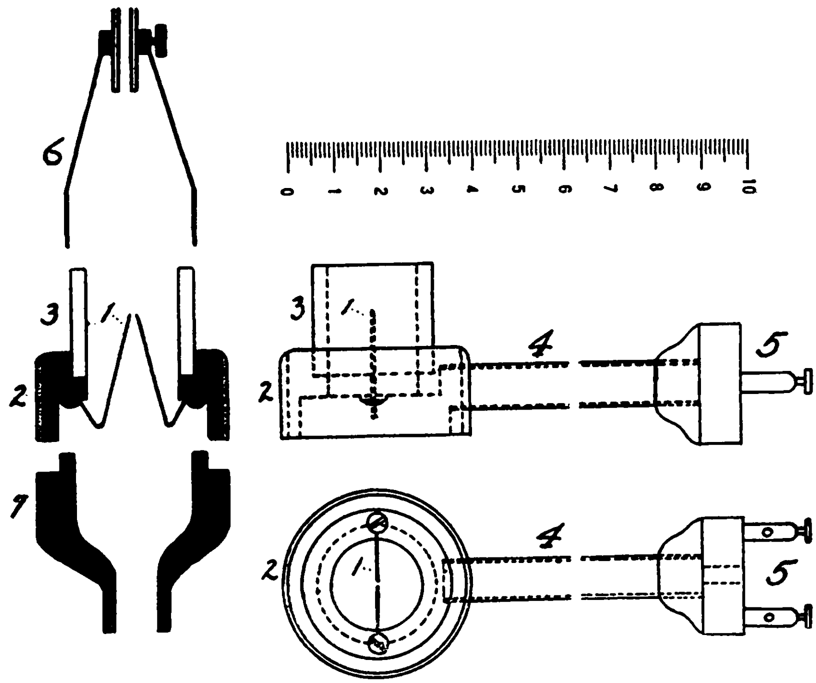

Fig. 2. Holder for contact points. Scale in millimeters.

of the shell (2). An aluminum sleeve is fitted tightly around the bakelite shell (2) to prevent splitting. All exposed metal on the under side must be covered with sealing wax or other insulating material. Into the top of the shell is fitted a glass tube (3) (from No. 000 Lunkenheimer oil cup) which serves to protect the points against accident. (The points may be easily adjusted from the bottom of the shell.) Above the glass tube is a support (6) which fits snugly over the tube (3) and serves to center and hold rigid the tube from which the drops originate. It consists of a split brass ring, to which is attached by means of 2 or 3 strips of 5 mm. spring brass a small collar, drilled to hold the "dropping tube" by means of a set screw. This comes to about the correct height for use with 60 cycle alternating current. Below the shell (2) is a bakelite drainage cup (7) which fits tightly into the shell and serves to drain the fluid into a rubber tube connected to the cup. A funnel may be used in its place. The brass tube (4) is used as a support for clamping the holder to a stand.

In practice, the lamp, relay and 2 dry cells (Fig. 1) are conveniently enclosed in a box 6x6x7 inches having appropriate binding posts for connection to the source of current, the contact points and the signal magnet.

During class demonstration of perfusion or excretion experiments, it has been found that the sound of the relay is a valuable adjunct to the visual record made by the signal magnet. If the relay itself does not click loudly enough, a telegraph sounder may be incorporated in the secondary circuit. Changes in rate of flow are easily impressed on the class by this method.

By using a signal magnet wound to 1000 ohms, the relay and lamp may be omitted from the circuit and the contact points connected directly in series with the signal magnet, using a 22½-volt B battery as the source of current. This latter circuit is not advised for general use inasmuch as it requires a specially made and rather delicate signal magnet. This can be made in the style of the Harvard signal magnet from the magnets of a radio headphone, substituting for the permanent horseshoe magnet of the phone a short bar of soft iron.

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Variations in Monocytic Response to Peroxydase Test.

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Naegeli[1] states that almost all, if not all, of the human monocytes are peroxydase reacting. The author[2] found no peroxydase-reacting monocytes in the blood of a rabbit. In a normal adult man there were present 3.4% peroxydase mononuclear phagocytes and 1.1% phagocytes that did not react to the peroxydase test. The conclusion was that the peroxydase cells of human blood are of myeloid origin, which is the view held by Naegeli. The negative phagocytes were thought to be the true monocytes derived from the reticular portion of lymphoid tissue. Recently some unpublished observations have brought me to a consideration of the alternative view, namely, that the peroxydase-positive phagocyte gets its granulation secondarily in a more or less accidental manner. The conclusions arrived at in this paper are based on tissue cultures of blood leukocytes.

Methods and Results: Numerous cultures of human blood were made by the coverglass method and examined by the peroxydase test

[1] Naegeli, O., *Blutkranheiten und Blutdiagnostic*, Berlin, 1923.

[2] McJunkin, F. A., *Arch. Int. Med.*, 1923, xxxvi, 799.