In a test series of photomicrographs of histological material, transparencies of excellent color rendition and density were produced, and the percentage of improper exposures was reduced to zero.

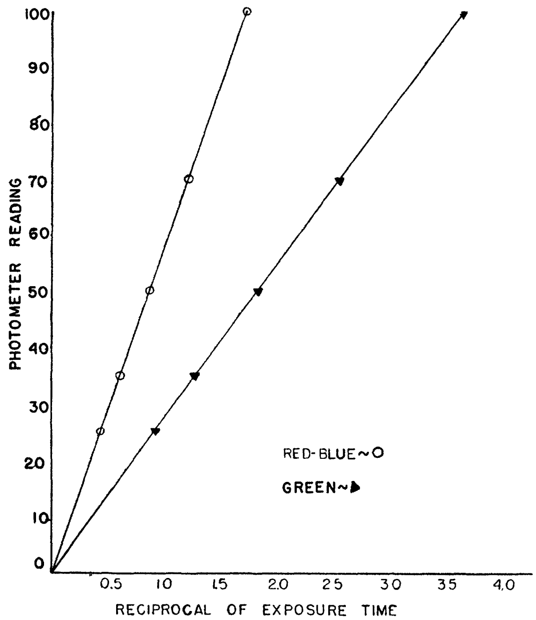

Fig. 1

This physical, nonsubjective method of exposure time determination in color photomicrography can be routinely used over a wide range of biological material.

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A Simple Electronic Electrolytic Drop Recorder

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The majority of drop recorders or drop counters in use today for the measurement of salivary secretion, urine output, and bile flow are of two fundamental types (*2*). One, the electromechanical type, which is available commercially, allows the drop to overbalance a bucket-ended lever, which in turn makes an electrical contact. With careful adjustment and continuous supervision, these drop recorders can be made to work satisfactorily with thin, watery fluids, like urine, but viscous secretions tend to stick to the bucket so that the system does not return to normal for ensuing drops. The other system is far more satisfactory. The drop serves to make contact between two electrodes, and a sensitive relay serves to actuate a writing lever (*1, 4, 5*). However, the very sensitive relays needed are liable to stick, and the high voltage requirement is hazardous. The current needed for more rugged relays corrodes ordinary electrodes rapidly so that they are soon inoperable.

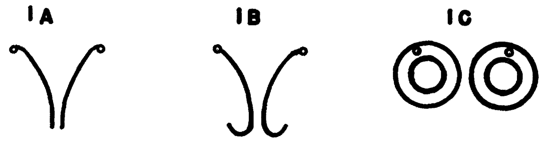

Fig. 1

These undesirable attributes may be easily overcome by proper electrode design and by using an electronic relay between the electrodes and an ordinary "physiological signal magnet" or one of the more elaborate integrating signal magnets (*6*). Biskind and Dan (*1*) suggested the use of curved platinum-wire electrodes (Fig. 1a) that would catch a drop, even though the drop source was not accurately centered, and yet not hold the drop after momentary contact was made. We have had excellent success with similar electrodes made of nichrome wire (Fig. 1b), but they are too frail for general student use. At present we are using stainless-steel washers (Fig. 1c). The eccentric hole facilitates adjustment to any desired size gap. The electrodes are attached to Johnson standoff insulators with 6–32 hex nuts, although thumbscrews could be used. By placing a medicine dropper orifice at sufficient height above these electrodes, a drop of even a very viscous fluid will have enough velocity to fall through the electrodes without sticking after making momentary contact.

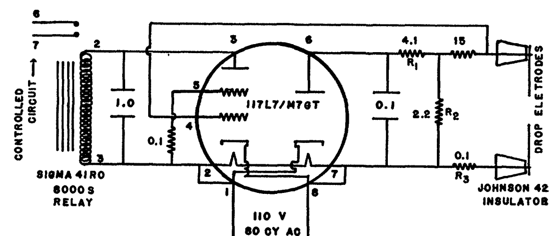

Fig. 2. All resistances in megohms; all resistors, ½-watt size; all condensers in microfarads; all condensers, 200-v paper type.

Although there are several hard-tube electronic relays on the market at present, we found it convenient to design our own device, which has certain advantages in that it is sturdy, simple, economical, and dependable. The wiring diagram in Fig. 2 is self-explanatory. The 117L7/M7GT electronic tube was used, since it combines both rectifier and tetrode in one envelope and requires no filament resistor or transformer. A 117N7 or 117P7 could be used with appropriate socket changes. The Sigma relay[1] was used because it has adequate sensitivity

[1] Sigma Instrument Company, 70 Ceylon Street, Boston, Massachusetts.

at low cost and is also hermetically sealed against dust and moisture. Being of the plug-in type, it can be easily replaced if necessary. In an early model, a variable resistor ("volume control") was used in place of R_1–R_2, but this was found unnecessary, since the present unit will operate if any resistance between 0 and 20 megohms connects the electrodes. The 0.1 megohm resistor, R_3, is introduced to lower the available current to a safe level in case the electrodes are contacted personally. The parts are mounted in a 2″ × 4″ × 4″ case. The unit will operate up to 15 cycles/sec without skipping, but we were only able to make about 7 drops/sec. This limit of 420 drops/min is in good agreement with the elegant photoelectric device of Josten (*3*). Three of these units have been in use during the past two years with no adjustments or repairs being necessary. The cost, exclusive of labor, is less than one-fourth that of commercial units.

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Electrically Heated Wax Pencil for Sealing Inoculated Eggs

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An electrically heated wax pencil devised in our laboratory for sealing inoculated eggs has been found to be an extremely convenient and time-saving device, especially when a large number of eggs is handled. The apparatus works directly on 110 AC or DC, and basically consists of an element wound around a copper tube with a suitable tip and release valve. The construction of the apparatus is very simple, and the materials required are readily available.

With the following on hand the apparatus could be easily constructed in any laboratory: (1) Spencer immersion oil dropper (Catalogue #470, Spencer Lens Company); (2) brass or copper tube, with an internal diameter of $\frac{3}{16}$″ and 4″ or 5″ in length; (3) 20′ of nichrome wire, gage 32, with a resistance of 10 ohms/ft; (4) asbestos paper; (5) a piece of steel or brass rod, $\frac{1}{16}$″ in diameter and 7″ long.

The cap of the immersion oil dropper is removed, and one end of the copper tube is fitted in its place. The joint so formed is soldered to make it leakproof. Next, one layer of asbestos paper, which has been moistened to prevent it from cracking, is wrapped tightly over the tube and part of the dropper (a, Fig. 1), leaving approximately 1″ of the tip of the dropper and $\frac{1}{2}$″ or so of the free end of the tube exposed. While the asbestos paper is still wet, approximately 20′ of nichrome wire is closely wound around the insulated portion of the apparatus, starting 1″ from the upper end of the tube (b), leaving 1″ of the wire free, and winding down to the end of the insulation (c), where 4″ or 5″ is left free. In winding the element, care must be taken not to overlap the loops of the wire.

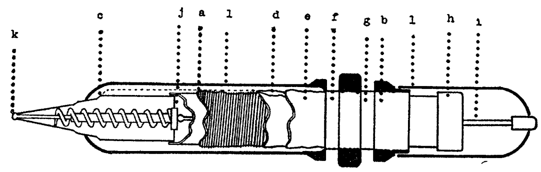

FIG. 1

The element is then insulated with another layer of wet asbestos paper (d), and the free end of the wire (c) is brought over it to the upper part of the apparatus. The element is further insulated with two or three layers of asbestos (e), and the free ends of the wire (b and c) are brought through the insulation.

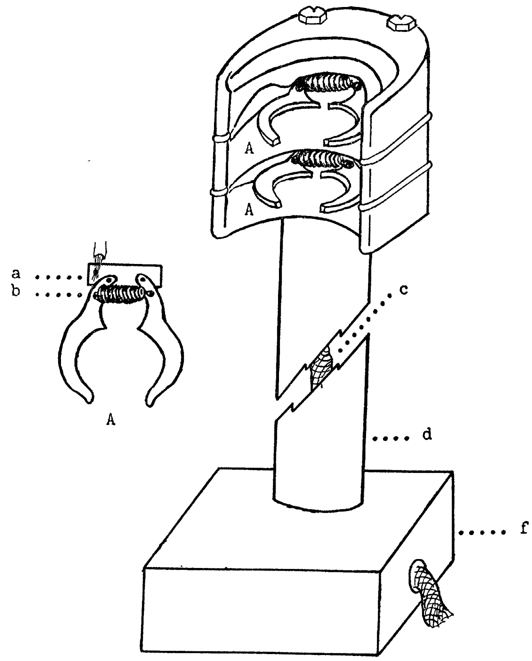

FIG. 2

The free end of the wire (c) is soldered to a narrow ($\frac{3}{16}$″ wide) copper strip, and the latter is tightly wound around the insulation, having the soldered wire on the inside, and soldered to form a band (f). The second free end of the wire is soldered to another similar copper strip, and in the same manner the second contact band (g) is made. The bands are spaced about $\frac{1}{2}$″ apart.

The apparatus is then embedded in acrylic (l) or wrapped into one or two thin layers of cork, leaving the contact bands exposed.

The free end of the copper tube is covered with a tightly fitting cap (h) with a central hole. The cap can