is in use, the oil connection is easily broken by movement of the mechanical stage, instead of traveling freely with it as happens in using the bevel top. Furthermore, any rapid downward movement of the condenser in focusing, often, and under some conditions usually, breaks the film at one side with the sucking in of a large bubble of air which is then trapped above the lens in the pocket formed by the edge of the raised metal face (Fig. d). This trapped bubble can be removed only by making a fresh immersion. When a condenser with an 8 degree oil-retaining bevel is used, racking the condenser downward, in focusing or in using a thin slide, allows the oil to gather in rapidly and uniformly on all sides, making a thicker layer of less diameter (Figs. b, e). The central body of oil can be drawn out to a surprising distance without breaking. On an upward focusing movement the excess of oil merely makes a larger ring of oil about the cone of the condenser top (Fig. c).

It would be well not only to alter the condenser which you are using but also to call the attention of the agent of the microscope manufacturer to this feature whenever he makes his round for orders.

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A SIMPLE METHOD FOR OBTAINING SYNCHRONIZED INDUCTORIUM BREAK SHOCKS

THE short-circuiting device described here was constructed in connection with an apparatus in which it was necessary to synchronize break-shock stimulation of muscle by a Du Bois Reymond inductorium, with the time of exposure of short lengths of photographic film mounted on a revolving kymograph drum. The inductorium was actuated through a relay whose circuit was closed and opened in the usual manner by a contact maker on the axle of the drum. Advantage was then taken of the vertical movements of the horizontal hammer of the inductorium to get only the break shock by the following simple and inexpensive procedure.

The hammer of the inductorium was extended about 5 cm by screwing on to it a light strip of brass. A piece of tough but flexible thread was fixed at the end of this strip and drawn over a light pulley, about 3 cm in diameter, carried on an axle about 10 cm above the inductorium. The free end of the thread was tied onto the head of a 6 penny nail which hung down within a 1 cm diameter glass tube, its lower end dipping into a pool of mercury contained in the tube. One pole of the inductorium secondary was connected by a light flexible electric wire to the nail head; the other pole to the pool of mercury by way of an electrode sealed into the glass tube. Instead of a straight tube of mercury and a sealed-in electrode, a U-tube may be used; the nail then rests in one arm of the tube and the wire from the other secondary pole in the other. A short circuiting key is thus formed across the poles of the secondary. When the inductorium is actuated the arm, moving downward, pulls on the thread and jerks the nail out of contact with the mercury. *If the length of nail originally dipping into the mercury is properly arranged,* contact between mercury and ascending nail will be maintained during generation of the make shock, thus shorting this away from the muscle. At the time of the break shock (in our arrangement, about 0.07 sec. later) the nail is pulled clear of the mercury, and this current can thus flow to the muscle electrodes.

This device, although simple to construct, is quite delicate to adjust properly. Improperly set up, part of the make shock may get to the muscle on the one hand, or, on the other, part of the break shock may be shorted out. The main factor controlling the situation is the length of nail originally dipping into the mercury. Once this is correctly arranged, break shocks automatically synchronized with the movement of the drum can be invariably obtained.

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