ishes the alpha waves. Strong sensory stimulation under light pentobarbital anesthesia has the same effect.

We have recently obtained a series of records of

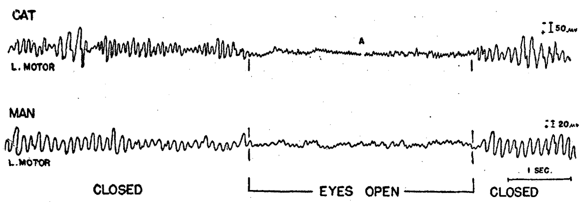

FIG. 1. The effect of opening and closing the eyes on the electrical activity of the cerebral cortex of the cat and of man. At A six seconds of the cat record was omitted. The record of the cat was made with concentric electrodes in the sigmoid gyrus; that of man was made with small metal electrodes cemented on the head, the grid lead over the motor area, and the ground lead on the lobe of the ear. Cat not anesthetized during observations.

the change produced by opening and closing the eyes in the cat. As may be seen from Fig. 1, the effect is altogether similar to the effect of the same procedure in man. It is readily obtained from cortical areas far removed from the occipital region, even when, as in this case, concentric electrodes are used. These fluctuations in potential come from immediately under the tip of the electrodes, for if electrodes are allowed to protrude into the ventricle or the subarachnoid space, although the sheath electrode is in contact with as much brain tissue as ever, the fluctuations of potential are no longer obtained.

There is now an accumulation of observations which bridges the gap between the electrical activity of the brain in animals and in man and emphasizes how closely the data on animals and on human material correspond.

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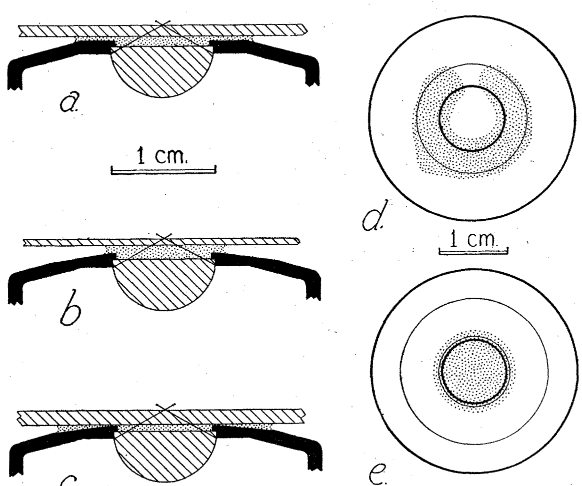
SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN OIL-RETAINING BEVELED FACE FOR HIGH-APERTURE CONDENSERS

FOR critical examinations with the microscope, especially with the highest magnifications, one requisite is that the sub-stage condenser (aplanatic or achromatic) be "immersed," that is, connected to the object slide by a layer of homogeneous immersion oil (refractive index 1.515). To omit this immersion is to limit the condenser to a working numerical aperture of 1.0, although its N.A. may reach 1.40 when properly immersed and focused. The outer rays of the cone delivered by a high-aperture condenser, if not utilized because of an air-gap, are then a source of glare and haze and reduce the contrast and brilliance of the image. Even for low-power objectives, an immersed condenser of aperture corresponding to the objective (or stopped down to that aperture) is best for visual observation and for photography.

One obstacle to the wider use of condenser-immersion is the difficulty of maintaining the connecting layer of oil intact and free from bubbles or air-pockets. This difficulty can be largely overcome by changing the shape of the condenser face. Most high-aperture condensers, as provided by the manufacturers, have a flat face of metal, forming a circular zone of considerable width about the glass of the upper lens (Figs. a, d). This flat face should be converted into a broad cone by filing (or grinding with a carborundum stone) to remove the outer part nearly to the glass of the lens (Figs. b, c, e). The angle of slope seems to be optimal at about 8 degrees, since a slope steeper than about 10 degrees allows the oil to drain away too readily instead of lying in place, while a slope gentler than 5 degrees is not enough to allow free movement of the oil and leeway in focusing range.



FIGS. a to e

In filing the bevel on the condenser face care must be taken to leave intact a ring of metal about half a millimeter in width around the top lens. The upper lens of a condenser is generally crimped into place by an overlapping lip of metal, which also seals the lens against leakage of the immersion oil into the body of the condenser. Leaving this ring maintains the security of the lens mounting and of the seal and also serves the original function of the metal face—that of protecting the lens from being scratched or being forced out of position should the condenser be raised against the slide in focusing.

When a condenser with the original broad flat face 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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