and the relative viscosity, measured in an Ostwald viscosimeter, decreases when pressure is applied. Furthermore, the solution shows double refraction of flow.[1]

I have found by investigating protein sulfhydryl and disulfide groups that when coagulation occurs in the cell the change in protein is distinctly different from that caused by the usual protein denaturing agents—heat, acid, etc. When these agents coagulate proteins, changes in their sulfhydryl and disulfide groups are observed;[2] whereas, when coagulation takes place in the cell, no change in these groups is detectable, although a change is observed if the proteins of the egg are treated with acid. In this respect coagulation in the egg resembles the coagulation of myosin as it occurs in the contraction and rigor of muscle.[3] Of all the known ways of coagulating myosin *in vitro* only in dehydration (either by drying or freezing) is loss of solubility *not* accompanied by a change in sulfhydryl groups.[4] In this kind of coagulation it would appear that when the shell of water enveloping a protein particle is removed the outer groups of the particle become firmly attached to the outer groups of other particles. An insoluble mass of protein is formed with far less disturbance of the inner configuration of the molecule than when coagulation is caused by any of the usual denaturing agents.[5] The type of coagulation that takes place in muscle and in the egg is of the type observed in dehydrated myosin. It should be noted that the protein in the egg which coagulates during fertilization readily coagulates if, when isolated, it is dehydrated.

The time-course of protein coagulation after fertilization shows that the protein change is not associated either with elevation of the fertilization membrane or with the cycle of cell-division that follows fertilization. The fertilization membrane is formed within a minute after insemination; coagulation begins about three minutes later and is completed within the next ten minutes. No change in the quantity of coagulated protein is detected during the next two hours, during which time the egg passes through a complete mitotic cycle. Coagulation is, however, associated with another change in structure of the egg, an increase in strength and elasticity. The unfertilized egg is broken by freezing and thawing, whereas the fertilized egg is not broken by this treatment. The increase in strength manifested in this way is not due to presence of the fertilization membrane, for even after it has formed the cell is still fragile. Increased strength of the cell appears within the ten minutes following membrane elevation, during the time of protein coagulation. And the ability of the cell to withstand freezing and thawing remains thereafter (at least for two hours) just as the coagulated state remains. The explanation of this increase in strength and elasticity is that in coagulation the elongated protein particles unite to form a fibrous net-work. This, an early step in development of the egg, may be regarded as a skeleton framework within which differentiation proceeds.

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THE BERGER RHYTHM IN CATS[1]

THE disappearance of the slower potential fluctuations of about 10 per second in the human electroencephalogram when the eyes are opened was one of the most striking observations reported by Berger in his early papers on the electrical activity of the human brain. This phenomenon has been studied in detail by Adrian and Matthews[2] and by Adrian and Yamagiwa.[3] It is so easy to produce in the average subject that it has now become a commonplace. Kornmueller, who has worked extensively on rabbits, did not report any comparable change in animals. Range,[4] working in the same laboratory, however, has recently published a figure which shows disappearance of the slower potentials in the rabbit with painful stimulation.

Ectors[5] reported that modifications similar to those seen in man are produced by sensory stimulation in the rabbit. The frequency of the slower components, which Berger calls alpha waves, is somewhat slower in the rabbit than in the normal adult human, but, as in the human, they diminish in amplitude or disappear when the eyes are illuminated. Adrian[6] has confirmed this observation on monkeys under light anesthesia.

Work which is now in press,[7] in which one of us had a part, shows a similar effect in the cat. Attention, in the cat as in the rabbit and man, abolishes or dimin-

[1] From the Departments of Physiology and of Neurology, Harvard Medical School.

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

We have recently obtained a series of records of 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.

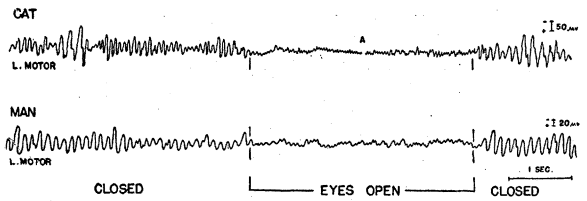

FIG. 1. The effect of opening and closing the eyes on the electrical activity of the cerebral cortex of the cat and of man. At A six seconds of the cat record was omitted. The record of the cat was made with concentric electrodes in the sigmoid gyrus; that of man was made with small metal electrodes 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.

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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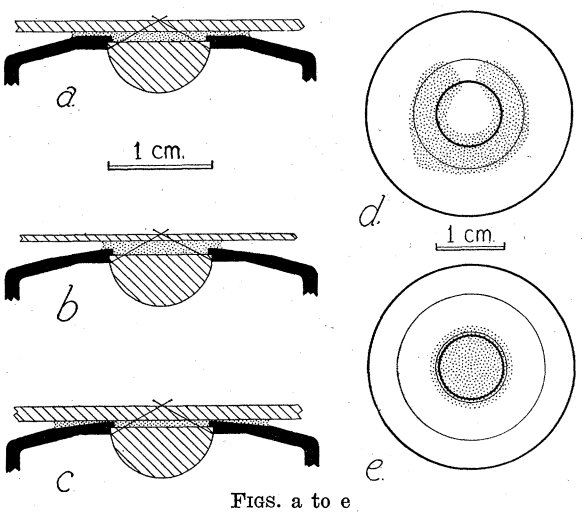
SCIENTIFIC APPARATUS AND LABORATORY METHODS

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