APPLIANCES

SIMPLE PUPILLOMETER*

BY

A. ARNAUD REID

Department of Psychological Medicine, St. Thomas's Hospital, London

THIS simple instrument for measuring pupil diameter, originally invented by Helmholtz, was used by Wenger (1948) in an attempt to assess autonomic balance in candidates for the U.S.A.A.F. It has been recently used fairly extensively by the writer to measure the action of drugs upon the pupil, and has been found to give highly accurate results.

The instrument consists of an oblong dull black card about 7×3 ", with pinholes punched in it (Fig. 1). At one end the two holes are 8 mm. apart vertically, and the vertical space between each pair is gradually decreased in 0.5 mm. steps, until the last two are only 2 mm. apart. The pairs are 1 cm. apart from each other horizontally.

FIG. 1.—Pupillometer, showing measurements between vertical pairs.

The subject stands with his back to a wall (to prevent excess lighting of the back of the card) and looks through the holes at a distant object which is well lit (the exact amount of illumination is relatively unimportant, probably because of the very small area of the pinholes as compared with the pupil itself). The card is held close to one eye to prevent any attempt at accommodation, and the other eye is closed. The subject tries to look through two holes at once and moves the card to and fro till he finds the pair which give the correct appearance. If the holes are too far apart the subject sees them as in Fig. 2(a); if they are too near he sees them as in Fig. 2(b); if they appear as in Fig. 2(c) the distance between them is taken as a measure of the pupil diameter.

FIG. 2.—Holes as seen (a) wider, (b) narrower, (c) same size as pupil diameter.

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The subject is asked to choose the appropriate pair of holes and their distance apart is noted. The card is then taken away and handed back the other way round, and he chooses again. This performance is repeated five or more times to give material for statistical analysis. It will be found that if the patient is of average intelligence his answers will seldom vary by more than ± 0.5 mm., once he has learned the method.

The writer, working with oral Dibenzylamine (a sympathetic blocking drug), found that in six out of ten cases the miosis produced was highly significant ($P < .001$) and in two cases it was significant ($P < .01$). The two remaining subjects showed no significant change. One was of poor intelligence and was obviously guessing, as shown by his perseveration at some times, and his wide scatter at others. The other had abnormally small pupils which probably made further miosis difficult to produce. (The analysis of variance and the "T" test were both used and they agreed fairly closely.)

It was noteworthy that, when the effects of Benzedrine (10 mg.) were measured in another series, no significant changes occurred in the majority of subjects, who had fairly large pupils. Two subjects with small pupils did, however, produce a significant degree of mydriasis. It is suggested, therefore, that it is easier to measure pupil changes directed towards their mean position than away from it, so that, as most subjects appear to have a pupil size of about 5 mm. the method appears more sensitive for tests of miotic activity.

It is suggested that this simple instrument is of considerable value for research work upon the physiology and pharmacology of the autonomic nervous system. It might also be of some slight value in neurology and ophthalmology, and perhaps also in the study of morphinism.

REFERENCE

WENGER, M. A. (1948). *Comp. Psychol. Monogr.*, **19**, No. 4, serial 101.

LARGE CONCAVE MIRROR FOR INDIRECT OPHTHALMOSCOPY*

BY

H. NEAME

London

THE mirror is concave, 9 cm. in diameter, of the type used by aural surgeons, but with a focal length of 50 cm. instead of the usual 30 cm. It was recommended a few years ago for indirect ophthalmoscopy for fundus examination by an American ophthalmic surgeon who had found that it gave very good fundus illumination in many cases when the pupil was dilated with a mydriatic. When used with a Hamblin dark-room lamp, it seemed to illuminate as brilliantly as with Weve's 500-watt lamp in an enclosed reflector as recommended for cases of detached retina. It was of no use with an active pupil.

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