APPLIANCES

STEREO-CAMPIMETRY*

A METHOD FOR USE WITH THE BJERRUM SCREEN

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FEW will deny the tedium of routine campimetry in any circumstances, and when the need for accuracy arises in a patient whose responses are vague and hesitating, the procedure is apt to be converted into one of competitive guesswork between the subject and the observer, the results of which are of somewhat uncertain clinical value. Unfortunately, it is in such cases that reliable information about the state of the visual fields is often of crucial value to diagnosis. The utility of the detection of small changes in the central fields in the early diagnosis of chiasmal lesions, for example, has been frequently noted in the literature. It is emphasized by Traquair (1942) in his description of the scotomatous type of field change seen in the chiasmal syndrome; and the significance of paracentral scotomata in the early stages of chiasmal pressure from pituitary tumours has been pointed out by Williamson-Noble (1939) and by Lyle (1939). The importance of small changes in the centro-caecal area in glaucoma is too familiar for comment.

Such considerations have prompted the present attempt to produce more reliable visual field records in these types of cases. One factor commonly giving rise to difficulty is that of fixation, which may be seriously hindered by the presence of central or paracentral scotomata, or because for some reason, organic or functional, the patient is unable to maintain concentration upon the fixation spot. The use of a binocular fixation device, which should attract fixation by a simple stereoscopic image, and enable a central defect to be plotted with greater certainty where present, suggested itself as a means towards this end.

The idea is not, of course, new. Schloesser (1901) advocated the use of binocular fixation by means of complementary colours viewed separately by the two eyes, and this method has recently been re-applied by Engel (1950). However, the known existence of wide individual variations in colour judgment, and of defects of colour vision in association with many central field defects suggested that a stereoscopic method such as is employed in the Lloyd stereo-campimeter might be preferable. Experience with this instrument however has shown that there were advantages in accuracy to be gained by adhering to the customary screen distance of 1 or 2 metres, in preference to the shorter working distance used in this instrument as at present made.

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The apparatus described by Fincham (1929) appeared to offer the required facilities, but as this was not to be bought trials were first made with this method, using an amblyoscope tube for fixation of the "covered" eye. Further modification has now resulted in the apparatus here described.

FIG. 1.—Apparatus in use, mounted on floor-stand headrest.

STEREO-FIXATION APPARATUS

The apparatus consists essentially of a stereoscopic pair of simple objects, one of which (Fig. 1, A) is fixed on to the ordinary Bjerrum screen and viewed by the eye to be examined, while the second is incorporated in a simple optical system (Fig. 1, B; 2, C; 3) and is viewed by the non-fixing eye. The objects used have been based on the synoptophore "bucket" slides, their relative sizes being so calculated as to give retinal images of similar size at the appropriate screen distance. Equality of illumination of the two objects is achieved by means of a rheostat (Fig. 1, C) regulating the illumination of the object seen by the non-fixing eye. This was the method employed by Fincham, and single binocular vision and a simple stereoscopic image are readily achieved by it.

The instrument has been used principally at a screen distance of 2 metres, but a hinge between the condenser tube (Fig. 2, B) and the viewing tube (Fig. 2, A) of the optical system gives access to this fixation object (Fig. 2, C), and enables it to be replaced by a larger one if examination at 1 metre is for any reason preferable. When the contralateral eye is to be examined, the whole tube is slid across into the appropriate position.

THE INSTRUMENT IN USE

This apparatus has been in regular use for a year or so at the Institute of Ophthalmology, the types of patient for which it has been employed being chiefly those with central or paracentral defects resulting from glaucoma. A few patients with purely central defects from macular lesions have also been examined.

The binocular image in general appears to provide an added stimulus to fixation, which assists in the accurate plotting of the field. Patients have stated that "It is less variable than without rings", "It is much easier, I concentrate better", or "The rings make me want to look in the centre". In a number of cases of doubtful defect in which the blind spot could not be plotted with monocular fixation it was reliably outlined with the binocular apparatus.

Since the inner ring of the bucket subtends a visual angle of approximately 5°,

the coarse stereopsis obtained is undisturbed by small central defects, and even when the field loss largely obliterates one image, binocular fixation appears to be retained with the remaining part of the object, if only as a form of simultaneous

FIG. 2.—Apparatus hinged open for replacement of fixation slide (forehead bar of headrest removed).

FIG. 3.—Optical system.

paramacular perception. The method is not invariably successful, and it does in an average case add to the length of time needed for an examination; but in doubtful cases, where a defect is suspected near a blind spot which cannot be outlined, or where the defect itself involves fixation, the field can usually be plotted with a certainty which is apparent both to observer and to patient.

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