and Air Force should play a leading part in integrating the results of research work in the medical and physiological fields in the plans of those responsible for equipment design or concerned with maintaining operational efficiency.

I am indebted to the Royal Naval Personnel Research Committee for permission to publish this account of some of the committee's activities.

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PERMANENT HOMONYMOUS QUADRANTANOPIA AFTER MIGRAINE

BY

W. M. RICH, D.O.M.S.

Migraine with visual hallucinations is reported often enough in the literature to need no further amplification. That it can have a permanent effect on vision is not. A case is here described of permanent homonymous quadrantanopia following 20 years of migrainous headaches.

Case History

The patient, a married woman aged 32, has had headaches since she first began to menstruate at about the age of 12. There is some relationship to her periods, but it is not absolute. The headaches have been getting worse during the past two or three years. They always develop in the same way: first there are "flashing lights," and as these fade a "haze" appears on the right side and spreads from above downwards and to the left. With the haze, or soon after, the headache ensues, beginning in front and radiating to the back of the head, becoming most intense occipitally. The patient recently noticed that the "haze" was permanently present wherever she looked and whether she had a headache or not. When I first saw her she had had this shadow in each eye, above and to the right, for about two years. She has been married 14 years and has two children (girls, aged 13 and 7); there have been no miscarriages. She was very thin up to the birth of the younger child, but during the next two years her weight rose from 7 st. 6 lb. (47 kg.) to over 10 st. (63.5 kg.), where it has remained for the past four or five years. Her periods are normal and regular. There is no polyuria or polydipsia.

On examination she was seen to be a well-nourished, placid, intelligent, and apparently healthy young woman. Eye examination revealed: R.V. 6/5, J. 1; L.V. 6/5, J. 1; emmetropic; orthophoric; pupils active to light, both direct and consensual, and to accommodation-convergence, equal and well sustained; Wernicke's hemianopic reaction could not be obtained; tension (digitally) normal; media and fundus of each eye normal and healthy. The blood pressure was 128/68. Night and morning specimens of urine were normal. The Wassermann reaction and gonococcus-fixation test were negative. *X*-ray examination of the skull showed that the pituitary fossa was exceedingly small, with ossification of the petro-clinoid ligaments. The only other abnormalities discovered were:

Peripheral Field.—1/330 mm. white was full and normal in each eye, except for a small absolute scotoma, homonymous and quadrantic in shape and less than 30 degrees, which was more satisfactorily plotted with the Bjerrum screen. Those for red, green, and blue were similar. Only the white is illustrated (Figs. 1 and 2).

Bjerrum Screen.—5/2000 mm. white, red, blue, and green were taken, but only that for white is illustrated (Figs. 3 and 4). The points to be noted are: sparing of the macula; the clean-cut edge along the 90 degrees vertical and 180 degrees horizontal meridians, and between these the absolute scotoma from 1 to 18 degrees; the relative scotoma for a further 5 degrees where the colour faded; its quadrantic shape, homonymous in character, and almost complete congruity. The colours followed an almost identical pattern.

Discussion

Migraine is usually considered to result from vascular instability, the headache being due to spasm of the arteries supplying the occipital cortex, or of the scalp and dura mater, or to irritation of the meningeal arteries following an initial dilatation which produces the sense of well-being. In the present case, however, there is just the possibility of friction on the left optic tract due to calcification of the clinoid ligament; but this seems somewhat unlikely, for the patient was re-examined at three-monthly intervals during the ensuing six months and no change was found.

Traquair (1933, 1942) states that the characteristic feature of optic tract lesions is incongruity, that the fixation area is more often affected when the lesion is in the anterior part of the suprachiasmal path, that homonymous quadrantanopia is found in damage to the calcarine fissure or to the radiation, that sparing of the fixation area of usually less than 5 degrees is almost constant in occipital hemianopias, and that isolated hemianopia is so rarely due to optic radiation and so frequently to occipital lesions that the latter position should be assumed as the site of the lesion unless there is other and stronger evidence, such as a wound, to implicate the former. While Peter (1938) states that perimetry definitely locates ophthalmic migraine in the visual cortex and that migraine is probably due to spasm of the small vessels in the cuneus and where the scotomata—quadrantic or hemianopic, always bilateral and homonymous—have become permanent, the repeated attacks of spasm in these vessels during the migrainous attacks have resulted in permanent occlusion of the vessel, with softening of the brain tissue, the functional now becoming organic.

It may therefore be safely assumed that in my case this is what has happened rather than the problematical suggestion of friction from an ossified clinoid ligament damaging the optic tract.

Review of the Literature

That there is a connexion between idiopathic migraine, epilepsy, and subarachnoid haemorrhage has been mentioned before. It is not the purpose here to discuss this, but to draw attention to the much greater frequency of hemianopias associated with migrainous headaches either of established or, most probably, vascular origin, irrespective of the age of the patient, and those associated, as in the case described, with idiopathic migraine in which the possibility of vascular origin other than vasomotor instability is most unlikely. Ormond (1913), quoting from his own and other observers' cases, mentioned nine in all, six of which,

with one doubtful exception, were probably cases of intracranial haemorrhage. In two of the three cases of migraine uncomplicated by a probable vascular lesion there was homonymous hemianopia with sparing of the macula by less than 5 degrees.

At a meeting of the Ophthalmological Society Prof. Uhthoff (1914) said that he had seen five cases of persistent homonymous quadrantanopia, and necropsy showed complete atrophy, strictly limited to the lower half of the cuneus, of the right occipital lobe. The second was recorded by Schiff-Wertheimer (1926). This patient, a man aged 60, had a right superior homonymous quadrantanopia, and necropsy revealed a lesion of the left cuneus, limited to the inferior lip of the calcarine fissure. These two cases,

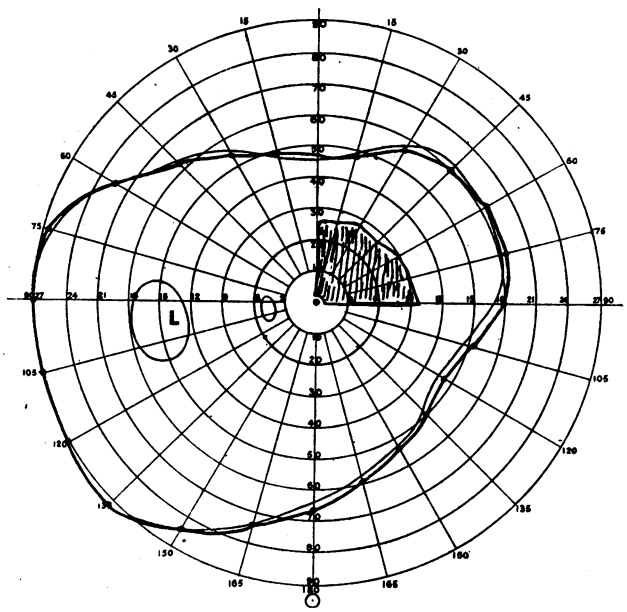

FIG. 1.—Perimeter field, left eye.

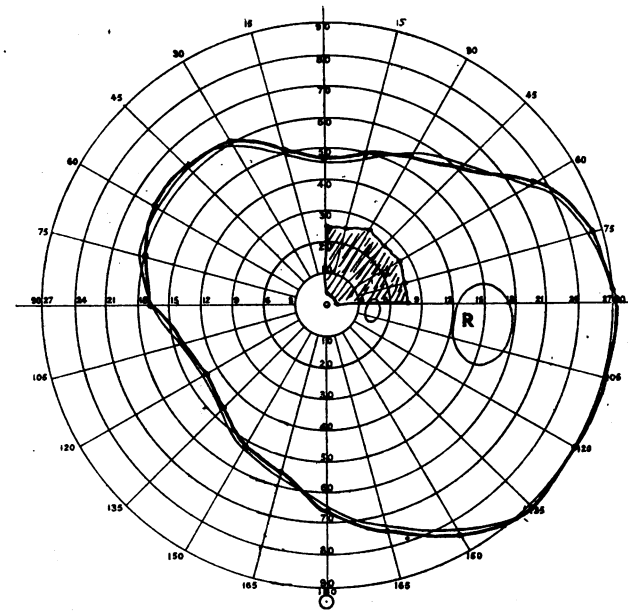

FIG 2.—Perimeter field, right eye.

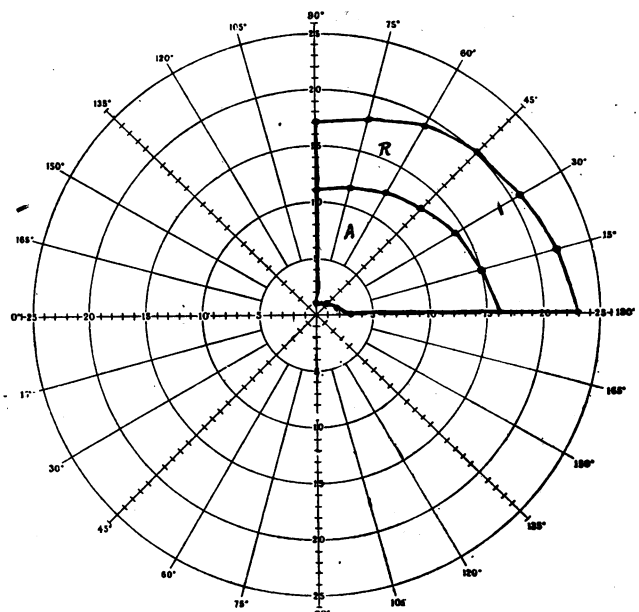

FIG. 3.—A: Absolute scotoma. R: Relative scotoma with blurring and loss of colour. (Left eye.)

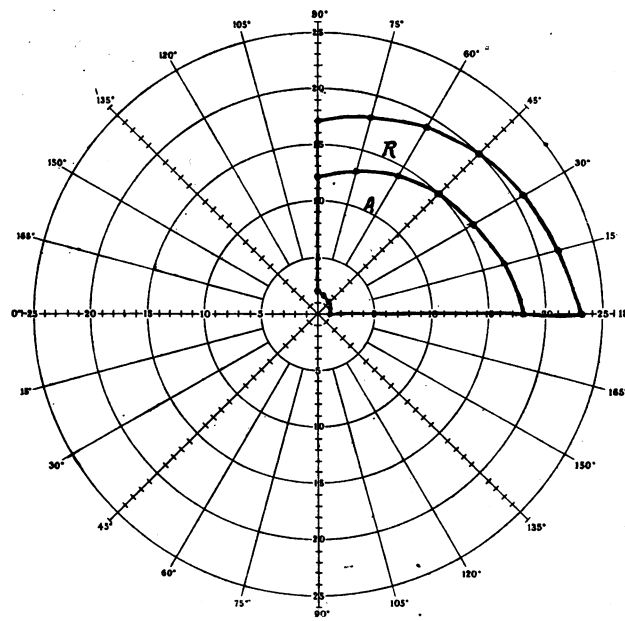

FIG. 4.—A: Absolute scotoma. R: Relative scotoma with blurring and loss of colour. (Right eye.)

partial hemianopia following recurrent migraine, and was of the opinion that they were localized to the occipital cortex; Hawthorne (1914) described four cases free from vascular or renal cause in young women, and five others in older patients with a greater or lesser degree of cardiovascular degeneration; and Cross (1914) mentioned 18 of his cases of the latter type, and stated that the common cause was embolism of some twig of the calcarine artery.

Johnson (1936) quoted two cases of quadrantanopia which came to necropsy. The first was that recorded by Hun (1887) This patient, a man aged 57, had a left inferior particularly the latter, support the hypothesis that in my case the lesion will be found in the occipital cortex rather than in the optic tract.

The statement by Veil (1930) that transitory hemianopia associated with ophthalmic migraine is of no importance seems to require revision, as does Tidy's (1945) that in rare cases migraine may subsequently result in complete blindness; for Thomas (1907) remarked that "a number of cases are reported [of hemianopia as an aura of migraine] where symptoms appearing during the attack similar to transitory ones in previous attacks have become permanent." He

quoted eight cases, four of which were his own. One of these four proved at necropsy to have had an aneurysm of the right posterior communicating artery which had burst; two others were probably vascular in origin, since in one case there was amnesia and in the other paraesthesiae; and the last of the four—a healthy young woman of 27—was a case of right permanent hemianopia as a result of idiopathic migraine, with sparing of the macula by less than 10 degrees and otherwise a clean-cut vertical edge above and below. She was re-examined six weeks later, but there was no alteration. The ages of these four patients varied from 15 to 67 and all had had proved intracranial vascular catastrophes.

Peter (1938), quoting Charcot and others in their description of cases of persistent quadrantic and hemianopic scotomata following migraine, remarks that other cases have appeared in the literature from time to time; while Adie (1930), drawing attention to permanent hemianopia in migraine, migrainous epilepsy, and spontaneous subarachnoid haemorrhage and their probable interrelationship, describes seven cases in which there was probably a subarachnoid haemorrhage. Dixon (1947), in drawing attention to the frequency of strokes in young adults, mentions four cases of field defect in young people associated with a probable intracranial haemorrhage.

Comment.—In this brief review of the literature 63 cases are mentioned, of which 14 seem to be of true idiopathic migrainous origin, and 49 have been associated with intracranial haemorrhage—a ratio of 2:7. It seems likely, therefore, that many more cases of migraine than appear in the literature would show permanent field defects, that sooner or later a number of these would show other signs of intracranial haemorrhage, embolism, or thrombosis, and that the relationship between migraine, epilepsy, and subarachnoid haemorrhage is closer than has been recognized. Attention is also drawn to its greater frequency in women.

Summary

A case of permanent quadrantanopia subsequent to 20 years of repeated attacks of idiopathic migraine is described.

The probable site of the lesion—at first functional, later organic—is discussed.

A review of the literature revealed only 13 other cases.

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The National Corporation for the Care of Old People has appointed a committee to make recommendations on grants for old people's homes and their welfare services in Scotland. Sir Hector Hetherington, Principal and Vice-Chancellor of Glasgow University, is chairman of the committee, and the other members are: Dr. A. Greig Anderson, Dr. A. D. Briggs, Dr. R. W. Craig, Miss Grace Drysdale, Prof. Ferguson, and Mr. H. L. F. Fraser. Offices are to be opened at 2, St. Andrew's Square, Edinburgh.

PHLEBOTHROMBOSIS DECUBITI AND PREVENTION OF PULMONARY EMBOLISM

BY

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The assumption that pulmonary embolus is an unavoidable accident is no longer tenable.—J. FINE.

In this article no attempt will be made to describe and discuss the prevention of phlebothrombosis by early ambulation, exercises and massage, or the administration of anticoagulants. Moreover, much as I should like to express my views on the relationship of posture to venous thrombosis, I am anxious to avoid becoming involved in controversies concerning the merits and demerits of Fowler's position. This does not imply that I fail to appreciate that the prevention of phlebothrombosis is an ultimate goal of the combined professions of medicine and nursing. On the contrary, it is because this goal cannot be reached without a numerically enhanced nursing service, including specially trained masseurs, far better laboratory facilities, an unlimited supply and unbridled use of expensive drugs, and, above all, more and better hospital facilities, that I propose to concentrate on how to grapple with the problem as it presents itself in average hospital and private practice in Britain to-day.

We are faced with the fact that, except in a few clinics that are accorded facilities not vouchsafed to any but a mere handful of the profession, there is not one iota of evidence that pulmonary embolus is less frequent to-day than it was ten, fifteen, or twenty years ago. It is for this reason, while continuing to preach the gospel of the prevention of phlebothrombosis instead of sitting with folded hands awaiting the medical millennium, that I propose to concentrate on measures to forestall pulmonary embolism which the clinician himself can inaugurate and carry out if he has the energy and determination to do so.

Fatal pulmonary embolus is always disconcerting. Those in attendance rightly cannot smother a conviction that the visitation should not have occurred. Little wonder that generations of conscientious workers have sought to rid the practice of surgery and gynaecology of a scourge. I envisage (*a*) the early detection of phlebothrombosis, and (*b*) the removal of the clot from the femoral vein before it has moved to the heart, as the two limbs of a Colossus astride a subject of fundamental importance to every surgical practitioner.

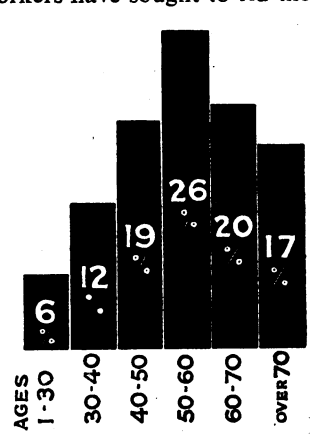

FIG. 1.—The age incidence of fatal pulmonary embolism. (A. W. Allen's and other statistics.)

Early Diagnosis

The temperature chart shows unexplained repeated slight elevations. As the condition is more prone in those past the meridian of life and the highest incidence is between ages 50 and 60 (Fig. 1), if the patient has undergone an operation about a week previously, more particularly if that operation was one of herniotomy, hysterectomy, resection of the rectum, prostatectomy, cholecystectomy, or