

## HETEROPHORIA AND NEUROSIS IN FLYING PERSONNEL\*

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HETEROPHORIA, or ocular muscle imbalance, is a condition in which the ocular muscles are not properly co-ordinated, so that the visual axes do not normally lie in alignment. The condition is caused by a relative insufficiency of one or other of the muscles. To compensate for this, the weak muscle has to supplement its normal tone by a continuous active contraction. From this constant activity is said to ensue "a liability to fatigue, and eye-strain, which depending on the constitution and nervous condition of the individual, may protrude itself into consciousness and produce symptoms" (Duke-Elder).<sup>1</sup> The symptoms given are blurring of vision and reflex disturbances, such as headaches and giddiness, and eccentric poses of the head.

A survey of ophthalmological opinion on the subject brings out several points of interest to psychiatrists. The condition is usually regarded as inherent or acquired, the acquired cases being in the majority. It is with the latter group only that we are concerned, and to which we refer when speaking of heterophoria. Among the organic causes are given errors of refraction and organic disturbances of innervation. When these have been excluded, there remain many cases for which no adequate organic cause can be found. These cases then represent a functional disturbance in the true sense, an abnormality of muscular co-ordination in the absence of a structural lesion in the muscles, nerves or central nervous system.

This point alone gives grounds for suspecting a psychological factor, and the suspicion is confirmed in many writings. Duke-Elder states that the condition may be the result of illness, general weakness, anaemia, or "nervous debility." When vitality is good there are usually no symptoms. Fatigue or overwork may promote the appearance of symptoms, which subside or disappear as a result of a rest or a holiday. Speaking of treatment, the

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same author stresses that orthophoria is rare, that most heterophoria is minor in degree, is symptomless and requires no treatment. Apart from correcting errors of refraction the general health requires treatment rather than the heterophoria, because "the lack of equipose is frequently less the expression of a local defect than of a general neurosis." This latter should therefore be treated. In normal civilian practice minor degrees of heterophoria are common and not associated with symptoms. (Duke-Elder, Parsons<sup>2</sup> *et al.*)

Livingston<sup>3</sup> quotes figures to show that with certain occupational exceptions, significant evidence of heterophoria is found in only 1.3 per cent. of routine ocular examinations. This, however, is not in conformity with the observations of other authorities. The presence of symptom-free heterophoria of considerable degree is shown by the work of Grieve and Archibald.<sup>4</sup> They examined 7,019 healthy men of military age, and 375 or 5.3 per cent. showed deviations of more than four prism dioptres laterally, or 1.5 prism dioptres vertically. Of these 375, only 1.3 per cent. complained of symptoms. The presence of a prominent psychological factor in this type of case is emphasised, and work by other investigators to the same effect, notably that of Mann,<sup>5</sup> is quoted. Dealing with the relationship between heterophoria and aviators, Livingston notes many cases where the response to tests falls well outside the standards laid down, yet who are steady and successful pilots. This author refers to many of these cases of acquired heterophoria as "ill anchored psychic vessels," and adds that "the first indication of cerebral unrest is due to the increasing subconscious effort needed to retain and maintain binocular harmony." Parsons regards heterophoria as a frequent cause of bad landings, and stresses the part played by fatigue and strain in the symptom complex. De Schweinitz<sup>6</sup> gives a comprehensive list of causes, including anaemia, lack of tone, nervous exhaustion, gout and so forth. In the syndrome he enumerates muscular weakness, variable blurring of vision, blepharospasm, photophobia, eccentric poses of the head, headaches and a reflex neurosis. Chavasse<sup>7</sup> includes among the list of central obstacles to binocular vision hysteria, malingering, undue nervous excitability and indocility, either congenital or acquired. Mary Pugh<sup>8</sup> contends that there is no longer any doubt that many squints, latent and manifest, are of psychological origin. She adds that local treatment in these poorly adapted people may lead to the establishment of other neurotic foci. In this connection Livingston describes an interesting case of a pilot who received successful orthoptic treatment for an esophoria which adversely affected his landings. As the esophoria cleared up and a return to duty became imminent, he developed gastric symptoms which were

found to be related to a flying phobia, an indication of his tendency to convert anxiety into somatic symptoms.

The inconstant and variable relationship between symptoms and objective findings in heterophoria is stressed by Michaelson<sup>9</sup> who noted that ocular muscle imbalance may exist for years without symptoms. These are often precipitated by emotional stress. He insists that a general idea of the personality pattern of each patient should be obtained in studying these cases.

The functional nature of the condition, the variable presence of symptoms, the inconstant relationship between symptoms and signs, the presence of associated nervous symptoms and indications of emotional instability, all suggest the existence of important psychological factors in heterophoria, calling for investigation.

With this end in view 57 successive cases of heterophoria in flying personnel were subjected to investigation by the usual means of a comprehensive interview and examination. All were cases presenting with eye symptoms and in whom heterophoria was discovered in examination by the ophthalmologist, using the standard tests, notably the Maddox rod.

Of the 57 cases examined, we found that 50 were suffering from definite well marked psychological illnesses. In 48 this illness was either an anxiety hysteria or hysteria. One was a case of severe depression, and one was a psychopathic personality. In 7 cases we could find no evidence of significant psychoneurotic abnormality associated with heterophoria. In the 50 cases which we found to be psychologically ill, we came to the conclusion that the heterophoria, though often the most prominent presenting symptom, was only one manifestation of a generalised psychological illness, which was itself the main and primary disability. The diagnostic categories are set out in Table I.

TABLE I

Diagnosis	No.	Percentage of Total (57 Cases)
Anxiety hysteria ...	40	70 per cent.
Hysteria ...	8	14 per cent.
Depression ...	1	2 per cent.
Psychopathic personality	1	2 per cent.
No significant abnormality	7	12 per cent.

Table II shows the presenting symptoms for which help was sought. It will be seen that in 56 cases the presenting symptom was an ocular one. The solitary exception was a patient whose initial complaint was of giddiness.

TABLE II

Presenting Symptom	Number of Cases
Faulty landings	24
Eye strain	16
Blurred vision	5
Night blindness	4
Diplopia	2
Deteriorating vision	1
Difficulty in seeing instrument panel	1
Tired eyes	1
Watering eyes	1
Found during routine examination	1
Giddiness	1

In the 50 abnormal cases the diagnosis of psychological illness rested on the usual criteria. Associated symptoms characteristic of neurosis were found in all the cases in varying numbers, depending upon the severity of the disorder and its type. They included apprehension, feelings of nervousness, timidity and anxiety, headaches, usually described as "terrific," and showing a characteristic neurotic variability. Other symptoms were sweating before a flight, nightmares, disturbed and unrefreshing sleep, spells of depression, claustrophobia, air-sickness and dizziness.

Palpitation and dyspnoea with easy fatigue and a general sense of malaise and lack of zest were common. Dyspeptic symptoms and grosser hysterical manifestations such as paralyses, amnesia, fugues and sensory disturbances were not encountered.

Evidence of the "neuropathic constitution" or predisposition to nervous disorder, was found in all 50 cases showing abnormality. Personality studies revealed varying numbers and degrees of those traits in early life which are regarded as an indication of an abnormal sense of insecurity, and as forerunners under special circumstances of a more manifest neurotic disease in later life. Restless sleep, nightmares, night terrors and nocturnal enuresis in childhood were repeatedly found. During school life most of the anxiety hysteria group had been timid and unaggressive, had lacked initiative and a sense of adventure. They were easily discouraged and avoided rough games. A fair number

could swim, but practically all avoided diving and disliked it. They revealed excessive visceral responses to ordeals such as examinations, important games or interviews; they had admitted and recognised feelings of personal insecurity and inferiority, lacked confidence in themselves and were unduly dependent on their parents. All of these were encountered frequently. Emotional immaturity was especially common in the hysterical group and was evident on examination.

A family history of definite neurosis in one or both parents was obtained in fifteen cases. Psychosis and alcoholism each occurred once in the family histories. A more familiar story in most cases was that of anxious, worrying and over-solicitous parents, who suffered from such complaints as chronic dyspepsia, back-ache, or hypertension and were frequently under medical care.

In all the cases of neurosis, the exciting cause which precipitated the disorder was a conflict over flying duties. Because of their predisposition to the development of neurotic symptoms these patients showed anxiety in response to the normal hazards of flying, and especially to flying stress, more readily than the non-predisposed. The subject of flying stress is not one for discussion here. It has been comprehensively surveyed by Symonds<sup>10</sup> and the various factors discussed. Our findings have agreed with those of Symonds, in that the more heavily predisposed persons broke down earlier in their flying career and as a result of less stress, than the more stable ones.

Insight into the nature of the trouble varied enormously. In the more intelligent and relatively stable members of the anxiety group, there was usually some awareness of a growing hostility towards flying but without full realisation of the rôle played by this hostility and its conflict with the sense of duty, in the production of the symptoms. In the hysterics the hostility tended to be more deeply repressed, and often was accompanied by conscious protestations of willingness and desire to continue flying.

### Illustrative Cases

Case 1.—Pilot, aged 23 years. Forty operational sorties. Complaint—difficulty in seeing his instrument panel after flying for half an hour, headaches and insomnia. Ocular findings—convergence fatigue, esophoria six prism dioptres. Psychiatric examination—an over anxious worrier, sleepless, "fed up," and much more impressionable than normal. Suffers from much anticipatory dread, reflected in sweating, trembling and epigastric sensations. Similarly affected by the sight of blood. Headaches and insomnia increasing in severity. Very anxious

over flying but with a high sense of duty and much tendency to persevere. Mother a chronic worrier.

Case 2.—Pilot, aged 30 years, with over 300 flying hours in Coastal Command. Complaint—tendency to take off to the left especially at night. Tends to land too high resulting in two accidents. Ocular findings—hyperphoria one prism dioptré. Adduction + 25 per cent.—not steady. Was recommended for a course of eye training, which was cancelled after inspection of psychiatric report. Psychiatric examination—markedly timid, and over conscientious person with obsessional trends. Well marked anxious anticipation before flying, motives for which were initially inadequate. Tends to panic in emergencies. Always timid and unaggressive, avoided fights and swimming. Increasingly anxious about flying duties.

Case 3.—Air Bomber aged 29 years, with 70 hours flying in elementary aircraft. Complaint—eyestrain, “bombing going to pieces,” and headaches. Ocular findings—marked ocular muscle imbalance, and convergence weakness of left eye. Orthoptic exercises prescribed but discontinued because he said it made him sick. Following this complaint of nausea he was referred for psychiatric opinion. Psychiatric examination—associated symptoms were found, such as “black-outs” and giddy attacks during training overseas, also feelings of fatigue, listlessness and loss of appetite. Could not concentrate. Markedly predisposed to nervous illness. In childhood exhibited fear of the dark, nail biting, thumb-sucking, and stammer during school days. Nausea at the sight of blood, feelings of faintness, food fads and capricious appetite. Gave up swimming because of lack of confidence; never dared to dive. Father always anxious worrier, died of angina. Mother chronically depressed and neurotic. Patient an only child. Extremely timid and anxious personality, containing marked anxiety and hysterical trends.

Case 4.—Air Gunner aged 22 years, with 250 non-operational hours flying. Complaint—headaches and blurred vision. Ocular findings—convergence defect and esophoria. Psychiatric examination—unreliable witness, untruthful; emotionally immature and given to histrionic poses. Eye symptoms were obviously part of a defensive system. Past history included phases of marked moodiness and anxious tension. The conclusion arrived at is that he is a typically hysterical person. Feels unable to continue flying duties because he is incapacitated by his symptoms.

### Conclusions

This series of cases does not attempt to give any idea of the frequency and distribution of heterophoria and neurosis in flying

personnel as a whole. What is submitted is that heterophoria and neurosis frequently co-exist, and that in 50 of our 57 cases, 87 per cent., heterophoria was itself a symptom of hysterical type, and part of a generalised psychological illness, which is the primary and major disorder. References to the literature indicate that this conclusion applies also to the civilian cases. If the conclusion is a valid one and it is established that heterophoria is in the majority of cases a psychiatric symptom, then it has important implications for prognosis and treatment.

It is customary to give these cases orthoptic, *i.e.*, local treatment, as a principal measure. Whether, or when, a neurotic symptom should be treated by local remedies, is a controversial point. There are circumstances which make such a course desirable and correct, and we are far from suggesting that it should not be employed. But it is submitted that in the treatment of neurotic symptoms, local treatment alone is not enough. It should be preceded by a psychiatric examination. This is essential, not only to establish a correct diagnosis, but also to decide on the appropriate treatment for each particular patient, whether by some environmental adjustment, or some form of psychotherapy, in addition to any local treatment that is desirable. Orthoptic treatment alone may cause the heterophoria to disappear. It will not cure the neurosis or render the patient less vulnerable to a recurrence. On the other hand it may confirm a hypochondriacal eye-consciousness, and render ultimate psychological treatment much more difficult. Whether it should be employed or not, and what other measures are desirable, for the treatment of the whole condition should, we think, be decided by collaboration between the ophthalmologist and the psychiatrist. At any rate, it would seem on the evidence presented, that the ultimate prognosis depends more upon the emotional stability of the patient, than upon the degree of ocular muscle imbalance which is present.

### Summary

The relationship between heterophoria and neurosis is discussed and the literature is reviewed.

Fifty-seven cases of heterophoria in flying personnel are presented and the psychiatric findings are discussed. Fifty cases or 87 per cent. were found to have psychological illnesses of well marked type.

The results suggest that a psychological examination is an essential part of the investigations of ocular muscle imbalance. Local treatment should not be started until the presence and degree of psychoneurosis has been assessed.

We wish to acknowledge our indebtedness to Air Commodore R. D. Gillespie and Air Commodore P. C. Livingston for putting at our disposal their case records of a number of these patients.

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### MACULAR COLOBOMA WITH BILATERAL GROUPED PIGMENTATION OF THE RETINA\*

BY

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GLASGOW

FIVE cases of grouped pigmentation have come under our notice in the past two years. Only one showed a coincident abnormality of the eye. It is the exception to find any lesion that might be considered congenital in the same eye as that showing grouped pigmentation. Blake, in a review of the literature until 1926 found, inferior conus, epicanthus, cataract in the fellow eye, and abnormality of the extra-ocular muscles. In none was there any visual defect. The case we propose to discuss had a macular coloboma in the right eye, and we have not been able to find a similar case in the literature. It was further unusual in the wide bilateral distribution of the pigment spots. These spots are considered to be of congenital origin. It would be legitimate to assume that the coloboma was also congenital, arising out of the same adverse factor. It is often difficult to say whether macular coloboma is congenital or not except in the familial bilateral group with skeletal deformity, or where there is some characteristic like ectasia, abnormal vessels, or coloboma of the disc to support the view. This case probably deserves record because the picture is rare and a brief consideration of the possible aetiology might be of interest.

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