CINEMATOGRAPH EYE IRRITATION

BY

JAMES ALEXANDER WILSON, O.B.E., M.D.,

GLASGOW

It has been alleged that cinematograph displays have injurious effects on the eyes, especially on the eyes of young people. This may or may not be true, for so far but little evidence has been produced to support any conclusion.

During the war I was resident surgeon in a large hospital where these displays were given from three to six times a week. The people attending were adults, soldiers, nursing staff and the medical officers. Most of them did not suffer any inconvenience, some suffered slightly, but a few suffered severely. In the severe cases the eyes became hot, congested and painful, and had to be closed or turned away from the pictures. Personally I suffered much inconvenience, and felt constrained to take an interest in its aetiology.

What are the conditions under which this discomfort is produced, or in what manner do cinematograph conditions differ from normal visual conditions?

The hall was large, and people entering after the exhibition had begun could not see to move about or to find a seat. They had to stand in the passage till their eyes got adapted to the darkness.

Photographs that have been taken in bright light when thrown on the screen show much pure white, yet the amount of light on the screen is such that the pictures would hardly be visible in full daylight; visibility is obtained by darkening the hall, and the pictures are brilliant only relatively to the darkness; thus the retinae are dealing with images that are feebler than ordinary images. We have a somewhat feeble central image, with the periphery almost in darkness, and the contrast is sharp. Although the picture on the screen gives the impression of continuity, it is really being rapidly changed. It is usually unsteady, jerking vertically or laterally; and, further, in a picture the sense of depth is artificial. What falls on the centre of the retina is not an image of objects standing out in relief and in natural colours, but it is an image of an image, and it is in black and white.

There are seven points that may be considered: (1) The vertical angle of view; (2) dark adaptation; (3) unsteadiness of the images of the pictures; (4) complexity of the images; (5) peculiarity of the fundus illumination; (6) the absence of natural colours; (7) individual susceptibility.

(1) The interim report of the joint committee appointed by the Illuminating Engineering Society states: "that the ocular discomfort arising is due mainly to the fact that the eyes of the

spectators are directed upwards at an abnormal angle." I usually sat 45 feet away from the screen, and the angle of elevation in my case was small and had nothing to do with the production of the discomfort. I never suffered from headaches, but my eyes became hot and painful. Occasionally luminous sensations, like scintillating scotomata, moved about the periphery of my field of vision. At first I thought some one was shining a flash-light on my waistcoat as I sat back in the chair. These are not symptoms of fatigue of the muscles that elevate the eyeballs, but of irritation of the retina. Experimentally I sometimes sat close to the screen, but the result was just the same. My eyes are normal in every way.

(2) In dark adaptation the standard of illumination is lowered and there is developed a condition of greater power to perceive dimly-lighted objects and fine differences in degrees of illumination. The occupation of the coal miner necessitates extreme dark adaptation and it is associated with eye trouble.

In the last year of the war several additional, open, electric roof lights were introduced into our hospital picture hall and during the intervals in the exhibition the hall was brilliantly lighted. This, in my experience, gave great relief.

(3) Is the discomfort produced by instability *per se*? If one reads a book in a railway train the book shakes and even if one reads under these circumstances for hours on end little or no discomfort ensues.

(4) A film, say of a landscape, with words printed over the photograph, one picture dissolving into another, or a fast moving object, are all irritating to the eyes. The eyes cannot focus blurred, confused, complex or rapidly moving objects. These fret and probably fatigue the eyes. Sharp retinal images are important for the comfort and the efficiency of the neuro-optical apparatus, and their prolonged absence is the cause of nystagmus. The nystagmus of the miner is usually associated with photophobia.

(5) The peculiarity of the fundus illumination is that the centre is occupied with a relatively bright image, while the periphery is in darkness. If the light on the screen is very bright, or bright in patches, or flashes, the peculiarity is exaggerated and the discomfort is increased.

Dr. Edridge-Green suggested that light falling on the periphery of the fundus liberates visual purple from the rods, and this, flowing towards the macula, supplies that on which vision depends. Here we have conditions which should test this theory, for if a definite law in physiology is broken, every person attending the display should suffer; but it is not so. If, during a cinematograph exhibition, a person sits close to the large screen, then the central image is much enlarged and the extent of the dark periphery correspondingly diminished; but still the discomfort is produced.

If that person sits at the back of the hall he suffers very little or not at all. In this position the screen conditions are much lessened and the screen is seen through some depth of diffused light.

Many people suffer discomfort during a lantern lecture. In this case there is no movement of the picture, but there is the uneven illumination of the fundus, a bright central image, a dark periphery and dark adaptation. Theatre headaches are recognised and here the lighting conditions are somewhat the same.

(6) The absence of natural colours in a photograph renders the identification of objects more difficult and increases the necessity for fixation and attention.

(7) The last point is individual susceptibility. The great mass of people do not suffer any discomfort, some suffer slightly and only a few acutely. One can only suggest as an explanation of this that some nervous systems are more sensitive than others.

Conclusions.—The locality of the discomfort is in the retina. In dark adaptation the retina is more sensitive to dim lights, more sensitive in every way probably, resenting coarse flashes of light, ill-defined and uncertain images. Dark adaptation seems to be one of the objectionable conditions. Could the necessity for this be diminished by raising the standard of light on the screen and in the hall? Brilliant illumination of the hall during the intervals is desirable. The pictures should be as steady as possible. Dissolving pictures should be abolished and so should printing over a landscape. Objects in rapid motion are irritating. Equality of lighting on the screen is desirable, i.e., avoiding strong lighting of white objects. Possibly dim lights placed beyond the screen to illuminate the periphery might be of service. I fancy the lowering of a green curtain during the intervals might be soothing, in so far as it would be a change from the monotony of black and white.

Does cinematograph irritation produce defective vision, or injure the eyes to the extent of producing disease? Frequently repeated irritation might produce some disease or simply defective vision, but I have never seen any that I thought had been so produced. Defective vision unassociated with error of refraction or eye disease, especially among scholars, was recognized before the cinematograph was introduced or before it came into general use.

ANNOTATIONS

International Congress of Ophthalmology

Six years have passed since the International Congress of Ophthalmology at Petrograd was postponed. Our brethren of the