THE EYESIGHT OF MOTOR DRIVERS *

BY

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The coming into force of the Road Traffic Act, with its requirement of a declaration on the part of the applicant for a licence of a certain standard of vision, has aroused little comment, either by way of commendation or criticism. It would appear that the regulation was in some sense a reaction to a popular demand caused by an allegation that "the vast majority of road accidents are due primarily to defective eyesight on the part of the pedestrian or driver." Whether or not the regulation will be effective in reducing the incidence of motor accidents we shall never know, for there is no evidence of the truth of the allegation of the dominant influence of bad sight. Accidents known to be due to bad sight do occur, but they appear to be rare. I have searched my records of bad-sighted patients, and find in several hundred only three such cases. A man with advanced chronic glaucoma stepped in front of a moving car and was killed. A woman, nearly blind from senile cataract, did the same, and was severely injured. A man nearly blind from optic atrophy drove his own car in a rural district for some years in safety—with a child on his knees to direct him!—but he eventually came to grief.

A CONFLICT OF EVIDENCE

Evidence given to the Select Committee of the House of Commons was in sharp conflict. For the R.A.C. it was said that the majority of road accidents appeared to be "unavoidable," and were due in general to a lack of road sense rather than to a lack of competence. The traffic advisor to the Metropolitan Police, admitting the relative freedom from accidents of the taxicab driver, who is subjected to comprehensive tests, considered that "in many cases danger does not arise from want of competence, but rather from want of consideration and undue trust in the driver's competence." For the London General Omnibus Company it was said that the bulk of accidents "arise out of the fact that there is a lack of mental alertness in the particular circumstances in which the accidents occur."

The only witness who urged the necessity for sight tests came from the Cyclist Touring Club. He said "far too many people are driving motor cars now whose sight renders them very dangerous." But on what facts this opinion was based we do not know.

One real piece of evidence of importance was given by the London General Omnibus Company. In the years 1927 and 1928 the company received 61,000 applications for employment as drivers. From these, 3,936 candidates were selected for examination with a view to employment. Only 56 per cent. of those selected passed the medical examiners, and of the 44 per cent. rejected about four-fifths were not aware of having any physical disability whatsoever, and were much surprised at their rejection. Of the 56 per cent. of the selected list who passed the medical examination, 90 per cent. passed the competence test for driving, and were placed on probation for a period of three months. Of these, a further 2 per cent. were, during the probationary period, found unsuitable to drive, as they "at once fell into accidents, and therefore showed that they had not got that balance of mind which is necessary to be a safe driver upon the roads." This means that only 30 per cent. of the superficially suitable candidates were actually accepted as drivers after test. (It will be noted that the evidence does not differentiate

between the various forms of physical unfitness.) In 1928 the London General Omnibus Company had 100 fatal accidents, but in no case was any blame attached to the drivers in the course of the inquests. Of the fatal accidents 60 per cent. were found to be attributable to pedestrians, 26 per cent. to cyclists and motor cyclists.

STANDARDS OF VISION

The problem has been considered in many countries. Most Continental countries, and many of the States of the United States of America, have passed laws requiring certificates of medical fitness, particularly as regards eyesight. Some are very severe—for example, Germany:

Only those individuals are suitable to drive motor cars in whom the visual acuity is over $1/2$ in one eye, with or without correction, and reaches a minimum of $1/6$ in the other eye; provided also that the field of vision is normal, and the examination has eliminated the question of any illness recognized as causing weakness of sight. Persons whose visual acuity in an eye is less than $1/6$, or completely lacking, may be passed if that condition is at least of two years' standing and the other eye has an acuity of at least $2/3$ without correction. Such cases require the certificate of an oculist. Persons suffering from diplopia, aphakia, or hemeralopia are unfit to drive motor vehicles.

We may be inclined to the opinion that the German rule is better than the English rule. Ability to read the number plate of a motor car at a distance of 25 yards (between $6/18$ and $6/12$) without regard to field of vision must be insufficient for the purpose desired.

There are certain possible reactions from the English regulation. The issue of a driver's licence to an applicant who can properly make the required declaration is in some sense a guarantee of his fitness to drive. It is true that no such guarantee is given, but there will undoubtedly be a tendency to hold that it is implied. The legislature has taken this risk, notwithstanding advice tendered to it by experts that the standard was inadequate. Ophthalmic surgeons, therefore, must strive to spread the knowledge of what in our opinion is good and sufficient vision for road users.

Safe progression for driver and walker in ordinary daylight demands that the sight should have a threefold quality: visual acuity, field of vision, and binocular vision. Obviously a driver must have acuity sufficient to see a pedestrian, and to see him well enough to be able to judge of his probable actions. For such a purpose the 25-yard standard is probably quite sufficient. But the fact that this criterion alone is recognized belittles other factors in vision, which for locomotion are of far greater importance. Without a good or sufficient field of vision the fullest visual acuity is useless. There is no one of us who has not known patients with vision equal to $6/9$ who were, by reason of their limited fields, blind for all economic purposes. Freeland Fergus, in a paper published in the *British Medical Journal* (1928, i, p. 42), stressed the necessity for a good field of vision. He even went so far as to assert that form or macular vision was relatively unimportant for general purposes. His emphasis on the need of a good field was right, though his belittlement of acuity was wrong. Both are necessary, but for locomotion the field is paramount. Experience shows that persons with a 20 degree loss of the periphery of the field of vision find that in ordinary walking they are liable to bump against other persons and door posts; they do not see objects which are close beside them. Such a limitation as this will be dangerous in a high degree to the driver of a fast-moving car.

BINOCULAR VISION

The need for binocular vision is a more debatable point. Personally I am sure that it makes for a good and safe driver. By binocular vision we are able to judge

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of the position and size of objects and our relation to them. It is true that this can be found to some extent by the swift and unconscious movement of the head, and the appreciation of the parallax. But this faculty is not developed easily, and the evidence gained from it is not always reliable. Medical officers of the R.A.F. hold that defects of binocular vision are in the main responsible for bad landings, which account for a large proportion of flying accidents. In somewhat the same fashion car drivers who frequently get into minor scrapes owe their lack of judgement to defective binocular vision. I know that there are cases of one-eyed men who have done well. Hinchliffe was one-eyed, and a great airman. I read recently that Wiley Post, who flew round the world in nine days, is a "one-eyed Red Indian." An even more remarkable feat was performed by the Italian motor car driver in the Irish Grand Prix race this year. A stone hit his goggles, and splinters cut his eyeball. After a rest he pluckily resumed driving in spite of being bandaged over one eye. To drive a car at 100 miles an hour in such a state was no mean feat. Also I know of a one-eyed surgeon who has driven for years with safety in London traffic.

Notwithstanding these exceptions I do not like the one-eyed driver; I should not employ one myself, and I would not drive with one eye obscured. I have tried it, and I did not like the experience. I think that much of the difficulty which drivers find in reversing is due to the fact that during that driving they are one-eyed. I am sure that with our rule of the road a man blind of the right eye and with a Wellingtonian nose is not safe. I think that a fair measure of the safety of the one-eyed can be gained by his ability to play tennis. Fast ball games require swift judgement of positions; those with good binocular vision are able to excel, those with bad binocular vision or none are usually failures. Golf is in another category; the one-eyed man can play the game almost as well as the man with perfect binocular vision.

Defects of muscle balance likely to cause diplopia in states of fatigue will require caution. In lower degrees of defect the driver will not be likely to be unsafe, but he should be cautioned against lengthy drives, or driving when in poor health. In higher degrees of defect with frequent symptoms of diplopia there will be added risks. It is certain that constant diplopia should be a bar to driving unless this can be done with one eye partly obscured with the Chavasse glass.

NIGHT DRIVING AND LIGHT SENSE

The reliability of the modern car tempts people to use it as a general conveyance, so that night driving is growing much more common. In this connexion the light sense becomes of special importance. It is common to find that myopes dislike night driving, for the very form of their lenses reduces the light that enters the eye.

It is comparatively easy to determine whether a person with a doubtful light sense is safe or not. It can be judged by the use of the perimeter. If the peripheral field be mapped out in good daylight, and then again after the adjustment of the window blinds so as to reduce the illumination to one-tenth of the full light, the excessive reduction of the field of vision in those with a defective light sense will be manifest. Subjects of these defects may be safe drivers in the daytime, but at night they are dangerous. These persons, and especially the high myopes, recognize the defect and avoid night driving.

COLOUR-BLIND DRIVERS

Defects of colour vision should not constitute any disability for driving, either day or night. But the growing use of coloured signal lamps at road crossings has introduced a real difficulty for the colour-blind. Signal lamps of red, yellow, and green are springing up everywhere.

A mistake in reading one of these signals may bring the colour-blind driver into conflict with the police, and possibly into collision with other drivers or pedestrians. It is surprising that, despite warnings the authorities have had in this relation, they have not seen fit to adopt the more simple and safe signals which depend upon form rather than colour. A horizontal bar of light would everywhere be recognized as a sign to stop, a round light would indicate the need for caution, and a vertical bar of light would indicate a clear road. Such a plan would follow the long-established precedent of the semaphore signal, and could not lead to confusion.

OTHER FACTORS IN THE PROBLEM

Such a sketch of the sight the motor driver should have gives a very poor view of its complexity. Nor does it touch upon the interrelation of sight and muscular co-ordination—foot, hand, and eye—of the driver. Nor does it hint at the overriding power of nerve control suggested in the term "reaction time"—that power of response which makes two persons who show a general equality in equipment so far apart in capacity. Many accidents arise from a defective reaction time. Perhaps as many are due to visual or cerebral anaesthesia, because the mind behind the eyes is far away from the road—"seeing, they shall see, and shall not perceive." This visual anaesthesia, or wandering attention, has caused the death of not a few drivers and walkers, and there is no cure for it. Again, all our reactions vary from time to time, so that a test one day may be valueless on the next. Ill-health, unwise indulgence, and fatigue (such as is caused by too long driving) produce wide variations in "reaction time." One driver is made jumpy, so he handles his car injudiciously, and it skids into a crash; another becomes too slow in the uptake, and he runs into a collision. These changes due to fatigue become most manifest on entry into a large city, so that a momentary rest before proceeding into crowded streets is a wise precaution.

Practical consideration will inevitably lead to a double standard of fitness for drivers. Public utility and transport companies and taxicab proprietors must demand a proper medical examination of the eyes of their employees. They are responsible for their safety. Also accidents do more than damage cars; they hold up vehicles during the slow process of repair, and insurance rarely covers that loss. A strict examination is justified for these drivers, for they have to drive in all weathers, and both day and night, so that minor defects may become material. Private drivers will in time learn that it is wise for their own safety and peace of mind to gain the assurance of sufficient sight for the driving of the modern speedy car; and if a more liberal interpretation of standard be allowed to them it can only be on the understanding that their driving is intermittent, and not undertaken when conditions are likely to be adverse.

The Council of Epsom College will shortly award two "France" pensions of £30 a year to medical men. Candidates must be not less than 55 years of age, and their income, independent of any allowance from the College or from the Royal Medical Benevolent Fund, must not exceed £100 a year. The Council will also award one "Grewcock" pension of £70 a year. In this case there is no limitation as to age, but candidates must be legally qualified medical men who have retired from professional work, and who, in the opinion of the Council, are in need of the pension. There is the same income limit as in the case of "France" pensioners, and special consideration will be given to the claims of candidates having association with Worcestershire, Lincolnshire, or Carmarthenshire. Forms of application should be obtained forthwith from the secretary, Major W. L. Giffard, O.B.E., 49, Bedford Square, W.C.1.