OPHTHALMIC INTERNATIONAL STANDARDS, 1950*

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ONE of the duties incumbent upon an international scientific organization is the establishment of a system of standard measures and methods for general use within its particular science.

In ophthalmology, this need was beginning to be felt at the end of the 19th century, and at the X Ophthalmological Congress which was held at Lucerne in 1904 the Société française d'Ophtalmologie made certain proposals, which resulted in the election of a committee for the establishment of uniform determination and notation of visual acuity. The members of this commission were Charpentier, Dimmer, Éperon, Hess, Jessop, Nuel, and Reymond. Their report, presented to the XI Congress at Naples in 1909, recommended the use of standard tables with Landolt's broken rings, numbers with oblique straight lines (1, 4, 7), and numbers with curved lines (0), as optotypes, graduated on the decimal system and read at a distance of 5 m. A notation symmetrical between the two eyes was recommended for the meridians of astigmatism. These proposals were accepted by the Congress, but this attempt at standardization was not crowned with success, for the methods advised were never put into general practice and have now, for the most part, been abandoned. This failure was due to a number of different causes: many oculists preferred a reading distance of 6 instead of 5 m., some considered the decimal graduation to be less scientific and less practical than a geometrical progression, and some found the optotypes difficult to handle.

Neither were the recommendations for the notation of the meridians of astigmatism generally accepted; they suited neither the existing markings on ophthalmic instruments nor the equipment of the optical industry. Since these instruments have only one scale, the transcription of spectacle prescriptions became necessary and this introduced a great risk of error.

When the question of re-establishing international relations in ophthalmology was considered by delegates from the national ophthalmological societies at Schwenningen in 1927, it was felt

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advisable to take up the question of standardization again, and the delegates set up a committee to examine international ophthalmological problems. On the suggestion of that committee the International Council set up special commissions to study the following questions:

- (1) Standardization of visual acuity: Dufour, Elschmig.
- (2) Notation of the meridians of astigmatism: Marquez, Nordenson.
- (3) Examination of light sense: Hertel, Ovio.
- (4) Establishment of visual standards for aviators, seamen, railwaymen, and drivers of motor vehicles: Engelking, McMullen, Onfray, Verrey.
- (5) Organization of ophthalmological studies for general practitioners and for specialists: Lindner, Parker.

The reports of these commissions were presented to the XIII Congress at Amsterdam in 1929, but were never considered at any general meeting. At two special meetings, one to discuss the reports on the determination of visual acuity and the notation of the meridians of astigmatism, and the other to discuss the reports on visual standards for transport drivers, no resolutions were adopted, but the minutes were sent back to the committees for consideration.

Five years later the reports, partly revised, were presented to the XIV Congress in Madrid in 1933, and the following further reports were presented:

- (1) Formulae for the prescription of glasses (by Marx).
- (2) Standardization of tonometry (by a commission elected by the XIII Congress with Priestley Smith as honorary president, and Bailliart, Comberg, Cridland, Gradle, and Zeeman as members).
- (3) The practice and teaching of ophthalmology in the Latin-speaking European states (by Villard).

These reports, especially those with definite proposals, were discussed at a general session of the XIV Congress but the only decision taken was to accept the notation of the visual fields proposed by Luther Peter, and even in this case a formal wording of the rules was not given.

All these reports and unconfirmed proposals should have been submitted to the XV Congress in Cairo in 1937 for final decisions, but owing to opposition in the International Council the matter was dropped for the time being. The Council then decided to consider the entire matter at the XVI Congress in London; the reports were again returned to the committees for revision, were submitted to the various national societies with a request for their opinions, and after a final review by the Council were presented to the Congress in 1950. It was considered advisable to ask the Congress to leave the final

decisions to the Delegation of the National Societies, since this body was a more adequate forum for their discussion, and the reports were finally approved by the Delegation, subject to certain alterations, on July 21, 1950. The regulations finally accepted by the International Federation of Ophthalmological Societies are as follows :

INTERNATIONAL RULES FOR EYE EXAMINATIONS AND VISUAL DEMANDS*

Glass Prescriptions, "Scriptint"

- (1) The formula shall be divided vertically into two parts: the left half shall be reserved for the right eye and marked with the letter D ; the right half shall be reserved for the left eye and marked with the letter S.
- (2) The text prescribing the interpupillary distance shall contain the letters D.I.P.
- (3) The scheme for the notation of astigmatism shall be printed on the formula.
- (4) In prescribing glasses the numbers of the upper semicircle shall be used.

Notation of the Meridians of Astigmatism, "Axint"

- (1) The notation shall be identical for both eyes.
- (2) The notation shall be made as the physician is looking at the affected eye.
- (3) The notation shall start from the right end of the horizontal meridian (from the nasal end in the right eye and the temporal end in the left) and proceed counter-clockwise.

Candidates for Transport Operators

GENERAL RULES

- (1) The examining physician shall know his own acuity of vision, and his own visual fields, and, if testing colour sense, shall have a normal colour sense.
- (2) The visual acuity shall be examined with tables, read at a distance of at least 5 m. Letters shall be used as optotypes. The unit of measure shall be Normal Vision, the capacity of reading letters that subtend an angle of 5', formed of lines that subtend an angle of 1'. The tables shall reach up to Normal Vision, and be graduated on the decimal system. They shall be in conformity with further rules given by the Council.
- (3) The visual field shall be tested generally by the manual method. In doubtful cases, on special prescription, and in case the examiner himself has not normal fields, it shall be tested at the perimeter with an object of an angular magnitude of 3°. The visual field shall be considered normal or admissible from the point of view of traffic if it has the following limits :
 - (a) on the right eye:

Normal: 0°; C50°. 45°; C60°. 90°; C50°. 135°; C60°. 180°; C90°. 225°; C90°. 270°; C70°. 315°; C50°.

Admissible: 0°; C30°. 45°; C30°. 90°; C20°. 135°; C30°. 180°; C70°. 225°; C70°. 270°; C40°. 315°; C30°.
 - (b) on the left eye the demands shall be symmetrical to those on the right.

* These rules repeal the decisions of the Eleventh International Congress, Naples, 1909.

(4) The colour sense shall be considered normal if pseudo-isochromatic tables prescribed by the Council are read. For anomaloscopic examinations rules recommended by the Council shall be applied.

SPECIAL RULES

(1) *Drivers of Motor Vehicles : "Motorint"*

Public Services.—Visual acuity 1.0; 0.7. Glasses not admitted until the age of 40 years. After 40 years correction glasses up to 4 D ametropia admitted. Visual fields and chromatic sense normal. Periodical examination every three years.

Taxis.—Same conditions as for public services, but glasses allowed from the beginning: not more than 6 D ametropia. Visual fields and chromatic sense normal. Periodical examination every five years.

Private Cars.—Binocular visual acuity after correction 0.6; in worse eye 0.1. Admissible visual fields. One-eyed persons admitted if the acuity amounts to 0.8 and the visual field at the perimeter is normal. Time of habituation one year. Persons with visual acuity below 0.1 or with inadmissible visual field shall be regarded as one-eyed. Periodical examination desirable.

(2) *Railwaymen : "Ferrint"*

Traction.—Visual acuity 1.0; 0.7 without glasses. Periodical examination of engine-drivers every year; for others every three years. Visual acuity after nine years 0.5; 0.5 without glasses; corrected 0.7; 0.7. Visual fields and chromatic sense normal.

Guards.—Visual acuity with glasses, 0.7; 0.5. Periodical examination every three years. After three years visual acuity with or without correction 0.5; 0.3. Visual fields and chromatic sense normal.

(3) *Seamen : "Nautint"*.—Persons responsible for the navigation of vessels or serving as look-outs, visual acuity at entry into service 0.7; 0.3. Glasses not admitted. Periodical examination every three years. Visual acuity after three years 0.7; 0.3; after nine years 0.5; 0.3. Visual fields admissible, chromatic sense normal. Persons with hypermetropia more than 3 D should be warned.

COMMENT

The following comments on certain points in these regulations may be useful:

(1) For the prescription of glasses: "*Scriptint*". Of the detailed regulations proposed by Marx in his report (XIV Congress, Madrid, 1933, vol. III, 5, p. 33) only those were retained which facilitate the execution of prescriptions in foreign countries. For the measurement of the distance between the optical centres of the lenses the old, somewhat inadequate, but more familiar denomination "interpupillary distance" was retained.

(2) For the notation of the meridians of astigmatism: "*Axint*". This was substituted for the symmetrical notation proposed at Naples in 1909. The new notation coincides with that laid down at Madrid in 1933 for the visual field, and with the notation generally used by opticians, and also takes into account the fact that many oculists already have these markings on the lower semicircle of their trial frames.

(3) The standardization of the visual requirements for transport operators has become more necessary because of the diminishing importance of national boundaries in this sphere of activity. Nowadays, this applies equally to seamen, air-crews, drivers of motor vehicles, and railwaymen. Because a lead from the ophthalmologists was delayed, the civil authorities have, in at least one case, taken the initiative in establishing international regulations for civil aviation.

In setting up visual standards for transport drivers, it must be remembered that since the examinations are often carried out by general medical practitioners, simplicity is a first essential. Thus, letter optotypes are recommended instead of broken rings, pseudo-isochromatic plates instead of anomaloscopes, and examination of the visual field by confrontation instead of by perimetry.

For the examination of visual acuity, it was considered impossible to enforce the international tables, and letters were adopted as optotypes. A distance of *at least* 5 m. was prescribed, allowing the examiner latitude to use a greater distance if he so desires. The commission did not take up any definite position with regard to hypermetropia in its final report. The acceptance of hypermetropes in a profession or occupation depends upon the practicability of their wearing glasses; in modern vehicles, drivers are fairly adequately protected so that, in most cases, spectacles may be worn, and therefore this problem is less important. The outstanding difficulty for hypermetropes will now be the possible eventual reduction of the candidate's unaided visual acuity below the prescribed level.

The decimal graduation of the international tables of visual acuity was retained in spite of considerable opposition from those favouring a geometrical progression. A committee was, however, appointed to investigate the possibilities of devising a method of transition between the two systems and to work out any further standards necessary for its achievement. All these regulations were much influenced by the requirements of expediency and practicability, and it must be admitted that the international standardization of the determination of visual acuity for scientific purposes has not yet been achieved.

(4) For the notation of the visual field: "*Campint*". These rules were accepted in principle in Madrid in 1933, and their wording was decided by the Council in 1950. They are, as far as possible, analogous with the rules for the meridians of astigmatism. If the visual field measured is a colour field, the letters *Cv* for green, *Cr* for red, *Cfl* for yellow, and *Cc* for blue, are substituted for *C*.

The questions of standardizing the examination of the light sense, and of binocular and stereoscopic vision, were delegated to special commissions. The Delegation largely accepted the proposals of the commission regarding the "*Motorint*" standards; it agreed to the acceptance of binocular visual acuity and rejected a demand for the adoption of total acuity as a standard. The principle of the

periodical examination of private motor drivers was accepted as desirable. The commission's recommendations with regard to railwaymen were accepted. The regulations for seamen were restricted to those directly responsible for navigation.

In the final decision, air-crews were omitted, since the International Civil Aerial Organization (I.C.A.O.) had already taken up the matter and issued recommendations. Although the standards aimed at by I.C.A.O. differ somewhat from those proposed by the commission of the Federation of Ophthalmology, it was considered that the delay which any intervention might cause was not justified.

It is to be hoped that colleagues all over the world will accept the standards thus agreed upon, and use their influence to encourage the acceptance by the authorities of the requirements advised by the Federation for persons engaged in various forms of transport, so that this new attempt to bring about international agreement on the subject of visual standards may prove more successful than its predecessors.