ARABIC TEST TYPES*† FOR THE DETERMINATION OF VISUAL ACUITY

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VISUAL acuity is determined by the smallest angle at which the eye is able to distinguish two points as separate. It is therefore inversely proportional to the minimum visual angle. The normal visual acuity is found to correspond to an average minimum visual angle of one minute. Thus with relatively small angles one may say that the visual acuity is inversely proportional to the space which separates two points or, when the space is constant, that it is proportional to the distance which separates the eye from the two points. However, the visual acuity cannot be determined by means of two points with a variable distance alone. This is because it is difficult to reckon precisely the exact moment when the two points cease to be seen separately and blend into a single visual impression. It is for this reason that for examining the acuity of vision the test objects must be slightly complicated. Acuity is therefore measured in terms of the visual angle subtended by the constituent parts of the test object.

In 1862, Snellen introduced some scientific standardization into the measurement of visual acuity. His optotypes achieved such a wide and rapid success that most of the distance test types in clinical use to-day are modelled on Snellen's original chart. These optotypes are based on the following principle:

Each letter in the Snellen chart (Fig. 1) is designed in a square the sides of which are five times the width of the letter strokes. The breadth of the black strokes of the letter is equal to the white spaces between them and subtends an angle of one minute at the nodal point of the eye at the specified distance. Serifs are added to the larger strokes in order to maintain the unit separation throughout the letter. The whole letter subtends an angle of 5 minutes at the nodal point of the eye at the given distance.

FIG. 1.—The Snellen "E" Test-type.

FIG. 2.—The Landolt broken ring.

In 1899, Landolt introduced a test object for the illiterate which does not depend upon letters. This consists of a black circle with a gap (Fig. 2) which subtends an angle of one

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minute at the nodal point of the eye at the specified distance. The patient is asked to indicate the position of the gap. The Landolt ring has not been generally adopted in practice as a test object because it has the following disadvantages:

- (1) The ring overestimates the visual acuity of the person with an uncorrected astigmatism since it has no vertical, horizontal, or oblique lines (Sloan, 1951).
- (2) The break in the Landolt ring is probably guessed by the increased illumination in the gap before the form of the ring is clearly recognized, so that the visual acuity estimated is higher than the actual value (Duke-Elder, 1962).
- (3) A considerable time is needed to explain to patients how to indicate the position of the gap.
- (4) The ring lacks the interest of reading letters.

In spite of these disadvantages, Landolt rings are still used in Arab countries to determine the visual acuity as there is no other substitute. For this reason it is here proposed to introduce a visual chart made up of Arabic letters for testing the vision of literate Arabic-speaking subjects.

Description of the Chart

The chart consists of a series of selected non-serif Arabic letters arranged in lines like a Snellen chart, each row diminishing in size from 6/60 to 6/5 (Fig. 3, opposite). Each letter is carefully drawn to comply with the physiological requirements of a visual test object and none can be guessed by its general outline. Each letter is of such a shape that it can be inscribed in a square 5 times the breadth of the lines composing the letter. The sides of the square are divided into five equal parts giving 25 small squares. Each small square subtends an angle of one minute at the nodal point of the eye at the given distance. The letter is drawn by filling in some of the small squares (Fig. 4), maintaining the unit separation of the black and white areas throughout. The whole letter thus subtends an angle of 5 minutes at the nodal point of the eye at the given distance.

FIG. 4.—Two Arabic letters illustrating the conformation of the proposed Arabic test-types to the Snellen principle of 1-unit line width and 1-unit interspace. These two letters are particularly useful when correcting an astigmatic error since they can be recognized only when clearly focused in all meridians.

The present chart is made of white opal plastic sheet (Perspex) so that it can be diffusely and evenly illuminated by a light source from behind. The letters are printed in black to give good contrast. Several charts are made in which the arrangement of letters is varied so that the observer cannot memorize the letters of any one series. Charts are also available for reverse use with a mirror.

Advantages of the Chart

(1) The use of test letters is clinically convenient to determine the best optical correction of the eye since they subject the eye to a test comparable with the varied tasks imposed upon it in everyday life.

(2) The letters which are selected for the chart from the Arabic alphabet conform to the Snellen principle of 1-unit line width and 1-unit interspace when drawn on the conventional 5 × 5-minute framework.

(3) The letters are of medium difficulty and of approximately equal legibility. Their relative difficulty was determined by comparison with the Landolt broken ring.

(4) None of the letters can be guessed before it is seen clearly because they all have the same external squared outline.

FIG. 3.—The Arabic chart.

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