THE

GILES-ARCHER Colour Perception Unit

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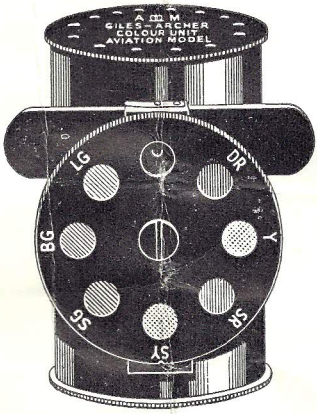

DESCRIPTION

The Colour Unit consists of:

(1) A Lamp House.
(2) A slide with three apertures.
(3) A set of filters enclosed in a disc which is engraved for more readily distinguishing the colour in use.

These filters are as follows:—

(1) D.R.—Dark Red, **for detecting shortening of Red End of the spectrum**
(2) Y. —Yellow.
(3) S.R. —Standard Red.
(4) S.Y. —Standard Yellow.
(5) S.G. —Standard Green.
(6) B.G. —Blue Green (Signal Green).
(7) L.G. —Light Green.
(8) —A Clear Aperture.

*The actual Transmission Values are:—

Filter S.R. Transmits from 6250 A.U. to Infra Red.
Filter S.Y. Transmits between 5600 to 6600 A.U.
Filter S.G. Transmits between 5000 to 5450 A.U.

Of these, S.R., S.Y. and S.G. approximate very closely to the specification suggested for civil aviation (I.C.A.N.).* For convenience in using the three standard colours, the disc is notched just above the standard yellow. This enables the operator to know easily in the dark the position of the standard filters, the standard red and the standard green being placed either side of it.

The lamp is housed in a container designed to avoid overheating and to exclude extraneous light. Illumination is furnished by a 15 watt Pigmy lamp of standard E.L.M.A. specification. The filters which are enclosed in a disc capable of rotation are of gelatine, enclosed in plane glass, and are protected from any radiated Heat by special Heat Resisting Glass placed between the filters and the bulb.

APERTURES

The slide has three apertures as follows:—

(1) 5 m/m aperture.
(2) 3 m/m aperture with frosted glass.
(3) 1 m/m aperture with neutral filter.

It will be seen that two yellows are found in the new Unit, denoted 'Y' and 'S.Y.' The yellow 'Y' is less sensitive than the Standard Yellow which complies as nearly as possible with the I.C.A.N. specification.

It will be noted that this filter is placed between Standard Red and Standard Green. It is shown immediately after one or the other, i.e. after either Red or Green has been exposed. So to a person possessing full normal colour vision, the Standard Yellow remains unchanged under these conditions, and is still called yellow. Where, however, colour vision is even slightly deficient, in some cases not sufficiently affected to fail in the Ishihara Test, the Standard Yellow will be miscalled as either red or green, according to the colour of the preceding filter. In its present position, it is of great value for record purposes, but it is considered that where failure is found with this filter, the ordinary yellow should then be shown. Provided there is no hesitation with the naming of this filter, the candidate can be passed if this is his only mistake.

METHOD OF TESTING

(1) Commence the Test by showing the complete sequence of colours through the large aperture (aperture 1), asking the candidate to name the colours.
(2) If the candidate miscalls the white light explain to him that this light is supposed to be white.
(3) Use aperture 2 pushing the slide sideways to bring this into view. Employ filters out of sequence and cover over the aperture with the hand, so that the candidate cannot guess what is coming. Then use aperture 3 in like fashion. Aperture 3 contains a neutral filter.
With this aperture it may be necessary to move the candidate up to 10 ft. distance when testing for dark red.

In cases presenting any difficulty, it is important to show the Red and Yellow filters and pass up to Light Green and then back from Dark Green to Yellow. Regard S.Y. (Standard Yellow) as a confusion test only. Remember that the small aperture is not a fair test unless the examination room is really dark and that where this is not the case the assessment may be made upon the results obtained through apertures 1 and 2.

Result A. Colour Normal: The term explains itself. There should be no mistakes whatever in the sequence of showing the filters using apertures 1 and 2. Even Standard Yellow (S.Y.) should be named Yellow or Orange, provided that the candidate has been shown the plain aperture immediately before this. In proper conditions of darkness, there should be no difficulty with any of the colours using aperture 3.

Result B. Colour Defective Safe: There should be no mistakes made in regard to the naming of the deeper shades of Red and Green. Standard Yellow can be misnamed and Yellow can be 'Orange.' The

palest Green can be named White (after showing a deeper Green). Greens and Reds must be correctly named with the small aperture 3 in the dark, but dark red can be misnamed.

Result C. Colour Defective Unsafe: If the candidate describes Red as Green or **vice versa,** with apertures 1 and 2, in any sequence, he should be rejected. If, in the dark, he calls Red Green, or **vice versa,** with aperture 3, he should be rejected.

In a case which presents features so bad that mistakes are made with Red and Green in aperture 1, there is no need to give further time to the test. Where the Ishihara results are very bad, but the lantern results seem conversely good, the test should be very carefully made, altering the sequence and covering the aperture with the hand during each change. It often happens that a candidate will suddenly misname a colour completely and become, therefore, Colour Defective—Unsafe.

This lantern is quite a simple piece of apparatus and the colour changes can quickly be mastered. The results, provided a reasonable technique is followed, can be relied upon.

The Unit, although designed primarily for the examination of candidates for the Royal Air Force, is equally useful for the other Services. Care must be taken however, to familiarise oneself with the standards governing colour vision, before an opinion is given as to the possibility of acceptance in the branch in which the candidate desires to enter.

CONFUSION TESTS

The Admiralty and many other services use a combined technique which embodies the use of a Confusion Test, which does not require the naming of colours, in addition to a lantern test, and it is strongly recommended that this be used for all who present themselves for Colour Examination. The Ishihara Colour Test is used by the Admiralty, and it is suggested therefore that two tests be used in the order named.

(1) Ishihara a Colour Test (in daylight).
(2) Fifteen minutes' dark adaptation.
(3) Giles-Archer Colour Perception Unit.

ACQUIRED COLOUR BLINDNESS (Central Scotomata)

A failure in the small apertures may be due to defective colour vision, or it may be due to a central colour scotoma. In the latter case if this is small, a slight shifting of the eyes may cause the candidate to recognise the colour. Hence care must be taken to see that the head and eyes are in the correct position. Thus candidates who pass the large aperture, and fail in the small aperture are probably congenitally colour blind, but they may fail as a result of a central colour scotoma, due to Toxic or Tobacco Amblyopia, etc. In these cases corrected visual acuity will practically always be sub-normal, and it may be necessary to bring the patient nearer than 6 metres. Diagnosis will be definitely established by the mapping of the scotoma on the Bjerrum screen.

For refractive cases with subnormal vision, the use of the Colour Unit forms a quick and easy method of detecting central colour scotomata, and thus is of great value in general refractive practice, apart from its pre-eminent function, that of the testing of the congenitally colour blind.