The detection of colour-blindness & imperfect eyesight by the methods of Dr. Snellen, Dr. Daae, and Prof. Holmgren : with a table of coloured Berlin wools and sheet of test-types / by Charles Roberts.

THE DETECTION OF COLOUR-BLINDNESS AND IMPERFECT EYESIGHT

ROBERTS

N.B.—This sheet of TEST-TYPES *must be kept Clean.*

No. 1.—(12 inches.)

437, 35, 86, 680, 956, 8634, 473, 833, 3536, 4303. During the minority of Queen Mary, the Palace of Holyrood was burnt, as well as the city, by the English forces under the Earl of Hertford; soon after, it was repaired and enlarged beyond its present size. At that time it is said to have consisted of no fewer than five courts, the most westerly of which was the largest. Great part of the Palace of Holyrood House was burnt by the soldiers of Cromwell; but, at the Restoration, it was again repaired, and altered into its present form by King Charles II. from designs by Sir William Bruce. Prince Charles Stuart took up his residence for some time in this mansion of his forefathers in 1745; and hither the inhabitants of Edinburgh repaired to pay the contribution levied on the city. It was afterwards occupied by the Duke of Cumberland. In 1793, apartments were fitted up for the residence of the Comte d'Artois, the Duce d'Angoulême and Berri, and others of the

No. 2.—(24 inches.)

75, 55, 42, 70, 9042, 450, 637, 768, 426. French Royal Family. In 1831, the Comte d'Artois, Charles X of France returned to his old apartments, after an absence of thirty years, with several of his family, but soon quitted them, and went to Germany. Previously to the visit of George IV. to Scotland, apartments in the palace were fitted up for his use; and, though he resided at Dalkeith, a levee, drawing-room, and meetings of Privy Council, were held here. The Palace is now fitted up as a residence for her present Majesty, who occasionally

No. 3.—(Three Feet.)

734, 463, 945, 678, 605, spends a short time here, on her visits to Scotland. The apartments of Mary, Queen of Scots, are shown to visitors. In them are many articles said to have been used by Queen Mary, and pieces of work said to have been wrought by her, but their history is very doubtful.

No. 5.—(Five Feet.)

4 5 7 8 2 6 9 S U Y A C E G L N P R T O D

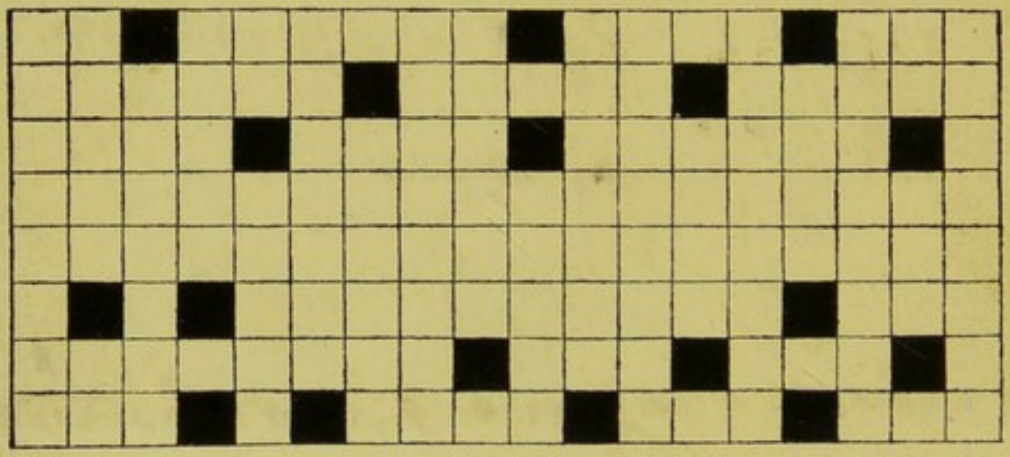
No. 7.—(Seven Feet.)

7 8 3 4 5 F H K O S U Y A C E

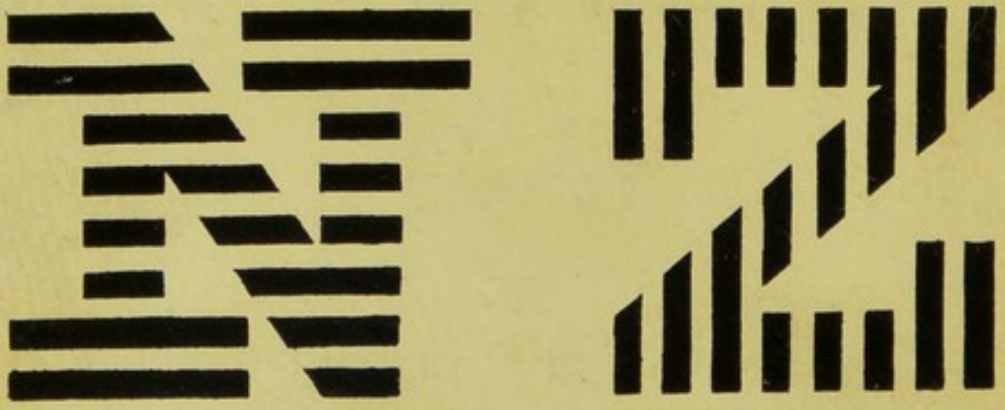
No. 10.—(Ten Feet.)

5 8 3 7 V Z B D F H K

No. 15–57. Army test dots. (57 Feet.)



No. 20. For Astigmatism. (10–20 Feet.)



THE DETECTION OF

COLOUR-BLINDNESS & IMPERFECT EYESIGHT

BY THE METHODS OF

DR. SNELLEN, DR. DAAE, AND PROF. HOLMGREN.

WITH A TABLE OF COLOURED BERLIN WOOLS AND SHEET OF TEST-TYPES.

Arranged for the Anthropometric Committee of the British Association for the Advancement of Science,

BY CHARLES ROBERTS, F.R.C.S., &c.,

AUTHOR OF A MANUAL OF ANTHROPOMETRY, ETC.

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PREFACE.

It has been found, by careful inquiries made in Germany and elsewhere on the Continent, that the eyesight of young persons has become less acute since education has become more general and protracted; and extensive investigations, made in the United States and on the Continent, have shown that colour-blindness exists to a much greater extent than was previously supposed,—amounting to one case in every twenty-five males; while among females it is of comparatively rare occurrence. It is of the utmost importance that railway servants and sailors should possess a proper perception of colours to enable them to recognise with certainty the signals by which the movements of railway trains and ships are regulated; and many industrial occupations, such as painting, dyeing, weaving, shop-keeping, &c., can only be carried on successfully by persons with a well-developed colour-sense.

As few inquiries of this kind have been made in this country, the Anthropometric Committee of the British Association for the Advancement of Science has determined to add these subjects to those of a similar nature already under their investigation, and the accompanying Tests and Instructions have been prepared for this purpose.

Dr. Snellen's test-types* are in general use for testing the quality of the eyesight, and a selection has been made from them sufficient for determining whether the eyesight be normal or defective.

Dr. Daae's table of coloured Berlin wools† is well suited for ascertaining the presence or absence of colour-blindness, as its use does not demand any technical skill in the examiner. This table, moreover, with the slight modifications which we have made in it, forms an excellent "Key" to the system of Professor Holmgren with loose skeins of wool,‡ a description of which is given for the use of those who prefer this method of testing the colour-sense.

We are indebted to the kindness of Dr. Daae for permission to copy his table of coloured wools, and to Prof. Holmgren for specimens of his test-colours.

A complete set of coloured wools for Holmgren's method has been procured as a sample, from Upsala, and similar sets can be obtained through the publisher, 3, St. Martin's Place, Trafalgar Square.

* 'Test-types for the Determination of the Acuteness of Vision,' by H. Snellen, M.D. Utrecht, 1862.

† 'Die Farbenblindheit und deren Erkennung,' nach Dr. A. Daae. Berlin, 1878.

‡ 'Om nagra nyare praktiska metoder att upptäcka färgblindheit.' Upsala, 1878.

INSTRUCTIONS FOR THE DETECTION

OF

COLOUR-BLINDNESS AND IMPERFECT EYESIGHT.

THE DETERMINATION OF THE QUALITY OF THE EYESIGHT.

As a standard of vision we adopt clear and accurate perception, not uncertain recognition, of the test-types. Each eye should be examined separately.

To determine the acuteness of vision we measure the smallest angle at which objects of known size and known form are distinguished. To determine the visual angle we measure the extreme distance at which objects of definite size (*e. g.* letters) can be recognised; or we measure the size of the objects which can be distinguished when placed at a definite distance (*e. g.* one foot). Square letters, whose limbs have a width equal to one-fifth of the letter's height, are generally distinctly visible to a normal eye at an angle of five minutes (*i. e.* one-twelfth of a degree). The nearest point of distinct vision is from four to seven inches; the farthest point is infinite distance.

The numbers placed at the head of each set of types and diagrams express the distance in *feet* at which they can be seen by the normal eye (*i. e.* at an angle of five minutes).

Test I.—The test-types must be placed in the perpendicular position in good daylight, the light coming from behind or either side of the candidate. When the small test-types are used, the card should be held by the candidate at the farthest distance at which he can read or spell the letters with the greatest fluency. The distance between the card and the eye should be measured with a rule or measuring-tape.

Test II.—When the large test-types, test-dots, or letters composed of parallel lines are used, the card should be suspended on the wall, and a tape marked in feet laid on the ground. The candidate should be placed at a distance greater

than that indicated by the numbers at the head of the type, and gradually advanced towards the card until he can clearly distinguish each letter or dot. His distance from the types will be shown by the tape at his feet.

Rule.—*The degree of acuteness of vision is found by dividing the distance at which the type is seen by the candidate, by the number at the head of the test-type,* (i. e. *the distance at which it can be seen by the normal eye*). *Thus if No.* 10 *test-type is read at a distance of ten feet,* $\frac{10}{10} = 1$, *or normal vision; if at five feet,* $\frac{5}{10} = \frac{1}{2}$, *or one-half that of normal vision. On the other hand, No.* 10 *may be distinguished at a greater distance than ten feet, say at twelve feet,* $\frac{12}{10} = 1\frac{1}{5}$. *In this case the vision is above the average.*

The test-dots (No. 15–57) are employed for testing the sight of recruits in the British army, and are useful when the candidate cannot read, or when he may have some motive for deceiving the examiner. "Each test-dot is one-fifth of an inch square, and corresponds at a distance of fifteen feet with the bull's-eye of a target two feet square at six hundred yards distance. With perfectly acute vision these test-dots ought to be clearly visible in full daylight at nineteen yards. Directions for using the test-dots :—1. Measure off fifteen feet with precision. 2. Hold the card perfectly upright in front of the man, and let it face the light so as to be fully illuminated. 3. Expose some of the dots (not more than seven or eight at a time) by covering the remainder with a card, and desire the man to name their number and relative position. 4. Vary the groups frequently, to provide against deception, by using a covering card with a square portion cut out of one corner; six different groups of dots may be exposed without exceeding the number above mentioned." This is a *minimum* test, and is intended to ascertain if the candidate's eyesight is good enough for military service. As a test of his acuteness of vision the farthest distance at which the dots can be distinguished with certainty, *out of doors*, must be stated.

When *astigmatism* exists horizontal and vertical lines (No. 20) cannot be seen with equal clearness at one and the same time, because the focal distance in the two meridian planes of the eye are unequal; the meridian of greatest curvature is most frequently vertical, while that of

the least curvature is horizontal, and they are always at right angles to each other; hence the defect of vision is generally horizontal. Astigmatism is often associated with other forms of imperfect eyesight.

Diagnosis 1.—If the test-types can be read with fluency at the distances indicated by their respective numbers, and if the horizontal and vertical lines (No. 20) are seen with equal clearness at a distance of from ten to twenty feet, *the eyesight is normal.*

2.—If the test-types can only be read with fluency at distances less than their numbers indicate, there is *short-sight* (or myopia). This defect can be completely corrected by suitable *concave* lenses.

3.—If the large type can be read at the proper distance, and the small type only at distances greater than their respective numbers, or not at all, and the candidate's age is upwards of forty years, there is *far-sight* (presbyopia), or impaired vision of advancing age. This defect can be corrected by suitable *convex* lenses.

4.—If the horizontal lines appear quite black and distinctly defined in outline, while the vertical lines are brown and obscure, or *vice versâ*, there is *astigmatism*. This defect can be corrected by suitable *cylindrical* lenses.

5.—If the test-types cannot be seen clearly at any distance without the aid of lenses, or when the small types are held very near the eye and the large types quickly become obscure, and when reading causes fatigue, there is *over-sight* (hypermetropia), which can be corrected by suitable *convex* lenses; *weak-sight* (amblyopia); or *feeble-sight* (asthenopia). *Squinting* (strabismus) is generally associated with some of these forms of imperfect eyesight. Weak-sight and feeble-sight are due to disease, and may be included with the various forms of *blindness* caused by injury, &c., under the term *impaired* eyesight.

N.B.—To record observations made on the eyesight, the number of the test-type must be placed at the bottom, and the distance at which it can be distinguished by the candidate must be placed above it in the form of a fraction: thus, if the greatest distance at which No. 10 can be read is nine feet, the entry should be $\frac{9}{10}$; if twelve feet, $\frac{12}{10}$; and so on. Astigmatism must be recorded as "horizontal" or "vertical," or by either of the letters, (N or Z,) which is *imperfectly* seen.

THE DETECTION OF COLOUR-BLINDNESS BY DR. DAAE'S TABLE OF COLOURED WOOLS.

No decisive results can be obtained as to the efficacy of a person's colour-sense by asking him the names of certain colours. One person's perception of colours may be irreproachable, yet his power of expression may be defective; whereas another may be colour-blind, but practice may have taught him the names of colours. The table of coloured wools has been marked with numbers and letters, so as to avoid the necessity both for the examiner and the candidate to designate the colours by their names, and it is only required that the person under examination should reply in the affirmative or in the negative to the examiner's questions. The wool patterns are already sorted, as the candidate is required to arrange them, by Holmgren's method, for testing the colour-sense. The table contains ten horizontal lines, on each of which seven colours are placed. Two of the lines are filled with one colour in various shades according to the degree of light: these are No. 8, green; and No. 10, red.

Test I.—The table should be placed in good daylight, and the candidate should be told that some of the horizontal lines contain colours of one description in different shades, and others different colours; after which, the first line should be pointed out, and the candidate questioned whether all the colours therein are of the same description, which question should be repeated with each consecutive line.

Diagnosis 1.—If the candidate designates the two uni-coloured lines (*i. e.* No. 8 and No. 10) correctly, and dismisses all the rest as mixed, his colour-sense may be considered *good*.

2.—But if he does not designate them correctly, nor any of the others, his colour-sense is *undecided*.

3.—If he designates one of the lines with various colours as being all of the same colour, he is *colour-blind*, and he will have great difficulty in distinguishing between *green* and *red*.

It is always desirable to repeat the examination again and again if it has not proved satisfactory in the first instance. If it be desired to test or to qualify the result of an examination one colour should be pointed out, and the candidate required to find all the similar colours on the table. Suppose red, say 5 G, is pointed out, and the candidate is found able (although with some difficulty) to point out the other red pattern, he evidently shows a keener perception for red than if he were to associate it with grey, brown, or (as sometimes happens) with green colours. The same method may be employed with other colours, but it should be remembered that, generally, light colours are more apt to engender mistakes than saturated tints.

TEST II.—According to Holmgren, those who would associate with purple ("magenta"), 6 C, a blue and a violet, or either tint, are *red*-blind; and those who would associate with a similar pattern, 4 C, green and grey tints, or either of these, are *green*-blind.

Persons associating yellow and other colours with 1, 2 and 4 D; yellow or grey with blue, 1 E; or blue and grey with yellow (lines 1 and 2);—suffer from *blue-yellow*-blindness.

a. In lines 1 and 2 of the table the characteristic combinations of *blue-yellow-blindness* are demonstrated.

b. In lines 3 and 4, that kind of red-green-blindness which is known as *green-blindness*.

c. In lines 5, 6 and 9, that kind of red-green-blindness known as *red-blindness*.

THE DETECTION OF COLOUR-BLINDNESS BY HOLMGREN'S METHOD WITH LOOSE SKEINS OF BERLIN WOOLS.*

A selection of Berlin wools in small skeins is made, including red, orange, yellow, yellow-green, pure green, blue-green, blue, violet, purple, pink, brown, grey,—several shades of each colour, and at least five gradations of each tint, from the deepest to the lightest. Green and grey, several kinds each of pink, blue, and violet, and the pale grey shades of brown, yellow, red, and pink, must especially be well represented.† I have selected, to determine whether the colour-sense is or is not defective, a light green (see table 7 F),—dark green may be also used,—because green, according to the Young-Helmholtz theory, is the whitest of the colours of the spectrum, and consequently is most easily confused with grey. For the diagnosis of the especial kinds of partial colour-blindness, I have selected purple (pink); that is the whole group of colours in which red (orange) and violet (blue) are combined in nearly equal proportions that no one sufficiently predominates over the others, to the normal sense, so as to give its name to the combination.... Our sample colours, therefore, are the two complementary colours of each other,—*green* and *purple* (see table 7 F, and 4 C, 6 C).

Method of Examination and Diagnosis.—The Berlin wools are placed in a pile in broad daylight, a skein of the test-colour is laid aside, and the candidate requested to select the other skeins most resembling this in colour and place them by the side of the sample. It is necessary that the candidate understands what is required of him. The examiner should explain that resemblance in every respect is not necessary; that there are no two specimens exactly alike; that the only question is the resemblance of the *colour*, and that, consequently, he must endeavour to find something similar of the same shade, something lighter and darker of the same colour, &c. The mode of procedure may be explained practically to a large number of persons at the same time without loss of security, for no one with defective colour-sense finds the

* Condensed from Dr. Joy Jeffries's translation in 'Colour-blindness; its Dangers and Detection.' Boston, U.S.A., 1880.

† Sets of wools can be obtained through Mr. David Bogue, 3, St. Martin's Place, W.C.

correct skeins in the pile of wools the more easily from the fact of having a moment before seen others looking for and arranging them. Besides the "*test-colours*," which the examiner presents to the candidate, there are the "*colours of confusion*,"—that is to say, those which the colour-blind selects from the heap of wools, because he confuses them with the other samples.

Test I.—The green sample, 7 F, is presented. This sample should be the palest shade (the lightest) of very pure green, which is neither yellow-green nor blue-green to the normal eye, but fairly intermediate between the two, or at least not verging upon yellow-green.

Rule.—The examination must be continued until the candidate has placed near the sample all the other skeins of the same shade, or else, with these or separately, one or several skeins of the class corresponding to the "colours of confusion" (line 7), until he has sufficiently proved by his manner of doing it that he can easily and unerringly distinguish the confusion colours, or until he has given proof of his difficulty in performing this task.

Diagnosis.—He who places beside the sample one of the "colours of confusion" (line 7)—that is to say, finds that it resembles the "test-colour"—is *colour-blind*. He who, without being quite guilty of this confusion, evinces a manifest disposition to do so has a *feeble colour-sense*.

If we need determine only whether a person was colour-blind or not, no further test would be necessary. If we want to know the kind and degree of his colour-blindness, then we must go on with another test.

Test II.—A purple skein is shown to the candidate. The colour should be midway between the lightest and darkest (4 C, 6 C).

Rule.—The trial must be continued until the candidate places near the sample all or the greater part of the skeins of the same colour, or else, simultaneously or separately, one or several skeins of "confusion" (lines 4 and 6). He who confuses the colours selects either the light or deep shades of blue and violet, especially the deep (6 B, 6 D), or the light or deep shades of one kind of green or grey, including the blue (4 B, 4 D).

Diagnosis 1.—He who is colour-blind by TEST I., and who, upon TEST II., selects only purple skeins, is *incompletely colour-blind.*

2.—He who, in TEST II., selects with purple only blue and violet, or one of them (line 6), is *completely red-blind.*

3.—He who, in TEST II., selects with purple only green and grey, or one of them (line 4), is *completely green-blind.*

Remark.—The red-blind never selects the colours taken by the green-blind, and *vice versâ*. Often the green-blind places a violet or blue skein beside the green, but only the brightest shades of these colours. This does not influence our diagnosis.

The examination may end with this test, and the diagnosis be considered as perfectly settled. It is not necessary, practically, to decide whether the colour-blindness is red or green. But to be more entirely convinced of the relations of complete colour-blindness with signal colours, and to convince railway *employés* and others who are not specialists, the examination may be completed by one more trial. The one we are going to mention is not necessary to the diagnosis, and only serves to corroborate the investigation.

TEST III.—The red skein (5 F, 5 G, 3 F) is presented to the candidate. It is necessary to have a vivid red colour, like the red flag used as signals on railways.

Rule.—The test, which is applied only to those completely colour-blind, should be continued until the candidate has placed beside the specimen all the skeins belonging to this shade, or the greater part, or else, separately, one or several "colours of confusion" (lines 3 and 5). The red-blind then chooses, besides the red, green and brown shades, which to the normal sense seem darker than the red (line 5). On the other hand, the green-blind selects opposite shades, which appear lighter than the red (line 3).

Remark.—Every case of complete colour-blindness discovered does not always make the precise mistakes we have just mentioned in the preceding examinations. The exceptions are either instances of persons with an inferior degree of complete colour-blindness, or of colour-blind persons who have been exercised in the colours of signals, and who endeavour not to be discovered: they, therefore, usually confound at least green and brown; but even this does not always happen.

Additional Note.—We have not given rules for discovering *total* colour-blindness, because we have not found any cases of this kind. If any such case should be found they will be recognised by confusion of every shade having the same intensity of light.

Violet-blindness will be recognised by a genuine confusion of purple, red, and orange, in TEST II. The diagnosis should be made with discrimination (lines 1 and 2). TEST I. often shows blue to be a "confusion colour;" this may, in certain cases, be the sign of violet-blindness; but not always. We have not thought it advisable to admit defects of this kind; only the most marked cases, that other examinations establish as violet-blindness, should be reckoned in our statistics. Finally, to acquire a desirable uniformity, it is necessary to add, that in the preparatory examinations, I record cases of *complete colour-blindness* by 2 (2 R, 2 G, 2 V), those of incomplete blindness by 1, and those of feeble colour-sense by 0·5 (0·5 R, 0·5 G, 0·5 V).

NOTE ON COLOURS AND COLOUR-BLINDNESS.*

"Besides white and black we distinguish a great variety of *colours*. These admit of being all arranged side by side, ray-wise, in a closed circle, but only in one certain order, not in any other. Starting from green we come, on the one hand, through yellow to red; on the other hand, through blue to violet; and red and violet meet in crimson. Proceeding quite empirically, selecting all the tints or hues which it is possible for a perfect sight to distinguish one from another by the slightest well-appreciated gradations, I arrived at the number of one hundred; and it is remarkable that when these hundred are arranged with equal areas radially in their due order in a circle, those standing diametrically opposite to each other are, within narrow limits, the complementary ones. Each *tint* or *hue* (nuance) has its various *shades* of *saturation*, and every shade its various *degrees of luminosity* (or *tones*)." The primary colours of the spectrum are red, yellow, green, blue, and violet; and these are sometimes stated to be all of them independent colours. According to Young, Clerk Maxwell, and Helmholtz, the three fundamental colours are red, green, and violet; and this three-divisional system is now generally accepted as a basis for studying the defects of the colour-sense.

The colour-sense is very differently developed in different individuals: while some are able to distinguish the minutest tints, others have great difficulty in doing so, and some seem to be able only to make a broad distinction between dark and light colours. The line drawn between an average sense of colour and colour-blindness must be deemed arbitrary. For ordinary purposes a person cannot be called colour-blind if he be unable to distinguish the various shades of red or of green, or between blue and violet with accuracy; and colour-blindness can only be said to exist if decidedly green, red, or grey colours cannot be separated; also when decidedly blue or violet colours are not with certainty distinguished from yellow or grey (Daae). "Sir John Herschel supposed, and Clerk Maxwell proved, that the colour-blind see only two colours; they have a dichromic system (Herschel, 1832). In the spectrum they see only two

* The portions of this note which are included in inverted commas are taken from Prof. Donders's remarks, on Colours and Colour-blindness, at the meeting of the British Medical Association, held at Cambridge in 1880, and published in the 'British Medical Journal' for November 13th, 1880.

colours: that on the red side we call *warm*, that on the blue side we call *cold;* they see a grey *neutral* stripe between them. Green, yellow, orange, and red belong to the *warm*, blue and violet to the *cold*, system. *Warm* and *cold* they distinguish easily; but the different colours belonging to *warm* or to *cold* are confused by the colour-blind; such differences as they do distinguish between these are differences of saturation and of intensity. Trying to apply our words to their sensations, their *warm* they call *red* if much saturated (and brilliant); *yellow*, if intense and moderately saturated; *green* if pale. And they often decide rightly. But red may be pale, yellow dark, green much saturated; and then confusion is inevitable. With the different colours belonging to *cold* they have no success at all; they call them all bluish, or blue. The *neutral* stripe produces a second series of confusions. It is found, as we saw, in the bluish green. Now pink is another neutral colour, producing the same equilibrium of *warm* and *cold;* so that it also is seen grey. Bluish green, pink, and grey are therefore the same, all grey; but the least predominance of *warm* or *cold* is recognised. All this holds good as well for red-blindness as for green-blindness; but there are differences. *Cold* seems the same for both, but *warm* is not. In the green-blind *warm* scarcely differs from our red; but in the red-blind it approaches green, and in some cases reaches it. . . . . Most remarkable differences occur in regard to the *neutral* stripe; that of the green-blind is *warm* for the red-blind, that of the red-blind is *cold* for the green-blind; and also there is a pink, which is blue for the former, red for the latter. All the colours of our circle, as the red-blind or the green-blind see them, can be made up by yellow and blue with black and white. In both the same tones recur twice, and twice the neutral stripe,—once between *warm* and *cold* in the greenish blue, and once between *warm* and *cold* in the pink. But to the red corresponds a much darker yellow in the red-blind, to the bluish green a darker blue in the green-blind. *Warm* and *cold* must be considered as complementary colours. To which of our sensations they correspond cannot well be told; probably *cold* is blue or violet; *warm* is yellow, approaching to red in green-blindness, to green in red-blindness."

Colour-blindness is congenital, and is often hereditary; when it exists in a high degree it is incurable. It is sometimes the result of disease, or the excessive indulgence in tobacco or alcoholic liquids, in which case it may pass away with abstinence and recovery of health. Colour-blindness must not be confounded with ignorance of the names of colours, which is very common in the lower classes, and among males of all classes of society.

EXPLANATION OF THE TABLE OF COLOURED BERLIN WOOLS.

Lines 1 and 2 characterise blue-yellow-blindness.	Dr. Daae.
„ 3 and 4 „ green-blindness.	„
„ 5, 6 and 9 „ red-blindness.	„
Line 8 comprises different shades of green.	„
„ 10 comprises different shades of red.	„

Line 7 comprises the light green (7 F), TEST I., and the "confusion colours" characterising *colour-blindness* or *feeble colour-sense*.	Holmgren.
„ 6 comprises the purple (6 C), TEST II., and the "confusion colours" characterising *red-blindness*.	„
„ 4 comprises the purple (4 C), TEST II., and the "confusion colours" characterising *green-blindness*.	„
„ 5 comprises the bright red (5 F), TEST III., and the "confusion colours" characterising *red-blindness*.	„
„ 3 comprises the bright red (3 F), TEST III., and the "confusion colours" characterising *green-blindness*.	„

N.B.—As the wools are liable to fade the table should not be exposed unnecessarily to the light; and, as they are easily soiled, they must not be touched with the fingers.

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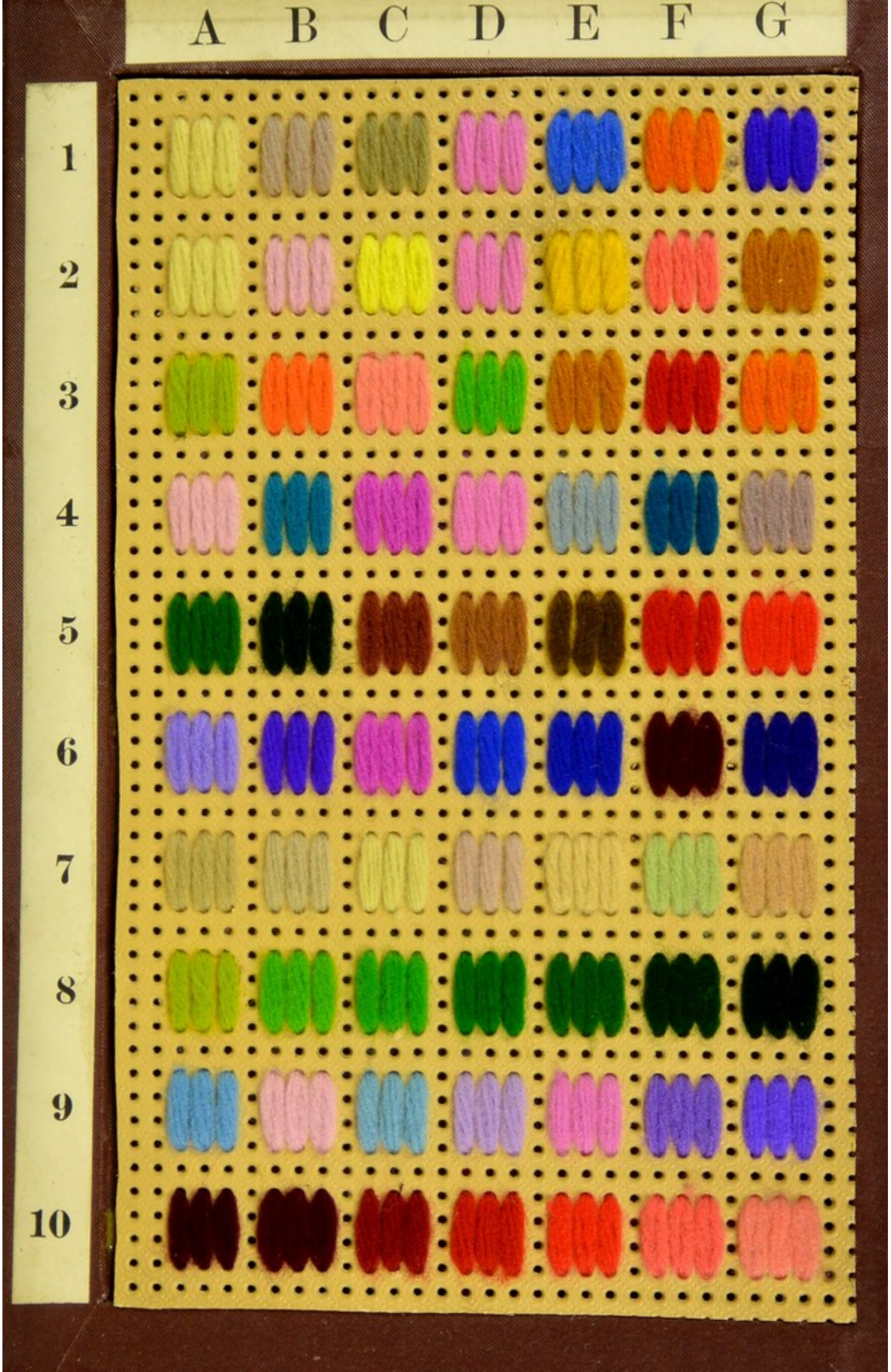
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