DALTONIANA

NEWSLETTER
OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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ATTENTION! EVERY IRGCVD MEMBER HAS TO RETURN THE LAST PAGE OF THIS ISSUE FOR THE ELECTION OF THE NEW DIRECTORIAL COMMITTEE.

ADMINISTRATIVE REPORTS FROM THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

During the Fifth International Symposium of the IRGCVD held in Strawberry Hills (Richmond-upon-Thames, 26th-28th june 1979), the Directorial Committee and the General Assembly decided that :

1) Dr. W.S. Stiles becomes a Member of Honour of our Research Group by unanimity of voices (this was announced to him after his lectrure on 29th june);

2) The amount of the annual membership fee is increased from 10 to 15 U.S. dollars; the research group has to find new sources of incomes, e.g. from company memberships; moreover the eventual expenses for invited papers at our symposia will be cut down to a maximal amount of 400 U.S. dollars;

3) The next int. IRGCVD symposium will be held, as asked by the Association Internationale de la Couleur, in West-Berlin in september 1981, with Prof. M. Richter as host; three sites (Besançon, Tokyo and Sydney) were proposed for the following 1983 symposium, and the majority of the General Assembly voted for Besançon, with Dr. A. Roth as host;

4) Among the 7 special themes suggested for the 1981 int. symposium, the General Assembly choosed as fundamental theme "Spatial and temporal approaches for studying colour vision", and as two clinical themes "Peripheral thresholds and chromatic discrimination in ophthalmologic diagnosis" and "Pathology of the higher optic centers and colour vision", moreover a panel discussion could be made about the subject "Why is the blue mechanism more liable to acquired damage?".

The authors will have the opportunity to present their data in posters if they prefer this to an oral presentation. A proposal of selection of the lectures and papers by a committee of referees was not approved by the general assembly;

5) Concerning the Directorial Committee, it was decided "to proceed finally to the elections foreseen by the by-laws" - a written ballot through Daltoniana - and "to transfuse new blood into the committee". During the meeting of the Directorial Committee on 25th june, the present members (A. Dubois-Poulsen, K. Lakowski, Y. Ohta, K. Ruddock, H. Sperling and G. Verriest) accordingly (a) accepted that A. Dubois-Poulsen, K. Ruddock and H. Sperling should retire (b) asked that the general secretary should write to each of the absent committee members for thanking them for the past activities and for knowing if they are candidates for the new committee (c) proposed W.D. Wright, L. Rositani-Ronchi, J. Birch, V. Smith and P. Lanthony as candidates for the new committee. The General Assembly added as candidates A. Hedin, J. Mollon, J. Vola, L. Went, F. Parra, G. Vogt and M. Maione, while H. Sperling was asked to reintroduce his candidature. All accepted.

G. Verriest wrote to the absent committee members : among them M. Marré and P. Grützner answered that they are also candidate for the new committee. Prof. J. François and Pieter L. Walraven prefer to retire and expressed the warmest wishes for our research group.

Guy Verriest.

STANDARDIZATION COMMITTEE OF THE IRGCVD

The following members of the Standardization Committee met for discussion at the Fifth IRGCVD Symposium in Richmond-upon-Thames on June 25th 1979 : A. Dubois-Poulsen, E. Hansen, R. Lakowski, Y. Ohta, A. Roth, G. Verriest and J. Birch (chairman).

The chairman regretted that having been asked to take over the organisation of the Fifth IRGCVD symposium when previous plans had to be cancelled, it had not been possible to continue the work of the standardization committee and the intended programme had not been completed. It is still hoped that the detailed guide to colour vision tests and test procedure, already begun by the committee, would be extended and completed for publication. However, for the present, it was decided to concentrate effort into preparing a short draft for all users of colour vision tests for the Concilium Ophthalmologicum Universale. This would be modelled on a similar report prepared by the International Perimetric Society.

Dr. Lakowski agreed to make a preliminary draft to be approved by the committee members present with the addition of Dr. Marion Marré to represent the Socialist Countries.

The approved draft would then be printed in Daltoniana so that all the members of the Group would be informed and final comments invited. The final report would then be published and made available at the meeting of the Concilium Ophthalmologicum Universale in San Francisco in 1982. Dr. Lakowski was asked to consult a similar guide being prepared for military personel in the U.S.A. so that direct conflict of advice is avoided.

The committee then expressed concern that no progress had been made in persuading the Kollmorgen Corporation to reprint the H-R-R plates. The corporation's policy appears to be that reprinting would not be considered unless the sale of 10,000 copies could be guaranteed. Further lobbying by members in individual countries to try and obtain better estimates of potential demand was suggested. A similar problem regarding the Mac Beth Easel lamp, also controlled by the corporation, has arisen. Concern was also expressed about the F2 plate and it was suggested that steps should be taken to obtain permission to reprint this plate commercially.

Dr. Verriest and Dr. Hansen were asked to correspond with the C.I.E. committee formulating traffic signal standards to ensure that the interests of colour defective observers are fully considered.

Jennifer Birch.

IRGCVD FINANCIAL STATEMENTS

The following statements are an accurate representation of the financial position of the IRGCVD. However, to those unfamiliar with financial statements, they may be confusing. Therefore, the three types of statements used are described below so that those unfamiliar will be able to grasp their significance.

The INCOME STATEMENT is a statement of the money received by the group throughout a specified period (revenues) less the money paid out (expenses) during the same period. It gives an indication of the gain or loss for that period only and is not representative of the total worth of the organization.

The STATEMENT OF RETAINED EARNINGS is a statement of all monies held by the organization at the date of preparation. It consists of all amounts previously held plus or minus the amount gained or lost since the last statement. The retained earnings statement is an indication of the total worth of the group.

NOTES TO THE FINANCIAL STATEMENTS are designed to clarify any ambigous titles used in the statements, to detail calculations and to explain confusing entries. To fully appreciate the financial statements it is essential that close attention be paid to these notes.

INCOME STATEMENT for the Two Year Period Ending December 31, '78

Revenues :		
1977 Membership Fees	$1370.00	
1978 Membership Fees	1200.00	
1979 Membership Fees	40.00	
Add: gain due to foreign exchange (net of bank charges)	132.12	
Other Membership Fees[1]	56.45	
Bad cheques recovered[2]	72.39	
1977 Interest Income[3]	139.88	
1978 Interest Income	160.22	
Total Revenues		$3171.06
Expenses :		
1977 Publication Expenses[4]	$1502.81	
1978 Publication Expenses	780.37	
1977 Conference Expenses[5]	570.05	
Total Conference and Publication Expenses	2853.23	
Bad cheques[2]	64.57	
Total Expenses		$2917.80
Net income		$ 253.26

STATEMENT OF RETAINED EARNINGS At December 31, 1978

Retained Earnings - December 31, 1977	$1,967.96	
Net Income for Year End December 31, 1978	719.93	
		$2,687.89
Add Back : Unearned interest income deducted from 1977 statement of retained earnings	25.00	
Less : 1978 Estimated unearned interest income[3]	(27.00)	
		$ (2.00)
Retained Earnings - December 31, 1978		$2,685.89

NOTES TO THE FINANCIAL STATEMENTS - 1977, 1978

(1). Other membership fees include cheques received from unidentified members. The banks from which the funds were received have been contacted but, at the time of these statements, the name of the sender(s) was unknown.

(2) When the Bank of Montreal does not have a cheque cashing agreement with a foreign bank, the cheque is returned to the foreign bank for collection. The ank of Montreal debits the IRGCVD account when this action is taken and,

for simplicity, this has been called "bad cheques". If the bank collects the funds from the foreign bank the IRGCVD account is credited and the credits are recorded as "Bad Cheques Recovered".

(3). Since interest income is paid by the bank semi-annually on April 30 and October 31, interest estimated from the previous year was deducted and interest estimated for the current year was added to arrive at interest income for each of 1977 and 1978. Interest income was estimated by calculating the average amount received per month based on the actual amount received in the year (ie. actual interest received multiplied by 2/12 equals interest income to be received for the period November 1 - December 31). For a more complete description of the method used refer to the 1977 and 1978 notes of the financial statements.

(4). Publication expenses are to cover the cost of publications such as Daltoniana.

(5). Conference expenses are paid to various members and guest speakers for expenses related to conferences such as travel expenses for guest speakers.

Romuald Lakowski.

LITERATURE SURVEY

Colorimetry by a new principle, by D. GUNKEL and D.G. COGAN, Arch. Ophthal. 96, 331-334, 1978.

A "practical chromaticity system" produced by Wratten coloured filters balanced with neutral density filters has been used to plot the extent of neutral zones in a small sample of colour defectives both congenital and acquired. The instrument called the chromagraph, produced any colour at any saturation level uniformly on a screen, and incorporates a marking device to plot neutral zones. A variable viewing angle is possible. Comparisons are made with scores on the HRR plates, D 15 test and Nagel anomaloscope. Good agreement in diagnosis in shown for colour normals but considerable disparity exists for the colour defectives. The test is designed to indicate the colours which are seen by the colour defective. The instrument appears to be available commercially although no details are given. It will be particularly useful as a teaching aid, and will assist clinicians in understanding the principles of colorimetry. - Janet Voke.

Maxwell spot and additivity in tetrachromatic matches, by D.A. PALMER (Department of Visual Science, Institute of Ophthalmology, Judd Str., London, WC1H 9QS, England), J. opt. Soc. Amer. 68/11, 1501-1504, 1978.

Following lights were matched, presented by Maxwellian View in a 10° circular field, hemisected vertically : R+C+V=Y+B; R+G+V=Y+B and R+C+V=G+B, where V=425 nm, B=473 nm, C=513 nm, G=543 nm, Y=591 nm and R=641nm. Initially a match, e.g. R+G+V=Y+B, was made at a retinal illuminance of about 50 td. Then the whole field was attenuated neutrally by interposing a sectored disk and after several minutes adaptation at the lower level a brightness match was made by adjusting Y and B together, so that the color balance was not disturbed. When the field was restored to the highest level and the observer was readapted he made a brightness match by adjusting Y only. A full color and brightness match was then made by adjusting R, G and V. The cycle was repeated until a match was obtained that did not change between the two extreme levels. In the matches the Maxwell spot was usually visible as a light patch on the side containing the violet or as a dark patch on the other side. Its presence could be confirmed by masking the field down to a subtense of 2°. The experiments demonstrate that the rod contribution in large-field color matches can be equalized on both sides of the field by adding a fourth stimulus to the usual three of colorimetry. However, if a violet test stimulus is included, the Maxwell spot can be seen and can cause large departures from Grassmann's laws. The tetrachromatic matching does not solve the problem of non-additivity in large-field colorimetry. - Ingeborg Schmidt.

Chromatic border distinctness not an index of hue or saturation differences, by B.[illegible] and A. VALLERY (Psychol. Dept. University of California, San Diego, LaJolla, California 92093), J. opt. Soc. Amer. 69/1, 113-118, 1979.

A series of experiments was carried out to study the utility of chromatic border distinctness as an index of hue and saturation differences between lights. In experiment I, part 1, each of two observers with normal color vision viewed a 1°30' circular bipartite field. In the right hemifield one of three spectral lights (500, 519 or 541 nm) was presented. The observer varied wavelength and intensity of monochromatic lights less than 460 nm on the left hemifield to find a light that produced no visible border with the right hemifield. In part 2, one of the observers was presented with one of a set of 6 lights (from 483 to 587 nm) in the right hemifield and one of another set of 8 lights (from 390 nm to 430 nm) in the left hemifield. The retinal illuminance of the light from the right hemifield was held fixed in each pairwise comparison. For each pair presented the observer adjusted the radiance of the left hemifield until a minimally distinct border (MDB) formed between the two hemifields. The distinctness of the border was rated on an eight point subjective scale where "0"

meant no visible border and "7" a very distinct border. Except of the very short wavelengths all observers were done at 30 td in these experiments. These two sets of results indicate that there are pairs of lights of differing hue that can yield no visible border. - In experiment II the right field was of a standard white of 30 td and of a color temperature so that it produced an invisible border with a 570 nm field. The experimenter randomly presented to the left hemifield one of 28 spectral lights from 400 to 700 nm. The subjects, two observers with normal color vision and normal visual acuity, had to (1) achieve optimal alignment of the border between the hemifields (2) adjust radiance of left hemifield until the MDB border was found (3) rate its distinctness on the 0 to 7 subjective scale. The experiments show that chromatic border distinctness increases in proportion to a function of the difference of responses of the R and G cones only. Thus distinctness of a chromatic border cannot be used by itself as an index of hue or saturation differences between lights because both of these aspects of color involve contribution from B cones. - Ingeborg Schmidt.

Complementary colors : composition and efficiency in producing various whites, by R.W. PRIDMORE (Material Branch, Department of Defence Russell Offices, Canberra, A.C.T. 2600, Australia), J. opt. Soc. Amer. 68/11, 1490-1495, 1978.

Various wavelengths are compared with complementary combinations of pairs of short and long wavelengths to determine their relative efficiencies for neutralizing unit power of the complementary color. The complementary efficiency function in any of 14 whites from 2000 to infinite K color temperature consists of two bands, a primary waveband, in which optimum complementary efficiencies are achieved by single wavelengths and a secondary band in which they are achieved by additive combinations of short and long wavelengths. In any CIE standard illuminant or other specific white, single wavelengths shorter or longer than the primary waveband are less efficient than secondary band optimum compound colors in neutralizing complementaries. Equations are given to find primary waveband intervals and limits in all whites. - Ingeborg Schmidt.

Regeneration of the human rod pigment after bright bleach, by T. TANINO and N. OHBA (Department of Ophthalmology, University of Tokyo School of Medicine), Acta Soc. ophthal. jap. 81/10, 1574, 1977.

Changes of transmissivity properties of the human rod receptors due to illumination were studied by photographing an optogram retained on the retina. The optogram was produced by illuminating a defined area of the peripheral retina and the fundus was photographed by a uniform, near monochromatic bluish-green flash with peak-wavelength at 508 nm. The optical density of rhodopsin was estimated by measuring difference in the photonegative density between the bleached and the adjacent un-

bleached area. A white bright light of 6.0 log scotopic trolands in 60 sec exposure revealed rhodopsin density (double passage of the rods) of around 0.16 at the 16° temporal retina. The density was smaller in other regions. The bleaching effects decreased systematically with elapse of time in dark, the change of the optical density on bleaching recovering in a simple exponential manner. The speed of the recovery appeared invariable in regions of the peripheral retina studied, and the time constant of the exponential function was about 6.5 minutes. - Yasuo Ohta.

Coloured pattern displacement and VEP amplitude, by N.O. PARRY-JONES and P. FENWICK (St. Thomas Hospital, Department of Neurology and EEG Department, London SE1 7EH, England, and Institute of Psychiatry, De Crespigny Park, Denmark Hill, London SE5, England), Electroencephalography and Clinical Neurophysiology 46, 49-57, 1979.

Visual evoked potential (VEP) amplitude and latency were measured for white/black, blue/black, green/black and red/black checkerboard patterns. The effect of the extent of the pattern displacement (measured as 1/4, 1/2, 3/4 or full check width) on the VEP amplitude and latency was investigated for each color checkerboard. In all cases, VEP amplitude increased linearly with increasing pattern displacement, and no systematic change in latency was apparent. When equal luminance adjustments were made for each color checkerboard, the VEP amplitude did not differ significantly between the white/black and the colour/black checkerboards. Some latency differences between the various color patterns were noted, however, these differences were not evident for all pattern displacements. - Gary L. Trick.

Studies of color perceptive information processing in retinal-brain system (1) Time duration effects of colored stimuli and a spectral sensitivity curve, by H. ICHIKAWA, T. YASUMA (Department of Ophthalmology, Nagoya University School of Medicine), and S. TANABE (Nagoya First Red Cross Hospital), Acta Soc. ophthal. jap. 81/10, 1563, 1977.

Basic experiments and clinical researches were performed in order to investigate defective color systems in some kinds of retinal diseases by a psychophysical method. Experiment 1 : The increment-threshold spectral sensitivity curve was investigated under the following conditions. A circular 1° test flash was superimposed over the center of a 7 log troland white background 3.5° in diameter. The durations of these stimuli were set on 9 and 135 msec. Two groups were studied, one consisting of two normal subjects and other of protanopia, deuteranopia, chronic open angle glaucoma and pigmentary degeneration of retina. The spectral sensitivity curve of the normal subject, using 1° test flashes of 135 msec exposure on a white background, had 3 peaks at approximately 440 nm, 530 nm and 610 nm, whereas the spectral sensitivity curve for 9 msec flashes was re-

sembled each other, and any increment of sensitivity was not detected at approximately 610 nm. It the case of pigmentary degeneration of the retina, the spectral sensitivity curve for 135 msec was similar to the normal one. From these results it could be assumed that the spectral sensitivity curve including 3 peaks for 135 msec flashes reflects the activity of the opponent color system of a neural unit.

Experiment 2 : This experiment was performed to make clear the mechanisms of 3 peaks of the spectral sensitivity curve for 135 msec obtained in experiment 1. The optical system for this experiment consisted of 3 paths; one is the same test path as in ex. 1 and the other two paths were used for the background, which contained polarization filters so that the 2 backgrounds could be mixed. Under these conditions, the mixture ratio of white light with monochromatic light (550 nm and 620 nm) could be changed continuously with a constant brightness (spectral compensation method). The increment threshold spectral sensitivity curves for 200 msec flashes were investigated under these conditions. It was assured that the spectral sensitivity curves under the monochromatic background of 550 nm or 620 nm changed its figure with an increasing ratio of mixed light. With the increased ratio of white light mixture, the responses of red-on and green-off reactions were emphasized and finally, the spectral sensitivity curves turned over the spectral sensitivity curves with 3 peaks which were taken under the condition of a white background.

Conclusions : The spectral sensitivity curves, investigated from the experiments under the conditions of long exposure time and a white background, might be conducted by the opponent color system, since the spectral sensitivity curves obtained from persons suffering from diseased neural unit did not reflect the activity of the opponent color system. Combinating these experiments with the results of spectral sensitivity curve under selectively bleaching background (after Wald), a method was found of detecting acquired color defect mechanisms, by the factor of cone channels and neural units. - Yasuo Ohta.

A property of the photopic monochromatic ERG in congenital color blindness, by T. YOSHIDA, Y. UJI, Y. KOBAYASHI and Y. NORIHIRA (Department of Ophthalmology, Mie University School of Medicine), Folia ophthal. jap. 29, 763-770, 1978.

Patients with congenital colour blindness were subjected to photopic monochromatic ERG recordings under white light adaptation. The monochromatic stimuli were calibrated in equal energies by means of a thermopile and ranged between 400 and 680 nm at intervals of 20 nm. All protanopes (10 cases) had a series of bp waves in which the maximum response occured at 540 nm; the response was markedly reduced above 620 nm. All deuteranopes (8 cases) and deuteranomals (15 cases) had a series of bp waves in which the maxi-

mum response occured at 560 nm; the response was relatively increased at 580 and 600 nm. - Yasuo Ohta.

Transient tritanopia in blue cone monochromacy, by E. HANSEN, T. SEIM and B.T. OLSEN, Nature 276, p. 390-391, 23 Nov. 1978.

Threshold measurements in a single case of blue cone monochromacy indicate an absence of transient tritanopia, the loss of sensitivity to short wavelengths following adaptation to the complementary yellow, shown by colour normals, protans and deutans. This phenomenon has previously been suggested to be due to the inhibition of the blue cone mechanisms by red and green types, and its absence in the blue cone monochromat supports this hypothesis. The authors compared the effect in a rod monochromat, who showed a similar response pattern to the blue cone monochromat at low adaptation levels, but a markedly different response at high adaptation levels. - Janet Voke.

The desaturated Panel D-15, by P. LANTHONY (15 bis, boulevard du 14 juillet, F-1000 Troyes, France), Docum. ophthal. 46/1, 185-189, 1978.

The desaturated Panel D-15 (available from Luneau Ophtalmologie, rue d'Edimbourg 20, F-75008 Paris, France, and from The House of Vision, Chicago, Ill., USA) is analogous in design to Farnsworth's standard Panel D-15, but of lower purity (Munsell chroma 2) and higher lightness (Munsell value 2). It is more sensitive than the standard Panel and so discloses milder losses in chromatic discrimination ability. The combination of the results of both standard and desaturated Panel allows recognition of the several degrees of chromatic discrimination loss. - Guy Verriest.

The new color test, by P. LANTHONY (15 bis, boulevard du 14 juillet, F-1000 Troyes, France), Docum. ophthal. 46/1, 191-199, 1978.

The test material consist of 60 colored caps in 4 boxes (the combinations of 15 Munsell hues and 4 Munsell chroma's, the value being still the same) and of 10 grey caps (of varying values). The test itself consists of a separation phase and a classification phase. The respective results allow estimation of the neutral zone and of the characteristic colour confusions. Moreover the width of the neutral zone is assessed by the ranges of hues confused with grey, while the severity of chromatic discrimination loss for a given axis is estimated by the range of chromas confused with grey. The test material is available from the same dealers as for the desaturated panel (see previous abstract). - Guy Verriest.

Some remarks on the scotopic axis of 100-hue response, by L. BARCA and G. VACCARI (Eye Clinic of the University of Florence, Viale Morgagni, Careggi, 50100, Florence, Italy), Atti Fond. G. Ronchi 34, 337-350, 1979.

The presence of a scotopic axis in the 100-Hue response of some patients tested at photopic levels raises some questions about the relationship between total score and visual acuity. By taking into account the illuminance dependencies of these two response indices (combined through their ratio), the equivalent optical density of an hypothetical neutral filter, having the same effect on visual performance as the disease a patient is suffering from, is defined. - Lucia Rositani-Ronchi.

Some remarks on the "scotopic axis" in 100-Hue response of congenital defectives under high pressure Na-illumination, by A. SERRA (Cattedra di Ottica Fisiopatologica dell'Università di Cagliari, Cagliari 09100, Italy) Atti Fond. G. Ronchi 34/1-2, 153-163, 1979.

Fifteen congenital defectives, tested by means of F-M 100-Hue test both under C- and high pressure Na-illumination (OSRAM Vialox, 250 W) of matched illuminance, show an enhancement of raw score across the 3rd box. Six of them, under Na-light, show a scotopic axis, which, according to Verriest, is centered around the 54th cap, between the tritan- and deutan lower bumps. It is suggested that the "mesopisation" of the blue receptor due to high-pressure Na-illumination, in conjunction with the defective performance of one kind of photoreceptors, results is a subnormal input to the brightness channel. - Lucia Rositani Ronchi.

Studies on color naming test for congenital color defectives. Report 2. Size of test stimuli, by K. FUKAMI (Department of Ophthalmology, Kyoto Prefectural University of Medice, Japan), Jap. J. clin. Ophthal. 31/3, 401-405, 1977.

A group of 38 deutans and 19 protans was tested for color naming using 8 saturated colors selected from Dvorine's nomenclature test. The stimulus colors were presented in 3 different sizes (26.0 mm, 4.0 mm and 1.5 mm in diameter) on a white background at the distance of 75 cm (visual angle subtended : 2°, 18' and 7' respectively). A higher frequency of incorrect answers was usually associated with smaller-sized stimuli. Gray was the sole exception as the rate of incorrect answers was constant for all sizes. When using the smallest size, purple was named in a variety of ways by all types of color defectives, while it appeared as blue when larger stimuli were used. Deuteranopes tended to incorrectly respond green stimuli except when the largest stimulus is used. Also, larger stimuli for brown, orange and red decreased the incidence of uncorrect answers. The finding that the red stimulus, 1.5 mm in diameter, was responded as gray or black by protanopes is readily understood by taking the luminosity curve of protans into consideration. - Yasuo Ohta.

The ability of color defectives to judge signal lights at sea, by J.A.S. KINNEY, H.M. PAULSON and A.N. BEARE (Naval Submarine Medical Research Laboratory, Croton, Connecticut 06340, U.S.A.), J. opt. Soc. Amer. 69/1, 106-113, 1979.

Measures were made of 81 color defective men to judge correctly the colors of navigation lights red, green or white. The lights were mounted at the top of the bridge of three yard patrol boats anchoring at one, two and three miles from a sea wall on which the subjects were standing. The chromaticities and intensity of the lights, their illuminance and angular subtense at the eyes are given. The lights were essentially point sources. The surround was entirely dark, the visibility excellent. Lights were presented one at a time for 10s. The subjects were categorized according to their color vision defect. Performance of the color-defective men on the average was considerably poorer than that of 24 color normals. At one mile distance protans experienced more difficulty with white and green lights than did the deutans. At two and three miles the difference between normals and color defective men became more pronounced. There were large individual differences within each category of color defectives. Attempts to account for these differences by variations in acuity, intelligence and motivation failed. A discussion in view of modern color vision theory concludes the paper. - Ingeborg Schmidt.

Incidence of color vision defective in University students Deviation due to social factors, by N. OHBA, T. FUJINO, T. TANINO, M. YANO, S. TOTSUKA and Z. INABA (Department of Ophthalmology, University of Tokyo), Acta Soc. ophthal. jap. 81/3, 248, 1977.

Regulations of admittance of congenital color vision defectives have been considerably variable among higher japanese educations. The examined students are the 1976 newly enrolled in one of the representative institutions in Tokyo, where any color defective students have traditionally been accepted. They were screened by using 6 plates of the Ishihara test, and those who correctly read all the plates were judged as normal. Those students who missed one or more screening plates were subjected to assessments by means of 25 Ishihara plates, the AO H-R-R plates and the Farnsworth dichotomous test. Ambiguous cases were also checked by the Nagel anomaloscope and the FM 100-hue test. Out of total 2,868 male students 4.85% were defectives. Of particular interest were the findings that the incidence varied considerably with the teaching programs : 8.03% of 361 students in the school of Economy; 5.83% of 613 in the School of Law; 5.17% of 290 in the School of Liberal arts and Education; 4.20% of 452 in the School of Agriculture; 3.47% of 1.065 in the School of Science and Technology; 3.45% of 87 in the School of Medicine. Similar tendencies were noted through the past several years, and the incidence as a whole has been invariably high, being over 5% up to 7. The values are larger than the Japanese general population of 4 to 4.5%. The present data suggest that, under the circumstances of variable regulations, relatively large number

of defective students are seen in those institutions which are generous to them. Marked differences of incidence in colleges would propose a sort of problem to be seriously discussed from various aspects. - Yasuo Ohta.

Duration thresholds for chromatic stimuli, by J. POKORNY R.M. BOWEN, D.T. WILLIAMS and V.C. SMITH (Eye Research Laboratories, The University of Chicago, Chicago, Ill., 60637, USA), J. opt. Soc. Amer. 69/1, 103-106, 1979.

Stimuli of wavelengths between 463 and 620 nm were presented in two modes : a) hue substitution by replacement of the central 40' of a 1°45' homogenous white field of 2.4 cd/m^2 by a chromatic stimulus of matched luminance, substitution accomplished by changing chromatic light passing through the open shutter for achromatic light reflecting off the closed shutter blades b) increment mode, the white field decreased to 1.2 cd/m^2 by a 0.3 neutral density to create a two-fold luminance increment. The chromatic replacement remained at 2.4 cd/m^2. The duration necessary to detect chromatic stimuli varied in substitution mode from approximately 3-4 ms for the spectral extremes to 45-66ms at 570 nm, the stimuli always seen as changes in chromaticity. In the increment mode thresholds were in the 2-4ms range throughout the spectrum seen either as changes in chromaticity or brightness. From the results the authors conclude about the channels processing the duration thresholds. - Ingeborg Schmidt.

Wavelength effects on simple reaction time, by M.J. NISSEN and J. POKORNY (Eye Research Laboratories, Univ. of Chicago, Ill. 60637, USA), Perception and Psychophysics 22/5, 457-462, 1978.

In many experiments which examine simple reaction time to spectral lights, the chromatic stimuli are presented as increments upon a dimmer achromatic background. In these cases, changes in both luminance and color occur. If, on the other hand, the chromatic stimuli are photometrically matched to the background and are substituted for the background rather than being superimposed upon it, then only the color will change. The authors examined simple reaction time to spectral stimuli (from 430 to 650 nm) which had been photometrically matched (by flicker photometry) using both the incremental and the substitution conditions. Their results for the incremental condition indicate that reaction time did not vary with wavelength. This was not true for the substitution condition for which reaction time was much slower for the less saturated mid-spectral stimuli (especially 570 nm) than for the more saturated spectral extremes. The data are interpreted as indicating that in the incremental condition (when both luminance and color changed) both the achromatic and the chromatic visual channels responded, but reaction time was mediated by the achromatic channel which responded sooner. In the substitution condition (where only chromatic changes occured), only the chromatic channels responded, and the speed of the response was a function of the stimulus wavelength. - Gary L. Trick.

CORRESPONDANCE

12th December 1978.

Dear Dr. Verriest,

I examined acquired color vision defectives with the Standard Pseudoisochromatic Plates (S.P.P.).

In total I examined 201 eyes of patients, subdivided in :

A.	normals	110 eyes
B.	congenital color vision defect	11 "
C.	S.P.P. examination impossible (Codif. : I)	31 "
D.	(acquired) red-green defectiveness	49 "
		201 eyes

Sub A. Normals. An eye is normal for the S.P.P. if 8 ore more plates are read in a correct way. Subdivision of this group :

(a) Normal without red-green indicative reading : 102 eyes.
AO HRR : 6 red-green defectives.
TMC : 7 red-green defectives.

(b) Normal but red-green indicative reading : 8 eyes.
AO HRR : 2 red-green defectives.
TMC : 4 red-green defectives.

Sub B. Congenital defectives : 11 eyes

Sub C. Impossible : 31 eyes.
AO HRR : 3 normal(!); 1 supermild; 1 mild; 2 medium; 4 strong; 20 impossible.
TMC : 3 strong defective; 28 impossible.

Sub D. (acquired) Red-Green defectives : 49 eyes.
Red-green defectives are supposed to perform less than 8 correct S.P.P. plates readings.
Again I made a subdivision (like in group A):

(a) Defective but no red-green indicative readings : 24 eyes.
AO HRR : 12 normal or supermild, 12 red-green defective.
TMC : 10 normal or supermild, 14 red-green defective.

(b) Defective with red-green indicative readings : 25 eyes.
AO HRR : 7 normal or supermild, 18 red-green defective.
TMC : 6 normal or supermild, 19 red-green defective.

In color normal eyes the S.P.P. screening ability is good : fault negative results in about 8% compared with the AO HRR. If red-green indicative readings are exluded from the normals the percentage of fault negative results becoms 6. Compared with the TMC these percentages are 11 and 7 respectively.

In color defective eyes the S.P.P. yields fault-positive results in 12 of 80 eyes (15%) compared with the AO HRR, and in 17 of 80 eyes (20%) compared with the TMC. In my experience at least

some of these fault-positive results are due to the fact that the patients are not familiar with digital numerals.

Conclusion : the S.P.P. is sufficient for screening of acquired red-green defectives. For diagnosis of the degree or subtype of color vision defectiveness a second P.I.C. test must be used. While the AO HRR is no longer commercially available I would favour the combination of S.P.P. with T.M.C.

A. Pinckers.

Dear Dr. Verriest,

Daltoniana is a source of information, the weight of which increases as time elapses. I wonder whether it might be possible to produce it in a form readable by a computer, and to extract the data wanted from time to time, according to a set of pre-arranged key words.

Suppose, for instance, that somebody likes to know what has been done in the past decade about colour discrimination in cases of lead intoxication. Others need informations about X-chrom lenses. Others need data about the age dependence of response to Nagel anomaloscope, or colour discrimination tests for handicapped children, or other peculiar topics.

Once chosen the appropriate "computer language", one might have soon the information (either automatically written by the computer itself, or in the form of a small record, to be read by the personal computer). Of course, it is a matter of cost, which in turn, depends on the number of people interested in.

I wonder whether, through Daltoniana, you might diffuse a questionnaire, in order to have an idea of what people think about this problem. -

Lucia Rositani Ronchi.

ANNOUNCEMENT

HELSON MEMORIAL SYMPOSIUM ON CHROMATIC ADAPTATION

February 3-6, 1980, Williamsburg, VA, USA

Under the joint sponsorship of the International Colour Association (AIC) and the Inter-Society Color Council, the Helson Memorial Symposium on Chromatic Adaptation will be held in Williamsburg, Virginia, on February 3-6, 1980.

The purpose is to provide (1) authoritative presentation, through invited papers, of the present state of knowledge of chromatic adaptation from historical, theoretical, empirical, and applied points of view; (2) the opportunity, through contributed papers, for younger workers in the field to describe their own current research; and (3) a forum for unhurried open discussion among all present.

Invited Papers : Peter K. Kaiser, W. David Wright, Leo M. Hurvich and Dorothea Jameson, W.S. Stiles, Robert M. Boynton, Yoshinobu Nayatani, John J. Mac Cann, Robert W.G. Hunt, Margeret B. Halstead, Gunter Wyszecki, C. James Bartleson.

Contributed Papers : Anyone wishing to contribute a 15-minute paper describing original work within the scope of the symposium should send a 200-word abstract to Dr. Peter K. Kaiser (Department of Psychology, York University, 4700 Keele Street, Downsview, Ontario, Canada MJ3 1P3) to arrive by september 28, 1979.