DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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LITERATURE SURVEY

Effect of intermittent photic stimulation on several aspects of visual perception, by R.J. BALL and S.H. BARTLEY (Lab. for the Study of Vision and Related Sensory Processes at Michigan State Univ., East Lansing, Mich. 48823) J. Amer. Optom. Ass. 42/7, 648-652, 1971.

In continuation of a research program, the authors studied the effect of intermittent photic stimulation on several aspects of visual perception. The variables of the intermittency were the rate in cycles per sec (cps) and the pulse-to-cycle fraction (PSF). In one experiment a bipartite target field was shown. On the test half of the field a highly saturated light of a narrow-band wavelength was focused on a matte surface. The intermittency was of 10 cps and of a PCF of 1/4 with the comparison target being a matte finish Munsell chip. The Munsell chip most closely approximating the intermittent pure wavelength test target was determined by a normal observer. The shift of the color due to change in hue and saturation by the intermittency was plotted on a CIE diagram. The test confirmed previous qualitatively reported results. Another test shows the change in the score of two normals and one mildly red-green deficient on the Farnsworth-Munsell 100 Hue test under intermittent illumination where rate and PCF were varied. - In summary, intermittency rates in the region of 5 to 10 cps and FCP's in the neighborhood of 1/4 tend to increase brightness and alter hue saturation depending on the wavelength region. They also produce decrements in performance on the AO H-R-R pseudoisochromatic plates, Farnsworth-Munsell 100 Hue test scores, visual acuity, and stereopsis. Intermittency rates of 15 cps or more with PCF's in the neighborhood of 3/4 tend to have little effect on brigthness, hue and saturation. In some situations these rates produce improved performance on pseudoisochromatic plates, Farnsworth-Munsell 100 Hue test scores, visual acuity, and stereopsis. The findings of the authors are related to the continuing task of better understanding the basic physiological mechanisms of the visual system. - Ingeborg Schmidt.

Prolonged color blindness induced by intense spectral lights in rhesus monkeys, by R.S. HARWERTH and H.G. SPERLING (Univ. of Texas Graduate School of Biomedical Sciences, Houston, Texas 77025), Science, 174/4008, 520-522, 1971.

Rhesus monkeys were exposed to intense blue and green lights for long periods and their increment-threshold spectral sensitivity measured before and after the exposure. The blue light of 463 nm was applied in one experiment ($1.1x\ 10^4$ trolands) in 3 series separeted by 6 week intervals, each series consisting of 80 min daily exposures for 7 consecutive days. In another experiment, blue light of $2.3x10^4$ trolands was applied in exposure periods of 40 min duration on 7 consecutive days. Intense blue light of 463 nm caused a 90% reduction of spectral sensitivity in the blue region that persisted for more than 5 months with almost no change in the red and green region of the spectrum. Reduced sensitivty to long wavelengths was produced by adaptation to light of 520 nm applying $3.3x10^5$ trolands in daily 55 min sessions on 10 consecutive days, and on another monkey to light of 510 nm ($1.9x10^6$ trolands) in daily 90 min sessions on 6 days. The loss of sensitivity due to green light lasted no more than 30 days. - The nature of the demonstrated long term losses of spectral sensitivity is consistent with the statement that blue light eliminates the response of only those cones containing the 445 nm photopigment, and that the green light, while it reduces sensitivity elsewhere, eliminates the response of the cones containing the 535 nm photopigment. The authors demonstrate the good fit of the increment-threshold spectral sensitivities with the absorption spectra of cones containing the corresponding photopigments. The period of induced dichromacy (which corresponds to deuteranopia after illumination with green light) was sufficiently long to imply tissue damage to different classes of cones caused by selective absorption of energy in the cone photopigments. - Ingeborg Schmidt.

The effect of sound on the perception of color, by J. LETOURNEAU and N.S. ZEIDEL (School of Optometry, Univ. of Montreal, Canada), Amer. J. Optom. 48/2, 133-137, 1971.

In order to study sensory interaction, experiments on the influence of audition on the perception of color were carried out on 12 subjects, each of which was emmetropic, had normal color vision and was able to hear a 20 db sound with either ear. After a 40 min. dark adaptation period the subject observed monocularly, in foveal vision, a patch of light in the center of four fixation dots. Each individual indicated the ascending or descending color threshold by stating appearance or disappearance of color. The order of presentation of different intensities of sound and qualities of light was varied. Before each threshold determination the subject heard the sound of a certain intensity for 5 min and the constant stimulation was maintained throughout the threshold determination period. A control group of 3 subjects passed through exactly the same stages of the experiment except that no auditory stimulation was given. The experimenters conclude that sensitivity to white and green light increases under the influence of a pure sound of 1,000 cps given at intensities of 50, 70 and 90 decibels. Sensitivity to red light diminishes only when the intensity of the sound has reached

70 decibels. Increase in sound intensity does not produce a proportional increase in sensitivity to white and green light, but does decrease visual sensitivity to a certain extent in the case of red light. The control group demonstrated that time alone had no effect upon the visual threshold. - Ingeborg Schmidt.

Fluorescent lights for color vision testing, by C.W. RICHARDS, T.O. TACK and C. THOME (College of Optometry, Pacific Univ., Forest Grove, Oregon) Amer. J. Optom. 48/9, 747-753, 1971.

The purpose of this study was to determine to what extent the improved color rendering fluorescent lamps Criticolor and GE Chroma 70 would serve as replacements for the Macbeth Easel daylight lamp, as this lamp is no longer readily available. The new lamps were checked on a small group of normals and color deficients. The color vision type was not checked with a spectral apparatus. Comparing the three illuminants, scores with the Farnsworth D-15 test were not significantly different. The improved color rendering fluorescent lamps produced some shifts in degree and type of color deficiency when using the H-R-R-plates, the Farnsworth-Munsell 100 Hue test and the ISCC Color Aptitude test for classification of defects instead of the Macbeth Easel daylight lamp. The shifts were not uniderectional and were explained by the different spectral energy distributions of the lamps. The authors conclude that the improved color rendering fluorescent lamps Criticolor and GE Chroma 70, were adequate replacements for the Macbeth Easel daylight lamp in cases of elementary color vision testing for industrial tasks such as with the Farnsworth D-15 test. They were not found adequate, however, for the critical evaluation of color vision. - Ingeborg Schmidt.

Cone spectral sensitivity and chromatic adaptation as revealed by human flicker-electroretinography, by P. PADMOS and D. VAN NORREN (Inst. for Perception TNO, Soesterberg, Netherlands), Vision. Res. 11, 27-42, 1971.

The human ERG response to a 40 Hz stimulus was measured using a synchronous detection technique (lock-in amplifier). Thus it was possible to record spectral sensitivity quickly and easily. Check experiments showed that only the cones contributed to the total response. Adaptation to a red background of 3.7×10^4 trolands, and a blue background of 2.2×10^4 trolands caused selective depression of spectral sensitivity. Neither green nor white adaptation altered the spectral sensitivity. The results of parallel experiments on a protanope indicated that no change in spectral sensitivity took place during his exposure to intense coloured backgrounds. Measurements of the influence of chromatic adaptation were also performed using a psychophysical threshold criterion for sensitivity. The results are in close agreement with the ERG data. The recovery of the response after exposure to coloured backgrounds of various intensities indicated that the selective depression of the luminous spectral sensitivity can be due to both neural adaptation and to bleaching of the photopigments. - Authors.

On the derivation of the foveal receptor primaries, by J.J. VOS and P.L. WALRAVEN (Inst. for Perception TNO, Soesterberg, Netherlands), Vision Res. 11, 799-818, 1971.

To derive the fundamental response curves for the three colour mediating systems from the location of the dichromatic confusion centres, one must make certain assumptions on the nature of dichromatism. It is shown, however, that one can avoid to make specific quantitative assumptions by bringing into the picture other visual data, such as the hue-stable wavelengths of the Bezold-Brücke effect and the Weber-fractions for the three separate systems. Then, an almost unique choice can be made about the set of primaries. Moreover, it can be derived that protanopia and deuteranopia have to be characterized by complete absence of the R-resp. the G-system. Finally some relations are derived between the visual constants involved. - Authors.

Coloured lenses and car driving (letter to the editor), by B.A.J. CLARK (Defence Standards Laboratories, Dept. of Supply, Melbourne, Australia), Acta Ophthal. (Kbh.) 49/5, 673-677, 1971.

Berggren (Berggren : Acta Ophthal. Kbh. 48, 537-545, 1970) showed that trichromatic observers wearing common sunglass lenses tend to make anomalous Rayleigh matches and read pseudo-isochromatic plates with greater difficulty than without glasses. There is in Sweden no ban against driving with tinted glasses and Berggren thus questions the relevance of prohibiting colour defectives from bus driving.

On the basis of his own studies in the field (for references, see Clark : Amer. J. Optom. 46, 825-840, 1969), Clark discusses some points on this subject. He points out that also grey glasses may have an uneven spectral absorption, and that the results of trials with shape-different traffic signals have been disappointing. He further discusses the visibility and separability of different signal colours and their apparent intensity viewed through coloured glasses. Corresponding to Berggren's intentions are three observations. First, a colour-normal subject who looks through tinted glasses does not see like a real colour defective even if his Rayleigh match is anomalous. Secondly, it is most doubtful whether the anomaloscopic test conditions are relevant to the traffic situation. The increased ranges of adjustment found with denser glasses are probably due to a reduced testfield luminance. Third, the ability to identify pseudo-isochromatic plates through sunglasses does not elucidate the glass-wearing subject's capability in specific driving tasks. Additionally, the illumination conditions are changed with glasses. - Anders Hedin.

Dark adaptation in dichromats and anomalous trichromats, by A. KARMA (Dept. of Ophthal., University Hospital, Oulu, Finland), Acta Ophthal. (Kbh.) 49/2, 211-220, 1971.

The dark adaptation of 14 normals and 50 colour defectives was measured with the aid of Goldmann-Weekers' adaptometer. The subjects having defective colour vision were classed on the basis of the results of the anomaloscope examination (Nagel) and the Farnsworth D-15 test. The mean value curves of the different deficiency groups were compared to that of the normals. The curve of the

deuteranopes (five subjects) showed lower sensitivity in the cone range. One protanope of three was less sensitive in the rod range. The mean curves of the anomalous trichromats were essentially uniform with the normal mean curve. The supernormal rod sensitivity as found by Denden was thus not revealed, neither their second rapid sensitivity shift, although a similar shift seemed to occur in two protanomals. The results were claimed to suggest that the type and degree of colour vision deficiency in a hitherto unknown way influences the course of dark adaptation. - Anders Hedin.

Experience with different pseudo-isochromatic tests (Erfahrungen mit verschiedenen pseudo-isochromatischen Tafelproben), by R.G. FREY (Univ. Augenklinik, Wien), Ärtzl. Dienst DB, p. 214-216, 1970.

The pseudo-isochromatic plates are the most used tests for studying colour vision. Most of them are intended for daylight and become less efficient with incandescent light. The plates of Boström, Boström-Kugelberg, Dvorine, Freeman, Hardy-Rand-Rittler, Ishihara, Polack, Rabkin, Velhagen and Tokyo Medical College are all even efficient for the detection of colour defective subjects. The efficiency of the Velhagen atlas can be improved discarding some less appropriated plates. The confusion digits of the Ishihara atlas are often read by normals and are thus not very convenient. Normals do often mistakes reading the Boström and Boström-Kugelberg plates. The Freeman plates can also be used with incandescent light and their passation time is very short. The plates of Dvorine can be used in doubtfull cases. The passation time is longest for the Polack atlas (46 plates). Differential diagnosis of the type and heaviness of a defect can only be done by means of the Rabkin atlas. - Ernst Heinsius. - (Some of conclusions are very different from those of other authors, e.g. the mine in Arch. Mal. profess., Méd. Trav. Séc. Soc. 29, 293, 1968. - Guy Verriest).

Examination of acquired anomalies of colour vision by Pulfrich's photometer, by Z. FALKOWSKA (Dept. of Ophthal., Med. School, Warszawa, Poland), Klinika Oczna, 28, 269-281, 1958.

For examining the acquired disorders of colour vision Pulfrich's photometer was used, the coloured filters existing in it and the variability of the light intensity being advantageous.

The optic nerve diseases first appear in "cold" colours, and thereafter they include the whole spectrum. In the degenerative macular lesions, the first disorders of colour vision concerns red. In the optic nerve diseases the colour vision disorders are found by means of Pulfrich's photometer frequently before the decrease of visual acuity, while, after healing, some traces of achromatic losses may remain although the other lesions have disappeared. Pulfrich's photometer is a more sensitive method than the examination with Ishihara's plates and may be applied in cases with very low visual acuity. The graphs obtained by means of Pulfrich's apparatus give a quantitative evaluation of the progress of the lesions. - Emilie Chomiczewska.

Disturbances in colour vision as a side symptom of the digitalis effect, by K. STRZYZEWSKI (Dept. of Ophthal., Med. School, Warszawa, Poland), Klinika Oczna 32, 45-48, 1962.

The author describes the colour sensations in a person subjected to prolonged treatment with digitalis and mentions the similar observations made by Reiter.-Emilie Chomiczewska.

Comparative examinations of the visual field in glaucoma and under the influence of noise, by E. OGIELSKA and K. BRODZIAK-KRZESIEKOWA (Dept. of Ophthal., Med. School, Wroclaw, Poland), Klinika Oczna 36, 351-354, 1966.

The authors compared the visual fields of men working in noise and in patients with simple glaucoma. In 10% of the workers a narrowing of the field during the working hours was observed. In the majority of cases of simple glaucoma a narrowing of the visual field for colour occurs simultaneously with the narrowing for white. In a small group of cases a considerable narrowing of the colour field was stated together with a normal field for white. - Emilie Chomiczewska.

On the significance of the ascorbic acid in the physiology of colour vision, by J. BIERNACKA-BIESIEKIERSKA and M. SZCZYGLOWA (Dept. of Ophthal., Med. School, Warszawa, Poland), Klinika Oczna 24, 1-6, 1954.

Basing on a material of 43 persons the authors draw the following conclusions : (1) There is an undoubtful relationship between the size of the visual field for a green object and the blood concentration in vitamin C, what even allows to consider a small field for green as an orientating sign of vitamin C deficiency. (2) There is a seasonal variation in the size of the green field parallel to the concentration in vitamin C. - Emilie Chomiczewska.

Criterion of colour discrimination in drivers and new methods of examination (the lamp of Wilczek), by M. WILCZEK (Dept. of Ophthal., Med. School, Krakow, Poland), Klinika Oczna, 33, 439-444, 1963.

The author proposes as requirements of colour discrimination in drivers a faultless discrimination in 2 sec and from a distance of 160-200 m of the colours of the light signals used on the crossroads. According to this criterion the author developed a lamp which has small windows, 5 mm in diameter, covered with the same coloured glass as used in the highway signals : examining the subjects from a 4-5 m distance we create the same conditions as given by the criterion. As a second method the author uses red, green and yellow colour filters in 5 mm apertures and which can be placed before each table lamp. The author presents the results of the examination of 110 subjects, rejected after the examination with the Ishihara charts as having a bad color discrimination. These persons were tested on the Ishihara charts, on Nagel's anomaloscope, on the Edridge - Green lamp, as well as on Wilczek's lamp. The results of the examination on the E-G lamp were identical with the results of the W. lamp, but the E-G lamp is more complicated and too expensive. With the use of Wilczeks lamp one can quickly and surely differenciate persons sufficiently seeing the highway signals from persons seeing and discriminating them insufficiently.

One can quickly and easily differenciate the people having small anomalies (protanomaly and deuteranomaly) from people seeing the colours very incorrectly (protanopia, deuteranopia and extreme anomalies). This division is the most rational for what concerns the colour discrimination requirements in drivers. The Wilczeks's lamp is thus suitable for the mass examination of drivers. - Emilie Chomiczewska.

LISTS OF THE PUBLICATIONS ON COLOUR VISION DEFICIENCIES OF MEMBERS OF THE RESEARCH GROUP

5. Papers of Dr. Avinoam ADAM (Governement Hospital, Tel Hoshomer, Israel).

ADAM A. - Linkage between deficiency of glocose-6-phosphate dehydrogenase and colour blindness, Nature, 189, 686, 1961.

R ADAM A. - Linkage between enzyme deficiency of the erythrocytes and colour blindness, Bull. Res. Coun., Israel, 10A, 1, 1961.

ADAM A. - A survey of some genetical characters in Ethiopian Tribes. VII. Color vision. Amer. J. Phys. Anthrop., 20, 194-195, 1962.

R ADAM A., BAT-MIRIAM M., BARNICOT N.A., LEHMANN H., MOURANT A.E., RAMOT B., SHEBA Ch. & SZEINBERG A. - A survey of some genetical characters in Ethiopian tribes. Proc. II. Int. Cong. Hum. Genet., 568-571, 1963.

ADAM A., SHEBA Ch., SANGER R., RACE R.R., TIPPETT P., HAMPER J., GAVIN J. & FINNEY D.J. - Data for X mapping calculations, Israeli families tested for Xg, G6PD and for colour vision, Ann. Hum. Genet. 26, 187-194, 1963.

R ADAM A. - Genetic aspects of intersexuality, Proc. Tel-Hashomer Hosp., III, 159-162, 1964.

BONNE B., ADAM A., ASHKENAZI I. & BAT-MIRIAM M. - A preliminary report on some genetical characteristics in the Samaritan population, Amer. J. Phys. Anthrop. 23, 397-400, 1965.

ADAM A., ZIPRKOWSKI L., FEINSTEIN A., SANGER R. & RACE R.R. - Ichthyosis, Xg blood groups and protan, Lancet 1. 877, 1966.

R ADAM A. - Family G and the mapping of the X-chromosome (Hebrew); Mada, 10, 302-310, 1966.

R ADAM A. - Segregation and linkage of four X chromosomal loci in an Israeli family, Proc. Tel-Hashomer Hosp., V : 5-7, 1966.

ADAM A. - Genetics of ratio between foveal red and green receptors in people with normal color vision, III Int. Cong. Hum. Genet., Abst., 1, 1966.

R ZIPRKOWSKI L., FEINSTEIN A., ADAM A., SANGER R. & RACE R.R. - A genetic study of X-linked ichthyosis in Israel, XII. Cong. Int. Derm. (Munich 1967), Springer Verl., 562-565, 1968

R ADAM A., DORON D. & MODAN R. - Frequencies of protan and deutan alleles in some Israeli communities and a note on the selection-relaxation hypothesis, Amer. J. Phys. Anthrop., 26, 297-305, 1967.

R ADAM A. - Anomals and anopes among Beduin of Southern Sinai, Amer. J. Phys. Antrhop. 28, 227-228, 1968.

ADAM A., ZIPRKOWSKI L., SANGER R., TIPPETT P., GAVIN J. & RACE R.R.- Linkage relations of X borne ichthyosis to the Xg blood groups and to other markers of the X in Israelis, Ann. Hum. Genet. 32, 323-332, 1969.

R FEILER-OFRY V., ADAM A., REGENBOGEN L., GODEL V. & STEIN R. - Hereditary vitreoretinal degeneration and night blindness, Amer. J. Ophthal.,67, 553-558, 1969.

R ADAM A. - Foveal red-green ratios of normals, colourblinds and heterozygotes, Proc. Tel-Hashomer Hosp., VIII, 2-6, 1969.

R ADAM A., PUENPATOM M., DAVIVONGS V. & WANGSPA S. - Anomaloscopic diagnoses of red-green blindness among Thais and Chinese, Hum. Hered., 19, 509-513, 1969.

R ADAM A., A further query on color-blindness and natural selection, Soc. Biol. 16, 197-202, 1969.

R ADAM A., WOOD W.B., SYMONS C.P., ORD I.G. & SMITH J. - Deficiencies of red-green vision among some populations of Mainland Papua - New-Guinea, Papua - New-Guinea Med. J. 12, 113-120, 1969.

R ADAM A. - The linkage between protan and deutan loci, Amer. J. Hum. Genet. 22, 691-692, 1970.

R ADAM A., MWESIGYE E. & TABANI E. - Ugandan colorblinds revisited, Amer. J. Phys. Antrop. 32, 59-64, 1970.

6. Papers of Mrs. Jennifer BIRCH-COX (Department of Ophthalmic Optics, Cranwood Annexe of the City University, Cranwood Street, London E.C. 1, England).

COX J. - Colour vision defects acquired in diseases of the eye, Brit. J. physiol. Opt. 17, 195-216, 1960; 18, 3-32, 67-84, 1961.

COX J. - Unilateral color deficiency, congenital and acquired, J. opt. Soc. Amer. 51, 992-999, 1961.

BIRCH-COX J. and WRIGHT W.D. - Colour Discrimination, Phys. Med. Biol. 6, 3-24, 1961.

7. Papers of Dr. I.A. CHISHOLM (Tennent Institute of Ophthalmology, University of Glasgow, Glasgow, Scotland).

CHISHOLM I.A., BRONTE-STEWART J. & FOULDS W.S. - Hydroxocobolamin versus cyanocobalamin in the treatment of tabacco amblyopia, Lancet 2, 450, 1967.

CHISHOLM I.A. - An evaluation of the Farnsworth-Munsell 100 hue test as a clinical tool in the investigation and management of ocular neurological deficit, Trans. ophthal. Soc. U.K. 89, 243, 1969.

CHISHOLM I.A., BRONTE-STEWART J. & AWDUCHE E.O. - Colour Vision in tabacco amblyopia, Acta ophthal. (Kbh.), 48, 1145, 1970.

CHISHOLM I.A. - Quantitative assessment of colour vision in tabacco amblyopia, Proc. roy. Soc. Med. 63, 20, 1970.

8. Papers of Dr. L. Conreur (83, rue Sans-Souci, B-1050 Bruxelles, Belgium).

CONREUR L., DANIS P., GILSON M., LAVERGNE G. & MEUR G. - Physiopathologie de l'amblyopie fonctionnelle, Bull. Soc. belge Ophthal. 151, 1-301, 1969.

9. Papers of Dr. Ricardo CRUZ-COKE (Dept. Medical Genetics, Hospital J.J. Aguirre, Santiago, Chili).

CRUZ-COKE R. & IGLESIAS R. - Defectos de vision de colores en la poblacion de la Isla de Pascua, Rev. med. Chile 92, 81, 1964.

CRUZ-COKE R. - Color Blindness and cirrhosis of the liver, Lancet, 2, 1064, 1964.

CRUZ-COKE R. - Color blindness and cirrhosis of the liver, Lancet 1, 1131, 1965.

CRUZ-COKE R. & VARELA A. - Color blindness and alcohol addiction, Lancet, 2, 1348, 1965.

CRUZ-COKE R. - Asociacion de defectos de vision de colores y cirrosis hepatica, Rev. med. Chile 93, 519, 1965.

CRUZ-COKE R., CRISTOFFANINI A.P., ASPILLAGA M & BIANCANI F. - Natural selection, alcoholism, color blindness and cultural evolution in andean populations, Int. Congr. human Genet. 3, 22, 1966.

CRUZ-COKE R. & VARELA A. - Inheritance of alcoholism, its relations to color blindness, Lancet 2, 1282, 1966.

CRUZ-COKE R. - Asociacion entre la oportunidad para la seleccion natural, los defectos de vision de colores y el alcoholismo cronico en diversas poblaciones humanas, Arc. Biol. med. Exper. 3, 21, 1966.

CRUZ-COKE R. - Inheritance of alcoholism (letter), Lancet 1, 274, 1967.

CRUZ-COKE R. & VARELA A. - Analisis genetico de la asociacion discromasia-alcoholismo, Arch. Biol. med. Exper. 4, 199, 1967.

CRUZ-COKE R. & BARRERA R. - Color blindness among aymarae in Chile, Amer. J. Phys. Anthrop. 31, 229, 1969.

VARELA A., RIVERLA L., MARDONES J. & CRUZ-COKE R. - Color vision defects in non alcoholic relatives of alcoholic patients, Br. J. Addict. 64, 67, 1969.

NECROLOGY

Koiti Motokawa (1903 - 1971)

After receiving his M.D. degree from the University of Tokyo in 1929, he commenced his academic career at the Department of Physiology of that University. In 1940 Dr. Motokawa was appointed as Professor of Physiology in the Tohoku University School of Medicine, Sendai where he stayed as a professor until he was elected President of the University in november 1965.

For the first several years in Sendai he engaged in the study of human electroencephalography. While they were studying the effect of light illumination on the EEG, Dr. Motokawa and Dr. Mita noticed that the ERG spreads into the surrounding areas and contaminates the EEG recording : this accidental observation led them to a closer investigation of the retina and a new component of the ERG, the x-wave, was then discovered.

There was another event which drew their attention deep into the retina. While measuring the skin impedance of the scalp, they not only experienced the electric phosphene, but also noticed that the threshold current for the phosphene depended upon the frequency of the alternating current. Following this, Dr. Motokawa and Dr. Iwama made discovery that the determining factor, in the time course of the threshold change for the electric phosphene, is the wavelength of the pre-illuminating light, not the intensity. Many problems of color vision, including color blindness, and of other psychophysical phenomena, such as optical illusions, figural after-effects, stereoscopic vision, etc., were extensively studied by this method on human subjects. Only a few months before he died, all these studies were published again in the monograph entitled "Physiology of color and Pattern Vision".

(From Vision Res.)

ANNOUNCEMENTS

A "Pupillensymposium der Deutschen Ophthalmologischen Gesellschaft" will take place from 10th to 12th march 1972 in Bad Nauheim. Different aspects of the normal and pathological pupil movements will be discussed. Further details can be obtained from : Abteilung für experimentelle Ophthalmologie (II. Physiol. Abt.) des W.G. Kerkhoff-Instituts der Max-Planck-Gesellschaft, Parkstrasse 1, 6350 Bad Nauheim 1, DBR.

The "Lichttechnische Jubiläumstagung" of the "Lichttechnische Gesellschaft" will be held from 21th to 24th march 1972 in Karlsruhe. The main subject are the effects and utilization of light, the light sources, the interior and street illumination. Further details can be obtained from : Lichttechnisches Institut der Universität, Kaiserstrasse 12, 75 Karlsruhe 1, DBR.

The IVth Congress of the European Society of Ophthalmology will be held from 17th to 21th april 1972 in Budapest. The main subject will be "The Functional Examinations in Ophthalmology", reported by Archangelsky, Dwyer-Joyce, Dubois-Poulsen, Hruby, Weale, Gligo, Harms, Aulhorn, Dreyer, Vander Tweel, Verriest, Ronchi, Tommila, Pedler, Erbakan, Huber, Kolder, Karpe, Henkes, Van Lith, Enoksson, Peleska, Monnier, Follmann, Ourgaud and François. In connection with the congress there will be several meetings and symposia, among others a meeting of the Association of Eye Research and the 4th International Ergoophthalmological Symposium. Further details can be obtained from the Secretariat, Illès u. 15, Budapest VIII, Hungary.