

**4th
INTERNATIONAL
VISUAL FIELD SYMPOSIUM**

IPS

PROGRAMME

13th—16th APRIL 1980

BRISTOL

**INTERNATIONAL
PERIMETRIC SOCIETY**

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Department of Physics
University of Bristol
Tyndall Avenue
Bristol, BS8 1TL
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E. L. Greve M. Pitman
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SYMPOSIUM BUREAU

During the symposium all information will be provided by the Symposium Bureau located in Room G.45, Department of Physics. The Symposium Bureau will provide the following services:

REGISTRATION

Participants registering on Sunday, 13th April should attend at MANOR HALL, Lower Clifton Hill, Bristol, BS8 1BU, between 2.00 p.m. and 7.00 p.m.

Participants arriving on Monday, 14th April should Register at the Symposium Bureau.

Information Desk

General Enquiries	Receipts
Symposium Folders	Badges
Abstracts	Tourist Information

PROCEEDINGS OFFICE

Room G.45

Complete manuscripts must be presented to the Editorial Committee on the FIRST day of the Symposium.

All registered participants will be sent a copy of the proceedings free of charge.

Note to Authors of non-read papers

You are responsible for supplying copies of your paper to those who wish to read it. To make the discussions on non-read papers easier, it is desirable to give all participants the opportunity to read non-read papers beforehand. Therefore, kindly submit your two original manuscripts and copies at the time of Registration.

LANGUAGE

The official language of the symposium will be ENGLISH. Simultaneous interpretation will not be possible.

GUIDANCE FOR SPEAKERS

1. All communications and discussions will be in the English language.
2. Your speaking time is limited; the length of your text must, therefore, also be limited. Allow one minute for 110 words at a minimum (which is about ten lines of typescript).
3. Speak into the microphone from a distance of about 30 cms.
4. Remember that all speeches and discussions will be taped. Speak clearly and please speak very slowly whenever you mention figures, names, formulae, enumerations of substances, etc.
5. Discussion speakers: Please state your name clearly before starting your question.

SLIDES

1. Only slides 5 x 5 cms. (2" x 2") can be projected. All slides must be clearly marked with your NAME and SLIDE NO.
2. Two projectors will be available.
3. Please liaise with the projectionist BEFORE the appropriate session, and collect your slides at the end of that session.
4. It is suggested that all slides should be easily read and not overcrowded. i.e., no more than seven words per line and no more than seven lines per slide.

INFORMATION ON TIMES AND PLACES

CONGRESS HALL			Room G.42 Department of Physics University of Bristol Tyndall Avenue, Bristol, BS8 1TL
REGISTRATION			
Sunday, 13th April	14.00–19.00		MANOR HALL University Hall of Residence Lower Clifton Hill Bristol, BS8 1BU
Monday, 14th April	} 8.30–13.00 14.00–17.00		Room G.45 (Symposium Bureau) Department of Physics University of Bristol Tyndall Avenue, Bristol, BS8 1TL Telephone: 24161 Ext. 449
Tuesday, 15th April			
Wednesday, 16th April			
INFORMATION and PROCEEDINGS			
	8.30–13.00		Symposium Bureau, Room G.45
	14.00–17.00		Department of Physics University of Bristol Tyndall Avenue, Bristol, BS8 1TL
RECEPTION		19.30	MANOR HALL University Hall of Residence Lower Clifton Hill Bristol, BS8 1BU
LUNCH			
Each day	12.45–14.00		University Senate House Senior Common Room
EXHIBITIONS			
Each day	9.00–17.00		Room B.16/17 Department of Physics University of Bristol

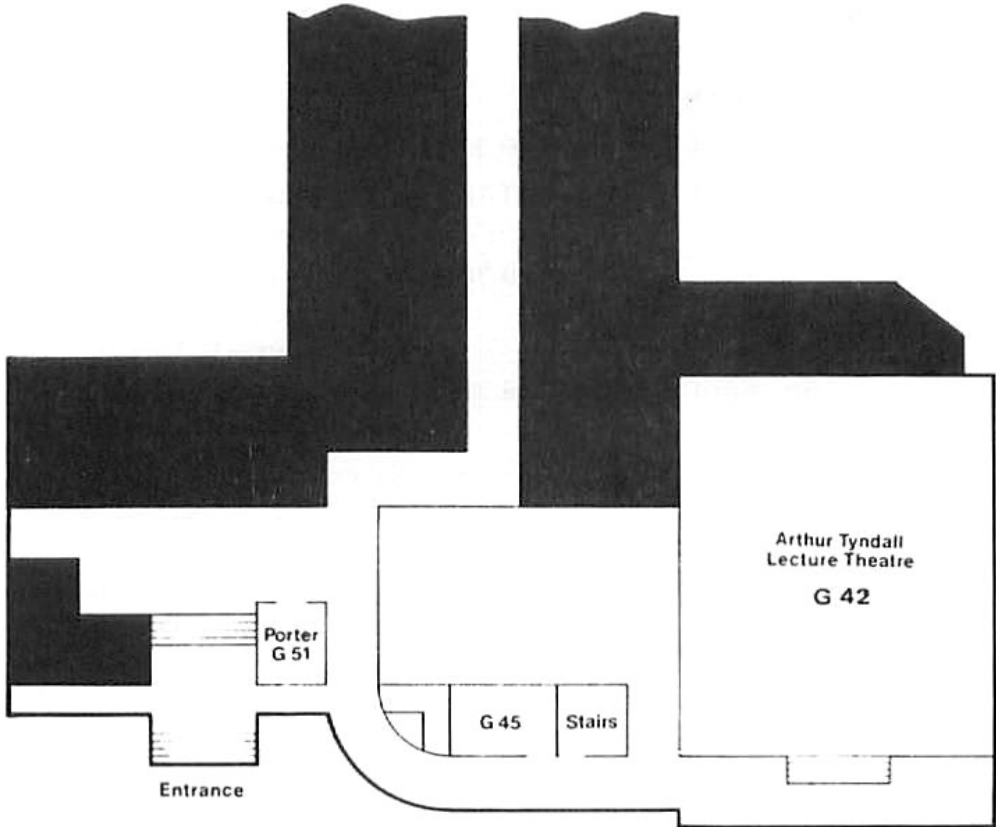
PRE-SYMPOSIUM MEETINGS

Saturday, 12th April		Meeting of IPS Board
Sunday, 13th April	9.00–12.00	Manor Hall. Meeting of Sub-Committee on Standards on Automatic Perimetry.
	12.00– 1.30	LUNCH
	1.30– 3.30	Sub-Committee on Standards for Visual Loss
	3.30– 5.30	An organisational Official Meeting

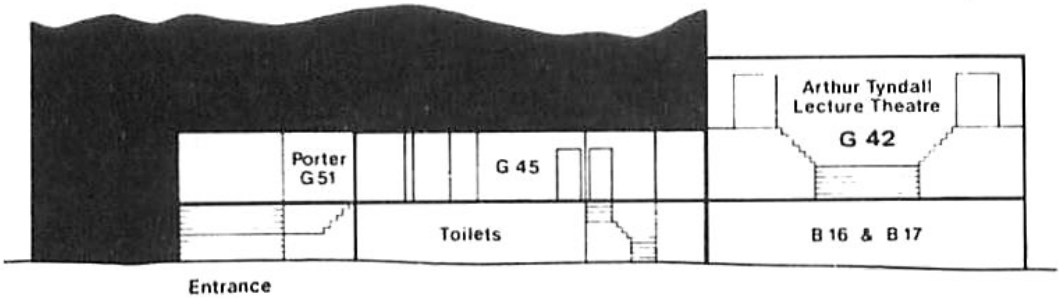
SOCIAL PROGRAMME

Sunday, 13th April	19.30	Reception
Monday, 14th April	14.15	Tour of Bristol (Accompanying Persons)
	19.30	Official Dinner at the Council House, Bristol. (Coach departs 19.15)
Tuesday, 15th April	9.30	Tour of Cotswolds. (Accompanying Persons)
	19.30	Dinner at Dodington House. Visit to Carriage Museum. (Coach departs 18.45)
Wednesday, 16th April	9.30	Visit to Lacock and Bath. (Accompanying Persons)
	12.45	Buffet Lunch and Tour of Harvey's Wine Museum (Scientific Participants) followed by Visit to Bath
	19.30	MEDIAEVAL DINNER at Caldicot Castle (Coach departs 19.00)

**H H WILLS
PHYSICS LABORATORY
TYNDALL AVENUE
BRISTOL
BS8 1TL**



FLOOR PLAN



FRONT ELEVATION

	SUNDAY, 13th April	MONDAY, 14th April	TUESDAY, 15th April	WEDNESDAY, 16th April
8.30				
9.00		REGISTRATION	REGISTRATION	
10.00		PSYCHOPHISICS	OPTIC NERVE	COLOUR
11.00		COFFEE (11.00-11.20)	COFFEE 11.00-11.30	COFFEE (11.00-11.20)
12.00		GENERAL PAPERS	OPTIC NERVE	FREE PAPERS
13.00			GENERAL MEETING IPS	
14.00		LUNCH	LUNCH	TOUR OF HARVEY'S WINE CELLARS Buffet Lunch
15.00		SPECIAL METHODS	Joint Meeting with SWOS RICHARDSON CROSS LECTURE AND PAPERS	
16.00		TEA	TEA	
17.00	REGISTRATION	FREE PAPERS	FREE PAPERS	TOUR OF BATH
18.00			ROUND TABLE DISCUSSION	
19.00	RECEPTION	OFFICIAL DINNER 19.30 (Coach leaves 19.15)	DINNER AT DODINGTON HOUSE 19.30 (Coach leaves 18.45)	MEDIAEVAL DINNER AT CALDICOT CASTLE 19.30 (Coach leaves 19.00)

MONDAY – morning

PSYCHOPHYSICS

Chairman: **Dr. E. L. Greve**

- 09.00 Opening Address President: **Professor S. Drance**
09.15 Guest Lecturer: **Professor R. Gregory**
Psychological concepts and the Visual Field.
09.45 **R. P. Scobey**
Psychophysical and Electrophysiological Determinants of Motion
Detection. Relevance to Kinetic Perimetry.
10.00 **F. Dannheim and A. Müller-Jensen**
Perimetry and Pattern VEP in Chiasmal Lesions.
10.15 **J. T. W. van Dalen and E. L. Greve**
Assessment of Visual Fields and Visual Evoked Responses in
Multiple Sclerosis.
10.30 **A. Serra and C. Mascia**
Quantitative Perimetry in Optic Sub-atrophy from Previous
Optical Neuritis in Multiple Sclerosis.
10.45 **B. Schwartz and S. Sonty**
Differences in the Visually Evoked Response between Normals
and Open Angle Glaucomas.
11.00 COFFEE

GENERAL PAPERS

Chairman: **Professor H. Matsuo**

- 11.20 **Professor H. Matsuo, G. Kikuchi, S. Hamazaki,
J. Hamazaki, E. Susuki, and M. Yamada**
Automatic Perimeter with Graphic Display
11.35 **H. Bebie and F. Fankhauser**
Statistical Programme for the Analysis of Perimetric Data.
11.50 **B. P. Gloor, U. Schmied and A. Fassler**
Difference between True Changes and Long-Term Fluctuations
in Glaucomatous Visual Fields as revealed by the Automatic
Perimeter Octopus.
12.05 **V. Natsikos, J. C. Dean Hart and E. Raistrick**
Visual Field Disturbances in Patients with Idiopathic Serous
Detachments of the Retina.
12.15 **J. C. P. Pitts Crick and R. Pitts Crick**
The sine bell stimulus in Perimetry.
12.30 **B. Esterman**
Grids for Scoring Visual Fields.
12.45 LUNCH

SOCIAL PROGRAMME

(Accompanying Persons)

- 13.45 Afternoon tour of Bristol

MONDAY – afternoon

SPECIAL METHODS

Chairman: **Professor M. Zingirian**

- 14.00 **F. Dannheim**
Patterns of Visual Field Alterations for liminal and supraliminal stimuli in chronic simple glaucoma.
- 14.15 **E. C. Campos**
Critical Flicker Fusion Frequency as an indicator of human receptive field-like properties, 11 Perimetric Studies.
- 14.25 **E. Gandolfo, G. Ciurlo, P. Rossi and G. Calabria**
Flicker Fusion in Pericoecal Area.
- 14.35 **Y. Ogita, T. Sotani, K. Kani and J. Imachi**
Fundus Perimetry in Optic Neuropathy.
- 14.50 **C. D. Phelps and P. W. Remijan**
Acuity Perimetry with a Laser Interferometer.
- 15.05 **Y. Ohta, M. Tomonaga, T. Miyamoto and K. Harasawa**
Visual Field Studies with Fundus Photo-Perimeter in Post-chiasmatic Lesions.
- 15.20 **M. Zingirian, G. Ciurlo, P. Rossi and C. Burtolo**
Flicker Fusion and Spatial Summation.
- 15.30 **TEA**

FREE PAPERS

Chairman: **Professor F. Fankhauser**

- 15.50 **T. Otori, T. Hohki and M. Ikeda**
Central Field Screener: A new tool for screening and routine quantitative campimetry.
- 16.00 **H. Kosaki**
A new Screening Method for the Detection of Glaucomatous field loss.
- 16.10 **A. Suzumura**
Prototype Campimeter AS-2 and its applicability with Both Eyes Open.
- 16.20 **R. Fulmek and F. Friedrich**
Visual Field Defect Characteristics in cases of Hyperprolactinaemia.
- 16.30 **V. Herzau**
The Aulhorn extinction phenomenon: Suppressing Scotomata in normal and strabismic individuals.
- 16.40 **H. Nakatani and N. Suzuki**
Correlation between the Stereographic shape of the disc excavation and the Visual Field of Glaucomatous Eyes.
- 16.50 **L. Barca, R. Paoletti and G. Vaccari**
Visual Field Defects in patients suffering from retinoschisis.

- 17.00 **R. Paoletti Perini**
Refraction Scotomata in the Frame of Artifacts affecting
Perimetric Tests.
- 17.10 **K. Kani, O. Mimura and T. Inui**
Spatial summation in the foveal and parafoveal region.
- 17.20 **V. J. Marmion**
An evaluation of the Friedmann Analyser Mark II.

SOCIAL PROGRAMME

- 19.30 Official Dinner
(Coach leaves 19.15)

TUESDAY – morning

OPTIC NERVE

Chairman: Professor J. Enoch

- 09.00 Guest Lecturer: **Professor W. Foulds**
An investigation of optic nerve disfunction with particular reference to the toxic amblyopias.
- 09.30 **Y. Ogita, T. Sotani, K. Kani and J. Imachi**
Fundus Perimetry in Optic Neuropathy.
- 09.45 **G. Calabria E. Gandolfo and M. Zingirian**
The Pericoecal Area in Optic Sub-Atrophy.
- 10.00 **J. M. Enoch, C. R. Fitzgerald, L. A. Temme**
Radiation Damage of the Optic Nerve.
- 10.15 **C. A. Johnson and J. L. Keltner**
Static and Acuity Profile Perimetry in Optic Neuritis: Loss and Recovery of Detection and Resolution Properties of the Central Visual Field.
- 10.30 **E. Hansen**
Hereditary dominant optic atrophy.
- 10.45 **J. M. Enoch, C. R. Fitzgerald, E. Campos and L. A. Temme**
Different Functional Changes Recorded in Open Angle Glaucoma and Anterior Ischemic Optic Neuropathy.
- 11.00 COFFEE

Chairman: V. J. Marmion

- 11.30 **H. S. Thompson**
Pupillary defects and optic neuropathy.
- 11.40 **Y. Tagami, K. Mizokami and Y. Isayama**
Comparison of Spatial Contrast sensitivity with visual field in optic neuropathy and Glaucoma.
- 11.50 **F. Koerner, A. Huber and F. Fankhauser**
The Hemianopic Border – Its Theoretical and Practical Significances.
- 12.05 **S. Maeda**
Screening of Visual Field Defects among Healthy Adults.
- 12.15 GENERAL MEETING OF THE
INTERNATIONAL PERIMETRIC SOCIETY.
- 12.45 LUNCH

SOCIAL PROGRAMME
(Accompanying Persons)

- 09.30 Tour of the Cotswolds
Start

TUESDAY – afternoon

**JOINT MEETING WITH
SOUTH WESTERN OPHTHALMIC SOCIETY**

Chairman: I. Payne

- 14.00 **Professor S. Drance**
The Richardson Cross Lecture
- 14.30 **E. L. Greve**
The Peritest
- 14.40 **G. K. Krieglstein, W. Schrems,
E. Gramer and W. Leydhecker**
Detectability of early glaucomatous field defects. A comparison
of Goldmann and Octopus Perimetry.
- 14.55 **J. H. Greite**
Visual Field in diabetic retinopathy.
- 15.10 **J. Flammer, H. R. Moser and F. Fankhauser**
Detection and Definition of Scotomata of the Central Visual
Field by Computer Methods.
- 15.30 TEA
- 15.50 **A. Heijl and S. M. Drance**
Automatic Perimetry in Glaucoma. A Clinical study with Three
Computerized Perimeters.
- 16.05 **J. L. Keltner and C. A. Johnson**
Capabilities and Limitations of Automated Suprathreshold
Static Perimetry.
- 16.20 **T. Neuhann and H. J. Greite**
Reliability of Visual Field examination in Clinic routine.
- 16.30 **ROUND TABLE DISCUSSION**
Chairman: Professor S. Drance
**Professor F. Fankhauser, Mr. A. Friedmann, Dr. E. L. Greve,
Professor H. Matsuo, Dr. A. Heijl and Professor G. Verriest**

SOCIAL PROGRAMME

- 19.30 Dinner at Dodington House
(Coach leaves 18.45)

WEDNESDAY – morning

COLOUR

Chairman: Professor G. Verriest

- 08.45 **G. Verriest and A. Hedin**
Report on Colour Perimetry.
- 09.15 **H. Kitahara, K. Kitahara, J. Irie, A. Shirakawa and H. Matsuzaki**
Extrafoveal Stiles II₅ Mechanism.
- 09.30 **P. M. Dunn and R. Lakowski**
Fully-Photopic and Scotopic Spatial Summation in Chromatic Perimetry.
- 09.45 **P. M. Dunn and R. Lakowski**
An instrument for the establishment of Chromatic Perimetry Norms.
- 09.55 **C. Genio and A. I. Friedmann**
A comparison between White Light and Blue Light on about 70 cases of early Glaucoma, using the Mark II Visual Field Analyser.
- 10.10 **L. R. Ronchi and L. Barca**
Refraction Scotomata and Absolute Peripheral Sensitivity.
- 10.25 **I. Iinuma**
An attempt of Flicker Perimetry using Coloured Light in Simple Glaucoma.
- 10.35 **R. W. Massof and D. Finkelstein**
Subclassifications of Retinitis Pigmentosa on the basis of two colour Scotopic Static Perimetry.
- 10.45 **V. J. Marmion**
Colour Normals on the Mark II Friedmann Analyser.
- 11.00 COFFEE
- 11.20 **S. S. Hayreh, R. F. Woolson and J. A. Kohler**
A procedure for the Computer Coding of Visual Fields.
- 11.35 **M. Coughlan and A. I. Friedmann**
The Frequency Distribution of early Visual Field Defects in Glaucoma.
- 11.45 **M. Zingirian, M. Rolando and F. C. Piccolina**
Relationship between Fundus Densitometric Analysis and Perimetry.
- 11.55 **S. Maeda, S. Usuba, K. Nagata and S. Matsuyama**
Visual Field Investigation in Cerebrovascular Accident.
- 12.05 **M. Zingirian, G. Calabria and E. Gandolfo**
The Pericoecal Area: A Static Method for Investigation.
- 12.15 **R. C. Pitts Crick and J. C. Pitts Crick**
The Sine Bell Screening Perimeter.
- 12.45 LUNCH included in tour of Harvey's Wine Cellars followed by a tour of Bath.

SOCIAL PROGRAMME

09.30 (Start) Tour of Lacock and Bath

19.30 MEDIAEVAL DINNER AT CALDICOT CASTLE
(Coach leaves 19.00)

PLEASE NOTE

To all participants REGISTRATION will take place on Sunday, 13th April at:

MANOR HALL
University Hall of Residence
Lower Clifton Hill
Bristol, BS8 1BU
14.00 – 19.00

For participants arriving on Monday, 14th April REGISTRATION will be at the

SYMPOSIUM BUREAU, Room G.45
Department of Physics
University of Bristol
Tyndall Avenue, Clifton
Bristol, BS8 1TL

RECEPTION will be held on Sunday, 13th April at 19.00 at **Manor Hall** (Buffet Supper).

Pick-up points for Symposium and Social functions:

MANOR HALL	St. VINCENT ROCKS HOTEL
AVON GORGE HOTEL	HAWTHORNS HOTEL

SPEAKERS

Please hand in a typed transcript for publication at Symposium Bureau.
Please note that the period you have been allocated includes discussion time.

ABSTRACTS

MONDAY, 14th APRIL

09.15 PROFESSOR R. GREGORY – Guest Lecturer

Psychological Concepts and the Visual Field

09.45 R. P. SCOBAY

**Psychophysical and Electrophysiological
Determinants of Motion Detection:
Relevance to Kinetic Perimetry**

Optimal stimulus parameters for kinetic perimetry and the neural mechanisms responsible for encoding movement are considered in this study. Using psychophysics, we have measured the human displacement threshold under varying stimulus conditions. Dr. C. A. Johnson and myself found that the displacement threshold varies as a function of target size, luminance, duration of movement and retinal eccentricity. Fundamental differences were found between central and peripheral vision that should be of interest to clinicians using kinetic perimetry. In addition, the neural mechanisms were studied in subhuman primates. Microelectrode studies on displacement threshold (*Vision Res.* 16:15–24, 1976) and my recent findings on differences in the response of tonic (X) and phasic (Y) retinal ganglion cells to image displacement correlate well with psychophysical measurements. In addition to providing experimental results consistent with theory of motion detection, these data provide a basis for choosing optimal stimulus parameters in kinetic perimetry.

10.00 F. DANNHEIM and A. MÜLLER-JENSEN

Perimetry and Pattern-VECP in Chiasmal Lesions

With an alternating checkerboard technique visual evoked cortical potentials may reveal alterations even in patients with slight compression of the chiasm and moderate depression of sensitivity in conventional perimetry. The prominent feature is a reduction of the amplitude. The latency delay as observed in some cases was less pronounced than in demyelinating diseases.

10.15 J. T. W. VAN DALEN and E. L. GREVE

**Assessment of Visual Fields (VF) and
Visual Evoked Responses (VER) in Multiple Sclerosis (MS)**

A number of definite MS patients were examined by means of VF and VER. The VF were recorded by:

Friedmann Visual Field Analyser – Goldmann perimetry – Static perimetry.
The VER was obtained by checkerboard stimulation.

In a large % VF abnormalities were found: the well known (para)central scotomata, but also significant VF defects in the Bjerrum areas. Friedmann visual field analysis and static perimetry were extremely useful. Goldmann perimetry did not provide much information.

In literature it has been suggested that electrophysiological testing in MS patients is very useful. Our results show that accurate VF testing is at least as reliable as VER assessment.

10.30 A. SERRA and C. MASCIA

**Quantitative Perimetry in Optic Subatrophy from
Previous Optical Neuritis in Multiple Sclerosis**

During the course of a systematic investigation on patients suffering from multiple sclerosis, particular attention was devoted to those showing optic subatrophy following optic neuritis.

Of interest are those cases where the responses to a battery of functional tests, when the part of the affected eye is compared to those of the contralateral unaffected eye. The same tests include visual acuity, chromatic discrimination (F–M 100–Hue), both kinetic and static perimetry, cortical visual evoked potential (VER), in the transient state, for a structured target (checkerboard).

10.45 B. SCHWARTZ and S. SONTY

**Differences in the Visually Evoked Response
between Normals and Open Angle Glaucomas**

Differences in latencies between eyes of normals and open angle glaucoma patients with visual field loss in one eye were determined on measuring the visually evoked response. The stimulus was a checkerboard pattern 40 minutes in size, projected on the macular region over a 9^o field by means of direct viewing through a hand-held ophthalmoscope. All patients had visual acuities of 20/40 in each eye or better. The visually evoked response was obtained under steady state conditions, and averages were obtained of 64 sweeps. The differences in latency between eyes were measured and significant differences were found between the normal and glaucomatous group, the glaucomatous group having longer latencies. These results indicate significant macular involvement in open angle glaucomatous field loss.

11.20

H. MATSUO, G. KIKUCHI, S. HAMAZAKI
J. HAMAZAKI, E. SUZUKI and M. YAMADA

Automatic Perimeter with Graphic Display

A much more improved type of automatic perimeter was devised based from experiences and accumulated data of the semi-automatic campimeter which was reported by Hamazaki *et. al.* on the last symposium in 1978.

The newly devised perimeter is easy to manipulate as compared to the semi-automatic one and whole process of examination proceeds automatically by computerized mechanisms.

The final result is displayed on the monitor TV and the same result is also simultaneously printed out.

Stimulus intensity integrated examination patterns are readily changeable according to examining purpose.

Certain specified points which the examiner wishes to scrutinize — the arrangement of the stimulus points and stimulus intensity — are simple to reproduced by using the typewriter keys as necessary. One of the beneficial points of this perimeter is relatively low production costs as compared with the presented automatic perimeter.

11.35

H. BEBIE and F. FANKHAUSER

Statistical Programme for the Analysis of Perimetric Data

It has been a long felt wish of many perimetrists, using automated perimeters, to preprocess their data by the computerized perimetric system directly in order to facilitate human decisions.

The new series of Octopus programmes possess such facilities in so far as recorded contrast sensitivities are compared with normal sensitivity, corrected for age and coordinate, the differences being determined automatically. Such differences are classified into 3 to 5 groups depending on the programme and are printed out as symbols (for rapid reading) or as numerical tables together with corresponding actual and statistical sensitivities arranged into a coordinate net.

This general principle has been pushed one step forward: A new programme for statistical evaluation has been created. This programme evaluates a temporal sequence of sensitivity values determined by means of Octopus programme 31. A great amount of data-reduction steps is performed automatically. The data are identified in the memory, evaluated and the results printed out. A number of statistical tests are performed, the results being displayed together with other data. The reliability, efficiency and the improvements of this principle are discussed.

11.50 B. P. GLOOR, U. SCHMIED and A. FÄSSLER

**Difference between True Changes and Long-Term Fluctuations in
Glaucomatous Visual Fields as Revealed by the
Automatic Perimeter 'Octopus'**

Repeated visual field examinations were performed on 66 glaucoma patients using the OCTOPUS automated perimeter. The results were analysed using programme 'Delta', developed for the 30° visual field by Bebie and Fankhauser. Analysis of the averaged results showed that both the extent and the total volume of field loss were less at the second examination, implying an improvement in the visual field. A detailed break-down revealed 28 fields showing an improvement and 19 which had deteriorated. In order to differentiate genuine improvements from long-term fluctuations and/or learning effects 15 second and third examinations were analysed. Since the differences or changes were significantly less, although improvements still occurred, it is likely that the learning effect has an upper value of about 3 dB.

12.05 V. NATSIKOS, J. C. DEAN HART and
E. R. RAISTRICK

**Visual Field Disturbances in Patients with
Idiopathic Serous Detachments of the Retina**

28 patients, diagnosed as having idiopathic serous detachments of the retina on the basis of their presenting symptoms and characteristic findings, elicited by ophthalmoscopic, biomicroscopic and fluorographic examination, in the age group 20–50 years, had combined static perimetric and Amsler chart studies performed. 14 patients had visual field investigations carried out on presentation to hospital and 6 months later, and a further 14 cases were studied, who had developed serous detachments between 6 months and 5 years previously, and had had no recurrences.

In the acute phase of the disease process, all patients who had static perimetric examinations performed showed reduction of retinal sensitivity in the central area, but the disturbances were more obvious in the axis joining the fovea to the centre of the leak detected on fluorescein angiography than in the standard 180/0° axis. All patients were also aware of defects on observing an Amsler chart.

After resolution of the detachments, 23 patients (82%) continued to report problems on looking at an Amsler chart. In 12 patients (43%), disturbances of the static profile were detected in the 180/0° axis, but a further 6 (21%) only showed changes when static profile was plotted along the axis passing from the centre of the previous leakage site, found on earlier fluorescein studies and now quiescent, through the fovea.

The implications of these findings are discussed.

The Sine Bell Stimulus in Perimetry

The stimulus pattern used in perimetry can be considered as a three dimensional signal with one temporal and two spatial dimensions. The visual apparatus responds to this signal with varying sensitivity over a limited range. The signal and the sensitivity may be analysed in terms of spatial and temporal frequency without initially making any assumptions about the mechanism. Work on contrast sensitivity using gratings as stimuli has shown that a fall in visual acuity is associated with the loss of sensitivity to high spatial frequencies. To minimise the influence of visual acuity in visual field testing it is necessary to use stimuli which lack high frequency components, containing only those frequencies necessary to give adequate separation of the closest stimulus loci. If the brightness of such a stimulus was plotted across a diameter the curve would be in the form of a sine bell. There would thus be theoretical and real advantages in adopting a sine bell or similar stimulus in perimetry.

Grids for Scoring Visual Fields

This paper is presented in response to Professor Enoch's Memorandum of 7-V-79 addressed to the Group on Standards. He stated: 'We are faced with a major problem: how do we specify DEGREE of loss WITHIN the visual field? . . . The problem is complex when one deals with visual fields wherein there is other than simple concentric contraction.'

The grids (or scales) presented are the exact answer to the stated problem. Ten years ago they were approved by the Committee on Optics and Visual Physiology, a joint committee representing the American Academy of Ophthalmology, the American Medical Association, the American Ophthalmological Society and the Association for Research in Ophthalmology. Since 1969 their use in the United States has increased each year.

The paper will briefly state the rationale, the method, the mathematics and the mechanics involved in the scoring process. It will emphasize that this method, unlike others, is based on FUNCTION rather than anatomy, making the grid a relative-value scale which is so constructed that it assigns *UNEQUAL* percentage values to the different parts of the normal field in direct proportion to their *functional* importance. It will show how the grid is designed to score ANY conventionally plotted field and to do so by direct reading, in per cent, in less than a minute's time.

The applicability of this device to the modern automated perimeter is obvious.

Lastly, the paper will touch on the 2000 trials by 20 of the staff of the Manhattan Eye and Ear Hospital used, before publication, to prove the relative accuracy and validity of the method.

14.00

F. DANNHEIM

**Patterns of Visual Field Alterations for
Liminal and Supraliminal Stimuli in Chronic Simple Glaucoma**

The findings of about 100 eyes with circumscribed glaucomatous alterations evaluated by liminal and supraliminal stimuli are presented. Disturbance of nerve fibre bundle characteristics may be found in any part of the central or peripheral field including the centro-coecal area. Myopic eyes are more likely to develop defects in uncommon locations. Changes in the nasal periphery especially for supraliminal stimuli reveal a second pattern corresponding to the vulnerability of the nerve fibres with the longest course from the bipolar cells to the optic disc. A non-linear scale for perimetric plots favouring the central field without excluding the periphery has definite advantages.

14.15

E. C. CAMPOS

**Critical Flicker Fusion Frequency as an Indicator of
Human Receptive Field-Like Properties
11 Perimetric Studies**

A new function reflecting receptive field-like properties was recently described by Campos and Bedell (*Invest. Ophthalm. & Visual Sciences* 17: 533, 1978). It is tested, measuring the critical flicker fusion frequency of a small test-target, centered on a round background of fixed luminance. The test parameter is constituted by the size of the backgrounds, which is varied appropriately. This function has some similar features with the so-called Westheimer or sustained-like function. However, part of it appears to derive from a non sustained-like source.

In the original publication only the foveal flicker-based function was studied. Aim of this paper is to provide further insight on this function and to report on its behaviour if tested perimetrically. The function was measured at various eccentricities in normal observers. The results are presented.

14.25

E. GANDOLFO, G. CIURLO,
P. ROSSI and G. CALABRIA

Flicker Fusion in Pericoecal Area

The pericoecal area is known to be the site of some early defects of the visual field.

Flicker fusion frequencies, in turn, have been reported to be often altered when more classical perimetric examinations are still unchanged.

This work is intended to report 'normal' values for flicker fusion frequencies in this area, based on the examination of a large number of people.

14.35 Y. OGITA, T. SOTANI, K. KANI and J. IMACHI

Fundus Perimetry in Optic Neuropathy

Central visual field was measured by fundus perimeter in cases of optic neuropathy, such as Leber's disease, infantile optic atrophy and retrobulbar neuritis etc.

The central visual field showed very complicated shape compared with those obtained by conventional perimeters.

Some cases of visual fields will be presented in clinical course of treatment.

14.50 C. D. PHELPS and P. W. REMIJAN

Acuity Perimetry with a Laser Interferometer

Measurement of peripheral visual acuity may provide useful clinical information not obtainable from classical light sense perimetry. We have designed and built a new laser interferometer which allows us to test visual acuity at various eccentricities from zero to 20° and along any meridian. The test field is round, one degree in diameter, and contains alternating red and black stripes. The orientation and separation of the stripes can be varied, as can the intensity of the background illumination. A separate viewing system allows the examiner to monitor the subject's fixation. The subject is asked if he can detect the striped pattern and, if so, its orientation.

The light source is a helium neon laser. A holographic phase grating separates the light into two coherent, equal strength, spherical waves diverging from a single point. The waves are focussed near the nodal point of the subject's eye and form interference fringes on the retina. The fringes are not 'focussed'; they occur wherever the waves overlap. Thus visibility of the fringes is virtually independent of the eye's refraction and is not impaired by minor media opacities.

15.05 Y. OHTA, M. TOMONAGA,
T. MIYAMOTO and K. HARASAWA

Visual Field Studies with Fundus Photo-Perimeter in Postchiasmatic Lesions

We have developed a new method of recording the isopter on the fundus photograph under direct observation or TV-monitoring under infra-red illumination.

We examined 17 cases with visual field defects in postchiasmatic lesions manifesting as bitemporal or homonymous hemianopsia and papilledema. The results were compared with those by Goldmann perimeter, U-O test chart and Amsler charts.

In cases with bitemporal hemianopsia, macular sparing detected by U-O test and Amsler charts appeared as vertical splitting lines located in the hemianopic side of the fovea with the present technique.

15.20

M. ZINGIRIAN, G. CIURLO,
P. ROSSI and C. BURTOLO

Flicker Fusion and Spatial Summation

Flicker fusion frequencies in the central and paracentral retina were studied for liminal and supraliminal stimulations with targets of different size.

Statistical analysis of the results obtained in a relatively large series of patients allows a good standardization of 'normal' values for healthy people.

Furthermore the evaluation of the results lends insight into the relationships between temporal and spatial summation.

15.50

T. OTORI, T. HOHKI and M. IKEDA

Central Field Screener: A New Tool for Screening and Routine Quantitative Campimetry

A light weight portable 'Central Field Screener' was designed. The new campimeter is the modification of Part Central Field Tangent Screen (Sola) and uses 46 static red diode targets and one target for fixation. Four targets are exposed simultaneously at the distance of 50 cm. and any one of these four targets can be extinguished at the examiner's will. A classical wand with a red diode target can also be used. These targets flicker at various speeds. Central Field Screener is also equipped with a daylight screen as in Autoplot Tangent Screen (Bausch-Lomb) and a portable quantitative light pointer.

This new campimeter has been found quite useful in detecting various field changes.

16.00

H. KOSAKI

A New Screening Method for the Detection of Glaucomatous Field Loss

It is well known that the flicker perimetry is sensitive in the detection of the earliest glaucomatous field loss and that the glaucomatous field loss begins in the central field.

I have developed a new screening method for detecting the glaucomatous field loss using a flicker campimeter that moves the flicker target on the circular lines of the 10°, 15° and 20° and detects the inequality in the flicker level on those lines.

In this report I will show the results of this new screening method and would like to hear your comments.

16.10

A. SUZUMURA

**Prototype Campimeter AS-2 and its
Applicability with Both Eyes Open**

In the present investigation the Suzumura spatial perimeter was modified and a new campimeter prototype was devised for use with both eyes open.

The feature of the new device is its capacity for fixation with both eyes of a fixed point on a screen positioned at an optionally chosen distance. The target is optically projected only on the eyes of the subject tested, and the distance of the image formed is equivalent to that of the screen. Thus, the visual target is seen as if to actually appear on the screen.

The results were as follows:

1. Central fixation is possible by the normal eye even if there is central scotoma, and error is small.
2. Fluctuation in ocular fixation is minimal.
3. Visual fatigue is marginal in central scotoma.
4. Accommodation and pupillary athetosis are prevented from occurring at the time of measurement.

16.20

R. FULMEK and F. FRIEDRICH

**Visual Field Defect Characteristics in
Cases of Hyperprolactinaemia**

It is reported about the results of kinetique-quantitative method of relative lightsense-perimetry with Goldmann's Perimeter in cases of physiological and pathological hyperprolactinaemia.

16.30

V. HERTZAU

**The Aulhorn - Extinction Phenomonon
Suppression Scotomas in Normal and Strabismic Individuals**

When one eye is presented with a small sized stimulus, a circumscribed suppression scotoma is produced on the unstimulated eye for a short period.

We examined the appearance of this extinction phenomenon described by Aulhorn and the size of the scotomatous areas in normal and strabismic subjects using a new haploscopic method.

The experimental results with squinters indicated, that the appearance of the phenomenon is restricted to specific areas of the visual field. These areas are dependant on the direction and the angle of the deviation.

The findings support the hypothesis that the binocular visual field in most of the strabismic patients is divided into two monocular areas of dominance, separated by a binocular area.

**Correlation between the Stereographic Shape of the
Disc Excavation and the Visual Field of Glaucomatous Eyes**

The vertical grating images are projected on to the ocular fundus from either nasal or temporal side and the fundus is photographed in the routine manner, and then, a fundus photograph with vertical grating lines can be obtained. When the surface of the fundus is uneven, the grating lines are distorted. In the present work, the distortion was measured by densitometer. This method also enables us to study the vertical profile of the retina and disc surface. We studied the correlation between the stereographic appearance of the disc excavation and the glaucomatous visual field.

Visual Field Defects in Patients Suffering from Retinoschisis

In later stages of retinoschisis the cut is known to have sharp or steep margins.

Some clinical cases are produced, which seem to suggest that in early stages the defect is only relative and not irreversible.

**Refraction Scotomata in the Frame of
Artifacts Affecting Perimetric Tests**

When using small targets for perimetric tests, it is of primary importance to get on the retina a sharply focused target. The out-of-focus dependencies of threshold as well as of suprathreshold responses (e.g. heterochromatic brightness match) are recorded by us from a number of normals as well as from patients.

Amongst others, early cataractous eyes, with incipient myopization are examined (due to changes in refraction index or to a sort of night myopia), oedematous retinal areas, etc.

The results are tentatively interpreted by taking into account the depth of focus of the eye, in view of the influence of off-axis eye aberrations such as chromatic aberration, oblique-ray astigmatism, the astigmatic nature of spontaneous eye lens fluctuations, the differential influence of cycloplegic drugs and similar.

17.10

K. KANI, O. MIMURA and T. INUI

Spatial Summation in the Foveal and Parafoveal Region

There has been little systematic research investigating the retinal sensitivity and spatial summation in the foveal and parafoveal region. Furthermore, the sensitivity is depressed when the target falls on the vessel, which causes the error of the sensitivity. We used the fundus controlled perimeter and monitored the target location on the retina and eye movement. In this study, we investigate spatial summation in the foveal and parafoveal region in normal and abnormal subjects.

17.20

V. J. MARMION

An Evaluation of the Friedmann Analyser Mark II

A retrospective comparison of the visual field analyser Mark I with the new Mark II is made using a specific standard Goldmann Kinetic field technique as a point of reference. The results indicate that there is a greater comparability than would be anticipated and suggests that the improved random sampling is an important factor.

TUESDAY, 15th APRIL

09.00 PROFESSOR W. FOULDS – Guest Lecturer

**An Investigation of Optic Nerve Dysfunction with
Particular Reference to the Toxic Amblyopias**

09.30 Y. OGITA, T. SOTANI, K. KANI and J. IMACHI

Fundus Perimetry in Optic Neuropathy

Central visual field was measured by fundus perimeter in cases of optic neuropathy, such as Leber's disease, infantile optic atrophy and retrobulbar neuritis etc.

The central visual field showed very complicated shape compared with those obtained by conventional perimeters.

Some cases of visual fields will be presented in clinical course of treatment.

09.45 G. CALABRIA, E. GANDOLFO and M. ZINGIRIAN

The Pericoecal Area in Optic Sub-Atrophy

Static exploration with 'close single stimuli' that we devised for the pericoecal area examination was used for a perimetric evaluation of patients with optic sub-atrophy.

The graphic (e.g. densitometric) representation of the results yields a fairly good display of the perimetric damage of this region. In turn the numerical representation of the whole defect in this area (pericoecal formula) offers a very useful indication for the quantitative follow-up of these cases.

10.00 C. R. FITZGERALD, J. M. ENOCH and L. A. TEMME

Radiation Damage of the Optic Nerve

A series of patients with radiation damage has been studied. Retinal vascular changes shown by fluorescence angiography were accompanied by local alterations in the sustained- and transient-like functions. When no retinal manifestations were found, and in all cases where the optic nerve was involved, visual fatigue or saturation-like effects were noted. These could be surprisingly subtle. Because of the amplification effects, small changes are revealed in the plateau region of the central kinetic field. Kinetic testing provided an extremely sensitive test of small magnitude fatigue-like effects. In every instance these effects, once discovered, could be verified using flashing repeat static tests. Comparable results were obtained in all patients tested.

**Static and Acuity Profile Perimetry in Optic Neuritis:
Loss and Recovery of Detection and
Resolution Properties of the Central Visual Field**

Luminance thresholds for detection (static profile perimetry) and resolution (acuity profile perimetry) of visual stimuli were determined in the central visual field of 12 patients with optic neuritis, using the Tübingen perimeter. Both the magnitude and time course of loss and recovery of function were generally equivalent for detection and resolution properties. In one case of particularly slow recovery, detection properties began to improve slightly before any improvements in resolution occurred. Beyond this initial state of recovery, both functions again showed parallel improvements with time. These findings are consistent with the results obtained for other types of optic nerve dysfunction. In contrast, cataracts, amblyopia, mono-fixation syndrome and central serous retinopathy exhibit substantially greater loss (and in some instances, recovery) of resolution properties than for detection processes. This suggests that acuity profile perimetry in combination with static profile perimetry may provide a valuable differential diagnostic technique for optic nerve disease.

Hereditary Dominant Optic Atrophy

Specific quantitative colour perimetry has been performed in patients with hereditary dominant optic atrophy. Patterns of separate receptor functions are presented together with ordinary perimeter records. Irregular defects in the visual fields are shown. In some patients there is a reduced blue receptor response present, though irregularly distributed in the visual field.

**Different Functional Changes Recorded in
Open Angle Glaucoma and Anterior Ischemic Optic Neuropathy**

The retinal ganglion cell exhibits two types of functional change. The difference in response appears to depend on whether or not the retrobulbar portion of the optic nerve is actively involved. This may imply differences in the myelinated and non-myelinated portions of the optic nerve and associated structures. In open angle glaucoma, alterations in the sustained- and transient-like functions but not in the flashing repeat static test are found. That is, there are changes in spatial neural interactions, but there is no evidence of a visual fatigue or saturation-like effect. In optic nerve radiation damage without evidence of retinal vascular changes, in optic neuritis secondary to multiple sclerosis, chiasmal lesions, ischemic optic neuropathy, varying degrees of visual fatigue or saturation-like effects are demonstrated with little or no change in the sustained- or transient-like functions. There have been no exceptions recorded. Clearly, it would be desirable to extend these studies to include chorioretinopathy juxta-papillaris and low tension glaucomas.

Pupillary defects and Optic Neuropathy

The relative afferent pupillary defect (RAPD) is the most commonly used clinical indicator of optic nerve function. The size of the pupillary defect can be measured by dimming the stimulus to the good eye by known amounts until the two eyes are balanced and no relative afferent pupil defect (RAPD) can be seen. This can be done clinically by holding a neutral density filter over the better eye and doing the swinging light test. The density of the filter needed to abolish the RAPD is recorded, in log units, as a measure of the relative afferent pupillary defect.

Patients with unilateral loss of visual field were studied and the amount of RAPD correlated with the size and location of the field loss.

Comparison of Spatial Contrast Sensitivity with Visual Field in Optic Neuropathy and Glaucoma

Spatial contrast sensitivity measured by sinusoidal gratings was compared with classical static perimetry and the perimetry with direct fundus examination (Quantitative Maculometry, Isayama and Tagami, 2nd IVFS) in optic neuropathy and glaucoma cases. The atrophic state of the retinal nerve fibre layer under red-free light was also compared with the contrast sensitivity. A good relationship was found between the contrast sensitivity, the atrophic state of the maculopapillar bundles, and the central visual field especially when it was measured by the perimetry with direct fundus examination.

The Hemianopic Border – Its Theoretical and Practical Significance

The sensitivity distribution left and right of the vertical main axis (90° / 270°) in hemianopia is of theoretical and clinical importance. The exact definition of this region is difficult because determination of contrast sensitivity is afflicted by a large measurement error. Averaging methods result in a more realistic assessment of the sensitivity distribution. Such methods will be described and the clinical and theoretical implications are dealt with.

12.05

S. MAEDA

Screening of Visual Field Defect among Healthy Adults

Visual fields were examined using a Static Campimeter (Takada Co. Japan) in 1,811 healthy adults, for the purpose of screening of the visual field defect in healthy populations.

The age of the subjects studied varied from 15 to 64 years and averaged 28 years.

Field defects were detected in 21 subjects by the present screening. Diagnostic results after further examinations were as follows: 9 intracranial lesions, 6 retinal lesions, 4 glaucomas and 2 unknown cases. Of the 9 cases of intracranial lesion, one was A-V malformation and two were suspected cases of aneurysm. Only 10 of 21 cases of field defect showed ophthalmoscopic findings. The time taken for the field screening was 2 to 3 minutes per two eyes, though dark adaptation was necessary for 10 minutes, prior to the examination to exclude 'false positive'.

The present study revealed that visual field screening is easily made by using Static Campimeter and the result of screening is of much value for the detection of ophthalmological diseases, especially for the detection of early diagnosis of lesions in the visual pathway among the subjects lacking subjective symptoms.

To be published in Jap. J. Clin. Ophthalmol. Vol.34, (1980)

14.30

E. L. GREVE

The Peritest

14.40

G. K. KRIEGLSTEIN, W. SCHREMS,
E. GRAMER and W. LEYDHECKER

**Detectability of Early Glaucomatous Field Defects:
A Comparison of Goldmann and Octopus Perimetry**

In a controlled clinical study the reproducibility of central visual field testing was investigated using handmade kinetic perimetry done by two independent observers and a duplicate examination by a computerized static perimeter. Qualitative and quantitative parameters have been established to compare both methods. Significant differences in duplicate examinations were found with an incidence of 28% in the kinetic perimetry and 12% in the computerized perimeter.

Visual Field in Diabetic Retinopathy

Visual field defects in diabetic retinopathy are difficult to detect with traditional perimetric methods. With the automatised perimetry system OCTOPUS it is easier to find small disturbances in light sensitivity in the entire visual field with great accuracy. In DR characteristic changes in the visual field show up in form of flecked, partially confluent relative scotomas. Even severe losses of retinal function occur before diminution of visual acuity can be stated. There is a close correlation between these scotomas and areas of capillary non-perfusion seen in fluorescein-angiography. The OCTOPUS-Perimetry is a valuable supplement for the evaluation of DR even in regard to a photocoagulative treatment.

15.10 J. FLAMMER, H. R. MOSER and F. FANKHAUSER

Detection and Definition of Scotomata of the Central Visual Field by Computer Methods

It is often difficult to detect scotomata as occurring in central visual field disturbance due to latent or manifest optic nerve disease in retrobulbar neuritis. Discrete scotomata submerged in noise may only be found by task-oriented computer routines. It is still more difficult to define the shape and extent of such sensitivity disturbances when the spatial extent is small and/or when the loss of contrast sensitivity is not large. Noise attenuating computer routines are described leading to a realistic definition of such defects.

15.50

A. HAIJL and S. M. DRANCE

Automatic Perimetry in Glaucoma A Clinical Study with Three Computerized Perimeters

A number of patients, with and without glaucomatous visual field damage, were tested with the three computerized perimeters COMPETER, OCTOPUS and PER!METRON. The patients were tested on the same day with all the three machines. Static and kinetic manual perimetry on the Tübingen perimeter was the method of reference.

The results will be given and discussed with special emphasis on the suitability of the machines for detection of visual field damage in glaucoma.

16.05

J. L. KELTNER and C. A. JOHNSON

Capabilities and Limitations of Automated Suprathreshold Static Perimetry

Automated suprathreshold static perimetry is a technique for performing rapid, quantitative visual field screening. Over the past three years, we have had the opportunity to evaluate four commercially-available devices that

utilize this procedure; the CFA-120 (Electro-Medical Technology, Redding, California), the Fieldmaster Model 101-PR and Model 200 (Synemed, Inc., Berkeley, California), and the Autofield-I (Cavitron-Biotronics, Irvine, California). Comparisons with manual kinetic and/or static perimetry have been performed in more than 2,500 eyes to date. Although each of the devices incorporate slightly different features, we have found a number of general principles associated with the various approaches to automated suprathreshold static perimetry. This paper describes an overview of our current evaluations of automated suprathreshold static perimetry. A discussion of the general principles, optimal test conditions, capabilities and limitations underlying the technique will be presented.

16.20

T. NEUHANN and H. J. GREITE

Reliability of Visual Field Examination in Clinical Routine

Detectability of Visual Field defects on 50 patients with GOLDMANN-Perimetry and the automatic perimeter systems OCTOPUS and FIELD-MASTER will be demonstrated.

WEDNESDAY, 16th APRIL

08.45 G. VERRIEST and HEDIN

Report on Colour Perimetry

09.15 H. KITAHARA, K. KITAHARA,
J. IRIE, A. SHIRAKAWA and H. MATSUZAKI

Extrafoveal Stiles II₅ Mechanism

Increment thresholds up to 20° from the fixation point on two normal observers were measured by Stiles' two colour threshold technique using 1° in diameter, 200 msec. test flash of wavelength 650 nm. at the centre of 35° adapting field of either short (430 nm.) middle (530 nm.) or long wavelength (650 nm.). The extrafoveal threshold versus intensity curve obtained for a 650 nm. test stimulus and either short, middle or long wavelength background showed two branches. Both the field sensitivities of lower [II₀(μ)] and upper branch [II₅(μ)] were studied by measuring increment thresholds on various backgrounds. Furthermore, to measure the field sensitivities of upper branch [II₅(μ)], a short wavelength auxiliary background (430 nm.) was added. The variation of the field sensitivity of the long wavelength sensitive mechanism with retinal eccentricity will be described.

09.30 P. M. DUNN and R. LAKOWSKI

Fully-Photopic and Scotopic Spatial Summation in Chromatic Perimetry

Chromatic static perimetry has in general been limited in the past to investigations involving one stimulus size only (Wentworth, 1930; Nolte, 1962) or different sizes for different chromatic stimuli (Verriest and Israel, 1965) making the study of spatial summation impossible. In the present study a modified Goldmann perimeter has been used to study spatial summation for chromatic stimuli using Goldmann stimulus sizes, I, II, III, and IV (6.8', 13.6', 27.2' and 54.3'). Achromatic thresholds have been obtained for 5 emmetropic normal trichromats for an achromatic and three chromatic stimuli; results are presented here for stimuli of $\lambda_D = 474$ and 617 nm. under fully-photopic (250 cd.m.⁻²) and -scotopic conditions. The obtained results are discussed with reference to the earlier work on summation for achromatic stimuli by Fankhauser and Schmidt (1958, 1960), Sloan (1961), and Gougnard (1961).

09.45

R. LAKOWSKI and P. M. DUNN

**An Instrument for the Establishment of
Chromatic Perimetry Norms**

A perimeter has been developed which represents a unique solution to requirements set out by the IPS Perimetric Standards (1978). Extensive modification of a Goldmann perimeter has made possible high-luminance chromatic perimetry under full-photopic and -scotopic conditions. An electronically-controlled shutter mechanism permits precise control of inter-stimulus interval (0.5 to 6.5 sec.) and stimulus duration 50 to 1000 msec.). The use of Xenon-arc lamps for projection of stimuli and background provides high luminance chromatic stimuli and a high-luminance background approximating Illuminant 'C'. This instrument has been used to establish static chromatic perimetry norms under fully-photopic (250 cd.m.^{-2}) and -scotopic conditions. Achromatic thresholds are shown for a 17 year old emmetropic, normal trichromat for 6.8' stimuli of $\lambda_D = 474, 535, \text{ and } 617 \text{ nm.}$, as well as an achromatic stimulus.

09.55

C. GENIO and A. I. FRIEDMANN

**A Comparison between White Light and Blue Light on
about 70 Cases of Early Glaucoma, using the
Mark II Visual Field Analyser**

This paper deals with about 70 cases of early glaucoma which were examined with the Mark II Analyser using on each eye, on the same day, white light and blue light. Characteristic examples of visual field findings will be shown, as well as the analysis of the comparison between the two techniques.

10.10

L. R. RONCHI and L. BARCA

Refraction Scotomata and Absolute Peripheral Sensitivity

The present report deals with spatio-temporal integrative properties of the dark-adapted peripheral retina. Natural pupil, monocular vision and monochromatic stimuli are used. Once fixed target size and eccentricity, along the nasal side of the horizontal meridian, the log liminal radiance-time product (P) is estimated for two different flash durations, 400 and 10 ms., at absolute threshold (recorded by means of a shortened constant stimuli method). Next, difference $\Delta = P_{400} - P_{10}$ is plotted versus stimulus wavelength (λ). In previous papers it was shown that when target size is as large as 2° , the plot of Δ versus λ is flat, denoting the expected independence of spatio-temporal integrative properties of the dark-adapted retina, at absolute threshold. On the other hand, when the target subtends at the eye a few min. of arc, the plot of Δ versus λ shows an unexpected wavelength dependence. The data reported in the present experiment concern the dependence of Δ on target size \underline{u} , once fixed both eccentricity and wavelength. At either end of the spectrum the plot of Δ versus \underline{u} is practically flat. In the middle of the spectrum, Δ increases with increasing \underline{u} , up to $30'$ at least.

On one side, the attempt is made to insert our findings in the frame of current views on rod-cone interactions in scotopic vision. On the other side, the attempt is made to look for a practical application. For this, refractive scotomata are considered. To avoid them, the target is to be focused on the tested retinal area, within tolerance limits imposed by the depth-of-focus of the eye. In this connection, the Δ dependence on u has been recorded by varying the spectral composition of the fixation light. The main finding is that as u exceeds 2 or 3 min. of arc, the response becomes practically independent of fixation colour. The possible use of a laser refractor (based on the neutralization of apparent speckle motion) as an aid to monitor the accommodation state during the course of perimetric testing is suggested, by taking into account recent ergo-ophthalmological requests concerning task demands in matter of retinal image quality.

10.25

I. IINUMA

An Attempt of Flicker Perimetry using Coloured Light in Simple Glaucoma

An improved Goldmann perimeter was used, setting a rotating sector for flicker in the arm of the instrument, and a red or blue filter cap on the projector head. Each reactive luminance of the red, blue or white was controlled to be almost the same (1.00) and that of the background 0.0315 by the attached density filters and controllers. Isopter ranges in the visual fields originated from the same frequency and brightness of the flickering lights were usually the same in the same normal subjects and also in early glaucomas of stationary state notwithstanding by any colour. In the case of testing advanced glaucomas with optic atrophy with the red light, the isopter ranges were more depressed than with the red or white; however, in the case of testing early glaucomas of a progressive state with the blue light, the results were sometimes more depressed than with the red or white.

10.35

R. W. MASSOF and D. FINKELSTEIN

Subclassifications of Retinitis Pigmentosa on the Basis of Two-Colour Scotopic Static Perimetry

On the basis of evaluations of rod sensitivity relative to cone sensitivity, determined from perimetric dark adapted absolute threshold measures to a short wavelength stimulus and a long wavelength stimulus, we have identified at least two forms of dominant retinitis pigmentosa (RP) and at least two forms of recessive RP. One group of dominant and recessive RP patients behave as if only cones mediate detection at absolute threshold over the entire visual field, implying an early and diffuse loss of rod sensitivity. A second group of dominant and recessive RP patients behave as if rods mediate detection at absolute threshold, despite one to four log. unit localized threshold elevations, implying concomitant losses of rod and cone sensitivity in a regionalized pattern. Our interpretations of the two-colour scotopic threshold results are corroborated by measures of dark-adapted spectral sensitivity in the peripheral field.

Colour Normals on the Mark II Friedman Analyser

An assessment of colour vision fields on the visual field analyser Mark II is presented. As a base line for comparability the subjects examined had their 100 hue, anomaloscope readings and static colour perimetry performed.

11.20 S. S. HAYREH, R. F. WOOLSON and J. A. KOHLER

A Procedure for the Computer Coding of Visual Fields

Perimetry is of great diagnostic significance in the evaluation of visual function. In order to summarize statistically the visual field information we have developed and tested a procedure for computer coding and retrieving the peripheral visual fields as well as the size, shape, orientation and location of scotomata with the use of a mechanical instrument. These data are manually transcribed on to a computer coded data form for calculation of numerical data and computer plotting of fields. The numerical data was compared to ratings of the fields made by three clinicians in our clinical studies. The fields were then ranked from best to worst by each clinician on each of eight characteristics: central scotoma in I/2, I/4 and V/4; and overall assessment of central scotomata: peripheral field in I/2, I/4 and V/4 and overall assessment of peripheral field. The rankings were compared between pairs of raters in addition to being compared to the numerically-derived data. Generally, the rankings agreed quite closely with the numerical data. Full details of these reliability studies will be presented.

11.35 M. COUGHLAN and A. I. FRIEDMANN

**The Frequency Distribution of
Early Visual Field Defects in Glaucoma**

50 patients with early glaucoma were examined with Mark II analyser and each stimulus graded according to the frequency. It resulted in an abnormal response.

11.45 M. ZINGIRIAN, M. ROLANDO and F. C. PICCOLINO

**Relationship between
Fundus Densitometric Analysis and Perimetry**

Comparisons of glaucomatous perimetric defects and ophthalmoscopic changes of the optic disc and of the peripapillary area (fluorangiographic defects and filling delays, rim abnormalities, cup/disc ratio, etc.) have already been reported by other authors. These studies are generally based on subjective evaluations that greatly reduce the reliability of the results. Similar investigations, are much more reliable when based on the objective quantitative data allowed by computerized densitometric analysis of photograms, that we are presenting.

11.55

S. MAEDA, S. USUBA,
K. NAGATA and S. MATSUYAMA

Visual Field Investigation in Cerebrovascular Accident

Visual fields were examined in 211 subjects of cerebrovascular accident, using Static Campimeter (Takada Co., Japan) for screening and Goldmann perimeter for the further analysis of the defects. CT was performed in all cases and other examinations as necessary. Prior to the field examination, anterior segments of the eyes and ocular fundi were examined in all cases. In 66 subjects, field examination failed to be carried out because of disturbance of consciousness and comprehension or aphasia. Localization and property of the lesions are discussed in connection with the types of visual field defects.

12.05 M. ZINGIRIAN, G. CALABRIA and E. GANDOLFO

The Pericoecal Area: A Static Method for Investigation

A careful perimetric assessment of the pericoecal area is quite important since it is often considered the site of earlier glaucomatous defects.

The results of such examination by means of classical techniques are however, made unreliable by several factors as the presence of the blind spot, the coecal edges profile, the angioscotomata, peripapillary chorio-retinal degenerations, especially found in myopic eyes etc.

For these reasons we analysed in detail the differential threshold and its variability in the pericoecal area, using 'close single stimuli' for the static presentation.

A special attention was paid to the convenience of presenting data in a numerical or in a graphical form (histograms, densitometry, etc.).

12.15 R. C. PITTS CRICK and J. C. PITTS CRICK

The Sine Bell Screener

There is an urgent need and an important role throughout the world for a simple and very cheap instrument (approximately £5) which would be effective in detecting visual field loss and be relatively independent of refractive error. The Sine Bell Screening Perimeter has been devised with this object in view and particularly for visual field screening for glaucoma. The principle of the sine bell stimulus which has been employed in this simple multiple stimulus instrument has already been described elsewhere. It provides a rapid test with an easy method of scoring visual field performance and it allows control of fixation as well as being relatively independent of the patients' refractive error. The SBS perimeter brings a reasonably standardised test within the reach of all those carrying out eye examinations and in particular encourages the early identification of glaucoma.

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DEMONSTRATIONS

Clement Clarke

Demonstration of the Visual Field Analyser Mark II
Room 17/18

Keeler Instruments

Demonstration of the Field Master
Room 17/18

Coherent Radiation

Demonstration of a Perimetron and a Dioptron

The organising Committee gratefully acknowledge the support given by the exhibiting Companies.

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. . . An Invitation to the Participants of the . . .
4th INTERNATIONAL VISUAL FIELD SYMPOSIUM
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will present their new

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A Perimeter with
motorized control stimuli projection for
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PERITEST

An instrument for a
time-saving testing procedure by
multiple stimuli presentation
not only in the central area, but also
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on the occasion of the
VIth CONGRESS OF THE
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