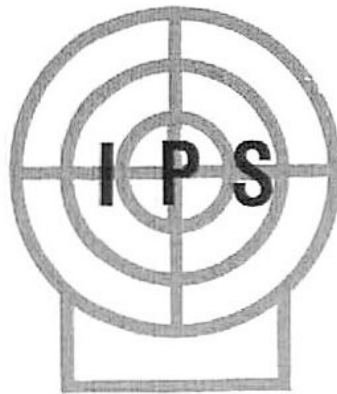


5th
INTERNATIONAL
VISUAL FIELD SYMPOSIUM



PROGRAM
October 20—23, 1982
Sacramento, California

INTERNATIONAL
PERIMETRIC SOCIETY

PROGRAM

**5th
INTERNATIONAL
VISUAL FIELD SYMPOSIUM**

20-23rd October 1982

AT

**Red Lion Motor Inn
2001 Point West Way
Sacramento, California 95815**

IPS COMMITTEE MEMBERS

President: S.M. Drance

Vice Presidents: E. Aulhorn A. Dubois-Poulsen

Secretary: A. Heijl

Treasurer: A.I. Friedmann

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| F. Fankhauser | C.A. Johnson | M. Zingirian |
| A.I. Friedmann | J.L. Keltner | |

MEETING HOSTS

J.L. Keltner
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REGISTRATION

October 20th, 1:00 - 8:00 p.m.
October 21st, 8:00 - 11:00 a.m.
Foyer of Thunderbird Ballroom

INSTRUCTIONS FOR PAPERS

Unless otherwise specified, your paper will be 10 minutes long. We will have equipment available for both single and double projection of 35 mm slides. Please give your slides to the projectionist at least one hour before the session in which your paper is to be presented. Slides should be numbered and, if two projectors are to be used, "left" and "right" should be noted. Slides should also have your initials or name for identification.

INSTRUCTIONS FOR POSTERS

Posters should be planned so that they can be presented within a 4 x 4 foot space. Materials for hanging your posters will be provided. You will be able to set up your poster on Wednesday evening (Oct. 20) or Thursday morning (Oct. 21) outside the Thunderbird Ballroom.

WRITTEN MANUSCRIPTS

Manuscripts must be handed to Mrs. Els Mutsaerts during the first day of the Symposium. The rules of Documenta Ophthalmologica must be observed, or the manuscript cannot be accepted.

The number of pages must be limited to six including figures, tables, abstract and references. In case longer manuscripts can be accepted the extra cost must be paid by the author.

The entire manuscript must be submitted in original plus three photocopies. It should be typed double spaced on one side with ample margins. The organization of the manuscript should be as follows:

- | | |
|-------------------------------|---------------|
| 1. Title page (and footnotes) | 6. References |
| 2. Key-words | 7. Tables |
| 3. Abstract | 8. Figures |
| 4. Text | 9. Legends |
| 5. Acknowledgements | |

Authors should bear in mind that all corrections in the text other than typographical errors must be kept to a minimum and these extra corrections must be paid by the author.

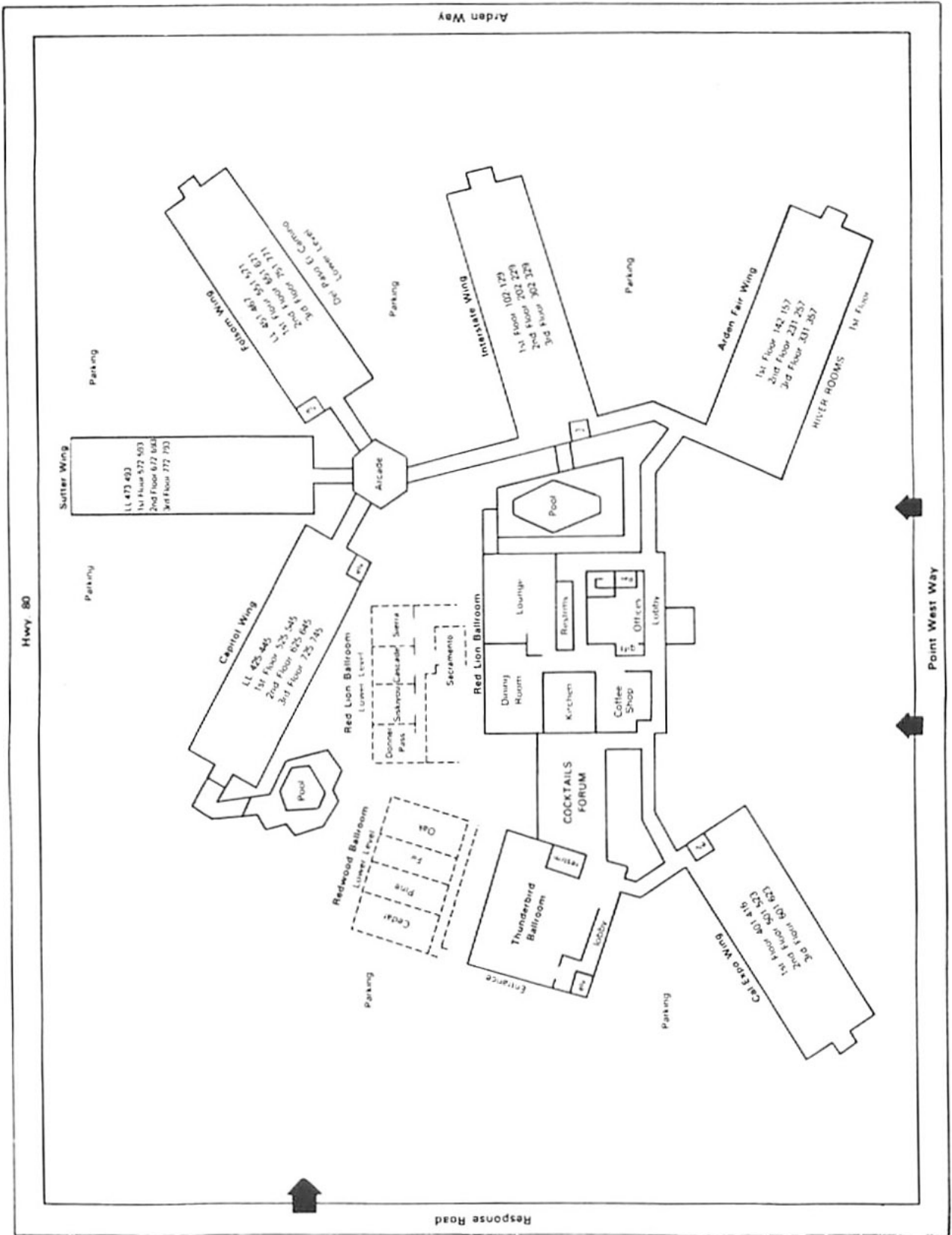
LOCATION OF MEETING ROOMS

| | |
|----------------------|---|
| Wednesday, Oct. 20 - | Registration - Thunderbird Foyer Reception and Buffet - Thunderbird Ballroom |
| Thursday, Oct. 21 - | Session I - IV - Thunderbird Ballroom |
| Friday, Oct. 22 - | Session V & VI - Redwood Room |
| Saturday, Oct. 23 - | Session VII - VIII - Sacramento Room, Siskiyou Room and Donner Pass Room. |

Note: Refer to map on next page for location of the meeting rooms in the Red Lion Motor Inn.

LUNCHESES

You must make your own luncheon arrangements for Thursday and Saturday which will allow time for informal discussions among small groups. There are several dining facilities available in the Red Lion Motor Inn.



Vth INTERNATIONAL VISUAL FIELD SYMPOSIUM
ITINERARY FOR SPOUSES' SOCIAL PROGRAM

Wednesday - October 20

- 1:00 - 8:00 p.m. - Registration
- 7:00 - Reception and Buffet

Thursday - October 21

- 9:00 - 3:00 - Tour of Sutter Creek "Gold Rush" Country
- 5:30 - Tour of Old Sacramento and travel to dinner
- 7:00 - Catered dinner at Crocker Art Museum

Friday - October 22

- 9:00 - 11:30 - Tour of the California State Capitol and Governor's Mansion
- 1:00 - Box lunch and bus trip to Napa Valley Wine Country
- 2:30 - Tour and wine tasting at small wineries
- 4:00 - Tour and wine tasting at Inglenook Winery
- 6:00 - Catered dinner at Inglenook Winery

Saturday - October 23

- 9:00 - 1:00 - Transportation to and from Old Sacramento for individual sightseeing and shopping.

Vth INTERNATIONAL PERIMETRIC SOCIETY MEETING

SACRAMENTO, CALIFORNIA

OCTOBER 20-23, 1982

Wednesday - October 20

- 1:00 - 8:00 p.m. Registration - (Thunderbird Foyer)
- 7:00 - SOCIAL EVENT: Reception and Buffet -(Thunderbird Ballroom)

Thursday - October 21

- 8:00 - 11:00 a.m. Registration - (Thunderbird Foyer)
- 8:30 - 8:45 Welcome and Opening Remarks - (Thunderbird Ballroom)
- 8:45 - 10:15 *Session I: Glaucoma: Correlation of disk and field - (Thunderbird Ballroom)*
Chairman - Dr. Enoch
Moderator - Dr. Phelps
- 10:15 - 10:30 Coffee Break
- 10:30 - 12:00 *Session II: Glaucoma: Correlation of disk and field - (Thunderbird Ballroom)*
Chairman - Dr. Frisen
Moderator - Dr. Phelps
- 12:00 - 1:15 p.m. Lunch
- 1:15 - 2:30 *Session III: General Topics - Psychophysical studies -(Thunderbird Ballroom)*
Chairman - Dr. Hansen
Moderator - Dr. Johnson
- 2:30 - 2:45 Coffee Break
- 2:45 - 4:30 *Session IV: Ergoperimetry: The functional visual field -(Thunderbird Ballroom)*
Chairman - Dr. Verriest
- 5:30 - SOCIAL EVENT: Tour of Old Sacramento and travel to dinner
- 7:00 - SOCIAL EVENT: Dinner at Crocker Art Museum

Friday - October 22

- 8:30 - 10:00 a.m. *Session V: Neuro-Ophthalmology* - (Redwood Room)
Chairman - Dr. Friedmann
Moderator - Dr. Bynke
- 10:00 - 10:30 Coffee Break
- 10:30 - 12:00 *Session VI: Neuro-Ophthalmology* - (Redwood Room)
Chairman - Dr. Matsuo
Moderator - Dr. Keltner
- 1:00 - p.m. SOCIAL EVENT: Box lunch and bus trip to Napa
Valley Wine Country
- 2:30 SOCIAL EVENT: Tour and wine tasting at small
wineries
- 4:00 SOCIAL EVENT: Tour and wine tasting at Inglenook
Winery
- 6:00 SOCIAL EVENT: Catered dinner at Inglenook Winery.

Saturday - October 23

- 8:00 - 9:00 a.m. Discussion of Automated Perimetry Posters
(Sacramento, Siskiyou, and Donner Pass Rooms)
Chairman - Dr. Zingirian
Moderator - Dr. Zingirian
- 9:00 - 9:30 Business Meeting
- 9:30 - 9:45 Coffee Break
- 9:45 - 11:15 *Session VII: General Topics* - (Sacramento, Siskiyou,
and Donner Pass Rooms)
Chairman - Dr. Kitahara
Moderator - Dr. Heijl
- 11:30 - 1:00 p.m. *Session VIII: Low tension glaucoma* - (Sacramento,
Siskiyou, and Donner Pass Rooms)
Chairman - Dr. Greve
Moderator - Dr. Phelps

| | Wed., Oct. 20 | Thurs., Oct. 21 | Fri., Oct. 22 | Sat., Oct. 23 |
|-----------|---|--|---|---|
| 8:00 a.m. | | Registration 8:00-11:00 | | |
| :30 | Welcome & Opening Remarks | | | Discussion of Automated Perimetry Posters |
| :45 | | | Session V: Neuro-ophthalmology | Business Meeting |
| 9:00 | Session I Glaucoma Correlation of disc and fields | | | Coffee Break |
| :30 | | | | Session VII: General Topics |
| :45 | | | Coffee Break | |
| 10:00 | | Session II: Glaucoma Correlation of disc and fields | | |
| :15 | Coffee Break | | | |
| 10:30 | | | Session VI: Neuro-ophthalmology | |
| 11:15 | | | | Session VIII: Low Tension Glaucoma |
| :30 | | | | |
| 12:00 | | Lunch | | |
| 1:00 p.m. | | | | |
| :15 | | Session III: General Topics Psychophysical studies | | |
| 2:00 | | | | |
| :30 | | Coffee Break | | |
| :45 | | Session IV: Ergoperimetry The functional visual field | | |
| 4:00 | | | | |
| 4:30 | | | Social event: Box lunch and bus trip to Napa Valley Wine Country - tour of small wineries | End of Meeting |
| 5:30 | | | | |
| 6:00 | | Social event: Tour of Old Sacramento Dinner at Crocker Art Museum | | |
| 7:00 | Reception & Buffet Thunderbird Ballroom | | Dinner at Inglenook Winery | |

POSTER SESSIONS

- I. Automated Perimetry
- II. Glaucoma and Miscellaneous

POSTER SESSION I: Automated Perimetry

Dannheim, F.: Clinical experiences with a new automated perimeter PERITEST.

Bakker, D. and Greve, E.: Clinical experience with the PERITEST.

Langerhorst, C., Veenendaal, W., v.d. Berg, T. and Greve, E.: New programmes of the Scoperimeter.

vanDalen, J.: Automated perimetry in 2500 subjects by the Fieldmaster 200.

Funkhauser, A., Haberland, H. and Fankhauser, F.: SAPRO, an adaptive program for the analysis of the visual field by automated perimetry.

Wetterwald, N., Funkhauser, A. and Fankhauser, F.: Scanning programs for automated perimeters.

Charlier, J., Moussu, L. and Moschetto, Y.: Programming and control language for computer aided visual field examinations.

Zingirian, M., Gandolfo, E. and Orciuolo, M.: Automation of the Goldmann Perimeter.

Keltner, J. and Johnson, C.: The SQUID automated perimeter.

Marmion, V.: An evaluation of the Baylor semi-automated system and the Friedmann Mark II Analyzer.

POSTER SESSION I

AUTOMATED PERIMETRY

Fritz Dannheim

CLINICAL EXPERIENCES WITH A NEW AUTOMATED PERIMETER PERITEST

The Peritest performs an automated or semi-automated evaluation of the visual field in 206 positions by LEDs. The convenient automated threshold-related spot-check procedure may be completed by further assessment of thresholds. The printout is easy to interpret. The semi-automated mode with single or multiple stimuli is even more time saving in fields with little disturbance, and may successfully be applied in patients with limited cooperation, when fully automated tests are not possible. In a comparative study the results of the Peritest turned out to be clearly better than those of conventional manual perimetry, and comparable to the ones of the Octopus computer perimeter.

D. Bakker and E.L. Greve

CLINICAL EXPERIENCE WITH THE PERITEST

The peritest (Rodenstock) is a perimeter for both automatic and semi-automatic visual field examination. The results of the automatic examination of several types of visual field defects are described. The additional possibilities of the semi-automatic version are explained.

C. Langerhorst, W. Veenendaal, T.P. v.d. Berg and E.L. Greve

NEW PROGRAMMES OF THE SCOPERIMETER

The Scoperimeter is an experimental automatic perimeter based on an oscilloscope screen. This report describes threshold programmes for selected areas of the visual field (resolution = 2 degrees) and programmes that compare the results of successive examinations.

J. T. W. van Dalen

AUTOMATED PERIMETRY IN 2500 SUBJECTS USING THE FIELDMASTER-200

During a period of more than a year, visual fields were measured in both eyes of 2500 subjects by means of automated perimetry. In approximately 2% of the subjects examined, visual field defects were found. Often these defects were quite severe, and indicative of underlying disease. Aspecific visual field defects were found in almost 1% of the subjects examined. The patients with visual field defects, as assessed by the Fieldmaster 200, were also examined with kinetic perimetry. Our results indicate that computer-aided perimetry (in our case, the Fieldmaster-200) may be regarded as a reliable method of visual field examination.

A. T. Funkhauser, H. Haberlin and F. Fankhauser

SAPRO, AN ADAPTIVE PROGRAM FOR THE ANALYSIS OF THE VISUAL FIELD BY AUTOMATIC PERIMETRY

SAPRO is an acronym for Spatial Adaptive Program. Spatially adaptive programs adjust the spatial resolution of automatic perimeter measurements according to the presence or absence of visual field defects. Information obtained during the examination is fed back to an adaptively interacting algorithm controlling further examination steps. Using this strategy, defective areas are examined in detail but less time is wasted on regions of normal contrast sensitivity. The efficiency of a visual field examination program is thereby substantially increased.

N. Wetterwald, A.T. Funkhauser and F. Fankhauser

SCANNING PROGRAMS FOR AUTOMATIC PERIMETERS

The analysis of a visual field is often subjected to considerable time restrictions which necessarily lead to loss of information and to results which have only limited assertive worth. It is the goal of scanning programs, on the one hand, to keep these disturbances as low as possible through the use of sophisticated computer programming techniques. On the other hand, the perimetrist must be absolutely clear about the information restrictions of any given program as well as the effectiveness of the noise suppression by the auxilliary routines. For the Octopus programs 03 and 07, the fundamental principles, solution possibilities and restrictions of the scanning programs will be explained and analyzed.

J. R. Charlier, L. Moussu and Y. Moschetto

PROGRAMMING AND CONTROL LANGUAGE FOR COMPUTER AIDED VISUAL FIELD EXAMINATIONS

The present first generation automatic perimeters have obtained impressive results in terms of screening performance. However, they still do not provide an adequate response to the other stage of perimetry, i.e. the quantitative evaluation of deficits. The large variability of visual defects and patients' behaviors requires the flexibility and adaptability of a skilled operator using a manual perimeter, a feature that is not presently available on automated perimeters. In this paper, we describe a high level, clinically oriented language that allows the introduction of flexibility and adaptability within examination programming and execution. The development of self-adaptive examination programs necessitates extensive clinical experience. For this purpose, practitioners must be provided with a programming language or "perimetry language" allowing them to cope easily with a repertoire of actions, storage facilities and computational capabilities dedicated to visual field examinations. However, the operator's skill will remain, in some situations, more efficient than existing automatic procedures. An adequate answer to this problem is given by an interactive control language providing the operator with information relative to the examination process (display of stimulation parameters, patient's responses, etc.) and a set of actions such as direct command of stimulations, response validation, etc.

M. Zingirian, E. Gandolfo and M. Orciuolo

AUTOMATION OF THE GOLDMANN PERIMETER

Automated perimeters of both lower and higher complexity have achieved limited distribution due to poor standardization, difficulty in interpreting computerized test results and in comparing them with those of traditional perimetry. As a consequence, our present concept concerning automated perimetry is not to build new computerized perimeters, but to provide automation for perimeters already well standardized and widely distributed. Therefore we have devised a computerized unit for the Goldmann perimeter. This unit automatically executes the traditional perimetric operations, without excluding manual use. Both kinetic and static procedures are carried out. Target size and luminance selection, fixation control, data acquisition and representation, assessment of defects and comparison between consecutive maps are also set up by the program. Advantages of the "Automated Goldmann Perimeter" include: good standardization, traditional representation of results (i.e. understandable data output) and low cost.

John L. Keltner and Chris A. Johnson

PRELIMINARY EXAMINATION OF THE SQUID AUTOMATED PERIMETER

The Squid is a new automated visual field device manufactured by Synemed, Inc. consisting of a projection perimeter controlled by an LSI 11/23 microprocessor. A variety of test programs are available to perform threshold evaluation of the visual field according to grid, meridional, radial and other target patterns. In addition to the standard test programs, special routines are available for data base management of patient records and storage of perimetry results, as well as programs to allow the user to design and implement customized test programs. All of the software and device controllers are accessible through FORTRAN callable subroutines. Test results can be saved on disk storage media (both a large Winchester drive and dual-sided, dual-density floppy disks are available) and/or transmitted to a high resolution thermal printer to provide a copy of the results according to several formats (e.g., grey scale, static profiles or numerical data). This poster describes the general operating principles and features of the Squid, as well as its theoretical capabilities and limitations. Examples of standard tests performed on patients with known visual field loss will be presented.

V. J. Marmion

AN EVALUATION OF THE BAYLOR SEMI-AUTOMATED SYSTEM AND THE FRIEDMANN MARK II ANALYZER

Fifty patients with suspected, or confirmed open angle glaucoma were examined using three different techniques; the Baylor semi-automated system, the Friedmann Mark II Analyzer and the Goldmann Perimeter, using a standard technique of two different target sizes and illuminations. The consistency of the results was compared with the optic disc findings. From this it was concluded that the Friedmann Mark II Analyzer was the more consistent method of examination.

POSTER SESSION II: Glaucoma and Miscellaneous

Flammer, J., Drance, S.M. and Douglas, G.: Long term fluctuation of the differential threshold.

Drance, S. and Munnerlyn, C.: Variations in the visual fields of ocular hypertensive patients.

Rossi, P., Ciurlo, G., Burtolo, C. and Calabria, G.: Temporal resolution in glaucomatous visual field defects.

Heijl, A. and Lundquist, L.: The location of earliest glaucomatous visual field defects documented by automated perimetry.

Kosaki, H. and Nakatani, H.: Computer analysis of kinetic field data determined with a Goldmann perimeter.

Aoyama, T. and Matsuno, K.: The course of early visual field change in glaucoma as examined by pupillographic perimetry.

Nakatani, H. and Suzuki, N.: Correlation between the stereographic shape of the ocular fundus and the visual field in glaucomatous eyes.

Piccolino, F., Parodi, G. and Beltrame, F.: Optic disc analysis by computerized image subtraction and perimetry.

Gandolfo, E., Zingirian, M. and Capris, P.: The role of perimetry in retinal detachment.

Rossi, P., Ciurlo, G. and Burtolo, C.: Temporal resolution and stimulus intensity in the central visual field.

Gandolfo, E.: Perimetric changes caused by ethyl alcohol.

Mizoguchi, F., Owada, Y., Shirato, S. and Kitazawa, Y.: Three dimensional display of static perimetry.

Thompson, S., Montague, P., Cox, T. and Corbett, J.: The relationship between visual acuity, pupillary defect and visual field loss.

ZaueI, D., Ransburg, R., Griest, M., Arffa, R. and Julian, K.: Leukocytoclastic vasculitis associated with bilateral central field loss: Improvement on corticosteroids and mercaptopurine.

Ernest, J. T. and Read, J. S.: Ophthalmoscopic perimetry.

Genio, C. and Friedmann, A. I.: A comparison of the early glaucoma field defects examined on the Goldmann perimeter (Armaly-Drance technique), the Visual Field Analyzer Mark II using white light and blue light, and the Fieldmaster 200.

J. Flammer, S. M. Drance and G. Douglas

LONG TERM FLUCUATION OF THE DIFFERENTIAL THRESHOLD

All measurements of the differential threshold have a scatter which may be influenced by many factors. The differential threshold may also fluctuate over time. A group of glaucoma patients and ocular hypertensives had several measurements carried out at different times of day during the same week, utilizing the Octopus program JO. Utilizing a component analysis of variance, the effect of time as a factor of fluctuation was estimated. Results will be presented.

S. M. Drance and Charles R. Munnerlyn

VARIATIONS IN THE VISUAL FIELDS OF OCULAR HYPERTENSIVE PATIENTS

In order to determine the normal variations in the visual fields of ocular hypertensive patients, a series of patients were tested at four-month intervals for a one-year period. The test included static profile perimetry done with the Perimetron automatic perimeter. The results of statistical analysis measurements of 37 eyes of 22 patients at the 270 degree meridian will be presented.

P. Rossi, G. Ciurlo, C. Burtolo and G. Calabria

TEMPORAL RESOLUTION IN GLAUCOMATOUS VISUAL FIELD DEFECTS

Flicker fusion frequency alterations have been reported to be an early sign of field defects in glaucomatous patients, often preceding the appearance of classic scotomata. In this work the flicker fusion frequencies within the scotomatous areas of glaucomatous subjects were tested using stimuli at liminal levels for each point tested. The flicker fusion frequencies for such stimuli did not appear to be decreased within the scotomatous area. These results suggest that glaucoma primarily affects the light threshold, but not the temporal resolution capability of the visual system. The early alterations of flicker fusion frequency observed when the same stimulus is used to test different regions is probably related to threshold sensitivity changes within scotomatous areas.

Anders Heijl and Leif Lundquist

THE LOCATION OF EARLIEST GLAUCOMATOUS VISUAL FIELD DEFECTS DOCUMENTED BY AUTOMATIC PERIMETRY

A large number of eyes (approximately 2000) with ocular hypertension, with or without established glaucoma in the fellow eye, were followed with automatic perimetry for several years. Those eyes that converted from reproducible normal fields to reproducible glaucomatous field defects were sorted out. Forty-five such eyes were found, the location of the field defects in the first pathological field was registered, and a composite diagram was drawn. The frequency distribution is similar to, but not identical with that previously reported by Aulhorn and Karmeyer for their stage II defects found with manual perimetry.

Hiroshi Kosaki and Hajime Nakatani

COMPUTER ANALYSIS OF KINETIC FIELD DATA DETERMINED WITH A GOLDMANN PERIMETER

A personal computer (YHP:HP-85) was used to analyze kinetic field data determined with a Goldmann perimeter. Fifty cases of primary glaucomas were chosen for this study. A reduced copy of the field was made, and a simplified profile of the visual island was drawn by the computer. Areas of each isopter were calculated and an attempt was made to evaluate the field changes as compared with those of the normal field. Improvement or loss of field was also evaluated in terms of areas of isopters. Graphic presentation of changes of areas of isopters were made, and an adequate intraocular pressure level was speculated for each individual.

Tatsuya Aoyama and Kimitoshi Matsuno

THE COURSE OF EARLY VISUAL FIELD CHANGE IN GLAUCOMA EXAMINED BY PUPILLOGRAPHIC PERIMETRY

In a preceding report, the authors employed pupillographic perimetry in cases of glaucoma in which no visual field change was detected by either kinetic or static perimetry in spite of high intraocular pressure. We observed a lowering of pupillary sensitivity in the Bjerrum area. Here, we describe several cases with followup, and examine the courses of subjective and objective visual field change at the same time by pupillographic perimetry.

Hajime Nakatani and Norihito Suzuki

CORRELATION BETWEEN THE STEREOGRAPHIC SHAPE OF THE OCULAR FUNDUS AND THE VISUAL FIELD OF GLAUCOMATOUS EYES

The purpose of this study was to correlate the stereographic shape of the ocular fundus and the visual field of glaucomatous eyes. Vertical parallel equidistant grating lines were projected onto the ocular fundus from either the nasal or the temporal side, and the fundus was photographed in a routine manner. By analyzing the phase shift of grating images on the ocular fundus, it was possible to draw the stereographic appearance of the ocular fundus. We found that in glaucomatous eyes with visual field changes, the excavation started in the retinal area and the corresponding disc rim was destroyed. These results suggest that glaucomatous visual field changes are due to degeneration of the retina.

F. Cardillo Piccolino, G. C. Parodi and F. Beltrame

OPTIC DISC ANALYSIS BY COMPUTERIZED IMAGE SUBTRACTION AND PERIMETRY

A computerized method of image subtraction was used to analyze the optic disc in 20 cases of open angle glaucoma. From the photographic and angiographic images of the optic disc a third image was obtained with a point by point subtraction of the density levels. The resulting image was displayed on a monitor, and an arbitrary color scale clearly showed the areas where pallor and hypofluorescence overlap in the same papillary sector. The method thus allowed for the detection of "critical areas" in the optic disc. Quantitative and topographic features of optic disc damage showed a close correlation to the size and location of the perimetric defect.

THE ROLE OF PERIMETRY IN RETINAL DETACHMENT

The results of perimetry in diagnosis, analysis and follow-up of eyes suffering from retinal detachment (r.d.) are evaluated. Classic kinetic and static procedures with the Goldmann perimeter are utilized. A r.d. usually generates an absolute visual field (v.f.) defect that exactly reproduces the topography of the detached retina. Only a very recent and slightly detached retina retains sensitivity. Perimetry helps to determine the exact extent of the r.d. in doubtful cases. After surgery perimetry indicates the amount of functional recovery. Usually, maximum recovery is reached within four weeks, although a moderate improvement is still possible within the first six months. Perimetry indicates that better functional results are obtained when surgery is carried out in recent r.d. (15 days maximum). Fairly good results are obtained with 1-2 month old r.d.s and progressively worse results are obtained in longer standing cases. The sensitivity improvement detected by perimetry in a re-attached retina is also inversely proportional to the magnitude of the surgical insult. The results of perimetry in specific cases of r.d., such as retinoschisis, macular holes, relapse, etc. will be described.

P. Rossi, G. Ciurlo and C. Burtolo

TEMPORAL RESOLUTION AND STIMULUS INTENSITY IN THE CENTRAL VISUAL FIELD

The relationship between temporal resolution and stimulus intensity was investigated in the central and pericentral visual field. Flicker fusion frequency (f.f.f.) changes related to elevated luminances were assessed using targets of different sizes. In the pericentral visual field (10 degrees) the gain in f.f.f. for increasing test luminances appeared to be independent of the target size. At fixation (0 degrees) a similar f.f.f. luminance relationship was found with larger targets, while with targets of small diameter the f.f.f. rapidly reached a maximum after which increased luminance levels had only minimal effects on f.f.f.. Physiological implications of these results are discussed.

PERIMETRIC CHANGES CAUSED BY ETHYL ALCOHOL

The author evaluates the effect of ethanol on the visual field. The following perimetric tests were carried out: standard kinetic perimetry (3 isopters), photopic and mesopic static perimetry along the 0-180 degree meridian and C.F.F. (Critical Flicker Frequency) along the same meridian. The latency of the response was also considered. All tests were first performed under normal conditions, and then on the same subjects (20 young males) with a B.A.L. (blood alcohol level) of 0.5% mg/ml. Ethanol, at this dosage level, had only moderate effects (either positive or negative) on kinetic and static perimetry. The positive effects were an increase in central sensitivity for both photopic and mesopic conditions (0.3 I.u.) and a slight global improvement of the mesopic static profile. Negative effects included enlargement of the blind spot and angioscotomata, some irregularities of threshold in the pericoecal area and a certain contraction of the peripheral isopters. The effects on the latency of response and C.F.F. were more evident and were always negative. The possible bases of these behaviors are considered and discussed.

Fumio Mizoguchi, Yujin Owada, Shiroaki Shirato and
Yoshiaki Kitazawa.

THREE DIMENSIONAL DISPLAY OF STATIC PERIMETRY

A system for three-dimensional representation of the visual field was developed for displaying the results of static perimetric examinations. The strategy we adopted is to make use of webbing the three dimensional space. The system has been implemented in a NEAC 50 in the interactive mode of graphic display and the three-dimensional representation was made on a Hewlett Packard plotter and a Tektronix 4301 graphics display.

H. Stanley Thompson, Paul Montague,
Terry Cox and James J. Corbett

**THE RELATIONSHIP BETWEEN VISUAL ACUITY, PUPILLARY
DEFECT AND VISUAL FIELD LOSS**

Loss of visual acuity, loss of visual field, and loss of pupillary function were compared in 64 patients with varied damage to the optic nerve. Loss of acuity depended on the location of the field defect but the pupil defect was proportional to the amount of visual field loss. Based on this information, a pattern of dots was constructed representing the retinal distribution of pupillomotor force (in log units). This pattern can be used to estimate the approximate amount of pupillary defect expected from a particular visual field defect.

D. Zauel, R. Ransburg, M. Griest, R. Arffa and K. Julian

**LEUKOCYTOCLASTIC VASCULITIS ASSOCIATED WITH BILATERAL
CENTRAL FIELD LOSS: IMPROVEMENT ON CORTICOSTEROIDS
AND MERCAPTOPYRINE**

A 16 year old female who admitted to chronic use of oral illicit medication abuse presented with dense central scotomas and pruritic skin lesions. Neuro-ophthalmologic work-up was negative and the patient was treated with high dosage oral Deltasone therapy with improvement in the central scotomas. As Deltasone was being withdrawn the patient developed skin lesions which were re-biopsied and were found to be consistent with leukocytoclastic vasculitis. The patient was then treated with Deltasone therapy and Purinethol and demonstrated continued improvement in the central scotomas. This is the first case report of central scotomas associated with leukocytoclastic vasculitis. This report describes improvement in the central scotomas with steroid and immunosuppressive therapy.

J. Terry Ernest and John S. Read

OPHTHALMOSCOPIC PERIMETRY

We have constructed and tested a computer assisted television ophthalmoscope for the examination of the visual field. The instrument is capable of both kinetic and static perimetry with direct visualization of test target position on the ocular fundus. The ocular fundus is viewed using modified Zeiss optics and a low-light-level television camera. The viewing (background) light source is a 500 watt tungsten lamp furnishing either white or green (560 nm interference filter with a half band width of 10 nm) resulting in a retinal illuminance approximately equal to that from a Goldmann perimeter when the patient has an 8 mm pupil. The target is the end of a fiber optic placed in a plane conjugate with the retina. Its light source is a 150 watt heat filtered Xenon arc lamp furnishing either white light or light of different colors. The colored targets are obtained with near-monochromatic light at 14 different wavelengths between 460 and 700 nm. The target light intensity can be rapidly varied under computer control in 0.03 log unit increments with a neutral density wedge. The target size is approximately 150 microns on the retina (about 0.5 degree, or 9 mm at 1 meter). With each 1 second target presentation the images are scanned and digitized and when the patient indicates that the target has been seen the digitized image is stored. The visual fields are analyzed using semi-automatic programs under the control of the operator. The images (100-200) are aligned using an interactive image comparison program. The operator identifies both a vascular landmark and the target in each image and the computer generates either density or meridian plots superimposed on the image of the ocular fundus. Ophthalmoscopic perimetry eliminates fixation problems and makes possible precise retinal localization of defects in the visual system.

C. Genio and A. I. Friedmann

A COMPARISON OF THE EARLY GLAUCOMA FIELD DEFECTS EXAMINED ON THE GOLDMANN PERIMETER (ARMALY DRANCE TECHNIQUE), THE VISUAL FIELD ANALYSER MARK II USING WHITE LIGHT AND BLUE LIGHT, AND THE FIELDMASTER 200

The paper shows the differences in the results obtained in the 136 cases of early glaucoma field defects. The presence or absence of optic disc changes are indicated and all cases also had computerized tomography as part of the general glaucoma work up. The question of false positives and false negatives is discussed.

PAPER SESSIONS

- I. Glaucoma
- II. Glaucoma
- III. General
- IV. Ergoperimetry
- V. Neuro-Ophthalmology
- VI. Neuro-Ophthalmology
- VII. General
- VIII. Low Tension Glaucoma

Thursday, October 21, 1982

8:30 - 10:30 a.m.

Thunderbird Ballroom

SESSION I: Glaucoma: Correlation of disc and field.

Chairman - Dr. Enoch

Moderator - Dr. Phelps

8:30 a.m. Welcome and Opening Remarks

8:45 Anderson, D.: The correlation of disc damage and field abnormalities in glaucoma.

9:05 Airaksinen, P.: Cup-disc ratio, retinal nerve fiber layer (RNFL) and manual perimetry in early glaucoma.

9:20 Heijl, A. and Airaksinen, J.: Correlation between retinal nerve fiber layer defects and visual field defects determined by automatic perimetry after optic disc hemorrhage.

9:35 Osawa, T., Furuno, F., Miyamoto, T. Seki, A. and Ohta, Y.: Kinetic perimetry of the retinal nerve fiber layer defect in glaucoma by fundus photoperimetry.

9:50 Greve, E. and Geijssen, H.: The relation between excavation and visual field in patients with and without raised intraocular pressure.

10:05 Hart, W. and Kolker, A.: Computer generated display for three dimensional static perimetry: Correlation of optic disc changes with glaucomatous defects.

10:15 - 10:30 a.m. - COFFEE BREAK

SESSION I

Thursday, October 21, 1982

8:30 - 10:30 a.m.

8:30 a.m. John L. Keltner

WELCOME TO SACRAMENTO, CALIFORNIA

8:35 a.m. Stephen M. Drance

OPENING REMARKS

8:45 a.m. Douglas R. Anderson

THE CORRELATION OF DISC DAMAGE AND FIELD
ABNORMALITIES IN GLAUCOMA

Stereoscopic fundus photographs and the corresponding visual fields (Goldmann perimeter) were collected and studied. The optic cup can enlarge concentrically without producing a nerve fiber bundle defect, although sometimes there is a simple generalized depression. Localized tissue loss in the disc can correspond to paracentral scotomas, nasal steps, and other forms of nerve fiber bundle defects. Of particular interest is the correlation of the type and location of disc damage with the tilt and configuration of the peripapillary scleral canal, with the peripapillary choroid, and with loss of retinal pigment epithelium (peripapillary haloes).

9:05 a.m. P. Juhani Airaksinen

CUP-DISC RATIO, RETINAL NERVE FIBER LAYER (RNFL) AND
MANUAL PERIMETRY IN EARLY GLAUCOMA

Twenty-nine glaucoma suspect patients with normal visual fields (VF) and a splinter hemorrhage on an otherwise normal optic disc were observed for 1 to 14 (mean 5.5) years in order to detect the first glaucomatous changes. Optic disc photographs were taken with a Zeiss camera. RNFL photographs were taken with a Canon wide-angle camera. VFs were examined with a Friedmann Analyzer. Eleven patients developed glaucomatous changes. A RNFL defect was observed in 9 cases, but in six of them the increase of both vertical and horizontal cup-disc ratio was 0.03 or less, which is below the resolving power of the method. Perimetry revealed first visual field defects 1 to 2 years after the first documentation of pathologic disc and/or RNFL changes in five cases.

CORRELATION BETWEEN RETINAL NERVE FIBER LAYER DEFECTS AND VISUAL FIELD DEFECTS DETERMINED BY AUTOMATIC PERIMETRY AFTER OPTIC DISC HEMORRHAGE

Fifteen eyes of thirteen patients were studied. All eyes fulfilled the following criteria:

1. Optic disc hemorrhage
2. Normal test results with the Friedmann visual field analyzer and peripheral testing on the Goldmann perimeter.
3. Good quality retinal nerve fiber photographs could be obtained.

These eyes were subjected to automatic perimetry including profile testing on the Competer automatic perimeter and to retinal nerve fiber layer photography. The results were analyzed for correlation between nerve fiber layer defects and visual fields. The results are given and discussed.

KINETIC PERIMETRY OF THE RETINAL NERVE FIBER LAYER DEFECT IN GLAUCOMA BY FUNDUS PHOTO-PERIMETRY

This study was conducted to clarify the relationship between the visual field defect and the retinal nerve fiber layer defect (RNFLD). The Fundus photo-perimeter method was performed on 3 eyes in 2 cases of glaucoma in which arcuate scotomata were detected by conventional perimetry and the RNFLD was easily observed by ophthalmoscopy. The following results were obtained:

1. Visual field defects equivalent to the border of the RNFLD were demonstrated by the Fundus photo-perimeter.
2. Slight visual field changes were detected in a normal appearing retina in the vicinity of the RNFLD, suggesting the presence of a fine distribution of damaged nerve fibers extending from the RNFLD.
3. The arcuate scotomata in these cases which were measured by the Goldmann perimeter were suggested by the Fundus photo-perimeter findings, indicating RNFLD.

9:50 a.m.

Erik L. Greve and H. Caroline Geijssen

THE RELATION BETWEEN EXCAVATION AND VISUAL FIELD IN
PATIENTS WITH AND WITHOUT RAISED INTRAOCULAR
PRESSURES

Several distinct patterns of optic disc damage can be recognized in patients with primary open angle glaucoma.

The aim of this study is to determine whether a difference can be found in the size and pattern of the excavation and its relation to the size and type of visual field defects in patients with and without a raised IOP.

10:05 a.m.

William M. Hart, Jr. and Allan Kolker

COMPUTER GENERATED DISPLAY FOR THREE-DIMENSIONAL
PERIMETRY: CORRELATION OF OPTIC DISC CHANGES WITH
GLAUCOMATOUS DEFECTS

Patients with simple open angle glaucoma and manifest visual field defects were examined with three dimensional threshold static perimetry. Three dimensional surfaces were interpolated between the threshold values and their images were generated by a computer algorithm. The volumetric size and shape of visual field defects correlated well with the extent and morphology of pathologic cupping of the optic disc and nerve fiber bundle loss. This form of threshold static perimetry has greater sensitivity for the detection of small or shallow defects, and the three dimensional graphic display allows high resolution visual inspection of the morphology of the visual field surface.

10:15 - 10:30 a.m. COFFEE BREAK

Thursday, October 21, 1982

10:30 a.m. - 12:00 p.m.

Thunderbird Ballroom

SESSION II: Glaucoma: Correlation of disc and field

Chairman Dr. Frisen

Moderator Dr. Phelps

- 10:30 a.m. Schwartz, B. and Nanba, K.: Fluorescein angiographic defects in the optic disc in glaucomatous visual field loss.
- 10:45 Mizokami, K., Ohkubo, K., Tagami, Y. and Isayama, Y.: Optic disc changes with the progression of glaucomatous visual field damage.
- 11:00 Piccolino, F., Capris, P. and Selis, G.: Capillary hyperpermeability of the optic disc and functional evolution in glaucoma.
- 11:15 Balaszi, G. and Werner, E.: The relationship between a circumlinear vessel gap at the neuroretinal rim and glaucomatous visual field loss.
- 11:30 Drance, S. and Heijl, A.: Changes in differential threshold in glaucoma patients during prolonged perimetry.
- 11:45 Campos, E. and Bellei, S.: Constancy of sensitivity in time in patients with open-angle glaucoma: Further results.

12:00 - 1:15 p.m. LUNCH BREAK

SESSION II

Thursday, October 21, 1982

10:30 a.m. - 12:00 p.m.

10:30 a.m. Bernard Schwartz and Katsuhiko Nanba

FLOURESCEIN ANGIOGRAPHIC DEFECTS OF THE OPTIC DISC IN GLAUCOMATOUS VISUAL FIELD LOSS

Flourescein angiographic defects or areas of hypoflourescence of the optic disc have been observed in glaucoma (Schwartz et al, 1977; Spaeth, 1977). The number of defects increase with the degree of visual field loss (Schwartz et al, 1973) and correspond topographically on the optic disc with the site of visual field loss (Fishbein and Schwartz, 1977). The purpose of this study was to obtain a more quantitative relationship between the area of flourescein filling defects and the degree of visual field loss. In open angle glaucomatous eyes, the area of flourescein filling defect was measured by planimetry from drawings made of projected photographs. The area of visual field loss was determined also by planimetry by measuring the visual field done with the Goldmann perimeter. As the visual field loss increases the area of flourescein filling defect increases. The quantitative relationship between these two parameters will be described and the results discussed.

10:45 a.m. Kuniyoshi Mizokami, Kiyoshi Ohkubo, Yusaka Tagami
and Yoshimasa Isayama

OPTIC DISC CHANGES WITH THE PROGRESSION OF GLAUCOMATOUS VISUAL FIELD DAMAGE

It is not yet clearly defined if early glaucomatous visual field damage originates from vasogenic or mechanical changes in the optic disc. In a previous study (Acta Soc Ophthal Japan, 1976, 79-100), we demonstrated that the optic disc capillaries were clearly decreased even in the glaucoma cases with early visual field damage not detected by the Goldmann perimeter. In this study, flourescein angiographic and stereoscopic photographic changes in glaucomatous optic discs were followed for more than 7 years. In eight cases the visual field damage progressed during the period. The optic disc changes with the progression of glaucomatous visual field damage are analyzed. From these results, the relationship of vascular changes to early glaucomatous visual field defects is discussed.

11:00 a.m. F. Cardillo Piccolino, P. Capris and G. Selis

CAPILLARY HYPERPERMEABILITY OF THE OPTIC DISC AND FUNCTIONAL EVOLUTION IN GLAUCOMA

Perfusion defects of the optic disc are a very common angiographic finding in glaucoma and have been correlated by many authors with visual field alterations. On the other hand, a sectorial hyperfluorescence has not yet been regarded as a typical feature of the glaucomatous optic disc. We observed it in one of 54 cases of ocular hypertension and in 14 of 33 cases of open angle glaucoma. Hyperfluorescence is secondary to the hyperpermeability of capillaries crossing hypoxic areas of the disc and can be considered a consequence of tissue acidosis. Our investigations demonstrated that capillary hyperpermeability is a temporary finding and a sign of functional deterioration in glaucomatous disease.

11:15 a.m. Gordon Balaszi and Elliot B. Werner

THE RELATIONSHIP BETWEEN A CIRCUMLINEAR VESSEL GAP AT THE NEURORETINAL RIM AND GLAUCOMATOUS VISUAL FIELD LOSS

We reviewed stereo disc photographs and visual fields of 232 control, ocular hypertensive and glaucomatous patients to assess the value of baring of the circumlinear vessel of the optic nerve head as a sign of glaucomatous damage. We found a significant correlation between the presence of this sign and the presence of glaucomatous visual field loss. The sign is rarely falsely positive. There was a 33% false negative rate in eyes with a circumlinear vessel and known glaucomatous visual field loss. However, the presence of a circumlinear vessel gap at the neuroretinal rim is generally associated with nerve head damage and always deserves further evaluation.

11:30 a.m.

Stephen M. Drance and Anders Heijl

CHANGES IN DIFFERENTIAL THRESHOLD IN
GLAUCOMA PATIENTS DURING PROLONGED
PERIMETRY

Patients with glaucoma and suspected glaucoma were subjected to prolonged continuous differential recording. This was performed on the Competer automatic perimeter and on the Tübingen perimeter. It was found that impairment of differential threshold with increasing test time was a common phenomenon in glaucoma patients. Points showing such a deterioration demonstrated this both for automatic and manual testing and at different background luminosities. The magnitude of these changes was larger for automatic than for manual perimetry and usually was smaller than that typically described by Enoch for shorter tests in patients with retro-laminar pathology.

11:45 a.m. Emilio Campos and Silvia Bellei

CONSTANCY OF SENSITIVITY IN TIME IN PATIENTS WITH OPEN-
ANGLE GLAUCOMA: FURTHER RESULTS

Several years ago Enoch et al showed a decay in sensitivity in time in the visual field of patients with active optic nerve disease, with the Flashing Repeat Static Test (FRST). Recently, Drance and Heijl found, with a different technique, similar changes in open-angle glaucoma patients. In this paper results are presented from an additional group of 10 open-angle glaucoma patients with the FRST. No significant decrease in sensitivity with time was found. Tentative explanations for the discrepancy in results are provided. It is concluded that functional responses of patients with open-angle glaucoma are different from those of patients with optic nerve disease.

12:00 p.m. LUNCH BREAK

Thursday, October 21, 1982

1:15 p.m. - 2:45 p.m.

Thunderbird Ballroom

SESSION III: General Topics: Psychophysical Tests

Chairman Dr. Hansen

Moderator Dr. Johnson

- 1:15 p.m. Kani, K., Inui, T., Haruta, R. and Mimura, O.:
Lateral inhibition in the fovea and parafoveal regions.
- 1:30 Kitahara, K., Tamaki, R., Noji, J., Kandatsu, A. and Mat-
suzaki, H.: Extrafoveal Stiles' pi mechanisms.
- 1:45 Hansen, E. and Seim, T.: and Selis, G.: Loss of inhibitory
mechanisms as a measure of cone impairment: A
method applied to static perimetry.
- 2:00 Enoch, J., Moses, R., Nygaard, R. and Allen, D.:
Perimetric techniques used to assess retinal strain dur-
ing accomodation.
- 2:15 Jacobson, S. and Sandbers, M.: Increment thresholds
with fundus perimetry in strabismic amblyopia.
- 2:30 Fusco, R., D'Aietti, M. and Verriest, G.: The visual field in
alternating hyperphoria.
- 2:45 COFFEE BREAK

SESSION III

Thursday, October 21, 1982

1:15 - 2:45 p.m.

1:15 p.m. Kazutaka Kani, Toshio Inui, Ryugo Haruta and Osamu Mimura

LATERAL INHIBITION IN THE FOVEA AND PARAFOVEAL REGIONS

Lateral inhibition effects have been studied in several retinal loci between 0 and 10 degrees from the fovea in normal subjects using fundus image-controlled perimetry. We measured the increment threshold of a test spot in the center of two parallel lines, as a function of the luminance and distance of separation of the two lines. Our results indicate that the area in which lateral inhibition effects occurred apparently became larger as eccentricity increased.

1:30 p.m. Kenji Kitahara, Ryotaro Tamaki, Jun Noji, Atsushi Kandatsu and Hiroshi Matsuzaki

EXTRAFOVEAL STILES' PI - MECHANISMS

Extrafoveal field sensitivities of Stiles' long wavelength sensitive mechanisms (π_5) were described two years ago. In the present study, the threshold versus intensity (t.v.i.) curves and field sensitivity action spectra for short and medium wavelength sensitive cone mechanisms and rod mechanisms were measured from the central fovea to 10 degrees extrafoveally using a Maxwellian view optical system. Differences among the t.v.i. curves and field sensitivity action spectra for each mechanism at foveal and extrafoveal locations will be described.

1:45 p.m. E. Hansen and T. Seim

LOSS OF INHIBITORY MECHANISMS AS A MEASURE OF CONE
IMPAIRMENT: A METHOD APPLIED IN STATIC COLOUR
PERIMETRY

Delayed recovery of light sensitivity following exposure to bright light is characteristically found in normal eyes due to inhibitory influences between retinal receptor mechanisms. The rods, when acting alone, have a great capability of fast recovery as demonstrated by rod monochromats. In those patients as well as in progressive cone dystrophies, static perimetry performed immediately after extinction of a yellow adapting light demonstrates a particularly high rod sensitivity. On the other hand, normal individuals demonstrate clearly elevated thresholds (transient tritanopia). The ability to recover after light exposure, as demonstrated by this type of static perimetry, is an indirect but significant indication of cone function.

2:00 p.m. J.M. Enoch, R.A. Moses, R.W. Nygaard and D. Allen

PERIMETRIC TECHNIQUES USED TO ASSESS RETINAL STRAIN
DURING ACCOMMODATION

Two modified perimetric techniques have been employed to allow quantification of retinal strain or stretch during accommodation. Maximum retinal displacement occurs at the ora serrata. One technique provides a measure of the anterior functional boundary by transscleral illumination. The second method makes available information on the displacement of the point of fixation relative to the blind spot. The two measures are independent and complementary.

2:15 p.m. S.G. Jacobson and M.A. Sandberg

INCREMENT THRESHOLDS WITH FUNDUS PERIMETRY IN STRABISMIC AMBLYOPIA

Monocular perimetry in strabismic amblyopia is made difficult by the unstable fixation of the amblyopic eye. We used, therefore, a hand-held stimulator ophthalmoscope to present stimuli under direct visualization of the fundus in adult patients with strabismic amblyopia. Thresholds were measured for monocular viewing conditions at the 0 degree, 10 degree temporal, 10 degree nasal and 20 degree nasal retinal loci in patients with visual acuity of 6/60 or worse in their amblyopic eye. Targets of 6 to 60 minutes of arc were flashed on a 10 degree steady background. All patients had elevated thresholds at the foveola of the amblyopic eye compared to the fellow eye. Just as in normal eyes, thresholds at the foveola in amblyopic eyes were lower than at either 10 degree eccentric locus. Marked nasal-temporal asymmetries were found in many amblyopic eyes. Elevated thresholds at the 10 degree nasal retinal locus compared with the 10 degree temporal retina were found in patients with esotropia or a history of esotropia. A patient with exotropia had higher thresholds in the temporal retina than in the nasal retina. Partial hemi-retinal scotomas, usually demonstrated with binocular perimetry, were present with our method of monocular testing in patients with strabismic amblyopia. The pattern of the results suggests that such monocular deficits may result from long-standing asymmetric interocular inhibition.

2:30 p.m. Rosa Fusco, Miria D'Aietti and Guy Verriest

THE VISUAL FIELD IN ALTERNATING HYPERPHORIA

Photopic, mesopic and scotopic static threshold sensitivities were measured along the principal oblique meridians for a group of 15 subjects exhibiting alternating hyperphorias. In comparison to the results for a normal control group, the alternating hyperphoria patients demonstrated depressed sensitivities in the inferior nasal quadrant. This result appears to be characteristic for the condition of alternating hyperphoria.

2:45 p.m. COFFEE BREAK

Thursday, October 21, 1982

3:00 p.m. - 4:30 p.m.

Thunderbird Ballroom

SESSION IV: Ergoperimetry

Chairman Dr. Verriest

Moderator Dr. Verriest

- 3:00 p.m. Verriest, G., Barca, L., Dubois-Poulsen, A., Houtmans, M., Inditsky, B., Johnson, C., Ronchi, L. and Villani, S.:
The functional visual field: I. Theoretical aspects.
- 3:30 Esterman, B.: Functional scoring of the binocular visual field.
- 3:45 Crick, R.: The representation of the visual field.
- 4:00 Calabria, G., Capris, P. and Burtolo, C.: Investigations of space behavior of glaucomatous people with extensive visual field loss.
- 4:15 Keltner, J. and Johnson, C.: Correlations between peripheral visual function and driving performance.
- 4:30 ADJOURN FOR SOCIAL PROGRAM EVENTS AND DINNER

SESSION IV

Thursday, October 21, 1982

3:00 - 4:30 p.m.

3:00 p.m. Guy Verriest(editor) and (alphabetically) Luigi Barca,
Andre Dubois-Poulsen, M.J.M. Houtmans, B. Inditsky,
Chris A. Johnson, Lucia Ronchi and Sergio Villani

THE FUNCTIONAL VISUAL FIELD: I. THEORETICAL ASPECTS

This official report from the IPS Group on Functional Visual Field describes the concept of functional visual field and defines the differences between it and the diagnostic visual field. In comparison to clinical perimetric findings, the behavioral visual field is generally binocular, the target acquisition level often must be higher than for simple detection, targets are generally suprathreshold, and both the target and background can be complex. Attention, pre-existing knowledge and training can considerably affect performance, and the target as well as the observer's eyes, head and body are often moving. The major theoretical components of the functional visual field consist of models of visual performance and visual physiology, and distinctions among different types of conspicuity fields and functional visual fields.

3:30 p.m. Ben Esterman

FUNCTIONAL SCORING OF THE BINOCULAR VISUAL FIELD

A new principle for evaluating the total (Binocular) field is based on function instead of anatomy. For human activity certain areas of the field are more important than others. Adapted from the Monocular Grid (in use since its approval by the American Committee on Optics and Visual Physiology in 1969) the new Binocular Grid is similarly a relative-value scale, weighted to assign proportionately higher scores automatically to these functionally more important areas. It attacks the problem: How useful is the total peripheral field to the patient? Until now, deriving the binocular functional score by combining the two monocular percentages has been elusive and inaccurate because both nasal fields extensively overlap. The new grid is especially useful in ergophthalmology for industrial, medicolegal compensation, automotive, social security and other disability evaluations. It scores accurately and rapidly, in percent, with any perimeter, manual or automated.

3:45 p.m. R.P. Crick

THE REPRESENTATION OF THE VISUAL FIELD

Any projection of the visual field is a manipulation. It is therefore essential to select a projection which gives the most useful representation of the field and its clinical defects. It should also provide a uniform numerical assessment of the sensitivity of vision throughout the field and incorporate a percentage functional field estimate along the lines proposed by Dr. Esterman. To study these requirements a mathematical system of representation of the visual field is proposed which progressively augments it parabolically towards the center. It is applicable to all types of perimetry, although the Octopus perimeter has been used as a test-bed employing the Sargon programme with both the traditional and the sine-bell stimulus. This work and the case for the adoption of the system are briefly presented.

4:00 p.m. G. Calabria, P. Capris and C. Burtolo

INVESTIGATIONS OF SPACE BEHAVIOR OF GLAUCOMATOUS PATIENTS WITH EXTENSIVE VISUAL FIELD DEFECTS

Glaucomatous patients with extensive visual field defects often show serious visual difficulties in their space behavior. Patients with visual field defects of similar extent but of different origin (optic pathway disorders, diabetic retinopathy, retinal detachment and photocoagulative retinal ablation) always show fewer visual problems. In order to explain this fact, the binocular field of both groups of patients was tested. Kinetic perimetry failed to show any difference in binocular integration of the monocular fields. Further examinations (binocular static perimetry, flicker perimetry, VEP, dark adaptation curves and visual reaction times) have suggested that different non-perimetric factors play a role in the visual difficulties of glaucomatous patients.

4:15 p.m. John L. Keltner and Chris A. Johnson

**CORRELATIONS BETWEEN PERIPHERAL VISUAL FUNCTION
AND DRIVING PERFORMANCE**

An automated visual field screening test was performed on 10,000 volunteers (20,000 eyes) at two California Department of Motor Vehicles driver's license offices. The incidence of visual field loss was 3.0 to 3.5% for individuals between the ages of 16 and 60, but rose to approximately 13.0% for the population over 65. Approximately half of the individuals with abnormal visual fields were previously unaware of any problem with peripheral vision. The most common causes of visual field loss were glaucoma, retinal disorders and cataracts. The relationship between peripheral vision and driving performance was determined by examining accident and conviction rates for three years prior to our testing. Drivers with binocular visual field loss had accident and conviction rates that were twice as high ($p < .005$) as those of an age and sex-matched control group with normal visual fields, whereas drivers with monocular visual field loss had accident and conviction rates that were equivalent to those of their age and sex-matched control group.

4:30 p.m. **ADJOURN FOR SOCIAL PROGRAM EVENTS AND
DINNER**

Friday, October 22, 1982

8:15 a.m. - 10:30 a.m.

Redwood Room

SESSION V: Neuro-Ophthalmology

Chairman Dr. Friedmann

Moderator Dr. Bynke

8:15 a.m. Bodis-Wollner, I.: Differential diagnosis of macular and optic nerve disease.

9:00 Ohnuma, T., Tagami, Y. and Isayama, Y.: Comparison of pattern VEPs with visual fields in recovered optic neuritis.

9:15 Hellner, K. and Jensen, W.: Homonymous hemianopsia with disturbance of pupillary response in a case of disseminated encephalitis.

9:30 Bynke, H.: Hippocrates and the homonymous hemianopsia.

9:45 Marmion, V.: Retinal perfusion and visual field loss.

10:00 Lao, K.: Anterior ischemic optic neuropathy and its visual field defects.

10:15 COFFEE BREAK

SESSION V

Friday, October 22, 1981

8:15 - 10:30 a.m.

8:15 a.m. INVITED LECTURER: Ivan Bodis-Wollner

DIFFERENTIAL DIAGNOSIS OF MACULAR AND OPTIC NERVE DISEASE

9:00 a.m. Takahiro Ohnuma, Yusaku Tagami and Yoshimasa
Isayama

COMPARISON OF PATTERN VEPs WITH VISUAL FIELDS IN RECOVERED OPTIC NEURITIS

Checkerboard pattern reversal VEPs were compared to visual fields in 58 patients (80 eyes) with recovered optic neuritis. VEPs were not recorded in cases of severely decreased sensitivities for Tubinger static central fields (TSCF). VEPs were recorded in cases with visual acuity of greater than 0.2, although there were no correlations between P2 peak latency of the VEP and sensitivities for TSCF testing. Furthermore, clinically definite MS patients with visual acuity of better than 0.7 exhibited prolonged latency of the P2 peak for the VEP, in spite of high sensitivities measured for the TSCF.

9:15 a.m. K.A. Hellner and W. Jensen

HOMONYMOUS HEMIANOPSIA WITH DISTURBANCE OF PUPILLARY RESPONSE IN A CASE OF DISSEMINATED ENCEPHALITIS

This paper reports a case of disseminated encephalitis in which there was an increased threshold for pupillomotor responses in the non-seeing field of a homonymous hemianopsia. Pupillary threshold measurements were performed with a Tubinger perimeter using video pupillography. Four weeks following the initial visit, the symptoms disappeared without treatment.

9:30 a.m. Hans Bynke

HIPPOCRATES AND THE HOMONYMOUS HEMIANOPSIA

9:45 a.m. V. Marmion

RETINAL PERFUSION AND FIELD LOSS

Forty patients with known chronic open angle glaucoma were examined using ophthalmodynamometry and Doppler Ultrasound evaluation of carotid flow. The common internal and external carotids were examined with A.T.L. and Mavis Scan. This provides information on disturbance and percentage reduction of flow. The comparison is drawn between the consistency of a field loss with the lesions noted as compared with the level of intraocular pressure.

10:00 a.m. Lao Yuan-Xiu (Katherine Lao)

ANTERIOR ISCHEMIC OPTIC NEUROPATHY AND ITS VISUAL FIELD DEFECTS

A typical pattern of visual field defect was found in nearly all cases of anterior ischemic optic neuropathy (AION) evaluated in this study (67 eyes of 47 patients). The defect consists of a short arcuate nerve fiber bundle scotoma bridging the blind spot, and a large area of field loss which usually appears "quadrantic". The fixation area is not enclosed in the defect. The same visual field may simultaneously or successively display involvement in different quadrants. If 4 quadrants are involved, an irregular central area of 10-20 degrees is left. This may be misinterpreted as concentric contraction. We suggest that an infarction of the anterior portion of the prelaminar region, supplied by a subdivision of a PCA and involving the deeper layers of the nerve fibers is responsible for the production of the large area field loss. This defect is not a Bjerrum scotoma in appearance and is usually not accompanied by glaucomatous cupping. Twelve cases of AION were tested with 1% adrenalin, and all but two of them showed a drop in IOP less than 5 mm Hg. These two cases were diagnosed as having POAG prior to the attack of AION. Although an imbalance between the perfusion pressure of PCA and IOP might be the most important cause for the production of visual field defects in both AION and low tension glaucoma, the two diseases are probably not the same entity.

10:15 -10:30 a.m. COFFEE BREAK

Friday, October 22, 1982

10:30 a.m. - 12:00 p.m.

Redwood Room

SESSION VI: Neuro-Ophthalmology

Chairman Dr. Matsuo

Moderator Dr. Keltner

10:30 a.m. Younge, B.: Problem cases in Neuro-Ophthalmology: Computer-assisted perimetry results.

10:45 Johnson, C. and Keltner, J.: Properties of scotomata in glaucoma and optic nerve disease: Computer analysis.

11:00 Bynke, H.: Statistical analysis of normal visual fields and hemianopsias recorded by a computerized perimeter.

11:15 Serra, A.: Quantitative isopter constriction under image degradation by defocus.

11:30 Maeda, S., Usuba, S., Nagata, K. and Matsuyama, S.: Visual field defect in thalamic hemorrhage.

11:45 Trobe, J., Acosta, P., Shuster, J. and Krischer, J.: Visual fields in the management of unexplained visual loss.

12:00 Bynke, H.: Discussion of neuro-ophthalmology papers.

12:10 BREAK FOR LUNCH AND SOCIAL EVENTS

SESSION VI

Friday, October 22, 1982

10:30 - 12:10 a.m.

10:30 a.m. Brian R. Younge

PROBLEM CASES IN NEURO-OPHTHALMOLOGY: COMPUTER-ASSISTED PERIMETRY RESULTS

Difficulty in diagnosis of such entities as optic pits, chronic optic nerve disease, hysterical visual loss, visual extinction and very early chiasmal lesions is often facilitated by critical analysis of computer-assisted perimetry as done by the Octopus automated perimeter. Threshold techniques of static perimetry are used, and documentation by photographs, CT scans and histopathology are correlated in case examples.

10:45 a.m. Chris A. Johnson and John L. Keltner

PROPERTIES OF SCOTOMATA IN GLAUCOMA AND OPTIC NERVE DISEASE: COMPUTER ANALYSIS

In a previous paper (Johnson and Keltner, *Ophthalmology*, 88:1058-1065, 1981), we determined frequency distributions for the location of visual field loss in glaucoma and other optic nerve disease. A computer algorithm was employed to determine these characteristics according to a high resolution grid (approximately 30,000 locations subtending 0.75 by 0.75 degrees). The distributions for glaucoma and optic nerve disease revealed distinct differences, and provided useful information to optimize presentation patterns for perimetric testing. This study presents an extension of our earlier work to include frequency distribution characteristics for the size and shape of visual field defects in glaucoma and optic nerve disease. The interrelationships of size and shape with visual field location will be described, and implications of these data for improving perimetric test strategies will also be discussed.

11:00 a.m. Hans Bynke

STATISTICAL ANALYSIS OF NORMAL VISUAL FIELDS AND HEMIANOPSIAS RECORDED BY A COMPUTERIZED PERIMETER

A modified 'Comper' which examines the central (2.5 - 20 degrees) and mid-peripheral visual field (20 - 35 degrees) was designed by Bynke and Krakau (Neuro-Ophthalmology 2:105,1981). In many cases this instrument can replace manual perimetry. Four statistical parameters were introduced: the performance values of the central (Pc) and mid-peripheral field (Pp) reflect total ability, and the difference values (Dc and Dp) the size and depth of a hemianopsia. These parameters were analyzed in 140 visual fields of 75 patients with CNS disorders, mainly tumors. Twenty-two had normal fields, 28 bitemporal and 25 homonymous hemianopsias. Sixty-one fields of 33 patients were examined on multiple (4 - 11) occasions. In the majority of the normal fields there was a slight rise of Pc from the first to the last examinations due to training and improvement of the general condition. In the hemianopsias, the course was quite variable and could be ascribed to treatment or spontaneous regression or progression of the pathological processes. There was a negative linear correlation between D and P values, but the calculated regression lines were displaced from the expected values because of additional defects in the non-hemianopic hemifields. It is concluded that quantification of visual fields by means of these parameters is of value in clinical and scientific work.

11:15 a.m. A. Serra

QUANTITATIVE ISOPTER CONSTRICTION UNDER IMAGE DEGRADATION BY DEFOCUS

In the present paper a quantitative evaluation of refraction scotomata is attempted. We evaluated the narrowing of isopters by degrading the image through a positive lens of variable power placed before the eye. Average data are presented for a sample of healthy normal individuals with an average age of about 50. An increase in lens power by approximately 2.5 diopters beyond the optimal refraction reduces the extent of an isopter by 50%, irrespective of the meridian considered. Prior to optimal refraction, a partial compensation on the part of residual accommodation occurs. Deviations from the above behavior on the part of the M.S. patients seems to indicate an impairment in the reflex arc subserving accommodative responses.

11:30 a.m. S. Maeda, S. Usuba, K. Nagata and S. Matsuyama

VISUAL FIELD DEFECT IN THALAMIC HEMORRHAGE

This visual field defect associated with thalamic hemorrhage is not clearly understood, despite the fact that thalamic hemorrhages comprise about 30% of all cerebral hemorrhages. In this study, visual fields of thirty-five cases of thalamic hemorrhage were measured with the Goldmann perimeter. Twelve out of thirty-five cases were found to have a homonymous visual field defect. They can be classified into four grades according to the extent of the field defect. We conclude that inferior wedge shaped defects are characteristic of thalamic hemorrhages.

11:45 a.m. Jonathan D. Trobe, Paulo C. Acosta, Jonathon J. Shuster
and Jeffrey P. Krischer

VISUAL FIELDS IN THE MANAGEMENT OF UNEXPLAINED VISUAL LOSS: A COST-BENEFIT ANALYSIS

In the investigation of visual loss from anterior visual pathway disease, it is imperative to differentiate the infrequent compressive from the much more common non-compressive lesions. In this task, we compare the cost-effectiveness of two diagnostic strategies, one that uses the results of visual fields as a determinant for ordering neuroradiological studies, and another that disregards the visual field results. The visual field-determined strategy proved more cost-effective only at accuracy levels above those believed to be current in community practice.

12:00 p.m. Hans Bynke

DISCUSSION OF NEURO-OPHTHALMOLOGY PAPERS

12:10 p.m. BREAK FOR LUNCH AND SOCIAL EVENTS

Saturday, October 23, 1982

8:00 a.m. - 11:15 a.m.

Sacramento, Siskiyou and Donner Pass Rooms

SESSION VII: Automated Perimetry and General Topics

Chairman Dr. Zingirian (Automated Perimetry)
Moderator Dr. Zingirian (Automated Perimetry)
Chairman Dr. Kitahara (General Topics)
Moderator Dr. Heijl (General Topics)

8:00 a.m. Zingirian, M.: Discussion of automated perimetry posters.

9:00 BUSINESS MEETING

9:30 COFFEE BREAK

9:45 Dunn, P.M. and Massof, R.W.: Perimetric assessment of temporal resolution.

10:00 Tomonaga, M., Miyamoto, T., Suzamura, H. and Ohta, Y.: Static perimetry in central serous retinopathy (Masuda's type) using a fundus photoperimeter.

10:15 Greite, J., Brandt, J., Adamczyk, R. and Zumbansen, H.: Computerized perimetry (system Octopus) as an aid for indication and optimization of panretinal photocoagulation (PRP) in diabetic retinopathy. (DR).

10:30 Jenni, A. and Flammer, J.: Special Octopus software for clinical investigation.

10:45 Wirtschafter, J. and Maeder, P.: Analytical functions for defining the boundaries of the retinotopic projection of the visual field onto the optic disc.

11:00 Gandolfo, E., Zingirian, M., Corallo, G. and Piccolino, F.C.: Diabetic retinopathy: Perimetric findings.

11:15 COFFEE BREAK

SESSION VII

Saturday, October 23, 1982
8:00 - 11:30 a.m.

8:00 a.m. Mario Zingirian

DISCUSSION OF AUTOMATED PERIMETRY POSTERS

9:00 a.m. BUSINESS MEETING

9:30 a.m. COFFEE BREAK

9:45 a.m. Patrice M. Dunn and Robert W. Massof

PERIMETRIC ASSESSMENT OF TEMPORAL RESOLUTION

Although historically there has been interest in the development of flicker perimetry, relatively little work has been done to determine the basic properties of temporal resolution across the visual field. Most studies have been restricted to the determination of the critical flicker fusion frequency (CFF) or the "critical duration" for Bloch's law of temporal summation. The present study was directed at the investigation of the elemental temporal response characteristics of the visual system as a function of visual field location. A single-channel Maxwellian-view optical system was used for both experiments, allowing exact superposition of stimulus and adaptation field, each subtending 5.15 degrees of visual angle. Experiment I involved presentation of square-wave pulses, from 1 to 999 msec duration, on a homogenous 500 troland background. In Experiment II the light was modulated sinusoidally about a mean luminance of 500 trolands. In both experiments a modified ascending method of limits was used, with stimulus luminance (Experiment I) or sine-wave amplitude (Experiment II) increased until a threshold response was obtained. Data was obtained for 3 normal observers, at the fovea and at 10, 20, 40 and 50 degrees in the temporal field. The results indicated that neither the ΔL vs t nor the temporal contrast sensitivity functions changed shape with eccentricity, though vertical shifts (indicating changes of sensitivity) were found.

10:00 a.m. Masaaki Tomonaga, Tadashi Miyamoto, Hirotaka Suzumura and Yasuo Ohta

STATIC PERIMETRY IN CENTRAL SEROUS
RETINOCHOROIDOPATHY (MASUDA'S TYPE) USING A FUNDUS
PHOTOPERIMETER

We determined quantitative, static visual field measurements within 16 degrees from the fovea in patients with central retinoblastoma, using a Fundus Photoperimeter. Testing was performed along two meridians; 45 to 225 degrees and 135 to 315 degrees at 2 degree intervals. The maximum luminance of the stimuli was 271 cd/m², and stimulus size was 6 minutes of arc. Three different stimuli were used; white, red (dominant wavelength 620 nm) and blue (dominant wavelength 450 nm). For these conditions, we evaluated changes in retinal sensitivity for localized lesions. The results indicated that there was not a uniform, gentle gradient of decreased retinal sensitivity associated with localized lesions. Rather, there was a scattering of the decrease in retinal sensitivity according to the site. This was most pronounced for blue stimuli, followed by red and white stimuli. Decreased sensitivity was most remarkable in areas of leakage on fluorescein angiography.

10:15 a.m. J. H. Greite, J. Brandt, R. Adamczyk, and H. P. Zumbansen

COMPUTERIZED PERIMETRY (SYSTEM OCTOPUS) AS AN AID FOR
INDICATION AND OPTIMIZATION OF PANRETINAL
PHOTOCOAGULATION (PRP) IN DIABETIC RETINOPATHY (DR).

As a followup to our study of visual fields in DR (presented at the IVth International Field Symposium) the present study examines the changes in the visual field following PRP. The visual fields of 47 eyes with DR were evaluated before and after treatment, using different modes of laser application in PRP. Results were evaluated statistically, and revealed three main points: (1) The more extensive the PRP, the more extensive are the iatrogenic visual field defects in the periphery. (2) In 29 of 47 cases we found a significant deterioration of the visual field in the mid-periphery, as well as in the untreated central area. In 12 cases no essential changes were detected, and in 6 cases the central visual field improved. (3) Of greatest importance is the mode of laser application in PRP. The least amount of visual field loss in the periphery and the greatest improvement in the central region were found when the laser photocoagulation spots are placed in rows following the course of the nerve fibers.

10:30 a.m. A. Jenni and J. Flammer

SPECIAL OCTOPUS SOFTWARE FOR CLINICAL INVESTIGATION

The development of new instrumentation has provided renewed stimulation for investigations of the visual field. Such studies can be given important support through goal-oriented, user-specified OCTOPUS software programs. In some cases, the studies only become possible by means of such program supplements. Utilizing a few examples, typical measurement procedures and statistical evaluation of the measurement results using the OCTOPUS computer will be described.

10:45 a.m. Jonathan D. Wirtschafter and Paul Maeder

ANALYTICAL FUNCTIONS FOR DEFINING THE BOUNDARIES OF THE RETINOTOPIC PROJECTION OF THE VISUAL FIELD ONTO THE OPTIC DISC

The correlation of visual field changes with optic disc changes in glaucoma has been subjective except for studies which measure the area of isopters and their relationship to parameters such as the cup-disc ratio. There is a need for methods which correlate specific areas of the visual field with regional loss of nerve fibers in the optic disc. We propose a method of arbitrarily defining the retinotopic projection of 15 areas of the visual field onto the optic disc. To promote uniformity the Cartesian coordinates of the sector boundaries can be expressed with the analytical functions describing 3 lines, 1 arc, 1 parabola and 4 ellipses. Applications on currently available perimeters will be demonstrated.

11:00 a.m. E. Gandolfo, M. Zingirian, G. Corallo and F. Cardillo Piccolino

DIABETIC RETINOPATHY: PERIMETRIC FINDINGS

Perimetry of diabetic retinal lesions permits us to demonstrate interesting and sometimes surprising findings. Retinal hemorrhages generate visual field (VF) defects of relative depth. Exudates cause a readily detectable VF defect when they are grouped together in large spots. In this case a relative scotoma is found. Exudative maculopathy generates a "plateau" in the central sensitivity so that the defect can only be easily detected by static analysis. Only if the maculopathy is long-standing can a distinct central scotoma be detected by kinetic perimetry. Cystoid macular edema generates characteristic local depressions in the central static profile. This finding is temporary because eventually the function falls in the form of a deep central scotoma. Ischemic areas, either peripheral or central, cause a reduction in sensitivity of 0.5 to 1.0 log unit in comparison with well perfused areas. At the border between normal and ischemic territories, the fall in sensitivity is abrupt. Usually, dramatic and wide diabetic alterations do not completely destroy the retinal function. Absolute VF defects are present in cases of proliferative retinopathy and when different types of lesions are grouped together in the same area.

11:15 a.m. COFFEE BREAK

Saturday, October 23, 1982

11:30 a.m. - 1:00 p.m.

Sacramento, Siskiyou and Donner Pass Rooms

SESSION VIII: Low Tension Glaucoma

Chairman Dr. Greve

Moderator Dr. Phelps

- 11:30 a.m. Anderton, S. and Hitchings, R.: A comparative study of visual field of patients with low tension glaucoma and those with chronic simple glaucoma.
- 11:45 Greve, E. and Geijssen, H.: Comparison of glaucomatous visual field defects in patients with high intraocular pressures and with low intraocular pressures.
- 12:00 Motolko, M., Drance, S. and Douglas, G.: The visual field effects of low tension glaucoma.
- 12:15 Phelps, C., Hayreh, S. and Montague, P.: Visual fields in low-tension glaucoma, primary open angle glaucoma, and anterior ischemic optic neuropathy.
- 12:30 Spaeth, G., McAllister, J., Poryzees, E. and Slagle, J.: Does lowering intraocular pressure affect the visual field of patients with glaucoma?
- 12:45 Flammer, J. and Drance, S.: The effects of diamox on differential thresholds.
- 1:00 END OF MEETING

SESSION VIII

Saturday, October 23, 1982

11:30 a.m. - 1:00 p.m.

11:30 a.m. Susan Anderton and Roger A. Hitchings

A COMPARATIVE STUDY OF VISUAL FIELDS OF PATIENTS WITH LOW TENSION GLAUCOMA AND THOSE WITH CHRONIC SIMPLE GLAUCOMA

This paper highlights the differences seen in the visual field defects on static perimetry of Chronic Simple Glaucoma and Low Tension Glaucoma patients. The Low Tension Glaucoma Clinic at Moorfields Eye Hospital offers the opportunity for an in-depth study of this type of glaucoma patient. Conventional kinetic Goldmann perimetry frequently fails to reveal differences in the character of the visual field loss between patients with Chronic Simple Glaucoma and Low Tension Glaucoma. Static perimetry, however, shows that the nature of the visual field defects may on occasion differ quite markedly. A comparative study was carried out whereby 30 patients from the Low Tension Glaucoma Clinic had their visual fields compared with 30 patients with Chronic Simple Glaucoma. The two groups of patients were matched according to age, experience with perimetry and area of visual field loss shown by kinetic perimetry. For the purpose of the study, both static and kinetic perimetry were carried out on each patient on separate days but on the same machine and by the same perimetrist. This procedure was repeated to ensure a certain degree of reproducibility. Differences in the slope of the visual field defects of patients will be described and discussed. The relevance of these differences to the pathogenesis of these two disease states will also be discussed.

11:45 a.m. Erik L. Greve and H. Caroline Geijssen

COMPARISON OF GLAUCOMATOUS VISUAL FIELD DEFECTS IN PATIENTS WITH HIGH INTRAOCULAR PRESSURES AND WITH LOW INTRAOCULAR PRESSURES

The visual fields of 30 patients with primary open angle glaucoma (POAG) and high intraocular pressures were compared to those of 30 patients with POAG and intraocular pressures of less than 25 mm Hg. Differences in the type, location and extension of the glaucomatous visual field defects will be described.

12:00 p.m. M. Motolko, S. M. Drance and G. R. Douglas

THE VISUAL FIELD EFFECTS OF LOW TENSION GLAUCOMA

The visual fields of 160 eyes with low tension glaucoma and 154 eyes with chronic open angle glaucoma were compared in patients with the same degree of optic nerve change. No difference in the qualitative or quantitative characteristics were found. The field defects in those low tension glaucoma eyes in which a major hemodynamic crisis had occurred were not different from those in which no crisis had been documented.

12:15 p.m. C. D. Phelps, S. S. Hayreh and P. Montague

VISUAL FIELDS IN LOW-TENSION GLAUCOMA, PRIMARY OPEN-ANGLE GLAUCOMA, AND ANTERIOR ISCHEMIC OPTIC NEUROPATHY

We compared the type and location of visual field defects in 93 eyes with low-tension glaucoma, 225 eyes with primary open-angle glaucoma, and 160 eyes with anterior ischemic optic neuropathy. The distributions in defects in the two varieties of glaucoma were similar; both involved the upper half of the visual field more frequently, the lower half less frequently, and central vision much less frequently than did anterior ischemic optic neuropathy. These differences in distribution of field defects were independent of the severity of field loss and of patient age. The most frequent defects in both low-tension glaucoma and primary open-angle glaucoma were superior nasal defects and superior arcuate scotomas; the most frequent defects in anterior ischemic optic neuropathy were inferior hemifield loss and central scotomas. These findings suggest that the pathogenic mechanism for optic nerve damage in low-tension glaucoma resembles that of anterior ischemic optic neuropathy.

12:30 p.m. G. L. Spaeth, J. A. McAllister, E. Porzees and J. Slagle

DOES LOWERING INTRAOCULAR PRESSURE AFFECT THE VISUAL
FIELD OF PATIENTS WITH GLAUCOMA?

The purpose of this investigation was to determine if lowering intraocular pressure affects the visual field of patients with glaucoma. Patients selected for study were those who had a clinically significant visual loss determined by the Octopus Computerized Perimeter and who, in addition, had a sudden, prolonged decrease in intraocular pressure that would ordinarily be considered likely to have been clinically beneficial. The visual field examinations were repeated after the fall of intraocular pressure. Results were compared using Fankhauser's Delta program analysis technique. Patients with a change in pupil size or visual acuity were not included. Results will be discussed in detail. Decreasing intraocular pressure, however, was associated with variable responses: improvement, apparent stabilization, and continued progression of visual field loss.

12:45 a.m. J. Flammer and S. M. Drance

THE EFFECTS OF DIAMOX ON DIFFERENTIAL THRESHOLDS

Diamox has been shown to improve retinal sensitivity (reduction of differential threshold) in glaucomatous eyes. Studies will be reported which have measured the effects of Diamox on the differential threshold using a special program designed for that purpose on the Octopus perimeter.

1:00 p.m. END OF MEETING

Acknowledgements

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