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THE CANADIAN JOURNAL OF Optometry

PERMANENT

SPECIAL CONTACT LENS ISSUE

LA REVUE CANADIENNE d'OPTOMÉTRIE

MARCH/MARS 1980

À L'INTÉRIEUR: RAPPORT ANNUEL POUR 1979
INSIDE: 1979 ANNUAL REPORT

VOL. 42. NO. 1

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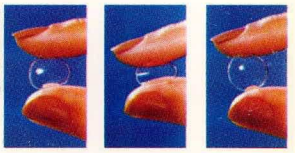

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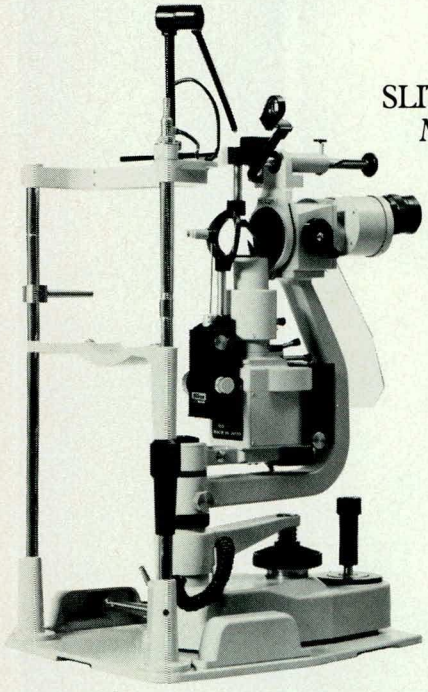

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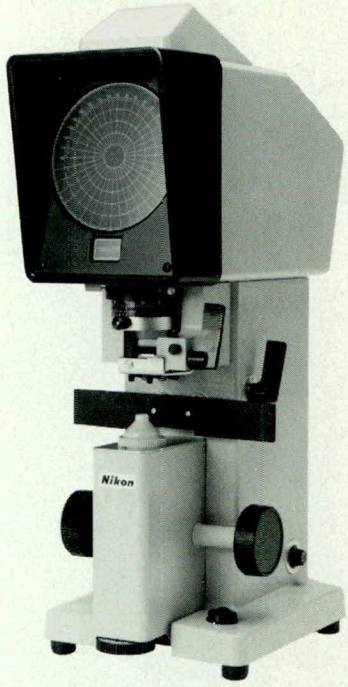

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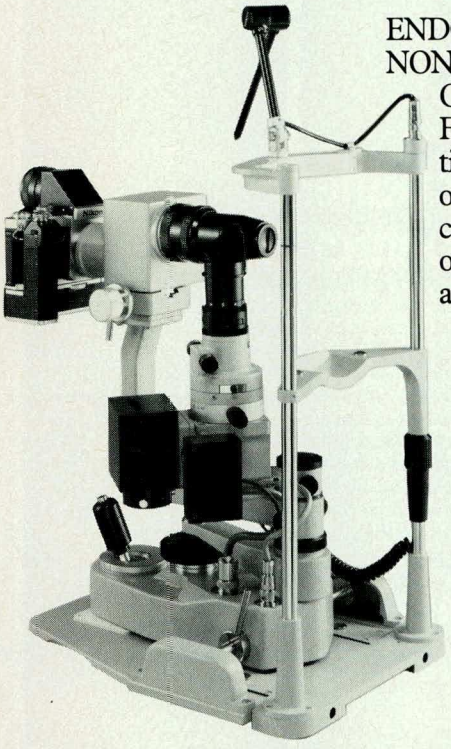

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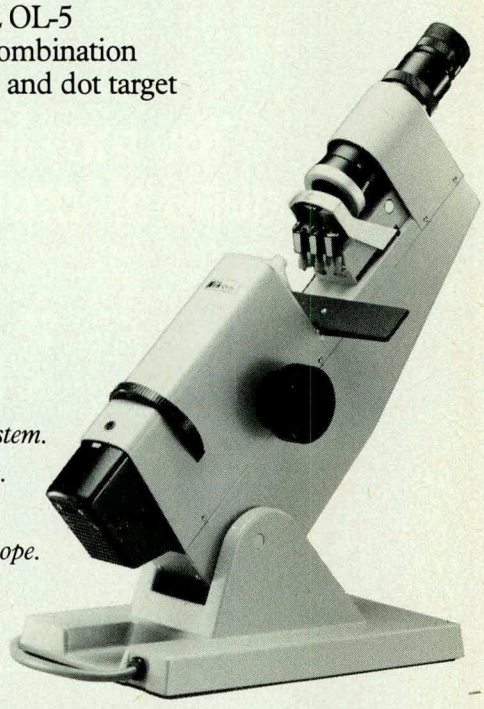

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THE CANADIAN JOURNAL OF OPTOMETRY

LA REVUE CANADIENNE D'OPTOMETRIE

Vol. 42 **OTTAWA, ONTARIO, MARCH, 1980** **No. 1**

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LETTERS

B.C. Passing Grade Same as Waterloo's

Dear Dr. Belanger:

There was a letter in the September/October issue, co-signed by Dr. Woo and Dr. Pickard, about the merits of the concept of National Board examinations. It mentioned that British Columbia requires a 75% passing grade in its Board examinations, which are set and marked by the Waterloo School of Optometry. That is not correct. Presently, and for some years past, the Board of Examiners has set the passing grade to be the same as Waterloo's, although it does have the authority to change that at any time.

Thank you for the opportunity of bringing this matter to the attention of your readers.

Sincerely,

Wm. R. Falls, O.D., Chairman, Board of Examiners in Optometry, British Columbia.

As Eye See It?

Dear Dr. Belanger,

I am sure that I join a host of optometrists from across Canada in wishing you great success in the new format of the Canadian Journal of Optometry. I find it easy to read, news-worthy and pertinent to our present day needs, as well as a glimpse into the future.

I would dare to make one suggestion — for your title page "Letters" (to the Editor) — how about the heading: "As Eye See It"?

I wish you good luck in all your endeavours — keep up the good work!

Yours truly,

Reginald Lewis, B.A., O.D., F.A.A.O.

Ed. Reply — We thank Dr. Lewis for his kind words and interesting suggestion. The double entendre suggested for the title of our letters column does not appear to work both ways, however, we would be interested to know what our readers think.

Biomicroscope Update

Dear Sir,

In the article entitled "Biomicroscope Information with Contact Lens Application" which appeared in the May/June, 1979 issue of the *Canadian Journal of Optometry* it was my intention to encourage suppliers or manufacturers of biomicroscopes not represented to enlighten us as to their location and supply product information, or even disperse sales representatives.

To date, I have received information from only Jena Instruments Ltd. (Carl Zeiss/Jena). The following is presented to supplement the original paper.

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Donald J. Egan, B.S., O.D., F.A.A.O.

Dear Dr. Belanger:

The cover on your recent *Canadian Journal of Optometry* was certainly impressive looking — at least from the standpoint of the Auxiliary.* I would like to express our pleasure.

Yours in Optometry,

Patricia Thomson, President, Auxiliary of the Ontario Association of Optometrists.

**Ed. Note—Mrs. Thomson graciously gave us permission to use the colour negatives from "Susan and Sam Visit the Optometrist" which we adapted for use on the cover of our last Journal. "Susan and Sam" is a colouring and activity book designed to introduce children to their first vision exam. It will soon receive international distribution by Imperial Optical.*

Bouquets for Canada

The following note was received with the newsletter from the Voluntary Optometric Services to Humanity (VOSH).

Dear Sir,

This is a note from me, personally, although I'm sure I express the feeling of every VOSH member when I say:

"THANKS CANADA, FOR SAVING THE SIX AMERICANS."

Ray Mienheartt, News Editor, VOSH Newsletter, Box 166 Brazil, Indiana

EDITORIAL

PRIMARY HEALTH DISCIPLINE: WHAT IT IMPLIES FOR OPTOMETRY

Optometrists have always considered themselves members of a health care profession even though sister professions were not always prepared to accept them as such. Gradually over the years optometrists have by quality of service and training gained recognition among sister professions and public authorities. Finally in the past years optometry was officially recognized as an independent primary health care profession by the various provincial optometry statutes.

What then is a primary health care discipline but one which deals directly with the patient without passing through a process of referral? The report of Ontario's Health Planning Task Force, 1974, defined primary health care:

> *Includes not only those services that are provided at first contact between patient and health professional but also responsibility for promotion and maintenance of health and for the complete and continuous care for the individual including referral when required.*

This concept is not a new one in optometry. Optometry recognized it in its very formative years by including anatomy and ocular pathology in its first formal educational programmes in Toronto and Montreal. Gradually over the years optometry broadened its scientific basis in ocular and general pathology, anatomy, physiology, physiological optics and pharmacology always with the intent of providing better care and diagnosis and referral when indicated.

The primary care practitioners must not only be experts in their own right but must possess sufficient background training to recognize conditions outside their scope of practice.

This accrued responsibility was sought after and willingly accepted by optometric leaders, educators and practitioners as a manifestation of their professional responsibility and maturity. However, the development of these diagnostic skills may have tended to reduce emphasis given to physical, geometric and applied otpics and dispensing to a point that was inconsistent with our original functions of caring for the vision needs of the public.

However useful and necessary is our ability to recognize abnormalities in the visual and general systems we must not neglect our basic training in optometry and in the related treatment services. Upwards of 80 percent of our treatment services include the prescription of an optical appliance be it a spectacle, contact lenses or low vision device. Even the prescription of vision training involves optical instrumentation in many shapes and forms.

The final step in such treatment is the actual dispensing and fitting and no optometrist should feel that such activity is below his or her professional status even though it is mainly a mechanical procedure. Dispensing is not to be understood as the actual surfacing and edging and assembling of the lenses and frame but the design of the glasses including specification of base curves, segment type and position, P.D. and other physical dimensions and the fitting of the device to the patient with appropriate instructions.

Surgery also is a mechanical act. It has been called "the cutting trade" by one of Canada's leading ophthalmologists.[1] Surgeons do not consider it demeaning to perform surgery.

Training in ophthalmic optics including selecting bifocal types, lens shapes and forms, glazing and mounting, fitting spectacles and manufacture of contact lenses is essential to a proper understanding of the functions of spectacles and contact lenses. This is no more unbecoming an optometrist in training than is the learning to tie suture knots under a blanket or any other mechanical procedure for a surgeon in training.

There is nothing in optometry to be ashamed of be it the most theoretical concept of binocular vision and space perception or the most humble mechanical act, if such activities are eventually to benefit the patient.

To close this editorial I quote Dr. Glen Fry, former director of the School of Optometry, Ohio State University, as he was honoured by his colleagues for 40 years of dedication to optometric education.[2] What this eminent eductor has to say on optics and its importance to optometric training and practice cannot be lightly set aside — the following are excerpts from his talk in response to the tributes paid by his colleagues at the 1975 Academy of Optometry meeting. Listen to the Master as he speaks:

Furthermore, I have promised myself to sit down and complete various textbooks which I have worked on intermittently for a period of years. The topics to be covered include ophthalmic lenses, ray tracing and image evaluation, the optics of the eye, motor mechanisms of the eye, applied problems in vision, color vision and binocular vision and space perception.

Back in the 1960's I was interested in curriculum planning, I had to help decide what was relevant to include in an expanded six-year program. We expanded our offerings in contact lenses, subnormal vision, aniseikonia, and orthoptics, which we considered that every optometrist should know about. Second, we expanded our offerings in applied visual problems such as school vision and industrial vision. Third, we were interested in practice building and the involvement of the government in the delivery of eye care and vision care. Fourth, we were interested in expanding our training in the area of detecting eye disease and referring patients

*for medical eye care.**

I also took on the self-appointed role of making math and optics more palatable to optometry students. I tried my hand at writing a textbook for geometric optics. I spelled out what ought to be covered. I have prepared a supplement on the use of computers in dealing with the abberrations of an optical system. This needs to be expanded to explain the use of computers for all aspects of geometrical optics, simple and complex. Matrix optics was also not covered but is now being taught at various schools.

I should like now to write a textbook on ophthalmic optics and another on the optics of the eye.

My interest in Math and Physics has been more than a mere academic exercise. I have been trying to provide optometrists with tools that they can use in designing and evaluating eyewear.

For a number of years I have served as Secretary of the ANSI Z80 Committee on Ophthalmic Lenses. There is in the mill a revision of the standard requirements for sunglasses which deals with the important problem of transmittance. A new standard for frames has just been completed. I have been serving as chairman of the working group on optical performance of spectacle lenses. I have been developing ray-tracing techniques for analyzing aberrations. I expect to publish these techniques, and this will probably be my final effort in the field of geometrical optics. In writing an order for a pair of glasses an optometrist may merely specify the power at the major reference point and the reading add. In the usual case no specification is given for the base curve although this may be done indirectly by specifying a type of lens by trade name. If the ANSI standard is adhered to this implies that the optometrist wants a lens with a base curve that will minimize radial astigmatism and center-marginal difference in power. There are standards set up that guarantee that the lens supplied will fulfill this requirement when the lens is mounted in a certain way before the eye. It also implies that the optometrist has carefully examined the needs of the patient and that it is not necessary to specify a lens of some other design and base curve which will better meet the patient's needs.

*One of the shortcomings of many optometrists is that they do not take this part of their work seriously.** *They honestly feel that their work ends when a prescription for power and cylinder axis is written. They feel that it is not their job, but the job of the optical laboratory to provide a pair of lenses that will function for peripheral as well as central vision.*

Since enough optometrists feel this way, it is easy to see why new students get the idea that we are trying to cram more physics and math down their throats than is necessary, and, therefore, I have the double job of persuading optometrists to take their work seriously and to assume more responsibility for providing first quality lenses and, in turn, convincing students that math and physics are relevant and necessary.

My objective in setting up standards for lenses has not been to set up guidelines for optical laboratories in providing first quality lenses so that

cont'd. next page

**Readers should note the order — he places optics first — Ed.*

**Emphasis added — Ed.*

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optometrists would never have to think about the problems involved in designing a lens.

*MY WHOLE OBJECTIVE HAS BEEN TO SET THINGS UP SO THAT THE OPTOMETRIST HAS TO ASSUME THE RESPONSIBILITY FOR THE DESIGN OF THE LENSES HE SUPPLIES.**

It is absurd to expect an optical laboratory to assume this responsibility when it never sees the patient. All the lab can do is to assume that when an optometrist lays down no requirement for the basic design for a pair of lenses, he is free to pick a design which will minimize radial astigmatism and curvature errors when mounted in a certain way in front of a standardized schematic eye.

I have made it one of the missions of my life to provide optometrists with guidelines and tools for designing first quality lenses and evaluating their performance once they are fabricated and worn.

With the advent of the computer there is no longer any drudgery in working out and checking designs, and it is one of my dreams that the optometrist of the future can be a real designer and fitter of spectacle lenses who can assume all responsibility for the performance of the lenses.

* *Emphasis added — Ed.*

Optometry grew out of optics — our heritage is in optics. We cannot ignore our origins if we wish to continue to exist as an independent health care discipline.

G.M.B.

References

1. McCullough, Clement. The Training of an Ophthalmologist, Editorial, *Canadian Journal of Ophthalmology* VOL. I, No. 2, p.83, 1966.
2. Fry, G.A. Years Past and Years to Come, *American Journal of Optometry and Physiological Optics,* 53-7, pp.365-8, 1976.

More on Contact Lenses

If one examines the content of educational programs provided at optometric congresses it is evident that the art and science of fitting contact lenses remains a priority interest for most optometrists. One area in the field which may be somewhat neglected is that of contact lens solutions and their compatibility with various soft lens materials. The paper by Drs. Inns and Jackson brings order out of chaos and should become a daily desk reference when recommending materials and solutions. They merit our sincere congratulations for the preparation of this invited paper.

An intelligent choice of gas permeable hard lenses and even between gas permeable and soft lenses will be made easier by a study of Dr. Garnett's paper. The more familiar one becomes with the properties of contact lens materials the better prepared one is to make a wise selection for any particular patient.

Optometrists are primary vision care practitioners. Contact lens patients should not be treated differently fom other refractive patients. Dr. Baker's paper on the optical considerations in contact lens practice should serve to remind the practitioner that other than cosmetic and physiological factors enter into the prescribing and fitting of contact lenses.

G.M.B.

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OPINION

A special section of the Canadian Journal reserved for expressions of opinions by our readers on controversial topics or for putting forward new thoughts or philosophies to provoke discussion among members of the profession.

The Editorial Board reserves the right to select such papers and realizes that these papers *may not* always have the scientific tenure of an academic or research paper.

The Board considers these papers to be more than "letters to the editor". However, the opinions expressed are solely those of the author. Acceptance for publication does not imply endorsation of these opinions by the Editorial Board and the Canadian Association of Optometrists. We invite your comments on this, or any other article in the Journal.

HAVE YOU DISPENSED WITH DISPENSING?

To tread the turning mill — or to lie flat on one's back knowing nothing and be still are the two traits of man. Which is worse I know not — but I know that both are ill.

A.E. Housman

I particularly address this article to those of my colleagues who are competent in their craft, who at the end of their day look back with pride and satisfaction at their achievement. My attempt to possibly change some of their concepts and fundamental thought in no way detracts from their professional expertise. However, many of my colleagues have become disoriented when confronted by the forest — when the single tree is of importance.

In most jurisdictions in both Canada and the United States optometry is defined as a profession dedicated to the correction of visual errors. (I deliberately choose to go no further in this definition knowing full well that many treatises have been written on this particular topic). In all jurisdictions optometry is allowed to, if visual correction is indicated, initiate corrective measures usually in the form of spectacles or contact lenses. (Again I deliberately avoid visual training etc., etc.) So in the final distillation, optometry prescribes and fits glasses or contact lenses.

That is the tree that is seemingly being blocked out by the forest. Knowing who and what we are, where our expertise lies, is the basis of all sound professional practise. All professions have limitations, we are no exception. However, many of us have lost some skills that are rightfully within our legally imposed parameters and we are now running scared because the discounter of optical goods and the smart chic dispensary is hurting us financially — our patients in various numbers want to go there for their glasses. They want us for our examination excellence but not for our optical services and sales.

The reasons are really very simple. The optician displays merchandise in a retail and appealing fashion with style the byword, coupled with good optical dispensing. Many of my colleagues after an examination turn the patient loose into a dispensary area where usually an ill-trained assistant advises in the choice of their frames. The doctor does not enter into this transaction as it is beneath his or her professional dignity to handle optical merchandise.

Is it not then reasonable for our patients to want to go to these other outlets where they are usually treated by trained optical dispensers and, in most cases, advised very well in their choice of glasses? The market place has proven this to be a fact.

We as a profession, in order to identify ourselves differently than our optical dispensary adversaries, must not play their game. Leave that to them — they do it better than we do — both as a result of their merchandise training and with their mechanical skills in handling spectacles.

What I recommend is a closed cabinet dispensary area with no frames on display. The doctor — not the ophthalmic assistant — prescribes the frame, takes the necessary measurements and dictates them to the assistant who is then left to work out the method of payment with the patient. The doctor, not the assistant, does the frame prescribing.

If any of you have not tried this— please do. It is not time-consuming since most patients will take your first frame recommendation. After all, who knows their requirements better than you, following an exhaustive case history and visual analysis? By doing so you will have successfully drawn a line separating you and your discount optical store as well as any other ophthalmic outlet.

Dr. Lorne A. Wolch,
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C.A.O. BULLETIN

CAO TO COLLECT HEALTH INSURANCE DATA

CAO will be gathering statistics on vision care services from provincial health insurance commissions in the coming months. This data will be made available to all provincial associations to better acquaint them with the situation in other jurisdictions. Unpublished 1977 statistics available from Revenue Canada will also be requested in order to develop an optometric income profile.

CLC MEDICARE CONFERENCE

A conference on the future of medicare in Canada sponsored by the Canadian Labour Congress was held in Ottawa Nov. 6-7 and CAO Executive Director Don Schaefer attended on behalf of the Association. Mr. Schaefer was able to discuss various aspects of the delivery of vision care services with a number of delegates including Chief Justice Emmett Hall, who is currently heading an inquiry into medicare in Canada. The Honourable David Crombie, Minister of Health and Welfare, addressed the conference, as did CLC President Dennis McDermott.

OPTOMETRISTS INVITED TO AOA CONGRESS

Optometrists from Canada are invited to attend the American Optometric Association's 1980 Congress, June 25-July 2, in Denver, Colorado. Five thousand doctors of optometry, their families and guests are expected to attend the business and education sessions at the Denver Convention Complex and six area hotels.

Of special interest to international guests will be the International Forum on Friday, June 27. Those attending will have an opportunity to share ideas and exchange information on the delivery of optometric care in their countries. Emphasis will be on optometry laws, both existing and planned. Attendees will receive copies of some of the presentations made at the 1979 meeting in Anaheim, California.

The AOA Congress will also feature 120 hours of optometric continuing education lectures in nine areas of interest: basic science; clinical; consultant services; diagnostic; interprofessional; intraprofessional; office administration; patient management; and treatment. In addition, an extensive exhibit hall of ophthalmic equipment is planned.

The 1980 AOA Congress registration fee for international guests is U.S. $125, if registration is received before May 1, 1980, and U.S. $135, if the registration is received after May 1, 1980. There will be a $5 per course hour charge for continuing education sessions for optometrists. The general registration fee includes access to all Congress special events. Registration forms and full details for the Congress can be obtained from the AOA Congress and Exhibits Manager, 243 N. Lindbergh Blvd., St. Louis, MO 63141, U.S.A.

COVD SEEKS JUVENILE DELINQUENCY DATA

The Juvenile Delinquency committee of the College of Optometrists in Vision Development seeks to establish a national program on the relationship of vision, learning disabilities and juvenile delinquency. Will you help compile a **complete** survey of all programs that have been initiated in working with juvenile offenders? If you are, or have been, involved in any way with a program dealing with delinquents or offenders, please let the committee know the following items:

1. Is your program currently active, or a program of the past?
2. Are you/were you involved in diagnosis, treatment, or both?
3. When did your program begin, and how long was it in effect?
4. If you know of someone else who has had a program with juvenile offenders, please list the following information so we may contact them: Name, Address, City, Province.

All those responding will then receive a copy of the compiled data from the committee. Send all correspondence to:

Roger T. Dowis, O.D., F.C.O.V.D.
Chairman, Committee on Vision & Juvenile Delinquency
1495 Canyon Blvd., Suite 220
Boulder, CO 80302

TORONTO, OTTAWA UNDERTAKE PARENT EDUCATION

Members of the Toronto and Ottawa optometric societies, with support from CAO, contributed toward better parent vision care education during an exhibition held in both cities during October. The event, called the Baby Fair, attracted about 25,000 parents and expectant parents in both cities—many of whom visited the optometry booth to learn about children's vision needs. Eye charts, pamphlets, posters and audio-visual presentations were employed to help answer people's questions. CAO invited the Ottawa media to attend, which led to some local coverage. While attendance was not as high as expected, all reports indicate the experience was worthwhile for optometrists and parents alike.

OPTOMETRIST NAMED "MAN OF THE YEAR"

Dr. Reginald Lewis, a Montreal optometrist has been honoured by the Progress Club of Montreal in being chosen "Man of the Year". Dr. Lewis is a former president of the club and a founder of the Pythian Clinic of Optometry. He was the first area chairman for Save Your Vision Week when the project was organized in 1958. More recently he was active in alerting the public about the possible dangers to vision during the February 1979 solar eclipse.

Dr. Lewis is a third generation optometrist — his grandfather and an uncle served to guide him into his chosen profession. Now he has been joined in practice by his son Howard, a 1968 graduate of the School of Optometry, University of Montreal who has done post graduate work at the Optometric Center of New York City.

YOU BELONG TO THE DELTA HOTEL CORPORATE PLAN

As a CAO member, you are entitled to the following benefits at all Delta Hotels in Canada; simply show your CAO membership card mailed with the last Journal:

Guaranteed reservations — when you pre-register your room is held even if you can't call to say you're late. And if the hotel is full, Delta will pay for your room and transportation to and from another fine hotel. By pre-registering, all you do is sign in on arrival to take advantage of the following rates, which are guaranteed until June 30, 1980.

	Single	Double or Twin
Barrington Inn, Halifax	$39	$45
Inn of the Provinces, Ottawa	$47	$54
Suites	$55	$60
Chelsea Inn, Toronto	$34	$41
Marlborough Inn, Winnipeg	$35	$39
Airport Inn, Vancouver		
Terrace	$34	$41
Tower	$39	$46
River Inn, Vancouver	$40	$46
Laurel Point Inn, Victoria	$40	$48
Canadian Inn, Kamloops	$30	$38
Discovery Inn, Campbell River	$31	$38
Inn of the North, Prince George	$33	$39
Deluxe	$37	$43

Delta Hotels are under construction in Calgary, Mississauga and St. John, New Brunswick.

2,000 EXPECTED AT GERMAN CONGRESS

Optica '80, a combined trade fair and congress for the Scientific Association for Ophthalmic Optics and Optometry (WVAO), is expected to attract 2,000 people to Cologne, West Germany, May 10-14.

Under the theme "Vision and the Environment" the Congress will examine problems facing wearers of spectacles and contact lenses and discuss illumination and safety precautions in the workplace. Special importance will be attached to work at data display units. A survey carried out at an insurance company reveals that a large number of people working at data displays suffer from headaches, smarting, swimming and running of the eyes. To avoid these complaints it is particularly important to realize optimal vision of a high standard with both eyes.

The WVAO is arranging 32 plenary sessions, panel discussions and 18 trade seminars in connection with Optica '80. There will be simultaneous translation into German, English and French.

JOSEPHSON LECTURES AT OPTIFORUM

Dr. Joshua Josephson lectured on silicone contact lenses and their comparison to hydrogels and oxygen permeable rigid lenses at Optiforum, the first annual symposium sponsored by Allergan Pharmaceuticals held in New York March 2. The event featured an international panel discussion and lectures by Dr. Josephson and Drs. Neil Bailey, Peter Fanti, Jan Jurkus, Donald Korb, Robert Morrison and Norman Bier. The symposium was held the day before Optifair East and proceeds were donated to the American Optometric Foundation.

Optifair, featuring over 220 hours of continuing education by over 100 lecturers, is one of the largest optometric gatherings in the U.S.

GETMAN LECTURES IN MONTREAL

G.N. Getman, O.D., D.O.S., presented a three-day Regional Graduate Clinical Seminar, for the Optometric Extension Program Foundation, at the Queen Elizabeth Hotel in Montreal, March 8-9. Attendees received three days of hands-on clinical experience working with patients. Day One provided group exploration of clinical basics for regimen options and goals. Day Two gave registrants practice in determining actual patient care needs and prescribing behavioral vision care programs. Day Three taught how to work with local educators to provide more children with full-spectrum vision care.

RABIES DEATH FROM CORNEAL TRANSPLANT

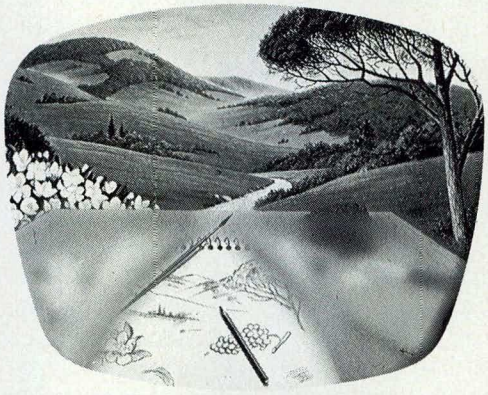
ATLANTA, Ga. (AP) — Federal health officials say a second death within recent months of persons who contracted rabies through a cornea transplant demonstrates the need for better screening of eye donors. A 36-year-old man died of rabies in France in November after receiving a cornea transplant from a woman who had died of muscular ailments, the U.S. National Centre for Disease Control said Jan. 25. In August, a 37-year-old Boise, Idaho, woman died after receiving an eye transplant from a 39-year-old man who developed weakness in the arms and legs and died in a hospital.

QUEBEC CONTACT LENS SYMPOSIUM

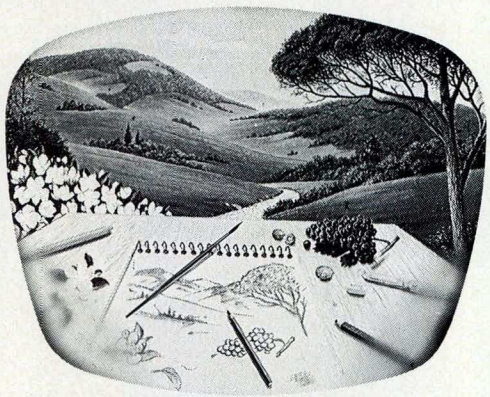
The International Symposium on Contact Lenses held in Québec City, October 6 and 7, 1979 accomplished its goal of attracting a large number of practitioners to hear top rate lecturers in a setting designed to stimulate interchange of ideas. The lectures were attended by over 325 persons from Canada and the United States. Major companies in the contact lens field were present and their displays attracted the interest of the majority of optometrists in attendance. Some of the most renowned specialists gave lectures on various topics related to the clinical and scientific aspects of contact lenses: Professeur M. Bonnet, Paris, France; Dr. Sami El Hage, Houston, Texas; Dr. Gerald Feldman, San Diego, California; Dr. Joshua Josephson, Toronto; Dr. André Lamonde, Montréal; Dr. Ross Maskell, Manchester, England; Dr. Jacques Sévigny, Québec; and Dr. George Woo, Waterloo. Simultaneous translation services were provided. During the evening, the congress attendees enjoyed the enchantment of historical seventeenth century Québec City as well the French atmosphere and *haute cuisine* of its many fine restaurants. The Symposium is an annual event and will be held in Quebec City again in October.

VARILUX 2
from ESSILOR

Clear, clean correction for presbyopia



"Invisible" bifocals:
a fuzzy central zone.



Varilux 2: clear, clean
vision at every distance.

Varilux 2, from Essilor, is the only true progressive lens in the world—a happy revolution in the world of optics. Unlike invisible bifocals, Varilux 2 does it all: eliminates major aberrations and assures maximum visual comfort **up close, far away and in between.** Varilux 2 is a clear advantage your patients will appreciate. It's the far-sighted answer to the psychological trauma of presbyopia.

VARILUX 2

ESSILOR

Canadian Optometric Education Trust Fund[1]

Part III:
The Medical Threat to Scope of Practice[2]

This is a continuation of our series outling the practical and urgent needs your Trust Fund is attempting to meet.

The medical profession as represented by the Canadian Ophthalmological Society has considered its future role in the delivery of vision care service. They have developed a program in response to their evaluation and have since 1975 implemented an action program to achieve their goals. Within this section of our Trust Fund discussion paper we will outline their program in terms of how it affects the profession of optometry and how it could potentially prevent us from attaining our own future scope of practice goals as outlined in Part I of this series of articles.

1. Understanding Ophthalmology's Program

Canadian optometry has developed an accurate overview of the concerns of ophthalmology from an address made by the former Executive Director of the COS in 1976 to an American state association of Ophthalmologists.(1) We have paraphrased important sections of the address and identified their plan of action to expand the scope of practice of ophthalmology:

a) The central issue surrounding the future of the medical practitioners involvement in the delivery of vision care services:

> *". . .Will optometry and all of the other non-medical health groups be permitted to practice medicine: and will they be permitted to displace physicans from any part of the practice of medicine?"*

b) The defensive steps that the COS is taking to prevent optometry's continued involvement in all aspects of primary care indicates that they will carefully monitor developments on four fronts:

1) They will watch health disciplines legislation such as the Optometry and Medical Acts which determine roles and scope of practice.
2) They will watch health delivery legislation such as medicare and health insurance programs which can affect roles and scope of practice in ways they might not always suspect.
3) They will monitor and seek to participate in all attempts at health manpower planning, since views about future roles and scope of practice often surface first in such planning.
4) They will pay special heed to health budgeting analyses, for many of the government's plans in regard to future roles and scope of practice are bound to derive from this source.

c) The steps the COS will take as part of their own action program to put them on the offense regarding optometry's growth indicates that:

1) They will plan long-term and future roles for ophthalmology and for all other potentially useful eye-care personnel, including optometrists in a manner that may or may not be similar to present roles. They may decide that, in the future, ophthalmologists should continue to do over half the primary eye examinations — or that they should reduce the proportion and concentrate more on secondary and tertiary care.
2) They will then develop positive plans based on their role models and attempt to seize the initiative for the first time and set about selling their positive plans as being preferable to others.
3) Having established their policies and objectives, they will pursue them consistently in future approaches to health discipline legislation, health delivery legislation, manpower, and health budgeting — as well as in other areas of activity.

2. Ophthalmology's Program in action

Based on our understanding of the objectives associated with ophthalmology's action program to deal with optometry's continued involvement in primary care, we can now evaluate the degree to which they have pursued their stated goals in the past four year period.

a) *CNIB—Vision Canada*

A submission by the COS to the 1975-76 Unmet Needs Study of Blind Canadians was contained in the CNIB report entitled "Vision Canada" published in 1976.(2) By reviewing the following four recommendations a major change can be identified in the COS's traditional position on the scope of ophthalmological practice. They are now saying publicly that they want to be associated with *all primary vision care needs of the public* and not just secondary and tertiary care. In short, they are not reluctant to promote the image of the ophthalmologist as being an optometrist with added medical training.

Recommendation 1: Expanded Ophthalmological Services - Programs of extended service into the community by ophthalmologists (glaucoma surveys, pre-school vision screening, vision screening in geriatric facilities and similar activities) should be encouraged and expanded. Ophthalmology residents should obtain improved education in these areas.

Recommendation 3: Patient access — The public must continue to have direct access to ophthalmologists for provision of regular preventive ophthalmic care.

Recommendation 8: Delineation of Responsibilities — All practitioners with patient contact in the eye care field should have their responsibilities defined accurately in the public interest.

Recommendation 15: Low Vision Aids — Education of ophthalmol-

1 Please see last two issues for Parts I and II.
2 By Donald Schaefer, Trust Fund General Manager.

ogy residents in the use of low vision aids should be enlarged and low vision aid clinics should be established in all University Departments of Ophthalmology, where they do not now exist.

b) *Diagnostic Use of Drugs*

Preventing the use of diagnostic drugs by optometry has been, and will continue to be, a major program objective of ophthalmology. We can measure the importance they associate with this goal by the statements made within their position papers and briefs at the time of legislative hearings on this topic. In 1974 they launched their first attempt in Ontario, in 1977 we dealt with them in Newfoundland, and in 1978 New Brunswick was the scene of their latest unsuccessful challenge to the diagnostic drug provisions. But their most blatant and potentially devastating blow was launched in 1977 through their brief to the Food and Drug Directorate of Health and Welfare Canada.[3] Their objective as summarized in their brief was to demonstrate that:

Self-medication is a danger both to vision and health. Drugs such as mydriatics and cycloplegics, local anesthetics and the powerful anti-glaucoma remedies all have serious ocular and systemic side effects. We believe that for the protection of the vision and health of the public these drugs should only be prescribed by physicians.

If the Food and Drug Directorate had not thoroughly investigated the clinical and scientific evidence associated with the COS claim, the ophthalmic drugs could have been placed on Schedule F. As a result, provincial governments when assessing optometry's request to gain legislative provision for the use of these drugs would most certainly have regarded the Drug Directorate's decision as a legitimate argument to be applied against our request. The Directorate ruled against the COS brief following submission of a CAO brief and subsequent investigation.

c) *Medical Manpower*

In 1975 a report outlining the future requirements in Canada for physicians by medical specialty was developed in collaboration with Health and Welfare Canada.[4] From the position taken by the COS in the report we learned that:

1) Two items of COS policy with manpower implications were repeatedly stressed. The first concerns the desire of ophthalmologists to continue to undertake primary care as "it is essential to the public welfare that ophthalmologists not be excluded from primary eye care (including primary optical care)." The second policy stressed restriction of optometrists to primary optical care and the establishment of guidelines for the mandatory referral of certain types of problems.
2) The proper role of the discipline of optometry, as well as the roles of related medical and non-medical disciplines, were outlined more definitively than is the case with most other specialities.
3) Early drafts of the report indicated that the working party had been unable to reach an estimate of manpower requirements by any approach. Part of the difficulty at that time was caused by a desire to consider requirements

(cont'd.)

CANADIAN OPTOMETRIC EDUCATION TRUST FUND CAMPAIGN
CAMPAGNE DE FINANCEMENT FONDS DE FIDUCIE DES OPTOMÉTRISTES CANADIENS

NAME/NOM _____

ADDRESS/ADRESSE _____

I/WE PLEDGE TO CANADIAN OPTOMETRIC EDUCATION TRUST FUND CAMPAIGN
JE M'ENGAGE/NOUS NOUS ENGAGEONS À VERSER AUX FONDS DE FIDUCIE DES OPTOMÉTRISTES CANADIENS POUR L'ÉDUCATION

ANNUALLY/ANNUELLEMENT	SEMI-ANNUALLY/BI-ANNUELLEMENT	QUARTERLY/TRIMESTRIELLEMENT	TOTAL GIFT/DON TOTAL
$	$	$	$

FOR 5 YRS / PENDANT 5 ANS ☐ 4 YRS / 4 ANS ☐ 3 YRS / 3 ANS ☐ 2 YRS / 2 ANS ☐ 1 YR / 1 AN ☐

PAID NOW/SOMME VERSÉE $

BALANCE/SOLDE $

DATE _____ 19 ___

This contribution is to be: (please indicate)
Cet argent soit être (indiquez votre choix)

☐ Assigned at the discretion of the Trustees of the Fund
Utilisé par les commissaires à leur discrétion

☐ Assigned as follows*
Utilisé à telles fins

SIGNATURE _____

NOTE: Please make cheques payable to: Canadian Optometric Educcation Trust Fund
All gifts are deductible for income tax purposes under Department of National Revenue Registration No. 0474601-25-10. Official receipt will be mailed on receipt of gift.

NOTE: Nous vous demandons d'établir vos chèques comme suit: Fonds de Fiducie des Optométristes Canadiens pour l'Education Enregistré auprès du Ministère du Revenu National sous le No. 0474601-25-10, tous les dons sont exempts d'impôts. Dès réception de votre contribution, un reçu officiel vous sera envoyé.

*Although efforts are being made to create a third school of optometry in the west, the location is by no means certain. For administrative reasons we urge that all donations for a third school therefore not specify location.

CAO ANNUAL REPORT 1979[1]

The calender year 1979 represented the 32nd year that the Canadian Association of Optometrists has functioned as an extension of your provincial optometric association. The purpose of this annual report is to summarize the activities that have been undertaken by us in response to the many challenging situations that we have encountered in 1979. We feel it is important that each one of you, as members of CAO, have an opportunity to review the activities we have been involved in during the past year and trust you will become more aware of an active, capable and well-administered association operating on your behalf.

The Canadian Association of Optometrists is administratively structured as a federation of the ten provincial optometric associations of Canada. Individual membership is available to you the practising optometrist by virtue of your membership in and support of your provincial association.

The national association programs are designed to ensure that through a collective voice the conditions under which you currently earn your livelihood, where possible, are not subject to arbitrary change by outside influences. CAO strives for the continuing advancement of the profession in all aspects of primary vision care by attempting to achieve the following organizational objectives:

1. We act as the recognized voice of Canadian optometry in areas of activity that are within the scope of federal jurisdiction.
2. We coordinate the activities of each provincial association in order to achieve an interprovincial understanding of the status of optometry.
3. We expand interprofessional relations between all allied health professions.
4. We identify and meet optometric manpower needs.
5. We increase public and government awareness of the need for the services provided by the optometrist.
6. We continually improve the science of optometry and the level of vision care to the Canadian public.
7. We promote the continuing education of the membership.
8. We encourage the active participation by optometrists in organizations dedicated to promotion of public health and the conservation of vision.

CAO Council

During the CAO Council meeting in Ottawa on October 9-11, councillors chose their executive members for the year October 1979 to October 1980. Dr. Jack Huber of Regina assumes the President's position. Dr. Roy Brown of Virden, Manitoba becomes Past-President and Manitoba councillor. Dr. Hervé Landry of Moncton is now Vice-President, while Dr. Reid MacDuff of Gander, Newfoundland becomes Treasurer. Dr. Don Cleal of Lloydminster is the Saskatchewan councillor during Dr. Huber's presidency. Dr. Ralph Rosere of Dartmouth will represent Nova Scotia replacing Dr. Garson Lecker. Dr. Jim McQueen of Brandon, Manitoba is also retiring from Council. The remaining Councillors are: B.C., Dr. Norm Armstrong; Alberta, Dr. Richard Watts; Ontario, Dr. Roland des Groseilliers; Quebec, Dr. Jean-Marie Rodrigue; PEI, Dr. Greg Beer.

Dr. Huber identified the following projects to be pursued by CAO on a priority basis throughout his term of office:

1. The creation of a third school of optometry.
2. The achievement of the Canadian Optometric Educaion Trust Fund objectives.
3. Expansion of our consumer education programs.
4. Making the membership more aware of CAO programs.
5. Assisting in the political growth of optometry through increased participation in international optometric activities.

Minister of Health

In October the federal Minister of Health and Welfare met with representatives of CAO to discuss matters of pressing concern to the profession of optometry. Topics discussed included a review of the status of the negotiations for a new school of optometry in western Canada and the availability of federal funding, CAO participation in the inquiry into medi-care now being undertaken by Chief Justice Emmett Hall, tax deductions for continuing health care education, the introduction of optometric consultants into the Health and Welfare Canada, support for a Natonal Health Care Institute for the providers and consumers of health care services recently proposed by the minister, and the status of a Drug Directorate response to a medical initiative to impose restrictions on the use of ophthalmic drugs which had been opposed by optometry.

The delegation was well received by the Minister, who indicated his department would follow through on the issues requiring governmental action.

Medical Devices

Early in 1979 officials of the Bureau of Medical Services, Health and Welfare Canada informed us that due to federal spending restraints they will not be able to sup-

[1] Developed by Donald Schaefer, CAO Executive Director and Tom Little, CAO Public Information Co-ordinator.

for enough ophthalmologists to provide for all eye services, however minor. The use of utilization data as an indication of who in fact had provided the specified eye services during a defined base period was ignored.

The above points should leave no mistake in anyone's mind as to ophthalmology's intent: to systematically reduce optometry's present and future influence in all aspects of primary vision and eye care service delivery.

We have itemized the Trust Fund's concerns for optometry's continued growth and development by emphasizing that the medical profession is now attempting to limit optometry's role while expanding its own scope of practice. But we obviously share a similar goal of meeting the primary vision care needs of the public. The most obvious differences between our profession and ophthalmology is that the COS has failed to grasp the reality of provincial legislation establishing the mutual right of both professions to delivery primary care to the Canadian public. The COS has also established its objectives without any practical considerations for the higher cost of training of, and service delivery by, the ophthalmologist.

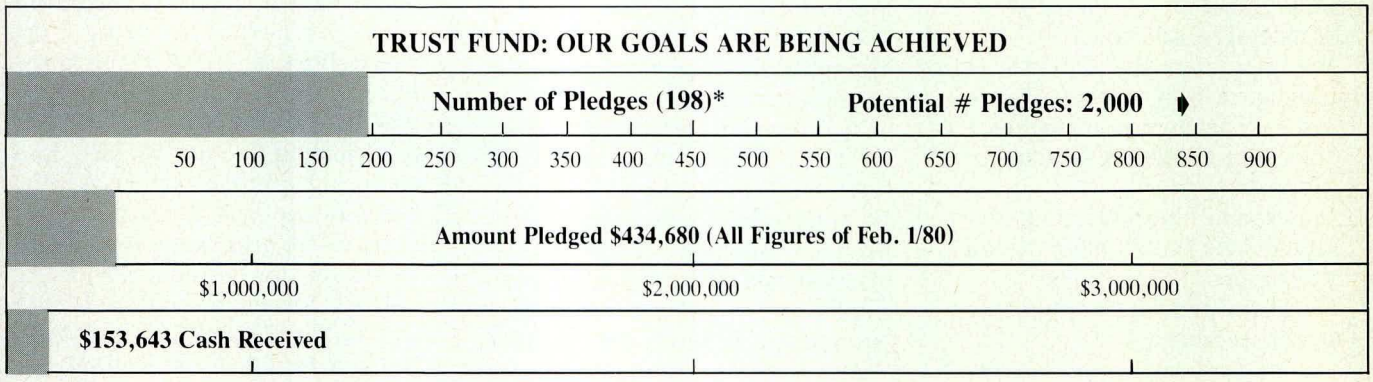
We therefore remain confident that the profession of optometry, with the long-term support of the Canadian Optometric Education Trust Fund, will be prepared to meet the medical challenge to our scope of practice. The money that you pledge to the Trust Fund will mean more and better educational personnel and facilities for optometry. This is of crucial importance for it means the education of more and more optometrists with the academic and clinical skills required to freely and responsibly meet the full range of the Canadian public's primary vision care needs.

References

1. Nason, G. "A Chill Wind May Blow Down from Canada," Address to the Annual Meeting of the Massachusetts Ophthalmological Society. Reprints distributed by the American Ophthalmological Society. (Undated, probably 1975.)
2. Greenland, C. Vision Canada, Vol. 1, The Unmet Needs of Canadians. Canadian National Institute for the Blind, 1976.
3. A Brief Outlining the Need to Place Certain Ophthalmic Drugs on Schedule F to Be Available Only on Prescription. Canadian Ophthalmological Society, May, 1977.
4. Report of the Requirements Committee to the National Committee on Physician Manpower. Department of Health and Welfare, Health Programs Branch, 1975.

TRUST FUND CHAIRMEN

NFLD.: Dr. Reid MacDuff
P.E.I.: Dr. John Rusk
NOVA SCOTIA: Dr. Garson Lecker
NEW BRUNSWICK:
Dr. L.J. Ouellette
Dr. W. Prince
QUEBEC: To be announced
ONTARIO: Mr. Cal Peppler
MANITOBA: Dr. E.J. Spearman
SASKATCHEWAN: Dr. John Seale
ALBERTA: Dr. Walter Mitson
B.C.: Dr. Bert Jervis



* Not including 23 donations without pledge cards and 20 special donations.

AUSTRALIA LOSES EXECUTIVE DIRECTOR

Dr. Damien Smith has announced his resignation as National Executive Director of the Australian Optometrical Association (AOA) to return to private practice. He was appointed in December 1972, and during his period of office, optometry in Australia made unprecedented political and professional gains.

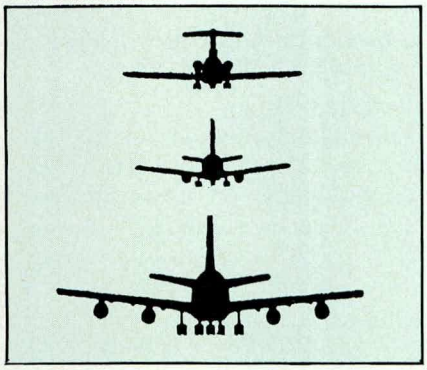
Announcing Dr. Smith's resignation to AOA membership, National President William H. Ure said: "Damien Smith has guided the Association past its greatest threats to its greatest political and professional advancements. He leaves a profession more prosperous and more prestigious than when he commenced in office, and a profession now firmly entrenched in the mainstream of Australia's health-care system".

Although the inclusion of optometric services under universal health insurance and the introduction of optometric care to Veteran's Affairs patients were the most notable political achievements, progress has been made by: expansion of clinical horizons and the acceptance of wider responsibilities for health of patients; access and frank communication with government; creation of an authoritative public image for optometry and a sound working relationship with the media; award of respect from all of the health profes-

(cont'd on p. 52)

port a CAO co-ordinated grant for the creation of an ophthalmic material problem reporting system. Thus the members of CAO's ophthalmic material committee were not able to meet in 1979 as originally planned to undertake the proposed program of monitoring problems in the use of contact lenses, solutions, and storage cases. We have been assured that the Bureau is anxious to resume its projected activities with optometry as soon as finances are made available.

Civil Aviation



We are pleased to report that as a result of our discussions with the Civil Aviation Medicine division of Transport Canada that an agreement has been reached whereby certain department letters to pilots needing eye examinations will specifically mention the use of either an optometrist or an ophthalmologist. Letters from Regional Aviation Medical Officers to applicants needing eye examinations will also specifically mention the use of either an optometrist or an ophthalmologist, instead of the latter as had previously been the case.

Restrictive Trades Practices Commission

The Restrictive Trades Practices Commission of the Department of Consumer and Corporate Affairs released its long-awaited report on the ophthalmic industry of Canada in early 1979. The Commission held hearings across Canada in 1975 and 1976 at which most of the ophthalmic community made representations, including CAO. The long-awaited 296-page report called for the establishment of minimum national standards of quality for spectacles and contact lenses, extension of price advertising for eyewear to all jurisdictions, and the appointment of consumer representatives on ophthalmic licensing boards. Its main recommendation called for government action to require Imperial Optical to divest some of its holdings to reduce its impact on the marketing of ophthalmic goods.

Other recommendations include: Rather than steering patients to a particular dispensing outlet, optometrists or ophthalmologists who test patients' eyes should ensure the patients know a prescription can be filled anywhere; contact lenses should be issued only when a prescription explicitly calls or allows for them; contact lens fitters should be adequately trained and licensed to avoid badly fitted lenses. CAO continues to monitor the status of the report which has, since its release, been under consideration by the Minister of Consumer and Corporate Affairs.

Drug Directorate

In late 1977, we became involved in discussions with the Drug Directorate within Health and Welfare Canada on the advisability of having ophthalmic diagnostic and treatment drugs restricted by Schedule F of the Food and Drug Regulations. The need for the restrictions was initially advocated by the Canadian Ophthalmological Society. As a challenge to the inappropriate aspects of the medical position we established an Advisory Committee that developed our own brief on this topic in March 1978.

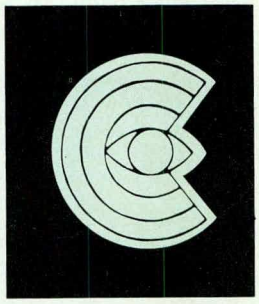
Since the time of submitting our brief, the Bureau has been evaluating this topic. In late 1979 they indicated in a brief statement to us that the COS request to schedule the ophthalmic drugs would not be acted upon. Although we accept the verdict of the Bureau as being appropriate, we will need to continue in 1980 to have a more precise statement made by the Bureau on this topic.

Health Services Review

CAO has become extensively involved in the development of a brief to the "Health Service Review — 1979" being directed by Chief Justice Emmett Hall, as it is felt the place of optometry in the Canadian vision care delivery system needs further elaboration. Changes in the profession and the delivery of vision care services in Canada have been brought about by the enactment of the Medical Care Act of 1971. Certain principles involving reasonable access, universal coverage, portability and reasonable compensation are being violated and require detailed optometric criticism.

Similarly some of the goals of the Charter of Health for Canadians eminating from the original Hall Commission in 1964 are being violated, for example, the tenets of a system making "the most effective use of the nation's health resources. . .financed through prepayment arrangements. . ." and with the participation of "free and self-governing professions." CAO will therefore be presenting the concerns of the profession to this national body in early 1980 based on the research and writing efforts completed in 1979.

Canadian Optometric Education Trust Fund



CAO is pleased to report that the fund-raising program of the Canadian Optometric Education Trust Fund continues to show steady growth. Set up in 1977 to generate financial resources to meet manpower needs, undertake research studies, grant scholarships as well as grants to renovate existing schools, and establish a continuing education program, the Trust Fund has been capably supported in its local activities through the energetic efforts of the National Board of Trustees and the provincial fund raising Chairmen.

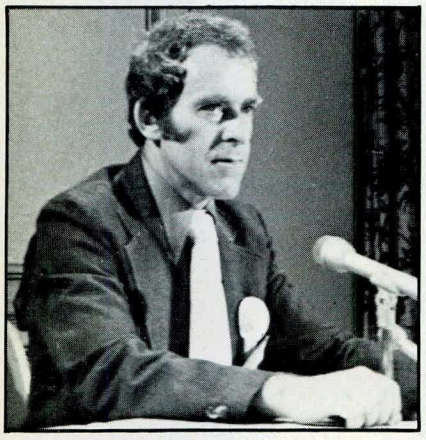
The COETF considered 1979 as another year of self growth in terms of understanding the administrative, financial and legal aspects associated with the operation of a charitable trust. The 1979 Annual Report of the Fund, soon to be released, will

indicate that it is well on the way to meeting its long-term financial goals.

National Defence

In October our representatives met with the Minister of National Defence to discuss the use of armed forces corps men in place of optometrists. In some cases it was felt the corps men were operating without adequate supervision or actually practising optometry without the legally recognized training to do so. The question of introducing optometrists into the military health care delivery system was examined as was the existing discriminatory policy of referring military patients to civilian ophthalmologists but not optometrists. The minister indicated his willingness to discuss these matters with departmental officials and is on record as being in favour of an internal policy of non-discrimination. The minister gave his assurance that he will be looking into this matter further and that a future meeting will be held.

National Council



Dr. George Edworthy, President of the National Council of Optometry

CAO continued in 1979 to bring together provincial representatives of each College of Optometry and Board of Examiners along with representatives of the University of Waterloo and the University of Montreal. In July the members met in Edmonton and unanimously agreed to proceed immediately with the incorporation of the National Council of Optometry. The decision of this meeting was the result of six years of effort by the CAO, provincial licensing authorities and optometric school representatives to establish this organization.

The National Council of Optometry will facilitate the creation of a national accreditation procedure for all Canadian schools of optometry, and a national examination procedure for all Canadian optometry school graduates. The National Council will therefore be establishing a standard of qualifications in optometry that will make certificate holders acceptable to all participating provincial licensing bodies. CAO will continue to be an active member of this organization and to support its objectives.

National Advisory Committee on Vision Care Benefit Programs

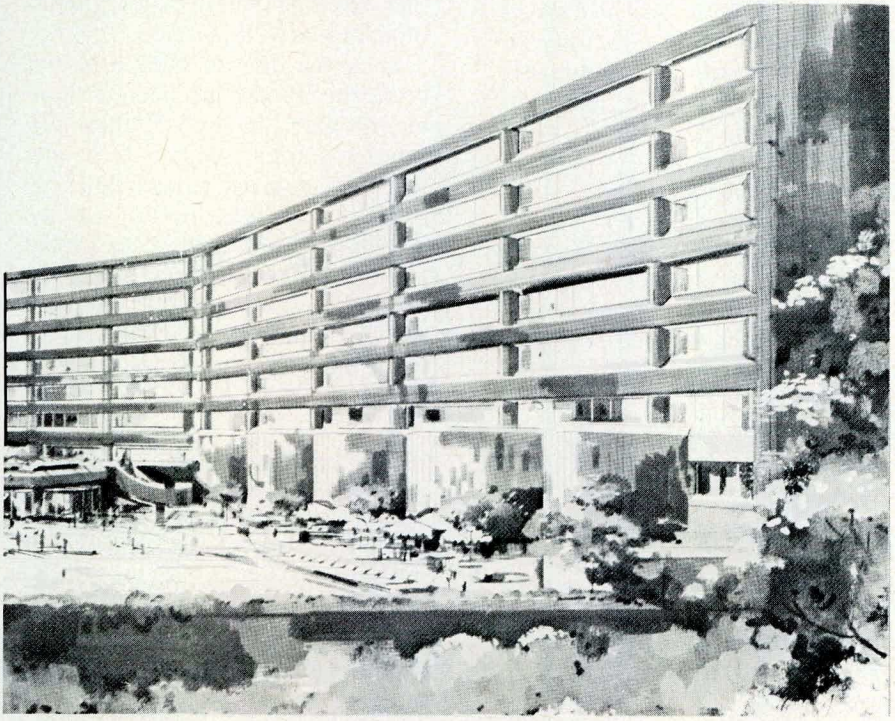
Because the field of third party vision care contracts potentially involves the vast majority of optometrists, provincial associations have developed, under the CAO organizational structure, the newly created National Advisory Committee on Vision Care Benefit Programs. This Committee is now considering the manner in which optometrists will participate in any non-governmental vision care benefit program offered to the Canadian public. CAO, as the national co-ordinating agency of optometric programs, is providing full administrative support to the work of the Committee in order to assure the future attainment of provincial association objectives. You can look forward to receiving a full report on the Committee's 1980 program in future editions of the C.J.O.

Interaction '79

Our annual national policy planning meeting Interaction '79 brought together 45 provincial leaders from across Canada. The two-day meeting successfully reviewed

New Academic Facilities

CAO negotiations for the creation of a third school of optometry in western Canada focused in 1979 on the province of Alberta. The New Academic Facilities Committee, under chairmanship of Dr. Ken Armstrong, joined with the Alberta Optometric Association in focusing on the University of Calgary as a future home of the school. In addition to several meetings with university and governmental officials the Committee and CAO's Public Information Office focused on developing a growing public awareness of the need for a new optometric educational facility. The Committee is now awaiting the results of a University of Calgary study on our school of optometry proposal that should indicate by mid-1980 the institution's interest in establishing a school of optometry.



and added to our current five year program of national objectives. Special consideration was given to the area of communication with M.O.S. President Dr. Harry Basman outlining the framework for an effective provincial consumer education program. The meeting also focused on optometric involvement in third party vision care programs with a consultant from the American Optometric Association providing expert advice on how to proceed in this complex area.

16th Biennial Congress

Our Edmonton Congress in July was a tremendous success owing to the tireless efforts of the group of Alberta optometrists and their spouses who devoted so much time in helping CAO organize and run the event. Over 230 optometrists attended, making this the greatest turnout of Canadian optometrists to date.

All tolled, there were almost 500 participants in the Congress which featured an extensive continuing education program, and a well-attended CAO General Business Meeting featuring speakers such as Dr. Alvin Levin, President of the American Otpometric Association and Richard Fraser, Legal Counsel to the Alberta Optometric Association. Reports from CAO Executive and administrative staff were given as well.

The Congress afforded the opportunity to hold other meetings vital to CAO business such as the National Council of Optometry, the Trust Fund, CAO Council, etc. There was a comprehensive program for spouses and children, who comprised 191 of those in attendance. Some 36 booths featured a comprehensive display of materials and equipment produced by ophthalmic manufacturers.

The social program was well planned for, with activity galore allowing the whole family to take advantage of many of the entertaining cultural offerings Edmonton has to offer.

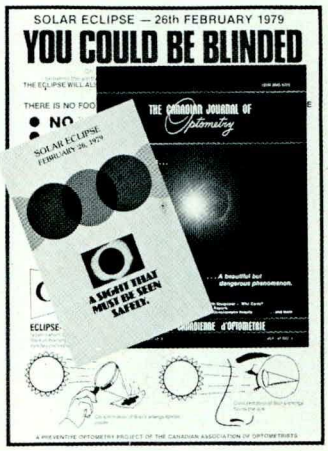
Other Meetings

During 1979 CAO representatives attended the following meetings: American Optometric Association Congress, New Brunswick Optometrical Society, Nova Scotia Optometrical Association, Alberta Optometric Association, (Dr. Roy Brown); Saskatchewan Optometric Association, Manitoba Optometric Society, British Columbia Optometric Association, (Dr. Jack Huber).

PUBLIC RELATIONS

Eclipse

Our 1979 P.R. program got off to a tremendous start as the CAO Public Information Office and the provincial associations worked to publicize the dangers of improperly viewing the February 26 solar eclipse. More than 125,000 pamphlets and posters were distributed from CAO and the Manitoba Society, with several provincial governments lending a hand. The Canadian Teachers' Federation distributed CAO's news release to its 14 member publications and a news conference held in Ottawa provided the platform for a nation-wide warning made by CAO President Roy Brown. Dr. Brown was instrumental in extensive media contact in his home province of Manitoba as well. CAO sent audio and visual material to TV stations and announcements for radio to all stations in Canada and responded with several radio interviews from interested stations. Major media such as Maclean's Magazine, Canadian Magazine, CTV's Canada A.M. and two CBC television shows were given interviews or information.



With all the warnings made it was unfortunate that the CAO nationwide eclipse eye damage survey still discovered 17 cases of eclipse retinopathy. These results were reported by Dr. Brown to newspaper, broadcast and wire service reporters during the Edmonton Congress in July.

Congress Publicity

A concerted effort was made to take advantage of the 1979 Congress in Edmonton to increase the public's awareness towards vision care. To this end, interviews were arranged for sixteen optometrists through CAO's Public Information Office. The Edmonton media responded whole-heartedly and carried stories on: occupational vision, eye-glass advice, sports vision, fluorescent lighting, National Council of Optometry, a complete eye examination, eye strain and computer

screens, children's vision, contact lenses, and vision screening. Several of these items were picked up nationally. Our major news conference was based on the need for a new school of optometry and received excellent coverage across the west when Dr. Brown and Drs. Campbell and Armstrong of Alberta discussed the growing shortage of optometrists.

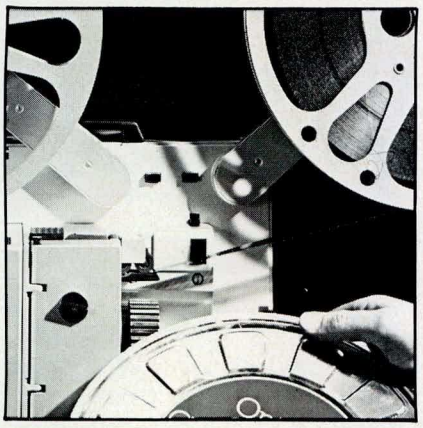
The next step in CAO's program was to have Dr. Brown and Armstrong appear on the Ron Collister Radio Hot-Line show, which allowed them to further stress the need for a third school. They also discussed vision problems with listeners during the two hour morning show. Mr. Collister, also Editor of the Edmonton Sun, followed up with a strong newspaper editorial supporting the creation of a new school of optometry in Calgary.

Finally news releases publicizing the election of Jack Huber as CAO President and the awarding of the President's award to William Lyle were timed to coincide with the Congress dates.

Television Films and Pamphlets

Distribution of our 60 and 30 second television public service announcements continued in 1979 on an "as-needed" basis with several dozen being ordered to replace worn out supplies. Generally speaking it is estimated that the free-time announcements have brought hundreds of thousands of dollars of prime-time information on vision care to Canadians. Manitoba's Public Information office has recorded over $100,000 in air time and one Montreal station alone aired the P.S.A.'s for the equivalent of $75,000 worth of commercial time. In 1979 $4,480 was approved by Council to edit our 60 second films for use as 30 second P.S.A.'s in 1980, thus offering stations a variation on our current theme.

Several thousand CAO pamphlets were mailed to the public, teachers, nurses and students during the year. Steps were taken in 1979 to update and renew our supply of pamphlets for 1980 with new material being aimed at parents, teachers, older adults, and contact lens wearers.



News Releases

During the year CAO succeeded in highlighting the importance of good optometric vision care through a series of news releases and interviews. President Brown spoke to a Canadian Press wire service reporter in Ottawa in February which led to three vision care stories being sent to media across the nation.

CAO's 1978 children's vision news release continued to receive attention as it appeared in the 100,000 circulation Canadian Consumer magazine, and several months later it appeared again in the Australian consumer magazine. In the fall of 1979 our children's vision release was circulated to all provincial optometric associations for use locally with radio spot announcements. In addition it went to all 14 publications of the 220,000 Canadian Teachers' Federation, along with photos of President Huber, who is quoted in the national release. A free pamphlet on vision problems was offered in this release and the requests for material are again heavy this year.

The election of Vice-President Hervé Landry and Treasurer Reid MacDuff was publicized in New Brunswick, Nova Scotia and Newfoundland.

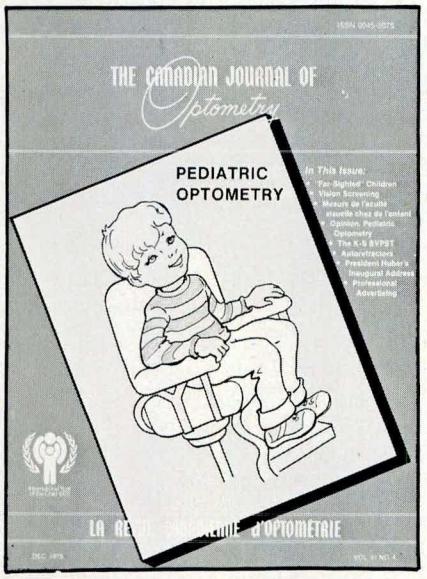
A news release schedule involving all provincial optometric associations was formulated for 1980 in November of 1979. The first release on vision and smoking was sent out in December for use during Non-Smoking Week, January 20-26.

Public Contact

Four optometrists represented CAO and the Quebec Association at the 700 delegate Canada Safety Council Conference in Quebec City in September of 1979. Three of them addressed the Traffic Safety Division Seminar on Vision and Driving while the fourth served as moderator. Two optometrists represented the profession at the Quebec Association for Children with Learning Disabilities Conference.

CAO assistance also went to Ottawa and Toronto optometrists in several health-related public exhibitions. During the year hundreds of calls from the public were fielded by CAO staff in Ottawa.

In addition, a special Public Relations seminar, chaired by CAO's Public Information Co-ordinator, was held during the Edmonton Congress to bring together provincial P.R. representatives to discuss techniques and co-ordinate activities.



Canadian Journal of Optometry

Many improvements were added to the CJO in 1979 and advertising revenue tripled. Several theme issues were realized including contact lenses, pediatric vision and a Congress wrap-up. The Journal continues to operate on a break-even basis while continually striving to improve its content. Its use as a pub-

lic relations vehicle is evident when one realizes it is sent to all ministers of health in Canada and is often given to journalists, administrators, other health professionals and government officials. Our co-production with the Canadian Journal of Public Health on vision care has been sent to members of the provincial legislature by the B.C. Optometric Association and is to be sent to CNIB regional bureaux in 1980.

Canadian Public Health Association

As part of our on-going public relations program, liaison with CPHA was continued in 1979. This included submission of an abstract in support of an application for an optometric speaker at the 1980 CPHA annual meeting and arrangements for an optometric display booth.

Finances

We regret that our 1979 audited statement was, at press time, still being undertaken by our auditors. We will therefore be publishing a summary report for your consideration in the next issue of the Journal.

Summary

The council and administrative staff of the Canadian Association of Optometrists regard 1979 as another year of positive self-development for the profession and for CAO. We thank each of you, the members of your executive boards, and the administrative staff of your provincial associations for the financial and program support in 1979. We will continue in 1980 to strengthen our organizational ability to deal with the range of complex and challenging issues that will be brought before us. We thank you for your interest in this report and welcome any questions or comments you may wish to make.

RAPPORT ANNUEL DE L'ACO POUR 1979[1]

Depuis 32 ans, l'Association canadienne des optométristes oeuvre en complément de votre association provinciale d'optométrie. Ce rapport annuel résume les activités que nous avons entreprises, en réponse aux nombreux défis rencontrés en 1979. Nous estimons qu'il est très important que chacun d'entre vous ait l'occasion, à titre de membre de l'ACO, de se familiariser avec les activités entreprises par votre association. Nous sommes persuadés que vous saurez apprécier le fait que cette association active et bien administrée travaille dans votre intérêt.

Sur le plan administratif, l'ACO est structurée selon le modèle d'une fédération des dix associations provinciales d'optométrie du Canada. En vertu de son affiliation à son association provinciale et de l'appui qu'il lui accorde, l'optométriste praticien peut aussi s'affilier à titre individuel à l'association nationale.

Les programmes de l'association nationale visent à assurer par une voix collective que les conditions qui régissent la pratique de votre profession ne seront pas assujeties à des changements arbitraires causés par des influences venant de l'extérieur. L'ACO cherche continuellement à améliorer tous les aspects des soins de première ligne offerts par la profession par la réalisation des objectifs d'organisation suivants:

1. Agir comme représentant reconnu des optométristes canadiens dans les domaines d'activité relevant de la juridiction fédérale.
2. Coordonner les activités de chaque association provinciale, afin de parvenir à une entente entre les provinces sur l'avenir de l'optométrie.
3. Encourager les relations entre les professionnels des diverses professions de santé.
4. Identifier les besoins en main d'oeuvre du secteur de l'optométrie et y répondre.
5. Sensibiliser davantage le grand public et le gouvernement à la nécessité d'accéder aux services qu'offrent les optométristes.
6. Chercher continuellement à parfaire la science de l'optométrie et à améliorer la qualité des soins ophtalmiques offerts aux Canadiens.
7. Encourager les membres à parfaire leurs connaissances par l'éducation permanente.
8. Encourager les optométristes à participer activement aux organisations qui se dévouent à promouvoir l'hygiène publique et la protection de la vue.

Conseil de l'ACO

Lors de la réunion du Conseil de l'ACO tenue à Ottawa du 9 au 11 octobre dernier, les conseillers ont choisi les membres de l'exécutif qui occuperont leurs postes d'octobre 1979 à octobre 1980. M. Jack Huber de Regina occupe la présidence. M. Roy Brown, de Virden au Manitoba, occupe de poste de président sortant et de conseiller pour le Manitoba. M. Hervé Landry, de Moncton, a été élu vice-président et M. Reid MacDuff, de Gander, Terre-Neuve, occupe le poste de trésorier. M. Don Cleal, de Lloydminster, occupera le poste de conseiller pour la Saskatchewan pour la période durant laquelle M. Huber sera président. M. Ralph Rosere, de Dartmouth, représente la Nouvelle-Ecosse, poste occupé auparavant par M. Garson Lecker. M. Jim McQueen, de Bran-

1 Rédigé par Donald Schaefer, directeur exécutif de l'ACO, et Tom Little, coordonnateur des relations publiques à l'ACO.

don au Manitoba, se retire lui aussi du Conseil. Le restant des membres sont: C-B., M. Norm Armstrong; Alberta, M. Richard Watts; Ontario, M. Roland des Groseilliers; Québec, M. Jean-Marie Rodrique; Île du Prince Édouard, M. Greg Beer.

M. Huber a identifié certains projets de grande importance dont l'ACO s'occupera en priorité au cours de son mandat:

1. Créer une troisième école d'optométrie.
2. Atteindre les objectifs du Fonds de fiducie des optométristes canadiens pour l'éducation.
3. Elargir la portée de nos programmes d'éducation des consommateurs.
4. Sensibiliser davantage les membres aux programmes de l'ACO.
5. Aider la croissance politique de l'optométrie en participant de plus en plus aux activités de l'optométrie à l'échelle internationale.

Ministre de la Santé

En octobre dernier, le ministre de la Santé nationale et du Bien-être social rencontrait les représentants de l'ACO afin de discuter de questions urgentes concernant la profession de l'optométrie. On a entre autres discuté:

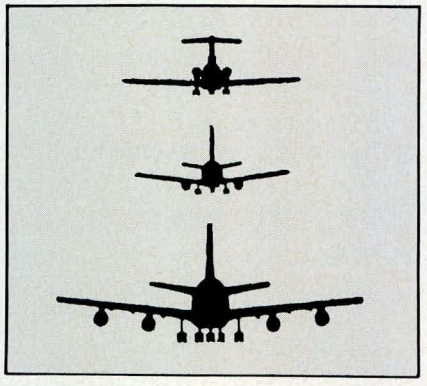
— de la révision de l'état des négociations sur une nouvelle école d'optométrie dans l'ouest du Canada et de la disponibilité de fonds fédéraux;
— de la participation de l'ACO à l'enquête sur l'assurance-maladie présentement en cours sous la direction du juge en chef Emmett Hall;
— des déductions d'impôt pour l'éducation permanente sur les soins de santé;
— de l'admission de conseillers en optométrie au ministère de la Santé nationale et du Bien-être social;
— de l'appui qui serait accordé à l'Institut national d'hygiène publique récemment proposé par le ministre, institut qui desservirait les fournisseurs et les consommateurs des services d'hygiéne publique;
— et de la réponse de la Direction des Drogues à une initiative médicale visant à restreindre l'usage des drogues ophtalmiques, initiative à laquelle les optométristes se sont d'ailleurs opposés.

Le ministre a aimablement reçu la délégation et a indiqué que son ministère poursuivra les questions qui nécessitent une action gouvernementale.

Instruments médicaux

Au début de 1979, des fonctionnaires du Bureau des instruments médicaux du ministère de la Santé nationale et du Bien-être social nous ont fait savoir que, à cause des restrictions budgétaires, ils ne pourront appuyer financièrement un fonds coordonné par l'ACO pour la création d'un système de signalisation des défectuosités dans les matériaux ophtalmiques. Par conséquent, les membres du comité de l'ACO sur les matériaux ophtalmiques n'a pu se réunir tel que prévu en 1979 pour mettre sur pied le programme proposé de signalisation des problèmes liés au port de lentilles cornéennes, à l'utilisation des solutions et aux étuis. Les représentants du Bureau des instruments médicaux nous ont assurés qu'ils sont toujours grandement intéressés à reprendre les activités projetées dès que les fonds seront disponibles.

L'aviation civile



Nous avons le plaisir d'annoncer que, à la suite de discussions avec la Division des services médicaux de l'aviation civile du ministère fédéral des Transports, un accord a été conclu en vertu duquel certaines lettres adressées aux pilotes qui ont besoin de subir un examen de la vue contiendront désormais une mention leur suggérant de s'adresser à un optométriste ou un ophtalmologiste. Les agents médicaux régionaux dans leurs lettres aux postulants ayant besoin d'examens de la vue leur préciseront eux aussi de s'adresser à un optométriste ou un ophtalmologiste, plutôt qu'à ce dernier seulement, comme c'était la coutume auparavant.

Commission sur les pratiques restrictives du commerce

La Commission sur les pratiques restrictives du commerce du ministère de la Consommation et des Corporations a publié au début de 1979 son rapport tant attendu sur l'industrie ophtalmique au Canada. La Commission a tenu ses audiences d'un océan à l'autre en 1975 et 1976. La majorité de la communauté ophtalmique y compris l'ACO, y a fait des dépositions. Le rapport de 296 pages recommande la formulation de normes nationales minima sur la qualité des lunettes et des lentilles cornéennes, l'introduction de la publicité sur le prix des articles de lunetterie, et la nomination de représentants des consommateurs aux conseils de réglementation de l'optométrie et de l'ophtalmologie. Dans sa recommandation principale, la Commission demandait au gouvernement de prendre l'initiative d'obliger Imperial Optical à se défaire de certains de ses avoirs afin de réduire son impact sur la mise en marché des produits de lunetterie.

Parmi les autres recommandations de la Commission, on note:

— plutôt que de manoeuvrer leurs patients vers des points de vente précis, les optométristes et les ophtalmologistes qui examinent la vue de leurs patients devraient s'assurer que ces derniers sont conscients du fait qu'ils peuvent faire exécuter leur ordonnance à n'importe quel endroit;
— on ne devrait fournir des lentilles cornéennes au patient que lorsque l'ordonnance l'exige ou le permet implicitement;
— les ajusteurs de lentilles cornéennes devraient recevoir une formation adéquate ainsi qu'un permis pour éviter que des patients reçoivent des lentilles mal ajustées.

L'ACO continue à surveiller les répercussions de ce rapport. De plus, depuis sa publication, le ministre de la Consommation et des Corporations lui a apporté une attention toute particulière.

Direction des drogues

Vers la fin de 1977, l'ACO a entamé des discussions avec la Direction des Drogues du ministère de la Santé et du Bien-être social portant sur la pertinence des restrictions imposées quant à l'usage des drogues pour diagnostic et traitement ophtalmique en vertu de l'Annexe F des Règlements sur les aliments et drogues. La Société canadienne d'ophtalmologie fut la première à préconiser la nécessité d'imposer des restrictions. En réponse aux aspects peu appropriés de la position des médecins, l'ACO a mis sur pied un comité consultatif qui a préparé un mémoire à ce sujet en mars 1978.

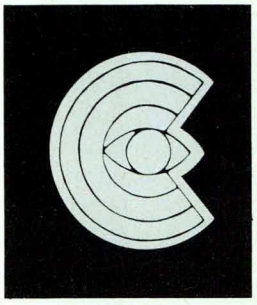
Depuis la présentation de notre mémoire, la Direction des Drogues étudie la question. Vers la fin de 1979, elle nous a fait parvenir une brève déclaration selon laquelle la demande de la Société canadienne d'ophtalmologie visant l'annexation des drogues ophtalmiques était rejetée. L'ACO accepte le bien-fondé de cette décision mais, en 1980, elle s'attend à recevoir une déclaration plus complète à ce sujet.

Revue des services de santé

L'ACO a travaillé intensement à l'élaboration d'un mémoire à "l'Examen des services de santé — 1979" sous la direction du juge en chef Emmett Hall, puisqu'elle est d'avis qu'il faudrait préciser davantage la place que doit occuper l'optométrie dans le système canadien de services de soins de la vue. La Loi sur les soins médicaux de 1971 a entraîné des modifications au Canada, tant au sein de la profession qu'au chapître de la prestation de services de soins de la vue. Certains principes ayant trait à la possibilité raisonnable de bénéficier des services assurés, à la couverture universelle, à la transférabilité et à la compensation raisonnable ne sont pas respectés et l'optométrie se doit d'en critiquer les abus de façon détaillée.

De même, on enfreint certains des objectifs de la Charte de santé des Canadiens proposée par la première Commission Hall, en 1964. On enfreint par exemple les principes d'un système qui "utilise de la façon la plus efficace les ressources de santé de la nation. . .financé sous forme d'assurances par paiement anticipé. . ." et comptant sur la participation de "professions libres qui se gouvernent elles-mêmes." L'ACO réunira donc les préoccupations de la profession pour les présenter à cet organisme national au début de 1980; sa présentation sera fondée sur les recherches et les rapports de 1979.

Fonds de fiducie des optométristes canadiens pour l'éducation



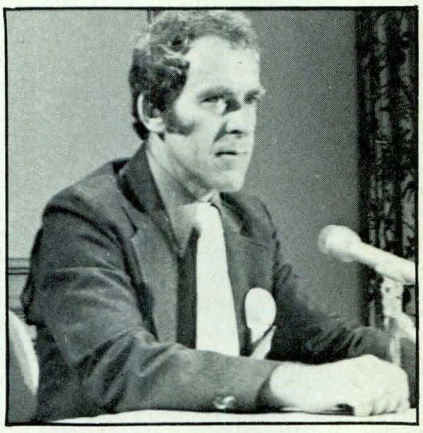
L'ACO a le plaisir d'annoncer que le programme de collecte de fonds pour le Fonds de fiducie des optométristes canadiens pour l'éducation accuse toujours de réels progrès. Le Fonds fut établi en 1977 pour réunir des sommes afin de satisfaire aux besoins en main d'oeuvre, d'entreprendre des travaux de recherche, d'offrir des bourses ainsi que des subventions pour moderniser les écoles déjà en place, et d'établir un programme d'éducation permanente. Le Bureau national des commissaires et les présidents des campagnes provinciales ont consacré des efforts vigoureux aux activités locales du Fonds de fiducie.

En 1979, le Fonds a connu une période de croissance en ce qui concerne la compréhension des aspects administratifs, financiers et légaux de la gestion d'un fonds établi pour des fins charitables. Le rapport annuel de 1979 du Fonds, qui sera bientôt publié, indique que les objectifs à long terme qui avaient été fixés seront bientôt atteints.

Défense nationale

En octobre dernier, nos représentants se sont réunis avec le ministre de la Défense nationale afin de discuter de la question des militaires qui font le travail des optométristes. Nous étions d'avis que, dans certains cas, les militaires accomplissant leur travail n'étaient pas suffisamment supervisés ou pratiquaient l'optométrie sans avoir reçu la formation nécessaire et approuvée par la loi. Nous avons étudié la possibilité d'intégrer des optométristes au système de soins de santé dans le milieu militaire, et nous avons discuté de la discrimination que représente la pratique courante d'adresser des patients militaires aux ophtalmologistes civils mais non au optométristes civils. Le ministre s'est dit prêt à discuter de ces questions avec les administrateurs du ministère et s'est prononcé formellement en faveur d'une politique interne de non-discrimination. Il nous a de plus assurés qu'il étudierait la question plus à fond et que d'autres réunions suivraient.

Conseil national d'optométrie



M. George Edworthy, Présidente du Conseil national d'optométrie

En 1979, l'ACO a continué la pratique de réunir les représentants provinciaux des deux ordres d'optométrie et de chaque conseil de certification ainsi que les représentants de l'Université de Waterloo et de l'Université de Montréal. En juillet, les membres de sont réunis à Edmonton et ont accepté à l'unanimité de procéder immédiatement à la constitution légale du Conseil national d'optométrie. La décision d'établir cette organisation, prise à cette réunion, est le fruit de six années de travail de la part de l'ACO, des autorités provinciales de certification et des représentants des écoles d'optométrie.

Grâce au Conseil national d'optométrie, il sera plus facile de mettre sur pied un procédé d'accréditation normalisé pour toutes les écoles canadiennes

d'optométrie, de normaliser à l'échelle nationale les examens pour les diplômés de toutes les écoles canadienne d'optométrie et d'établir des normes dans le domaine de l'optométrie afin que tous ceux qui ont les compétences requises soient acceptés par les organisations provinciales de certification participantes. L'ACO continuera, à titre de membre, à participer activement à cet organisme et à appuyer ses objectifs.

Comité national de consultation sur les programmes d'indemnités de soins de la vue

Puisque la question des contrats à une tierce partie pour la prestation des soins de santé pourrait affecter la vaste majorité des optométristes, les organismes provinciaux viennent récemment de créer le Comité national de consultation sur les programmes d'indemnités de soins de la vue, sous la tutelle de l'ACO. Le Comité étudie présentement de quelle façon les optométristes participeront aux programmes privés de soins de la vue auxquels contribuent une tierce partie. A titre d'organisme national de coordination des programmes d'optométrie, l'ACO met ses services administratifs à la disposition du Comité afin d'assurer que les objectifs des associations provinciales sont atteints. L'un des prochains numéros de la Revue canadienne d'optométrie comprendra un rapport exhaustif du programme du Comité en 1980.

Interaction '79

Quarante-cinq dirigeants provinciaux de tous les coins du pays se sont réunis lors d'Interaction '79, notre rencontre nationale annuelle afin de mieux planifier nos politiques. Au cours de cette réunion de deux jours, les participants ont réussi à passer en revue notre programme quinquennal actuel d'objectifs nationaux et à y ajouter des éléments. On a porté une attention particulière au domaine des communictions et M. Harry Basman a tracé les grandes lignes d'un programme provincial d'éducation du public. Les participants se sont aussi penchés sur la question de la participation des optométristes aux programmes de soins de la vue subventionnés par une tierce partie et des experts de l'American Optometric Association ont offert leurs conseils sur la façon de procéder dans ce domaine complexe.

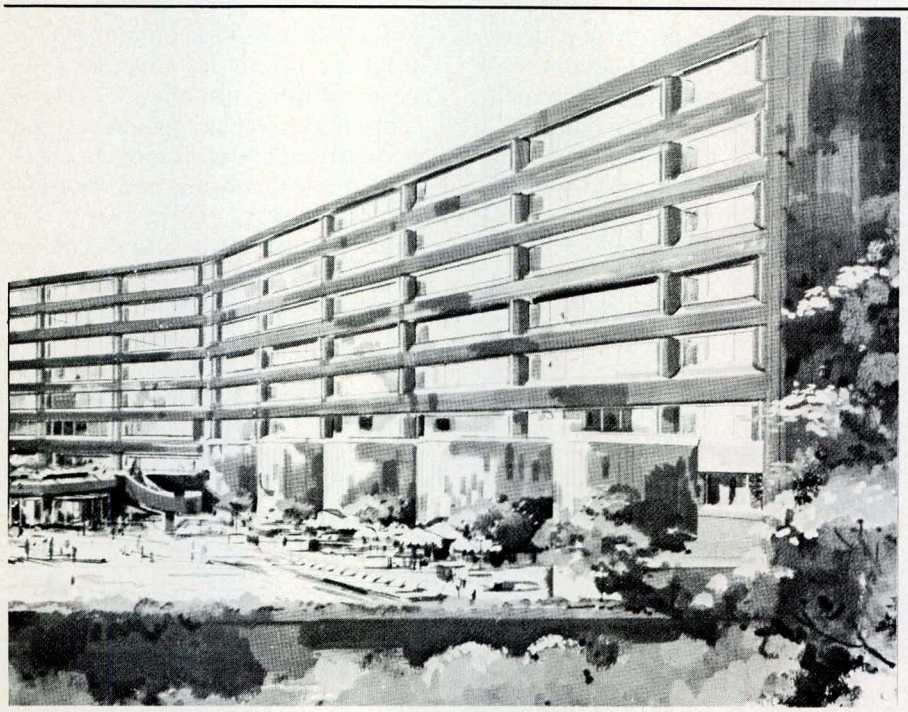
16e Congrès biennal

Notre Congrès à Edmonton en juillet dernier connut un énorme succès, et ce, grâce au travail inlassable des optométristes de l'Alberta et de leurs épouses qui ont consacré une si large partie de leur temps à aider l'ACO à organiser et à diriger la réunion. Plus de 230 optométristes ont participé au Congrès: le plus grand nombre d'optométriste canadiens jamais réunis à un Congrès de l'ACO.

Au total, près de 500 personnes ont participé à ce Congrès. L'ordre du jour comprenait un programme complet d'éducation permanente, ainsi qu'une réunion sur les affaires courantes de l'ACO. Cette réunion a d'ailleurs rassemblé un grand nombre de participants et de conférenciers invités tels M. Alvin Levin, président de l'American Optometric Association, et M. Richard Fraser, conseiller juridique de l'Association d'optométrie de l'Alberta. On a aussi soumis les rapports du personnel de direction et de l'administration de l'ACO.

Au cours du Congrès, nous avons eu l'occasion d'organiser d'autres réunions d'importance vitale pour les affaires de l'ACO, telles celles du Conseil national d'optométrie, du Fonds de fiducie, du Conseil de l'ACO, etc. Nous avons organisé un programme complet pour les 191 épouses et enfants présents. Au Congrès, on comptait 36 kiosques montés par les manufacturiers de produits ophtalmiques qui offraient un éventail complet de matériel et d'équipement d'optométrie.

Le programme social était bien planifié et offrait une foule d'activités: toute la famille pouvait profiter des nombreuses activités culturelles offertes par la ville d'Edmonton.



Nouvelle école d'optométrie

Dans ses négociations portant sur la création d'une troisième école d'optométrie dans l'ouest du pays, l'ACO s'est concentrée en 1979, sur la province de l'Alberta. Sous la présidence de M. Ken Armstrong, le Comité d'étude sur la nouvelle école d'optométrie, avec le concours de l'association des optométristes de l'Alberta, a étudié la possibilité d'établir cette nouvelle école à l'Université de Calgary. En plus de participer à plusieurs réunions avec des dirigeants de l'université et du gouvernement, le Comité s'est aussi chargé de sensibiliser le public sur la nécessité de créer une troisième école d'optométrie. A l'heure actuelle, le Comité attend de recevoir les résultats d'une étude effectuée par l'Université de Calgary portant sur le pojet. D'ici le milieu de 1980, on devrait savoir si l'université est intéressée à la nouvelle école.

Eclipse du soleil

Notre programme de relations publiques a connu un excellent départ en 1979. Le Bureau des relations publiques de l'ACO et les associations provinciales ont travaillé de concert afin d'attirer l'attention du public sur les dangers d'une observation directe de l'éclipse du soleil du 26 février sans prendre les précautions nécessaires. L'ACO et l'association du Manitoba ont distribué plus de 125,000 dépliants et affiches, et plusieurs gouvernements provinciaux


L'ÉCLIPSE DE SOLEIL DU 26 FÉVRIER 1979.

VOUS POURRIEZ DEVENIR AVEUGLE!

Le lundi 26 février 1979, la Lune passera entre la Terre et le Soleil, créant ainsi un éclipse de Soleil. Il s'agit là d'un événement exceptionnel.
PAR CONTRE, CETTE ÉCLIPSE PEUT VOUS RENDRE AVEUGLE SI VOUS L'OBSERVEZ DIRECTEMENT.

ON NE PEUT OBSERVER DIRECTEMENT UNE ÉCLIPSE SANS COURIR DE GRAVES DANGERS.

- Des verres teintés ou opaques protègent les yeux. FAUX
- Il n'y a aucun risque si l'on ne regarde que très brièvement. FAUX
- On peut sans danger observer l'éclipse en regardant entre les doigts ou à travers un trou d'épingle. FAUX

LES ENFANTS SONT LES PLUS EXPOSÉS.

- Surveillez vos enfants pendant toute la durée de l'éclipse. Assurez-vous que leur curiosité ne les pousse pas à mettre leur vue en danger.

IL EST POSSIBLE D'OBSERVER L'ÉCLIPSE EN TOUTE SÉCURITÉ.

- Suivez son déroulement à la télévision. L'image sera alors meilleure et vous ne courrez aucun danger.
- Fabriquez votre propre système de projection. Percez un trou de 3 à 5mm de diamètre au centre d'un carton d'environ 30cm carrés. Tenir le carton face au soleil. Une image claire et nette du Soleil apparaîtra alors sur toute surface blanche située à une distance comprise entre 2 et 6 mètres du carton.

CÉCITÉ CAUSÉE PAR UNE ÉCLIPSE

CAMPAGNE DE PRÉVENTION PRÉSENTÉE PAR L'ASSOCIATION CANADIENNE DES OPTOMÉTRISTES

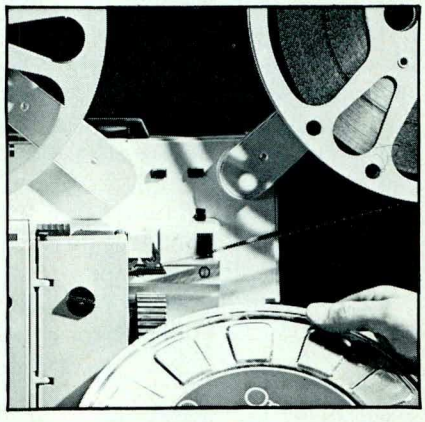
ont prêté leur concours. La Fédération canadienne des enseignants a distribué le communiqué de presse de l'ACO aux responsables de ses 14 publications et, lors d'une conférence de presse à Ottawa, le président de l'ACO, M. Roy Brown, a émis une mise en garde qui fut diffusée à l'échelle du pays. M. Brown fut aussi largement responsable de l'attention accordée à cette question par les média de sa province natale, le Manitoba.

L'ACO a assuré la distribution nationale de matériel audio-visuel et de messages publicitaires aux réseaux de télévision et aux postes de radio. De plus, nous avons accordé plusieurs entrevues à divers postes de radio. Nous avons aussi accordé des entrevues ou fourni des renseignements à des revues telles "Macleans" et "Canadian Magazine", à l'émission "Canada A.M." du réseau C.T.V. et à deux émissions du réseau anglais de Radio-Canada. L'A.P.O.Q. était responsable pour la plupart de notre matériel en français.

Malheureusement, en dépit de toutes ces mises en garde, l'enquête nationale menée par l'ACO sur les blessures aux yeux subies à la suite de l'éclipse du soleil a relevé 17 cas de rétinopathie. M. Brown a communiqué ces résultats aux reporters de la presse écrite, électronique et des services de dépêches lors du Congrès d'Edmonton en juillet dernier.

Messages télévisés et documentation

En 1979, l'ACO a continué a distribuer les messages d'intérêt public de 60 ou de 30 secondes pour la télévision selon les besoins; nous avons commandé plusieurs douzaines de films pour remplacer ceux en mauvais état. En général, on estime que le temps d'antenne donné gratuitement par les média électroniques représente des centaines de milliers de dollars. Les messages ainsi diffusés durant les heures de pointe portaient sur les soins de la vue et étaient destinés aux auditeurs canadiens. Le Bureau des relations publiques du Manitoba rapporte que le temps d'écoute consacré à notre message représente plus de $100,000 et un poste de télévision de Montréal nous a gracieusement consacré plus de $75,000 de son temps d'antenne. En 1979, le Conseil a approuvé l'allocation de $4,480 pour le montage des messages de 30 secon-



des à partir de nos films de 60 secondes, afin d'offrir aux divers réseaux des variations sur notre thème actuel. Le résultat de ce montage sera diffusé cette année.

Cette année, l'ACO a fait parvenir plusieurs milliers de dépliants au public, aux enseignents, aux infirmières et aux étudiants. Nous avons aussi pris des mesures pour mettre à jour et renouveller nos dépliants pour 1980 et, avec notre nouvelle documentation, nous visons à rejoindre les parents, les enseignants, les adultes plus âgés et les porteurs de lentilles cornéennes.

Communiqués de presse

Au cours de l'année, l'ACO a réussi à faire ressortir l'importance des soins de la vue dispensés par un optométriste, grâce à une série d'entrevues et de communiqués de presse. En février 1979, le président, M. Brown, a discuté avec un reporter du Service des dépêches de la Presse canadienne à Ottawa et, par la suite, trois reportages sur les soins de la vue furent distribués dans tout le pays.

Le communiqué de presse de l'ACO sur la vue chez les enfants, publié en 1978, a continué de susciter l'intérêt et il fut reproduit dans la revue "Canadian Consumer", tirée à 100,000 exemplaires. Il fut aussi reproduit dans une revue australienne sur la consommation. Au cours de l'automne 1979, nous avons distribué un communiqué sur la vue chez les enfants à toutes les associations provinciales d'optométrie pour compléter les informations contenues dans des annonces-éclairs diffusées à la radio. Nous avons aussi distribué le communiqué, accompagné d'une photo de M. Huber, qui est d'ailleurs cité dans le texte, aux 14 publications de la Fédération canadienne des enseignants, forte de 220,000 membres. Dans le communiqué, on offrait gratuitement un dépliant sur les troubles visuels et, cette année encore, il y eut une forte demande de documentation.

L'élection de M. Hervé Landry au poste de vice-président et de M. Reid MacDuff au poste de trésorier fut rendue publique dans les provinces du Nouveau-Brunswick, de la Nouvelle-Ecosse et de Terre-Neuve.

En novembre 1979, nous avons établi un programme de communiqués de presse pour 1980, auquel participeront toutes les associations provinciales. En décembre, nous avons distribué le premier communiqué; il portait sur la Semaine des non-fumeurs qui se tenait du 20 au 26 janvier.

Publicité sur le Congrès

Afin d'améliorer nos relations avec le public, nous nous sommes efforcés de saisir l'occasion qui nous était offerte par la tenue du Congrès de 1979 à Edmonton. A cette fin, le Bureau des relations publiques a organisé des entrevues avec 16 optométristes. Les média d'Edmonton ont participé avec coeur et ont publié des reportages portant entre autres sur la vue dans le milieu de travail, des conseils sur les lunettes, la vue et le sport, l'éclairage fluorescent, le Conseil national d'optométrie, l'examen complet de la vue, la fatigue des yeux et les écrans cathodiques, la vue chez les enfants, les lentilles cornéennes et le dépistage des troubles visuels. Plusieurs de ces reportages furent diffusés à l'échelle nationale.

La principale conférence de presse a porté sur la question de la nécessité d'établir une nouvelle école d'optométrie. Les média de l'Ouest canadien ont consacré d'excellents reportages à la pénurie grandissante d'optométristes, sujet abordé par M. Brown, M. Campbell et M. Armstrong.

La participation de M. Brown et M. Armstrong à l'émission de ligne ouverte animée par Ron Collister représentait l'étape suivante du programme de l'ACO. Ils ont su profiter de l'occasion pour souligner la nécessité d'une troisième école d'optométrie. Ils discutèrent ensuite des problèmes de la vue avec les auditeurs pendant deux heures. M. Collister, qui est aussi rédacteur en chef du Edmonton Sun, a ensuite publié un éditorial appuyant fortement la création d'une nouvelle école.

Enfin, nous avons fait en sorte que la date de publication des communiqués de presse sur l'élection de Jack Huber au poste de président de l'ACO et sur la remise du "President's Award" à William Lyle coincident avec la tenue du Congrès.

Rapports avec le public

Quatre optométristes ont représenté l'ACO et l'A.P.O.Q. devant les 700 délégués présents à la conférence du Conseil canadien de la sécurité tenue à Québec en septembre 1979. Trois d'entre eux ont pris la parole lors de la présentation de la Section de la sécurité routière sur la vision et la conduite, tandis que le quatrième jouait le rôle de président d'assemblé. Notre profession fut représentée par deux optométristes lors de la Conférence de l'Association québécoise pour les enfants ayant des troubles d'apprentissage.

L'ACO a aussi prêté main forte aux optométristes d'Ottawa et de Toronto lors de plusieurs expositions publiques portant sur la santé. Au cours de l'année, le personnel de l'ACO à Ottawa reçoit des centaines d'appels du public.

En outre, lors du Congrès d'Edmonton, le coordonnateur des relations publiques a présidé un colloque spécial sur les relations publiques visant à réunir les représentants provinciaux des relations publiques afin de discuter de techniques et de coordonner les activités.

Association canadienne d'hygiène publique

En 1979, dans le cadre de notre programme continu de relations publiques, nous avons maintenu nos rapports avec l'Association canadienne d'hygiène publique. Nous avons soumis entre autres un résumé expliquant pourquoi l'Association devrait inviter un conférencier de l'ACO à sa réunion annuelle de 1980 et nous avons pris des dispositions pour le montage d'un kiosque d'information sur l'optométrie.

Autres réunions

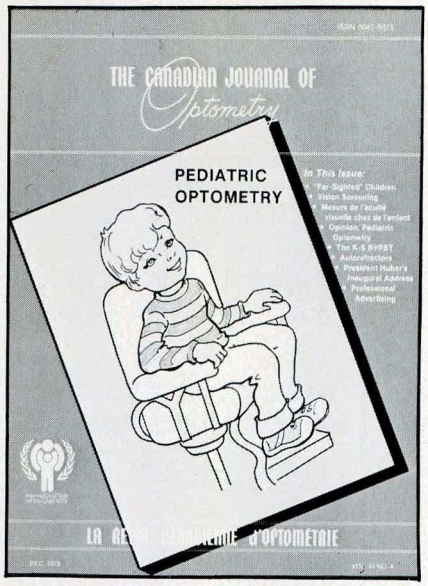
En 1979, les représentants de l'ACO ont assisté aux réunions suivantes:

Congrès de l'American Optometric Association, (M. Roy Brown);

Saskatchewan Optometric Association, Manitoba Optometric Society, British Columbia Optometric Association, (M. Jack Huber);

New Brunswick Optometrical Society, Nova Scotia Optometrical Association, Alberta Optometric Association, (M. Roy Brown).

Revue canadienne d'optométrie



En 1979, nous avons apporté de nombreuses améliorations à la Revue canadienne d'optométrie et les revenus de publicité ont triplé. Nous avons consacré plusieurs numéros à des thèmes particuliers tels: les lentilles cornéennes, la vision chez l'enfant, et un résumé du Congrès. La Revue continue à montrer ni profit ni perte tout en cherchant toujours à améliorer son contenu. Il ressort nettement que la Revue est un outil de relations publiques, lorsqu'on considère que des exemplaires sont envoyés à tous les ministres de la santé du pays et sont souvent distribués aux journalistes, aux administrateurs, aux autres professionnels de la santé et aux fonctionnaires. L'association des optométristes de Colombie-Britannique a envoyé un exemplaire de notre numéro sur les soins visuels publié de concert avec la Revue canadienne de santé publique à tous les députés provinciaux et, en 1980, des exemplaires seront distribués à tous les bureaux régionaux de l'I.N.C.A.

SOFT CONTACT LENSES AND SOLUTIONS IN CANADA

H.D.E. Inns*

Abstract

Factual background information is provided on hydrophylic lens polymers and the changes in lens parameters when a change is made in the temperature, tonicity or pH of the solution they are immersed in. Cleaning and disinfection are discussed under three headings. 1) Cleaning: a) surfactants b) oxidizing agents c) enzyme cleaners; 2) Heat disinfection: 3) Chemical disinfection: a) antimicrobial substances b) oxidative substances. Tables list details of the available lenses, the systems, the salines, the surfactants, the chemical disinfectants, the extra cleaners and the ocular lubricants.

Abrégé

Ce travail discute des caractéristiques de polymères utilisés dans la confection de lentilles hydrophiles et des variantes dans leurs spécifications dues à des changements de la température, de la tonicité et du pH des solutions dans lesquelles elles sont immersées. Le nettoyage et la désinfection sont abordés sous les entêtes; 1) Nettoyage: a) détergents de surface b) agents d'oxydation c) les enzymes; 2) Désinfection thermale; 3) Désinfection chimique; a) substances microbicides b) substances oxydantes. Les tables présentent les détails des différentes lentilles disponibles, des systèmes d'hygiène, des solutions salines, des détergents de surface, des microbicides chimiques, de nettoyeurs spécifiques et des substances lubrifiantes.

The purpose of this paper is to provide a list of soft (hydrophilic) contact lenses available in Canada, along with the manufacturer's suggested disinfection systems. Hopefully, practitioners will be able to refer to the following tables to gain information on the many new contact lenses and solutions that are now available

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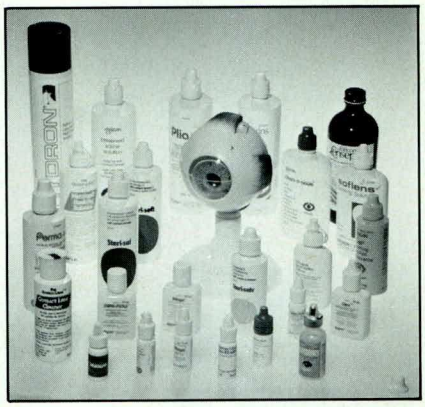

An effort has been made to include all the lenses and solutions available at the present time, however some might have been missed for which I apologize to the manufacturer. I plan to write a follow-up paper at a later date and would appreciate receiving information on any products that have been left out and on new products as they are developed.

The first part of this paper is provided as background information on the polymers from which contact lenses are made, and how their dimensions can vary with the properties of the solutions they are immersed in. The second section of the paper deals with the disinfection of contact lenses and the problems that can arise when using contact lens solutions. For an in depth study of the subject the reader is referred to the reference material listed at the end of the paper.

Polymers

Polymers are possible because of the ability of certain atoms to bond together to form stable covalent bonds. The polymers we are concerned with fall within the area of organic chemistry, or the chemistry of carbon compounds. This is due to the ability of the carbon atom (C) to link together with four other atoms of its own kind or with other atoms such as hydrogen (H), oxygen (O), nitrogen (N), sulphur (S), or chlorine (Cl). Thus long polymer chains are formed from monomers as the name (Poly-mer) suggests (from the Greek root meaning "many parts"). The name of the polymer comes from the chemical group repeating itself in th chain, eg. — Poly(ethylene), Poly(vinyl chloride), Poly(methyl methacrylate).

Individual polymer chains can be made to become entangled with their neighbours and also to "cross link" at intervals, forming a network. The frequency at which the cross linkages occur can be varied by the manufacturing technique and is called the "cross-link density". A large number of cross links will restrict deformability of the plastic. For good elastic behaviour a polymer chain must be mobile enough to change positions when a deforming force is applied to a piece of the plastic material and yet it must have enough restraining cross links to return to its original position when the force is removed.

By changing the chemical constituents and arrangements in a polymer chain the mobility of the chains can be changed to obtain flexible, or at the other extreme, hard glassy behaviour. Also as the temperature is raised the kinetic energy of the systems increases and the chains obtain greater mobility becoming rubbery at what is known as the "glass-rubber" transition temperature (Tg).[1]

Another way to separate the polymer chains, allowing them to move more freely is to add a mobile component, usually an organic liquid having a high boiling point to act as a plasticiser.[2] When water is used as a plasticiser it behaves as an "internal lubricant" allowing the chains to move more freely.

Materials Used in Hydrophilic Contact Lenses

The polymers used in the manufacture of hydrophilic lenses have been divided into three groups by Cordrey.[3]

Group A: Those materials derived from HEMA. Examples: B & L Soflens®, and Hydron®.

Group B.: Those materials derived from copolymerization using HEMA as one comonomer. Examples: Hydrocurve® and Softcon®.
Group C: Those materials containing the pyrrolidone ring, not HEMA, as a major hydrophilic unit. Example: Sauflon®.

Hathaway and Lowther (1978) state that lenses in group A, made of HEMA, attract and hold not only water but also charged organic molecules and ions such as protein, lipids, calcium and iron, which may lead to deposit build up.[4]

In Group B another monomer is mixed with HEMA and many of the original reactive sites may become occupied by the different monomers present, so that fewer sites are available for binding with tear components. Lenses in Group B are therefore less prone to deposit formation.

The lenses in Group C have as their major hydrophilic unit the pyrrolidone ring, not HEMA, and the side groups of that pyrrolidone ring may serve to block the reactive sites prone to binding organic tear constituents, and so deposits on this type of material are not common.

Three classes of hydrophilic contact lens materials classified according to their water content have been suggested by Pedley and Tighe.[5]

Class 1: HEMA plus a small amount of a non-hydrophilic monomer, giving lenses with a water content below 40%.

Class 2: HEMA (as above, but with a difference in the type and extent of the cross-linking and the technique of polymerization). These behave in substantially the same manner, the main differences being a question of lens design.

Class 3: Major hydrophilic unit not HEMA — usually vinyl pyrollidone, which is more hydrophilic than HEMA, to give a water content higher than 40%.

Water Content of Hydrophilic Contact Lenses

With polyhydroxyethylmethacrylate (HEMA) the plastic is made more hydrophilic by the presence of hydroxyl groups (OH). The majority of these OH groups are not bound, so that HEMA has a high water uptake, but it also shows a high polarity and chemical reactivity. This is a drawback when other reactive substances such as tear components come into contact with it. Deposits tend to accumulate on the surface of this plastic and become incorporated into its molecular structure.[6] With HEMA contact lenses these deposits must be removed or ocular irritation will occur.

According to Johnson, Nygren and Sjogren (1978) the water content of the material can be divided into two categories:[7]
Category 1: Water strongly bound to the polymer. In order for this water to leave the polar OH locals, high heat and a vacuum are required.
Category 2: Free water which is located in the space between the bound water and the polymer structure.

Johnson, Nygren and Sjogren state that substances dissolved in the free water can diffuse through the plastic and, if the correct charging conditions exist, can become bound to the polymer. They also state that while pores of up to 35 Å do occur in HEMA material, the pore size is normally 5-10 Å which limits the diffusion of substances to a certain size.

Holly and Refojo (1972) have shown that the higher the water content of a polymer the higher the oxygen permeability.[8] However as a contact lens becomes more hydrophilic and more flexible it also becomes more susceptible to tearing for a given thickness due to a lower modulus of elasticity. This occurs because water acts as a plasticiser, separating the polymer chains and reducing their cohesion.[9]

Depending on their chemical construction, the water content of hydrophilic lenses varies with the temperature, tonicity and pH of the hydrating solution they are immersed in.

Temperature

As the temperature of the hydrating solution is raised from a room temperature of 22 degrees centigrade to 40-50 degrees centigrade, the water content of a hydrophylic lens can decrease by as much as 20%; this is then followed by an increase in water content.[9a] High water content lenses can therefore decrease in water content by as much as 20% when taken from the storage solution at room temperature and are placed on the eye at a body temperature of around 35.7 degrees centigrade.

Tonicity

The addition of sodium chloride to water reduces the bonding and the water content is reduced. The normal osmotic pressure of tears is equivalent to that of 0.9% sodium chloride, about the same as Plasma, or intravenous saline.[10] A hypotonic solution has less sodium chloride and a hypertonic solution has more sodium chloride. As the concentration of sodium chloride increases in a hydrophilic lens, (hypertonic) the water content drops and the lens changes in dimension, becoming smaller.[11] Lenses are larger in a hypotonic solution and smaller in a hypertonic solution, as compared to an isotonic solution.[11a] There is a significant increase in the water content of a lens when it is changed from an isotonic saline solution and placed in a hypotonic distilled water solution, and as shown above, the lens swells, becoming larger. This can aid in purging a lens when it is being cleaned. Also a lens can become larger and tighter on the eye when swimming in fresh water pools. A lens rinsed in tap water will also be larger and tighter than normal.

pH

The hydrogen ion concentration is called pH. A pH of 7.0 is neutral, a pH greater than 7.0 is basic and a pH less than 7.0 is acidic. Seiderman (1972) stated that there is a greater degree of swelling of a lens in a basic solution and a lesser degree of swelling in an acidic solution.[12] If a lens is in a solution which has a pH of less than 7.0 then it is smaller in diameter and shorter in radius and higher in power, and on the other hand if the solution has a pH of more than 7.0 the lens will be larger in diameter, longer in radius and lower in power. When the parameters of a lens are being measured or stated, we must know the pH and tonicity

and temperature of the solution the lens is being stored in.

It is important to keep lenses in a solution that has the same approximate pH (and tonicity) as a patient's tears, so that there is less equilibrating for the lens to do in the first few minutes on the eye. Carney and Hill found tears to be mildly alkaline with an average pH of 7.4.[13] Lenses therefore should be kept in a solution with a pH of 7.4, however R.M. Hill found an "acidward drift" in the solutions of stored lenses.[14] He felt that this could be one cause of a stinging or burning sensation when some new lenses are placed on the eye. In practice it may be wise to change overaged solutions when necessary. Dr. Hill felt that the pH level could also be brought back nearly to the level of tears by heating the capped vials to drive out the carbon dioxide, which had permeated in through the silicone stopper.

R.A. Koetting, Craig Andrews and R.R. Koetting found an alkaline shift in the tears of hydrogel lens wearers in a period from two to 24 months.[15] (Hard lenses produced the opposite effect.) As shown previously, an alkaline shift causes a lens to be larger in diameter and therefore to fit tighter than previously. Lenses therefore can tighten over a period of months due to a change in the tears and so the fit should be monitored at regular intervals.

Hydrophilic Lens in Solution

Hypertonic Solution and/or **pH less than 7.0**	**Hypotonic Solution** and/or **pH greater than 7.0**
Smaller Diameter	Larger Diameter
Shorter Radius	Longer Radius
Higher Power	Lower Power

Cleaning and Disinfection of Contact Lenses

This will be discussed under three headings:

(1) Cleaning (a) surfactants (b) oxidizing agents (c) enzyme cleaners.
(2) Heat disinfection
(3) Chemical disinfection: (a) Antimicrobial substances (b) Oxidative substances

(1) Cleaning

(a) Surfactants

The purpose of a surfactant cleaner is to mobilize, emulsify and remove proteins and other material from the lens surface. Its daily use is prophylactic, that is to prevent deposit formation rather than, as an after-the-fact cleaner, to remove built up deposits. The cleaning properties of a surfactant depend on its ability to lower the surface tension of the oil-water or solid-water interface.[16] Usually it is of a medium viscosity to protect the lens surface from rubbing frictional forces.[4a] It also should be of a high molecular weight to prevent molecules from entering the pores of the lens.[4b]

Some solutions, such as Steri-soft, are made slightly hypertonic in the hope that any contaminants which have been absorbed will be drawn out by the osmotic pressure differential.[17] Also solutions may be made somewhat alkaline so as to maximize protein removal.[17a] Softmate® and Pliagel® are well known examples of surfactant cleaners.

A new surfactant cleaner called Miraflow, has recently been introduced by Cooper Pharmaceuticals. It contains the same high molecular detergents as Pliagel (poloxamer 407). In addition, it also contains a solvent, isopropyl alcohol, which acts as an additional cleaner to take off the highly lipid and proteinaceous deposits, and therefore, the cleaning action is said to be better than using Pliagel alone.[18] The Miraflow cleaner can be used for any type of lens currently on the market: hard, soft, extended wear, CAB, and silicone lenses.[18a] With soft lenses, however, the alcohol enters the plastic and after cleaning with Miraflow, the solution must be thoroughly washed off and the soft contact lens left in a saline such as Pliasol so that all of the isopropyl alcohol will come out of the lens.[18b]

(b) Oxidizing Agents

These agents are for removing previously formed deposits and they act by oxidizing the structure of the accumulated protein deposits.[4c] They work most efficiently when used in conjunction with heat, but the cleaning must be controlled at a safe level to prevent destructive changes from occuring in the lens polymer. The lens must be made non-toxic after cleaning and the manufacturers directions should be followed carefully.

A recent addition is Liprofin, which is an intensive cleaner to be used only by the contact lens practitioner. At a temperature of 60°C it releases oxygen that is chemically highly reactive and which breaks down organic deposits by oxidation. Kreiner (1978) stated that Liprofin is able to remove lipids and mucins from hydrophilic lenses as well as having a very strong antimicrobial effect.[19]

(c) Enzyme Cleaners

Papain (as used in meat tenderizers) is the enzyme usually used in this type of cleaner. It acts by hydrolyzing the peptide linkages of the denatured protein on the lens surface,[4d] Unfortunately, it has little or no action against lipids, waxes, and cosmetic contaminants, etc.[17b]

A great drawback to this cleaner is the danger of ocular sensitization to the papain with potentially injurious effects. Phillips states that it should be used only once every seven days and the instructions for overnight cleaning and rinsing must be carefully observed.[17c] However, Hathaway and Lowther quote a study by Rudko which showed no sensitizing effects with the enzyme used in the Allergan Enzyme cleaning system.[4e]

Studies by Hathaway and Lowther showed that both (b) (Ren-O-Gel oxidizing agent) and (c) (Allergan enzyme) had about equal ability to remove deposits, but that the Allergan "at home" system was easier to use and took less time than the "in office" Ren-O-Gel system.[20] They also stated that the enzyme cleaner has been shown to have no deleterious effects on the lens polymer, whereas the oxidizing agents like those in Ren-O-Gel may react with the basic polymeric chain, with the introduction of pH sensitive molecular groups. They quote Erickson who found that protein deposition is often enhanced by the oxidative system, thus increasing the rate of further deposition subsequent to the initial cleaning.[4f] Ren-O-Gel is properly viewed as a last resort approach to thorough cleaning when nothing else works.

(2) Heat Disinfection

A number of heating units are available in which the temperature reached inside the lens case is typically around 96°C.[21] The temperature is held there for 20 minutes, and then the case containing the lenses in saline, is allowed to cool off.

Phillip states that the physical requirement for disinfection is 80°C for 10 minutes and that total sterility is only achieved by autoclaving for 15 minutes at 120°C and 15 lbs. per. sq. in. pressure.[21a] He lists a number of disadvantages to heat disinfection which I have summarized as follows:

(1) There is a fairly high risk of micro-organism build up if the procedure is not carried out daily and fresh saline prepared daily (Brown, Bloomfield, Pearce and Tragakis, 1974).

(2) Certain bacterial spores may survive and cause lens damage if the heating is not carried out daily to destroy vegetative forms of the organism.

(3) Some units use saline which does not contain a preservative, so there is a slight risk of micro--organisms being transferred on to the lens from the fingers.

(4) Repeated heating may cause slow degradation of the polymer structure, reducing lens life, and this may be more noticeable with one lens material than with another.

(5) Micro-proteins on the lens surface become coagulated or denatured and the film thus formed may cause lens discomfort, and loss of transparency. There may be loss of acuity and a conjunctival injection and possibly a change in lens fitting. Lens porosity may be reduced, aiding in the formation of corneal edema.

Callender and Lutzi (1978) compared the clinical findings of Soflens® wearers using thermal and cold disinfecting procedures, and they found that more patients developed problems using the thermal disinfection method.[22]

(3) Chemical Disinfection

There are two groups of preparations with a bacteriocidal effect used to disinfect contact lenses, (a) Antimicrobial Agents and (b) Oxidative Agents.

(a) Antimicrobial Agents (Preservatives)

The term "preservative" refers to a compound which is incorporated into a solution to prevent contamination by micro-organisms. It is said to have "cidal" action if the organism is killed and "static" action if the growth of organisms is prevented. A prefix is used to denote a specific effect on bacteria, fungi or yeast. If a preservative is effective in killing bacteria but only inhibits the growth of fungi, it is said to be bactericidal and fungistatic in action.[23] Bacteriostatic agents by themselves cannot disinfect, but are used in contact lens solutions for disinfection by combining with other antibacterials. The most common combinations are chlorhexidine, thimerosal, and EDTA. Chlorhexidine is the more effective of these but has poor fungicidal activity, whereas thimerosal is slower acting but is more effective as an anti-fungal agent. EDTA (ethylene diamine tetra acetic acid) enhances the bactericidal effect, and may also prevent calcium salts from forming lens deposits. Its own antibacterial effect is minimal but it acts by chelating-forming complexes with certain metals, notably calcium.[24]

While these substances are effective in disinfecting the lens, they have some less desirable effects. Some of the disinfectant molecules diffuse into the contact lens due to the pores of the lens, the water content, and the charge of the lens material.[25] Callender and Lutzi (1979) stated that early papers mentioned possible hazards of ocular irritation from the slow release of bound chemicals concentrated in the gel material. However they state that studies have shown that the concentrations of antimicrobial agents in commercially available solutions are safe. They also say that there is no agreement amongst clinical investigators on the incidence of adverse reactions to some formulations of chemical disinfectants for soft lenses.

Johnsson, Nygren and Sjogren (1978) stated that the storing of thiomersal reaches equilibrum after the lens has been in the solution for one hour, but that chlorhexidine continues to be stored up even after 24 hours and at a constantly increasing concentration.[7] They quote a study by Sibley and Young (1973) that showed that Thiomersal is not actively bound to the lens material and so it leaves the lens, which rests on the eye in contact with the tear liquid, just as rapidly as it was stored up. They quote a study by Refojo (1976) which said that Chlorhexidine leaks very slowly from the lens and thereby exposes the tissues of the eye to a certain influence (although at a sinking concentration) during the time that elapses until the next disinfection.

Due to electrostatic forces, chlorhexidine becomes weakly bound to a clean lens surface (Sibley, 1973).[26] However, it binds very effectively to protein deposits on the lens surface, and this increased concentration of preservatives can cause ocular discomfort, as the contaminants build up (Hind and Goyan, 1947).[27] Lens surfaces should therefore be kept as clean as possible.

While the nature of hydrophilic lenses is to absorb aqueous solutions, there may also be an adhesion of molecules to the lens surface, known as adsorption (from the Latin *ad* + *sorbere* — to suck in). Soft lens solutions should not contain preservatives that adsorb or complex with molecules on the lens surface, as they will then be concentrated on the surface and in these higher concentrations can cause damage to the corneal epithelial cells. Many hard lens solutions contain preservatives that bind strongly to hydrogel lenses and this is why they should not be used with soft lenses. An example is Benzalkonium Chloride which is widely used in ophthalmic solutions but is harmful to eye tissues when concentrated in soft lens materials.

While the lens is on the eye, the mucin in the tear fluid is adsorbed onto the surface of the lens in the same way that it is adsorbed on to the corneal epithelium. Phillips (1977) states that mucin and other tear proteins such as lysozyme remain in their natural state when attached to the soft lens surface in the eye, and there is not an excessive protein build-up.[28] However, daily removal of the lens results, in time, with the denaturing of adsorbed proteins. This occurs slowly with certain cold sterilizing solutions and more rapidly with boiling. Lipid secretions from the meibomian glands can also bind to the lens surface for-

ming a hard to remove lipo-protein film which may serve as a growth medium for bacteria and fungus. Other contaminants may be present in either the ad-or absorbed state such as environmental pollutants, chemical vapours, cosmetic ingredients, nicotine, and oil and dirt from the fingers.[29] Storage cases must be kept clean and storage solution volume must be sufficient to allow adequate diffusion and dilution of contaminants into the solution. Also daily changing of the solution is a must.

A study by Johnson, Nygren and Sjogren showed a significant effect on lysozyme by chlorhexidine in a concentration of 0.005%.[7] Thimerosal at a concentration of 0.001% left the lysozyme enzyme intact. They were unable to prove the significance of these results as the level of lysozyme in the tear fluid varies from one person to another and also the concentration of the disinfectant discharged from the lens into the tear layer may vary.

The question arises as to whether a lens leaching a disinfectant against the eye can upset the natural protective mechanism of the eye, due to a change in the normal eye flora, and from disturbed lysozyme activity. The eye's own defense mechanism against infection may be affected, and a number of functions important to the eye may be influenced.

(b) Oxidative Agents

These must be inactivated after the disinfection is concluded and before the lens is worn on the eye:

(1) Hydrogen Peroxide 3% was the first method of chemical disinfection, being introduced by Isen in 1972.[30] Originally lenses were soaked for five minutes in 3% peroxide and the resulting high acidity was then neutralized by soaking the lenses for 15 minutes in a mixture of 0.5% sodium bicarbonate (tablet) dissolved in a 0.9% sodium chloride solution.[31] Lenses were stored overnight in isotonic saline. Janoff states that this is very effective as a method of disinfection.[32] Tregakis, Brown and Pearce reported in 1973 that the procedure killed a variety of organisms on lenses including the fungus aspergillus fumagatus.[33] Inns presented details of studies done in the Warner-Lambert microbiology laboratory showing a high kill rate on lenses purposely contaminated with pathogens specified by the F.D.A. (U.S.A.).[34] In the original method, problems arose because all of the sodium bicarbonate tablet did not dissolve, leaving residual particulate material on the lens. Also much of the rinsing sodium chloride solution was not sterile, being made by the patient or the local pharmacy. The hydrogen peroxide was said to be ineffective if kept in plastic containers or if exposed to light or to the atmosphere (Charles, 1975).[35] Another problem was the danger of omitting the sodium bicarbonate neutralizing procedure. The Septicon System manufactured by Warner-Lambert has eliminated the above mentioned problems.[36] Highly controlled manufacturing procedures produce a relatively stable 3% peroxide, named Lensept®. Dark brown glass bottles eliminate the "exposure to light" problem. After soaking for 10 minutes in the Lensept solution the hydrophilic contact lenses are transferred to the Lensrins (sterile buffered saline) cup. This cup contains a Septicon disc—a catalyst which decomposes the Lensept (peroxide) to water and oxygen in approximately six hours. The Lensrins quality is highly controlled to give a sterile buffered saline with a pH to match that of the tears. Besides killing organisms on the surface of the lens, the peroxide also cleans the lens surface, due to the physical expansion of the lens while in Lensept. As the surface expands anything adhering to the surface tends to be flaked off. The lens returns back to the correct size when placed back in the Lensrins saline. This flexing action keeps the lens pliable and soft. Lenses do not yellow as peroxide is a bleach. An important feature is that residues of the disinfection system do not build up in or on the soft lens, as the peroxide is reduced to water and oxygen.

Lensrins however contains thimerosal and so for those patients who may be sensitive to it, a substitute may be made by using Pliasol®. This does not contain thimerosal or chlorhexidine and so is relatively free of a sensitization potential. Fresh unpreserved buffered saline such as that by Hydron or Unisol would also be an adequate equilibration medium after peroxide exposure except that sterility is compromised. In this case, the Lensrins cup containing the catalyst should be periodically rinsed with hydrogen peroxide, to prevent the growth of bacteria, and it should not be used for intermittent storage during the day with the unpreserved saline.

(2) Iodine is prepared in the form of an iodophor, in an isotonic polymeric vehicle, in order to stabilize the free iodine. (Pliacide®—Nutraflow® Kit). The addition of the neutralizing medium which itself has been preserved with sorbic acid, EDTA and sodium borate, reduces the iodine to the iodine ion. Neutralization takes about two hours and the solution becomes colourless which indicates that the lenses can now be worn. Phillips (1977) reported that there appears to be no binding effect of the preservative, although he quotes Stone (1976) as reporting stinging if the product is used on old and probably contaminated lenses.[37] Although the system is not as convenient as other systems, it does offer flexibility, excellent disinfectant action and a colour indicator which tells the patient when the lenses have been disinfected.

Other Additives to Contact Lens Solutions

1. EDTA to increase the effect of antibacterial substances.
2. Buffer systems to bring the pH of the solution close to that of the tears.
3. Water soluable Polyvinyl alcohol to increase the wetting capacity and consistency of the solution.
4. Salts to make the solution Isotonic.

Acknowledgment

I wish to thank Dr. Scott MacKenzie, for his assistance in the preparation of the tables of solutions and lenses.

TABLE 1: THE LENSES

Lens Name	Manufacturer	Polymer	Polymer Name	Production Method	Hydration	Recommended* Cleaner	Recommended* Disinfection	Recommended* Storage	Compatible With Enzymatic Cleaners
Soflens	Bausch & Lomb	HEMA	Polymacon	Spin cast	38.6%	Surfactant (Soflens soaking solution)	Heat: B&L Aseptron Chemical: Hydrocare or Soflens Cleaning & Soaking Solution)	Saline (Soflens soaking solution)	Yes
Aquaflex	Union Optics	HEMA/ NVP/ MMA	Tetra-(filcon) A	Lathed	42.5%	Surfactant (Preflex)	Heat/ Chemical (Flexsol)	Saline Flexsol)	No
AO-Soft	American Optical	HEMA/ NVP/ MMA	Tetra-filcon A	Lathed	42.5%	Surfactant (Preflex)	Heat/ Chemical (Flexsol)	Saline (Flexsol)	No
A1-47 (Alden)	Alden Labs	HEMA/ MA NVP	NA	Lathed	36.5%	Surfactant	Heat or Chemical	Saline	Yes
Durasoft**	Wessley-Jensen	HEMA/ Compoly-mer	Phemecol	Lathed	30.0%	Surfactant	Heat or Chemical	Saline Chemical	Yes
Hydron**	National Patent	HEMA	Polymacon	Lathed	38.6%	Surfactant	Heat or Chemical	Saline	
Softcon	American Optical	HEMA/ PVP	Vifilcon A	Lathed	57.5%	Surfactant (Softcon Lens Cleaner)	Chemical: Lensept (Hydrogen Peroxide)	Saline (Lensrins)	Yes
Sauflon-70**	Medical Optics	NVP/ MMA	Lidofilcon A	Lathed	70.0%	Surfactant (Sterisolv)	Heat or chemical	Saline (Sterisoft, Sterisal)	Yes
Sauflon PW	Medical Optics	NVP/ MMA	Lidofilcon A	Lathed	79.0%	Surfactant (Sterisolv)	Chemical	Saline (Sterisal, Sterisoft)	Yes
Hydrocurve II	Soft Lenses Inc.	HEMA/ acrylamide	Bufilcon A	Lathed	46.0%	Surfactant (Preflex)	Heat or Chemical (Flexsol)	Saline (Flexsol)	Yes
Naturvue**	Milton Roy (now B&L)	HEMA/ NVP	Hefilcon A	Lathed	46.0%	Sufactant (Preflex)	Heat or Chemical (Flexsol)	Saline (Flexsol)	Yes
Permalens	Cooper	HEMA/ NVP MA/NVP	Perfilcon A	Lathed	71.0%	Surfactant (Pliagel-Miraflow)	Chemical	Saline (Permasol-Pliasol)	Yes (Lipofrin)
Ultrathin	Bausch & Lomb	HEMA	Polymacon	Spin cast	38.6%	Surfactant (Soflens soaking solution)	Heat: Aseptron Chemical (Soflens complete care system)	Saline (Soflens soaking solution)	Yes
N & N #515**	N & N Optical	HEMA polymer	NA (Material by Toyo)	Lathed	35.6%	Surfactant (Preflex-Pliagel)	Heat or Chemical	Saline (Flexsol)	Yes
N & N #1500**	N & N Optical	HEMA polymer	NA (Material by Toyo)	Lathed	29.0%	Surfactant (Preflex-Pliagel)	Heat or Chemical	Saline (Flexsol)	Yes
M-79**	N & N Optical	HEMA polymer	NA (Material by Toyo)	Lathed	37.0%	Surfactant (Preflex-Pliagel)	Heat or Chemical	Saline (Flexsol)	Yes

* Manufacturer's recommendation
* *Available in toric lenses

TABLE 1: THE LENSES

Lens Name	Manufacturer	Polymer	Polymer Name	Production Method	Hydration	Recommended* Cleaner	Recommended* Disinfection	Recommended* Storage	Compatible With Enzymatic Cleaners
Weicon** ***	P.C.L.	pHEMA	NA	Lathed	40.0%	Surfactant	Heat or Chemical	Saline	Yes
TC-75	Kelvin Contact Lenses	poly-HEMA	None as yet	Lathed	70-80%	Surfactant (Hydroclean)	Chemical	Saline (Hydrosoak)	No
TC-50	Kelvin Contact	poly-HEMA	None as yet	Lathed	50%	Surfactant (Hydroclean)	Chemical	Saline (Hydrosoak)	No
Freflex 60** ***	Freflex Canada	HEMA/MA	None?	Lathed	60%	Surfactant	Chemical	Septicon System or any soft lens solution	Yes
Contaflex	Canadian Contact Lens Company	Random Copolymer (HEMAR EDTA)	None as yet	Lathed	42%	Hydrosoak Autoclaving Boiling or any soft lens solution	Any soft lens cleaner	Any soft lens solution	Yes
Contaflex	Canadian Contact Lens Company	Random Copolymer (HEMAR EDTA)	None as yet	Lathed	75%	As above except do not boil on a regular basis	Any soft lens cleaner	Any soft lens solution	Yes
Veragel	Veracon Incorporated	515 Toyo	Polyama	Lathed	34.6%	Any soft lens cleaner	Any soft lens soaking solution or thermal disinfection	Any soft lens solution	Yes
Veragel	Veracon Incorporated	1500 Toyo	Polyama	Lathed	29%	Any soft lens cleaner	Any soft lens soaking solution or thermal disinfection	Any soft lens solution	Yes
Optiflex	Opti Contact	Burton Parsons Material		Lathed	43%	Preflex and Enzyme Tablets	Flexcare or Flexsol/ Normol or any other soft lens solution or boiling	Flexcare or flexsol	Yes
Membrana	Viscon Contact Lens Manufacturing	HEMA		Lathed	78%	Any soft lens solution	Any soft lens cleaner	Any soft lens solution	No
Viscoflex	Viscon Contact Lens Manufacturing	HEMA		Lathed	43%	Any soft lens solution	Any soft lens cleaner	Any soft lens solution	Yes
Dominion**	Dominion Contact Lens	poly-HEMA	None as yet	Lathed	35%	Surfactant	Heat or Chemical	Heat or any soft lens solution	Yes
Dominion**	Dominion Contact Lens	poly-HEMA	None as yet	Lathed	50%	Surfactant	Heat or Chemical	Any soft lens solution	Yes

*Manufacturers recommendation
** Available in Toric Lenses
***Tinted lenses available

TABLE 2: THE SYSTEMS

Manufacturer	System Name	Details of Use	Additional Details
Burton-Parsons	**Burton-Parsons Cold System**	Lenses cleaned with Preflex, rinsed with Normol, stored overnight in Flexsol.	Flexsol is Normol with addition of Adsorbobase lubricant.
Burton-Parsons	**Flex-Care System**	Lenses cleaned with Preflex then rinsed and stored with Flex-care.	Flexcare is the same as Normol, is used for both rinsing and storage, is now said to be compatible with enzymatic cleaners containing Papain.
Softcon(AO)	**Septicon System**	Lens cleaned with Softcon Lens Cleaner, soaked in Hydrogn Peroxide (3%) for 10 minutes, then 6 hours minimum in saline plus Septicon disc.	H_2O_2 is neutralized by Septicon disc in #2 case.
Cooper-Flow	**I-Septic System**	Pliacide is mixed with Nutra-flow in Porta Flow unit. Iodine solution is neutralized in about 15 minutes and lens remains in a clear isotonic saline overnight.	Solution initially coloured. Colour will dissipate indicating disinfection is complete. Lens is not removed from Porta Flow unit until following morning. Not used with lenses that contain PVP.
Cooper-Flow	**Mira-Flow System**	Lens is cleaned with Mira-flow for 60 seconds then stored (after rinsing) in Mira-soak overnight.	Mira-flow is essentially Pliagel plus isopropyl alcohol. Mira-soak may be replaced by Pliasol, particularly for patients reactive to chlorhexidine or thimerosal.
Barnes-Hind	**B-H Cold System**	Lens is mechanically cleaned with B-H cleaning, rinsed, then stored overnight in B-H rinsing and soaking solution.	Can be augmented by B-H weekly cleaning system for periodic cleaning.
Wessley-Jessen	**Durasoft Autoclave**	Lens is cleaned with surfactant, placed in autoclave for 15 minutes, stored overnight in saline (preserved).	Utilizes low pressure steam at 120°C for 15 minutes.
Medical Optics Centre	**Sauflon Cold System**	Lens is placed in 4-5 drops of Sterisolv for 2-3 minutes, stored overnight in either Steri-sal or Steri-soft (after rinsing),	Sterisal is preserved with thimerosal 0.002% and 0.001% chlorhexidrine, Steri-soft has neither of these, rather disodium EDTA 0.1% and nipastat 0.1%.
Cooper-Flow	**Perma-Therm**	Lens is cleaned with surfactant (Pliagel or Miraflow), rinsed, then boiled in Permasol for 20 minutes, then store in Permasol.	For use with Permalenses. Frequent use not advised. Chemical disinfection recommended. (Miraflow, Pliagel — Permasol, Pliasol)
Bausch & Lomb	**B & L Aseptron**	Lenses are precleaned with surfactant (Soflens soaking solution) then heated at 90°C for 60-75 minutes - has automatic shut-off.	Recommended disinfector for B & L Soflens (polymacon). Lenses stored in B & L Soflens soaking solution.
Contactosol Ltd.	**Soft Lens Care System-Generic**	Lens is cleaned with Hydro-clean and stored in Hydrosoak.	Manufactured by U.K. company. Kelvin lenses are stored in Hydrosoak and they recommend this system for their lenses. (To ensure correct pH)
Bausch & Lomb	**Soflens Complete Care System**	Lens is gently rubbed in Soflens soaking solution, rinsed and stored overnight (6-8 hours) in same solution. Use Soflens cleaning tablets weekly. Saline may be used for rinsing.	Soflens soaking solution has incorporated surfactants, antimicrobials, buffers, preservatives and cushioning agents. Soflens cleaning tablets are for surface deposit.

TABLE 3: THE SALINES

Product Name	Manufacturer	Purpose	Details of Use	Preservative and Composition
Normol	Burton-Parsons	Rinsing	Rinse lens (after cleaning with Preflex) and before storing in Flexsol or Flexcare.	Sodium phosphate, sodium biphosphate, NaCI 0.9% and preserved: Thimerosal 0.001%.
Flexsol	Burton-Parsons	Storage	Lenses stored in Flexsol when not used.	NaCI 0.9%, disodium edetate 0.1%, absorbase. Preserved: Thimerosal 0.001%.
Flexcare	Burton-Parsons	Storage, rinsing	Latest addition to B-P system. Combines the functions of Normol and Flexsol.	NaCI, sodium borate and boric acid. Do **not** use with enzymatic cleaners (papain eg. Hydrocare). Preserved: disodium edetate 0.1%, Thimerosal 0.001%, and chlorhexidine 0.005%.
Boil 'N Soak	Burton-Parsons	Boiling, storage	Boiling and storage medium.	Boric acid, sodium borate, NaCI 0.7% Preserved: Thimerosal 0.001%, disodium edetate 0.1%.
Lensrins	Softcon(AO)	Rinsing, storage	Used with Septicon disc to neutralize hydrogen peroxide 6 hour minimum (Lensept = 3% H_2O_2).	NaCI 0.85%, buffering agents, disodium edetate 0.1%. Preserved: Thimerosol 0.001%.
Pliasol	Cooper-Flow	Rinsing, boiling, storage	Used to rinse either Pliagel or Miraflow. Lens stored in Pliasol.	Balanced NaCI (0.9%), purified H_2O. Preserved: sodium edetate 0.2%, Sorbic acid 0.1% and EDTA 0.1%.
Permasol	Cooper-Flow	Rinsing, storage, irrigating	For use with Cooper Permalens	Buffered balanced NaCI, poloxamer 407, sodium borate. Preserved: Thimerosal 0.001%, disodium edetate and sorbic acid 0.1%.
Mira-soak	Cooper-Flow	Rinsing, storage	Lens cleaned with Mira-flow, stored in Mira-soak overnight.	Balanced NaCI (0.9%), purified H_2O, disodium edetate 0.1%. Preserved: chlorhexidine 0.008%.
Nutra-Flow	Cooper-Flow	Neutralizing, diluting solution	Neutralize and dilute Pliacide (Iodine) to provide daily storage medium.	Isotonic. Same as Pliasol plus KC1.
Soft Lens Storage and Rinsing Solution	Barnes-Hind	Rinsing, storage	Rinse lenses after mechanical cleaning. Store overnight.	Buffered, isotonic NaCI. Preserved: Thimerosal 0.001%, disodium edetate 0.1%.
Preserved Saline	Allergan	Rinsing, storage, soaking.	To use whenever normal saline required.	Buffered saline (NaCI). Preserved: Thimersal 0.001%, disodium edetate 0.1%.
Durasoft Solution	P.C.L.	Rinsing	Rinse lenses after Durasoft cleaner to prepare for autoclave.	Normal saline.
Steri-sal, Steri-soft	Medical Optics Centre	Rinsing, storage, soaking	Lens is mechanically cleaned (Steri-solv), stored either in Steri-sal or Steri-soft for further disinfection.	Steri-sal: 0.9% NaCI, 0.1% disodium EDTA, 0.01% Nipastat (preservative). Steri-soft: 0.9% NaCI BP, 0.1% disodium edetate, 0.001% Thimerosal, 0.001% chlorhexidine. Both in buffered aqueous polymer complex base.
Salette	Medical Optics Centre	Boiling medium	For use with Monoclens cleaner	Packaged in 10 ml pouches — sterile. Buffered 0.9% NaCI — no preservative.
Hydrosoak	Contactosol Ltd.	Rinsing, soaking	Lens precleaned with Hydro-clean and stored in Hydro-soak.	Preserved: 0.001% Thimerosal, 0.001% chlorhexidine.
Soflens soaking solution	Allergan for Bausch and Lomb	Rinsing, soaking, disinfecting	Use a few drops and rub gently for surfactant action then soak for 6-8 hours for disinfecting.	Provides complete surfactant plus disinfective properties. Contains: polysorbate 80 U.S.P., alkyl triethanol ammonium chloride, propylene glycol U.S.P. Na thimerosal, dialized hydron polymer, + 3 buffers.
Hydron Non-Preserved Saline	Hydron	Soaking in heat disinfection unit	Rinse,lens with saline, fill lens case with fresh saline and heat in lens disinfector.	0.9% naCI in pressurized 250 ml container.
Unisol Non-Preserved	Burton-Parsons	Rinsing & storage	mix with distilled water and boil lens.	15 ml (MINUMS) for use in place of preserved solutions.
Salt Tablets (Non-Buffered)	B & L	Removal of lens deposits and to equilibrate the lens.	mix with distilled water and boil lens.	NaCI only.

TABLE 4: THE SURFACTANTS AND CHEMICAL DISINFECTANTS

Product Name	Manufacturer	Purpose	Details of Use	Additonal Details
Pliagel	Cooper-Flow	Prevent proteins, oils and remove cations.	Spread small amount on lens surface. Rub gently. Rinse before disinfection.	Contains Poloxamer 407, 15% non-detergent, isotonic vehicle, sorbic acid 0.1%, trisodium edetate 0.5%.
Softcon Lens Cleaner	Softcon	Remove protein and lens residue.	Same as Pliagel.	Isotonic cleaning solution. Thimerosal 0.004%.
Softmate (Softlens Cleaning Solution)	Barnes-Hind	Remove surface residues and protein.	Same as Pliagel.	Contains octylphenoxy ethanol. Hydroxyethyl cellulose. Tyloxapol 1/4%.
Preflex	Burton-Parsons	Removes tear residue and deposits.	Same as Pliagel. (Rinse with Normol or Flex-Care).	Thimerosal 0.002%, disodium ehtylene, diamino-trocetate 0.1%.
Pliacide	Cooper-Flow	Disinfection	Daily disinfection is neutralized by Nutra-flow in Porta-flow unit (2 hours). When colour is gone process is complete.	Contains 0.1% Iodine in isotonic vehicle. Not to be used with NVP or PVP containing lenses.
Mira-flow	Cooper-Flow	Surface solvent cleaning.	Lens is covered and gently rubbed for 60 seconds. Stored in Mira-soak overnight.	One detergent component same as Pliagel and another added. Contains: Isopropyl alcohol - solvent - for disinfecting and cleaning lenses.
Lensept	Softcon	Disinfection	Used daily - patient soaks lenses for 10 minutes. Stored overnight in Lensrins plus Septicon disc.	Is 3% hydrogen peroxide. Requires 6 hour minimum storage in Lensrins, plus disc, for complete neutralization.
Steri-solv	Medical Optics Centre	Disinfection	Lens soaked in 4-5 drops of Steri-solv for 2-3 minutes then placed in steri-sal or Steri-soft overnight.	NaCl BP 2.5%, Hyromellose disodium edetate 0.1%, Thimerosal 0.004%, buffered polymer base (aqueous).
Hydroclean	Contactosol Ltd.	Disinfection, Surface cleaning	Hydroclean is a mechanically utilized cleaner and disinfector. Lens stored after rinsing in Hydrosoak.	Thimerosal 0.001%.

TABLE 5: THE EXTRA CLEANERS

Product Name	Manufacturer	Purpose	Details of Use	Additional Details
Hydrocare	Allergan	Removes protein	1 Hydrocare tabled mixed with distilled water or saline. Lens deposited for 6 hours. Disinfected normal system.	Weekly use is often enough. Used by patient at home.
Soflens Cleaning Tablets.	Bausch & Lomb	Removal of surface deposits.	1 tablet with distilled water. New lens requires 2 hours in solution, older lens up to but not to exceed 12 hours. Rinsed and stored in Soflens soaking solution.	Do not use tablet if discoloured. Also compatible with B & L Aceptron system (boiling). Same as Hydrocare above).
Salt Tablets (Non-Buffered)	Bausch & Lomb	Removal of lens deposits & to equilibrate the lens.	Mix with distilled water and boil lens.	NaCl.
Barnes-Hind Weekly Cleaner	Barnes-Hind	Removal of surface deposits	Lens deposited in premixed solution for 2 hours, then disinfected with normal system.	Patient use, weekly.
Buffered Salt Tablets Tablets	Barnes-Hind	Removal of lens deposits.	Mix with distilled water and boil lens.	NaCl, sodium bicarbonate, disodium edetate, chelating agents.
Ren-O-Gel 1	Cooper-Flow	Remove protein and oily deposits.	Lens boiled in solution, cleaned with Pliagel, rinsed with distilled cold water. Disinfect before insterting.	Office use only. Frequent use will damage lens. Incompatible with PVP lenses. Lenses must be equilibrated in 10 ml isotonic solution for 2 hours at room temperature to remove residuals which can cause ocular irritation.
Ren-O-Gel 2	Cooper-Flow	Remove inorganic salts.	LKens boiled in solution for 5-15 minutes. Clean with Pliagel, rinse with distilled cold water. Disinfect before inserting.	Same as above.
Monoclens	Medical Optics Centre	Surface Cleaning, restoration	Lens boiled in solution, disinfected with Steri-solv, stored in either Steri-sal or Steri-soft.	Professional use only. Periodic cleaning of trial lenses (Sauflon) recommended.
Lipofrin	Burton-Parsons	Surface deposits and restoration	Lens precleaned with Preflex, rinsed with Normol. Lens heated in solution for 2-4 hours at 50°C, again rinsed with Normol, cleaned with Preflex, rinsed with Normol and is ready for Flexsol. (uses a magnetic stirrer)	Is an inorganic electrolyte with oxygen releasing action. Professional use only. Inns variation for P.W. lenses - 1/6 of a packet in 120 ml. of distilled water and boil lens in basket for 10 minutes then let stand 1-1/2 hours. Back in Permasol etc. 2 hours before wearing.

TABLE 6: THE OCULAR LUBRICANTS (WHILE LENS IS ON)

Product Name	Manufacturer	Purpose	Details of Use	Composition
Clerz	Cooper-Flow	Lubricating, cleaning, hydrating, re-wetting.	While lens is worn, 1 or 2 drops as required to enhance vision and to lubricate.	Poloxamer 407, sorbic acid 0.1%, disodium edetate 0.1%, sodium borate 0.2% in a neutral isotonic solution.
Adaptettes	Burton-Parsons	Cleaning, Re-wetting	While lens is worn, 1 drop 3-4 times daily as required.	Absorbase in a buffered isotonic solution. Thimerosal 0.004%, disodium edetate 0.05%.
Comfort Drops	Barnes-Hind	Re-wets, hydrates, cleans	1 or 2 drops as required while lens is being worn.	Nonionic surfactant in buffered isotonic solution. Thimerosal 0.004%, disodium edetate 0.1%.
Sterilette	Medical Optics Centre	Cleaning, re-wetting.	Insert few drops while lens is worn.	NaCl BP 0.9%, disodium EDTA 0.1%, Thimerosal 0.002% in aqueous polymer buffer solution.
Hydro-sol	Contactosol Ltd.	Lubrication, comfort.	Used on insertion for comfort.	Simple formulation for lubrication. Thimerosal 0.001%.

References

1. O'Driscoll, K.F. Soft Contact Lenses, Gasset, Antonio R. & Kaufman, Herbert E., Polymeric Aspects of soft contact lenses, Chap. 1, Page 3-15, Mosby, 1972.
2. Pedley, Derek G. Tighe, Brian J. The Search for the Ideal Contact Lens Material, *The Journal of the British Contact Lens Assoc.*, Vol. No. 2, Page 12, May 1978.
3 Cordrey, P. Mechanism of Protein Binding to Hydrogel Lenses, Eyel, Contact Lenses (Manufacturing) Limited (6), Sept. 1974.
4. 4a,4b, 4c, 4d, 4e, 4f. Hathaway, Rodney A., Lowther, Gerald E. Soft Lens Cleaners: Their effectiveness in removing deposits, *Journal of the Am. Opt. Assoc.* Vol. 49, No. 3, Page 260, March 1978.
5. Pedley, Derek G., Tighe, Brian J. The Search for the Ideal Contact Lens Material, *The Journal of the British Contact Lens Assoc.*, Vol. No. 2, Page 13, May 1978.
6. Kreiner, Christina. Microbiology and Contact Lenses, *The Contact Lens Journal*, Page 10, Vol. 7, No. 5., Sept. 1978.
7. Johnsson, Jan, Nygren, Börje, Sjögren, Eva. Disinfection of Soft Contact Lenses in Liquid, *The Contact Lens Jounal*, Page 3-10, Vol. 6, No. 5, Jan. 1978.
8. Holly, Frank J., Refojo, Miguel F. Oxygen Permeability of Hydrogel Contact Lenses. *Am. J. Optom. & Arch. Am. Acad. Optom.*, Vol. 43, No. 11, Oct. 1972.
9. 9a. Pedley, Derek G., Tighe, Brian J. The Search for the Ideal Contact L:ens Material, *The Journal of the British Contact Lens Assoc.*, Vol. No. 2, Page 13, May 1978.
10. Shaw, E.L., Aquavella, J.V. Anatomical and physiological basis of contact lens fitting. *Cont. Intraocular Lens Med. Jl.* 2:2, Page 53, April/June 1976.
11. 11a. Seiderman, Maurice. Report on physiological hydrophilic polymers for soft gel lenses, Symposium on flexible lenses, Co-editors Joseph L. Bitonte and Richard H. Keates, Page 88-89, C.V. Mosby Co. St. Louis, 1972.
12. Seiderman, Maurice. Report on physiological hydrophilic polymers for soft gel lenses, Symposium on flexible lenses, Co-editors Joseph L. Bitonte and Richard H. Keates, Page 215, C.V. Mosby Co. St. Louis, 1972.
13. Carney, L.G. Hill, R.M., Human tear pH. *Arch. Ophthal.*, 54, Page 821-824, 1976.
14. Hill, Richard M. Escaping the sting; *Int. Contact Lens Clinic*, Jan/Feb 1979.
15. Koetting, R.A., Andrews, Carig, Koetting, R.R. Tear pH changes in long term contact lens wearers. *Inter. Contact Lens Clinic*, Page 46-53 Jan/Feb 1979.
16. Shively, C.D. Hydrophilic flexible lens cleaning and chemical disinfection systems. *Contacto*, Page 33-37, May 1975.
17. 17a,17b,17c,17d. Phillips, A.J. Contact lens solutions, *The Contact Lens Journal*, Vol. 6, No. 2, Page 20, July 1977.
18. 18a,18b. Krezanowski, J. Cooper Laboratories, Personal Communications, Dec. 1979.
19. Kreiner, Christina. Microbiology and contact lenses, *The Contact Lens Journal*, Vol. 7, No. 5, Page 18, 1978.
20. Hathaway, Rodney A., Lowther, Gerald E. Soft Lens Cleaners: Their effectiveness in removing deposits, *Journal of the Am. Opt. Assoc.* Vol. 49, No. 3, Page 262-263, March 1978.
21. 21a. Phillips, A.J. Contact lens solutions, *The Contact Lens Journal*, Vol. 6, No. 2, Page 16 & 13, July 1977.
22. Callender, M., Lutzi, D. Comparing the clinical findings of soflens wearers using thermal and cold disinfection procedures. *Int. Contact Lens Clinic*, Page 123, May/June 1978.
23. Bailey, Wm.R. Jr. Preservatives for contact lens solutions, *Contact Lens Society of America Journal*, Vol. 6, No. 3, Page 33, Oct. 1972.
24. Thompson, R.E.M. Some microbiological problems with soft lens solutions, *The Journal of the British Contact Lens Association*, Vol. 2, No. 2, Page 32, May 1979.
25. Callender, M. Lutzi, D. The incidence of adverse ocular reactions amoung soft contact lens wearers using chemical disinfection procedures. *Canadian Journal of Optometry*, Vol. 41, No. 3, Page 138, Sept/Oct. 1979.
26. Sibley, M.J., Yung, G. A technique for the determination of chemical binding to soft contact lenses. *Am. J. Optom.* 50, Page 710-714, 1973.
27. Hind, H.W., Goyan, F.M. A new concept of the role of hydrogen ion concentration and buffer systems in the preparation of ophthalmic solutions. *J. Am. Pharm. Ass.*, Page 36, 33, 1947.
28. Phillips, A.J. Contact lens solutions, *The Contact Lens Journal*, Vol. 6, No. 2, Page 19, July 1977.
29. Krezanoski, J. What are the implications of dirty soft contact lenses? *Int. Contact Lens Clinic*, Vol. 4, No. 2, Pages 57-60, March/April 1977.
30. Isen, A.A. The Griffin lens., *J. Am. Optom. Assoc.*, 43, Page 275-285, 1972.
31. Inns, H.D.E. The Griffin lens, *Am. J. Optom. & Arch. Am. Acad. Optom.*, Vol. 50, No. 12, Page 978, December 1973.
32. Janoff, Lester E. *Contacto*, Vol. 23, No. 1, Page 37-40, 1979.
33. Tregakis, M.P., Brown, S.I., & Pearce, D.B. Bacteriological studies of contamination associated with soft contact lenses. *Am. J. Ophthal.*, 75 Page 496-499, 1973.
34. Inns, H.D.E. Chemical, physical and fitting characteristics of the Softcon Lens, Ophthalmology Seminar, Toronto, May 10, 1976.
35. Charles, A.M. A comparison of some commercial methods for asepticizing and cleansing hydrogel lenses. *Contacto*, Page 4-11, May 1975.
36. Inns, H.D.E. The septicon system, *The Canadian Journal of Optometry*, Vol. 41, No. 3, Page 144-146, Sept/Oct 1979.
37. Phillips, A.J. Cotact lens solutions, *The Contact Lens Journal*, Vol. 6, No. 2, Page 18, July 1977.

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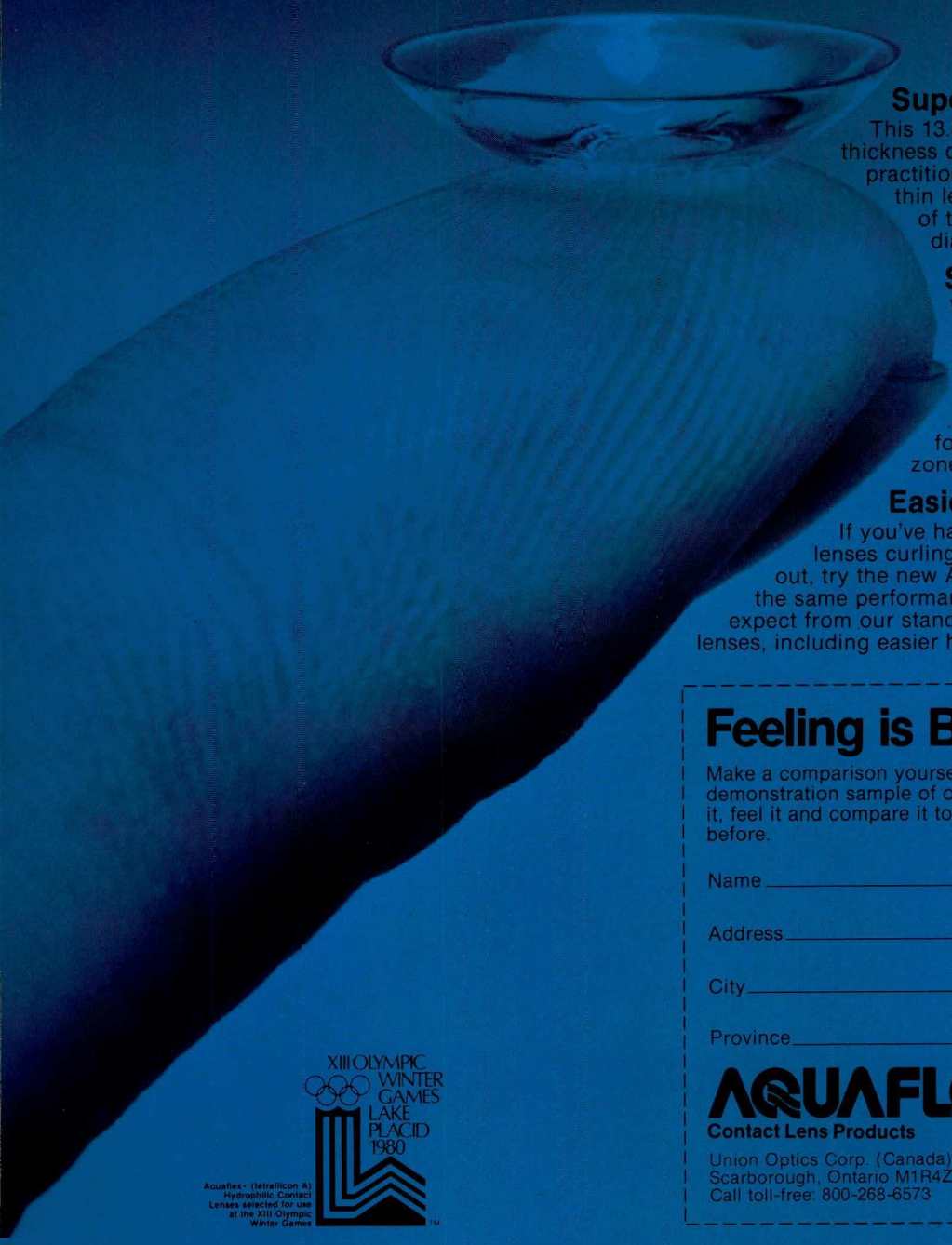

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Optical Considerations in Contact Lens Fittings

Irving Baker*

Introduction

The widespread use of contact lenses in the general population is a relatively new mode of therapy which has become available to practitioners and patients alike for the amelioration and correction of vision problems. This popularity and acceptance is the result of a number of factors which have had both some beneficial and questionable results upon the appropriate clinical care of patients and on the practitioners who prescribe and provide this method of therapy.

In order to achieve this level of current popularity and usage it is obvious that these health care devices must be relatively safe to use, fairly easy to maintain, reasonably comfortable to wear and provide users with acceptable levels of vision performance. In addition, social and psychological factors as well as the state of the economy have given impetus to this development.

In order to have achieved the present level of utilization of contact lenses it is understandable and essential that these health care devices and their complementary equipment and their supporting pharmaceutical solutions be developed under controlled and standardized manufacturing and clinical conditions. Such actions and activities have been and will continue to be a requirement and responsibility of the lens manufacturers, the pharmaceutical companies and the prescribers of contact lenses.

Statement of Purpose

However, these essential developments and their resultant effects have obscured — at least, in part — the obvious clinical purposes for prescribing these health or vision aids. To emphasize this point it could be stated that the prescribing and fitting of contact lenses are the means to an end and *not* an end in themselves. In referring to contact lenses (or any other optometrical therapy, for that matter) as "the means to an end" it is meant that the end result of optometrical diagnosis and therapy is to achieve for the patient clear, comfortable, single simultaneous binocular vision within the patient's occupational and avocational vision requirements and environments. A clear distinction must be made between achieving the appropriate clinical results and actually "fitting" a contact lens to the eye of a patient. The former deals with vision function and performance while the latter deals with the eye as an organ and more specifically with the tearlayer and the conjunctival and corneal tissues.

Most of the literature and practice is presently more concerned with "fitting" — albeit an essential part of the therapy — than with achieving optimum and acceptable clinical and vision performance. While this may appear to be too harsh a statement, clinical practice suggests that contact lens failures occur not only as a result of corneal insult, physical discomfort and/or loss of patient motivation, but also, in the longer term, unacceptable vision performance, i.e. the lack of clear, comfortable simultaneous binocular vision even though the clinical criteria of the "fit", i.e. the contact lens — cornea relationship, have been met.

In this latter category of "failures" it is found that the patient's vision requirements or environments have changed, that latent deviations (i.e. divergence excess, divergence insufficiency, convergence excess, convergence insufficiency and/or vertical phorias) are present, that residual astigmatism has not been corrected or has been induced, that high anisometropic refractive errors are present and that myopic patients experience the early onset of presbyopic symptoms.

While some of these problems exist in patients who are wearing spectacles, nevertheless it is important to note that the application of contact lens therapy *per se* can and does aggravate specific clinical conditions. (It is, however, equally valid to say that contact lens therapy is, in some cases, the treatment of choice, e.g. irregular astigmatism, aphakia, keratoconus, high amounts of iso-ametropia). Further, it should be stated that contact lens therapy cannot and should not be expected to resolve or ameliorate all vision problems in isolation from spectacle therapy and/or orthoptics. Obviously, the objective of any optometrical therapy is to provide a patient with safe, comfortable, efficient vision performance.

Criteria for Indicating Clinical Performance

Specifically, with respect to contact lens therapy, the following criteria are proposed with the view of applying them as indicators of clinical performance. The greater the compliance (with the criteria) the more likely the objectives of providing long term, safe, comfortable, efficient vision will be met; the lesser the compliance the less likely the objectives will be met.

Criterion #1. The absence of clinically significant amounts of oedema and/or fluorescine staining and/or invasion of blood vessels as observed with a biomicroscope.

Criterion #2. The presence of an adequate and continuous tear supply (particularly "soft" contact lenses), and appropriate "tear break-up time."

Criterion #3. The absence of clinically significant changes in the appearance of the keratometer mires (distortion) and/or changes in the keratometer measurements.

*Lecture notes prepared for Contact Lens Symposium, Montreal, Quebec, October 8, 1978 by Irving Baker, O.D., Registrar, College of Optometrists of Ontario, 908-40 St. Clair Ave. W., Toronto, Ont.

Criterion #4. The absence of any significant reduction in corrected visual acuity, distance and near, with spectacle correction ("spectacle blur"). [A corollary to this criterion is — the absence of clinically significant changes in the refractive status of the eye as determined by measurement following the removal of contact lenses].

Criterion #5. The absence of clinically significant amounts of ametropia (spherical and astigmatic) as measured with contact lenses *in situ*. [A corollary to this criterion is — the absence of any significant reduction in corrected visual acuity, distance and near, with the contact lens correction.]

Criterion #6. The absence of any clinically significant oculomotor (including accommodative function) and/or sensory (stereoscopic acuity) anomaly as determined by the assessment of these functions with the contact lenses *in situ*.

Criterion #7. Acceptable patient comfort and wearing time.

In applying (and assessing) these criteria, attention is drawn to the fact that numbers 1-4 deal entirely with the *"fitting"* of the contact lenses, i.e. the contact lens — cornea relationships, tear layer and effects upon these tissues. Criteria 5 and 6 deal directly with the effects these lenses have upon those components of the vision system which relate to clear, comfortable single simultaneous binocular vision, i.e. the input or stimulus patterns which subsequently give rise to visual response and performance. [The physical and physiological effects vs. the optical effects and resultant visual responses.]

This paper is not concerned with "fitting" as such. However, these criteria are important in terms of patient safety, comfort and acceptance, and so must be realized to a great degree if the objectives of the therapy are to be achieved. However, the realization of achieving this level of compliance in itself or by itself does not constitute a "successful case". It merely, but importantly, signifies a successful "fitting" of the contact lenses, an important and integral part — but only a part — of the total clinical picture.

Optical Properties of Spectacle and Contact Lenses

It is with the "other part" of the clinical picture that this paper will attempt to deal with in some detail, i.e. what occurs to the "optical system" in terms of spectacle and ocular refraction, stimulus to accommodation, stimulus to convergence, and size of the ocular images, when a patient is changed from spectacle therapy to contact lens therapy.

This can be put in another way. Spectacle lenses and contact lenses differ in the manner in which they correct ametropia. The optical properties of the two systems differ in many significant respects and, accordingly, make the vision performance of a contact lens wearer quite different from the vision performance of the spectacle wearer. While the patient's vision response to a specific lens system is strongly influenced by the visual acuity obtained through the lens system, the patient's vision response (i.e. performance) cannot be evaluated only in terms of Snellen acuity: optical properties of the lens system (spectacle or contact lens), other than focal power, effect the patient's *total* vision response (performance). Some patients achieve better vision performance with spectacles, others with contact lenses and some achieve clinically acceptable vision performance with either system of correction.

A review of "vision with contact lenses", particularly as a function of the optical properties of both the contact lens and the fluid media present between the lens and the cornea, would now appear to be appropriate.

1. *Ocular Refraction and Spectacle Refraction*

a) In hyperopia, the contact lens power required is always *greater* than is required in a spectacle lens.

b) In myopia, the contact lens power required is always *less* than is required in a spectacle lens. (See figures 24 and 25)

Source: Gorsvenor, T.P. "Contact Lens Theory and Practice" The Professional Press, 1963 Chicago, pp. 72-73.

This variation between ocular refraction and spectacle refraction is a function of the vertex distance and

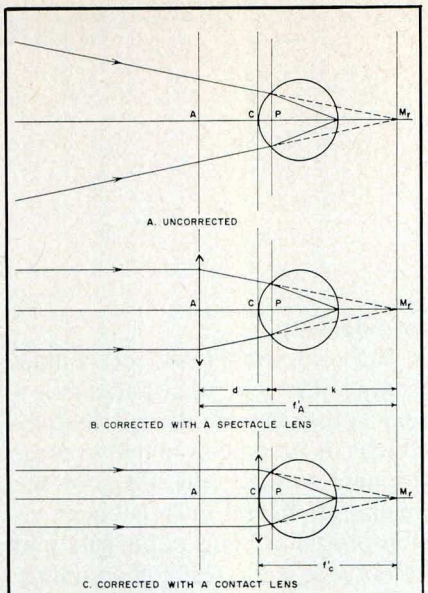

Figure 24. Spectacle and ocular refraction in hyperopia.

lens powers. If lens powers are less than ±4D the difference can be neglected; if greather than ±4D the relationship is expressed by the formula:

$$K \text{ (ocular refraction)} = \frac{F \text{ (spectacle refraction)}}{1\text{-d (vertex dist. in M) F}}$$

Further, it is to be noted that K (ocular refraction) equals the contact lens power *providing* the lens is fitted on K. If the contact lens is not fitted on K (i.e. the low dioptric power as measured by the keratometer) then the power of the contact lens requires modification:

(i) if *steeper* than the flattest meridian, *decrease* plus power (or *increase* minus power) by an amount equal to the number of diopters by which the base curve of the lens is *steeper* than the flattest corneal meridian.

(ii) if *flatter* than the flattest corneal meridian, *increase* plus power (or *decrease* minus power) by an amount equal to the number of diopters by which the base curve of the lens is *flatter* than flattest corneal meridian.

These latter adjustments, of course, do not relate to the fitting of soft contact lenses although, on occasion, the calculation of ocular refraction as the contact lens power for soft lenses does not appear to be consistent with expectations.

2. *Evaluations of Residual Astigmatism*

a) by working definition —

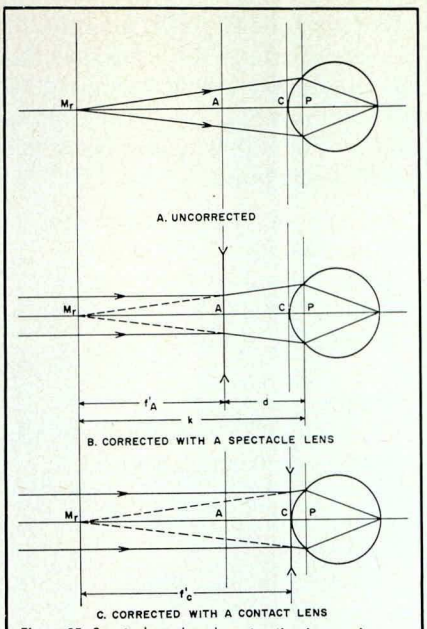

Figure 25. Spectacle and ocular retraction in myopia.

Residual Astigmatism = Total Astigmatism* − Corneal Astigmatism

*Total Astigmatism = Corneal Astigmatism + Residual Astigmatism.

eg.(1)

Spectacle Rx −3.00 D.S./ −1.50 D.C. × 90

K readings 42.50 at 180
42.00 at 90 = −.50 × 90

∴ R.A. = −1.50 × 90 — (−.50 × 90) = −1.00 × 90

Spectacle Rx −3.00 D.S./ −1.50 D.C. × 90*

K readings 42.50 at 90
42.00 at 180 = −.50 × **180***

*Note: Total astigmatism is "against the rule" (× 90) while corneal astigmatism is "with the rule" (× 180). When this occurs it is necessary to transpose the corneal astigmatism into plus cylinder form. Thus —

R.A. = −1.50 × 90 − (−.50 × 180) = −1.50 × 90 − (+ .50 × 90) = −2.00 × 90

When the calculated residual astigmatism is 0.75D or more there is the probability that visual acuity through "spherical" contact lenses will be significantly poorer than with spectacles.

Clinically when this occurs, i.e. estimated residual astigmatism of .75D or more there is the requirement for further evaluation of this element of the optical system. This can best be done — for it is a direct measurement — by using a trial contact lens with the appropriate base curve and measure the refractive status of the eye with the lens in place. This will not only establish the amount of residual astigmatism present (if any) but also will determine the visual acuity (at distance and near) with only the spherical component (equivalent sphere) of the correction in place.

Depending upon the results of this assessment the practitioner is now in the position to counsel the patient appropriately and take the appropriate clinical action. Such action and counsel could be to advise against the use of this form of therapy, to suggest the use of spectacles (containing the measured amount of astigmatism) for specified types of vision requirement or consider the application of non-rotating contact lenses incorporating a front surface cylinder.

3. *Non-rotating or Toric Contact Lenses*

Since residual astigmatism has just been discussed and reference was made to non-rotating contact lenses, reference should be made to the three classes of this type of lens since they do have an effect on the optical system.

(i) Toric front surface lens — a lens with a toric front surface and spherical back surface. This form of lens serves an optical or vision requirement.

(ii) Toric base lens — a lens with a spherical front surface and a toric back surface. This form of lens serves a physical or fitting need, i.e. the lens-cornea relationship may be improved when fitting a "toric cornea". However, the optical properties of this lens cannot be overlooked or neglected since they sometimes increase the astigmatic refractive state, and sometimes they correct or reduce the astigmatism present in the eye. Accordingly, careful evaluation of these possible effects have to be explored with the contact lens *in situ*.

(iii) Bitoric lens — a lens with toric front and back surfaces. This form has the characteristics and features of both the previously noted lenses.

4. *Aberrations*

Contact lenses, because they rotate with the eye (as opposed to the fixed position of a spectacle lens before the eye), eliminate most of the aberrations such as oblique astigmatism, distortion, coma and curvature of the field.

However, contact lenses in *air* have more spherical aberration than spectacle lenses because they have a relatively high curvature for their aperture. However, the contact lens *on the eye* increases the inherent aberrations in the eye. As a result it has been shown that under reduced illumination and the dilated pupil, visual acuity with contact lenses decreased more quickly than with spectacle lenses. This may account for some symptoms of patients who have large size pupils.

5. *Accommodation*

When a patient accommodates to focus on a near object the amount of accommodation required is different depending upon whether the ametropia is corrected by contact lenses or spectacle lenses. To clarify this point it is necessary to review the formulae proposed by Pascal (1) and defined as the "accommodative unit".

For the natural emmetrope, this unit equalled 1.00D, but for the hyperope corrected by spectacle lenses it was always *more* and for the myope similarly corrected always *less*. This can be expressed by the following formulae —

(i) for each diopter of hyperopia, the unit is expressed as 1 + .04 (diopters of H).

(ii) for each diopter of myopia, the unit is expressed as 1 − .03 (diopters of M).

To illustrate, assume that there are three subjects, one a natural emmetrope, the second a corrected hyperope of (+)4.0D and lastly a corrected myope of (−)4.00D all fixating a target at 33 cm.

a) the A.U. = 1 for the emmetrope,
∴ accommodation exerted is 3 × 1 = 3D.

b) for the hyperope,
the A.U. = 1 + .04(4) = 1.16,

∴ accommodation exerted is
3 × 1.16 = 3.48D.

c) for the myope,
the A.U. = 1 − .03(4) = .88,
∴ accommodation exerted is
3 × .88 = 2.64D.

It can be stated that when the "near point" is considered the effect of the *spectacle correction lens* varies significantly, and that a corrected ametrope is *not* an emmetrope. On the other hand, the effect of the contact lens correction does not vary significantly when the "near point" is considered, and therefore, the corrected ametrope — in this case is an "emmetrope".

As a result of this optical effect or property, a spectacle corrected myope changed to contact lenses will experience a change in the stimulus to accommodation and this change will require the myope to use *more accommodation* than was in the case when wearing the spectacle correction (see A.U. example). Similarly, the spectacle corrected hyperope changed to contact lenses will also experience a change in stimulus to accommodation with the result that this hyperope will be required to use *less* accommodation than was the case when wearing the spectacle correction. (see A.U. example).

These changes in the stimulus to accommodation which occur when changed from spectacle lenses to contact lenses have a number of clinical implications:

(i) The myope fitted with contact lenses may experience ocular discomfort, difficulty in focussing, headaches when doing close work. Frequently the symptoms subside when adaptation to the increased stimulus to accommodation occurs.

(ii) The myope who is also an incipient presbyope will experience difficulty with the full contact lens correction since there is an *increase* in the stimulus to accommodation.

(iii) The hyperope who is also an incipient presbyope will experience less difficulty with the full contact lens correction (as compared to the spectacle lens correction) since there is a *decrease* in the stimulus to accommodation.

(iv) Since the stimulus to accommodation is altered, (increased in M, and decreased in H), the stimulus to accommodative convergence is altered. Consequently, this change in stimulus could have clinical significance — particularly if the A/CA is high—as it affects oculomotor function.

6. *Convergence*

To fixate, binocularly, an object at a distance closer than infinity, the convergence (in prism diopters) required for an *emmetrope* is equal to the dioptric distance from the object multiplied by the P.D. in centimeters. The convergence required for an *ametrope* when wearing contact lenses is the same as that required by an emmetrope since on convergence the lens rotates with the eyes and the lines of sight remain directed essentially through the centres of the lenses.

However, when a hyperope converges through spectacle lenses (which have been centred for distance) *base out* effect results and consequently the amount of convergence to fixate a "near object" is *greater* than the amount of convergence required by the emmetrope or contact lens wearer. Similarly, a myope converging through spectacle lenses (which have been centered for distance) encounters increasing *base in* effects and consequently the amount of convergence required is *less* than the amount of convergence required by the emmetrope or contact lens wearer. The following examples will clarify these points:

Interpupillary distance 65 mm (near 60 mm).
Object distance = 33.3 cm
Convergence (△) = P.D. (cm) × dioptric distance.

Emmetrope
Convergence = 6.5 × 3 = 19.5△
Ametrope corrected with C.L's
C = 6.5 × 3 = 19.5△
−5.00 Myope corrected with spectacles
C = 6.5 × 3 = 19.5△
= 5 × .5 = 2.5 △ BI
Convergence = 17.0△
+5.00 Hyperope corrected with spectacles
C = 6.5 × 3 = 19.5△
△ = 5 × .5 = 2.5△ B.O.
Convergence = 22.0△

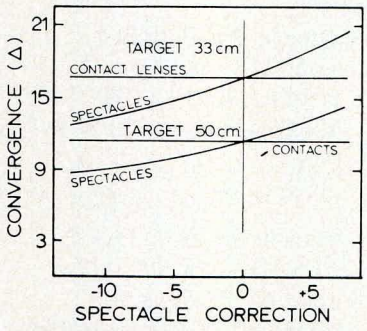

Figure XXIII-8 - Convergence in prism diopters that has to be exerted by patient (P.D. 65 mm.) with the spectacle ametropia shown on the abscissae of the graph, when viewing a target 33.3 cm. and 50 cm., respectively, in front of the spectacle plane when wearing spectacle lenses and contact lenses (from Westheimer, 1962).

Source: (for Figs. XXIII-7 & XXIII-8) I.M. Borish, "Clinical Refraction," The Professional Press, Chicago, Third Edition, 1970, p. 994.

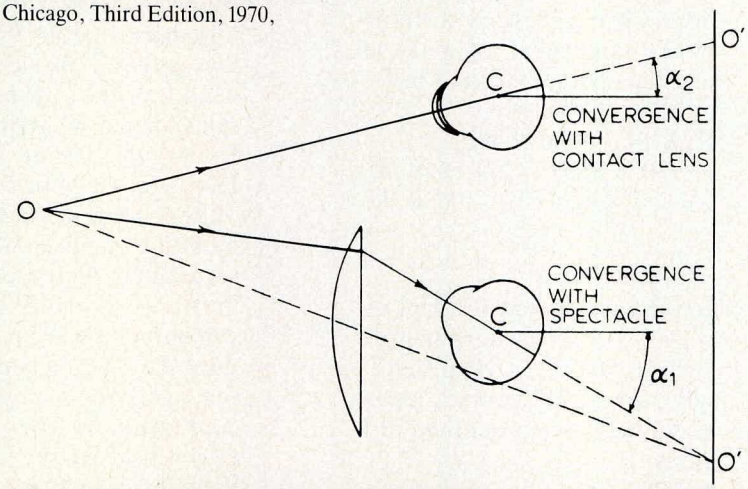

Figure XXIII-7 – Convergence required with plus spectacle lens (α_1) is greater than with contact lens (α_2). O' is the image of O as formed by the spectacle lens positioned at a distance d from the corneal apex. C is the center of rotation of the eye.

In summary:

The contact lens myope *accommodates more* and *converges more* when fixating a near object as compared with wearing spectacle lenses.

The contact lens hyperope *accommodates less* and *converges less* as compared with spectacle lenses.

This being the case, these optical effects and the changes in the stimulus to accommodation could be clinically significant in some cases of accommodative and oculomotor anomalies. Sometimes they can be used to advantage and sometimes they create problems, e.g. the myope with convergence excess (high A/CA ratio) and the hyperope with convergence insufficiency (low A/CA ratio).

7. *Magnification*

In discussing this optical effect no attempt will be made to derive formulae or deal with spectacle magnification or contact lens magnification specifically. The purpose is to *compare* the size of the retinal image as formed by a contact lens and a spectacle lens. This can be done by the use of two simple formulae:

(1) difference in retinal image size (Spectacle/CL)
= C.L.M. = $1 - d_1, F_s$
where d_1 = vertex distance in metres
F_s = spectacle lens power.

(2) %M. = 100 (C.L.M. − 1)

The following examples will clarify the application of the formulae and identify the magnification effects when changing a patient from spectacle lenses to contact lenses.

(i) −10D myope, vertex distance 14 mm.
(1) C.L.M. = 1 − (.014 × −10) = 1.140
(2) %M = 100 (1.140 − 1) = +14% i.e. C.L. image 14% larger than spectacle image.

(ii) +10D hyperope, vertex distance 14 mm
(1) C.L.M. = 1 − (.014 × +10) = 0.860
(2) %M. = 100 (.860 − 1) = −14%
i.e. C.L. image 14% smaller than spectacle lens image.

From these examples it can be seen that the *myope* will always have a *larger* retinal image with contact lenses than with spectacles, and the *hyperope* will always have a *smaller retinal image* with contact lenses than with spectacles. These optical characteristics have some interesting clinical effects and applications.

1. The contact lens hyperope may experience some difficulty at the near point, e.g. reading, since the size of the retinal image has been diminished.
2. If cases of ametropia can be identified as being either axial or refractive then it would be possible to determine whether spectacle correction or contact lens correction would be more suitable. Optically we know that the *relative spectacle magnification* will be *unity* for an *axial ametrope* if a spectacle lens is provided and *unity* for a *refractive ametrope* if a contact lens is provided.

This being the case, these considerations are important in considering which type of lens should be supplied when anisometropia is present. However, the difficulty in practice is to establish whether the anisometropia is *axial* or *refractive*. However, there are some indicators and cases where we may be able to predict whether the ametropia is axial or refractive.

(i) Compare the flat K readings of the two eyes and if they are essentially *equal* the anisometropia may be considered to be *axial* and, accordingly, spectacle lenses are less likely to give rise to aniseikonia; on the other hand if the flat K readings are different in amount and approximately equal to the difference in power between the two eyes, the anisometropia could be considered to be *refractive* and, accordingly, contact lenses are less likely to give rise to aniseikonia.

(ii) Where the axes or amounts of astigmatism are noticeably different between the two eyes, contact lenses would be the treatment of choice since astigmatism is a *refractive anomaly.*

(iii) High spherical ametropia is much more likely to be *axial* than refractive and, consequently, when anisometropia exists in such cases spectacle lenses are less likely to give rise to aniseikonia.

(iv) Aphakia is a condition which is mostly *refractive* and consequently contact lenses afford the only opportunity to restore single binocular vision.

(v) Keratoconus can be classified as *refractive ametropia* and contact lenses (aside from visual acuity) minimize the possibility of aniseikonic effects.

Summary and Suggestions

The review of the optical properties of the "systems", i.e. spectacle lens and contact lens, shows that the two "systems" or corrections differ in many respects and result in the fact that the vision performance of a contact lens wearer and the vision performance of a spectacle wearer can be quite different. In clinical terms these "differences" can be used to advantage, and sometimes these "differences", if not appropriately identified by the practitioner, can create or cause additional vision problems or discomfort for the patient. Since this is the case, it logically follows that prior to prescribing contact lens therapy the practitioner should carefully consider the keratometer findings, the nature and type of the refractive status, the accommodative status and the status of the oculomotor-sensory mechanism.

In other words there should be three "diagnoses" which relate to the vision performance status of the patient at the time of the examination:

(i) Diagnosis of ametropia —
(a) type of refractive error
(b) indications of axial or refractive etiology.

(ii) Diagnosis of the accommodative function.

(iii) Diagnosis of the oculomotor-sensory function.

On the basis of these three diagnoses the practitioner can make certain predictions, select the appropriate form of lens and/or orthoptic therapy and counsel the patient accordingly.

It may very well be that to satisfy the patient's vision needs and vision

cont'd on p. 55

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CONGRESS PAPER

GAS-PERMEABLE HARD CONTACT LENSES*

Brian Garnett[1]

The purpose of this paper is to discuss gas-permeable hard contact lenses. Either some presently available type of lens or some as yet undeveloped material will no doubt replace the conventional polymethylmethacrylate hard lens, and may conceivably displace a large percentage of the soft lenses currently in use. Only time will prove these prognostications but it is intended herein to review the current status of several materials now available and outline some of the problems which will demand our greatest attention with these new lenses, with particular emphasis on three-and-nine o'clock staining.

There is one gas-permeable lens which the writer believes to have been improperly labelled as a gas-permeable lens since its permeability is so low. The material is generally referred to as modified PMMA; one example of it is the BP-Flex lens.

The oxygen permeability has been shown[1,2] to be such that lenses with no tear pump in the thickness of 0.05mm or less will allow about one-half the minimum oxygen necessary to avoid clinically detectible edema.[3] Even though lenses of this material are usually made in an ultra-thin design, it is rare that thicknesses of 0.05mm exist, so the resultant oxygen transmissibility of most lenses is of little clinical significance. The material does however have improved surface wetting characteristics and the thin design does provide for reduced lens mass and some small degree of lens flexure, all of which should improve the efficiency of the tear pump. It is likely that these factors as much as the gas-permeability provide for the success of the modified PMMA lenses.

This type of lens is likely to play only a secondary role in hard lens fittings of the future in light of the advent of other more permeable materials. They may serve however to help out the patient who oscillates from day to day just at the edema detection threshold with standard PMMA lenses.

Cellulose acetate butyrate or C.A.B. lenses have received the most attention in the professional literature of all the gas-permeable hard lenses on the market. Two of the properties of this material deserve special attention — oxygen permeability and dimensional stability.

First of all, its oxygen permeability is not high but high enough that most lenses of standard thickness should prevent clinically observable corneal edema for normal daily wear. Hill[4] has shown that even without a tear pump, oxygen levels beneath the lens would reach two percent, the mid-point of the Polse and Mandell edema detection threshold range,[3] as long as the thickness is 0.10mm or less. Fatt[5] has shown that with commonly obtained tear film thicknesses and tear-mixing efficiencies, oxygen levels to satisfy the Polse/Mandell criterion are achievable with thicknesses down to at least 0.15mm. It has been stated that C.A.B. is thirty per cent more wettable than PMMA as well,[6] which would augment tear movement allowing thicknesses even greater than 0.15mm without detectible edema.

Careful inspection for central circular clouding is still imperative. Particular attention should be paid to those patients with thick lenses, tight fitting lenses, or low-riding stationary lenses since they are the most suceptible to oxygen deficiency.

Concerning the use of C.A.B. lenses during sleep, Sarver and Staroba[7] have shown that periods of lid closure with C.A.B. lenses caused excessive corneal swelling. They conclude that significantly better oxygen diffusion properties will be needed to consider wearing of C.A.B. lenses during periods of lid closure.

The news is not good about the second property of C.A.B. lenses; their ability to maintain their original base curve, sometimes referred to as their dimensional stability. Since C.A.B. lenses absorb about two per cent water, they are subject to significant changes in base curve during periods of hydration and dehydration.

Several investigators have studied these changes.[8-11] The results reported could be summarized as follows:

1. Moderate to high power minus lenses steepen within the first ten minutes of hydration, return to normal in about an hour and then stabilize just slightly flatter than the original dry state. Then after about four days of hydration, lenses over about ten diopters flatten as much as two diopters.
2. Plus lenses are relatively stable, showing less than a half diopter of flattening within the first two hours followed by a return to the original dry state reading.
3. The thinner the lenses, the greater are the variations in base curve for lenses having all other parameters equal.
4. A significant amount of uniform toric lens warpage is frequently detectable in radiuscopic measurements.
5. At other times the end-point of the radioscope measurement is uncertain because of an irregular base curve distortion.

The studies from which this information was obtained used lathed lenses. Some types of C.A.B. lenses

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are now molded. It is possible that the stresses within a molded lens are less and therefore the stability greater. It may be true that the distortion is less, but the author's clinical experience with one molded C.A.B. lens, the Danker and Wohlk lens has shown that time irregularities just cited still occur.

C.A.B. lenses therefore offer a significant physiological advantage over PMMA lenses but do have frustrating problems of lens instability which can affect vision or the fitting characteristics of the lenses.

A very promising group of gas-permeable lenses is the silicon-PMMA combination type. Lenses such as the Boston lens from PCL, the Polycon lens from Syntex, and the Minicon 0_2 (PHCL) lens from N & N fall within this category. These would appear to be the best hard lenses currently available. They offer a permeability superior to the C.A.B. lens and far better dimensional stability.

A review of the differences between these three similar lenses is in order, beginning with the Boston lens from PCL. Its primary advantage over the other two is that the fitter has freedom to specify lens parameters. Virtually any former hard lens fitting design or any new design which the gas-permeable lens allows can be employed. The exception would be lenses modelled after the Korb technique which are very thin, high-riding lenses. It is claimed that the fragility of the plastic will not safely allow center thicknesses less than that of standard PMMA thickness, which is too thick for the Korb design.

One weakness of the Boston lens, then, is the requirement that the lenses be at least standard PMMA thickness. We have begun to order for problem cases lenses about thirty per cent thinner and using lenticular design where appropriate to see if lens thickness can safely be reduced. To date the damage rate has not been remarkable, which would suggest that fears of lens fragility may be largely unfounded. Dr. Jack Morgan of Kingston compared the rate of lens damage for two groups of patients using Boston lenses.[12] One group had never worn hard lenses before, the other had previously worn PMMA lenses. He found twice the incidence of damaged lenses in the group of previous wearers.

Other characteristics of the Boston lens and its manufacture worth noting are:

1. Stability of the material showing no more base curve distortion than PMMA lenses.
2. Good quality assurance. Measurable lens parameters seldom exceed tolerances.
3. Similar fitting characteristics to PMMA lenses of the same parameters.

The Polycon lens manufactured by Syntex Ophthalmics is another silicon-PMMA lens which will be available in Canada very soon.

Polycon lenses have less oxygen permeability than the Boston lens material.[13,14] The permeability constant or DK value has been reported between 4.2 and 5.0 x 10-11 ml 0_2 cm^2/sec. ml mm Hg for the Polycon lens[13,14] and 7.4 x 10-11 ml 0_2 cm^2/sec. ml mm Hg for the Boston lens.[15] The permeability constant is a figure describing the oxygen permeability of a material and can be stated without reference to a specific lens thickness. Equivalent oxygen percentage of a lens is a description of oxygen levels more frequently used but it must be stated relative to a specific lens thickness. The two values are related and the equivalent oxygen percentage can be calculated from the permeability constant.[16]

Syntex claims to be able to make the lens thinner than the Boston lens while retaining a strength equivalent to PMMA lenses of the same thickness. The thickness of a Polycon lens for example would be 0.08mm for a -4.50 diopter lens and 0.15mm for a plano lens. The difference in the thickness between it and the thicker but more permeable Boston lens would allow for a similar equivalent oxygen percentage available to the cornea. What one loses in permeability with the Polycon lens, one gains in the shorter distance the oxygen has to travel through the thinner Polycon material. Both lenses would have about a five per cent equivalent oxygen percentage for the -4.50 diopter lens just mentioned.

By way of comparison, the C.A.B. lens has an oxygen permeability reported[5] between 3 and 5 x 10^{-11} ml 0_2 cm^2/sec ml mm Hg and thicknesses similar to those of the Boston lens. The oxygen transmissibility (permeability/thickness) of the C.A.B.lens should therefore be about one-half that of the Boston lens and the similar Polycon lens.

Syntex have chosen to adopt, presumably for economic reasons a one-size-fits-all philosophy, much like that of some of the soft lens manufacturers. The size is to be 9.5mm with an 8.4mm optic zone and a standard series of peripheral curves. The laboratory's philosophy that practitioners will have to find eyes to fit their lens parameters rather than the converse is one which should be rejected by the professions.

It is for this reason that the author's experience with the third lens in this category, the N & N Menicon O^2 lens is limited. It too is a one-size lens, this time 9.2mm diameter/8.0mm optic zone for non-aphakic lenses. Its thickness lies about half way between that of the Boston and of the Polycon lens. Published permeability data in the literature from N & N rates it as slightly higher than that of the Polycon lens[17]. Taking into consideration the thickness differences of the three silicon-PMMA lenses, they should all provide nearly equal oxygen levels to the cornea.

Correspondence with practitioners who have used the N & N lens extensively indicates impressive results, similar to those published for the Polycon lens[18] and those of the author for the Boston lens. This would support the hypotheses that all three lenses would provide similar oxygen levels and certainly sufficient oxygen levels for most patients.

Similarly, all three lens types should prove invaluable in refitting those long-term hard lens wearers whose corneas have become distorted from years of full-time wear such that spectacle refraction is nearly impossible. Frequently in these cases a low-grade corneal edema exists as well, leading to edematous corneal formations.[19]

Kame has recently published a study of 26 patients with edematous corneal formations.[13] Historically this type of patient has been treated by removal of lenses for several weeks which allows for a disap-

pearance of the edematous corneal formations. Kame has found that refitting these patients with Polycon lenses allows for as rapid and as complete a remission from the edematous corneal formation as totally abstaining from the lenses.

The major benefit to the patient of course is the avoidance of the period of inadequate vision with outdated spectacles before proper spectacles or contact lenses can be prescribed. Similar remissions should occur with any of the silicon-PMMA lenses.

As a result of the development of the oxygen-permeable hard lens there should be a resurgence of interest in hard lens designs and fitting techniques. A new-found freedom from the constraints of oxygen needs will allow closer attention to resolving other physiological and optical problems. Although fitters will have to be ever-watchful for the presence of corneal edema in highly sensitive patients, the physiological problem likely to surface as the most troublesome will be what is known as juxtalimbal staining, three-and-nine o'clock staining, or limbal exposure keratitis.

In its most innocuous form it presents as transient mild punctate staining in the lateral peripheral portions of the cornea, those portions not covered by the contact lens. In other cases the punctuate epithelial disruptions coalesce to form larger areas easily visible without flourescein staining. In yet other cases, the staining extends around the entire lower limbal area. Even in the milder forms of three-nine staining, the conjunctival blood vessels adjacent to the corneal disturbance become engorged causing an unisightly red eye. Often this is the presenting complaint rather than discomfort. In more severe cases, non-staining grey sub-epithelial plaques form at the limbus. In the worst cases, such a severe epithelial disturbance occurs that there develops a reduction in corneal thickness in the juxta-limbal area. It is thought that this localized thinning is similar in origin to dellen, a rare pathologic thinning of the cornea caused by a localized discontinuity of the pre-corneal tear film.[20]

Three-and-nine o'clock staining is not a rare complication of hard lens wear. Varying degrees of this phenomenon occur persistently in as many as twenty-five per cent of all hard lens wearers.[21]

There have been several theories proposed to explain the existence of this form of staining. Unfortunately no one feels that oxygen deficiency is the cause, so one would deduce that gas-permeable lenses should do nothing to prevent or reduce three-nine staining. Our experience with the various types of gas-permeable lenses would support this deduction. We have found what seems to be greater numbers of cases of three-nine staining but this may only be a false impression because of the greater numbers of patients able to have their corneal oxygen needs satisfied and wear lenses long enough to manifest the staining.

Several theories have been proposed to explain three-nine staining. What follows is a review of the scientific support for each where it exists, and suggestions for treatment which follow from each theory.

The first is the theory that pressure from the lens edge, peripheral curve, or secondary curve are irritating the tissue. Presumably cases of with-the-rule corneal toricity would be worst since greater pressure from lens bearing would be applied to the flatter horizontal corneal meridian. This does seem unlikely since those portions of the cornea which stain are peripheral to the points of lens contact. Nothing could be located in the literature which supports what would seem at first glance to be a logical theory.

Others have postulated that contact lens wearers secrete an excess of lacrimal fluid, thereby creating a dilution of the elements of the tears responsible for maintaining epithelial integrity.[22] This theory too seems to suffer from a lack of scientific support.

Before commenting on the remaining three theories it would be useful to review briefly the composition of the pre-corneal tear film, its secretion by the various glands, and its distribution, by the eyelids.

The tear film is generally considered to have three layers. The thin oily outermost layer consists mostly of lipids secreted by the Meibomian glands and the glands of Zeis and Moll. Almost the entire seven micron thickness of the tear film is formed by the next layer, the aqueous layer, which is secreted by the main and accessory lacrimal glands. The innermost mucus layer is an extremely thin semi-solid mucin coating of the epithelium. Its shape under high magnification parallels the microvillous morphology of the superficial epithelium. Its origin is primarily the goblet cells of the palpebral conjunctiva.

It has been proven that this innermost layer of the tears is the one critical to corneal surface wetting and tear film stability. Lemp *et al*[23] published in 1970 results of an experiment using rabbit corneas and solutions matching as closely as possible human tears. He was able to remove the mucus layer from corneas. In this state, the cornea proved to be unwettable by the tear solutions. By smearing a mucus film lightly over the surface of the corneas, they became completely wetted with a drop of tear solution.

The leading edge of the upper lid has been shown to be the applicator of ocular mucus.[20] The tarsal border is the only part of the upper lid to apply any pressure to the corneal surface during the blink. It applies a force across the globe which is greatest at the apex of the cornea and least at the limbus. Quite possibly then, a difference across the cornea exists in the quality or quantity of ocular mucus laid down.

The downward movement of the upper lid with each blink is coincident with an upward reflex rotation of the eyeball. This movement is known as Bell's Phenomenon.

When the eyelids open, a uniform three-layered tear film forms almost instantly on the normal cornea. This tear film remains stable for a period of time which has come to be termed tear breakup time — the interval between a complete blink and the first randomly distributed dry spot. Some of the lipid from the superficial layer of the tears migrates through the aqueous layer, contaminates the inner mucus layer, and leads to the formation of a corneal dry spot. Epithelial damage can result if this dry spot is not immediately rewetted. Tear breakup time is the best method of measuring the stability of the tear film and is an indirect measurement of the quality and/or quantity of the mucus layer of the tear film.

This brief review of tear physiology will serve as background for the remaining three theories of three-nine staining.

The first might be called the lacrimal deficiency theory. It is postulated that some people have either reduced mucus secretion or have a type of mucus inadequate for guaranteeing tear film stability and this leads eventually to three-nine staining.

Lemp, Dohlman and Holly[24] have shown by conjunctival biopsies of five patients with exaggerated dry eye problems either an absence of, or a severe reduction in, the numbers of conjunctival goblet cells. Interestingly, these patients all had normal aqueous tear volumes. Although not yet proven, it is conceivable that other patients have only a minor reduction of goblet cell count or goblet cell production which only becomes clinically apparent under situations such as breakup time testing or wearing hard contact lenses. These findings suggest that we should perform BUT tests on prospective contact lens patients to rule out gross mucin deficiencies. No studies appear to have been done correlating BUT with three-nine staining, although this would seem to be an obvious study to test the hypotheses that mucin deficiency is the cause of three-nine staining.

Some recent work by Korb and Herman[25] with sequential staining of the cornea offers hope as a predictor of poor contact lens candidates as well. By staining the tear film at five minute intervals with fluorescein, they found forty-two per cent of people showing corneal staining, most of them only after repeated instillations of dye. This could be another technique for assessing the effectiveness of the tear film in keeping the cornea wet which may relate to the three-nine staining problem.

The next two theories of three-nine staining postulate deficiencies not in the production of mucus but in its distribution by the eyelids.

The first is that the contact lens inhibits the completeness or the frequency of the blink. A study of six patients published in 1969 by Sarver, Nelson & Polse[26] supports this theory. Of six hard lens wearing subjects, five had varying degrees of three-nine staining in both eyes. They were asked to wear one contact lens only for four hours, during which time the blinking pattern was monitored. All five with three-nine staining continued to demonstrate the staining in the eye with the contact lens. However, three of the five showed staining of the contralateral cornea as well. These three had unusually low blink frequencies or blink amplitudes as well. The study demonstrates that blinking is at least one of the factors responsible for three-nine staining. A similar study by Korb and Exford[27] the next year also implicated the blinking mechanism in three-nine staining.

The final theory is the "bridging theory". It is felt by many investigators that the thickness of the contact lens causes lid-globe congruity to be poor in the area adjacent to the lens. This results in a poorly distributed mucus layer in the juxta-limbal areas, leading to local instability of the tear film. Dry spots appear and damage is done to the epithelial cells through evaporation.

As reported, the application of mucin in the limbal area is likely to be naturally the least complete. If the application of mucin is further weakened by the thickness of the contact lens edge, then it seems reasonable that this area should suffer some tear film instability.

Personal observations have supported the statement often appearing in the literature that three-nine staining is more frequent and severe in highly myopic hard lens patients. Presumably the extra edge thickness of these lenses causes the greatest lid gap and poorest mucus layer rejuvenation in lateral juxta-limbal areas.

Scientific evidence seems to support the last three of these theories; that is, that three-nine staining can be caused by a deficiency in secretion by the goblet cells, or by a deficiency in spreading of this mucus layer by an inadequate blink pattern or by a bridging effect of the upper lid by the lens.

Attempts at remediation should therefore be first directed towards the detection of these deficiencies. Assessment of the adequacy of mucus production can be estimated by doing tear breakup time tests and to some extent by single or sequential staining of the cornea with fluorescein. Mucus deficiency would be expected in certain inflammatory conditions of the conjunctiva which reduce the goblet cell population, such as avitaminosis A, ocular pemphigoid, and Stevens-Johnson disease. If medication is being taken which reduces mucus membrane secretion, there is also a potential problem with dry eyes.

If one is faced with a mucin-deficient eye, then the best advice is probably to forget contact lenses. As a last resort, one may wish to try artificial tears. Burton Parsons' Adsorbotear has been shown to have the greatest retention time,[28] but to date nothing has been formulated to match the conjunctival mucin in its ability to adsorb to the cornea and create a hydrophilic surface.

In cases where blinking seems to be inappropriate, one must determine if some aspect of lens fit is inhibiting the blink. For example, sometimes a small interpalpebral lens leads to an incomplete blink and a low-riding lens. When the excursion of the upper lid is only to the top edge of the lens, desiccation of the lower three-nine o'clock peripheral cornea is inevitable.

Modifications to the lens to make it more comfortable, such as blending and polishing of the secondary and peripheral curves, removing lens scratches, and optimum finishing of the lens edge will encourage complete blinking by improving lens comfort. As a general rule, small interpalpebral lenses are the most likely to cause peripheral corneal staining because of their inhibition of blinking. Often remaking the lens to a larger type high-riding lens is needed.[29]

Korb[30] has described the normal blink as one in which only the smaller palpebral fibres of the orbicularis oculi muscle contract. In an abnormal blink the larger orbital portion of the muscle contracts as well. Bell's Phenomenon occurs with the normal blink but disappears in the abnormal blink when the sphincter action of the orbital portion of the muscle appears. This inappropriate action often appears during adaptation to contact lenses, causing an inhibition of Bell's Phenomenon. It is Bell's Phenomenon which Korb feels is essential to maximize lens movement on the eye dur-

ing the blink and to provide for adequate re-wetting of the corneal surface. He has outlined a blinking training procedure[28] for new contact lens patients which teaches them to blink naturally with a foreign body on the eye. He instructs the patients to touch the orbital rim at the outer canthus while blinking. If any inward tugging is felt, then the wrong muscles are being used and Bell's Phenomenon is not operating optimally.

Cases in which bridging seems to be taking place present the biggest challenge to the hard lens fitter. The objective of lens design is to make the lens edge as thin as possible.

The best hard lens design with thinness of the lens as a primary component is the Korb technique.[30] With this system the lens is fitted flatter than the flattest corneal meridian, is made extremely thin, and has peripheral and edge contours that encourage the upper lid to catch the edge of the lens and hold it in a high-riding position.

The design of the Polycon lens is a modification of the Korb technique. As a result, it should lead to a lower incidence of three-nine staining than the C.A.B. or Boston lenses.

Since C.A.B. and Boston lenses apparently cannot be made as thin as Korb would suggest, the other modifications that can be employed in an attempt to reduce three-nine staining would include:

— ordering the minimum allowable center thickness
— ordering lenticularization of high minus lenses and thick plus lenses
— the use of some minus carrier to lenticular lenses to encourage a high-riding lens
— going larger with the lens so that more of the peripheral cornea is covered. This offers less corneal area to suffer the effects of evaporation.
— a technique once employed by the author for a patient with persistent staining and injection was to fit a plano-T Bausch and Lomb Soflens between the eye and the offending Boston lens. Corneal edema became apparent at ten hours of wear but the injection and staining disappeared. The patient, if pressed to wear the lenses longer, would simply take out the soft lens and wear the hard lens alone for a few hours. Removal of the soft lens would allow recovery from the edema and the hard lens alone would not be worn long enough to create the peripheral staining problem.

These are some of the suggestions to relieve what may become the most difficult problem to solve for gas-permeable hard lens wearers.

Other hard lens problems, particularly refractive ones, can be attacked much more vigorously with gas-permeable lenses than with the PMMA lenses. The limitations imposed upon lens parameters by corneal oxygen demands will be relaxed. Thus larger lens diameters and optical zones can be prescribed for those suffering flare, thicker prism ballast front surface toric lenses can be prescribed to compensate for residual astigmatism, back surface toric lenses, or combination front surface/back surface toric lenses can be fitted to the highly toric cornea, vertical prism so often omitted from contact lens correction can be included, and presbyopic correction lenses can be provided when they become available.

Correction of these optical problems will always be a challenge but given the freedom of design which gas-permeable lenses will allow, practitioners will be able to provide contact lens correction for an ever-expanding population. Further challenges in keeping abreast of the advances in materials, lens designs, and diagnostic techniques will make this an exciting field for many years.

References

1. Hill, R.M. and N.J. Bailey: Can oxygen pass through PMMA? *Int. C.L. Clinic* 5(1): 29-31, 1978.
2. Stranch, L.A.W.: Relative oxygen permeability of rigid contact lens materials related to centre thickness: A preliminary report. *Int. C.L. Clinic* 5(1) 5-9, 1978.
3. Polse, K. and R.B. Mandell: Critical oxygen tension at the corneal surface. *Arch. Ophthal.* 84(4) 505-508, 1970.
4. Hill, R.M.: C.A.B.: A practical contact lens option? *J. Am. Optom. Assoc.* 48(3): 387-389, 1977.
5. Fatt, I., and D. Lin: Oxygen tension under a hard, gas-permeable contact lens. *Am. J. Optom.* 54(3): 146-148, 1977.
6. Stahl, N.O., Reich, L.A., and E. Ivani: Report on laboratory studies and preliminary clinical application of a gas-permeable plastic contact lens. *J. Am. Optom. Assoc.* 45(3): 303-307, 1974.
7. Sarver, M.D. and J.E. Staroba: Corneal edema with contact lenses under closed eye conditions. *Am. J. Optom.* 55(11): 739-743, 1978.
8. Pearson, R.M.: Dimensional stability of several hard contact lens materials. *Am. J. Optom.* 54(12): 826-833, 1977.
9. Pearson, R.M.: Dimensional stability of lathe cut C.A.B. lenses. *J. Am.Optom. Assoc.* 49(8): 927-929, 1978.
10. Sarver, M.D., Gold, G., Trezza, J. and D. Lopez: Stability of C.A.B. contact lenses with hydration. *J. Am. Optom. Assoc.* 49(12): 1377-1380, 1978.
11. Stone, J.: Changes in curvature of cellulose acetate butyrate lenses during hydration and dehydration. *J. Brit. C.L. Assoc.* 1(1): 22-35, 1978.
12. Personal communication at Boston Lens Seminar. Toronto, March 17, 1979.
13. Kame, R.T.: Clinical management of edematous corneal formations. *Rev. Optom.* 116(4): 69-71, 1979.
14. Sarver, M.D., Polse, K.A. and M.G. Harris: Patient responses to gas-permeable hard (Polycon® contact lenses. *Am. J. Optom.* 54(4): 195-200, 1977.
15. Rosenthal, P.: The Boston Lens: Theory and Practice. Polymer Technology Corporation.
16. Loshack, S. and R.M. Hill: Oxygen permeability measurements: Correlation between living eye and electrode chamber measurements. *Int. C.L. Clinic* 4(6): 26-29, 1979.
17. Hirano, J., Tsuda S., and K. Tanaka: A report on experiments with Toyo's super gas-permeable hard contact lens, prepared for International Contact Lens Congress under the auspices of Australian Optometric Association., July, 1978.
18. Williams, C.E.: New design concepts for permeable rigid contact lenses. *J. Am. Optom. Assoc.* 50(3): 331-336, 1979.
19. Korb, D.R.: Edematous corneal formations. *J. Am. Optom. Assoc.* 44(3): 246-253, 1973.
20. Mackie, I.: Localized corneal drying in association with dellen, pterygia, and related lesions. (from Symposium on the dry eye.) *Trans. Ophthal. Soc.* U.K. XCI 129-145, 1971.
21. Lester, R.W.: Limbal exposure keratitis and contact lenses. *Int. C.L. Clinic* 5(5): 243-247, 1978.
22. Berglund, J.H.: Lacrimation in its relation to corneal contact lens wear. *Optom. Weekly* 60(4): 15-16, Jan. 23, 1969.
23. Lemp, M.A., Holly, F.J., Iwata, S., and C.H. Dohlman: The pre-corneal film, I. Factors in spreading and maintaining a continuous tear film over the corneal surface. *Arch. Opthal.* 83(1): 89-94, 1970.
24. Lemp, M.A. Dohlman, C.H., and F.J. Holly: Corneal desiccation despite normal tear volume. *Ann. Ophthal.* 2(3): 258-261, 1970.
25. Korb, D.R. and J.P. Herman: Corneal staining subsequent to sequential fluorescein instillations. *J. Am. Optom. Assoc.* 50(3): 361-367, 1979.
26. Sarver, M.D., Nelson, J.L., and K.A. Polse: Peripheral corneal staining accompanying contact lens wear. *J. Am. Optom. Assoc.* 40(3): 310-313, 1969.
27. Korb, D.R. and J.M. Exford: A study of three and nine o'clock staining after unilateral lens removal. *J. Am. Optom. Assoc.* 41(3): 233-236, 1970.
28. Holly, F.J. and M.A. Lemp: Review: Tear physiology and dry eyes, *Surv. Ophthal.* 22: 69-87, 1977.
29. Farkas, P., and T.W. Lassalow: Case report: Procedure to solve nasal-temporal staining in the non-blinker. *J. Am. Optom. Assoc.* 44(3): 274-277, 1973.
30. Korb, D.R. and J. Exford Korb: A new concept in contact lens design - Paris I and II *J. Am. Optom. Assoc.* 41(12): 1023-1032, 1970.

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Optometry Students Provide Eye Care for Jamaicans

Dr. Raymond Pellowe, University of Waterloo optometry professor, spent six days in Jamaica last fall delivering 260 pairs of glasses prescribed by a team of UW students who visited the island during the summer. The students spent a month there conducting more than 1,500 eye examinations.

This was the first time since 1976 a team of UW optometry students has visited the Caribbean. Previously, the Canadian International Development Agency supported such visits annually, however CIDA has since changed its priorities.

The project this year was initiated by Lions clubs in Jamaica who raised the air fare for the three students forming the team and provided lodging for them and a supervisor for one month. Air Canada provided a return air fare for one supervisor. The Jamaicans are concerned because there are simply no vision care services available on many parts of the island, especially for low-income groups. Indeed, in recent years, statistics indicate, there has been a reduction in the number of health care practitioners available throughout Jamaica.

"The trip was a wonderful morale booster for the students," Dr. Pellowe says. "Some of the people our students helped were so grateful they became quite emotional . . .that is when they learned what a difference good vision can make."

The students were paid a stipend for their efforts. The money for these stipends came from donations from Ontario Lions clubs, private individuals and other sources. The cost of the glasses Dr. Pellowe delivered was also paid for, in large measure, by donations from Lions clubs and other individuals.

A Trenton optometrist, Dr. L.A. Coward, supervised the students during the early part of their month. Dr. William Coomb, Toronto, was with them for the balance. Neither optometrist accepted any pay for this service. In addition, Dr. Coomb paid his own way to Jamaica. The students were: Andy Patterson, Ottawa; Steve Matthew, Chatham, Ont., and Gerald Leinweber, Jasper, Alta.

Dr. Pellowe says Jamaicans have urged UW's school of optometry to send another team of students this year. Whether this happens depends on the availability of adequate funding. The best solution, said Dr. Pellowe, would be to see more Caribbeans trained in optometry abroad so they can return home to practice.

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Study Shows Injuries Occur Frequently From Soft Lenses With High Water Content*

Investigations in Japan have shown that many high water content soft lens wearers suffer from injury during a short period of wearing time, and that doctors must be very carful in prescribing these lenses and in assuring after-care.

The study, by Hikaru Hamano, M.D., and others of the Department of Ophthalmology, Osaka University Medical School, was based on wearing tests made on human and rabbit eyes and compared with results using ordinary soft lenses.

In explaining the results, Dr. Hamano stressed that "the water in high water content soft lenses evaporates easily. If the water supply through tearing cannot compensate for the amount of evaporation, tears between the cornea and the lens are absorbed into the lens and the normal clearance cannot be kept constant."

In the extreme case, he observed, there is even a possibility that the water will be absorbed in the epithelial cells. This could injure the epithelial layer.

Another possible explanation for lens injury is the considerable variation of base curve or deformation of the lens due to evaporation, he explained. "This would give the dynamic force to the cornea and the movement of the soft lens by blinking would be suppressed. This would prohibit tear exchange."

In order to ensure the applicability of high water content soft lenses for extended continuous wear, it is necessary to ascertain that they are safer than the ordinary soft lens on wearing at least half a day, Dr. Hamano commented. One of his studies included examinations of the cornea and conjunctiva by slit lamp every two hours of both eyes of 10 subjects who had not worn contact lenses. An ordinary soft lens with 30 percent water content was applied to one eye, and a high water content soft lens containing 65 percent water on the other eye.

"In the high water content soft lens, some kind of injury was recognized after two hours of wearing in five eyes," he stressed. "During six hours of wearing, staining was recognized in seven of the 10 eyes."

In a similar experiment conducted with high water content soft lenses containing 70 percent water, staining was seen on six out of 10 eyes, he reported. "In contrast, with ordinary soft lenses containing 30 percent water, slight staining was seen on only two lenses, after two and six hours."

Because high water content soft lenses produce injury more frequently, this implies that they produce more risk than the ordinary soft lens, Dr. Hamano commented.

The typical epithelial abrasion induced by wearing of high water content soft lenses is apt to occur in the wide region from the central or negative zone to the peripheral zone of the cornea, he said. "Irregularity is induced on the epithelial layer of cornea and epithelial edema can be recognized partly. Thus as a whole, complex morphology is realized."

Calling the high water content lens "superb from the standpoint of physical properties," Dr. Hamano noted that "it seems there are some elements which would have a negative effect on the physiology of the cornea." To elucidate those elements he conducted several other experiments.

In one study he examined the weight loss of soft lenses of the same thickness containing 30 percent and 65 percent water and subjected them to atmospheric evaporation under the same conditions. The high water content soft lens dried more quickly, with 62.7 percent of the water evaporating within 30 minutes. Evaporation was 50.8 percent in the ordinary soft lens.

The amount of evaporation was not as great in tests conducted on human eyes due to the tear supply. The high water content lens showed a much higher degree of evaporation, however.

In measuring deviation of base curve with the time of wearing soft lenses of the same thickness by an electronic device, Dr. Hamano found that as the water evaporated from the lens, the base curve became smaller. The high water content soft lens showed a larger deviation.

"Recently many people have shown a great deal of interest in continuous wearing of high water content soft lenses with good oxygen permeability," Dr. Hamano observed, "Continuous wearing is what we have been longing for as an ideal status. We cannot deny the fact, however, that there remain many problems in the safe application of high water content soft lenses."

*Reprinted from the Optometric Observer & Contact Lens News, Vol. 3, No. 2, March-April, 1978.

Australia Loses. . .

(cont'd. from p. 15)

sions; acceptance of a philosophy of professionalism and its increasing embodiment in statutory controls and everyday mode of practice; extension of influence and concern by Australian optometry to optometry elsewhere through involvement with IOOL, the sponsorship of IFAPAO and the provision of clinical aid teams to underpriviledged countries; up-grading of undergraduate education in optometry; promotion of continuing education as an integral part of professional life; improvement of neglected areas of optometric endeavour such as low vision and children's vision; development of significant AOA member services such as malpractice insurance, travel services, directories and clinical manuals, low-cost practice insurance; achievement of deserved self-respect and pride among optometrists as primary care practitioners and the institution of effective communication channels between all levels of optometry.

HOW IS YOUR RRSP PERFORMING?[1]

Optometrists, like many other Canadians, are interested in providing for retirement by taking advantage of the provisions in the Income Tax Act allowing a certain percentage of taxable income to be set aside in a Registered Retirement Saving Plan. As with many other consumer services that are in public demand, there has developed a very competitive RRSP market that has banks, trust companies, credit unions, life insurance companies and mutual funds sponsoring a wide range of investment programs. There are many variables that must be considered before selecting an appropriate RRSP and the financial institution that can ensure the most competitive return on your money.

Fortunately, a leading Canadian weekly, the *Financial Post*, published a comparative report on RRSP's in their January 26, 1980 edition. The report will prove to be extremely valuable to all of us who either have money invested in an RRSP or are considering opening a program for the 1980 taxation period.* The following tables will give you the needed basis upon which to make your future RRSP decisions as an informed consumer.

The article points out that two popular types of RRSPs are variable-rate deposits and Guaranteed Investment Certificates (GICs) or term deposits offered by deposit-taking institutions.

A variable-rate deposit is essentially a savings deposit: the rate may change frequently, reflecting the trend in interest rates generally, but the money can be withdrawn or transferred to another RRSP at any time.

GICs and term deposits are generally available in one to five year terms and you're usually locked into the term with a fixed rate paid on the principal throughout the term.

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*We regret our publication dates did not permit us to bring this information to you by the February 29 RRSP closing date for the 1979 taxation period.

[1]Parts of this article are reprinted from the *Financial Post*, Jan. 26, 1980, with permission.

The following tables cover a cross-section of variable-rate and five-year, GIC and term deposit plans offered by banks and trust and loan companies. The tables were prepared by Fiscal Agents, Oakville,Ontario.

Variable-rate deposits

At the banks:	Quoted rate* %	When interest compounded	When rate may be adjusted	Registration fee $	Termination fee $	Annual fee* Max. $	Annual fee* Min. $	Minimum initial investment (and minimum subsequent investment where applicable.) $
Bankof B.C.	12.25	Semi-ann.	Semi-ann.	nil	50 if cancelled within 90 days	50	20	No minimum
Bank of Montreal	12.25	Semi-ann.	Semi-ann.	nil	nil	55	—	50(25)
Bank of Nova Scotia	12.25	Semi-ann.	Monthly	nil	10	25	—	200
Commerce	12.5	Semi-ann.	Monthly	5	15	25	6.50	50
National	12.25	Semi-ann.	Monthly	nil	25 on cancellation (15 on retirement)	25	—	100(50)
Royal	12.25	Semi-ann.	Monthly	5	10	25	6	100(15)
Toronto Dominion	12.25	Semi-ann.	Monthly	5	15	25	6.50	250(100)
At the trust & loan companies:								
Canada Permanent	12	Annually	Daily	nil	nil	nil		No minimum
Canada Trustco	12.5	Semi-ann.	Monthly	nil	nil	nil		250
Co-op Trust	10	Semi-ann.	Daily	nil	nil	nil		100
Credit Foncier	12.5	Semi-ann.	Quarterly	nil	nil	nil		No minimum
Crown	11	Semi-ann.	Semi-ann.	nil	nil	nil		No minimum
Eaton/Bay	11.5	Quarterly	Quarterly	nil	nil	25	10	25
First City	13	Annually	Quarterly	nil	nil	nil		25
Guaranty	11.25	Quarterly	Quarterly	nil	nil	nil		No minumum
Hellenic Cdn.	12	Semi-ann.	Daily	nil	nil	nil		500
Montreal	12.25	Quarterly	Monthly	nil	25 if within one year	¾ of 1%		No minimum
National	11.75	Monthly	Monthly	nil	$100 if within one year	nil		100
North West	11.5	Semi-ann.	Daily	nil	¼ of 1% if within one year to max.$100	nil		10(25)
Nova Scotia Savings	12.25	Semi-ann.	Monthly	nil	nil	nil		No minimum
Principal	12.05	Semi-ann.	Semi-ann.	nil	nil	nil		No minimum
Royal	12.5	Quarterly	Quarterly	nil	nil	nil		25
Sterling	12	Semi-ann.	Monthly	nil	nil	nil		100
Yorkshire	12+	Semi-ann.	Monthly	nil	nil	nil		No minimum

* Bank annual fees are taken out of interest (reducing the quoted rate) or principal. These charges consist of administration fees and trustee fees. In the case of Montreal Trust and Eaton/Bay annual fees would reduce the effective rate of annual interest paid.
+An inflation bonus is paid.

Five-year GICs and term deposits

	Quoted rate* %	When interest credited	Rate at which interest reinvested	Termination fee $	Annual fee $	Minimum investment $
At the banks:						
Bank of B.C.	11	Semi-ann.	Original	50 if within 90 days	nil	500
Bank of Montreal	11.25	Semi-ann.	Original	nil	25 max.	1,000
Bank of Nova Scotia	11.25	Semi-ann.	Original	10	25 max.	1,000
National	11.25	Annually	Original	1% of value to $50 max.	nil	1,000
Toronto-Dominion#	11.5	Semi-ann.	Original	15	Max. 25 Min. 6.50	250
At the trust & loan companies:						
Canada Permanent	10.75	Annually	Original	nil	nil	500
Canada Trustco	11.25	Annually	Original	nil	nil	500
Continental	11.75	Annually	Original	nil	nil	1,000
Co-op Trust	11.75	Annually	Original	nil	nil	500
Credit-Foncier	11.875	Annually	G.I.C. rate or savings rate at time of crediting	nil	nil	500
District	11.50	Semi-ann.	Original	1% of value to max. $100	nil	No minimum
Eaton/Bay	11	Annually	Original	nil	Max. 25 Min. 10	500
Federal	11	Semi-ann.	Original	1% of value to max.$100	nil	No minimum
Fidelity	11.25	Annually	Original	nil	nil	100
First City	11.5	Annually	Original	nil	nil	500
Fort Garry	11.25	Annually	Original	nil	nil	100
Guaranty	11.25	Semi-ann.	Original	nil	nil	500
Guardian	11	Semi-ann.	Original	½ of 1% of value	nil	No minimum
Hellenic Cdn.	12	Semi-ann.	Original	nil	nil	500
Macdonald/Cartier	11.5	Semi-ann.	Original	nil	nil	500
Montreal	11.25	Annually	Original	nil	nil	500
Morgan	11.25	Annually	Original	nil	nil	1,000
Municipal	11.5	Annually	Original	nil	nil	100
National	11.25	Annually	Original	nil	nil	1,000
Norfolk	11.75	Annually	Original	nil	nil	500
North America	11.5	Annually	Original	100	nil	500
North West	11.25	Annually	Original	nil	nil	500
Nova Scotia	11.5	Semi-ann.	Original	nil	nil	500
Principal	11.75	Annually	Original	nil	nil	1,000
Royal	11.5	Semi-ann.	G.I.C. rate at time of crediting	1% of value to max. $100	nil	200
Standard	11.25	Annually	Original	¾ of 1% of value plus ¼ of 1% if transferred to another carrier max.$100	nil	500
Sterling	11.25	Annually	Original	nil	nil	500
Vanguard	11.25	Semi-ann.	Original	50	nil	1,000
Victoria & Grey-Metro	11	Semi-ann.	Original	1% of value to max. $100	nil	500
Yorkshire	11.5	Semi-ann.	Original	nil	nil	500

#Toronto Dominion charges a registration fee of $5.

* All the banks except Toronto Dominion charge an interest penalty if money is withdrawn before the end of the term. A few trust companies will allow withdrawals before maturity (charging an interest penalty) if the money is transferred to another plan offered by the company.

Recent and Long-term Performance of Various Funds

— Total net assets — Dec 31 1979 $000	Change from Dec 31 1978 %			Net asset value per share Dec 31 1979 $	— Change in value — of investment since Dec 31 1978 %	Dec 31 1974 %	Dec 31 1969 %	Maximum sales redemption charge %
		Equity funds						
9,335	−21	AGF Japan		13.24	−17.2	+168.6	—	9.0
14,693	+13	AGF Special		8.02	+53.5	+370.4	+139.7	(e)
7,891	+18	Acrofund	R	2.12	+42.1	+193.9	—	7.0
12,602(a)	−8	All−Canadian Compound		7.26	+10.4	+108.3	+29.6	(e)
13,585	−9	All−Canadian Dividend		7.93	+10.4	+110.5	+36.3	(e)
897	−8	All−Canadian Northern Energy		5.44	+24.6	+152.3	—	(e)
4,666	−6	All−Canadian 4,000	R	5.05	+12.9	+109.7	—	(e)
59,693	−0.9	American Growth		6.95	+28.2	+107.7	+25.8	9.0
2,592	+22	Associate Investors	R	8.34	+27.5	+141.7	+150.0	1.0
30,970	+18	Beaubran	R	5.83	+27.5	+119.1	+144.1	1.0
5,383	+3	Bolton Tremblay International		9.57	+17.8	+175.3	+65.5	9.0
667	−9	Cambridge Growth	R	7.34	+9.5	+65.3	+80.5	(e)
11,080	+63	Canada Cumulative	R	10.08	+26.8	+258.5	—	9.0
13	−100	Canada Permanent Trust		18.24	+39.8	+121.0	+86.5	nil
26,668	+27	Canada Permanent Trust RSP	R	51.87	+40.5	+125.3	+91.8	nil
23,991	+8	Canada Trust		25.96	+30.8	+130.9	+100.4	nil
85,197	+22	Canada Trust RSP	R	45.64	+34.8	+129.5	+113.7	nil
12,486	+45	Canadian Anaesthetists	R	27.92	+45.7	+186.1	+200.4	nil
63,653	+86	Canadian Gas & Energy	R	7.75	+82.3	+419.4	+259.9	9.0
110,566	+1	Canadian Investment Fund	R	5.73	+21.6	+101.2	+109.0	7.0
8,874	+6	Canadian Security Growth	R	8.80	+23.2	+165.6	+134.8	9.0
10,794	+15	Canagex Fund	R	13.14	+31.9	+139.5	+97.5	1.0
1,660	+38	Capital Growth	R	5.04	+27.1	+151.8	+180.0	5.66
315	−4	Central & Eastern Trust		17.58	+35.2	+98.9	+74.0	nil
716	+9	Central & Eastern Trust RSP	R	27.62	+49.4	+129.0	+96.7	nil
15,002	+18	Collective Mutual		10.97	+25.8	+165.0	+60.9	9.0
1,121	+11	Confed Dolphin	R	6.11	+43.9	+176.0	—	5.5
1,177	+29	Co−operative Trust	R	7.49	+22.4	+145.4	—	nil
500	−9	Co−operators Mutual		14.45	+31.8	+103.2	—	nil
7,432	−3	Corporate Investors	R	7.31	+16.8	+97.6	+81.2	8.0
4,855	+14	Corporate Investors Stock	R	10.21	+41.5	+228.4	+95.2	9.0
10,646	+20	Crown Trust RSP	R	25.71	+38.6	+128.5	+139.8	nil
16,267	+41	Cundill Value		7.82	+29.9	+287.1	+85.9	8.75
2,686	+196	Dixon Krogseth Trust	R	14.15	+80.7	+276.5	—	9.0
3,366	+23	Dominion Compound	R	11.94	+26.1	+135.0	+140.2	3.0
12,523	+75	Dominion Equity	R	14.88	+47.2	+155.2	+184.5	4.0
19,350	+200	Dynamic Fund	R	13.97	+31.0	+256.5	+275.9	nil
32,752	−11	Eaton/Bay Commonwealth		19.43	+0.3	+107.3	+85.2	(f)
29,027	+12	Eaton/Bay Growth		15.52	+25.1	+171.2	+91.0	(f)
11,636	−7	Eaton/Bay International		13.95	+6.5	+263.8	+142.6	(f)
24,913	−3	Eaton/Bay Leverage		6.65	+12.7	+211.2	+99.0	(f)
11,471	−8	Eaton/Bay Venture		6.63	+14.8	+235.7	+70.3	(f)
23,603	+21	Eaton/Bay Viking	R	7.91	+38.3	+126.1	—	(f)
201	−13	Equitable Trust	R	22.79	+25.5	+105.1	—	nil
194	+17	Esto Mutual	R	10.21	+33.6	+201.2	—	nil
11,350	+10	Fonds Desjardins Actions	R	11.59	+32.6	+156.9	+153.8	nil
4,913	−15	Fonds Desjardins International		10.20	+8.0	+122.7	+34.9	nil
4,443	+4	Fonds Desjardins Quebec	R	5.86	+28.3	+138.9	+80.8	nil
1,402	+8	Fonds Desjardins Spec.		9.09	+37.2	+253.8	+3.5	nil
17,399	+42	Formula Growth		1357.19	+42.6	+465.8	+182.4	3.0
281	+19	Fortune Fund	R	4.46	+25.6	+100.9	—	3.0
4,473	+85	Goldfund		11.28	+157.5	+88.4	+548.7	8.75
11,494	+10	Grouped Income Shares		4.71	+33.4	+168.1	+118.0	9.0
51,243	+57	Growth Equity	R	17.51	+60.3	+339.1	+183.4	9.0
1,227	+81	Growth Oil & Gas		92.93	+89.6	+380.0	+348.9	(e)
5,157	+23	Guaranty Trust Investors	R	11.38	+34.5	+160.3	+138.4	nil
21,766	+23	Guaranty Trust RSP	R	18.26	+29.0	+181.8	+151.2	nil
20,205	+67	Guardian Enterprise	R	1.50	+40.6	+143.9	—	9.0
9,129	+9	Guardian Growth		17.61	+32.4	+171.8	+112.7	(e)
5,362	+13	Guardian North American		7.08	+35.8	+184.7	+28.1	9.0
31,963	+32	Guardian World Equity		5.61	+9.7	+161.9	—	9.0
2,406	+11	Harvard Growth	R	11.57	+39.6	+229.6	+53.2	(e)
2,369	+38	Heritage	R	4.15	+61.5	+211.3	—	9.0
37,700	+89	Industrial Equity	R	10.43	+30.4	+211.5	—	9.0
		Fixed income funds						
2,452	+23	All−Canadian Revenue Growth	R	4.17	+7.8	+77.7	+159.8	9.0
10,203	−5	Altamira Income	R	6.26	+7.1	+64.7	—	nil
641,007	+16	Canada Permanent GIC	R	34.14	+10.3	+57.2	+132.8	nil
11,772	−3	Canada Permanent Trust RSP	R	29.69	+2.0	+45.7	+109.5	nil
8,840	−3	Canada Trust		8.01	−0.5	+54.9	+126.6	nil
22,293	−6	Canada Trust RSP	R	16.15	+1.6	+50.5	+128.0	nil
29,010	−20	Canadian Trusteed Income	R	4.13	+1.5	+53.3	+116.6	9.0
6,367	−2	Canagex Bond	R	8.72	+1.8	+51.4	—	1.0
8,995	−6	Canagex Hypotheque	R	9.68	+4.7	+51.0	—	1.0
327	−14	Central & Eastern Trust		7.76	−1.1	+42.5	+89.3	nil
1,196	−15	Central & Eastern Trust RSP	R	13.78	−1.2	+48.9	+87.9	nil
24,216	+9	Commerce Income	R	10.04	+7.4	+56.3	—	nil
3,486	+2	Co−operative Trust	R	8.72	+2.7	+55.0	—	nil
3,022	−9	Crown Trust RSP	R	28.06	+0.1	+42.7	+108.8	nil
36,985	+3	Eaton/Bay Income	R	3.92	−2.1	+40.2	—	(f)
134	−8	Equitable Trust	R	17.73	+3.7	+65.1	—	nil
7,397	−24	Federal Trust	R	4.66	+6.2	+56.6	—	nil
116,485	−14	First Canadian	R	9.89	+6.3	+56.6	—	nil
55,652	+8	Fonds Desjardins Hypotheque	R	4.13	+6.0	+57.7	+122.2	nil
892	−0.6	Fonds Desjardins Obligations	R	4.59	−1.7	+57.3	+113.8	nil
1,920	−12	Guaranty Trust Investors	R	3.96	+4.4	+51.2	+107.8	nil
6,187	−17	Guaranty Trust Mtge.	R	9.68	+6.8	+51.0	—	nil
9,025	−6	Guaranty Trust RSP	R	10.46	+2.9	+47.9	+103.5	nil
2,076	−14	Guardian Security Income	R	9.54	+7.8	+49.1	+143.8	9.0
6,849	+63	Industrial Income	R	9.28	−2.7	+38.3	—	9.0
1,148	−11	International Income	R	3.77	+9.5	+59.6	+28.3	(e)
3,350,00	+956	Investors Mortgage	R	4.66	+5.6	+53.5	—	6.0
10,266	−8	Metropolitan Trust Mortgage	R	9.95	+6.5	+52.9	+128.6	nil
5,941	−15	Montreal Trust		7.77	+0.9	+48.6	+119.5	nil
97,434	+17	Montreal Trust Guaranteed Savings	R	10.00	+10.4	+52.1	—	nil
66,219	−8	Montreal Trust Mortgage		9.28	+5.9	+57.9	—	nil
15,187	−3	Montreal Trust RSP	R	15.75	+1.1	+48.1	+116.8	nil
43,811(d)	+2	Montreal Trust RSP Mortgage	R	9.30	+5.8	+56.3	—	nil
33,645	+22	Phillips, Hager & North Bond	R	9.45	−0.2	+50.8	—	1.0
62,804	−2	Royal Trust B	R	8.32	+1.5	+51.9	+124.1	nil
652,522	−3	Royal Trust M	R	9.37	+6.0	+57.7	+139.8	nil
112,228	+10	RoyFund Income	R	4.78	+8.0	+53.9	—	4.0
17,524	n.a.	Saskatchewan Development	R	4.70	−0.4	+48.0	—	4.0
31,535	−0.5	Toronto−Dominion Mortgage	R	9.62	+6.8	+58.5	—	nil
11,300	−7	Trust General Hypotheque	R	9.52	+4.0	+54.5	—	nil
15,100	+0.7	Trust General Obligations	R	8.24	+1.4	+51.0	+136.3	nil
4,615	−12	United Security	R	4.20	+2.0	+51.0	—	9.0
6,213	+12	Victoria & Grey Trust RSP	R	31.53	+6.3	+53.1	+110.0	nil

— Total net assets — Dec 31 1979 $000	Change from Dec 31 1978 %			Net asset value per share Dec 31 1979 $	— Change in value — of investment since Dec 31 1978 %	Dec 31 1974 %	Dec 31 1969 %	Maximum sales redemption charge %
		Equity funds						
75,000	+38	Industrial Growth	R	7.05	+33.3	+172.1	+547.8	9.0
5,801	+314	Industrial Pension	R	33.35	+10.4	+117.1	—	(n)
1,108	+2	International Energy	R	2.99	+22.1	+138.4	+26.2	(e)
373	−3	International Growth		5.10	+10.0	+42.1	+6.7	(e)
43,932	+67	Investors Dividend		8.25	+14.9	+84.0	+78.7	6.0
176,795	+7	Investors Growth		15.35	+33.6	+113.8	+100.0	6.0
28,431	−0.9	Investors International		8.44	+20.6	+124.8	+19.4	6.0
13,542	−37	Investors Japanese		11.51	−25.0	+130.3	—	6.0
188,987	+3	Investors Mutual		6.96	+26.3	+106.9	+101.3	6.0
150,687	+22	Investors Retirement	R	9.66	+39.1	+119.6	—	6.0
5,242	+48	Jones Heward	R	3.80	+38.9	+213.4	+132.0	nil
112	−25	Marcinvest	R	15.39	+7.7	+72.5	—	2.0
1,031	+31	Maritime Equity		3.61	+25.3	+80.5	+2.6	8.5
2,058	+56	Marlborough Fund	R	8.47	+37.8	+245.4	+146.4	9.0
2,093	+33	Metropolitan Trust	R	18.03	+34.6	+97.7	+91.0	nil
11,577	+15	Montreal Trust		21.12	+32.9	+129.9	+136.0	nil
1,044US	−3	Montreal Trust International		10.58US	+15.0	+127.7	+51.2	nil
32,664	+21	Montreal Trust RSP	R	34.56	+33.2	+131.8	+108.8	nil
622	+37	Mosslaw Growth	R	11.84	+49.1	+211.3	+182.5	(g)
23,093	+11	Mutual Accumulating	R	7.31	+23.2	+118.8	+103.9	9.0
4,517	−3	NW Canadian	R	7.06	+28.3	+119.6	+77.8	9.0
2,076	+10	NW Equity		11.26	+17.0	+231.2	—	9.0
29,167	+16	National Trust RSP	R	15.35	+28.8	+101.9	+89.3	nil
5,765	+13	Natrusco		19.49	+29.5	+94.0	+84.3	nil
9,188	+0.4	Natural Resources	R	5.52	+20.2	+102.4	+54.9	(e)
4,758	+9	Pacific Dividend		6.77	+26.5	+180.6	+105.3	(p)
5,863	+78	Pacific U.S.		6.03	+28.5	+210.6	+71.2	(p)
806	−1	Pension Mutual	R	9.92	+35.1	+89.7	+26.5	(e)
4,567	+35	Phillips, Hager & North Canadian	R	11.91	+31.5	+208.9	—	2.0
17,064	+24	Phillips, Hager & North Fund		17.90	+20.6	+231.9	+122.9	2.0
4,398	+11	Phillips, Hager & North Retirement	R	19.54	+21.1	+135.1	—	2.0
13,452	+114	Planned Resources	R	9.41	+59.8	+325.4	+83.6	9.0
32,669	+57	Principal Growth	R	6.66	+28.0	+193.5	+76.8	9.0
15,197	+56	Principal Venture		6.04	+34.8	+289.7	—	9.0
8,351	+6	Provident Stock		8.14	+37.5	+132.5	+59.8	6.0
17,935	+17	Prudential Growth	R	8.86	+33.0	+141.0	—	8.5
10,654	+4	Royal Trust A		13.71	+16.0	+135.0	+18.6	nil
67,469	+19	Royal Trust C	R	23.90	+36.9	+128.9	+131.2	nil
90,967	+34	RoyFund Equity	R	10.66	+42.7	+152.2	+170.5	4.0
1,305	−19	Savings & Investment American		12.65	+11.3	+131.4	+21.5	6.0
18,109	−10	Savings & Investment Mutual		9.08	+21.6	+125.5	+97.8	6.0
7,708	+8	Savings & Investment Retirement	R	9.41	+15.6	+88.9	—	6.0
22,183	+27	Scotiafund	R	1.38	+38.2	+122.6	—	6.75
2,897	+23	Sterling Equity	R	7.64	+38.6	+144.5	+80.1	(k)
13	−100	Taurus		12.03	+34.9	+473.7	+130.5	9.0
396,909	+71	Templeton Growth		7.59	+24.7	+343.6	+522.5	8.5
4,068	+31	Tradex Investment Fund	R	20.25	+43.9	+236.5	+205.8	(m)
751	−10	Trans−Canada Shares A	R	5.90	+13.1	+66.6	—	(e)
5,483	−3	Trans−Canada Shares C	R	12.19	+12.7	+91.1	+128.1	(e)
4,400	+38	Trust General	R	16.58	+38.2	+154.3	+154.0	nil
96,891	+9	United Accumulative		6.16	+39.8	+115.6	+57.4	9.0
18,192	+20	United Accumulative Retirement	R	6.61	+38.6	+151.8	—	9.0
2,031	+13	United American		2.18	+28.2	+131.9	−20.3	(e)
3,797	+3	United Horizon		4.37	+41.8	+276.4	+31.4	(e)
20,821	+22	United Venture		4.74	+46.2	+184.9	+12.2	9.0
8,643	+33	United Venture Retirement	R	7.81	+60.3	+245.5	—	9.0
22,932	+31	Universal Savings Equity	R	14.70	+35.3	+185.4	+184.5	9.0
2,189	+9	Univest Growth	R	6.39	+8.9	+58.9	—	9.0
425	+1	Vanguard		11.29	+45.5	+222.6	—	9.0
422	+5	Victoria & Grey Trust		16.15	+29.0	+94.1	+99.6	nil
4,843	+37	Victoria & Grey Trust RSP	R	50.39	+33.6	+131.0	+144.6	nil
1,767	+93	Western Growth	R	7.79	+34.9	+107.5	+68.1	6.0
1,750	+14	Xanadu	R	6.93	+46.5	+209.4	+69.4	(e)
		Newer fixed income funds (initial offering date)				Change since initial offering date %		
3,428	−2	AGF Money Market (Jan./76)	R	10.00	+11.6	+40.5	—	(m)
2,205	n.a.	Bolton Tremblay Income (May/79)	R	9.54	n.a.	+2.1	—	7.0
4,192	n.a.	CIF Income Fund (July/79)	R	10.00	n.a.	+7.6	—	4.0
57,065	−21	Canada Trust Mortgage (Jan./75)	R	14.77	+6.0	+47.7	—	nil
9,391	−22	Commerce Capital (Jan./77)	R	9.52	+6.0	+25.7	—	nil
2,316	−7	Continental Mortgage (Aug./76)	R	4.95	+7.5	+36.8	—	5.0
1,563	+11	Dolphin Mortgage (Jan./76)	R	4.87	+8.1	+43.0	—	2.5
3,195	n.a.	Dynamic Income (Nov./79)	R	5.60	n.a.	+4.9	—	nil
4,871	+2	Fidelity Trust (Jan./77)	R	13.61	+9.0	+36.1	—	nil
40,571	n.a.	Investors Bond(May/79)	R	4.50	n.a.	−4.2	—	6.0
301	n.a.	Principal Bond (Feb/79)	R	2.86	n.a.	−2.4	—	9.0
19,590	+22	Prudential Income (Jan./75)	R	4.75	+1.6	+40.7	—	8.5
20,284	+8	Savings & Investment H (March/75)	R	4.77	+6.7	+49.9	—	6.0
53,723	+13	Scotiafund Mortgage (Jan./75)	R	0.95	+5.2	+45.4	—	3.0
7,105	−32	Sterling Mortgage (Feb./76)	R	4.78	+5.1	+38.1	—	nil
13,832	+13	Universal Savings (Aug./75)	R	4.42	−2.8	+32.2	—	9.0
		Newer equity and balanced funds (initial offering date)						
7,457	n.a.	AGF Option Equity(May/79)		4.57	n.a.	+6.8	—	9.0
3,520	−2	Banner Fund (Nov 8/77)		4.95	+5.5	+12.1	—	5.0
262	n.a.	Cundill Security (June/79)	R	9.62	n.a.	−0.5	—	6.0
1,270	n.a.	Dynamic American (Nov./79)		5.00	n.a.	+7.1	—	nil
4,252	+33	Eaton/Bay Dividend (Oct 1/78)	R	4.97	+3.3	+5.6	—	(f)
4,313	+85	Fiscon Investment (July/76)	R	5.94	+13.4	+59.8	—	9.0
2,657	+127	Goldtrust (Oct./75)	R	4.91	+90.7	+102.6	—	8.75
22,100	+133	Industrial American (Sept./75)		3.23	+19.5	+126.7	—	9.0
15,723	+19	Industrial Dividend (May/75)	R	7.24	+16.8	+109.6	—	9.0
1,547	+6	Phillips, Hager Dividend (June 30/77)	R	10.57	+9.2	+28.2	—	1.0
528	+91	Synchrovest (Feb./77)		6.65	+11.8	+34.4	—	8.0
2,096	+435	Universal Savings International (Dec/78)		4.96	+10.0	+10.2	—	9.0
10,610	+40	Universal Savings N.Resource (Jan/78)	R	7.37	+54.3	+75.2	—	9.0
		Balanced funds						
7,716	+234	Pacific Retirement	R	5.14	+14.8	+104.0	—	(p)

Footnotes to mutual funds roundup

R Fund is eligible for Registered Retirement savings Plans.
(a) All invested in All-Canadian Dividend.
(b) All invested in Grouped Income Shares.
(c) All invested in Montreal Trust Mortgage.
(d) All invested in Montreal Trust Mortgage.
(e) Not currently offered.
(f) Redemption fee: 5% of net asset value, but not more than 9% of investment.
(g) Stock exchange rates on sales, 1% on redemptions.
(k) Redemption charge: $1.50
(m) $5 initial charge.
(n) No sales or redemption charge, minimum investment $100,000.
(o) Less than 0.05%.
(p) Stock exchange rates on sales, one-half rates on redemptions.

Your RRSP may also be invested in a combination of stocks, bonds, or mortgages through participation in mutual funds. As the report points out the weighted average gain made by the equity funds which can or cannot be used for RRSP purposes over the 12 months ended Dec. 31, 1979, was 30.2%.

Their calculation in the table below does not take into account the cost, if any, of purchasing fund shares, and they assume that all dividends paid out are reinvested.

By way of comparison, they list the changes in some of the stock market indexes over the same 12 months that are without benefit of dividend reinvestment:

- Toronto Stock Exchange 300 gained 38%;
- TSE golds were up 82%;
- TSE oil and gas rose 103%;
- Dow Jones industrial average rose 4%;
- New York Stock Exchange composite gained 16%;
- Standard & Poor's 500 rose 12%.

Life Insurance companies also operate investment funds that offer either equity or fixed income features that can be incorporated into your RRSP. The following table taken from the report shows the performance of some insurance company funds sold to individuals without the cost of purchasing the policies taken into account.

How life insurance funds fared

THE TABLE below shows the performance of some life insurance company funds sold to individuals. Such policies generally contain guarantees of minimum benefits. Costs of purchasing the policies have not been taken into account.

—Total net assets— Dec 31 1979 $000	Change since Dec 31 1978 %			Unit value Dec 31 1979 $	—Change from— Dec 31 1978 %	Dec 31 1974 %	Dec 31 1969 %	—Total net assets— Dec 31 1979 $000	Change since Dec 31 1978 %
		Equity funds							
12,230	+22	Abbey Life N.American	R	2.20	+27.2	+364.2	+308.7	22,156	+21
1,767	+27	Alliance Mutual	R	20.41	+32.9	+131.1	+102.6	1,616	+23
6,635	+16	Canada Life E.2	R	50.27	+31.2	+135.4	+141.1	9,213	+40
13,947	+26	Canada Life S.9	R	24.92	+31.4	+124.3	+136.5	6,633	−2
1,815	+24	Canadian General Life	R	36.97	+24.0	+135.2	+168.5	3,266	+31
399	+32	Canadian Reassurance		28.22	+38.0	+206.0	+172.4	59,523	+38
615	+35	Citadel Life	R	3.47	+45.4	+156.7	—	2,248	+39
18,091	+35	Confederation Life A	R	4.34	+35.3	+162.4	+178.2	33,028	+33
35,512	+25	Confederation Life B	R	4.25	+37.3	+159.9	+164.0		
17,647	+25	Crown Life (C.C.I.F.A.)	R	24.30	+23.7	+101.5	+107.5		
32,129	+48	L'Assurance–Vie Desjardins		27.40	+37.8	+163.0	+117.1	22,467	−1
992	+30	Dominion of Canada General	R	14.47	+29.7	+181.0	+181.5	1,079	+10
14,313	+30	Dominion Life	R	26.28	+32.7	+112.3	+94.2	8,620	−2
14,223	+14	Empire Life	R	12.61	+32.9	+169.4	+164.9	35,848	+24
7,262	+40	Equitable Life Canada	R	36.06	+38.6	+158.8	+175.1	43,622	+14
1,019	nil	Fidelity Life	R	19.86	+19.6	+92.1	+78.4	2,757	+2
34,402	+25	Great–West Life	R	2.67	+37.1	+129.9	—	3,039	+0.2
1,793	+24	Imperial Life — Growth		27.52	+37.6	+132.9	+141.2		
4,963	+20	Imperial Life — Retirement Growth	R	27.27	+38.6	+139.8	+159.8		
32,640	−19	Manufacturers Life	R	2.52	+37.3	+131.4	—		
5,497	+45	Monarch Life	R	5.14	+41.2	+134.0	+178.8	412	+63
60,031	+18	Mutual Life A	R	39.02	+37.0	+131.6	+111.0	640	+21
4,418	+46	Mutual Life B		23.07	+40.8	+131.8	—	1,955	+45

			Unit value Dec 31 1979 $	—Change from— Dec 31 1978 %	Dec 31 1974 %	Dec 31 1969 %
		Equity funds				
	R	National Life	56.34	+32.4	+128.1	+139.3
	R	National Life — Equannuity	23.47	+30.9	+122.2	—
	R	North American Life Growth R	21.60	+28.4	+98.0	+110.3
	R	North American — fixed income B	14.80	+2.6	+47.0	—
	R	Norwich Life	2.47	+38.0	+130.8	+100.8
	R	Prudential Assurance	39.94	+38.9	+137.3	+129.8
	R	Prudential Assurance — Pruvest	32.94	+49.4	+153.2	—
	R	SunFund	21.57	+35.7	+141.6	+110.2
		Fixed income funds				
	R	Canada Life S.19	15.62	+0.5	+46.0	—
	R	Canadian General Life — fixed income	23.92	+8.3	+92.1	+136.1
	R	Confederation Life —C— fixed income	2.04	+1.7	+56.8	—
		L'Assurance–Vie Desjardins — bond	22.05	+0.5	+52.4	+117.3
		L'Assurance–Vie Desjardins — mortgage	18.68	+5.3	+59.7	—
	R	Equitable Life Canada — Bond	21.12	+1.8	+53.2	+112.9
	R	Mutual Life — fixed income	16.47	+3.3	+53.8	—
		Newer funds (date first offered)			Change since inital offering date	
	R	Abbey Life Growth —equity— (Dec./75)	2.06	+54.0	+102.7	—
	R	Abbey Life Selective — fixed — (Aug./75)	1.34	+9.9	+31.5	—
	R	Canada Life S.29 — money mkt. (Jan./75)	15.06	+10.9	+46.7	—

Optical Considerations in Contact Lens Fittings

(cont'd. from p. 43)

problem the use of contact lenses is contraindicated *or* that contact lenses are the treatment of choice *or* the use of contact lenses be complemented by spectacle lenses and/or orthoptics *or* spectacle lenses are the treatment of choice. Whatever the clinical decision, it will be based upon a thorough clinical examination and a consideration of the optical facts related to lens therapy as well as consideration of the patient's personal history, occupational and avocational settings and requirements.

REFERENCE

1. Borish, I.M. Clinical Refraction 3rd Ed., Chicago, The Professional Press, 1970, pp.176-7.

QUEBEC SHARES PRACTICE SURVEY RESULTS

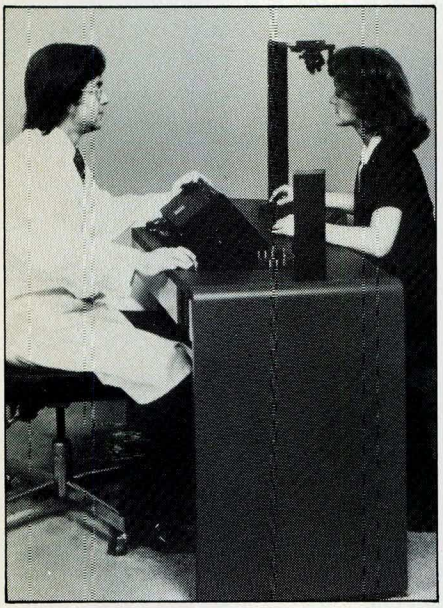
CAO will be receiving the results of an extensive mode of practice survey commissioned by L'Association Professionnelle des Optometristes du Quebec. The APOQ's $18,000 study is part of "Operation Regroupement" designed to help the profession diminish the impact of monopolistic commercial influences in Quebec. One aspect of the survey indicated group practices were more efficient, offering the practitioner a greater return, while offering the public a greater range of services and office hours. Practitioners were also able to see a greater range of cases.

Correction for Book Review

We regret any inconvenience caused by the omission of all the publishing data for "Atlas of Strabismus Surgery" by E.M. Helveston, in our last issue. The remaining details are: Publisher, C.V. Mosby, 1977, Hardcover, 262pp., $42.75.

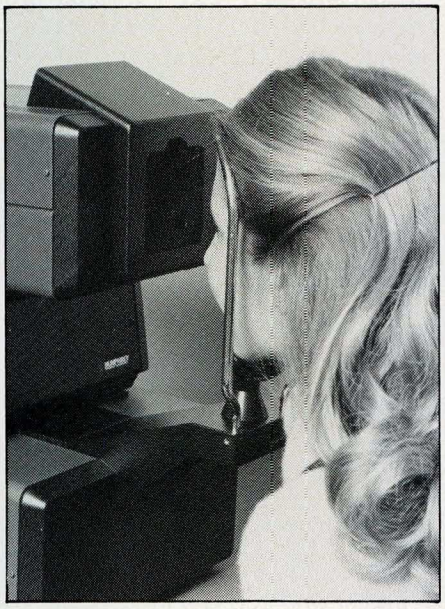
Electronic Vision Analysis

Now you can achieve more efficient patient flow while providing better patient care with state-of-the-art and computerized eye care instrumentation from Zeiss.



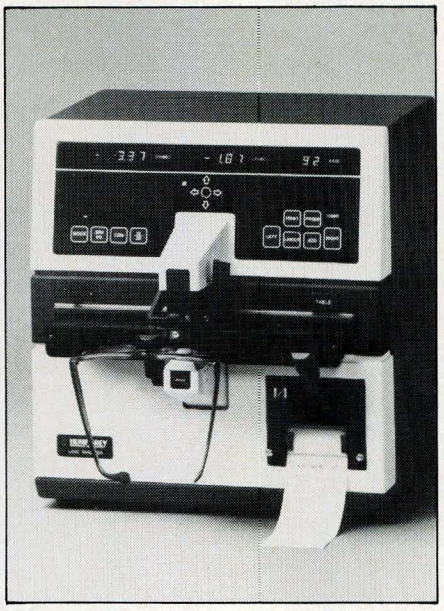
Electronic Vision Analyzer

The ultimate in fully automated electronic vision analysis. A refractor that actually replaces the phoropter. Performs all the tests of current subjective refraction procedures including far acuity, near acuity, phorias, vergences, and more. All with increased speed, accuracy and patient comfort. Truly a practice builder.



Auto-Keratometer

Here's an automatic keratometer which is so simple to operate that anyone on your staff can obtain objective measurements of the curvature of the cornea and contact lens base curves with unsurpassed accuracy, reliability and all in just seconds. You get an instantaneous digital display in diopters or millimeter radius plus the option of an additional hard copy printout.



Lens Analyzer

Measure lenses faster, more accurately, more reliably and at a lower cost per operation than with any conventional or automatic lensometer. But that's not all. It can be operated by anyone in your office after just a few minutes training, and it provides you with a hard copy printout assuring your customer that his prescription has been accurately and professionally handled.

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BOOK REVIEWS

Diseases of the Fundus Oculi, by Arnold Sorsby, Butterworth & Co. (U.S.A.), Boston 1975. 232 pp. Illus. Cloth, $37.95 (U.S.)

From the title one might expect to find another atlas of fundus disorders but those seeking such will be disappointed. Instead this book contains a wealth of well organized and precise information. It is divided into five sections including an introductory chapter devoted to ophthalmoscopically visible reactions, without a single illustration. This reliance upon direct ophthalmoscopic appearances persists throughout the text with only minimal reference to indirect ophthalmoscopy, fluorescein angiography, ERG, EOG, modern field techniques, dark adaptometry, colour perception and other current clinical techniques for the evaluation of retinal and choroidal integrity.

The déjà vu of the second section, on developmental anomalies, is striking to those familiar with Professor Sorsby's earlier text, "Ophthalmic Genetics"; much of the material, including diagrams, figures and captions, is identical. However, it is based on the years of clinical and research experience of this eminent authority on ophthalmic genetics and his many co-workers (including a number of optometric educators) and bears repetition.

The third section concentrates on acquired affections limited to the fundus such as trauma, neoplasia, detachments and senile changes while the fourth section covers fundus changes of systemic origin. In the final section, the optic nerve is considered briefly without reference to recent concepts of optic nerve angioarchitecture, haemodynamics or axoplasmic transport.

Fundus drawings and paintings are provided rather than fundus photographs and the few colour photographs included at the end of the book are either illustrating "The Hammersmith Standards" for diabetic retinopathy or have not been enlarged from their original 35 mm format. The quality of the few histological plates is poor and no ultrastructure is included. Some of the generic terminology may mystify more recent graduates who have been subjected to the regrettable resurgence of ophthalmic eponyms. Opinions expressed by the author relative to the treatment of diabetic retinopathy and retinal detachment and the use of photocoagulation will draw disagreement from most retinal specialists.

Unfortunately, the extensive list of references, so valuable in Professor Sorsby's earlier books, has been omitted. A couple of incursions on the index ("glaucoma" and "telangiectasis") revealed that it was not reliable, an obstruction which can be negotiated with little difficulty by those familiar with the style of presentation.

The strength of this publication is in the area of hereditary disorders of the retina and choroid. I would not recommend it for those optometrists whose libraries already contain "Ophthalmic Genetics."

Anthony P. Cullen, M.Sc., O.D.

Optics in Vision. Henri Obstfeld, Butterworth's 1978, 327 pp. $24.95 U.S.

The interest in basic optics in the practice of optometry has declined considerably in recent years to a deplorable level. It is important to be concerned with biological, physiological, neurological, pharmaceutical and psychological aspects of optometrical practice, but practitioners and students tend to forget that the ocular system is based essentially on physical optics. Without the optics part, there would be no concern with the system at all. Further, optometry's basic concern is to provide not only a triage system of visual care for detection and referral of abnormalities, but to provide important over-all care for the visual system in particular. The vast majority of our patients, perhaps as high as 95%, require only optical care. To spend (waste?) so much time energy, and concern on ancilliary areas apart from recognizing and referring them, seems to be a gross disservice to the public, who depend upon optometrists for service and advice.

It is therefore refreshing and stimulating to find a new book which considers in detail the optical problems encountered in everyday practice. Such a work has been undertaken by Henri Obstfeld with considerable success. It is written in a clear concise style and covers the essential optical problems which confront the optometrist in practice.

From the introductory chapter on Geometrical Optics - a very clear and concise review for most of us - to the concluding chapter on Contact Lenses, the author considers the visual system in all its optical ramifications. There is a review of the basic optics of emmetropia and ametropia, the visual optics of refractive errors, and their correction. The chapters on spectacle magnification and relative spectacle magnification require but little additional thought to adapt them to the prescription of proper base curves for spectacle lenses in order to alleviate the problems of anisometropia.

The author also considers the optical problems involved in the condition and correction of presbyopia and astigmatism. Very interesting and appropriate chapters are devoted to "Ocular Rotation" and "Ocular Catoptrics and Catadioptrics". These may appear to the neophyte as excess baggage but they are indeed very practical in dealing with patients.

The chapter dealing with the optics of contact lenses should prove to be very useful to the contact lens practitioner. Here we find the basic optical problems explained in a clear and condensed fashion. He deals with such problems as the effect of pupil size, the correction of astigmatism (from an optical viewpoint, not the technique of accomplishing the ideal), magnification effects, and problems in presbyopia and binocular vision. But then, are optics very important in hydrophylic types of lenses, as long as the patient can wear them and achieve $^{20}/_{30}$ or better? (Hopefully, he/she will not complain about slight reductions in vision). Where have our standards of precise optical correction gone? So what is the importance of that last diopter of cylinder, or any old axis

cont'd. on p. 59

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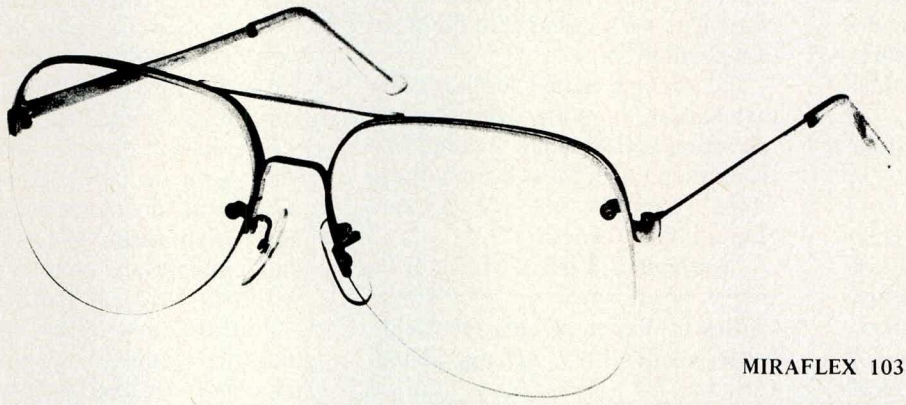

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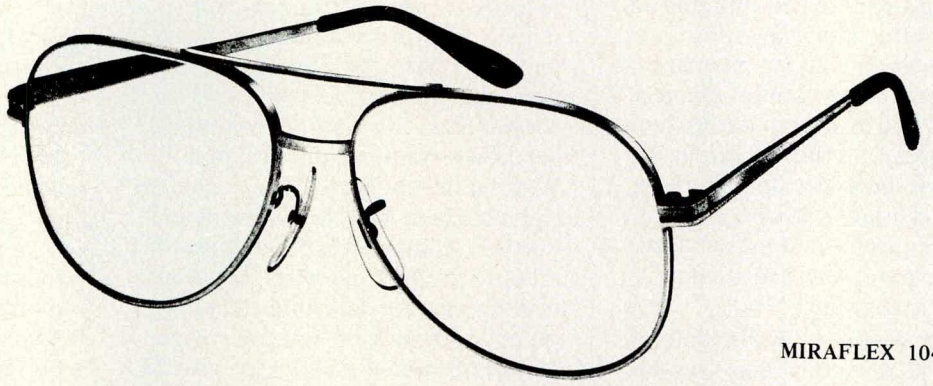

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E.J. Fisher, Dip. Opt., B.A., D.Sc., F.A.A.O.

External Infections of the Eye: Bacterial, Viral, Mycotic, ed.2., Helene Fedukowicz, M.D., 283 pp., with illus., $20.00 (U.S.), New York, Appleton-Century-Crofts, Ins. 1978.

The first part of this textbook includes a beautiful collection of 47 colour plates presenting clinical pictures, techniques of laboratory procedures and diagnosis, and photomicrographs of microbial organisms.

The second part of this book has five chapters, four of which refer to external infections of the eye covering bacterial, viral, and fungal infections. This is followed by a practical and helpful chapter on working-up patients with external ocular disease and endophthalmitis. Details are also presented for obtaining and preparing conjunctival smears for cytological examination.

An extensive bibliography is provided at the end of each chapter.

Joseph Mittelman, O.D., F.A.A.O.

Ocular Anatomy, by J.D. Spooner, Published by Butterworth's, Boston, 1976, 226 pages $17.95

This book appears to be an offset copy of the original published in 1957 by Hatton Press. At the time, the author was Lecturer in Anatomy in Ophthalmic Optics Department of the Northampton College of Advanced Technology (now Department of Optometry and Visual Science, The City University), London.

The poor reproductive quality of the figures in the book is apparent even before a serious effort is made to read it. Many of the figures are completely valueless. Examples include; a photograph of the human fundus (Fig. VII, 8) in which the blood vessels are not visible, blurred photographs which are meant to show individual variations in the frontal appearance of the human iris (Fig. IV, 9), and indistinct photographs of the skull and orbit (Figs. VIII, 1 and 8) and brain (Figs. VII, 12 and 16). Numerous additional figures, especially photographs of histological sections, are difficult to decipher. This criticism applies equally well to the figure captions which are frequently blurred and difficult to read. To make matters worse, the quality of the binding is inferior. Over 50 pages of the copy in the possession of this reviewer have broken away from the spine after a few weeks of use.

Aside from the question of production quality, the book is subject to two main criticisms. First, too much ground is covered in too little space. One can hardly expect 226 pages to be sufficient to adequately describe the anatomy of the eye and surrounding structures as well as that of the visual pathways and associated portions of the brain, in addition to a description of the eye's embryological development, evolution and genetic relationships. Throw in an epilogue consisting of a copy of an essay by Sherrington on the eye and appendices describing ocular dissection and histological techniques (the last 20 pages) and the small size of the book is more obvious. What may have been an adequate summary over two decades ago is not today.

A second point is simply that the book is becoming outdated. Anatomical advances of the last 22 years are missing. The lack of information provided by electron microscopy is particularly glaring. In fact, the book did not contain all of the most recent information available even when originally published. Thus, little reference is made to Warwick's studies of the third cranial nerve nucleus which were published in the early 1950's.

The most attractive feature of the book is that it is written from an optometric point of view. Sections such as those dealing with variations in optical constants of the human eye and refraction and growth are not found in other ocular anatomy texts. However, an expanded and revised version with greater attention to figure reproduction would have been much more acceptable.

J.G. Sivak, L.Sc.O., M.S., Ph.D.

Electronystagmography: Technical Aspects and Atlas, by Joseph Toglia, Charles C. Thomas Co., Springfield, Ill., 1976, hard cover, 160 pages.

This book is an excellent introduction to the principles of electronystagmography (ENG) and its clinical application. It is published in easily readable print and is divided into five short chapters dealing with the historical, technical and clinical aspects of ENG. The author has clearly and succinctly described the various categories of nystagmus and the procedures for eliciting and evaluating visual and vestibular nystagmus and diagnosing neurological disorders. Dr. Toglia has avoided elaborate discussions of the physiological basis of phenomena presented in the text without making the phenomenon appear mysterious and unexplainable. He wisely gives only a casual explanation of some of the principles discussed and presents a 26 page bibliography on most of the subjects for those readers desiring additional information. Specific cross-reference between subject matter and the bibliography are, however, not given.

Also included in this book is a 73 page atlas illustrating the technical aspects of ENG, and an index of neurological, otological and ophthalmological disorders with accompanying ENG records. This section is particularly effective in illustrating the use of ENG in diagnosing physiological disorders.

Dr. Toglia has managed to present much information in a reasonably short and well-sectioned text presenting his own views as well as the opinion of others. The title of his book, however, is somewhat deceptive in that it can be interpreted to be a "cookbook" for ENG. For the reader uninitiated in electrophysiological procedures the text will undoubtedly present some conceptual problems. The text appears to be directed to the clinician or researcher who is already familiar with electrophysiological apparatus and is interested in exploring the clearly outlined potentials of ENG. For the individual wishing to set up an ENG unit this text is an excellent reference text.

J.S. Lovasik, O.D.,M.Sc.

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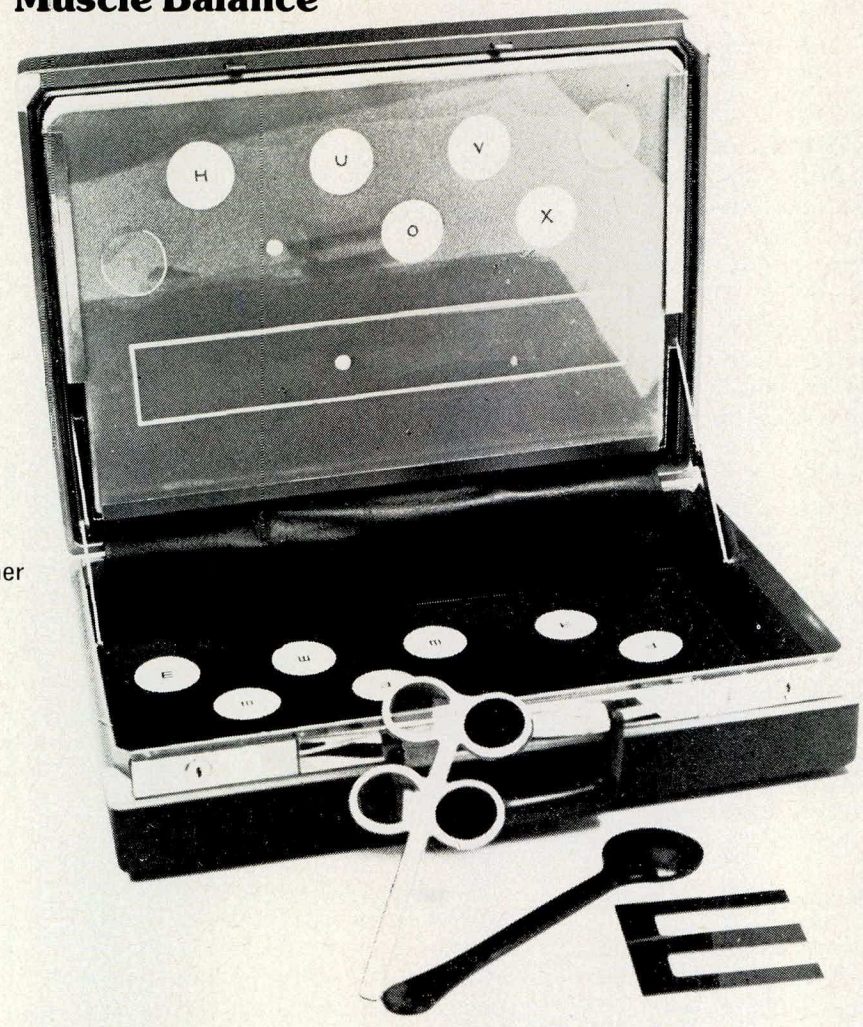

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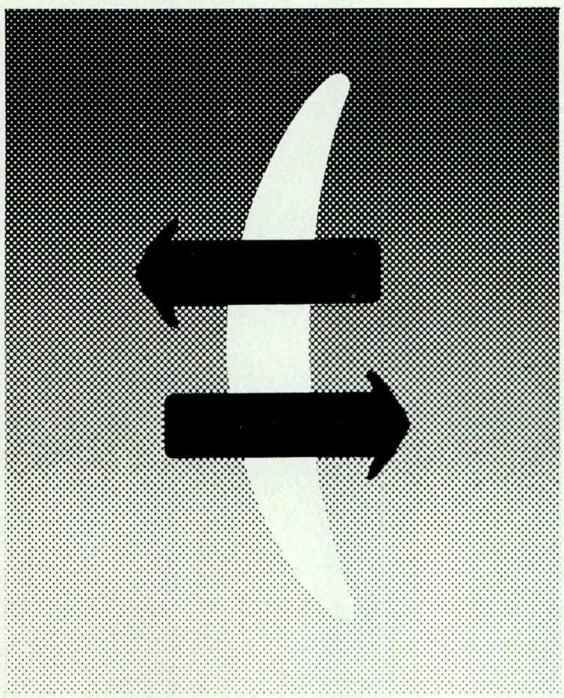

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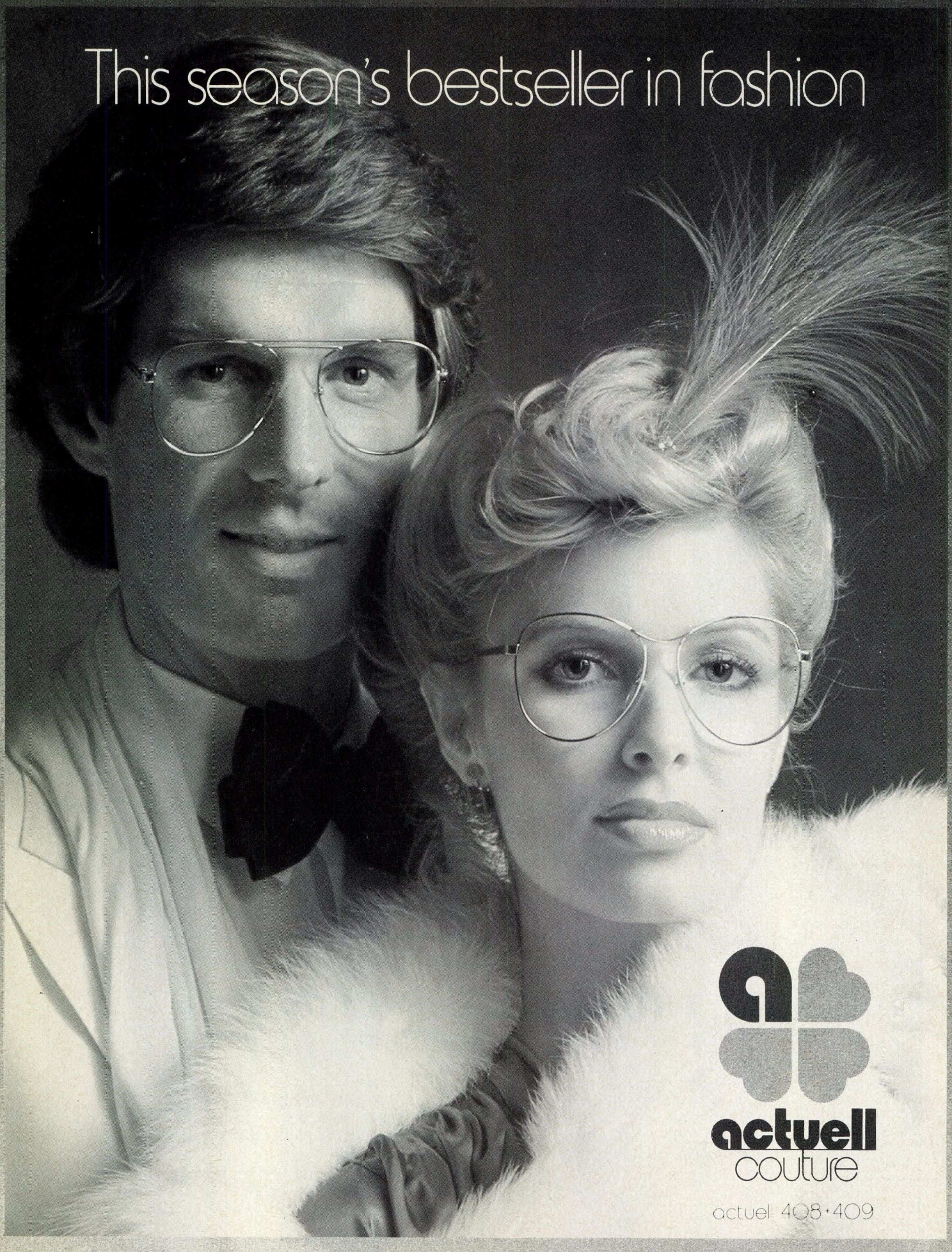

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APRIL

19-22
Manitoba Optometric Society Annual Meeting
WINNIPEG

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434-167 Lombard Ave.,
WINNIPEG, Man. R3B 0T6

20-21
Southern California Behavioural Vision Seminar
SAN DIEGO, Cal.

Contact:
R. Schrock, O.D.,
2925 Lincoln Ave.,
SAN DIEGO, Calif. 92104

26-28
L'Assoc. Prof. des Optométristes du Québec Symposium on Workers' Vision and Safety

Contact:
M. Laplante,
APOQ, Suite 302,
614 ouest St. Jacques,
MONTREAL, Que. H3C 1E2

MAY

2-4
British Contact Lens Association Annual Clinical Conference

Contact:
CAO or:
Mrs. Sheila Tant,
Gen'l. Secretary,
51 Strathyre Ave.,
Norbury,
LONDON, England SW16 4RF

25-28
B.C. Optometric Assn. Annual Meeting
FAIRMONT HOT SPRINGS

Contact:
BCOA,
411-1033 Davie St.,
VANCOUVER, B.C. V6E 1M7

26-30
IOOL & Japan Optometric Association Congress
NAGOYA, Japan

Contact: CAO, or:
Mr. P. Smith,
IOOL
10 Knaresborough Pl.
LONDON, England, SW5 0TG

MAY

May 20-June 28
Annual Continuing Education Program
School of Optometry
University of Waterloo

Contact:
M.J. Samek
c/o School of Optometry
U. of Waterloo,
WATERLOO, Ont. N2L 3G1

JUNE

May 31-June 1
Midwest Int'l Contact Lens Congress
National Eye Research Foundation
CHICAGO, ILL.

Contact:
Dr. L.A. Prechtel,
NERF,
18 S. Michigan Ave.,
CHICAGO, Ill. 60603

2-6
3rd Asian-Pacific Optometric Congress
HONG KONG

Registration forms from CAO or:
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Suite 730-731,
Ocean Center Bldg.,
Canton Road, Kowloon,
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HONG KONG

June 8
Annual Meeting of L'Association Professionnelle des Optométristes du Québec,
MONTREAL

Contact:
APOQ
614 ouest St. Jacques,
Suite 302,
MONTREAL, Que. H3C 1E2

14-16
Interaction '80
CAO Presidents/Secretaries & Council Meeting
OTTAWA, Ont.

Contact:
CAO

JUNE

22-27
Rehabilitation Int'l. 1980 World Congress
WINNIPEG

Contact:
Canadian Rehabilitation Council for the Disabled,
Box 1980,
WINNIPEG, Man. R3C 3R3

23-26
71st Annual Conference Canadian Public Health Assn.
OTTAWA

Contact:
CPHA,
1355 Carling Ave.,
Suite 210,
OTTAWA, Ont. K1Z 8N8

23-28
Hellen Keller Centennial Congress
BOSTON, Mass.

Contact:
American Foundation for the Blind,
15, W. 16th St.,
NEW YORK, N.Y. 10011

June 25-July 2
83rd Annual Congress American Optometric Assn.
DENVER, Colorado

Contact:
Linda Grussmeyer,
A0A, 243 N. Lindbergh Blvd.,
St. Louis, Missouri, 63141

JULY

18-20
22nd Annual Conference New Zealand Contact Lens Society
INVERCARGILL N.Z.

Contact:
Mrs. E. Bloomfield,
Box 280,
Masterton,N.Z.

26-29
Mountain States Optometric Congress
DENVER, Colo.

Contact:
Robert Camp, O.D.
Box 484, Loveland,
California, 80537

AUGUST

14-15
San Jose Vision Training Conference

Contact:
Arthur Heinsen Jr.,
2730 Union Ave.,
SAN JOSE, Cal. 95124

SEPTEMBER

Alberta Optometric Association Annual Meeting

Contact:
Mr. A. Berry,
1225A Kensington Rd. N.W.,
CALGARY, Alberta T2N 3P8

26-29
National Optical Congress University of Lancaster

Contact:
John Allcutt,
21 Spruce Way,
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ENGLAND, L37 2YF

OCTOBER

11-12
Contact Lens Symposium
QUEBEC CITY
Association Professionnelle des Optométristes du Québec

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10-12
Optifair West
ANAHEIM, Calif.

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13-18
New Zealand Optometric Association 50th Jubilee
WELLINGTON, N.Z.

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20-22
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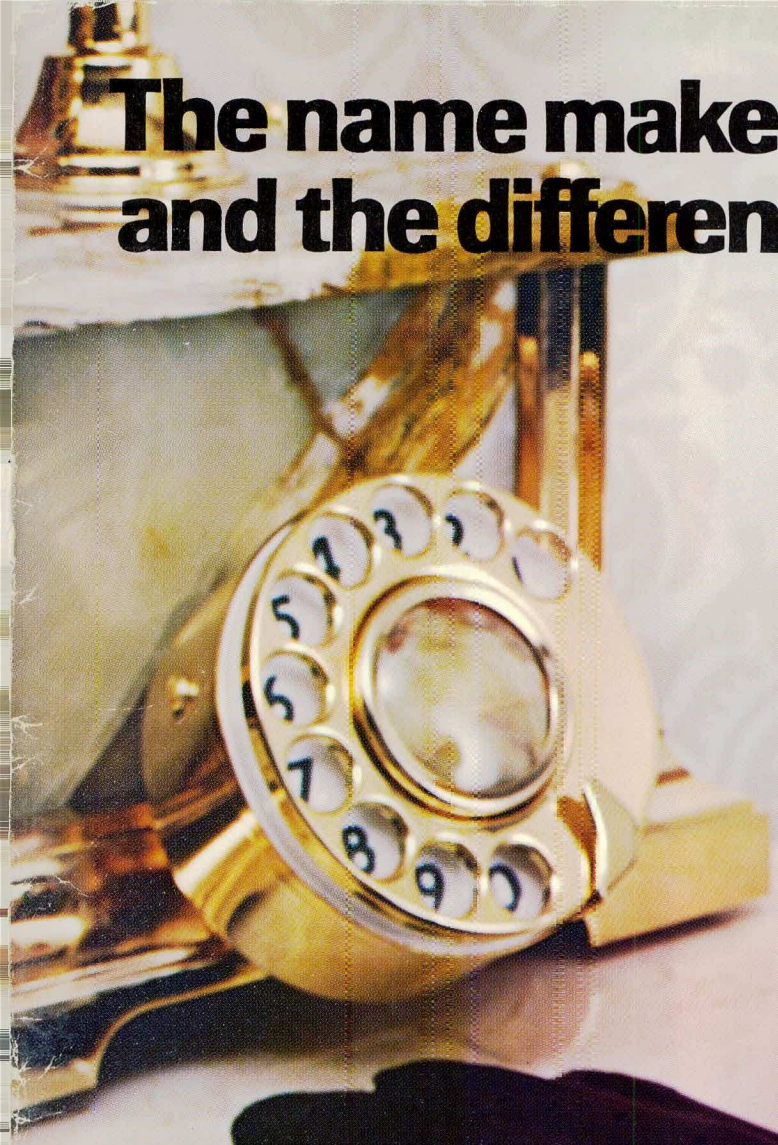

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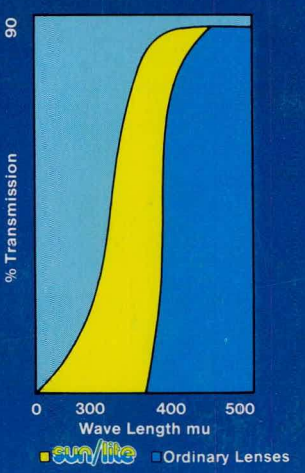

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