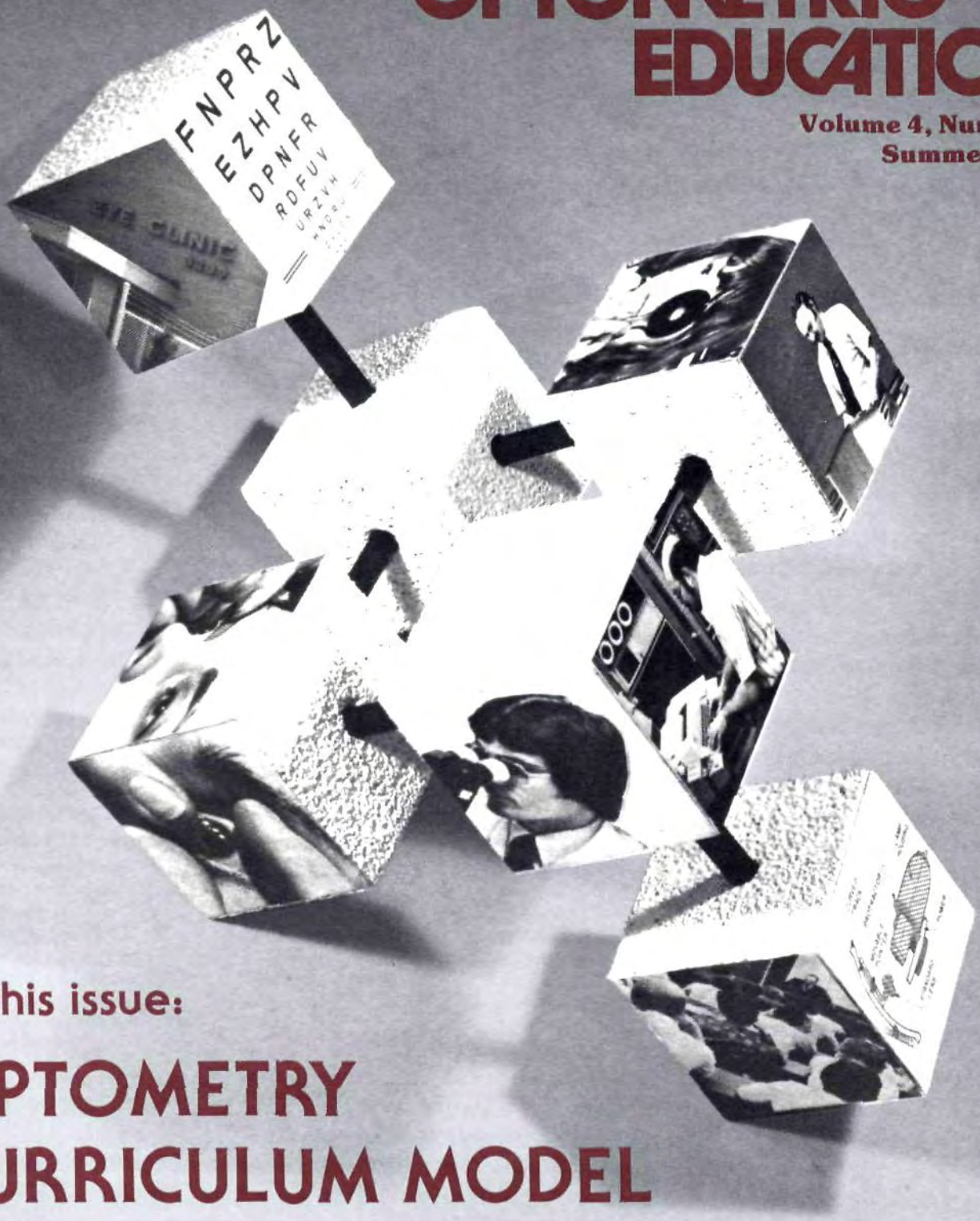
JOURNAL OF OPTOMETRIC EDUCATION

Volume 4, Number 1
Summer 1978



In this issue:

OPTOMETRY CURRICULUM MODEL

A special twelve page section for handy reference

ISSN 0098-6917

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The Journal of Optometric Education (JOE) publishes scholarly papers, descriptive and timely reports, continuing information and findings in the field of optometric and professional health education, as well as news of the member institutions of the Association of Schools and Colleges of Optometry (ASCO). Manuscripts are accepted for review with the understanding that they are to be published exclusively in JOE, unless other arrangements have been made in advance.

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References should conform to standard manuals of style and should be keyed to the text in numerical order. For journal references, give the author's name, article title, journal name (or standard abbreviation), volume number, first page of article and complete date. For books, give the author's name, book title, location and name of publisher, and year of publication. Exact page numbers are required for direct quotations from books. Limit references to those specifically referred to in the text, with all references listed on a separate page at the end of the manuscript.

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JOURNAL OF OPTOMETRIC EDUCATION

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Association Activit

This issue of JOE will highlight actions and recommendations from ASCO's most recent Annual Meeting held in July, 1978, in New Orleans.

While no report will be given on the April quarterly meeting of the Board because much of the activity centered around Congressional visitations with AOA Keymen and Keywomen, several significant actions resulted from that meeting which are summarized briefly here.

The first and foremost action was the withdrawal of ASCO from the "umbrella agreement" it had maintained with the American Optometric Foundation (AOF) and the American Optometric Association (AOA). This agreement concerned the collection of private funds for the support of optometric education.

The second was the adoption of a dual definition of an optometrist, one being a short general statement and the second being a more detailed role/scope definition. The decision now will be to determine the proper use and dissemination of the two definitions once they achieve unanimous approval of the Board of Directors.

The third item of importance was the announcement of a request from the Veteran's Administration for a guideline proposal for residency standards and criteria and a request for an estimated number of residencies which could be expected to be established during the next year. This was to be included in the budget and position requests of the VA Office of Academic Affairs.

Annual Meeting
July 1-2, 1978
New Orleans, Louisiana

Dr. Alden N. Haffner, President of the Association, was reaffirmed in office by the Board of Directors following the announcement of his recent acting appointment as Associate Chancellor for Health Sciences of the State University of New York. Dr. Haffner, concerned that his new position might represent a conflict with his ASCO responsibilities, gained full support and cooperation of the Board and was commended for his exemplary leadership and outstanding contributions on behalf of optometric education and the profession in a resolution unanimously adopted at the close of the session.

The Council on Student Affairs reported that an attempt had been made during the past year to deal, on a more in-depth basis, with areas of student affairs not traditionally addressed. In addition to urging the incorporation of selected data changes in the COE Annual Survey, the Council expressed concern over the lack of adequate staffing in the AOA Executive Offices to coordinate placement services and dissemination of career guidance information.

A project team on student affairs was also established by the Council to develop guidelines for student affairs functions at the schools and colleges. A final report is expected to be presented at the mid-year meeting of ASCO.

Introduction of the non-cognitive portion of the Optometry College Admission Test (OCAT) is now expected to be implemented during the 1980-81 test year. Originally anticipated to be operational by Fall of 1978, it was felt that further preliminary testing and scoring evaluation were needed before the new section could be introduced.

The number of persons taking the OCAT during 1977-78 showed a decline of 10 percent. This compared with medicine which had a decline of 10.8 percent and dentistry with a decline of approximately 20 percent.

The Council on Academic Affairs reported that the teacher's manual is complete, with more than 1,000 copies distributed to the faculty of the schools and colleges. In addition, a topical outline for section 8 of the National Board Examination on *Public Health, Community Optometry and Optometric Jurisprudence* has been developed with the help of ASCO's Council on Institutional Affairs. The outline was submitted to the National Board of Examiners in Optometry for review and consideration.

Mr. Paul Harris, President of the American Optometric Student Association (AOSA), urged consideration of four concerns on behalf of the students. These included: 1) inclusion of student membership on the ASCO Board of Directors with the President of AOSA being established as liaison; 2) examination of limitations imposed by contract agreements between the schools and various states; 3) establishment of a student exchange program in England; and 4) strengthening of the practice management aspects of the curriculum.

An update on activities surrounding the establishment of a new school of optometry at the University of Missouri, St. Louis, was presented by Michaele Houston, Special Assistant to the Chancellor. Ms. Houston reported that, with legislation to establish the new school duly signed into law by the Governor of Missouri in May of this year, the anticipated starting date for the first class of students is Fall of 1979 or 1980.

ASCO was welcomed as new members of the International Optometric and Optical League (IOOL) by Dr. George Wheatcroft, President of the IOOL, and Drs. Peter Smith and David Pickwell. Members of the ASCO Board pledged their support of IOOL objectives in upgrading optometric education worldwide and appointed a representative to monitor international affairs for one year to determine the need for a standing committee on international affairs.

Dr. Fumio Morie, accompanied by his son, Dr. Kazushige Morie, discussed the establishment of a new school of optometry in Japan. Dr. Morie expressed his intent to establish a second school in Tokyo next year and was commended and congratulated for his

ies & Board Briefs

dedication and perseverence in a resolution unanimously adopted by the Board.

Dr. Nathan Watzman, Chief, Special Projects Staff of the Bureau of Health Manpower, reported that it was his anticipation that most money available for special education studies and activities in the future would be in the form of contracts and that cost containment will be the obvious expectation for federal spending. Dr. Watzman also expected that all contracts would demonstrate a national "flavor" and noted that a number of activities are being undertaken toward review of existing health manpower legislation.

Miss Lynn Laverentz, Health Loan Program Specialist for the Office of Education, presented a status report on implementation of the new HEAL program. Ms. Laverentz reported that the program is expected to be operational by the coming school year and noted that interim final regulations would appear shortly with hearings being held in various cities throughout the country from August to December.

The office of a President-Elect was created upon recommendation of the Constitution and Bylaws Committee, and Dr. Alfred A. Rosenbloom, current Vice-President, was chosen to fill that office. Dr. Willard B. Bleything, Dean of Pacific University College of Optometry, was elected to the office of Vice-President.

A classification for sectional membership was also created in the *Constitution and Bylaws* which provides that any professional organization with optometric education as a primary objective can become eligible for section membership in the Association. Such organizations may affiliate with the Association upon petition to the Executive Committee and upon two-thirds majority vote of the Board of Directors. Annual dues are $100, payable by December 31.

A motion barring the requirement of a deposit prior to January 15th to secure a place in an entering class was unanimously approved by the Board. This policy, which does not include letters of acceptance which may be sent out as early as individual institutions desire, will be implemented for the class entering in September, 1979.

Ferris State College of Optometry announced that it had received accreditation from the Council on Optometric Education of the American Optometric Association. The Board voted immediately to accept Ferris as an active member of the Association.

New chairmen for the three standing councils of the Association were appointed. They are: Dr. Michael Heiberger, Council on Student Affairs; Dr. J. Boyd Eskridge, Council on Academic Affairs; and Dr. Anthony DiStefano, Council on Institutional Affairs. Drs. Heiberger and Eskridge are incumbent chairmen of their respective councils.

A resolution commending Dr. Henry B. Peters, newly elected President of the National Health Council, was adopted for his exemplary leadership and extended contributions in behalf of the optometric profession. In addition, a resolution commending the AOA Keyman/Keywoman program and the Washington Office staff of the American Optometric Association for their efforts and cooperation in obtaining support for federal appropriations beneficial to the schools and colleges was adopted.

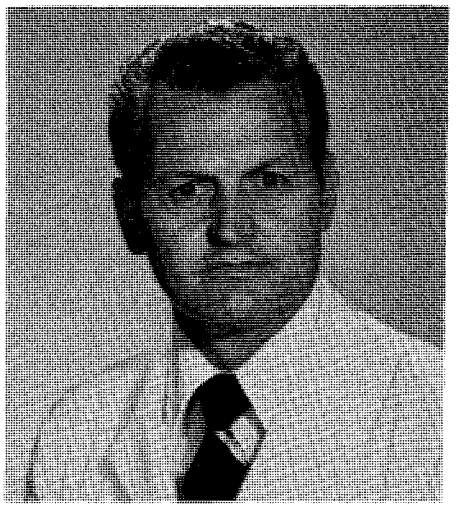
A committee to develop standards and criteria of recommended residency training programs in optometry was established with priority given to those that might be established within the Veterans Administration in view of the VA's commitment to this effort.

A motion to pursue a proposal for a contract with the Health Resources Administration to review problems of competency assessment in optometry was approved.

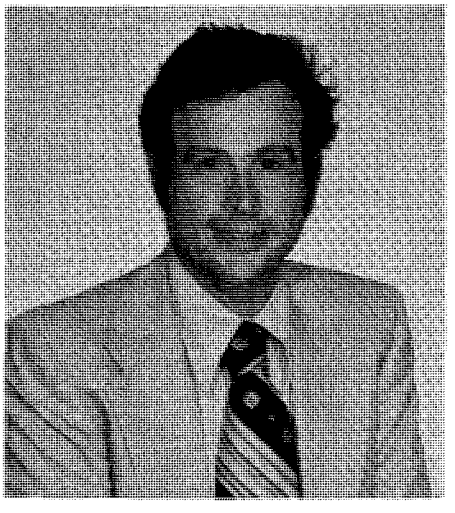
In addition, a motion to appoint a task force to respond to forthcoming HRA contract proposals was approved, and an additional line item in the budget was assigned to support that project.

In closing, the President, Dr. Haffner, noted the tremendous challenges which lie ahead for the Association and the optometric profession and stressed the continued need for commitment and a sense of professionalism on the part of all those involved to meet the demands of the future.

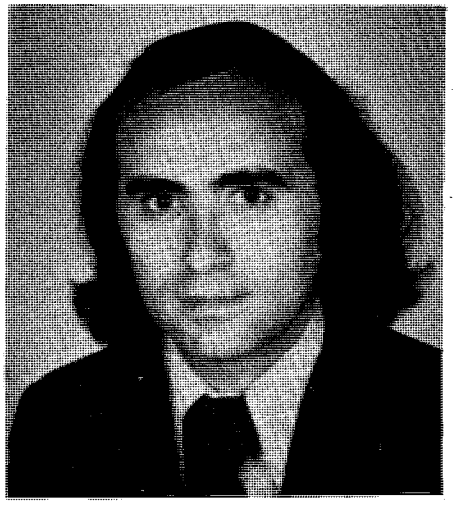
Dr. J. Boyd Eskridge



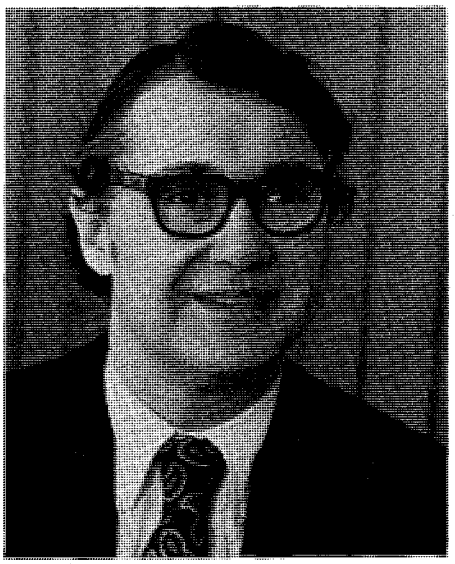
Dr. Michael Heiberger



Dr. Anthony DiStefano



GUEST EDITORIAL



Michael Pertschuk

The Federal Trade Commission, Advertising, and Consumer Self-Protection

By Michael Pertschuk, Chairman
Federal Trade Commission

A new era is emerging in the public's dealings with the professions, signalled by the recent actions of the Supreme Court in the area of advertising by lawyers, and by the Federal Trade Commission concerning advertising by optometrists, ophthalmologists and opticians. At the same time, the "taxpayer's revolt" symbolized by Proposition 13 in California, signals a new direction in the relationships between government and the governed.

Both the professions and government have been accused of fostering the misconception that only we know what is best for the consumer. I recently had the opportunity to address a national consumer affairs forum on the future of consumer protection in the United States. I'd like to share with you one of the thoughts I had on that occasion:

"Consumer Protection" is a term that can be put out to pasture for several decades. It smacks of paternalism. For what consumers seek is not "protection" from a benevolent "big brother," but participation, Rules of Conduct in the marketplace which enable the consumer to help himself. The consumer wants essential information upon which to base decisions, so that he can fulfill his theoretical role as sovereign of the marketplace—not substituting government decision-making for individual choice; but making individual choice workable.

The time has come for government and the professions alike to move away from "consumer protection" and to redirect our efforts into providing consumers the tools they need to protect themselves.

The trade regulation rule recently adopted by the Commission is an important step toward realizing this goal. Our release of prescription requirement provides an excellent illustration of the difference between "consumer protection" and "consumer self-protection."

The Commission's rule requires that you, the optometrist, must give a copy of the prescription to your patient. As it applies to contact lenses, this requirement has caused a furor among many optometrists. We have been accused of ignoring the potentially adverse health consequences of improperly fitted contact lenses, and of intruding into the sanctity of the doctor-patient relationship.

All the Commission's rule actually requires is that at the conclusion of an eye examination, a copy of the patient's prescription is delivered to the patient. The doctor remains free to consult with his or her patient on where the best care in fitting contacts can be obtained, to advise or make recommendations. What the Commission's rule insures is that it is the *patient,* not the doctor, who makes the ultimate determination on where to obtain care. The Commission's rule does not determine who should, or should not, be permitted to fit contact lenses. Rather, the rule provides the consumer with the tool, the prescription, which will enable him to select among those persons whom the *state* permits to dispense contact lenses.

Consider carefully the argument that consumers should not have a right to their prescriptions for contact lenses: that the optometrist should "protect" the consumer from making a decision not in the consumer's best health interests—or the practitioner's best economic interests.

The doctor-patient relationship should be a mutual one, a relationship in which the doctor is the advisor, the counselor, but in which the patient is the sovereign. The paternalistic model ad-

Editor's Note: *This is the first of a series of guest editorials by prominent individuals which JOE hopes to bring you on topics of significant concern to optometric education and the profession. We recognize the existence of differing viewpoints within the ranks of the profession itself and encourage and invite your comments concerning these topics. Our first editorial is hosted by the Honorable Michael Pertschuk, Chairman of the Federal Trade Commission. We would like to thank Chairman Pertschuk for his valuable time and assistance in presenting us with this commentary on ophthalmic advertising and consumer self-protection.*

vocated by critics of the Commission's rule stands the doctor-patient relationship on its head, making the doctor the ultimate decision-maker, the sovereign.

When we turn to the question of advertising by optometrists, we are once again faced squarely with the issue of "consumer protection" versus "consumer self-protection." By now, the economic effects of advertising bans are not in much dispute. The studies conducted by the Benhams, and more recently the study conducted by Dr. James Begun,[1] have demonstrated the correlation between advertising restrictions and higher price-tags for both eyeglasses and eye examinations. Even more important is the evidence of the wide range of prices available from various practitioners in the vision care marketplace. The record in the Commission's rulemaking demonstrates that consumers are not aware of their price alternatives.

Certainly, one of the salutary effects of ophthalmic advertising, particularly price advertising, should be to sensitize consumers to the issues of price. Advertising, here as elsewhere, provides information with which consumers can protect themselves. Undoubtedly, some consumers will be misled by ophthalmic advertising; some consumers will be subject to bait-and-switch tactics. But these will be the exception rather than the rule. Armed with information concerning price alternatives, the consumer can reassert dominance in the marketplace—selecting the source and cost of care that best meets his or her needs.

But, it is argued, you cannot place a price tag on a person's health—price ought not be a consideration in seeking out health care. I think that this is an attitude that the American public can no longer afford. The cost of all health care, including optometric care, has risen significantly in the recent past. While vision care costs may not have risen as quickly as other medical costs, the inflationary trend is nonetheless disturbing.

I have no doubt that those who serve the public through their optometric practices do indeed have strong commitments to the public interest. But consumers are quickly coming to the realization that the professions also have a significant economic self-interest. In this sense optometry is no different than medicine, dentistry, or law.

Increasing the sensitivity of consumers to cost considerations in the health care field is not synonymous with having consumer decisionmaking motivated solely by price. For example, a study conducted by the California Optometric Association showed that almost 90% of the consumers surveyed wanted more price information, and almost 90% of the consumers felt that price was an important feature in making their purchase decision, but close to 95% of those surveyed thought that the reputation of the doctor, and the range of services he or she offers, were the most critical factors. It is somewhat unrealistic to believe that, in the main, consumers will purchase on price alone.

A criticism frequently leveled at the Commission is our alleged failure to consider the issue of quality. While I won't rehash our findings on the correlation between advertising bans and quality, the data do not support a finding that, in the aggregate, price and quality are correlated. But in assessing the issue of "quality of care" it is important to look carefully at the effects of advertising bans on consumer awareness, and on consumers' ability to make intelligent and informed decisions.

For example, in one study, conducted by California Citizens Action Group, it was found that almost 30% of the population believe that optometrists can prescribe eye medication, and over 10% believed that optometrists can treat eye disease. The conclusions of the author of this study are worth reflecting upon:

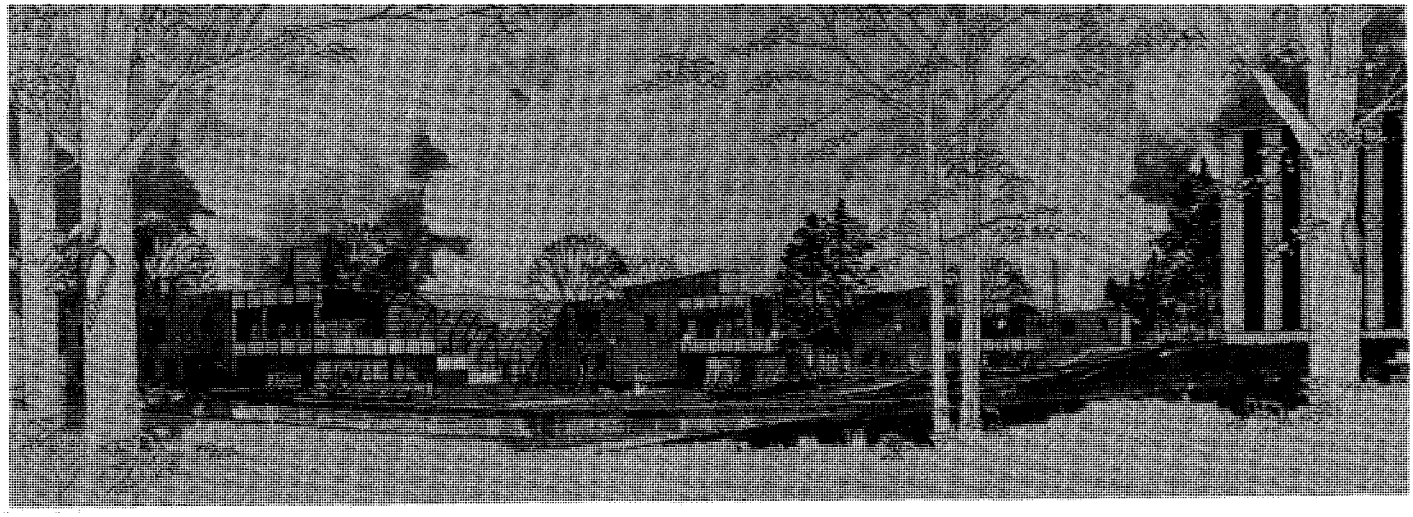
> *Price advertising restrictions, far from being a protection from a dangerous open sesame to public deception is [sic], in fact, a barrier to the possibility of the public's being able to take appropriate action to protect itself.*[2]

I believe that Colleges of Optometry will be of critical importance in determining the ultimate effectiveness of ophthalmic advertising. As the primary vehicle by which new optometrists learn the norms of the profession, the colleges of optometry must take an affirmative role in educating new as well as practicing optometrists on the needs of consumers for more information. I urge the optometric schools to assume a leadership role in facilitating the flow of information to consumers.

Regulatory action which stifles the ability of individual consumers to decide for themselves is neither desirable nor effective. In contrast, the elimination of advertising bans is one step in the movement toward consumer sovereignty. I can assure you that the Commission will continue its efforts to provide solutions to problems which maximize the ability of consumers to protect themselves. I encourage you, as a growing profession, to similarly commit yourselves to this goal.

[1See Lee Benham, "The Effect of Advertising on the Price of Eyeglasses," *Journal of Law and Economics*, vol. 15 (1972), p. 337; Lee Benham and Alexandra Benham, "Regulating Through the Professions: A Perspective on Information Control," *Journal of Law and Economics*, vol. 18 (1975), p. 421; and James Begun, "Professionalism and The Public Interest: Price and Quality in Optometry" (Ph.D. dissertation, University of North Carolina, 1977).]

[2From testimony of Paul Fine, Ph.D., Associates before Federal Trade Commission hearings on Proposed Trade Regulation Rule on the Advertising of Ophthalmic Goods and Services, San Francisco, California, July 29, 1976, p. 3669.]



THE EYE INSTITUTE— A Health Care Delivery Center

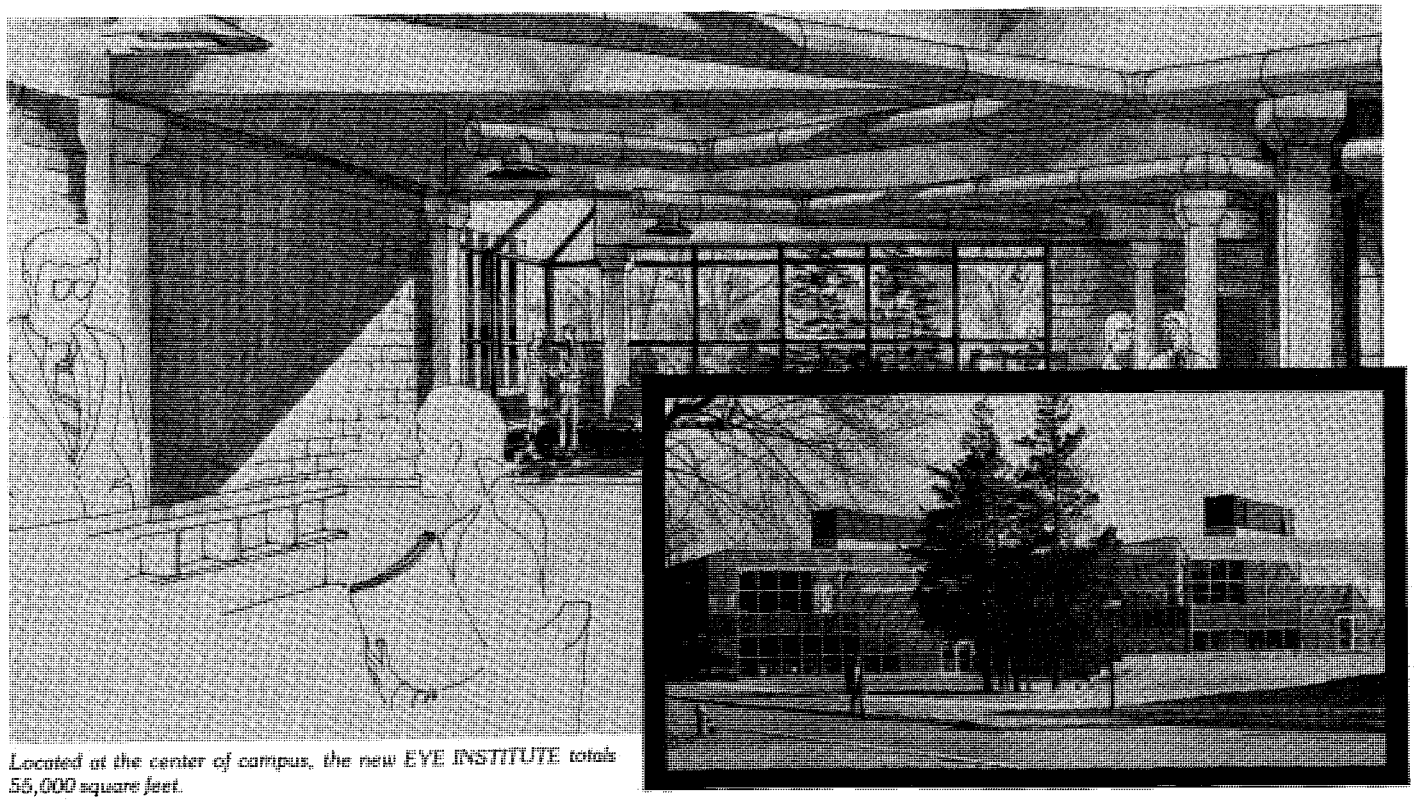
By Charles F. Mullen

The Need Was Urgent

With the opening of THE EYE INSTITUTE, the Pennsylvania College of Optometry has the opportunity to attain one of the highest goals set by its founder nearly sixty years ago. Dr. Albert Fitch had stated, "A proper college of optometry must compare with any of the colleges of the other health professions, such as medicine and dentistry, and be on a par with the best of them." THE EYE INSTITUTE provides the means to close the final gap in achieving a favorable comparison of the College with other educational institutions in the health professions. In fact, fresh approaches to the integration of patient care and clinical education may result in THE EYE INSTITUTE serving as a model for all.

The need for improved clinical education facilities became urgent during the 1972-1974 period. Following the installation of a new administrative team headed by the College president, Norman E. Wallis, the curriculum had undergone extensive revision. Emphasis was placed on preparing future optometrists for an expanded scope of practice which addresses the problems of the whole patient. An academic program was devised to provide a thoroughly integrated background in the biological, behavioral, visual and clinical sciences

Charles F. Mullen, O.D., is Executive Director of THE EYE INSTITUTE, Pennsylvania College of Optometry.



Located at the center of campus, the new EYE INSTITUTE totals 56,000 square feet.

that can be applied to patient care. Throughout this process the conviction developed that the mission of all optometric education is excellence in patient care.

Yet, while the prime objective was to bring clinical education and patient care experiences forward as the critical element in the education of the practicing clinician, the College was handicapped by seriously inadequate clinical facilities.

In 1974, a thoroughly investigated and carefully planned proposal for a new clinical education and patient care facility was submitted to the U.S. Department of Health, Education and Welfare. In 1975, the Pennsylvania College of Optometry was granted the entire amount requested, $3.8 million. The total cost of the new building was $5.1 million.

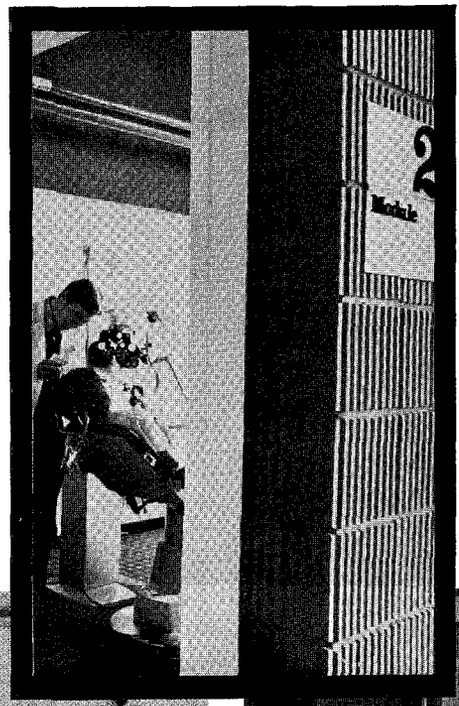
The New Building

The architectural firm of Hardy, Holzman, Pfeiffer Associates of New York was selected, principally because they promised to challenge the College on every preconceived idea regarding the development of a clinical facility for the profession. Planning involved all segments of the College community, as well as leaders in the optometric and other health care professions on the local, national and even international level. The architects came to understand that the College wanted not only to develop a facility for patient care and education, but also to impact on the public and add to the recognition of the profession. They agreed that recognition of the worth of a profession by the public grows out of respect for the educational institutions in which the professionals are trained.

The basic function of THE EYE INSTITUTE was to be a regional resource —for the College's educational process, for the community, for all health care professionals—and a national resource for the profession of optometry. The architects were outstandingly successful in creating a physical environment which facilitates and demonstrates this function.

Of modern design, the building is on two levels totalling approximately 52,000 square feet. The upper level houses all primary care facilities, while the lower level incorporates secondary specialized care suites, administrative offices, a 147-seat amphitheater, a conference room, and optical and ophthalmic drug dispensing areas.

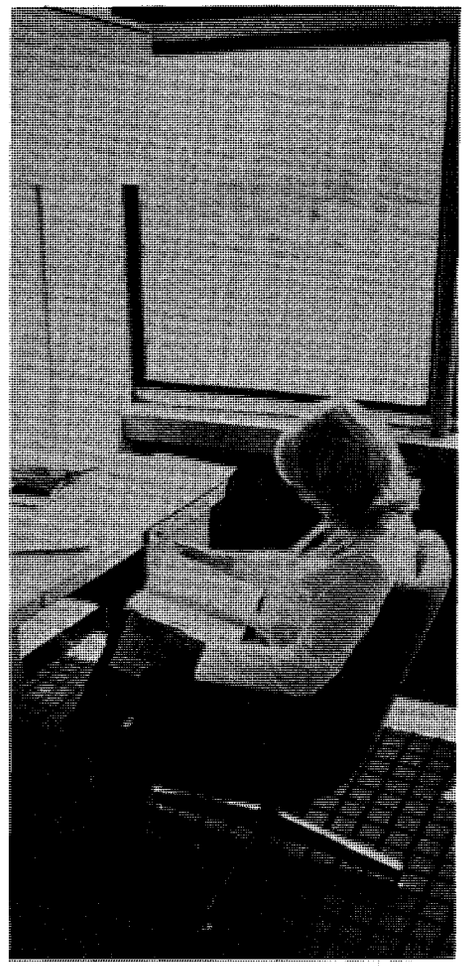
Each examination room within a module provides a complete range of primary care procedures.



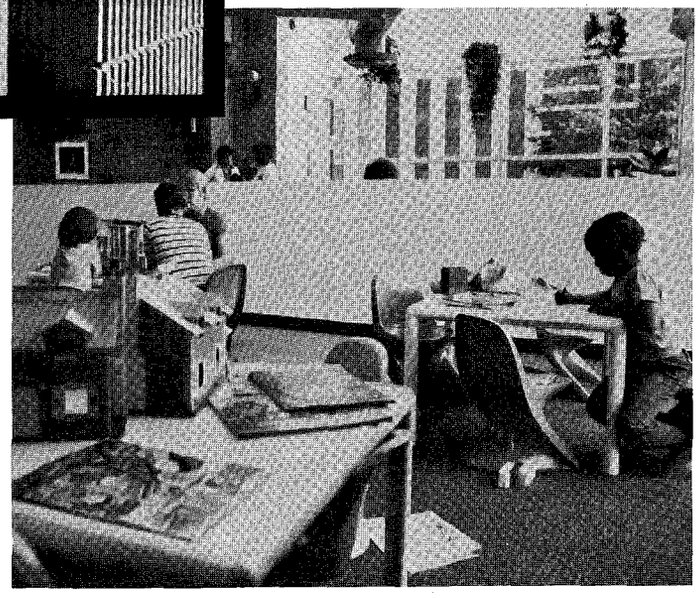
A reception desk and preliminary testing area are components of each primary care module.

The Primary Care Service Module is the patient's entry point into the INSTITUTE's eye care delivery system. Each of five such units operates with a degree of independence from the whole and is

Faculty offices provide a pleasant environment for academic pursuits.



Young children are supervised by volunteer "candy stripers" in the INSTITUTE's child care enclosure.



physically somewhat separate. The purpose of dividing primary care into the service modules is to provide an environment in which the patient receives personalized continuity of care as he or she would within a small private group practice; yet, the advantages of scale—multidisciplinary skills, complex instrumentation and quality assurance mechanisms—are available.

Each module is comprised of a preliminary testing area, eight fully-equipped examining rooms, staff offices, and a consultation area. A reception station and a comfortably furnished waiting area are shared by paired modules. A sixth modular area has been reserved for the future creation of a group family practice in which all primary prescribing professions will be represented. This experiment in interdisciplinary cooperation will provide students assigned to this module experiences in a multidisciplinary setting.

Twelve third or fourth year optometric students, assisted by second year students, are assigned to each Primary Care Service Module. Student interns are supervised by two professional staff members holding academic rank at the Pennsylvania College of Optometry, and one optometric post-doctoral Fellow. In addition, ophthalmological personnel are assigned to the module to provide diagnostic consultation and supervision of general therapeutic services for patients discovered to be suffering from ocular disease. In support of professional staff, there are optometric technicians, optometric assistants and clerical personnel.

Operating Procedures

All patients are seen by appointment except in emergencies. When the patient registers at the service module's reception desk, a unitized case record is created which contains all reports relating to that patient from all sources, including specialists to whom the patient may be referred. A licensed optometrist is always assigned the responsibility for case management, as the patient's attending doctor.

The patient next undergoes a series of preliminary screening tests to evaluate the state of his/her ocular and general health. Hypertension and glaucoma screening, visual acuity, and visual skills are included in this protocol. The results are used to generate a problem-oriented patient record, and to determine the level of care required to solve the problem(s) uncovered. If the screening tests indicate no evidence of an urgency, the patient proceeds to a comprehensive eye examination, aimed at disease detection and the determination of a prescription for achieving optimum visual efficiency. The patient is then assigned to the student most appropriate to conduct the examination.

The Optical Service of THE EYE INSTITUTE, located on the lower level of the building, offers the patient the option of having his/her ophthalmic prescription filled on the premises. No prescriptions are filled for persons who are not patients of THE EYE INSTITUTE.

When the patient is referred outside the Primary Care Module for consultation or therapy, the professional within the module is not relieved of his/her responsibility to the patient. He/she continues to monitor and coordinate the management of the case, whether the problem was ocular or systemic. In this way, three objectives are met: (1) the patient receives the most cost beneficial care by professionals best equipped to solve his or her problem; (2) the patient remains under the case management of the primary care provider who assures that care is not fragmented by split responsibility; and (3) each professional is challenged to perform at the highest level of his/her training and capabilities because the process assigns the patients in a rational manner.

The specialty service units are located on the lower level of THE EYE INSTITUTE. Access by patients to specialized services is by referral only, either by a professional staff member of a Primary Service Module or by a private health care practitioner. Patients referred by other than eye care professionals generally visit a Primary Care Module for case work-up prior to receiving secondary services.

Specialized Services

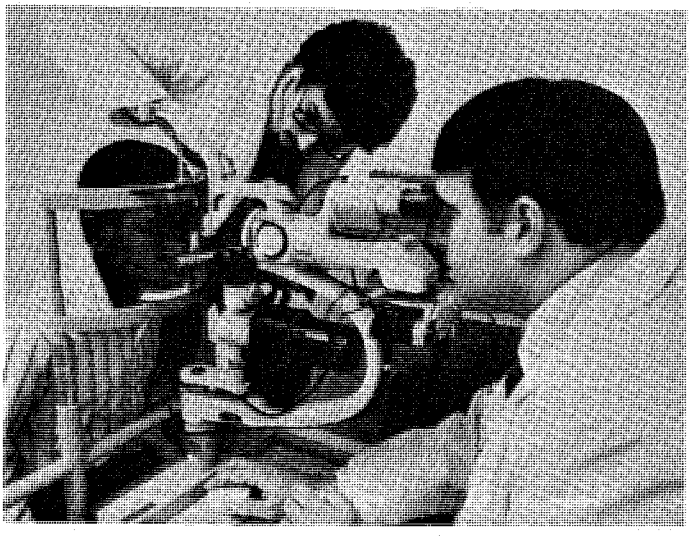
Specialized services within THE EYE INSTITUTE include the following:

Ophthalmological Service: The ophthalmological suite is comprised of four examination/treatment rooms, and private offices. Provisions have been made for expansion of this facility so that, in the future, ambulatory surgery may be accomplished.

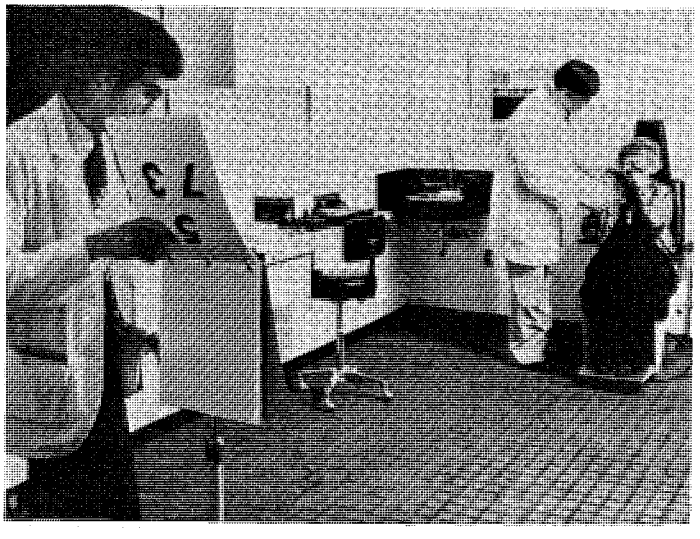
While general ophthalmological services are provided in the Primary Care Service Modules, this Service offers consultation in the sub-specialties of corneal-, retinal-, and neuro-ophthalmology. A *second opinion service* is also available to patients, primary care physicians, and third-party health insurors.

(continued on page 23)

Complete facilities for ophthalmic photography are offered as a referral resource to optometrists in the region.



The William Feinbloom Vision Rehabilitation Center receives referrals from various parts of the country and many foreign nations.



Special Section:

OPTOMETRY CURRICULUM MODEL

A Report of the Curriculum Committee of the ASCO Council on Academic Affairs

The development of an optometry curriculum model began in 1974 when the first Curriculum Workshop convened by the Council on Academic Affairs produced a working definition and role of the optometrist upon which to build the necessary educational content. A second workshop held May, 1975, produced a preliminary report which was published in the Summer/Fall 1975 issue of the *Journal of Optometric Education*.

Over the next few years, the curriculum model continued to be a high priority program of the ASCO Council on Academic Affairs. In order to have more information available for the study and development of the model, approximately 40 letters were sent to known experts in the selected academic areas of the curriculum. These individuals were requested to supply, in outline form, the knowledge, skills, and attitudes that they felt were necessary to prepare an optometry student to meet the optometric role and responsibility of health care in their particular academic area.

A tremendous number of outlines, notes and information was received. A study group of eight people was then selected to review and evaluate this information and, using their own knowledge and experience, to develop the specific curricular elements in the selected academic areas. A meeting was held in St. Louis, Missouri, during the first week of March, 1977, to finalize the effort. The results of that meeting are presented in this report.

Development of a curriculum model has not been an easy assignment. The science of optometry is in a stage of constant evolution and is a dynamic profession. Therefore, although a list of curricular elements has been designed, they represent today's evaluation and will require constant study and refinement to meet the ever changing demands on the optometric practitioner in providing for vision care needs of the public. It has been recommended that this be an ongoing responsibility of the Council on Academic Affairs.

The report which follows was presented as part of the Annual Report of the Council on Academic Affairs to the Board of Directors at the Toronto, Ontario, meeting in July, 1977. This report does not, in its present form, represent a policy statement. It is to be considered a working document.

Thanks must be expressed to the members of the Curriculum Committee of the Council on Academic Affairs who devoted considerable time and effort to the development of this curriculum model: Dr. Frank Brazeltorr of the Southern California College of Optometry, Dr. John Carter and Dr. Paul Pease of the New England College of Optometry, Dr. Anthony DiStefano and Dr. Lester Janoff of the Pennsylvania College of Optometry, Dr. Troy Fannin of the University of Houston, College of Optometry, Dr. David Higgins of Kittery, Maine, and Dr. T. David Williams of the University of Waterloo, School of Optometry.

—Jess Boyd Eskridge, O.D., Ph.D., Chairman

I. Introduction

The role of optometry in health care, the vitality of the profession of optometry, and the health care delivered by the practitioners of optometry are functions of the scope and quality of optometric education. The need and desire for a modern, current, problem-oriented approach to optometric education and a greater educational consensus among the Schools and Colleges of Optometry from *within* optometry, and the increasing significance of third parties and the role of optometry in health care *external* to optometry are requiring that more attention be given to the scope and quality of optometric education.

The scope and quality of optometric education is determined to a great extent by the optometric curriculum. The ASCO Council on Academic Affairs has received the assignment to organize and develop an optometric curriculum model that will be responsive to the expressed desires and needs in optometry and yet be sensitive to the issues that are external to optometry. Several meetings and discussions have been held in an attempt to achieve this difficult task.

To produce the type of optometric practitioner that is desired and to provide for the appropriate impact of optometry on health care, we must begin the development of the optometric curriculum with these goals in mind. The appropriate logic scheme for the development of an optometric curriculum therefore consists of:

1. Develop a working definition of what an optometrist should be and/or do.

2. Outline in general terms the role and in more specific terms the responsibilities of an optometrist in health care.

3. List, in specific terms, the knowledge, the skills, and the attitudes that are needed to fulfill the role and health care responsibilities.

4. Separate, correlate, and condense this information into logically associated, academic areas — relating information that fits together for efficient teaching and learning — not necessarily in the usual conventional manner.

5. Outline the specific curricular information or elements in each academic area necessary to equip the students with the knowledge and skills required to fulfill the optometric responsibility in health care.

6. Design individual courses, course sequences, and develop a specific curriculum using the informational units or curricular elements. This phase of curriculum development will be left to the individual Schools and Colleges of Optometry, since such design will be significantly influenced by each school's educational and professional philosophy and by its faculty and facilities. Flexibility in curriculum design must be preserved so as to take advantage of local strengths, interests and opportunities.

Finally, the effective management of the curriculum is essential if it is to continue to fulfill its purpose. Too often, curricula are developed and then cast in bronze or are randomly changed by individual faculty members to include their own teaching interests. A good curriculum cannot be frozen; it must be flexible and responsive to change, but the change must be planned, purposeful, and constructive. Faculty must have academic freedom, but they also must teach and cover the specific areas assigned to them to insure a minimum of overlap and program completeness. Curriculum planning, therefore, must be followed with implementation and evaluation procedures. This concept of planning, implementation, and evaluation is vital for the curriculum to be effective, and it requires the help and input of administrators, faculty, students, state boards, health planners, etc. in a continuing management program.

II. Working Definition of an Optometrist

An optometrist is a health care practitioner who participates as a member of the primary health care team in providing for comprehensive health care, health maintenance, and health education, and a primary vision care provider with the responsibility to prevent, detect, diagnose, treat, and/or manage visual and ocular problems, to enhance visual performance, and to provide vision and ocular health education and a continuing program of vision and ocular care.

With this definition, the optometrist has, in essence, a double role to fulfill; i.e., he is a health care practitioner and a primary vision care provider. A previous report stated that the role of the optometrist is:

1. To prevent, detect, diagnose, and treat and/or manage problems of the visual system.

2. To analyze, evaluate, and advise on problems of the visual environment.

3. To evaluate the involvement of vision in behavior or performance.

4. To provide general health screening for problems of high incidence and high significance, and general health education and counseling.

5. To provide vision health education to the public and other health care providers.

6. To serve as the administrator for the delivery of vision health care, and to provide administrative support or guidance for comprehensive health care programs.

III. Optometric Responsibility in Health Care

The delineation of optometric responsibility in health care can be approached in several ways. The one selected for this report is the problem-oriented approach. The responsibilities involved in the above definition and the role of an optometrist were divided into patient care, community health, and professional. The specific knowledge and skills required to meet each of these responsibilities were then listed.

A. Patient Care Responsibilities.

1. Knowledge and skill required to prevent, diagnose, and manage refractive errors and ocular optical anomalies.

2. Knowledge and skill required to prevent, diagnose, and manage binocular problems of accommodation and convergence.

3. Knowledge and skill required to prevent, diagnose, and manage anomalous oculo-sensory and oculo-motor problems.

4. Knowledge and skill required to analyze, evaluate, and modify visual components of perceptual and learning behavior.

5. Knowledge and skill required to detect, evaluate, and manage ocular

health problems and those systemic health problems that have visual and ocular manifestations.

6. Knowledge and skill required to screen for those general health problems which have high prevalence, significant morbidity, and/or mortality consequences, little or no symptomatic evidence, and for which effective early detection methods are available and for which early treatment is successful.

7. Knowledge and skill required to counsel patients concerning modifications of the visual environment for improved visual performance and/or safety.

B. Community Health Responsibilities.

1. Knowledge and skill required to provide general health education and to counsel patients concerning preventive health care practices.

2. Knowledge and skill required to provide ocular and vision health education to other health care providers and to the public.

3. Knowledge and skill required to serve as an administrator for the delivery of vision and ocular health care and to provide administrative support for comprehensive health care programs.

4. Knowledge and understanding of the social and economic aspects of health care and the governmental, industrial, and business involvement in health care delivery.

C. Professional Responsibilities.

1. Knowledge and skill required for the development and management of a practice of optometry.

2. Knowledge and understanding of the legal and ethical aspects of health care in the practice of optometry.

3. Understanding and appreciation of the need for research and the need to participate in optometric continuing education.

4. Understanding and appreciation of the need for the growth and development of the educational institutions and the professional optometric associations.

IV. Separation of Knowledge & Skills

The next step in the development of an optometric curriculum was to separate the needed knowledge and skills into logically associated academic areas for efficient teaching and learning. The areas that were selected are as follows:

A. Basic Health Sciences
B. Optics
C. Vision Sciences
D. Behavioral Science
E. Disease
F. Clinical Patient Services
G. Community Health
H. Professional Orientation & Service
I. Patient Care Experience

V. Curricular Elements

A. *Curricular Elements in Basic Health Science*

1. Gross human anatomy of the cardiovascular, musculoskeletal, integumentary, special and general sensory, respiratory, digestive, endocrine, and reproductive systems.

2. Gross human anatomy of the head and neck. Emphasizing the musculoskeletal system, integumentary system, peripheral circulation, peripheral nervous elements, as well as the sensory organs of the head and neck.

3. A study of the microscopic anatomy of human cells, tissues, and organs, but excluding the nervous system of the eye. The composition, structure, and form of the idealized cell, its components and their relationship to one another. The biochemical properties, metabolism, and division of cells.

4. Specialized cells and their morphology, attributes, and classification. The characteristics and classification of tissues. Cellular types and characteristic cellular configurations of major body organs.

5. A study of the microscopic anatomy of various portions of the central and peripheral nervous systems. The composition, structure, form, biochemical, and bioelectrical properties of the idealized neuron. The specialized neurons and their characteristics and locations within the nervous system.

6. The glial cells, their morphology, relationship to neurons, classification, and their typical location within the nervous system. The typical microscopic anatomy of neural tissue at a variety of locations within the central nervous system.

7. The gross anatomy of the central and peripheral nervous systems including the major subdivisions of the central nervous system and the cranial nerves with their intracranial and extracranial roots and connections.

8. The autonomic nervous system including the parasympathetic and the sympathetic components. Organs mediating general and special sensation and their neural connection.

9. The vascular supply to the eye including the arterial components, the venous drainage system, and their relationship to selected neurological elements. The meninges and the meningeal blood supply. The relationship between neural elements and the bony features of the cranial cavity and other potential sources of pressure or tension upon the brain.

10. Principals, sequence, and course of general embryological development. The embryological origin of tissues and structures and factors that interfere with normal embryological determination. Teratology and the minor disorders of embryological development.

11. General human physiology, including the study of the fundamental organ systems and the mechanics which regulate body function including the function of the cardiovascular, musculoskeletal, integumentary, special and general sensory, respiratory, digestive, endocrine, and reproductive systems.

12. The neuro-physiology of the central and peripheral nervous systems with emphasis upon the mode of functioning and the purposes of selected neural and humoral sites throughout the system. The biochemical and bioelectrical aspects of nerve conduction. The biochemical and bioelectrical properties of various kinds of synapses. The central and peripheral neuro-transmittor substances and their antagonist both facilitory and inhibitory. The cybernetic functions of the synapses.

13. The ganglion and other specialized neuronal elements, reflex arcs, neuronal circuits, conduction pathways. The general patterns of transmission and interaction at various sites within the brain and spinal cord. The special roles, properties and functions of the sympathetic and parasympathetic systems and the neuro-secretors within the central nervous system. The mapping of the cerebral cortex. The split brain experiments and presumed right-left differences in cortical functioning. The functions of the thalamus, hypothalamus, midbrain, pons, cerebellum, and spinal cord.

14. Interactions of substances with intact cells at the molecular level. The role of the cell membrane and the role of the intracellular components. The movements of water, soluble, and lipid

soluble substances across the cell membrane. The passive and active transport mechanisms and the intracellular biochemical transformation and cell metabolism. The reproduction of cells and the roles of DNA, MRNA, TRNA. The natural history of the cell and cellular function.

15. The neuron as a functioning cell and the transport of metabolites and other substances across the neuronal cell membrane. The metabolism in the neuron, the axoplasmic flow, and the mechanisms triggering and generating polarized, depolarized and hyperpolarized states. The action potential, the action current, and the nerve message. Transmission of nerve impulses in myelinated and non-myelinated nerve fibers.

16. The identification of neuro-transmitters at various sites within the nervous system. The facilitory and inhibitory neuro-transmitters and the production, storage, release, and fate of neurotransmitter substances. The properties and functions of the synapse and the properties and functions of the myoneural junction. The mechanisms of action current transmission in muscle and the mechanisms involved in muscle fiber depolarization and repolarization. The roles of sodium, potassium, and calcium in this process.

17. General pharmacological principles. The classification, dosage, storage, and routes of administration of pharmaceuticals. The mechanism of drug action, pharmocodynamics, absorption, distribution, and metabolism excretion. The dosage calculations, drug interactions, and adverse drug reactions of toxicity, side effects, and allergy. The FDA methods of drug evaluation, identification of pharmaceuticals, and legal considerations.

18. Drug action and autonomic drugs, drugs modifying neuromuscular transmission, histamines, anesthetics, drugs modifying the cardiovascular system, hormones and drugs modifying endocrine activity, drugs acting on the central nervous system, chemotherapeutic agents, drugs affecting immune mechanisms.

19. Routes, dosages, and precautions in the administration and use of ophthalmic pharmaceuticals. The absorption, distribution, biotransformation, and elimination of ophthalmic pharmaceuticals. Specific pharmaceutical agents useful in ophthalmic practice — irrigation solutions, osmotic agents, viscosity agents, dyes, topical anesthetics, mydriatics, cycloplegics, decongestants, miotics, antihistamines, chemotherapeutic agents, steroids, etc.

20. The adverse drug reactions and potential ocular hazards associated with drug use. The over-the-counter drug preparations and the ocular and visual side-effects of non-ophthalmic medications. The comparison of normal side-effects versus signs of drug toxicity. The management of general and ocular drug-induced emergencies.

21. Concepts of human genetics, Mendelian principles, dominance, expressivity, and penetrance. Autosomal and sex-linked inheritance. Genetic disorders, chromosomal fractures and anomalous linkage. The frequency and distribution of genetic disease, polygenetic inheritance, multifactoral genetics, genetic syndromes, genetic markers and principles of genetic counseling.

22. Basic concepts of general and cellular biochemistry with study of nomenclature, structure, and reactions of organic molecules. Carbohydrates, lipids, and electrolytes. Amino acid metabolism and the biosynthesis of protein. Nucleotides and nucleic acids. Enzymes and co-enzymes. Carbohydrate metabolism and the biosynthesis of fatty acids and triglycerides. The citrate cycle and the generation of ATP and the ATP decomposition and energy released. Vitamins.

23. The immunological responses in man. Antigens and antibodies, humoral and cellular immunity, specific and non-specific host defense mechanisms, hereditary and acquired immunological deficiencies, and the classification of immunological deficiency states. Auto immune disease.

24. A study of bacteria, viruses, protozoa, fungi, and other micro organisms which are of significance to the human host. A study of the normal flora as well as pathogenic organisms. The structural and biochemical attributes of organisms that may influence their pathogenicities, virulence, and/or resistance to various classes of pharmacological agents. The mutations and the adaptations of pathogenic organisms. The host-organism relationship and interactions. Invitro-methods to culture and/or process and/or classify organisms and methods to evaluate organism susceptibility to control by means of selected therapeutic agents.

25. A study of fundamental pathological processes as they occur in various tissues of the body at the microscopic level.

26. Anomalies of cellular function, disturbances of the selective permeability of the cell wall, failure of active transport mechanisms, enzyme deficiency states, anomalies of metabolism, anomalies of protein synthesis and anomalies of cellular reproduction. Factors which influence the rate at various stages of cell division, acquired chromosomal defects, and effects of exogenous toxins and specific cellular poisons.

27. Disorders of organs or organ system function when diseased or in the presence of disease. Anomalous modes of functioning of certain organs and/or organ systems in the presence of disease.

28. An introduction to general pathology including the fundamental pathological processes and the general classes of disease.

29. Substances involved in cellular metabolism, carbohydrates, fatty acids, amino acids, enzymes, vitamins, minerals, and trace elements. In-vivo nutrient storage. Exogenous and endogenous factors in malnutrition. The nutritional values of common foods and the adulteration and denaturization of foods. The consequences of subclinical malnutrition and the clinical diseases associated with nutritional deficiencies or excess.

30. Morphological and functional aspects of post-natal growth, development, and maturation. The time course of growth, development, and maturation and the limits of normality. Hereditary determinants and environmental influences in growth and maturation. Therapeutically reversable anomalies. The influences of disordered growth, development, and maturation upon self sufficiency, general level of functional capacity, susceptibility to disease, and longevity.

31. Biological changes associated with aging and senescence and the implications with regard to performance decrements and the patient's general ability to cope with environmentally-imposed stress.

B. Curricular Elements in Optics

1. The propagation of light, luminant bodies, frequency, velocity, wavelength, rectilinear propagation, Huygens' principle, wave fronts, rays, beams, optical infinity, vergence, curvature, pinholes, shadows, eclipses.

2. Behavior of light upon reaching a new medium. Reflection-specular and diffuse, laws of reflection absorption, transmission, refraction, refractive

index, Snell's law, optical density, optical length, laws of refraction.

3. Reflection-plane surfaces. Objects and object space, real and virtual objects, images and image space, real and virtual images, image location and orientation, field of view, deviation of incident beam, multiple images.

4. Refraction-plane surfaces. Refraction and deviation by a single parallel plate or series of parallel plates. Reversibility of ray paths, graphical construction, critical analysis, total reflection, mirages, apparent image depth versus actual depth, reduced distance concept, prisms, path of light through a prism, image deviation, minimum deviation, reflecting prisms, dispersive power, achromatic prisms.

5. Curved refracting surfaces. Radius of curvature, curvature, measurement of curvature, the spherometer, the lens measure, curvature of wave fronts, vergence, reduced vergence, paraxial optics, paraxial rays, change in vergence, change in a ray path, center of curvature, conjugate foci, principle foci, focal lengths, nodal point, object and image distance, object and image space, ray diagrams.

6. Thin lenses. Combination of two spherical refracting surfaces, form of lenses, ray tracing, lens power, measurement of lens power, focal points, focal lengths, conjugate foci, the thin lens equation, lateral magnification, multiple thin lens systems, object and image space, central versus edge thickness.

7. Spherical reflecting surface. Focal power, measurement of focal power, conjugate foci, principle foci, focal length, radius of curvature, center of curvature, ray diagrams, magnification, field of view, lens-mirror combinations, spherical aberrations.

8. Cylindrical and sphero-cylindrical lenses. Cylindrical surfaces, cylindrical lenses, toric surface, sphero-cylindrical lenses, axis convention, principal meridians, curvature changes on a cylindrical surface, the optical cross, image formation by cylindrical and sphero-cylindrical lenses, and Maddox rod, interval of Sturm, conoid of Sturm, circle of least confusion, spherical equivalents, position and lengths of line foci, specification and correction of ocular astigmatism, transposition, obliquely crossed cylinders.

9. Thick lenses. Centered lens systems, equivalent power, refracting power, focal points, focal lengths, principal points and planes, nodal points, graphical construction, front and back vertex power, image formation, measurement of focal power, spectacle magnification.

10. Limitation of beams. Stops, pupils, ports, field of view, depth of focus, depth of field, vignetting, telecentric principle, Maxwellian view, condensers.

11. Principles of optical instruments. The eye, simple magnifiers, compound microscopes, telescopes, photographic objectives, lensometer, projectors, ophthalmoscope, retinoscope, ophthalometer, biomicroscope, objective optometers, tonometers.

12. Photometry. Flux, intensity, candle power, illumination, the inverse square law, cosine law, luminance, illumination, illumination versus luminance, measurement of intensity, illumination, and luminance.

13. Dispersion. The spectrometer, wavelength, frequency, color, spectra, dispersive power, irrationality of dispersion, anomalous dispersion.

14. Aberrations. Classification, chromatic aberration, coma, distortion, spherical aberration, radial or oblique astigmatism, curvature of the field, lens design to reduce aberration, Von Seidel's theory.

15. The nature of light. Electromagnetic theory, quantum theory, theories of propagation, wave motion, simple harmonic motion, lasers, fiber optics, theory of image formation, modulation transfer function, fluorescence, phosphorescence.

16. Interference. Conditions for interference, coherence, incoherence, form of interference fringes, thin films, Newton's rings, thick plates, interferometers.

17. Diffraction. Diffraction effects, diffraction at a single slit, diffraction grating, circular apertures, resolving power, relation to acuity testing, halos.

18. Polarization. Double refraction, producing polarized light, polarization by reflection and by refraction, Brewster's law, polarization by scattering, optical rotation, clinical application of polarization.

19. Optical glass and plastic, history, types, ingredients, manufacturing procedures, optical and physical characteristics, comparison of optical glass and optical plastics.

20. Physical characteristics of ophthalmic lenses. Composition, curvature, relationship of curvature to refracting power, surfaces of revolution, spherical, cylindrical, and toric surfaces, the form of a lens, changes in thickness from the center to the edge, color of lenses, shape of lenses, measurement of size.

21. Optical characteristics of ophthalmic lenses. Optic axis, optical center, index of refraction, the Nu value, the power of a lens, the approximate power, back vertex power, effective power, front vertex power, equivalent power, writing a lens formula, astigmatism from tilted lenses, Fresnel press-on lenses.

22. Ophthalmic prism and prismatic effects of lenses. The prism diopter, effective power of a prism for distance and near viewing, thickness changes across the prism, prismatic aberration, Risley prisms, Fresnel press-on prisms, decentration, Prentice's rule, prismatic effects in the periphery of spherical lenses, cylindrical lenses and sphero-cylindrical lenses.

23. Multi-focal lenses. Common types, fused, one-piece, progressive additions, optical properties, segment center location differential displacement (jump), total displacement, optical and physical requirements, size of segment, shape of segments, location of segments, selection of multi-focal lenses for routine versus special use, fitting techniques for multi-focals. Verification of lens power and quality.

24. Theory of lens design. General formulation of the problem, parameters of lens design, Tscherning's elipse, base curve concept, best form for spherical spectacle lenses, best form for sphero-cylindrical spectacle lenses, modern "corrected curve" lenses, plus toric design versus negative toric design, custom lens design, aspherical lenses.

25. Reflections from lenses. Fresnel's equations, types of reflective images, conditions causing patient difficulties, methods of attenuating problems, anti-reflective coatings.

26. Absorptive lenses. Divisions of the spectrum and their effects upon the eye, classification of lens tints and absorptive coatings, photochromatic lenses, spectral transmission curves, Lambert's law of transmission, density, opacity, considerations in prescribing a tint.

27. Protective lenses. The FDA regulations, impact resistant lenses, industrial safety lenses, thermally hardened lenses, chemically hardened lenses, plastic lenses, laminated lenses.

28. Anisometropic prescriptions. The effect of eye-lens separation on ocular accommodation, differential pris-

matic effects in the lens periphery, methods of compensating vertical prismatic imbalance, spectacle magnification differences.

29. Aniseikonia correction. Spectacle magnification, relative spectacle magnification, magnification by a thick lens, effective eye-lens separation on magnification, measurement of magnification, design of size lenses, meridional magnification, meridional magnification systems.

30. Low vision aids. Principles of magnification, types of low vision aids, optics of image magnifiers, telescopes, design of telescopic spectacles, loupes, microscopic aids, field of view, field extenders, hemianopic spectacles.

31. Optics of contact lenses, types of contact lenses, manufacture of contact lenses, lens thickness, effective power concepts, relationship of base curves to keratometric readings, accommodation convergence and magnification differences with spectacles and contact lenses, residual astigmatism, correlation of the radius of curvature power and index of refraction of the plastic contact lens and the cornea, thick lens formulas applicable to contact lenses, prismatic effects of contact lenses, contact lens specification, fabrication, inspection, verification and modification.

32. The fitting of spectacle frames. Physical characteristics of spectacle frames, frame specifications, frame materials, frame nomenclature, frame selection, pantoscopic tilt, pupillary distance, placement of distance and multifocal optical centers, factors in determining bifocal height, writing the laboratory specifications for spectacles, lens and frame inspection and verification, concepts of fitting and adjusting, cosmetic considerations.

C. *Curricular Elements in Vision Science*

1. The microscopic structures of the orbit. The relationship of the paranasal sinuses to the orbit and visual structures with a view toward pathological implications. The microscopic and macroscopic anatomy of the tissues of the eye including the cornea, sclera, choroid, ciliary body, iris, crystalline lens, vitreous and retina. The macroscopic and microscopic anatony of the limbus, anterior chamber, trabecular meshwork, and the aqueous outflow apparatus.

2. The macroscopic and microscopic anatomy of the ocular adnexa including the eyelids, the conjunctiva, the lacrimal system, the plica semilunaris, caruncle, and glands of the lids and conjunctiva. The orbital periosteum and fat. The microscopic and macroscopic anatomy of the extraocular muscles and the origin, insertion, line of action, and discussion of functional significance. The vascular system, the arterial and venous routes to the eye and orbital structures.

3. The development of the ocular structures. The evolution of the three germinic layers — ectoderm, mesoderm, and endoderm. The formation of the primary optic vesicle and the the contribution of the surface ectoderm, neuro-ectoderm and associated mesoderm. The differentiation of the appropriate blastic tissues into ocular structures including the extraocular muscles.

4. The embryological development of the vascular system, the ocular adnexa, the ocular neuro pathways and the ocular nerves, the facial characteristics, and the developmental abnormalities including both environmental and genetic factors.

5. The gross and microscopic anatomy of the retinal-genticulo-striate pathway including the optic nerve, optic chiasm, optic tract, lateral geniculate nucleus, optic radiations, and visual cortex. Emphasis will be placed on the retinal-topical mapping and implications for visual fields defects.

6. The gross and microscopic anatomy of the extra-geniculo-striate pathways including the retinal output to the ventral-lateral geniculate nucleus, superior colliculus, pretectum, accessory optic tract nucleus, pulvinar and consideration of other important visual centers including the infero-temporal cortex, lateral frontal cortex, entorhinal cortex, hippocampus, tail caudate, ventro-lateral putamen, amygdaloid, and hypothalamus.

7. The macroscopic and microscopic anatomy of cranial nerves 3, 4, 5, 6, 7, and their central origin and peripheral pathways and distribution.

8. The physiology of the cornea with consideration given to the biophysical and biochemical properties, corneal metabolism, deturgescence, hydration, corneal permeability, corneal transparency, corneal sensitivity, corneal tissue regeneration and wound healing, and corneal vascularization.

9. Retinal metabolism including nutritional supply to the retina and the integration of vascular supply to the eye, especially the choroid and retina. The vascular dynamics of choroidal and retinal vessels.

10. The physiology of the crystalline lens, the physical and chemical properties, crystalline lens metabolism, cataract and its relationship to metabolism. The physiology of vitreous, physical and chemical properties of vitreous, vitreous metabolism, and vitreous aging. Pathological changes and the vitreous.

11. The physiology of the aqueous and intraocular pressure. Physical properties of the aqueous, composition of the aqueous in both the anterior and posterior chambers, mechanisms of aqueous formation, aqueous circulation and drainage, the intraocular pressure and its measurement.

12. The physiology of tears, lacrimal apparatus, and lids. Consideration of the chemical and physical properties of the tear film and formation of the tear and neuronal pathways. Relationship of tears to contact lens wear.

13. Characteristics and functional significance of the optical components of the eye. Definitions and uses of schematic and reduced eyes. The optics of the ocular structures including the cornea, aqueous, crystalline lens, and vitreous.

14. The measurement of the optical constant of the eye, the curvature of the anterior and posterior surface of the cornea, the thickness of the cornea, and the depth of the anterior chamber, the curvatures of the anterior and posterior surfaces of the crystalline lens, refractive indices, and axial lengths of the eye. The definition and measurement of the angles and axes of the eye.

15. Refractive conditions of the eye. Definitions and quantitative aspects of emmetropia, myopia, hyperopia, and astigmatism. The etiology of refractive anomalies, studies of optical component measurement, studies of growth of the eye in the relationship to refractive status, and the subject of emmetropization. The theories of the causes of myopia.

16. Accommodation. The optical aspects of accommodation including the stimulus to accommodation, the amplitude of accommodation, and the measurement and clinical significance. The role of the pupil in the optics of the eye. The determination of the retinal image size. The calculations of the aberrations of the eye. A discussion of the entoptic phenomenon.

17. The actions of adnexal musculature. Unique structural characteristics, functional characteristics, functional significance, reflex mechanisms, and neurological control. The musculature of the iris. Unique structural characteris-

tics, functional significance, dynamics, pupillary reflexes, and the physiological, psychological, and pharmacological factors influencing pupil size.

18. The ciliary muscle. Unique structural characteristics, functional significance, the dynamics and control of accommodation. The near response and stimulus response relationships. The extraocular musculature. Unique structural characteristics, functional significance, action of the extraocular muscles including ductions, torsions, translational movements, vergence, fields of fixation, control mechanisms including reflex movements, postural control, dynamics and functional significance of eye movements including physiological nystagmus, saccadic movements, pursuit movements, fusional movements, and accommodative convergence movements. Heterophoria, fixation disparity and strabismus.

19. The identity of the visual photopigments, rhodopsin and the three cone pigments. The method of study including extraction, fundal reflectometry, macrospectrophotometry, and microspectrophotometry. The characteristics of the spectra including the absorption, difference action, and absorbance spectra.

20. The photochemical and thermal reactions of the visual photopigments. The transduction to sensory information, the role of the pigment epithelium in the rod disc turnover, and the retinal-cortical transmission.

21. Temporal aspects of vision. Aspects of visual sensation that involves time as an independent variable. The phenomenology of critical flicker fusion frequency, subfusional flicker phenomenon, brightness enhancement, chromatic flicker, modulation transfer function, induction of color, masking, temporal summation, successive contrast. The perceptual significance of eye movements. The effects of retinal image stabilization.

22. The aspects of visual sensation that involve a distance or a spatial variable as an independent variable. Visual acuity. The definition and theoretical aspects of the various tests and tasks. Factors affecting visual acuity. Theories of spatial resolution. The contrast sensitivity function. Methodology and clinical and theoretical implications. Spatial summation, simultaneous contrast, and brightness enhancement.

23. The absolute visual threshold and involved factors including spatial and temporal summation, rhodopsin and spectral sensitivity, receptor density and sensitivity, quantal fluctuations, subject variability and retinal illuminance. The differential threshold, Weber's and DeVries-Rose laws, definition of contrast, and brightness perception. Dark and light adaptation and the involved physical, photochemical, and neural mechanism. The duplicity theory. Theories of dark adaptation.

24. Analysis of experimental evidence from sensory and motor neurophysiological studies of the visual system. The encoding of sensory and motor information and their interrelations. The neurophysiological models for the encoding of brightness, color, form, motion and depth. The receptive field and receptor interaction including Mach and Hering inhibition. The interpretation and clinical significance of gross potentials including the EOG, the ERP, the ERG, and the VER.

25. The principles of the measurement and specification of light, the definition of terms and concepts, and the photopic and scotopic luminosity standards. The principles of the measurement and specification of color including the RGB system, the CIE XYZ system, and the color order systems.

26. The principles of the measurements and specification of electromagnetic radiation, definition of terms and concepts, the production of light and the emission spectra and other characteristics of light sources.

D. Curricular Elements in Behavioral Science

1. The scientific nature of psychology, psychological methodology, philosophical considerations of mind/body, hereditary/environment, maturation/learning, etc. The role of psychology in optometry.

2. *Psychophysical methods. Uses of* psychophysics and its application to optometric practice. Description and evaluation of psychophysical methods for obtaining sensory data. Method of *limits, method of adjustment, constant* stimuli, forced choice, and staircase procedure. Signal detection theory.

3. Effects on psychophysical judgements of context, instructions, demand characteristics, experimenter, stimulus or stimuli sequence, stimulus set. Methods of assessing and reducing bias in psychophysical measurements.

4. Perception, sensation versus perception, theories of perception, perceptual constancies, intrasensory coordination and integration, perceptual adaptations to distorted sensory input. Motivation and perception. Theories of perceptual learning. Modification of perception by experience. Effects of stimulus deprivation on perception.

5. The pre and post natal development and factors affecting the development of the optical and neural characteristics for seeing. The development of basic sensory processing including brightness, color, contour, acuity, form, arousal, attention, and memory. Perceptual motor development including stages and mechanisms. Visual deprivation, plasticity and recovery.

6. The perceptual aspects of vision with reference to discriminable differences of form, lengths, curvature, ambiguous or reversible figures, illusions, figural after effects, figure and ground perception. Feature detection, subjective contours, integration of form over time, and binocular perception of form. Gestalt principles.

7. The perceptual aspects of vision with reference to the detection of real *and apparent movement, movement* after effects, phi-phenomenon, Korte's laws, the Michotte effects, motion detectors, dynamic visual acuity.

8. Monocular and binocular functions relating to the perception of distance and size. The concept of physical and visual space. The geometric aspects of binocular projection, the theory of corresponding points, and the Vieth-Muller circle. The concept of visual direction, oculocentric direction, egocentric direction. The perception of distance, the monocular and binocular clues.

9. Binocular interaction and fusion. Retinal disparity and stereopsis. Stereoscopic acuity, stereopsis with double images, chromostereoscopsis, and stereoblindness. The horopter and the effects of optical distortion on the horopter. Binocular interaction including summation at threshold, brightness averaging, rivalry, suppression, ocular and cerebral dominance. Theoretical aspects of aniseikonia and other binocular anomalies. Design of instruments for the measurement of binocular fusion, including eikonometers, stereoscopes, and haploscopes.

10. The phenomenology of normal trichromatic vision including the basic discriminations of hue, saturation, and brightness. The relationship and interrelationships of the photometric and the perceptual qualities of color, color naming, the various modes of color apperance, and subjective color (Fechner-

Benham colors). The interactive effects of chromatic and achromatic information. Successive and simultaneous color contrast.

11. Analysis of the design and interpretation of clinical tests of color vision status. The classification of color vision status. The acquisition of color defects including congenital, genetic, and acquired mechanisms. The design and interpretation of the various tests to evaluate color vision. The theories of color vision both component and opponent, historical perspective and experimental evidence.

12. Temporal characteristics of visual information. Visual persistence and iconic storage, perceptual moment hypothesis, perceived simultaneity, temporal numerosity, masking, metacontrast, internal scan rates, serial versus parallel processing, short term storage, rehearsal, re-coding, visual memory. Information processing approaches to visual pattern recognition. Templates, distinctive features, prototypes, structural relations, rule governed constraints, analysis-by-synthesis, schemata, frames of reference.

13. Visual information intake through successive fixation. Eye movements and perception, foveal, parafoveal, and peripheral intake of visual information. Visual search in spatially random arrays, and peripheral search guidance. Visual search through lists, visual search in complexly structured arrays, scan paths, visual search without eye movements, attention in visual information intake. Selective attention, filtering, switching, and synthesizing models of attention. Dividing attention between multiple tasks. Attention and effort.

14. Generating and processing visual representations. Geographical orientation, mental maps, orientation and form, visual imagery, distinctions between imaging and perceiving, internal operations on visual images, eidetic imagery, hypnagogic imagery. Processing pictoral information, the roles of convention and experience in comprehending pictures, distortions arising from inappropriate viewpoints, compensation for distortions.

15. Information and control in visual motor skills. Factors involved in visual-motor behavior, bodily coordination, lateralization, reading, drawing, writing. Linear position tasks, open and closed looped performance, tracking tasks, visual-motor programs. Complex visual-motor skills, perceptual and perceptual motor tasks, copying and drawing, phases of skills acquisition, conditions effecting skill acquisition.

16. Reading as a visual skill. Visual discrimination and identification of letters, word recognition through whole-word method and through phonics. Types of eye movements encountered in reading, measuring reading performance through eye movements, eye movement characteristics of normal readers, eye movements differences between good and poor readers, peripheral guidance of eye movements, reading without eye movements, eye-voice span, central guidance in skilled reading. Laterality effects, inter-hemispheric transfer of verbal and non-verbal material, trace scanning hypothesis, unilateral and bilateral presentation.

17. The sociology of patient care. The sociology or urban and non-urban life, of ethnicity, age, and economic status. The special problems of various underprivileged groups, such as welfare recipients, ghetto dwellers, immigrants, non-English speaking patients, etc.

18. Principles of human interpersonal relationships. The development of patient-doctor, technician-doctor, staff-doctor, and community-doctor relationships. Emphasis is on preparing the student to understand and deal with the many human inter-personal relationships necessary in the practice of optometry.

19. Principles of child development. Motor, social, moral, emotional, personality, and cognitive development. The status of age norms. Behavioral and perceptual skills. Long term and short term motivations.

20. Psychopathology. Overview of mental health. Mental health epidemiology. Concepts and models of mental illness. Psychosomatic illness. The neuroses, the psychoses and the psychopathic personality. Neurological and genetic conditions. Mental retardation. Doctor-patient relationship with such patients.

21. Definition and history of concept of specific developmental disabilities, epidemiology, cultural deprivation, childhood disease or injury, genetic basis, mentally retarded or emotional disorder. Minimal brain dysfunction, specific learning disability. Role of optometry in specific developmental disabilities.

E. Curricular Elements in Disease

1. The essentials of bacteriology, virology, and immunology, and the biological properties of micro-organism, processes of infections and chemotherapy. Flora of the anterior segment of the eye and adnexa and the anatomical and physiological features which favor or inhibit their activity.

2. Principles of health and disease, nature of disease, and disease processes. The role of blood and lymph vascular systems in biostasis. The origin and function of the cells of the blood. Disturbances of circulation, hemorrhage, thrombosis, embolism, ischemia, infraction, hypermia, and edema. Inflammation. Types, vascular changes, classification by type of exudate, function of the inflammatory process, desirable and undesirable effects, repair and healing as an integral part of inflammation. Chronic inflammatory reactions.

3. Disturbances of growth. Developmental disturbances from genetic origin, from environmental influence, or both. Acquired disturbances of growth, hypertrophy, hyperplasia, metaplasia, anaplasia and neoplasia.

4. Degenerative processes, types of degeneration. Swelling, hyaline change, fatty change. Necrosis, etiology, pathogenesis, and biological indicators. Infiltrations and metabolic disorders, adipose tissue, infiltration, amyloidosis. Storage diseases, glycogen mucopolysaccahride, hemosiderosis, hemochromatosis. Calcium disturbances, metastatic and dystrophic calcification. Vessel sclerosis, atherosclerosis, hyperplastic arteriolarsclerosis, medial sclerosis, involuntionary sclerosis. Perivascular disease and its effect on blood vessel walls.

5. Immunity and hypersensitivity. Mechanisms of humoral and cellular immunity. Concepts of auto immune disease. Development of immunological competence. Immune tolerance and changes in immune tolerance. Immune deficiency state. General concepts of neoplasia, cellular and sub-cellular attributes of the neoplastic cell, tumor immunity. Infection. Endogenous and exogenous sources. Discussion of the normal flora of man and interactions among the normal flora.

6. Tissue regeneration, physiological regeneration, healing by regeneration, nature of tissue healing, healing sequence, scarring.

7. Etiology, epidemiology, systems signs, and course sequela of disease and anomalies of the orbit, lid, and lacrimal apparatus — such as congenital and developmental anomalies, proptosis, exophthalmos, enophthalmos, cellulitis, orbital tumors, infections and

inflammation of the lacrimal glands and glands of the lid, entropion, ectropin, madarosis, trichiasis, tumors of the lid and lacrimal apparatus, inflammation of the lid and lacrimal apparatus, blepharitis, ptosis and other lid positional defects, tearing and epiphora, obstruction and inflammation of puncta, obstructions and inflammations of canaliculi and lacrimal sac, dacryoadenitis, and dry eye syndromes.

8. The etiology, epidemiology, symptoms, signs and course sequela of disease and anomalies of the conjunctive and cornea — such as congenital anomalies, inflammations, degenerations, abnormal pigmentation, keratitis, structural changes associated with past and present corneal disease, aging changes, endothelial disturbances, keratic precipitates, corneal anesthesia as a sequela of infection or trauma, keratoconus, degenerations and dystrophies.

9. The etiology, epidemiology, symptoms, signs and course sequela of disease and anomalies of the sclera, iris, and uveal tract — such as growth and age changes, inflammation, degenerations, pigmentations, sclera healing, tumors, congenital and acquired pupil reflex anomalies, congenital and acquired anomalies of pupil size and iris color, signs of iris atrophy, iridodonesis, pupillary frill as an index of atrophy, iritis, anterior and posterior synechia, granulomatous and non-granulomatous uveitis, infections and inflammations, toxoplasmosis, and histoplasmosis, developmental anomalies of the uveal, sequela of inflammation and/or mechanical damage to the uvea, circulatory disturbances, atrophy and dystrophy of the uvea, metabolic disease, uveal tumors, and degenerative changes.

10. The etiology, epidemiology, symptoms, signs, and course sequela of disease and anomalies of the crystalline lens and vitreous — such as congenital cataracts, metabolic cataracts, aging changes, dislocation of the lens, effects of radiation on the lens, traumatic cataract, cataract secondary to other intraocular disease, angle closure glaucoma due to Morgagnian cataract, exfoliation and pseudo-exfoliation of the lens capsule. Congenital anomalies of the vitreous, aging changes in vitreous, infiltration into the vitreous, alterations of the vitreous due to retinal and/or uveal disturbances, vitreous hemorrhages, neovascularization of the vitreous, retinitis proliferans, vitreous detachment, and associated retinal or sub-retinal hemorrhage or retinal detachment.

11. The etiology, epidemiology, symptoms, signs, and course sequela of disease and anomalies of the retina — such as congenital malformations, anomalies of retinal blood vessels, retinal hemorrhages, retinal edema, reaction of the retinal pigment epithelium to trauma, infection, congenital malformations, vascular phenomenon, arterial and venous pulsations, serpentine motions, vessel occlusions, retinal degenerations, retinal detachments, cystoid degeneration, lattice degenerations, retinoschisis, tumors, and drug toxicity.

12. The etiology, epidemiology, symptoms, signs, and course sequela of disease and anomalies of the optic nerve — such as individual differences in appearance of the optic disc and entry of central retinal vessels, developmental anomalies of the nerve head and associated functional disturbances, papilledema, papillitis, retrobulbar neuritis, injuries, evulsion of the optic nerve, compression of the nerve due to intraorbital, extraorbital or intracranial tumors, intrarelation of ciliary and central retinal circulation and changes observed with the disturbance of either, neovascularization of the optic disc, primary and secondary atrophy of the optic nerve, nutritional diseases, tumors,and demyelinating diseases.

13. The etiology, epidemiology, symptoms, signs and course sequela of congenital, angle-closure, open angle, and secondary glaucoma.

14. The etiology, epidemiology, symptoms, signs, and course sequela of neuromuscular anomalies affecting vision — such as paresis or paralysis or the extra ocular muscles, paresis or paralysis or the intraocular muscles, congenital or acquired nystagmus, external ophthalmoplegia. Infection, vascular, or neoplastic growth that affect the visual fields.

15. The principles of management of ocular and other emergencies, acute iritis, acute glaucoma, central retinal artery occlusion, retinal detachment, corneal ulcer, foreign bodies, syncope, airway obstruction, cardiopulmonary resuscitation, etc.

16. The etiology, epidemiology, symptoms, signs and course sequela of the health problems in endocrinology and rheumatology — such as pituitary anomalies, thyroid anomalies, parathyroid anomalies, diabetes mellitus, arthritis, rheumatoid variance, polyarteritis nodosa, small vessel vasculitis, temporal arteritis, lupus erythematosis, scleroderma, sarcoidosis, etc.

17. The etiology, epidemiology, symptoms, signs and course sequela of health problems in cardiology, respiration, and hematology — such as arteriosclerosis, atherosclerosis, hypertension, congestive heart failure, coronary vascular disease, myocardial infraction, cardiac valvular disease, endocarditis, asthma, emphysema, anemia, leukemia, sickle cell disease, blood dyscrasias, multiple myeloma, etc.

18. The etiology, epidemiology, symptoms, signs and course sequela of the health problems in nephrology, oncology, and neurology — such as renal disease, glomerulonephritis, anomalies of blood volume, principles of cancer, cancer problems with ocular involvement, Horner's Syndrome from lung cancer, cerebrovascular disease, multiple sclerosis, myasthenia gravis, syncope, dementia, neoplasms, infections, alcoholism, meningitis, seizures, etc.

19. The etiology, epidemiology, symptoms, signs and course sequela of the health problems in infectious disease, gastroenterology, and dermatology — such as viral disease, herpes simplex, venereal disease, meningitis, anomalies of the liver, hepatitis, cirrhosis, gall stones, malabsorption of food, inflammatory bowel disease, peptic ulcer, gastrointestinal neoplasms, dermatoses of the face, cutaneous neoplasms, etc.

F. Curricular Elements in Clinical Patient Care

1. The process of patient care — diagnosis, prognosis, therapy. Patient orientation and the patient-doctor relationship. The patient as a person not an anomaly. Basic concepts of treatment and/or management. Treatment related to the needs of the patient. Treat the patient not just the anomaly.

2. The role and significance of case history in patient care. The art and science of history taking. Ocular, environmental, and constitutional factors involved in ocular discomfort, specific symptoms and signs of ocular discomfort, obtaining and evaluating patient problems and complaints, patient and family medical and ocular history, vocational and avocational visual demands, and patient evaluation.

3. Development of clinical skills for the use of pharmaceutical agents.

4. Development of clinical skills necessary for patient evaluation in the

area of sensory function such as examination of visual acuity, fixational ability, color vision, light and dark adaptation, peripheral and central visual fields, the visually evoked response, simultaneous perception, binocular integration, stereoacuity, etc. with appropriate recording procedures.

5. Development of the clinical skills necessary for patient evaluation in the area of ocular motility such as examination of lid movements, pupillary reflexes, accommodative amplitude and facility, versions, convergence amplitude and facility, positions of the lines of sight at various fixation distances and directions of gaze, fusional vergence amplitude and facility, the electrooculogram, fixation disparity, etc. with appropriate recording procedures.

6. Development of the clinical skills necessary for further patient evaluation in the area of disease with such procedures as ophthalmoscopy, biomicroscopy, tonometry, perimetry, gonioscopy, ophthalmodynamometry, exophthalmometry, corneal and conjunctival smear evaluation, tear testing, nystagmus evaluation, neurological evaluation, corneal sensitivity, the electroretinogram, swinging flashlight test, etc. with appropriate recording procedures.

7. Development of the clinical skills necessary for patient evaluation of refractive status with such procedures as ophthalmometry, retinoscopy, refractometry, monocular and binocular subjective refraction techniques, etc. with appropriate recording procedures.

8. Development of the clinical skills necessary for patient evaluation in the area of vision performance with such procedures as eye-hand coordination, perception ability, laterality testing, distance-location testing, speed of recognition, span of recognition, malingering, etc. with appropriate recording procedures.

9. Correlation, evaluation, and analysis of optometric data. Clinical expected or normals, accommodative convergence relationships, relationship of visual acuity to refractive status, clinical syndromes, patterns of symptoms and signs in relationship to disease, refractive status, motility problems, sensory fusion problems, and vision performance problems. Concepts of clinical decision making and arriving at specific treatment and/or management procedures. Procedures for referral.

10. Historical development of the contact lens and its use. Corneal structure, metabolism, topography, tear film layer, thickness and their significance in contact lens fitting. Basic theories and methods of contact lens fitting. Contraindications for contact lens fitting. Contact lens materials and characteristics, hard; soft, combinations, gas permeable, etc. Concepts of lens selection. Insertion and removal techniques. Fitting of hard and soft contact lenses and their modification. Fluorescein pattern interpretation. Problem solving in contact lenses. Complication and post fitting care. Care and treatment of contact lenses. Contact lens solutions.

11. Advanced contact lens fitting. Theories and clinical methods for the fitting of toric, bitoric, aspheric, prism balance, and bifocal contact lenses. Fitting keratoconus, aniridia, astigmatic corneas, aphakia, high refractive errors, high anisometropic, color deficiency, diseased and damaged eyes. Orthokeratology. Use and fitting of haptic lenses, cosmetic shells, and prothestic eyes.

12. The definition of blindness, low vision and blindness, historical development of care for blind and partially sighted patients, optometric contributions. Psychological and social factors associated with blindness and low vision. Diseases associated with blindness and low vision.

13. The etiology, epidemiology, symptoms, signs, and course sequela of low vision. Methods of examination, determination of prognosis, and selection of appropriate therapy. Design of optical or other aids and the modification of environment to enhance visual performance.

14. The need for and the essentials of low vision patient counseling and rehabilitation. Performance monitoring and continuous care. Interdisciplinary resources and coordination. Agencies, laws, public and social assistance for the partially sighted and blind.

15. The psychological, physiological, social and ocular changes associated with aging. Visual and ocular problems of the elderly. Unique examination procedures and care of geriatric patients. Special problems for the institutionalized and bed-ridden patient. Special frame and ophthalmic device fitting problems. Problems of therapy compliance.

16. The physiology, psychology, and sociology of children. Growth patterns of infants and children. Expected intellectual and motor behavior at various ages. Diseases of infants and children. Visual and ocular problems of infants and children. Unique examination procedures and care of the pediatric patient. Concepts of disease prevention and health maintenance in children. Problems of prescribing optometric care for children.

17. The etiology, epidemiology, symptoms, signs, and course sequela of learning, perception, perceptual-motor, and other such vision performance problems and their detection, diagnosis, prognosis, and therapy.

18. The etiology, epidemiology, symptoms, signs and course sequela of the obstacles to efficient binocular vision —sensory, integrative and motor—and the detection, diagnosis, prognosis, and orthoptic treatment of such anomalies. The clinical care of aniseikonia.

G. Curricular Elements in Community Health

1. The collection, tabulation, and elementary analysis of data, including vital statistics, the treatment of rates, distribution of variates and sampling variation. Probability and probability methods, and elementary principles of statistical inference.

2. Exploratory data analysis, permutations and combinations, histograms, measures of location and dispersion, the normal distribution, sampling distributions of means and variance.

3. The role of public health statistics, methods appropriate for use in quantitative analysis of current problems facing public health administrators. Classification and evaluation of morbidity and mortality data, sources and uses of population data, techniques in planning and evaluation. Basic principles for the conducting of field investigations.

4. Principles and methods of epidemiological investigations of both infectious and non-infectious diseases. Methods by which properly conducted studies of the distribution and dynamic behavior of disease in the population can contribute to an understanding of etiological factors, modes of transmission, and pathogenesis of disease. Concepts of incidence, prevalence, natural history and levels of prevention.

5. Evaluation of screening surveys, concepts of validity, reliability, sensitivity and specificity. Epidemiological bases of mass screening. Questionnaire and interview design. Longitudinal, cross-sectional, case-control, and cohort studies. Application of life-table methods to epidemiological data, and the conduct of therapeutic and preventative clinical trials.

6. Methods of assuring quality in the data collection process, sample size, selection of controls, masking, randomi-

zation, examiner training, examiner variance, non-response, follow-up, record forms, tangible and intangible costs of data collection. Operational definitions for diagnosis and data processing.

7. Appreciation of research literature. How to use and evaluate research information. Integration of research findings into optometric practice. The use of library research.

8. Introduction to the health care system and optometry's role within that system. The history, philosophy and sociology of the optometric profession within a broad public health context. The role of the optometrist and his responsibilities as a member of the interdependent health care team.

9. Organization of the delivery of health care in communities, health care needs and resources of the communities, major functions of the health administrator, and the role of the health team. The development of official and voluntary institutions, the relevance of economics, operations research, manpower planning, behavioral science in the delivery of health care to communities and individuals. The role of the consumer in health care delivery.

10. General principles of health economics, planning and evaluating of health services, methods for improving the effectiveness and efficiency of patient care services.

11. Classification of levels of care into primary, secondary, and tertiary. The interrelationships among the various levels of care. General concepts of availability, accessibility, quality, point of entry, triage, health maintenance and promotion, continuity of care, responsibility, etc.

12. Governmental and third-party roles in the organization, delivery, financing, and evaluation of health care. The health care legislative process, health legislation such as Medicare, Medicaid, Professional Standards Review Organization, Health Systems Agencies, (National Health Planning and Resources Development Act), Health Maintenance Organization, diagnostic and therapeutic drug legislation.

13. The provision of appropriate health information to various groups: public, industry, school systems, community action groups, political bodies, nursing homes, penal institutions, etc.

14. Identification of public health education needs, strategies for translating needs into demand for services, community preventative activities such as screenings, surveys, etc.

15. Counseling of community groups about the role of the various health care practitioners and agencies that are concerned about and active in the caring for the eyes and vision.

16. Development of educational strategies for teaching health information to various age, economic, sex and cultural groups. Understanding the public's need for health information and identifying sources of such information. Understanding the community and the health care system within which the patient lives and works, and the various cultural attitudes towards health care in the community.

17. Understanding the general concepts of prevention and the role of the community, family, and individual in promoting good health care and preventing health problems.

18. The development of group interactive skills and appreciation for the science of mass phenomena and their impact on the health status of the individual and community. General principles of human interpersonal relationship, the psycho-social basis of human health problems.

H. Curricular Elements in Professional Orientation and Service

1. The sociology of work applied to the learned professions. The definition of a profession, how it develops, and the pattern for development of the health care professions.

2. An overview of the profession of optometry, its organizational, educational, legislative and ethical development.

3. Codes of ethics and the current concept of professional responsibility of the optometrist.

4. The legislative process and state legislation regarding licensing boards, licensing examinations, rules of practice, and procedures required in the practice of optometry.

5. Malpractice and its direct application to the practice of optometry.

6. Legal questions for the optometrist that involve taxation, professional fees, office procedures, accounting system, and insurance coverage.

7. The professional role and how the individual's appearance and actions relate to that role. The legal and ethical considerations involved in the personal grooming of the optometrist and his employees and their behavior towards patients. The optometrist as a patient advocate. The optometrist as a partner with the patient in the delivery of care to the patient. The optometrist as a fellow human being. The optometrist as a counselor and confidant. The optometrist as a teacher (patient education). The optometrist as a perennial student. The optometrist as an administrator and/or businessman.

8. The federal government and the optometrist. The federal legislative process and the agencies that the individual practitioners will encounter or wish to influence. Federal programs that deal directly with optometrists, such as the military, public health services, veteran's hospitals, etc.

9. Optometric organizations — political, educational, service, etc. — and the value of participation in and support for these organizations from the individual optometrist.

10. A summary of the current trends within the optometric profession. A comparison of the development to date of optometry with that of the other health care professions. Some future concerns.

11. Human interpersonal relationships with the optometric patient free of overt psycho-pathology.

12. General principles of verbal and non-verbal communication and the importance of good communication skills particularly in demonstrating "caring."

13. The patient's introduction to the office from telephoning for an appointment to the meeting of the doctor.

14. Dealing with the patient inside the office during the examination procedure. A discussion of the verbose patient, the anxious patient, the belligerent patient, etc. The art of listening.

15. Communication of your tentative diagnosis and treatment plan to the patient. The first bifocal, specialty therapy, ophthalmological consultation for suspicion of disease, followed by the discussions, etc.

16. Communication with office personnel in the presence of patients and in work and non-work settings. Teaching your personnel to communicate. The problem of depersonalization of health care.

17. Elements embodied in the selection of a practice site and practice style. The size of the city, number of eye practitioners already there, needs of the community, cultural patterns of the community, etc.

18. Practice entry techniques such as: purchasing an existing practice, associating with the practicing optometrists, employment, opening "cold,"

etc., and their advantages and disadvantages.

19. Ethical practice development techniques, both initial and on-going. Making the community aware of the practitioner's presence and the services he provides.

20. Practice development via intra-inter-professional relationship and the assumption of one's professional responsibilities.

21. Efficient office design and emphasis on the beginning practice with an eye to future growth.

22. Equipment selection, purchasing, and payment during various stages of practice development. Office management systems, record keeping, fee structure, etc. and the selection, training, and duties of office personnel.

23. An overview of the important facets of banking, accounting techniques, insurance purchasing, and tax law and how they are useful for efficient office management.

24. Appreciation of the concept of preventative care, emphasizing vision care through the relationship of sight conservation (its cost to the community), and the awareness of the impact of social and emotional well-being upon the quality of life.

25. The optometrist as a counselor providing advice on the visual environment, ocular hygiene, vision related aspects of nutrition, etc. The optometrist as a counselor providing occupational advice, particularly where vision is paramount (industry, school, motor vehicle operation, etc.)

26. The optometrist as a counselor for recreational activities posing unusual demands upon the visual system.

27. The optometrist as a counselor, knowledgeable about visual law from the standpoint of compensation formulas, governmental agencies involved in, social needs of the patient, etc.

28. The optometrist as a counselor should be aware of all federal, state, and community resources that relate to all health problems so that his patient can be directed to the proper sources for assistance.

29. The optometrist should be capable of performing an analysis of the visual demands of a specific task. This is necessary to assist if the visual demands exceed those norms accepted by vision scientists.

30. Application of knowledge of both radiation and illumination for solutions of problems such as: attenuating excessive radiation (goggles for welders, glass blowers, etc.), maximizing or improving insufficient levels of illumination (lighting in classrooms, night driving, etc.), effecting the quality of light and relating it to certain tasks (fluorescence versus incandescent lighting, using color lights or reflecting surfaces, etc.), applying knowledge of color visibility to various hazardous environments (fire engine yellow, hunter's orange, etc.).

31. Application of knowledge of visual acuity and contrast sensitivity to problems created by dynamic stress upon these functions (visual acuity in high speed transportation, vibration effects, motor vehicle operation and signs of poor contrast, etc.).

32. Application of the knowledge of the retinal adaptation to problems created by the need for rapid adaptation (military problems, motor vehicle operation, movie, theater, and counters, etc.).

33. Application of knowledge concerning epidemiology in the design of screening programs and their conduct directed at the preservation of vision or visual functioning (school screening, glaucoma screening, amblyopia screening, diabetes screening, etc.).

34. Application of the knowledge of ophthalmic materials to solving problems of ocular trauma (industrial eye safety, etc.).

35. Application of knowledge to assist the prevention of chemical injury to the eye and its adnexa (industrial chemicals, treatment methods, air pollution, etc.).

36. Application of knowledge to help devise special prosthetics to meet needs not properly served by conventional spectacles (special bifocal segments, skin divers corrected lenses, motorcycle visers, etc.). Application of the knowledge of visual functions in the assessment of special nearpoint demands and their assistance through using specialized visual aids (magnifiers for stamp collectors, base-in prism for hosiery loopers working very close in addition to increased plus power, etc.).

I. Curricular Elements in Patient Care

1. The clinical exam and care of patients in a primary optometric care facility on a random basis with regard to age, sex, anomaly, etc.

2. The clinical examination and care of special patient populations such as pediatric, geriatric, and patients in hospitals, nursing homes, schools for the blind, penal institutions, etc.

3. Screening for visual, ocular, and systemic problems with ocular manifestations in schools, hospitals, factories, etc. and referral for appropriate optometric and other health care needs.

4. The clinical examination and care of patients with refractive anomalies along with the design, fitting, evaluation, and dispensing of appropriate ophthalmic lenses and frames or other aids.

5. The clinical examination and care of patients who want or need contact lenses along with the design, fitting, evaluation, and appropriate modification of the contact lenses or fitting procedure.

6. The clinical examination and care of patients with reduced visual capabilities along with the design, fitting, and evaluation of appropriate low vision aids and/or modification of the environment and use of available vision to produce maximum visual performance.

7. The clinical examination and care of patients with binocular vision and ocular motility problems such as strabismus, phoria and vergence problems, amblyopia, eccentric fixation, suppression, anomalous correspondence, aniseikonia, accommodative anomalies, etc. and the design, evaluation and modification of appropriate treatment or management procedures.

8. The clinical examination and care of patients with learning disabilities or developmental disorders and the participation with an interdisciplinary health team to design, administer, evaluate, and modify appropriate treatment or management procedures.

9. The clinical care of patients with ocular disease, systemic disease, neurological anomalies, emotional/psychological anomalies, etc. with appropriate examination and management procedures and referral, where needed, to other health care professionals.

10. The evaluation of visual conditions in various office, school, industrial, transportation, etc. situations and the development of appropriate vision requirements and qualifications and the design of the lighting, visual display, and other environmental factors to provide for maximum safety, visual performance, and job efficiency.

THE EYE INSTITUTE *(from p. 10)*

Ophthalmic Photography: Instrumentation and skills exist for performing all types of ocular photography—external, slit lamp, and fundus (including stereoscopic).

Electrodiagnostic Service: THE EYE INSTITUTE has one of the finest and most complete installations for electrodiagnosis in the country. Dark adaptometry and comprehensive color vision testing is also offered within this Service. Referring doctors receive copies of biopotentials tracings and an interpretation of them, with the conclusions reached by the consultant.

Pediatric Unit: This Unit addresses the problems of binocular dysfunction in adults as well as children. Fully equipped for both diagnosis and vision therapy, the Unit is staffed by specialists in binocular vision, oculomotor anomalies, and visual perception. A pediatric ophthalmologist is also on the staff to provide medical balance to the optometric view of functional anomalies. A post-doctoral residency program in binocular vision is conducted by this Unit.

The Pediatric Unit specializes in the visual problems of the retarded, the learning disabled, the perceptually immature, and the visually handicapped child. It is also equipped to perform infant and early childhood vision analysis —a neglected area in eye work.

Vision Rehabilitation: Since the merger into this Service of the practice of William Feinbloom, D.O.S., Ph.D., internationally recognized expert in the field of low vision, this facility is named "The William Feinbloom Vision Rehabilitation Center." This Service receives referrals from the professional community, government, and social service agencies for the management of patients with impaired visual acuity and/or significant field restriction. The work of the Vision Rehabilitation Service is carried out through the integration of a multidisciplinary team including social service, ophthalmological, electrodiagnostic, and mobility-training personnel (the latter through an affiliation with the Philadelphia Center for the Blind.)

Special contact lenses are included in the armamentarium of this Service for such conditions as keratoconus, corneal leucoma, iris coloboma and aniridia. The Service also has a rarely available space eikonometer and other instrumentation for providing measurement and consultation in the area of aniseikonia.

Sports Vision: Staff members have developed special skills in testing, evaluating, adapting and enhancing an athlete's visual performance to the particular demands of his sport. They offer consultation to athletic coaches, team managers, and school health authorities, as well as to referring eye care practitioners and other physicians.

Consultation Services: THE EYE INSTITUTE has initiated a unique service in recognition of the obligation of an optometric educational institution to support optometrists in private practice. EYE INSTITUTE professional staff members, each of whom have developed some special skill or area of expertise, will consult by telephone or in writing with any practitioner who requests it.

Pharmaceutical Service: When the pending licensing arrangements are concluded, a pharmacy for the dispensing of ophthalmic drugs will be in operation. This Service will be available to EYE INSTITUTE patients and to optometrists, ophthalmologists, and other appropriately licensed health professionals. A full line of ophthalmic prescription drugs for both diagnostic and therapeutic purposes, as well as over-the-counter preparations for contact lenses, ocular irrigation and decongestation, will be stocked.

Other Activities

A Social Services Department is under the direction of a person experienced in health care counseling. It assists all patients who need and request guidance through the health care delivery system, or offers assistance with eye-related personal problems. Referral to other agencies for help in nutrition, shelter, and other life problems is accomplished. A volunteer aide program operates under the supervision of this department.

Student, faculty and volunteers are available to present programs in eye health care to various groups. Most such educational programs are given in THE EYE INSTITUTE amphitheater through arrangement with schools, civic organizations, and senior citizen groups.

Aside from the critical peer review normally operative in an academic environment, THE EYE INSTITUTE has established a structured Quality Assurance program. Through records review and other studies, the program monitors and evaluates health services rendered.

Impact on Clinical Education

The impact of THE EYE INSTITUTE on the student body has been dramatic. Rather than acceptance of clinical assignments as another "course," students are enthusiastic about participation in a patient care practice which avoids the depersonalization inherent in the institutional "clinic."

Organization into Primary Care Service Modules closes the feedback loop in the student's clinical education, allowing the opportunity to provide a continuum of services to individuals and families. Such patients can then relate to "their doctor" rather than to THE INSTITUTE as a whole. The students are thereby enabled to monitor the outcome of their management plans.

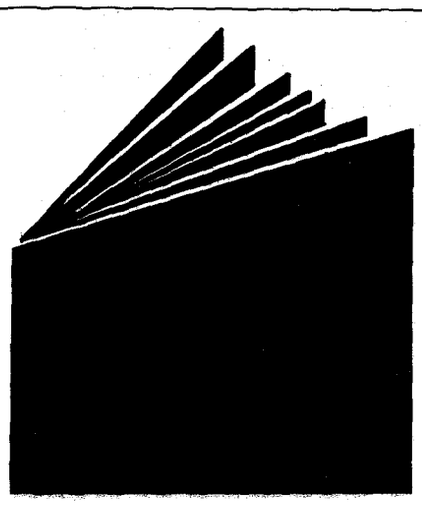
Reinforcing and supporting the student clinician's ability to provide continuity of care is the fact that a total range of ambulatory eye services is available under one roof. By retaining supervisory management of the patient within a single "system," the clinician is assured of receiving consultants' reports as input to his/her decision-making process. The presence of the wide variety of primary and secondary service activities also serves to broaden the students' clinical interests. Their rotations through the various services and participation in many ancillary activities provide exposure to all aspects of eye care practice.

THE EYE INSTITUTE's success in enhancing the clinical education of student optometrists grows out of two premises upon which all planning is based:

1) While the Pennsylvania College of Optometry operates THE EYE INSTITUTE as a teaching facility, patient care is co-equal with education as its mission. The guiding principle here is the conviction that only in the context of an excellent patient care delivery system can future optometrists receive clinical experiences of high quality. THE EYE INSTITUTE may be regarded as being analogous to a teaching hospital affiliated with a medical school.

2) A team of health care professionals —optometrists, ophthalmologists, opticians, technicians, and consultants in other specialties—must work cooperatively at the highest level of their training and competence, with the visual welfare of their patients as their highest priority.

The improvement in the clinical education process will become evident as PCO's graduates enter private practice and public health optometry, striving to emulate the scope and quality of work they experienced in THE EYE INSTITUTE.



Teaching Aids and Informational Material

Vision: Its Impact on Learning
Robert M. Wold, Editor
Special Child Publications
Seattle, Washington — 1978
Price $10.95
Reviewed by
Rocky Kaplan, O.D., M.Ed.

The text of this book consists of 20 chapters representing 9 papers presented at the second annual meeting of the College of Optometrists in Vision Development. The remaining portions consist of reprinted papers from optometric journals and chapters from books with a couple of additional literature and research reviews. Organized around a symposium title of, "Vision: Its Impact on Learning," the purpose of the book is to provide relevant documentation of the role of vision as the primary method of information processing and its relationship to academic achievement.

It is most fitting that the book is dedicated to Dr. Getman, one of the authors, who provides a historical overview of the growth of Developmental Optometry. The remaining chapters deal with clinical and theoretical issues of the vision process with the viewpoint that it is a dynamic learned function.

A wealth of information for the optometrist and non-optometric professional is provided in this book; however, it is not always easy to locate. Chapters 9, 10 and 11 present basic and clinical research data which is too academic and optometric oriented for readers such as educational specialists and other professionals.

In contrast, Chapters 5, 6, 8, 14, 15, 17, 18 and 19, are practical chapters written by vision specialists discussing such topics as vision as part of the human action system (Dr. Elliott Forest), near point lenses affecting physiological processes of the body (Dr. Homer Hendrickson), visual memory (Dr. Arthur Hinsen), perceptual screening programs (Coronado), M.K.M. diagnostic and therapy techniques (Dr. James King), vision and learning disability (Dr. Irving Peiser), vision and learning (Dr. Robert Wold), and how successful is vision therapy (Dr. William Swanson).

The role of vision in learning is a controversial issue when discussed between the disciplines of education, medicine, optometry, psychology, speech, hearing and others. The editor has compiled a worthy set of papers, which should put the role of vision and the process of learning into a proper perspective. There are a significant number of references which provide support for the functional concepts of vision. These will assist those interested professionals in stimulating public awareness of the need for comprehensive vision care. In addition, the text provides some basic diagnostic, but more vision therapy information, which should enable the general optometrist to become more involved in vision therapy (visual training).

Public Health Optometry
Proceedings and Recommendations of
The Public Health Information Forum
American Optometric Association
Washington, D.C.—1978
Reviewed by
Chester H. Pheiffer, O.D., Ph.D.

This booklet, "Public Health Optometry," presents the proceedings and recommendations of the Public Health Information Forum held March 26-27, 1977, at the University of Houston. This meeting was attended by optometric educators, practitioners, students, and optometrists representing governmental agencies. Twelve of the thirteen United States optometry schools and one of the Canadian schools were represented.

Recommendations produced by those in attendance have been grouped in this booklet into three sections — General Recommendations, Curriculum Recommendations and Future Directions. The emphasis of the recommendations is on the expansion of the clinical education programs and broadening of the "exposure of students to diverse clinical populations in multidisciplinary health care delivery systems." The recommendations are also directed to the need to make the students "aware and sensitive to community needs, able to use epidemiological principles to document such needs, able to develop and apply quality assurance systems, able to participate and provide leadership in health related agencies, able to effectively promote the inclusion of optometry in health programs, able to interact with other professionals, and able to foster public awareness of the need for eye care."

The material is presented well with the exception of the mix-up of titles and authors for the keynote and special addresses in the text. The reader is given the correct information in the index concerning who presented which address.

The Forum adopted definitions of public health, community health and made a number of recommendations. Critical among their general recommendations is that public and community health is in large part a philosophy that pervades the optometric curriculum. While their recommendation concerning the selection of students for admission is laudable, one can only hope that the public health optometrists will assist in determining how this recommendation which has eluded so many, can be effected.

Their curriculum recommendations encompass almost every aspect of the optometric curriculum and appear to incorporate, as a whole or in part, what is now included in other departments into the department of Public Health. Examples are their design for a course in environmental vision and their emphasis on various diagnostic procedures.

Their Future Directions recommendations are somewhat disappointing in that the only goals toward which they are oriented appear to be the production of a textbook and an organization for public health optometrists.

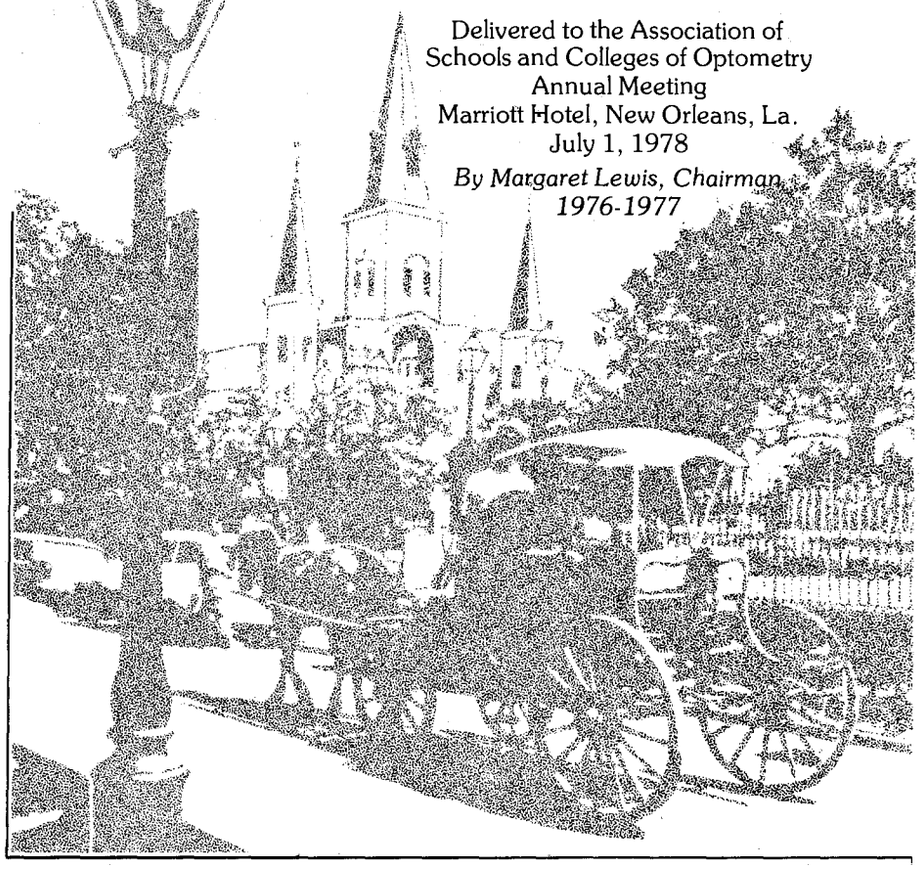
All in all, this material is well worth reviewing and being used as material for discussion by faculty in general and curriculum committees in particular.

A Report From The Association of Vision Science Librarians

The Association of Vision Science Librarians was invited to speak before the ASCO membership at the 1978 Annual Meeting recently held in New Orleans. Mrs. Margaret Lewis, 1977 Chairman of the AVSL and Librarian for the State University of New York, State College of Optometry, presented a report which reminds us, once again, of the important role the vision science library plays in the education and training of the optometrist. Following is a summary of that report.

Delivered to the Association of Schools and Colleges of Optometry
Annual Meeting
Marriott Hotel, New Orleans, La.
July 1, 1978

By Margaret Lewis, Chairman 1976-1977



It is a pleasure for me to report for the Association of Vision Science Librarians. As the Chairman of the AVSL for the past two years, I have had the opportunity to consider its development in some depth. Time has a strange way of passing faster than we realize. This is the exact date, seven years ago, that the SUNY, State College of Optometry was born. I had been thinking of myself as a newcomer to optometry and to the librarians association, but when I began to consider what I would report, I realized that I am now in the exact middle in seniority among librarians serving optometry colleges. I think that gives me something of a vantage point from which to view the organization. Hence, I would like to look back at some of the accomplishments and look forward to the near future, at least. My feelings are strongly positive about the role librarians have played in optometric education and the role they can play in the future.

The colleges of optometry, almost without exception, now have fully qualified librarians with M.L.S. degrees directing their library programs. A staff survey conducted by Linda Morgan of Houston and reported at the 1977 meeting showed that three libraries now have two librarians, and most have at least one full-time supporting person. It is significant that all librarians felt that the libraries were understaffed. The group now has its first Ph.D. librarian, Jenko Lukac of Pacific, and now has six men in what has been considered by some a female profession. In addition to the librarians from the colleges of optometry, librarians from the corporate libraries of Bausch & Lomb and American Optical, and librarians of other eye-related institutions in this country and abroad are affiliated with our group. The library of the American Optometric Association continues to play a vital part in all of our meetings. This year has seen two significant additions to our membership. The first ophthalmology librarian and the first librarian representing a perceptual psychology library have joined us. We welcome these additions because they add breadth to our group by representing collections that give a varied emphasis to the subject of vision.

The Association of Vision Science Librarians has, from its inception, recognized that quality library service in the diverse institutional settings in which librarians functioned required cooperation and mutual assistance. Our budgetary support, the institutional governance of libraries by the various colleges and the numbers of students and faculty served vary widely, but our commitment to quality does not. The "Standards for Vision Science Libraries" developed in a workshop funded by ASCO in 1973, and edited by Elizabeth Egan of Indiana, is a prime example of this. As librarians, we welcome standards that provide a base, not a ceiling for library service. We have worked with the Council on Optometric Education to develop reporting forms for the various types of libraries that would give an outline at least of how well libraries are meeting these standards.

A year ago, we produced the Third Edition of the "Union List of Vision Science Periodicals." This was an excellent production which was made possible by the cooperation of all the libraries and by the hard work of Pat Carlson, Southern California College of Optometry, Alison Howard, of Berkeley, and Lu DeGrave of Bausch & Lomb Contact Lens Library. A union list is a working tool for librarians and is a prime example of cooperation. It makes it possible for a patron of one library to acquire journal articles from another library when they are needed for research. It means that each library knows what the periodical holdings are in each other library and provides a means of access to them. This Union List was distributed to all twelve Regional Medical Libraries in the United States and was purchased by many other libraries with an interest in vision. It has added to cooperation among vision librarians and has brought us a measure of recognition and respect from major medical libraries.

This past year, we developed the descriptive pamphlet which recounts a

bit of our history and describes the activities and publications of our group. It describes one aspect of our cooperative endeavors that is vitally important to all of us. This is the exchange of acquisition lists. The literature of vision covers many fields and is published by a wide range of publishers both domestic and foreign. It would be impossible for any one person to keep up with all of this. A title that I may uncover and purchase for SUNY may not have been seen by another librarian until it appears on my acquisition list. The acquisition lists that I receive are a prime source of information on books that I consider for purchase. This exchange of lists means that all libraries have the benefit of knowledge of what is available in the field. Unfortunately, not all libraries have the same budget with which to purchase materials. Apart from budget considerations, however, there is also a diversity of focus in collection development among the various colleges. This is a strength for optometry in general as long as interlibrary loan requests are honored between the colleges.

In the future, the computer is bound to play an increasing role in libraries. It is basic to the operation of many libraries now and its use will be important to all libraries in the future. Optometry libraries must keep up with computer developments or remain in a backwash of the library world. Optometry libraries are keeping up to a certain extent. Two librarians, Nancy Gatlin of Southern College, and Eleanor Warner of The New England College of Optometry produce their acquisition lists by computer. Ferris State, Ohio State, Indiana, Pacific, and Houston are currently part of the OCLC Computerized Cataloging System. SUNY will join them this month. The system was developed to provide shared cataloging among libraries of all types. There are over 1,800 on the system now. In addition to cataloging functions, the data base provides information as to location of books. This has great value to all libraries by making it possible to locate books needed for interlibrary loan. It provides a source of bibliographic information and enables one to print out lists of books available in one's own library. As optometric libraries become involved in this system their specialized collections will gain recognition as sources of books not available in any other location.

Other computer uses involve computerized circulation systems, as at Ohio State, and computerized check-in and control of periodicals, as is done at Alabama. Computerized searching of the literature of vision is familiar to most as it has been well demonstrated by Hal Gibson and the Vision Science Index. It will be a tremendous loss for us all if this valuable data base is allowed to cease functioning. Computerized searching is a skill that is vital to modern literature searching. Several of the colleges have access to computer search terminals and regularly make use of them for faculty and students. All of this is an indication of the rapid development of computerized library functions.

Audio-visual materials are a part of most library collections now, and they are bound to become more important in the future. These materials are expensive. If a college buys or produces them for classroom use, they should be available for individual study by students. The library should have the equipment to display the various types of media from slides to video tapes. These programs also provide a fine way to give continuing education. Librarians have cooperated to the fullest extent possible in the development of the Audio-Visual Catalog compiled by the American Optometric Association. The main reservations on our part have been on the procedures for loaning such materials.

Micro forms in some ways are a cross between media and the book. They require equipment to use them, but they may be pictorial or printed. The various forms of micro-publishing are rapidly developing. Just this month the American Chemical Society has offered a service on microfiche. For the small price of $14.95 per year it will send copies of selected articles from 18 journals. Optometric librarians see microfiche as a part of their responsibilities. Optometric education should recognize its possibilities.

Modern librarians see themselves as enablers in the transfer of information, not the guardians of physical collections. Nothing delights one more than to convey information in the form of a journal article or book that is important to a faculty member, for instance, before the person asks for it. Many of the librarians have developed alerting services to do just that on a regular basis for faculty. The publication of books and journals at this time is massive, but if a person does not know where or how to find the specific materials he needs, there might as well be none. The role of the trained librarian is to enable a researcher to find the reference he needs and then to bend every effort to acquire the actual material.

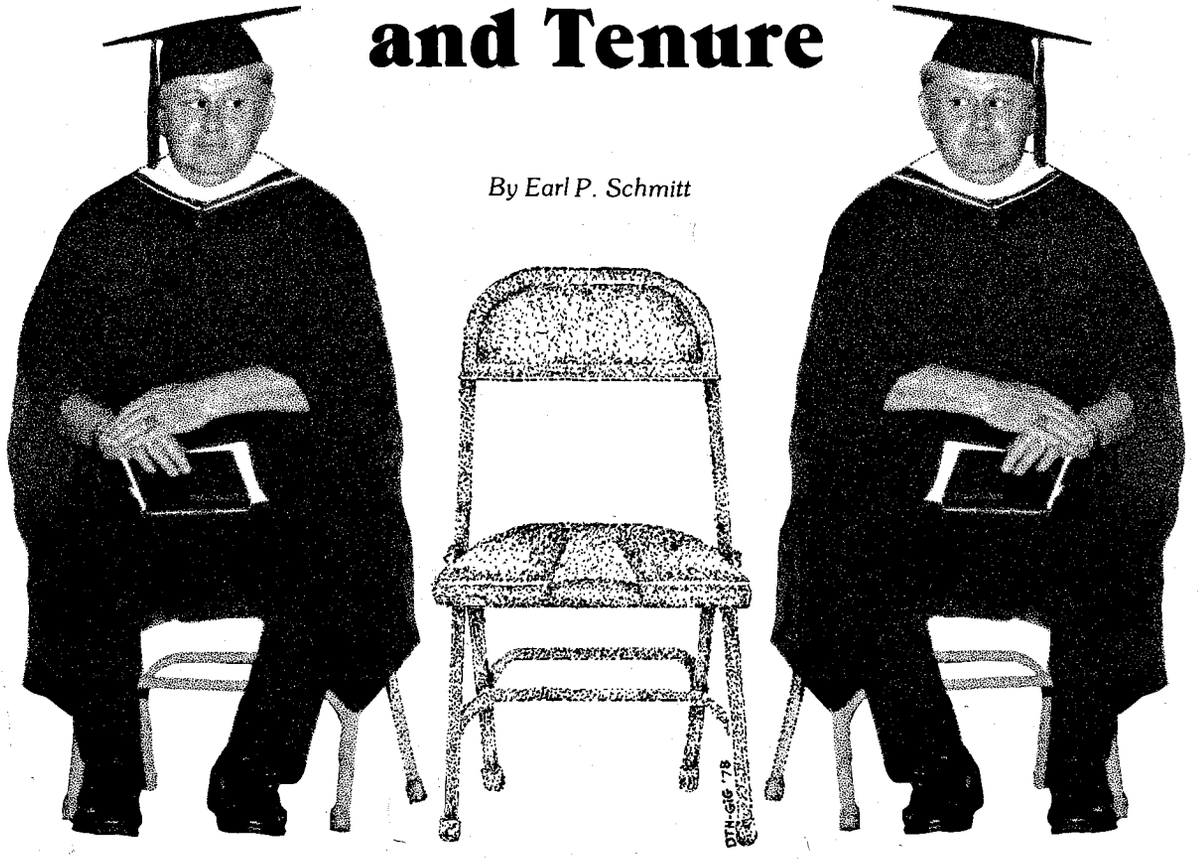
Most optometry librarians realize that the intensity of the optometry curriculum means that the majority of teaching is textbook oriented. Library research is neglected in many of our colleges. Efforts to overcome this lack are being made in several schools. However, librarians cannot do this in isolation. They can and do teach library research either in class or to individuals. The teaching won't take unless the students see it as a need. Students won't see it as a need unless administration and faculty see it as a need. In an "evolving" profession it is almost criminal to graduate students who do not have the skills to keep up with the professional developments in their own field. Occasional courses and the weekly, now monthly, reading of popular professional journals will not be sufficient to keep an optometrist up-to-date. Such a person must have the skills to pursue knowledge on his or her own, and the knowledge of where and how to find materials needed should be acquired before graduation.

Every practicing optometrist needs to know the workings of the Regional and National Medical Library System. It is there to help him or her the same as it does the M.D. Every practicing optometrist needs to know in which abstracts and indexes he can locate literature on vision. He needs to know how and where he can conduct a computerized search of the literature. He needs to know that vision science librarians stand ready to assist him in any way possible. These are things he needs to learn and practice in college so that he will feel confident about them after he graduates. Librarians in some schools are teaching these techniques. We will continue to urge the importance of library instruction as part of the curriculum at optometry colleges.

To sum up, the strength of optometric college libraries lies in the fine librarians now serving them and upon the cooperation between them which enhances the services and collections of all of them. Our organization, like optometry, is evolving, but it is evolving in a way that will strengthen optometric education. The libraries need continued support financially if they are to keep current with the publishing in the areas of vision that are relevant to the curriculum and research needs in each college; but more than that, the librarians need support to develop programs that will increase meaningful library use. Finally, the Association of Vision Science Librarians needs support as it seeks to bring optometric libraries into the mainstream of modern library practices and developments.

Some Historical Perspectives of Academic Freedom and Tenure

By Earl P. Schmitt



More often than not a clinician will be employed as an instructor by a health care teaching institution because of his or her perceived competency in a specialty area. Unless such an instructor can draw upon previous teaching experience, or perhaps has pursued systematically a program of formalized graduate training, the clinician-teacher may have little exposure to and knowledge of the traditions and folklore of higher education.

Two shibboleths the clinician-turned-teacher quickly encounters are those of academic freedom and tenure. As a concept, academic freedom in higher education provides that faculty and students enjoy unqualified license to inquire, investigate, interpret data, and to arrive at and announce conclusions, both within and outside of the classroom, without fear of institutional sanctions, control, or retaliation.[1] Concomitantly, the status of tenure extends to an instructor the expectation, within reasonable limits, of permanent employment,[2] with dismissal then being predicated upon demonstrable cause which, in turn, must be evidenced by way of a due process hearing.[3]

To the uninitiated, the principles embraced by academic freedom on the one hand and tenure on the other might appear to be divergent in purpose, and represent separate and distinct entities. Yet they are mutually supportive, as tenure is seen to supply a procedural construct by which the exercise of academic freedom may be protected.[4] Murphy has pictured academic tenure as being the necessary handmaiden of academic freedom, the former existing to protect the latter.[5]

Tenure has been described as being a unique personnel policy adapted to the particular circumstances of colleges and universities.[6] The concept is not limited to the higher education scene, however, for in many ways we are a tenured society. For example, physicians are tenured by their peers upon completion of training, their successful licensure, and reasonably proper decorum thereafter. Licenses rarely are revoked, barring criminal behavior. Attorneys likewise enjoy tenure by licensure in their profession, being permitted to practice so long as moral and legal restraints are demonstrated. Having successfully passed through an apprenticeship program, union carpenters, plumbers, and other tradesmen enjoy the right to follow their crafts, essentially tenured so long as organizational rules are obeyed. The universality of tenure in American society has been recognized.[7,8] There exist pitfalls, of course, as the incompetent and mediocre may find a haven be-

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hind the tenure shield.[9,10] Yet the purpose of this discussion is neither to defend nor attack the principles of academic freedom and tenure, but merely to present a historical perspective of these concepts in American higher education.

Three features characterized the emergence of higher education in this country and vitally affected the status, the freedom, and the initiative of instructors. First, American colleges in the colonial period were sponsored initially by private denominational groups and experienced only modest governmental intervention by the State. Second, American colleges became established in scattered locations and did not cluster in centers of learning in the tradition of Oxford and Cambridge. Third, a thoroughly unique innovation was to be found in the establishment of lay boards of control embodying a system and philosophy whereby major policy decisions were made by visiting committees of non-resident governors who were not faculty members. This is a characteristic which persists in American institutions of higher learning to this day.[11]

Prior to about 1870, the phrase "academic freedom" scarcely had been heard in America. From this point, however, certain traditions of German universities began to influence our emerging colleges and universities, and among these constructs was one dealing with the right to pursue knowledge without worry about the political, economic, or social consequences that might result. However, just what academic freedom meant at that time was not clearly understood by early American educators. As evolved in Germany it was almost wholly an internal freedom, asserting the right of professors to organize the curriculum without the interference of the Ministry of Education, and had been promulgated as a safeguard against political meddling in the secularized universities of the bureaucratic German Empire.[12] Hence, originally academic freedom was more a tolerance by the State, rather than the assertion of a prescriptive right or moral tradition.

Academic freedom emerged in nineteenth century Germany as a recognizable essence, with Professor Friedrich Paulson of the University of Berlin being credited with formulating systematically in 1902 the embodiment of academic freedom that had arisen in Germany during the preceding decades.[13] German universities following the Reformation typically remained theological seminaries, largely under the control of state bureaucracies. But as the demand grew for a more divergent and comprehensive curriculum, with the need to incorporate the practicalities of scientific and sociological discoveries, higher education in Germany slowly became more self-assertive, less subservient to governmental control of course offerings, and more insistent that research, teaching, and scholarly activities be unimpaired by political and bureaucratic climates.[14]

This blossoming concept of unabridged intellectual investigation and expression excited the young American graduate students who were completing their academic studies in Europe at the turn of the century, many of whom later would have a profound impact on American higher education. Individuals such as Andrew D. White (Cornell, 1868-1885); Nicholas M. Butler (Columbia, 1902-1950); James D. Angell (Michigan, 1871-1909); Charles W. Eliot (Harvard, 1869-1909); Daniel C. Gilman (Johns Hopkins, 1876-1902); and Charles K. Adams (Wisconsin, 1892-1903) all were so influenced, and returned to their native country ultimately to serve as presidents of their respective institutions and help shape the course of American higher education accordingly.

It is interesting to note that in the history and development of American colleges, freedom of thought first appeared as a positively formulated goal applicable as religious freedom for students. Before anyone spoke of freedom for instructors, the essence of religious freedom or toleration for undergraduates commonly was touted as a viable asset of our eighteenth century colleges.[15] The original German concept likewise had included freedom of investigation for both students and faculty. However, the German ideal experienced a certain metamorphosis in its transition from the Old World to the New World. As conceived originally, the concept of academic freedom in its Germanic dress granted the student wide prerogatives within an elective curricular system, and enfranchised the professor from governmental interferences. Tradition notwithstanding, academic freedom became, in the minds of those Americans who adopted the term, a bastion behind which partisan activities could be conducted outside the classroom and among the public at large, a practice which represented a significant deviation from the Germanic theory.[16]

Indeed, the matter remains as a viable and unresolved point of controversy to this day. Zimic presents a current discussion relative to the interfacing of academic freedom and faculty accountability. At issue are those statements which a teacher may make on controversial subjects both within and outside of the academic environment. The writer considers how such statements have been interpreted by institutions as evidence that instructors, by their utterances, have demonstrated an unfitness for continued employment. But as Zimic asks, "Where does free speech leave off and insubordination begin?"[17] The emphasis is made that no one surrenders his or her Constitutionally protected rights by joining a college faculty, and additional evidence is presented to support the notion that the concept of academic freedom, perforce, has experienced a reinterpretation in its transition from the Old World to the American scene.

Arguments persist in the literature as to the exact philosophical origin of the concept of academic freedom. Kirk holds that academic freedom is rooted in the medieval academic institution which thrived in an aristocratic atmosphere of church sponsorship and religious affiliation. Teachers were clerics, and their prerogatives were above challenge from the community, for as the teacher was held to be a servant of God, his authority was sanctioned by a commission other than from man.[18] On the other hand, Hutchins denies the medieval origins of academic freedom and emphasizes instead that a university is a center of independent thought and criticism, and that such prerogatives are essential to the survival of modern societies.[19] Regardless, the question well may remain moot. Yet academic freedom has persisted as a vital issue throughout the development of American higher education, and no doubt will remain so in the foreseeable future.

The number of institutions of higher learning has continued to grow in America from the earliest times, with a significant proliferation having occurred toward the end of the nineteenth century. At that time, profound changes were taking place in American colleges and universities. A laissez-faire student environment then was encouraged, to the extent that at Harvard there were almost no course requirements and, during that period, little student supervision. Student bodies were growing even then, and the American society was changing rapidly. The nation was moving inextricably toward industrialization, and populist sentiment was strong.[20]

Between 1890 and 1900, the number of employed college instructors increased ninety percent over the decade preceding.[21] The academic marketplace neared a saturation point, at least at the more prestigious institutions. As the law of supply and demand was felt in academic environments the number of qualified teachers expanded, and their bargaining power consequently diminished. As more job-hunters pressed upon the scene, job-holders became less secure. In self-interest there came into being a strong impetus for bureaucratization from within the ranks of employed professors. Such a demand was, in reality, a quest for rules and regulations, for elaboration of contractual agreements, specification of conditions governing both continuation and termination of employment, standards for promotion, and in general the formulation of a regimented bureaucracy designed to provide job security for those fortunate enough to be gainfully employed. It was at this time that the two concepts being considered in this paper crystallized into their uniquely American interpretation. As academic bureaucracies became established, so changed the direction of the struggle for academic freedom in this country. As one author states, the fight for academic freedom in American higher education became one for precautionary rules, for academic legislation, and for guaranteed permanence. In short, academic freedom and academic tenure became inseparably joined in the American educational picture.[22]

The emergence of an administrative structure in American colleges and universities paralleling that to be found in large business corporations was another thrust which served to change the concept of academic freedom on this continent, as compared to practices historically found in Europe.[23] Old World universities were self-governing guilds of scholars devoted entirely to learning. But this idea did not survive intact when transported to America. Early American colleges were staffed largely by young clergy who in turn served under various boards of control. These boards represented diverse interests, first sectarian and later more varied in their social influences. American institutions of higher learning originally were private enterprises, and faculty were not civil servants or state employees. Trustees from the general society brought to their institutions experiences and interests from the business world, and these groups came to resist both domination from outside and faculty assertion from within concerning affairs of their colleges and universities. In this country, the enterprise of perpetuating an institution of higher learning gradually came to be identified as an activity separate from the teaching, service, and research responsibilities of academicians. Instructors were to devote their energies to dealing with students and academic life; institutional maintenance became vested in academic businessmen who represented the controlling boards and tried to serve the needs of faculty as well. An overlying administrative structure developed, distinct from the teaching ranks, and created a complex hierarchy which led to faculty demands that academic freedom be associated with precise legal rights that were themselves part of the system and could not be challenged by authority.

Prior to the turn of the century, few formal statements on academic and intellectual freedom were promulgated by American colleges and universities. The entire issue ultimately came into focus, however, during the first fifteen years of the 1900s. American professors gradually rallied to a new image, claiming exemption from interference by administrators or boards of trustees on the grounds that as instructors, they consti-

tuted a professional class by definition, and were subject only to self-established standards and peer review. It was this germ of an idea which served to draw American faculty toward a common cause, and which culminated in the establishment of the American Association of University Professors in 1915.[24]

As might be suggested by the date of origin for the American Association of University Professors, this group coalesced at a time of world tension and local socio-political turmoil. Higher education in America then was largely untrammeled by external influences and regulatory agencies. Institutions generally were isolated, autonomous, and private, and were not subject to state or Federal control other than as defined in their individual charters. Working conditions resembled more the relationship of a private employer with his employees rather than organizations infused with diverse societal obligations, interests, investments, and influences. At the start of the century, the American college or university was thought of by the country more as a public curiosity than as a public utility. The infusion of Federal monies was negligible, primarily because the Federal government had no particular demands to make of higher education outside of the Morrill Acts, and no mandated sense of social missionary work was being proposed through opening opportunities in higher education to the bulk of the population.

As America became entangled in the events of World War I, some members of the academic community began speaking out on controversial issues. When these faculty members consequently experienced intimidation by administrators and boards of control, it was realized that the time had come for faculty to band together in order to proclaim and protect professional prerogatives. With these objectives in mind, the American Association of University Professors was established, and became dedicated to the development and protection of academic freedom and tenure in institutions of higher learning. Rudolph has remarked that the founding of the Association symbolized the arrival of academic man in America.[25]

Academic freedom is a relatively modern term, but as a concept it can be traced to Socrates' self-defense against charges of corrupting the youth of Athens, and has a continuous history concurrent with that of universities since the twelfth century.[26] Tenure likewise has hoary origins which extend to the twelfth century when scholars were provided with various benefits of physical and economic security such as exemption from army service and certain taxes.[27]

Yet despite the pervasive nature and longevity of these concepts, the entire perception of tenure, along with its counterpart of academic freedom, currently has been experiencing heavy pressures for change from certain segments of contemporary society. Moreover, the issues remain prime topics of controversy to this day.[28,29] Nor is optometric education exempt. In 1977 a study demonstrated that of the five independent, non-affiliated colleges of optometry in the United States, only three had policy documents which expressed to an acceptable level or higher the guidelines established for the maintenance of academic freedom and tenure by the American Association of University Professors in the *1940 Statement of Principles*.[30] To the extent that this situation might be reflected in the schools of optometry associated with universities is problematical, as that aspect of the question has not been researched. Also, policy statements concerning academic freedom and tenure since may have undergone revisions at the non-affiliated colleges originally surveyed. Such has been the case in at least one of the institutions. But in the mood of the times, the topics of academic freedom and tenure will continue to occupy the attention of faculty. For those lacking a historical perspective, this brief resume might serve as a primer for these issues which affect so intimately our professional activities.

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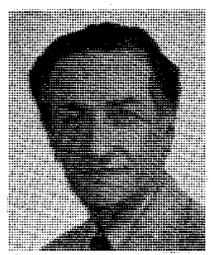

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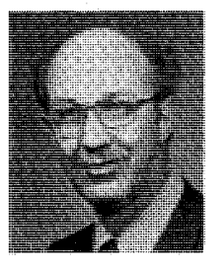

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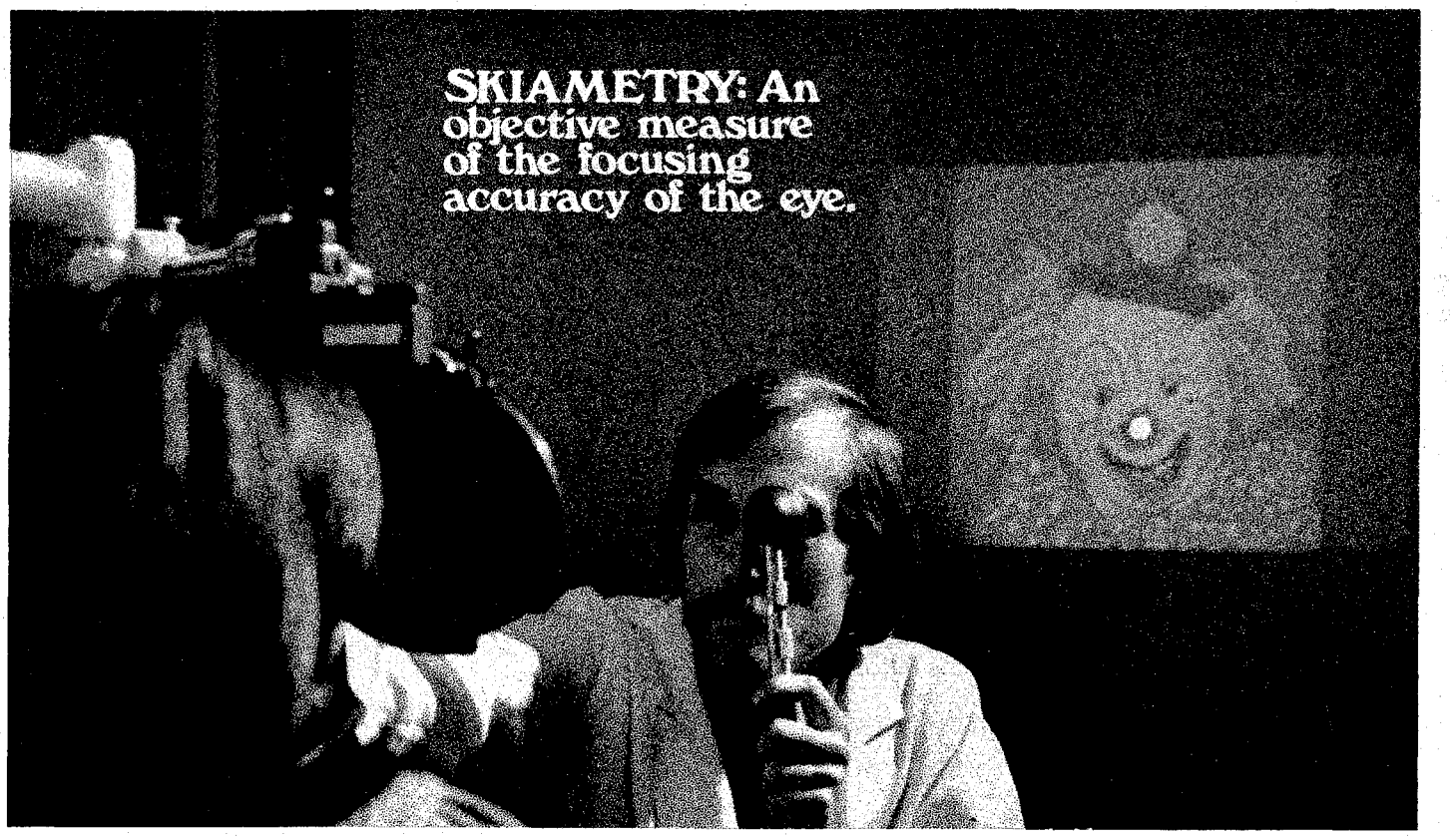

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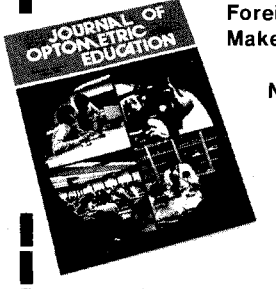

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