JOURNAL OF OPTOMETRIC EDUCATION

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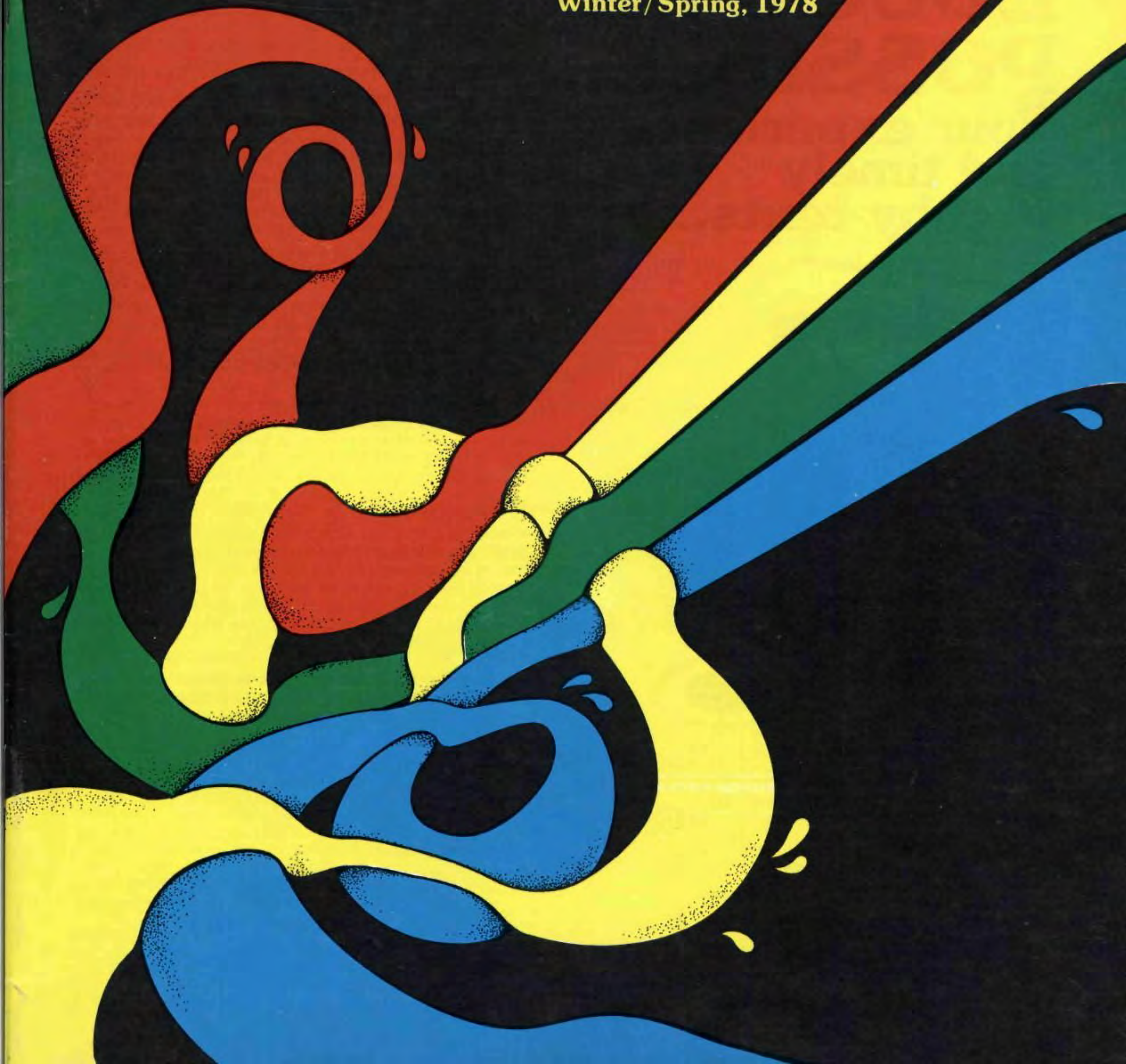

JOURNAL OF OPTOMETRIC EDUCATION

Official Publication of the Association of Schools and Colleges of Optometry

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Front Cover by David Kidd

Association Activities

This issue of the *Journal of Optometric Education* highlights the minutes from the Board of Directors Meetings in Washington, D.C., October, 1977, and Phoenix, Arizona, January, 1978.

Board of Directors Meeting
Washington, D.C.
October 20-21, 1977

The Board met with invited guests from government agencies and other organizations to discuss issues concerning optometric education. Dr. Daniel Whiteside, Mr. Thomas Hatch, and Dr. Nathan Watzman of the Bureau of Health Manpower met with the Board to discuss the new Health Professions Educational Assistance Act, the status of implementation, and potential funding for the coming year. The guests noted that those aspects of the new law which provide for institutional assistance are gradually being phased out and that, in the future, federal assistance in areas such as construction and special projects would have to be requested under a categorical approach to the Congress.

Mr. Douglas Redmond, Director of the Optometric Manpower Resources Project, reported on a study of optometric manpower resources being conducted by OMRP for the AOA and under contract to the Health Resources Administration. He also asked cooperation of the schools and colleges in securing selected data on non-respondents to a student questionnaire distributed in the Fall of 1975.

Mr. Peter Topaz, Editor and Publisher of the Professional Press, solicited the help of the Board members in providing articles for the *Optometric Weekly* and new texts, manuals and other book publications for optometric distribution by the Professional Press.

Mrs. Alice Swift, Chief, Planning and Procedures Section of the Student Affairs Branch of the Bureau of Health Manpower, reported on the status of pending legislation, implementation of programmatic materials and development of regulations for the student assistance programs administered by the Bureau of Health Manpower.

Dr. Merrill DeLong, Chief of the Educational Development Branch of the Bureau of Health Manpower, discussed possible approaches for ASCO to take in soliciting support for optometric education as a national resource. He also noted that there has been a lag in development of regulations and guidelines for many of the programs.

Optometric Chiefs of the Army and Navy, LTC Arthur Giroux and Captain Donald E. Still, along with LTC John Leddy, Chairman of the AOA Federal Service Optometry Committee, met with the Board to discuss problems concerning the status and role of optometry in the three services. The Board pledged the support of ASCO in rectifying the problems which had been presented and indicated that the AOA Washington Office would assist.

Dr. Donald Harrington, Professional Affairs Officer of the National Health Service Corps, discussed the role and future of the NHSC with the members of the Board, particularly as it might relate to the practice of optometry and to recently graduated optometrists.

The following day, the Board met with members of the Senate and House staffs on health manpower to discuss federal funding legislation for the schools and colleges. Mr. Terry Lierman, Professional Staff Member of the Senate Appropriations Committee, Mr. Allan Fox, Chief Legislative Assistant to Senator Jacob Javits, and Mr. Stephan Lawton, Chief Counsel of the Subcommittee on Health and Environment, observed that federal support for the schools of optometry had declined steadily over the last four years. It is Congress' intent to phase out capitation funding and increase student loan availability. They felt that Congressional funding priority is to provide delivery of health care to meet the national need.

The President of ASCO noted that the schools are the prime mover for alternate forms of health care delivery and students need a variety of backgrounds to meet this challenge. Congress must understand that the schools and colleges are a national resource and must be supported. If not, the consumer will have to pay the increased costs and the public will be outraged.

The Board discussed the significance of the MOD and VOPP groupings and requested advice as to what would be convincing to the Congress concerning optometry being a national resource. Mr. LeRoy Goldman, Chief, Planning and Evaluation Staff of the Bureau of Health Manpower, suggested that a national plan for optometric education might be worthwhile.

Mr. James Clark, Director of the AOA Washington Office, reported plans had been made for key Congressional aides to visit the schools and colleges and suggested they use this opportunity to increase the awareness of optometry as a primary vision care profession and national resource.

Dr. Kenneth Myers, Director of Optometry Services for the VA, presented an update on the current status of VA optometric involvement.

Mr. William Fullerton, Deputy Administrator of the Health Care Financing Agency, presented a summary background on the development of HCFA, then answered questions from Board members in a general and informative session.

Dr. Charles Comer, Project Director for Minority Recruitment of the National Optometric Association, met with the Board to discuss minority recruitment in the schools and colleges. Dr. Comer related that the two most important problems concerning the NOA now were financial aid and retention of minority students. He solicited assistance in establishing retention programs in the schools, and the Board expressed its support.

The Board interviewed final candidates for the position of Executive Director. Mr. Lee W. Smith was subsequently selected by the Executive Committee.

Board of Directors Meeting
January 6-8, 1978
Phoenix, Arizona

The receipt of a $25,000 grant from Bausch & Lomb, Inc., for the furtherance of optometric education was announced. In addition, a $500 grant has since been received from Danker & Wohlk, Inc.

A progress report on the definition and role of an optometrist indicated further review is being conducted in an attempt to achieve a comprehensive, more acceptable definition. Faculty response to the proposed definition is also being obtained. A final report will be submitted to the Board at this year's Annual Meeting.

The Secretary-Treasurer reported that the Association is operating in the black, with outstanding dues expected to be received by the end of the academic year. A revised budget for the remainder of the current fiscal year was approved by the Board.

The Constitution and Bylaws Committee reported on areas for possible suggestion for change and will distribute a report by May 1 for consideration and action at the Annual Meeting.

The Committee on Public Members reported on options for inclusion of public members on the Board of Directors. The need for public members and the advisory capacity of public input were discussed; however, no Board action was taken at this time.

The Board reversed an earlier decision to oppose the ANSI Z80.1 proposed standards for ophthalmic lenses. In light of clarifications presented by Dr. Glenn Fry, Regents Professor at The Ohio State University College of Optometry, the Board resolved to go on record in support of the revised standards.

Mrs. Ann Guler, Consumer Affairs Specialist for the Federal Trade Commission Regional Office in Los Angeles, addressed the Board on the subject of the trade regulation rule for optometric advertising. Mrs. Guler explained the development of the rule and answered numerous questions in a general and informative discussion.

A meeting was called among ASCO, AOA and AOF leadership to discuss issues relevant to fund-raising activities of the AOF.

A number of efforts surrounding development of new schools of optometry were discussed. However, none of these are at the point of certainty. The Board resolved to invite the AOA to join in a study of the causes of failure of several states to bring plans to create optometry schools to successful conclusion and to determine future direction of prospective initiatives.

The question of independent versus dual evaluation of the clinical programs of the schools and colleges by the COE and the CCOC was debated. The Board decided to discuss the problem further with the AOA.

It was reported that a Project Team on Federal Support for Optometric Education has been established by the AOA to study future funding of optometric education. Board members were asked to identify specific priorities to be addressed by this task force.

A meeting was planned for April, 1978, to meet with representatives of the executive and legislative branches of government. This meeting will include visits to House and Senate committees on health and appropriations as well as federal agencies and other organizations to discuss subjects of concern to optometric education.

It was announced that Dr. Henry Peters, Dean of the School of Optometry at the University of Alabama, was to be installed as the new President of the National Health Council.

An ad hoc committee was formed to study the feasibility of increasing the use of the National Board Examination on a nationwide basis in an effort to move toward national licensure.

The Board embarked on a new adventure in international optometric concern by adopting three proposals presented by Dr. Henry Hofstetter, Rudy Professor of Optometry at Indiana University School of Optometry. These included: 1) application for membership by ASCO in the International Optometric and Optical League (IOOL) and attendance at the IOOL meeting to be held in St. Louis in June; 2) an invitation to representatives from the international education community to attend the ASCO Annual Meeting in July; and 3) formation of a standing committee on international relations.

A resolution expressing appreciation and thanks to Dr. John D. Chase, Chief Medical Officer of the Department of Medicine and Surgery of the Veterans Administration, for his sincere efforts in developing procedures and policies for implementation of the Optometry Service in the VA was unanimously approved.

A statement supporting the recent

GAO review of unsuccessful attempts by some optometry schools to establish affiliations with various VA institutions was also approved.

Introduction of a noncognitive section in the OCAT was announced by the Council on Student Affairs. Expected to be operational by Fall of 1978, this section represents an important instrument in the selection process of students in the schools of optometry. Final approval will be requested from the Board at the Annual Meeting.

A meeting was called for between COE and ASCO on the problem of collection of data for use by the schools and colleges to insure the availability of information needed by the institutions.

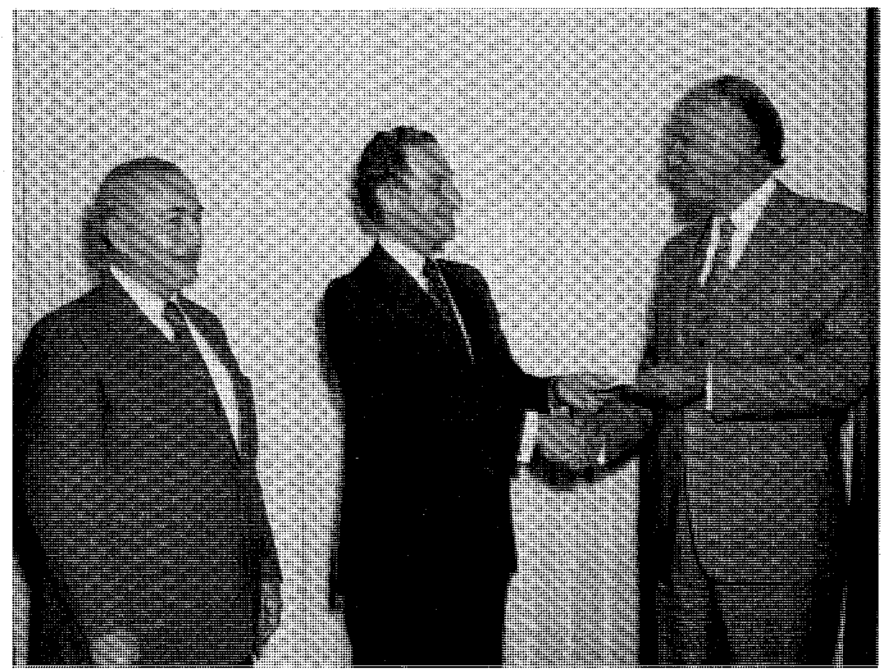
The Council on Institutional Affairs reported it is working on a proposed outline for the National Board Examination section on *Public Health, Community Optometry and Optometric Jurisprudence*. A spring program to develop guidelines for primary care delivery within the clinical programs of the schools and colleges is also planned, and a conference among clinic directors will be held to develop separate guidelines for data gathering and reporting, clinical affiliations and residents utilization.

The Council on Academic Affairs reported it is working on development of a pharmacology program model for diagnostic and therapeutic use of pharmaceuticals by optometrists and a refinement and expansion of the behavioral science curricular elements in the optometry curriculum model.

The teaching guide for optometry instructors is being reviewed in final and will be ready for distribution in June.

The Annual Meeting of ASCO was set for July 1 and 2 in New Orleans with a combined Board Meeting and Annual Meeting planned for the two-day session. ●

ASCO Receives Two Grants



Dr. Alden N. Haffner (center), President of ASCO, receives the $25,000 grant from Bausch & Lomb's Daniel G. Schuman, Chairman of the Board (right), and Jack D. Harby, President.

The Association of Schools and Colleges of Optometry recently announced that it had received a general purpose grant from Bausch & Lomb, Inc., in the amount of $25,000. In addition, a contribution in the amount of $500 has been made by Danker and Wohlk, Inc. Both grants were given to further the Association's objectives in increasing the quality and breadth of optometric education.

Dr. Alden N. Haffner, President of the Association of Schools and Colleges of Optometry and the State University of New York, State College of Optometry, traveled to Rochester, New York, in January to receive the Bausch & Lomb grant from Daniel G. Schuman, Chairman of the Board, and Jack D. Harby, President. In making the presentation, Mr. Schuman expressed Bausch & Lomb's keen interest and continued support of optometry and optometric education.

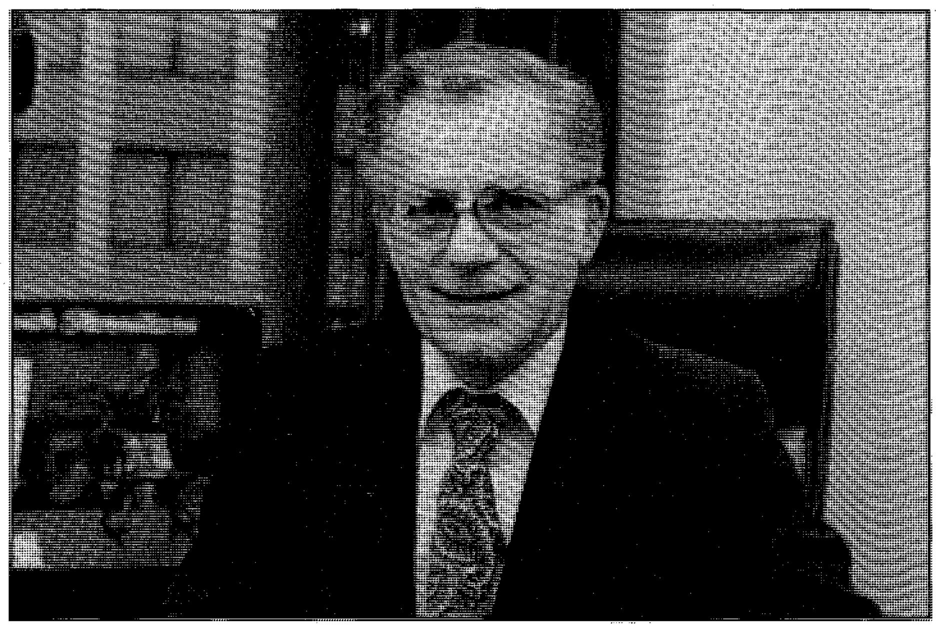
Frederick J. Danker, Chairman of the Board of Danker and Wohlk, also indicated his company's strong support in making its contribution.

The Board of Directors of the Association at its recent meeting in Phoenix, Arizona, presented and discussed projects which the Association will undertake and which will be made possible through the generosity of the Bausch & Lomb and Danker and Wohlk grants.

A Message from the Executive Director

When I accepted the responsibility of the position of Executive Director of the Association of Schools and Colleges of Optometry, I did so with a great deal of feeling of challenge, unbounded enthusiasm, and numerous thoughts of how the Association could better serve its public, optometry, and optometric education. I've now been on board for nearly three months, and none of my enthusiasm or feeling of challenge has waned. I find the organization to be on a sound budgetary basis, its members totally supportive of its activities and purposes, and its leadership dedicated and committed to the betterment of optometry and, particularly, optometric education.

I have spent a great deal of time in review of the financial position of the Association and am satisfied that we will operate in the black during this year. The Board of Directors has approved a revised budget proposal for operating the Association during the remainder of this budget year and it is expected that we may have a credit line on June 30. My major efforts and objectives over the next few months will deal with:



ASCO Executive Director Lee W. Smith.

1. The *Journal of Optometric Education*. I'm more than satisfied with the quality of the articles which have been and continue to be submitted, and we wish to maintain that high level of excellence. Our efforts at the National Office level will be to work to reduce the cost of production of each issue of the *Journal*, to insure its timeliness, to increase the revenue generated in support of the *Journal*'s costs through broader advertising and increased subscriptions, and finally, to increase prestige in readership of the *Journal of Optometric Education*. Mrs. Harriet Long, the Managing Editor of JOE, brings to her responsibilities skill and educational background and is fully able to reach our goals in these three areas.

We of JOE encourage you the faculty, student body, and others to do your part by developing and submitting quality manuscripts to the *Journal* for publication.

2. A second major activity of the National Office will be to evaluate and pursue additional base funding arrangements for ASCO and to insure that no dues increase will be required in the years ahead. Federal funding is an unstable funding source and should represent subsidiary income to carry out short-term and special activities of the Association, not a primary source of operating capital.

3. My third, and I hope, the most important priority of activities that I will be undertaking will be to review ASCO's functions to insure a balanced program of services not only to the member institutions of the Association, but services to the faculty and student bodies of those institutions as well. To accomplish this, I have already begun a schedule of visits to the institutions to meet with the administration, representative groups of faculty, and representative groups of students in order for them to have the opportunity for input as to what activities ASCO can undertake to better provide for and meet their needs. Accomplishing this well in advance of the 1978 Annual Meeting of the Association, the National Office will be in a position to propose a program for 1978-79 that will insure the support of students, faculty and institutional members of the Association.

With the above in mind, we are already undertaking projects that deal with affecting legislation and appropriations in the legislative branch of government. We are meeting with agencies of the executive branch to open up opportunities for clinical affiliations of our schools, potential for additional financial support of students and, of course, support for new and regional schools of optometry.

I now invite you to contact me, at any time, to let me know what you think, what needs you have, as faculty, as students, as Association members, and ask that you not wait for the opportunity you may have when I visit your particular institution. The real success of ASCO depends as much on its membership and their support as on the work of the National Office staff.

Lee W. Smith

ASCO's National Office Staff

The National Office of the Association of Schools and Colleges of Optometry has seen a change of faces over the last few months. Dr. Louis Ebersold, former Executive Director, left the Association in September, 1977, to pursue private practice in dentistry. During the next few months, Mrs. Harriet Long managed the affairs of the National Office until such time as a new Executive Director could be appointed by the Board of Directors. On December 1, 1977, Mr. Lee Smith assumed his duties as the new Executive Director of ASCO.

Mr. Smith brings a wealth of experience in the health field to his new responsibilities. At the time of his retirement from the Public Health Service on December 1, Mr. Smith was serving as Associate Director for Student Assistance of the Bureau of Health Manpower and had achieved the rank of Assistant Surgeon General (Rear Admiral). In addition, he holds the PHS Award for Meritorious Service. Besides his more recent position as Associate Director of the Bureau of Health Manpower, Mr. Smith held a variety of operational and managerial posts within the PHS over the last 20 years.

Mr. Smith earned his M.P.H. degree in Epidemiology from the University of Pittsburgh in 1958, as well as a Master of Science degree in Microbiology in 1953. He is a member of the American Public Health Association and the Association of Military Surgeons, among others. In addition, he is a member of Phi Sigma and Sigma Xi honor societies. He resides in Potomac, Maryland, is married and has a son and two daughters.

Charlotte, Lee and Harriet get together to review the last issue of JOE.

Mrs. Harriet Long, Managing Editor of the *Journal of Optometric Education,* assists with the administrative duties of the National Office in addition to supervising publication of the *Journal.*

Mrs. Long previously taught eighth-grade Language Arts in Akron, Ohio, while working toward her Master of Arts degree in Journalism at Kent State University. As part of her graduate work in journalism, Mrs. Long conducted a study of the housing market in Akron, Ohio, for a series of articles for publication. She also served as Associate Editor of the School of Journalism's alumni publication, the *Jargon.*

Mrs. Long holds a Bachelor of Arts degree in English from the University of Akron. In addition, she brings extensive secretarial and office management experience to her position, having worked in a variety of capacities prior to her teaching career.

Mrs. Charlotte Ahrendts is ASCO's newest addition. She joined the National Office staff in January as Secretary to the Executive Director and receptionist for the Washington office. Mrs. Ahrendts holds a Bachelor of Science degree in Human Nutrition and Foods from Virginia Polytechnic Institute and State University in Blacksburg, Virginia. Her experience in the health field includes a variety of work in hospital dietetics and a geriatric nutrition study.

In addition to her health background, Mrs. Ahrendts gained considerable experience in secretarial and office procedures while working toward her undergraduate degree.

The ASCO National Office staff appreciates your support and looks forward to serving you at any time. •

Notice to Our Subscribers

This issue of the *Journal of Optometric Education* combines Numbers 3 and 4 of Volume 3, offering a full four issues to complete the current year. As we move into our fourth year of publication, we anticipate being back on a regular schedule of quarterly publication following the upcoming Summer 1978 issue. These alterations were necessitated by a change in editorial management of the *Journal.* We intend to provide you with timely, professional issues on topics of significant concern to optometric education.

The editors of JOE wish to thank you for your valuable support in the past and look forward to your continued support during the coming year. Your suggestions on improving the *Journal of Optometric Education* are always welcome.

Editorial

Needs for Optometric Educators

By Chester H. Pheiffer

Associated with the opening or proposed opening of new colleges of optometry and with the expansion of some colleges, is an often repeated question, "But where will we obtain the faculty?" Manipulation of the data presented in the annual COE report (dividing enrollment figures by full-time equivalent faculty figures) gives good indication that the student to faculty ratio in the schools and colleges of optometry varies from approximately 2/1 to 10/1. Many years ago, the Council stated that the student to faculty ratio in our colleges should be 5/1.

What is not revealed by the student/faculty ratio is the mix of full-time and part-time faculty nor the implications of this mix for optometric education. However, it is fairly safe and accurate, in most instances, to assume that the academic area is staffed by full-time faculty while the clinical faculty are largely part-time. This is especially true at the universities where "publish or perish" is not an idle phrase. No longer is there simply a need for more faculty, there are also needs for faculty with different skills, knowledge, backgrounds and interests. In fact, the need for faculty in certain areas of optometric education has become acute as a result of the conditions within the educational institutions and the characteristics of the graduate programs producing optometric educators.

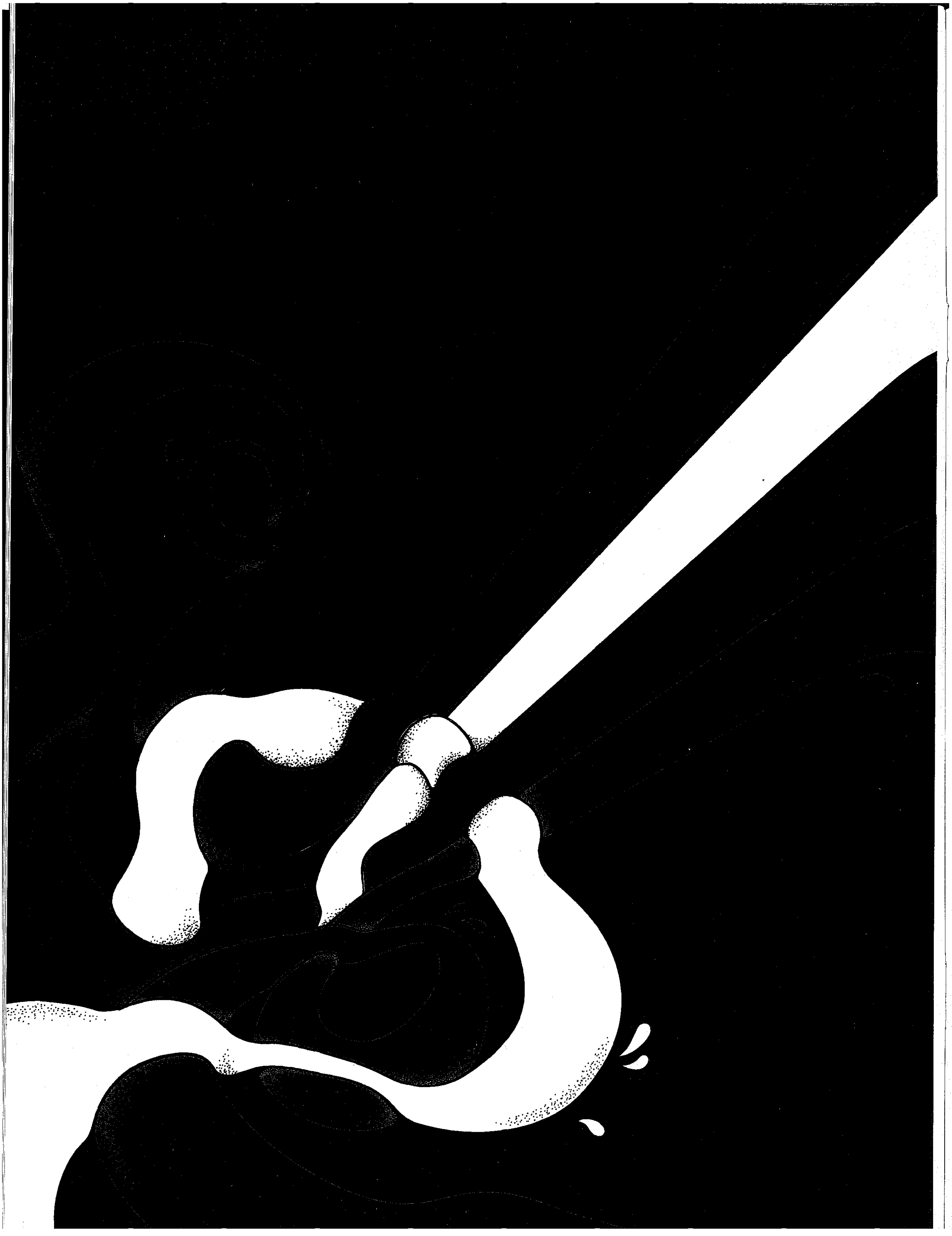
Historically, high ratios of students to faculty have been associated with lack of adequate funding. While the pay scale for optometric educators, although greatly improved during the past five years, is still inadequate, funding no longer seems to be a problem of the magnitude it once was. Today, a more frequent complaint by the administrators of the schools and colleges is that they are not able to find the faculty needed to fill their funded positions. The schools and colleges have approached this problem by nonstop advertising, sporadic advertising, circularizing of other institutions and personal recruiting. The nonstop advertising by some institutions leads one to wonder whether they are unable to obtain and retain faculty, or are using the advertising for public relations purposes. They are also admired for their financial ability to do so.

The sources of optometric educators are the basic sciences, usually anatomists, physiologists, physicists, pharmacologists, and psychologists holding a Ph.D. degree; products of the graduate programs in physiological optics holding the M.S. or Ph.D. degrees; and recent graduates, graduate students, ex-military personnel and ex-practitioners with the O.D. degree. In this mix, the supply is more than enough to care for the needs of some areas of optometric education, but not nearly enough for other areas. This is particularly true at those institutions where the O.D. is not given full accord as the terminal doctoring degree and a degree representing unique knowledge and skills. This point speaks to the failure of the graduate programs to produce needed optometric-educators. These programs have succeeded admirably in producing basic scientists and educators for a segment of optometric education. Unfortunately, these programs have not expanded in scope to the extent required to keep pace with the profession and the needs of the public. This condition becomes understandable when viewed in the light of the pressures of "traditionalism," of the zeitgeist, and the schism which developed in optometry during the 1930s. On the other hand, while those colleges without graduate programs were unable to support more than very simple research projects, clinical exploration—research if you will—was being conducted by practicing optometrists. Students who sought to develop their doctoring and research knowledge and skills in these areas found that they had to leave optometry for fields such as education and psychology. Many never returned. In response to this problem, some institutions have attempted to broaden the graduate-research education offered by changing the name of their program. That this change will solve the problem is highly doubtful, for the critical element—faculty—is lacking. Those who have the required clinical orientation, understanding and expertise either are not available or do not have the credentials required.

The Doctor of Optometry is the highest degree that can be obtained in the clinical science of optometric health care. But skill in teaching and applying knowledge have not been sufficient for self-advancement. Programs which enable the development of the research skills needed by educators who seek to advance the ability of the profession to provide care commensurate with its scope have not been available. Programs for the development of research skills appropriate to the development of new knowledge for all areas of optometric care are imperative.

Some institutions seem to be looking to the developing residency programs to provide the educators needed to teach the full scope of optometry. If the residency programs are true residency programs, they are oriented to the development of the resident's clinical skills and knowledge of the area. Those ingredients necessary to prepare the needed instructors are absent or minimal. Research knowledge and skills in the area and appropriate credentials must be added to the doctoring knowledge and skills.

In brief form, the need for optometric educators can be satisfied by narrowing the scope of optometry to that of the present graduate programs, or by means of graduate programs that are as broad as optometry, that speak to the needs of the profession and the public and that utilize the present level of expertise to develop faculty in an ever ascending spiral of production, thereby producing the knowledge and developing the skills the profession requires to provide ever increasingly effective, efficient, optometric care. •



Characteristics of Professions: Some Implications for Optometric Education

By Jerry L. Christensen

"Optometry is immersed in a period of what seems to be healthful ferment and change . . . . keeping in mind the distinguishing characteristics of a profession is important both for those involved in education and curriculum planning and for leaders and spokesmen of the profession."

There are several reasons why those of us involved in optometric education, or simply concerned with optometry as a profession, should look again to the characteristics that define the professions. Optometry is changing rapidly, and many portions of the curricula of the schools and colleges of optometry exist largely because of the distinctive features graduates must evince to be considered true professionals. It is easy to forget the purpose of these curricular components in this larger sense, especially during a period of transition when many courses never before included in the study of optometry are finding their way into the curriculum. Examining the basics of a profession is a useful counterpoise to the lure of new subject matter.

Secondly, the professions are being hugely criticized; an examination of the unique features, prerogatives and responsibilities they possess will help determine the bases for these criticisms. Professional schools will bear the bulk of the burden for solving these problems. Taking stock of the hallmarks of the professions and evaluating the criticisms leveled at them can predict the manner in which they are most likely to be transformed. Obviously, changes in the nature of the profession, even if instigated by outside pressure, will necessitate corresponding changes in professional education.

Prior to discussing the characteristics of a profession, the question, "Why do professions exist at all?" should be entertained. What prompted the development of professions and why have recent years seen a proliferation of them?

Originally, professions developed in response to major problems of society: medicine and other health professions were concerned with the health and well-being of society; the clergy with spiritual and moral well-being; law with justice and insurance of a safe and secure environment, teaching and academic professions with developing and maintaining culture and values; and the military with protection from external threats.

Lately, professions have become more and more concerned with technique, that is, with the application of the latest in technology. The recent claims of many occupations as being professions are largely supported by the uniqueness of their technique base rather than by the unique service or solution they offer to societal problems.

The first definitive statement of the features of a profession was that of Abraham Flexner[1] in his 1915 address entitled, "Is Social Work a Profession?" He listed six criteria as follows:

1. The activities involved in a profession are essentially intellectual. A professional must apply his intelligence to the processes of identifying problems, understanding them and finally, devising a strategy leading to their solution. Using instruments does not lead to loss of professional status as long as they are utilized as part of the process delineated above.

2. A profession is learned in the sense that it is based in science and recent research. This fact keeps the professions from degenerating into routine.

3. Professions are practical. Flexner states, "His [the professional man's] processes are essentially intellectual; his raw material is derived from the world of learning; thereupon he must

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do with it a clean-cut, concrete task."

4. A profession encompasses a technique that is communicable through an ordered and highly specialized educational process.

5. A profession is a brotherhood, a society. Professionals' lives center around a professional nucleus.

6. There is an altruistic aspect to a profession. Professional associations work for the achievement of social ends rather than banding together to promote self-interests. The pecuniary interests of the practitioners should be a secondary concern.

Robert Maynard Hutchins[2] discusses educational requirements for professions in his interesting monograph, *The Higher Learning in America.*

He carefully differentiates professionalism and vocationalism and indicates that the former is the only one of the two deserving of a place in a university curriculum. He states:

> "If the universities can revert to a condition where the number of professional schools and courses is limited to those that have intellectual content in their own right, they will have gone some distance toward disposing of the dilemma of professionalism. They will go still farther toward disposing of it if they can insist that the professional schools and departments that remain deal with their subject matters in the true university spirit, that is, in the spirit of studying them for their own sake. Every learned profession has a great intellectual heritage, and it is this which should be the prime object of the attention of the professional schools."

Hutchins distinguishes professionalism and vocationalism by the former's emphasis on intellectual pursuits and problems. Vocationalism is viewed as being bad for the universities and ruinous to the professions. Again, in Hutchins' words:

> "But I suggest that vocationalism is not merely bad for the universities; it is also bad for the professions. I beg to lay down this fundamental proposition that every profession requires for its continuous development the existence of centers of creative thought; to the extent to which universities and professional schools abandon creative thought and degenerate into trade schools the profession must degenerate into a trade."

Becker[3] approached the question of definition of a professional from a more sociological point of view; that is, an occupation is a profession when society accepts it as such. In this context the designation profession is an honorific symbol which implies that a profession knows, maintains and controls a body of knowledge which is unique. He summarizes important features:

> "A professional can do 'something' only other professionals of the same designation can do; professionals are among the most able and intelligent of people; learning a profession requires many years of systematic study and effort; professionals practice free of lay control; the state may regulate professional practice; professional practice ideally represents a relationship to a client that is personal, altruistic, private, based on mutual trust, and not subject to revelation to others without consent. Finally, a professional occupies an 'esteemed position' in society, in that professionals are presumed to be economically more affluent than others and have high community prestige."

"Originally, professions developed in response to major problems in society: medicine and other health professions were concerned with the health and well-being of society; the clergy with spiritual and moral well-being; law with justice and insurance of a safe and secure environment; teaching and academic professions with developing and maintaining culture and values; and the military with protection from external threats."

The very word "professional" provides some insight into the features characterizing a profession. This designation indicates that the members of such a group *profess* or have faith in the benefits of the activities they practice. "Thus, medicine professed health, law professed justice, education professed truth, the ministry professed salvation."[4]

Schein has developed the most exhaustive list of the characteristics of professions.[5] He also states the major problem of defining professionalism as follows:

> "The problem of definition derives from our attempt to give precision to a social or occupational role that varies as a function of the setting within which it is performed, that is itself evolving, and that is perceived differently by different segments of society."

Schein lists 10 important defining features of a profession:

1. "The professional, as distinct from the amateur, is engaged in a *full-time occupation* that comprises his principal source of income.

2. "The professional is assumed to have a *strong motivation* or calling as a basis for his choice of a professional career and is assumed to have a stable lifetime commitment to that career.

3. "The professional possesses a *specialized body of knowledge and skills* that are acquired during a *prolonged period of education and training.*

4. "The professional makes his decisions on behalf of a client in terms of *general principles, theories, or propositions,* which he applies to the particular case under consideration.

5. "At the same time, the professional is assumed to have a *service orientation,* which means that he uses his expertise on behalf of the particular needs of his client. This service implies diagnostic skill, competent application of general knowledge to the special needs of the client, and an absence of self-interest.

6. "The professional's service to the client is assumed to be based on the objective needs of the client and independent of the particular sentiment that the professional may have about

the client. The professional promises a 'detached' diagnosis. The client is expected to be fully frank in revealing potentially unlikeable things about himself; the professional as his part of the contract is expected to withhold moral judgment, no matter how he may feel personally about the client's revelation. Thus, the professional relationship rests on a kind of *mutual trust between the professional and client.*

7. "The professional is assumed to know better what is good for the client than the client himself. In other words, the professional demands *autonomy of judgment of his own performance.* Even if the client is not satisfied, the professional will, in principle, permit only his colleagues to judge his performance. Because of this demand for professional autonomy, the client is in a potentially vulnerable position. How does he know whether he has been cheated or harmed? The profession deals with this potential vulnerability by developing strong ethical and professional standards for its members. Such standards may be expressed as codes of conduct and are usually enforced by colleagues through professional associations or through licensing examinations designed and administered by fellow professionals.

8. "Professionals form *professional associations which define criteria of admission, educational standards, licensing or other formal entry examinations, career lines within the profession, and areas of jurisdiction* for the profession. Ultimately, the professional association's function is to protect the autonomy of the profession; it develops reasonably strong forms of self-government by setting rules or standards for the profession.

9. "Professionals have great power and status in the area of their expertise, but their *knowledge is assumed to be specific.* A professional does not have a license to be a 'wise man' outside the area defined by his training.

10. "Professionals make their service available but ordinarily are *not allowed* to advertise or to seek out clients. Clients are expected to initiate the contact and then accept the advice and service recommended, without appeal to outside authority."

Let us consider these characteristics of professions both with regard to their educational implications and as possible sources for the disenchantment and criticism leveled at them today. The features listed by the writers considered earlier will be grouped into five categories as follows: a profession(al)'s 1) attitudes, 2) intellectual foundation, 3) decision making, 4) relationship to clients and 5) socialization. Each category will be dealt with in turn.

Attitudes

The attitudes or behavioral traits most generally associated with professionals are a strong motivation, perhaps even a calling, and altruistic tendencies. These features are not directly addressed in professional schooling, although motivation and desire can be strengthened by appropriate educational and clinical experiences. This is an area where role models are of great importance, i.e., teachers or clinicians after whom the students can pattern themselves.

Motivation is traditionally considered in the selection process for entry into professional training. Evaluating or assessing the type of motivation is extremely difficult. Admissions committees gravely ponder the applicant's past record, letters of evaluation and the interview and then make an intuitive decision. The supposedly altruistic nature of those who are admitted to the professions seems incongruous with the high fees and incomes later generated. Perhaps this characteristic has been overplayed, thereby leading the public into false expectations. The behavior of professionals will also be considered in the section dealing with their relationships to clients.

"The student must learn to deal with ambiguity. An exposure to scientific reasoning in the science components of the curriculum is most beneficial. Early in the student's training, simulation would be very effective."

Intellectual Foundation

There is widespread agreement that a professional must have a solid knowledge base. Consequently, professional educational programs have a significant science component. However, in recent years several problems have arisen in this regard.

The knowledge and technological explosion has made it much more difficult to provide an appropriate basic science grounding in the professional curriculum. Not only is there a greatly increased amount of scientific fact, but the technological boom also causes those portions of the curriculum dealing with clinical skills to be larger and more unmanageable. These same occurrences have led practitioners to specialize in an effort to avoid early obsolescence.

Optometry has a unique problem in that it currently seems to have two basic science areas which must be included: the traditional subject matter of physiological optics, or basic visual science; and basic science, i.e., anatomy, physiology, histology, microbiology, pathology, pharmacology, etc., on a scale comparable to dental and medical education. Increasing emphasis on this latter area of study is the result of changes in the perception of optometry and its role which have culminated, in many states, in a legal redefinition of optometry and its scope. Therefore, the problems of optometric education are all the more acute and have resulted in an increase in the preprofessional college requirements, along with much deliberation on professional curriculum content. Must old friends, such as physical optics, or some portions of physiological optics, be jettisoned to make room for the newcomers, such as extended pathology and pharmacology courses? These and other considerations are going on in many of our educational institutions.

Added to these difficulties is pressure from students and clinicians to move patient contact to the earliest possible point in the four-year curriculum. This desire is due partly to the demands for relevancy of the late 60s and early 70s, partly to the knowledge and technological explosion in the optometric and clinical areas, and also in response to the increasing public criticism of all professions and their usefulness.

The increased pace with which both knowledge and techniques become obsolete means that professionals must continue their education following graduation. Many states now have continuing education requirements designed to ensure that optometrists keep up-to-date. Professional education attempts to ensure that graduates will have this capability in several ways. While in school, the students are provided with an up-to-date and broad knowledge base; the basic sciences and physiological optics courses play a predominant role in this process. Concurrently, the students learn the scientific process and how to analyze and evaluate scientific and clinical research. This is not an easy thing to teach; demonstrations of scientific reasoning and careful evaluations of scientific and clinical research can be given by instructors in the classroom but, ultimately, students must attempt to carry out these procedures on their own. Feedback on their performance is necessary if they are to improve on it. Term papers, projects both of a laboratory and a library nature, are useful elements in this procedure. Elective or self-study courses are also a very good way for students to pursue their interests and learn to be self-educating.

Increasing the effectiveness of teaching techniques is another method for helping to alleviate the geometric growth of knowledge problem. Programmed instruction or its many variants could be used to good advantage in many professional programs; setting performance standards and allowing the time spent for their achievement would seem particularly well suited to the goals of many of the courses in the optometric curriculum, where the competency necessary can be specifically defined and evaluated.

The basic science, basic visual science and optometry courses could be better integrated and not taught in a serial, isolated fashion. If this were done, time would permit some of the more recent additions to the curriculum to receive the consideration they deserve.

The subject matter of optometry's basic intellectual base must be chosen such that research in these disciplines will advance the profession by augmenting its clinical effectiveness. Physiological optics has long served this role and also has provided the profession with a unique scientific base. This is an area in which an optometrist has a much better grounding than an ophthalmologist; the clinical capabilities of optometrists reflect their thorough education in vision science. Despite the difficulties in so doing, optometric educators must decide what the scientific foundation of optometry should be and plan a curriculum which contains a sufficient amount of basic science, basic visual science and the proper experiences to enable graduates to be competent on the day they graduate and to prepare them for lifelong learning in their profession.

Decision Making

It is with regard to decision making that we begin to talk of the "art" of the practice of optometry. Armed with a knowledge of the facts and theories of basic science, visual science and clinical science; equipped with the latest techniques and technology; faced with the often contradictory results supplied by tests due to the unbelievable complexity and variability of a human being; the professional must decide on a course of action.

An essential part of professional schooling must be directed toward enabling the student to learn professional judgment. Both didactic optometry and clinical optometric experiences are important in this regard. Again, this is an area where role modeling is necessary; this type of decision making is considered an *art* because it is not possible to explain precisely how to do it, as can be done with techniques such as retinoscopy or keratometry. With these considerations in mind, one can see the importance of having a full-time, experienced clinical faculty. The use of young, part-time, junior-level clinical faculty with a high turnover rate is not educationally sound.

The student must learn to deal with ambiguity. An exposure to scientific reasoning in the science components of the curriculum is most beneficial. Early in the student's clinical training, simulation would be very effective. Programmed patients[6] or simply paying a patient to be seen by three or four students and a faculty member who subsequently compare procedures, findings, diagnosis and treatment in a seminar setting would seem to promote development of the student's competence in making decisions.

Today's professional is faced with much more complex problems due to the effects of scientific and technological developments on the individual and society; these multifaceted problems cannot all be properly addressed by isolated professionals, forced into specialization by these same developments. Our professional schools must make an effort to develop some interdisciplinary cooperation, whether it be by primary health care teams or some other mechanism. Such cooperation could occur with the least effort, and more naturally and effectively, if our schools and colleges were located in or associated with academic health centers. If an interdisciplinary approach is not taken, every new problem is likely to spawn a new profession.

"The schools and colleges of optometry have been socializing forces in a rather desultory fashion and could come to play a more important role in orienting a student to a profession."

Relationship to Clients

The appropriate professional relationship to a client is one in which the client is fully revealing, trusting the practitioner to be confidential; the professional's decision-making process is objective (detached) and in the patient's best interest; and there is full compliance on the part of the patient with the regimen of treatment. Obviously, there are several things that can go awry with these procedures in practice. However, there are ways that a practitioner can maximize the chance that the patient will provide all of the facts and will follow the suggested course of action. Optimizing these behaviors is the purpose of courses which are newcomers to professional programs and may be called, the doctor/patient relationship, interpersonal and group dynamics, or applied behavioral science for the optometrist.

An attempt is being made to teach what was formerly left to graduates to learn by experience or possibly by example from their clinical instructors. Such considerations, while not enlarging the technical base of the profession, do enhance the professional's *effectiveness*. In some measure, these courses have arisen in response to consumer advocates or others of the lay public who are critical of the various professions' abilities to solve problems.

It is also becoming increasingly difficult for the professional to determine exactly who his clients are. When this occurs, a professions' standards and ethics may erode, since it is not perceived that particular individuals are being harmed in a particular manner. The recent medicare scandals exemplify this.

Another problem, receiving great public attention is the fact that today's professionals are not offering equal services to all segments of society. The low income group cannot afford to avail themselves of professional help or care. Today's graduates have been accused of not feeling much empathy for low socioeconomic groups. Consequently, courses dealing with public health concerns or with the health care delivery system have been added to nearly every optometric curriculum. Clinical experience in community health programs or with particular patient populations can also be beneficial.

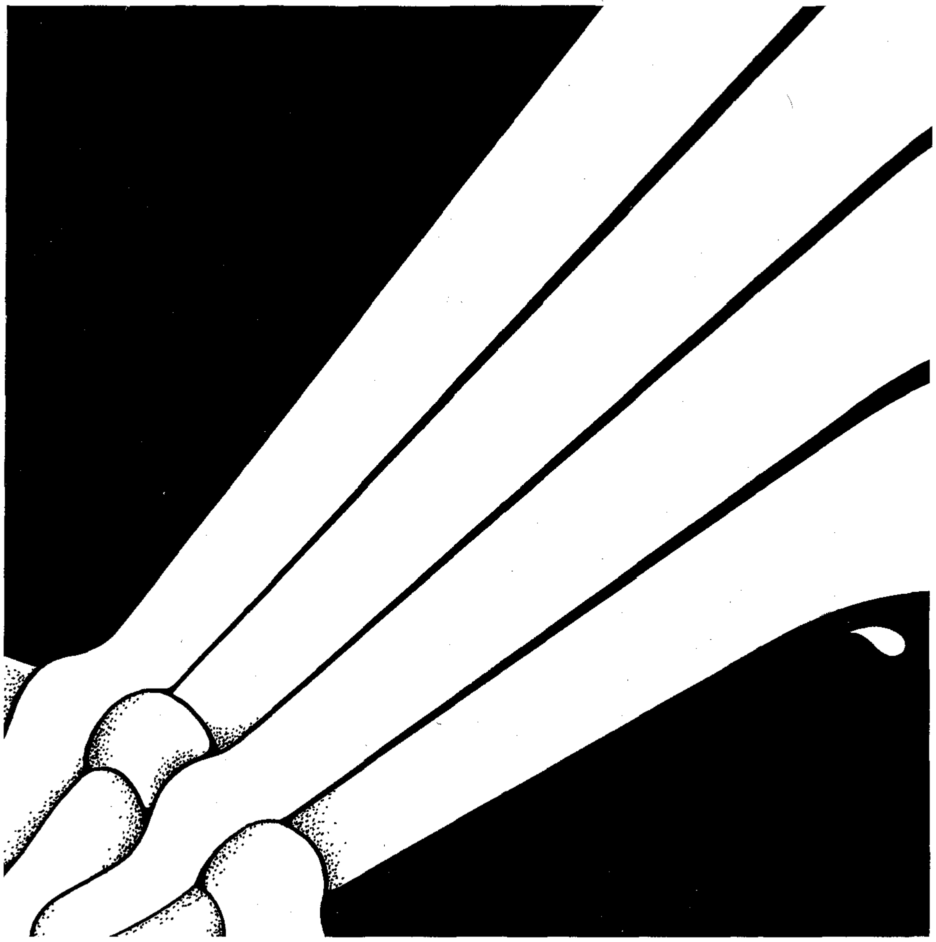
Despite the burgeoning amount of scientific and technical knowledge to be imparted in professional school, the curriculum must not become technique-ridden to the point of ignoring other considerations equally important to the professional's effectiveness in solving problems and providing a service.

Socialization

Professional school is not just an educational experience; it is also a social system.[7] This latter aspect can be most influential in shaping the budding professional's attitudes and values regarding professional practice. The socialization begun in school extends into professional practice in the form of professional associations and societies (actually, these associations usually have a student branch which most students join in their first year of school). Thus, we speak of professionals as being brotherhoods or "a way of life."

These professional societies serve several important functions. They develop and enforce standards of practice and ethical behavior. State or national boards composed of professionals determine whether an individual will be licensed to practice in their area of jurisdiction. Since the public cannot determine whether a given professional is capable, qualified or ethical in his/her professional area, the associations have developed rigorous self-policing policies.

Recent years have seen a vigorous consumer's rights movement, and some of these societies' restrictions, such as price advertising, are now being criticized as depriving the public of knowledge which would enable individuals to make an intelligent choice regarding professional services. The associations and societies are viewed as being monopolistic and acting only in the professional's interest, that is, in keeping fees high



by avoiding a free marketplace. Professions and their associations have been accused of operating out of self-interest and of showing too little concern for public well-being. Unless the professions can successfully respond to these concerns on the part of consumer protection groups, legislators and others concerned with health care in America, they stand a chance of losing a great deal of their autonomy by being subjected to outside regulation. Professional autonomy must be regarded as a privilege, not as a right, and, consequently, must be carefully guarded.

Many professions have a great deal of influence, if not control, over the educational institutions producing those of their particular profession. This situation has also recently been criticized as operating in the profession's interest rather than in the public's interest. Those professional accrediting groups which are agencies of professional societies are being challenged, not only by governmental agencies, but also by some universities which consider their recommendations to be too self-serving.

In addition, professional associations have been accused of delimiting the boundaries of a profession so thoroughly as to preclude any chance of interdisciplinary cooperation. This charge is all the more important because, to many, interdisciplinary activity seems to be the only solution to many of society's pressing problems.

At a time when all institutions and establishments are being questioned and examined with suspicion, it is not surprising that professional societies are among those criticized. Anyone who looks closely at the professions realizes that their societies have been very beneficial and also realizes that their role is likely to change to some degree, largely due to outside influences.

The schools and colleges of optometry have been socializing forces in a rather desultory fashion and could come to play a more important role in orienting a student to a profession. Here again, role model learning, the effect of faculty attitudes and behavior on students, curricular arrangement, student selection, the nature and type of patient experiences, peer influence, the effect of student professional organizations and the overall atmosphere and learning climate of the school are, probably, all important factors in the socialization process. Some professional schools are attempting to affect their students' professional attitudes and values in a more methodical way through public health courses or by means of seminars dealing with professions and their privileges and consequent obligations.

Summary

Optometry is immersed in a period of what seems to be healthful ferment and change. Many decisions must be made; keeping in mind the distinguishing characteristics of a profession is important both for those involved in education and curriculum planning and for the leaders and spokesmen of the profession.

Occurring simultaneously with the changes in the profession of optometry are changes in professions in general. These alterations have been brought about by charges leveled by various consumer advocacy groups, other segments of the general public and by agencies of the state and federal government. Here again, by looking to the features of the professions, perhaps we can determine why and how they are being transformed. Such changes will certainly have an effect on the profession of optometry and the education of its practitioners. ●

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Teaching Aids and Informational Material

Optometry in Third Party Programs

Optometry in Third Party Programs is another excellent compilation by an AOA committee. Published in September, 1977, by the AOA Third Party Care Committee, this manual is concerned with third party vision care plans which have created so much concern among health care providers. Both governmental and non-governmental plans are presented in fair detail. The thoughtful reader will have no doubt that these programs will have considerable impact upon the delivery of health care in general and vision health care in particular. Optometry must not only be knowledgeable about the plans which exist but attempt to predict and influence the plans as they develop. Particularly is this true with the ever-present possibility of national health entitlement. The Third Party Care Committee hopes that "this information can assist optometric educators, optometry students and practicing optometrists in gaining a greater understanding of third party vision care."

The gamet of material covered varies from indemnification plans to the optometric care foundation. Governmental plans covered include Social Security, CHAMPUS, FEHBA and many others. There is also a glossary of terms and an appendix of articles on third party programs.

In that third party payment plans are becoming a routine part of the optometrist's professional life, it is essential that the optometrist becomes "knowledgeable regarding whatever the future presents within his scope of care." You should be able to find this manual in your school or college library.

Rural Optometry

Dr. Penelope Kegel-Flom of the University of California School of Optometry has recently completed a report on Rural Optometry which was supported by a Health Professions Special Project Grant. In this report, sent to all schools and colleges of optometry, Dr. Kegel-Flom provides a positive approach to a developing problem in optometry, namely, the tendency for fewer and fewer graduates to locate in rural and inner city areas. Optometry is in danger of losing to other health professions the advantage it has long held in regard to the appropriate geographical distribution of its members.

> "The major goal of the research was to develop the means to identify, at pre-admission, those persons most likely to enter rural optometric practice upon completion of training. Optometry schools could then use this information as they wished in selecting students most likely to practice in areas of greatest need. Students could, in turn, be encouraged to consider practice in areas most likely to satisfy their needs."

A complete description of rural/urban differences, in personality and practice mode is offered in a reprint included in the report. A second reprint presents a method for the prediction of future practice location among students. The findings suggest that optometry students "most likely to enter rural—or/and—urban practice can be objectively identified early in and even prior to training." Thus, the content of this report is timely for persons involved in selecting students to meet optometry's manpower distribution needs and for students seeking information about their future practice location. Opportunities for practice in rural and small town locations are excellent; both educators and students will discover here the kinds of persons who are most likely to enter and be satisfied in such practice.

Faculty who teach Optometry Orientation courses as well as those who teach Practice Management will also be interested in the project's film, *Rural Optometry*, which may be obtained by writing to: Bob Tarr, School of Optometry, Multi-Media Center, University of California, Berkeley, California 94720.

Primary Care

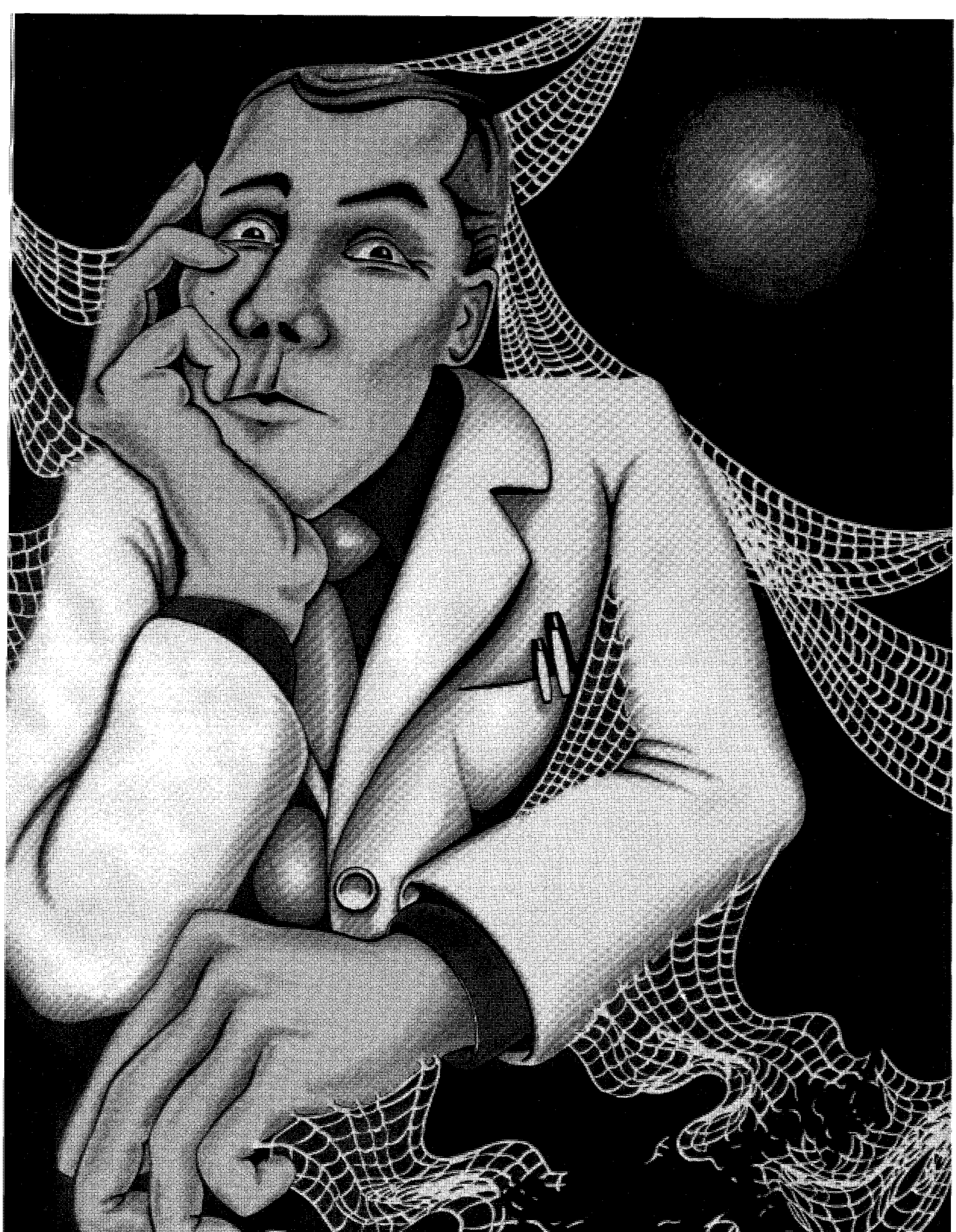
Have you had trouble with the term "primary care?" With the concepts of secondary and tertiary care optometry in its compilation of *Reference Materials On Primary Care Optometry* of September, 1977, the American Optometric Association provides eight definitions of primary care and concludes the section with a statement as to what optometry is and what optometric practice is. This compilation includes many of the articles which have been published in optometric journals concerning optometry as a primary health care profession. The section on "Optometry: The Profession's Role in Primary Health Care," by the AOA Optometric Care Committee, will be of particular interest to those who would like to know the role of optometry as a primary, secondary and tertiary health care profession.

If you have wondered about eye care in prepaid group practice or about optometric care in third party programs or optometry and primary care in federal programs, you may find some of the answers in this interesting publication. You should be able to find this compilation in your college library. It composes a useful and efficient reference source for students and for those who want a quick introduction to the problems of optometry as a primary health care profession.

Programmed Text on Optometric and Medical Terminology

A programmed text can be fun and this one detinitely fits that category. Dr. Wallace M. Handeland and Dr. John E. Staroba II, have put together a self-paced study aid for acquiring the basis of a professional optometric and medical vocabulary in a manner that is both stimulating and interesting. First we must communicate and, in order to communicate at the level of the classroom, laboratory and clinic, words are required. It has been said that one of the best ways to learn any material is to make sure one has a thorough understanding of the terminology of the subject. Although optometry draws from many disciplines—biology, chemistry, physics, psychology and others—there is fair commonalty of all of these in the use of Latin and Greek roots. As the authors of this text point out, of the over 100,000 words in basic optometric and medical terminologies, about three-quarters of the words (and one-half of the commonly used words in English) are composed of Latin and Greek roots. Thus, by knowing some 600 common roots and how they are put together to make compound words, the student "can deduce the meaning of many thousands of long, involved words."

"This book has been designed to enable the student to recognize, analyze, understand, and effectively use the technical language of textbooks, professional journals and optometric courses." Since the book is self-paced, it is an excellent supplement for the beginning student in optometry. A summer spent with this book prior to entering Optometry I should pay tremendous dividends. This book was published in 1976 by the Multi-Media Center, School of Optometry, University of California, Berkeley, California 94720, and is available through the center.



Continuing Education and the Role of the Optometrist

By M.J. Samek and M.E. Woodruff

The Association of Schools and Colleges of Optometry approached the task of defining the role of the optometrist in light of the optometrist as a vision care practitioner and as a health care practitioner and manager.[1] The intent was to create a more rational basis for the development of optometric curricula. Within this context they stated that the role of the optometrist is:

"A. To detect, diagnose, and treat problems of the visual system.

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

"C. To evaluate the involvement of vision in behavior.

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

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

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

This definition of the role of the optometrist has only considered those aspects of the role related to services provided by the optometric professional. The intrinsic contribution that the health professional can and should make has been overlooked.

The following addition to the role of the optometrist is proposed:

> To maintain or enhance his/her capabilities* on a continuing basis in relation to the provision of (vision) health care.

Practitioners and students must be impressed with the fact that lifelong learning is an essential component of health care delivery.[3,4,5] They must realize that a continuum of education exists extending from undergraduate and graduate to continuing education. They must also realize that education and learning are not synonymous. Various avenues exist for an individual to actively engage in learning without being confined to an educational environment.[6] Self-directed learning is an important avenue for health care practitioners to effectively cope with change.

The introduction of this additional element to the role of the optometrist requires that we examine our roles as educators. How have we affected acceptance and how can we aid in the promotion of lifelong learning?

Havighurst[7] reported that 43 percent of optometry students surveyed responded that at least some of the faculty were not interested or did not know how to teach. Even within the limitations of the study we cannot dismiss the results. The need for improved quality of optometric continuing education programs has also been vigorously voiced.[8,9,10,11,12,13]

Dorothy Canfield Fisher, in her book *Learn or Perish* (1930), noted that educators were the poorest consumers of their own product. Education since 1930 has changed markedly. How many of us have taken it upon ourselves to upgrade our capabilities with respect to our roles as educators or facilitators of learning? Janoff[14] highlights this ever increasing need for optometric faculty to become better educators. As noted by the World Health Organization,[15] "Competence as a practitioner or researcher is no longer an acceptable guarantee of skills as a teacher." The need to improve our own lot so that we can foster the need to learn must be a major facet of our endeavors. Bruner[16] aptly stated, "The teacher is not only a communicator but a model."

To paraphrase a section of medical school philosophy:[17] if optometrists are to be lifelong learners, able to assess changing health care needs, keep up with changing concepts and new knowledge, and adapt their own performance accordingly, the skills to do this should be defined and developed during the formative years of training. Issues in preparatory and continuing education that promote lifelong learning are varied and copious.

At the preparatory level we could consider curricular changes as one means of promoting the addition to the role. These curricular changes could

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*Capabilities are those learned human performances which include verbal information, intellectual skills, cognitive strategies, attitudes and motor skills.[2]

include greater use of learning modules and more flexibility in the curriculum.

It has been a well established fact that individuals learn at different rates and in different ways. "The learner is a single personality with his own unique mental and emotional sets. He possesses his own repertoire of previous experience and academic preparation. And he has certain variabilities in rate, comprehension, and retention of what he learns."[18] Changes in time requirements or depth and range of subjects or mode of delivery of instruction can be introduced to accommodate this individuality.

Miller[19] in addressing the issue of changes in medical school curricula indicated some of the obstacles encountered: ". . . but the principles underlying such change seem still to reflect faculty preoccupation, first, with instructional time and sequence despite clear evidence that the individual's learning style and pace is so variable that neither time nor instructional format can be standardized; and second, with subject matter coverage, despite persuasive evidence that the most important task we face is helping students learn how to deal independently with the body of new information that will continue to grow throughout their professional lifetimes." Optometry cannot afford to be subsumed in this same turmoil.

Continuing education, at the practitioner level, can be enhanced by instructors being more attuned to adult learning and the instruction of adults.[20,21] Improvement in the design and management of instruction is of great importance. Educators must be cognizant not only of learning theories, principles and processes, but of instructional design, learning outcomes, techniques of instruction, and process of evaluation.[22,2] Educators must also be aware that adults come to continuing education programs with a wealth of experience, an orientation towards learning relevant and applicable material, and thus with a greater readiness to learn.[20,21] The essence is needs identification with specific programs to fill the needs. The integration of all these factors in the instruction of adults can only promote more effective and efficient learning,[22] and thereby eliminate barriers to continuing education such as:

1. The image from preparatory education that education is passive reception of information from experts.

2. The image of continuing education as formal programs that are overwhelmingly specialized, concerned with unusual developments, organized within subject matter fields, and unresponsive to the ways in which adults learn most effectively.[3]

Dryer[23] stated, "The purpose of continuing education for health professionals is the improvement of patient care and health maintenance and the enrichment of health careers." The use of continuing education to stave off professional obsolescence, thus to maintain or enhance competence, appears paramount.[24,5,25] Since the interface between health care and competency continues to change at an increasing rate, it is necessary that continuing education become an essential ingredient within preparatory education and professional practice.[27] "When faced by a health problem requiring solution, it matters little what a health professional was taught—only what he learned is important."[15]

Inclusion of the ongoing need for learning in the role of the optometrist gives prominence to the inherent value of lifelong learning within the health care delivery system and within optometric educational philosophy. It lends focus for optometric educators. ●

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Monitoring the Quality of Care in an Optometric Clinic

By D. Leonard Werner

This paper invites a dialogue among clinical administrators to exchange ideas on the maintenance of the quality of patient care and clinical teaching effectiveness. The author describes the program at the University Optometric Center, the clinical facility of the State College of Optometry, State University of New York.

Introduction

The dual objectives of an optometric teaching clinic are to provide both excellence in patient care and the ultimate educational environment for students. These roles are obviously integrated because the learning relates to the provision of care. A secondary objective is the training and upgrading of clinical faculty to aid in the primary role.

This paper describes how one teaching clinic, the University Optometric Center of the State University of New York, evaluates its staff, its care and itself. It is hoped that this discussion will add to the dialogue among clinical administrators which may result in elevating the state of the art.

The Optometric Center of New York originally developed as an outgrowth of the clinics of the Columbia University School of Optometry. After Columbia terminated its optometry program, some of its faculty wished to provide continued clinical care to persons in the New York Metropolitan area. From this beginning the Optometric Center has grown to a level of 70,000 patient visits each year and has more than 100 full and part-time professional staff including optometrists, ophthalmologists, opticians, social workers, and psychologists. In 1971 the New York State Legislature voted to begin a College of Optometry as part of the State University of New York and chose the Optometric Center as its teaching clinic. The University Optometric Center is currently providing eye care within its main clinics on 24th Street in New York City, several satellite clinics in various sections of the city, thirty-seven nursing homes, as well as numerous extramural programs.

Health care educators have long been frustrated in attempting to monitor the quality of care rendered and, with it, the related clinical and didactic experience. With the ever expanding volume of technical professional knowledge escalating educational costs, the erosion of public confidence in health professionals, and soaring health care expenses, there is a pressing need to effectively evaluate the students and clinical faculty performance. Institutionally, there are additional pressures to evaluate the end product of the educational process in order to provide feedback for curriculum design, faculty growth and development, and admissions criteria.

One of the authorities in the field of the evaluation of health care is Donabedian. He has stated that there are three basic criteria to be used in this type of study—process, outcome, and structure.[1] If we use these criteria, we must investigate how care is provided to the patient, the success of this care, and the physical and administrative setting which provides this care. Thus, using Donabedian's criteria, evaluation of care should include:

1. Process of care studies.
2. Outcome studies.
3. Studying the setting in which care takes place.

1. Evaluation of Care—Process of Care Investigation

Classically there have been many forms of monitoring the level of care in institutions. Approaches have been designed ranging from tissue and infection committees to record and audit groups and utilization review committees.[2] Some clinical care institutions have used patients to evaluate care by elaborate interview techniques, while others have preferred peer review, understanding that one's peers are potentially best able to judge a professional.[3,4]

The development of a review system to be used while training optometric students is certainly not new. All optometry school clinics have evolved a system of direct clinical supervision similar to those that we have used through the years in our clinics. This procedure allows clinical supervisors to work with students, recheck their findings and discuss decisions. This program intertwines with lectures and seminars so that the student understands what he is doing and why. Our clinical seminars have been programmed to directly follow the patient schedule so that the day's patients can serve as an object lesson in patient care. This observation may take place in the form of having the clinical faculty member within the examination room during the examination, watching via closed circuit television, or observing through special windows. Clearly, each of these methods has advantages and disadvantages for patient care as well as teaching.

The success of this program is de-

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pendent upon the availability and caliber of the clinical faculty. Our student/faculty ratio of 3:1 has allowed for a very close interaction, and the experienced, well-respected faculty provide an excellent learning experience. This ratio varies with the specific teaching situation, being 4:1 when students practice on each other, 2:1 when students first examine and treat "real" patients, and 3:1 after they have more experience.

The more formalized program of peer review has many stages. Record cards are reviewed daily. If the administrator has any questions, criticism, or suggestions, a form is filled out and returned to the responsible practitioner (see Figure 1). The staff member must respond, usually in person, by a prearranged date. The purpose of this record review is to observe whether all necessary procedures were performed and whether the reviewer agrees with the consistency of findings and the logic of the disposition. There is no attempt to foster one philosophy of thought, but rather we insist that the student and/or clinical faculty member be able to intellectually justify decisions. The review is usually performed by the administrators of the specific clinical area; thus, an administrator in the Contact Lens Clinic reviews the contact lens records, etc. All of the clinics have administrators who have time programmed into their schedule for this role. These are usually full-time persons, so no specific teaching time credit is involved. When part-time faculty perform these administrative roles, the time is calculated into their contracts using the same ratios as for clinical teaching time.

Figure 1

RECORD REVIEW

DOCTOR: ______________________

PATIENT: ______________________ Date: ______________________

History: Good
Poor ______________________

Externals and Ophthalmoscopy Good
Poor ______________________

Examination Good ______________________

Disposition and Diagnosis Good
Poor ______________________

Other Comments Good
Poor ______________________

Doctor's Response ______________________

Response Due By ______________________

____
Signature

We have found full faculty cooperation with this review because of our clinical faculty evaluation system. We recognize that clinical faculty can't be properly evaluated for promotion or retention based upon the same standards as other faculty—namely classroom effectiveness, research, and publication. They were appointed for clinical faculty roles because of their effectiveness in clinic teaching and in patient care situations. Among those evaluating the performance are the same persons performing the record reviews.

We also believe that peer review is no longer a debatable issue and that the academic freedom arguments of the past no longer apply. Various levels of review are an ever increasing fact of life in the health professions.

The utilization of an on-site review of the health care practitioner in our clinics has received much impetus with the New York City Medicaid Program. This on-site review, as well as the patient audit instituted by the New York City Department of Health, has brought non-staff optometrists into the review procedure. The patients of the University Optometric Center are thus subjected to the same evaluative procedures as patients in the private sector. This twofold Medicaid-induced procedure is both a record review and a re-examination of patients. An important concept relative to this is the realization on the part of the practitioner that society has the right and obligation to question the quality of care rendered. Undoubtedly, parties representing government, insurance carriers and others will be visiting with increased frequency to all types of sites where care is being given.[5,6,7,8,9]

2. Evaluation of Care—Outcome Investigation

Donabedian feels that outcome investigation is a less successful procedure than quality of care assessment. Philosophically, the difficulty lies in definitely linking the input of the clinical intervention with the final clinical picture. We have employed several techniques in order to evaluate the care as perceived by the patient. In addition to an informal periodic questioning of patients, we have used written questionnaires (see Figure 2). With this approach, we try to learn whether there is courteous care plus good communication. An extension of this has been a lengthy interview of a group of patients by graduate students in our Social Services Department from the School of

Figure 2

QUESTIONNAIRE
(TO BE ANSWERED AFTER EXAMINATION)

1. The Person Who Escorted Me To The Waiting Area Was:
   Very Friendly
   Friendly
   Indifferent
   Not Friendly
   Rude

2. Were You Taken On Time For Your Appointment?
   Yes
   No

   If Not, How Long Did You Have To Wait? ________ Minutes

2a. Did The Doctor Introduce Himself When He Met You? Yes No

3. Did The Doctor Completely Explain The Condition Of Your Eyes To You?
   Yes
   No

   In Your Own Words, Please Describe How Your Eyes Are.

4. Were Glasses Prescribed? Yes No

   If So When Are You Supposed To Wear Them?
   All The Time — Reading Only
   Reading and Television — Driving
   Work — Whenever I Feel I Need Them
   Other Specify ________

5. Is Additional Testing Necessary? Yes No

   If So. a) What Other Testing Is To Be Done?

   b) Why Is This Additional Testing Necessary?
   (If You Don't Know, Please Indicate)

6. The Doctor Who Examined Me Was: (May Check More Than One)
   Friendly
   Not Friendly
   Interested In Me As A Patient
   Not Apparently Concerned With Me As A Patient
   Professional and Thorough
   Not Professional
   Other (Explain) ________

7. The Care I Received Today Was:
   Excellent
   Good
   Poor

8. My Doctor's Name Is ________

9. Comments: ________

Figure 3

COMPLAINT CASE EVALUATION AND DISPOSITION

Date: ________

Patient's Name: ________

Patient's Complaints: (Include areas of patient's satisfaction as well as dissatisfaction. Use patient's own words if possible).

Unsatisfactory Rx (if applicable):

Distance	O.D.		V.A.
	O.S.		V.A.
Near	O.D.		V.A.
	O.S.		V.A.

Prescribed by: ________
Date Prescribed: ________

New Disposition and Comments:

Doctor ________

Please give to Dr. Werner after completing above.

Social Work of New York University, who are part of our cooperative program with that school.[10] The feedback from these interviews plus the written report from Social Services allows for an additional monitoring of patient satisfaction.

Some of the best lessons one can learn in patient care comes from the grief patient. We have been monitoring patient "complaints" in order to identify procedural as well as individual weaknesses (see Figure 3). A copy of this completed form is sent to the "offending" student and clinical instructor whenever it is felt that it would be a learning process. We often do not reschedule the patient with the original clinician, but rather a selected experienced faculty member so that we can use this as another means to evaluate students and faculty.

The techniques mentioned above are largely patient care oriented. Obviously, we must use additional methods to evaluate clinical faculty. One of these is the student evaluation form. We are currently experimenting with two—one clearly more detailed than the other (see Figures 4 and 5). The results of these evaluations reflect in the retention and advancement of clinical faculty. The well-motivated, patient-oriented faculty member goes a long way in the effective education of the student. Students react best to example; faculty evaluation and upgrading relates directly to all of the levels of care offered within the institution.

3. Evaluation of Care—Study the Setting in Which Care Is Rendered

A first step in quality care is to attempt to set the behavioral goals and objectives which will help to define the aims in this area. This is then integrated with the Patient's Bill of Rights to identify the desired results from both the institution and the patient's frame of reference.

Perhaps the most important area in the quality of patient care is under this heading of "structure." Rhee[11] reported that "the organization of the setting in which care is provided has more influence than the education and training that physicians attained." Whether this is the most important factor or not, it is unquestionably essential. A very careful selection process for the professional and support staff who then function within a well designed, newly equipped clinical facility is a major step in quality care. The desirability of an appointment to the college clinic results in a large potential staff pool. The Professional Staff Committee must review many prospective candidates before making its selections. Those chosen become effective role models for our students.

There is a continuous ongoing self evaluation of the institution by the various clinical administrators. The results of these are discussed at weekly administrator meetings. The agenda items of these meetings may be a number of general items or may focus entirely on

Figure 4

CLINICAL OPTOMETRIC SCIENCES DEPARTMENT

Dr. D. Leonard Werner, Chairman

CLINICAL FACULTY EVALUATION

Date: ____________

Name of Faculty Member: ____________

Instructions: Complete form for as many faculty members as you can. This form need not be signed. Use numerical rating or "N/A" if you feel that you can't respond with confidence.

Numerical ratings:

1 .... poor
2 .... adequate
3 .... good
4 .... excellent

1. Attitude towards patient ____________
2. Availability to student ____________
3. Attitude towards student ____________
4. Knowledge ____________
5. Ability to impart knowledge ____________
6. How does this faculty member compare to other clinical faculty? ____________
7. Comments: ____________

Figure 5

CLINIC FACULTY EVALUATION

Vision Training Department

Evaluation of Dr.

Date ____________ Class of ____________

Instructions

You are going to evaluate each clinic instructor with whom you've had significant contact by indicating your agreement or disagreement with the following statements. The following criteria should be used:

1. You strongly disagree with the statement
2. You moderately disagree with the statement
3. You feel neutral about the statement — have no opinion
4. You moderately agree with the statement
5. You strongly agree with the statement

NA Have not had enough exposure to evaluate this item

NOTE: IN ALL CASES HIGHER NUMBERS REFLECT A BETTER RATING

____A. The instructor has a thorough command of clinical optometry and/or his area of specialty.

____B. He can relate his command of clinical optometry to firm theoretical optometric principles when reviewing the findings on your patients rather than relying solely on his past personal experience.

____C. When you work with this instructor, he explains the rationale involved in handling cases of this type so that you know what to consider the next time a similar case confronts you.

____D. He reviews each case thoroughly, and tells the student the reasons behind his recommendations for the case.

____E. He makes the students feel free to ask questions, express ideas, disagree with his recommendatinn, and encourages the development of new ideas and viewpoints.

____F. He appears to be interested in the welfare and quality of care administered to the patient.

____G. He does not carry on personal conversations, etc., while the intern waits for assistance with his patient.

____H. He appears sincerely interested in teaching students and in practicing clinical optometry.

____I. He is enthusiastic about optometry and transfers this feeling to the student.

____J. He exhibits professional dignity in the clinic; i.e., sets a good example for prnfessional behavior and patient handling.

____K. He appears interested in the student as a person.

____L. He is fair and impartial in his dealings with the student.

____M. I find it easy to get along with this instructor.

____N. I have learned much about optometry from this instructor.

____O. Considering everything, I would rate this instructor:
(1) Very Bad (2) Poor (3) Average (4) Gond (5) Excellent

General Comments:

one department or area of concern. Periodic accreditation team visits also provide an external check over our internal standards.

The evaluation process is also enhanced by the utilization of a Professional Advisory Board. This board consists of a group of well-respected practitioners who bring a private practice orientation into institutional care. The Professional Advisory Board visits the institution periodically for a several day stay observing and reviewing all phases of care. Their written report is carefully reviewed by appropriate administrative persons.

The evaluation procedures, as mentioned above, represent a constant ongoing approach to maintain the highest level of patient care possible. These procedures are, in turn, evaluated and revised periodically. The dollar cost of this is quite high, as one might guess. We have roughly estimated the institutional cost of this evaluation system at more than $25,000 per year, although many of these procedures also intertwine with other evaluations and administrative details. As mentioned earlier, the same record review that works toward upgrading care also evaluates clinical faculty performance.

In spite of the apparent cost, poor care and poor clinical teaching is far more costly. Thus, we have no alternative. ●

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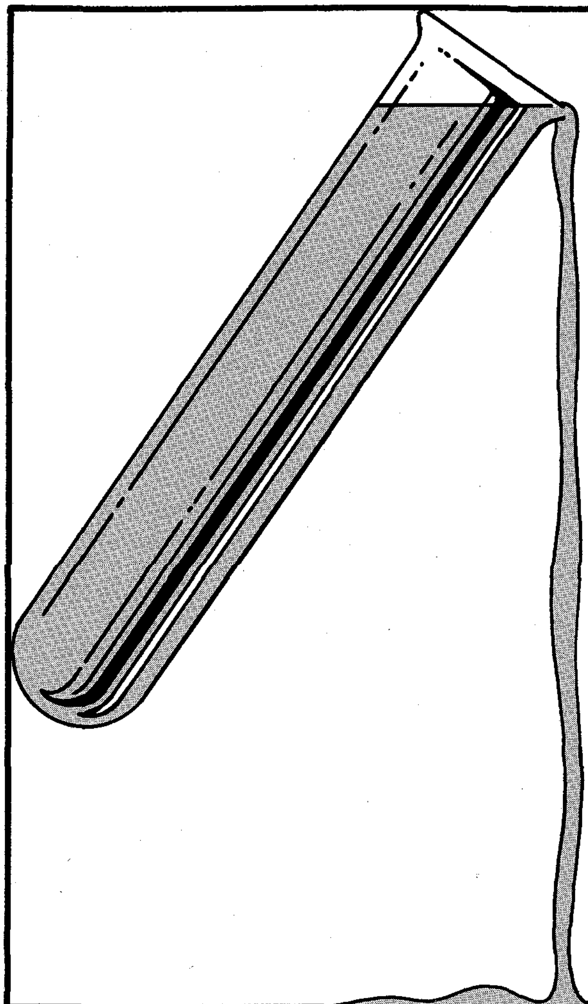

Biochemistry in the Optometry Curriculum

By Charles F. Howard, Jr.

Biochemistry can contribute measurably to the optometric curriculum by:

1. Educating students in the biochemical bases of the living human being, with specific emphasis on ocular biochemistry; and

2. Providing each student with a bio-chemical foundation by which to grasp other biological subjects in the optometric curriculum.

Both goals *are important*—students must understand human biochemistry, especially of vision at the molecular level, and in addition be prepared for future comprehension of biological topics. Physiology, anatomy, and pathology all utilize biochemical information, and there is particular applicability of biochemistry to understanding pharmacological actions at the molecular and physiological levels. Biochemistry thus provides a means for fully understanding all biological topics rather than just superficially memorizing these subjects. Optometrists who graduate with an adequate, integrated biological background will have increased understanding of the biological bases of vision, a background commensurate with other health care professionals, and the technical knowledge to allow comprehension and updating of biological advances necessary to sustain patient care. My purpose here is to comment on the ways in which biochemistry enhances optometric education and provides the modern practicing optometrist with a deeper understanding of the biological sciences.

The essence of biochemistry lies in understanding life at the most fundamental molecular level. Titles may vary from "physiological chemistry" to "molecular biology," but the discipline of biochemistry encompasses the variety of biological, chemical, and physical approaches utilized to understand living organisms. When the disciplines are applied to optometry, the biological approach should predominate, and chemical and physical molecular interactions should serve to enhance understanding of physiological chemistry. Here, the term "biochemistry" includes all aspects necessary for educational purposes.

My evolving philosophy for teaching biochemistry to optometric students can be simplistically summed up in the diagram:

$$\begin{tikzcd} \text{FUNCTION} \arrow[rr, shift left] \arrow[dr, Leftrightarrow] & & \text{STRUCTURE} \arrow[ll, shift left] \arrow[dl, Leftrightarrow] \\ & \text{VISION} & \end{tikzcd}$$

These word* interrelationships provide an organizational basis for presenting biochemistry that both relects my

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*Within this article the words "structure" and "function" serve biochemically didactic purposes and only peripherally relate to schools of thought within the optometric profession. Similarly "vision" is used in preference to "sight": much of ocular biochemistry does indeed deal with the mechanics of sight, but the applicability of biochemistry to other biological disciplines within optometry justifies the use of the word vision.

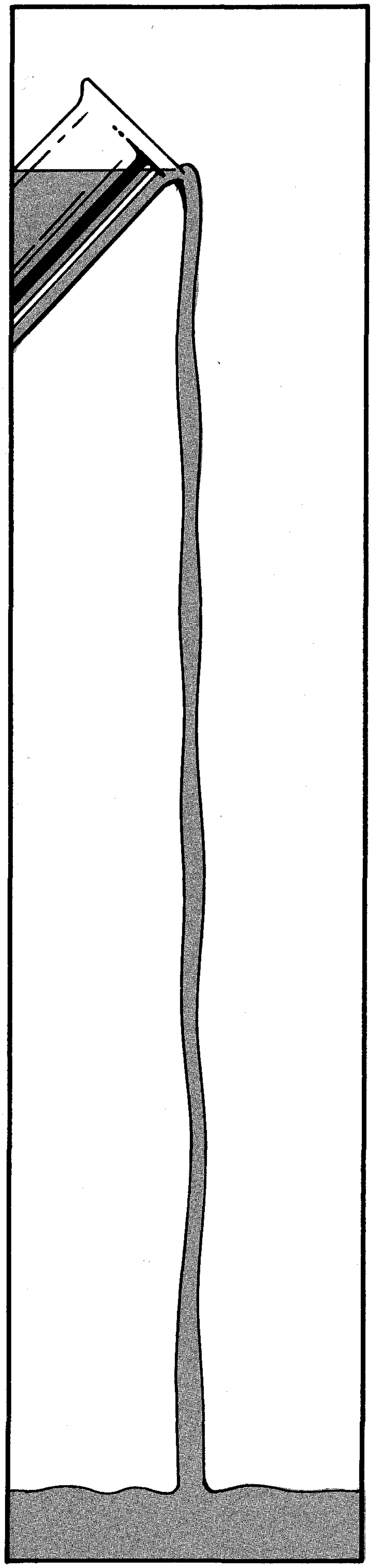
comprehension of biochemical organization and also allows entree into specific ocular biochemistry. Consider first structure$\rightleftharpoons$function as applied specifically to esoteric biochemistry. Structure and function are intimately interrelated, and comprehension of one is improbable without the other. As examples, consider:

Enzymes—An enzyme is a *protein* with a specific sequence of amino acids that conform to a *spatial configuration*. Within this large molecule is a smaller *active site* with varying specificity that causes a simple *organic reaction* by changing the electronic and spatial milieu of a *metabolite*. Changes in enzyme rate or specificity may be effected by structural changes in the protein, either by binding of a metabolite to an *allosteric site* to change the spatial configuration or by altering association$\rightleftharpoons$dissociation of the monomeric units which comprise the enzyme.

or:

Membranes—Cell membranes contain layers of *lipids* (fat, cholesterol, and phospholipid) in which are embedded *integral proteins* or to which *peripheral proteins* are attached. Some of the proteins have *carbohydrate* chains and confer antigenicity, useful in cell recognition or in allergic responses; other proteins are *enzymes* that selectively control passage of metabolites into and out of the cell; and still others serve as *membrane receptors* for hormone action.

Among numerous other examples of biochemical structure$\rightleftharpoons$function interrelationships which could be cited are the structure of the genetic material DNA as it serves as a functional template for controlling biosynthesis of protein, or the structurally organized cellular organelles, the mitochondria, which function in energy production.



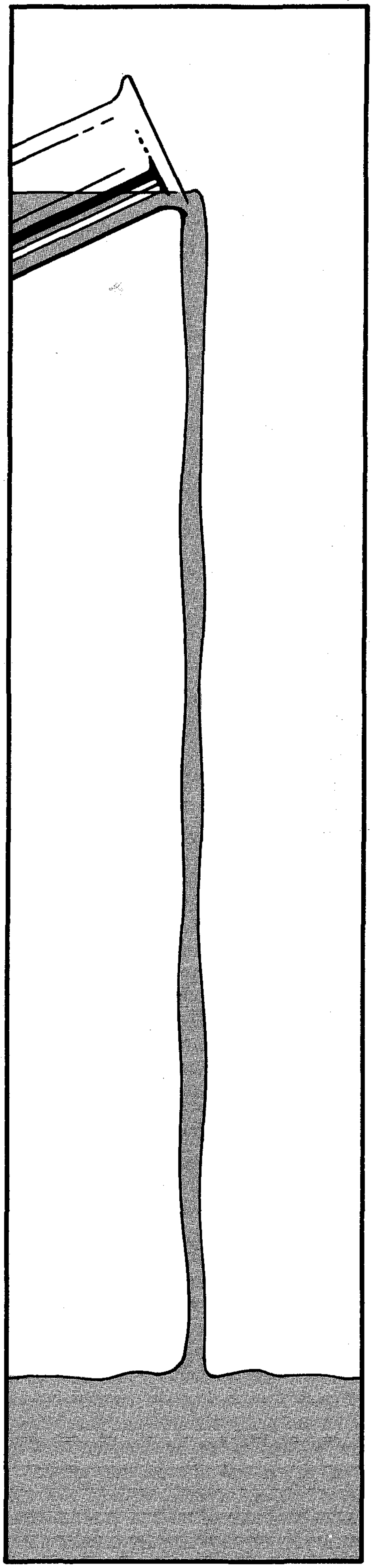
Historical Integration in Biochemistry

A similar approach of structure$\rightleftharpoons$functions of the eye arose (a) by application of extant information on biochemical structures and functions gained from other living organisms or mammalian organs to the eye, and (b) by utilization of biochemical techniques directly to those structures and functions unique to the eye.

Before proceeding to specific ocular biochemistry, let me expand on the last two points. The discipline of biochemistry arose from both physiology and organic chemistry. Over the decades, increasing awareness of their interrelationships established that organic chemical reactions, as effected by enzymes, could cause definable physiological responses; conversely, changes in the physiological status could effect alterations in molecular mechanisms. An example of the former is beriberi; lack of the vitamin thiamine, required as a structural cofactor with certain enzymes, prevents functioning of those enzymes and results in the observable physiological dysfunction of the deficiency disease beriberi. A classic example of physiologically effected changes is *pate de foie gras;* geese force-fed corn convert the excessive starch to liver fat and this is then further worked into the delicacy of a liver paste. Even as the vitalistic vs. mechanistic theories were being resolved, there was recognition of a commonality of biochemical reactions among all living organisms.

Much of our current understanding of mammalian biochemistry is founded on knowledge obtained from microorganisms, especially *Escherichia coli* and various viruses. It has usually been easier to isolate and characterize enzyme structures from procaryotic organisms than from the more complex eucaryotic organisms. Functions are quite similar between the organisms; although structures differ somewhat, they are surprisingly similar, when one considers the evolutionary distances involved. For example, the multifunctional enzyme that synthesizes fatty acids in microorganisms can be isolated and readily fractionated into subunits, each of which is an enzyme effecting one step of the complex synthetic process. In mammalian organisms, the same sequence of reactions occurs (function is identical), but the multifunctional enzyme is tightly bonded and is subfractionated only with difficulty (structure varies). Another major source of biochemical knowledge is the rat liver, which has served as a mother lode to biochemists seeking information on mammalian metabolism. Information from these sources has then been applied to other tissues and organisms.

All of the preceding emphasizes that information from one organism or tissue can serve as a guide to biochemical reactions in another organism or tissue—up to a point. Then the organism or tissue must be studied in its own right. Thus, certain structures and functions within the eye can be understood on the basis of information available from procaryotic and mammalian tissues. Beyond that, the variety of biochemical technical approaches must be applied specifically to establish the quantitative and qualitative characteristics of each tissue and component part of the eye. Knowledge about structures $\rightleftharpoons$ functions gained from other tissues and organisms has been applied to the understanding of vision; beyond that investigators have used, adapted, or developed the necessary biochemical techniques to understand the specific biochemical structures and functions unique to the ocular system.



Visual Biochemistry

Most biochemical reactions occur in the eye as they do elsewhere. There are interesting distribution patterns of biochemical reactions according to anatomical cell and tissue types, and functions throughout the eye. Most of these reactions differ only quantitatively from those in other tissues; qualitatively, structures, functions, and their controls are similar to those in other mammalian and nonmammalian tissues. The unique ways in which the eyes differ from other mammalian tissues is in photochemistry; yet even selected aspects of photochemistry have been studied in light sensitive microorganisms such as *Rhodospirillum rubrum*.

Thus visual biochemistry shares a commonality in structure and function with biochemistry in numerous other living tissues and organisms. Yet, because vision is so important to human beings, it deserves detailed understanding. Knowledge of the specificities of ocular biochemistry have lagged behind characterization of other tissues, mainly because of difficulties of tissue disruption for biochemical studies. The eye is noted for its structural complexities and for the methodological difficulties encountered in attempting to study it. Interest in and studies on a variety of aspects of ocular biochemistry are increasing. Besides Wald's classic work on the visual cycle, the literature is enriched with the works of Davson, Kinoshita, Pirie, Van Heiynigen, Spector, and many more. These investigators have applied extant biochemical knowledge to understanding visual metabolism and have utilized existing methodology or developed new techniques to examine quantitatively and qualitatively the biochemical reactions which, when combined, make the eye a unique tissue.

Biochemistry in the Optometric Curriculum

A biochemistry course designed for optometry students must provide sufficient information to meet the two goals set forth earlier; i.e., there is the need both (1) to grasp the complexities of the human organisms and its visual system, as well as (2) to build a foundation for understanding material presented in the biological courses of anatomy, physiology, pathology, and pharmacology.

The organizational approach I find useful is based on the ideas stated above and embodied in the previous diagram —structure and function are interrelated biochemical concepts, and they can be expanded to encompass the fundamentals of vision. Sequentially in the course, the biochemical background must first be introduced before biochemical aspects related to eye vision can be understood. Biochemical information obtained from all organismal and tissue sources can be utilized in the establishment of a didactic foundation. The intricacies of vision are built upon this biochemical foundation and related specifically to structure and function in the eye.

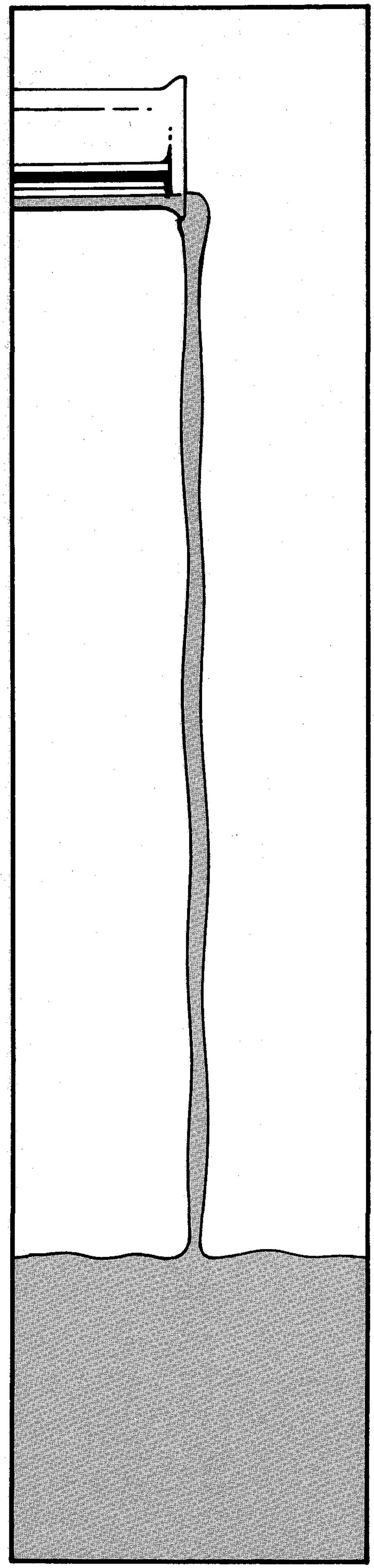
The following outlines the eye biochemistry that is interspersed within the general biochemistry course:

Ocular Structure of cornea, sclera, lens, and vitreous humor—Emphasis is on relating molecular structure to visual transparency. After amino acid and protein structure and function are developed, collagen synthesis is considered in detail and variations in collagen fibril size and periodicity is emphasized as it creates transparency in the cornea but translucency in the sclera. Lens proteins, both soluble crystallins and the insoluble high molecular weight and cell membrane proteins, are considered in light of previous discussions of protein structures and functions. Development of carbohydrate structural chemistry provides a basis for understanding structures and roles of the various glycosaminoglycans in the cornea and sclera. Structure and transparency of the vitreous humor are related to the extensively hydrated hyaluronic acid within the variously sized and spaced fibrils of the collagen network.

The proteins section on ocular structures is the first opportunity students have to begin grasping the relevancy of biochemistry to their optometric studies and this is soon followed by the structural carbohydrates of the eye. Interest is often enhanced from this point on. Parenthetically, it provides students with an opportunity to consider a teleological rationale for molecular structure and visual function.

Ocular Metabolism—The biochemical reactions and enzymes of carbohydrate and amino acid metabolism common to the human organism are next presented. Beyond general comprehension of human metabolism, they are specifically applied to the tears, corneal layers, lens, and retina. The active role of tears and corneal epithelium as barriers to the external environment are explored. Further emphasis is on oxygen availability and utilization in various loci of the different tissues, and upon the rather unique metabolic interrelationships between carbohydrates and amino acids found in certain parts of the eye. It is necessary to understand the aerobic and anaerobic conditions at different anatomical sites within the eye in order to grasp the energy potentialities of tissues and their ultimate metabolic functions. Thus maintenance of corneal health and transparency is directly influenced by oxygen availability, observations important to intelligent understanding of contact lenses in optometric practice. Biochemical maintenance of optimal hydration of corneal and lens tissues to attain transparency is related to ocular metabolism and the controls of energy and active transport. Retinal metabolism is covered only briefly; detailed consideration is futile since there is little definitive information available on the metabolic characteristics and relative importance of specific cell types within the layers of the retina.

Visual Cycle—Full comprehension of the visual cycle requires a detailed knowledge of the fundamentals of biochemistry and so comes late in the course. Understanding of structures and of the metabolism required for synthesis and turnover of rods and cones is based on previous units on protein structures, enzymes, lipid structures and metabolism, and membrane synthesis. I begin with the structures of rods and cones at the molecular level, proceed to the biosynthetic mechanisms whereby the membranes are constructed, opsin is synthesized and inserted into the membrane, and retinal is bonded. Vitamin A intake, transport, and conversion to retinal (retinylidene) are traced with emphasis on the structure$\rightleftharpoons$function interrelationships of the protein-lipid rhodopsin within the milieu of the uniquely characteristic lipid fluid membrane. Finally, the detailed biochemical reactions of the visual cycle that occur once light impinges upon rhodopsin are studied, and current hypotheses for initiation and transmission of electrical membrane potential are presented.



Synthesis of Eye Tissues—After the unit on informational transfer DNA-RNA-protein synthesis, synthetic reactions of two specific ocular tissues are examined. Epithelial replication in the cornea and in the lens are considered with emphasis both on the underlying biochemistry and on the rationale for considering protein synthesis in these two tissues. Corneal epithelia, because of its location as an interface between the eye and the environment, must perforce have rapid biosynthetic capabilities for continued cellular replacement. Replication of cells in the lens is unique as an epithelial cell differentiates to a fiber cell. Biochemically there is initial synthesis of the necessary crystallin proteins; simplification of the cell occurs by loss of organelles and there is eventually just a cell membrane containing a hydrated, transparent protein.

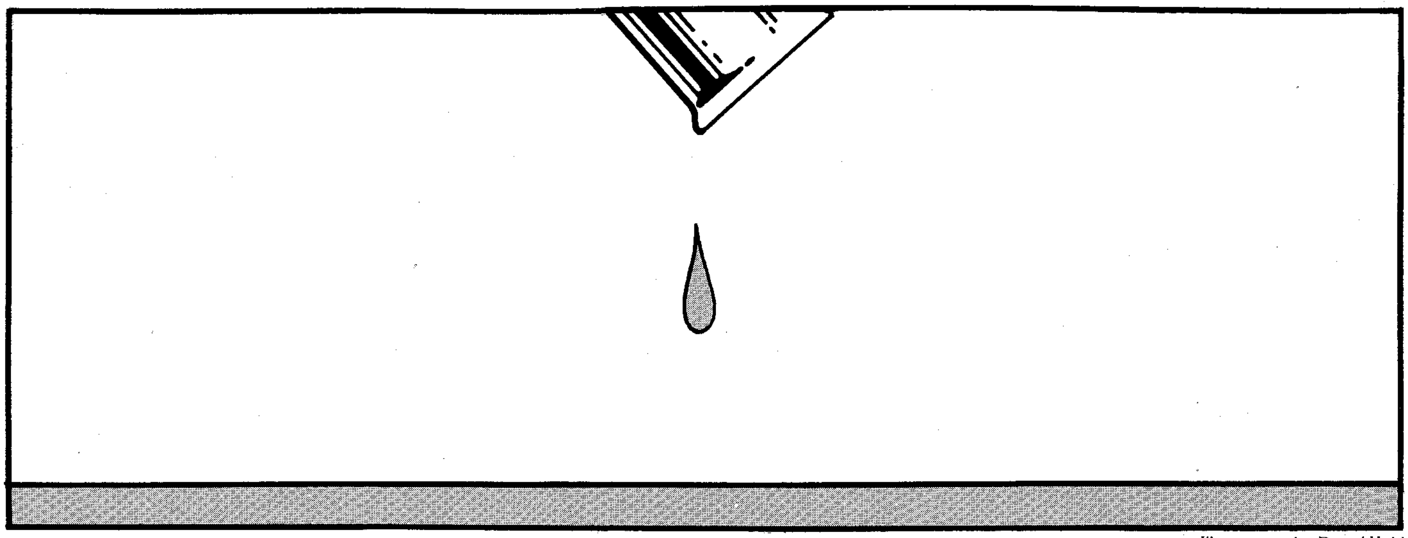
Miscellaneous—The didactic sequence follows a format commonly used in presenting a general biochemistry course. There are two differences: whereever possible, illustrative examples of biochemical information use the eye; and biochemistry pertaining to vision is considered in detail. This format with interspersed ocular biochemistry also serves to retain or enhance some of the students' interest in a course that initially appears to them to be largely irrelevant.

The second major goal proposed for biochemistry is to prepare students for the other biological courses in the optometric curriculum. Although a detailed consideration is beyond the scope of this article, a few examples will serve to document this second goal:

Anatomy—Biochemistry can provide students with a deepér understanding of histological structures of the cornea, lens, and vitreous humor, and their metabolic reactions required in maintenance of transparency. Structures and functions of the retina can be meaningfully related to detection of light and conversion of physical to chemical energy.

Physiology—Numerous aspects of biochemistry relate to the different systems of human physiology; particular note can be made of endocrine and hormonal controls and functions, biochemistry of nerve transmission, and active maintenance of salt-water balance.

Pathology—Modern pathology has its bases in morphological observations, but biochemical contributions provide a



Illustrations by David Kidd

greater understanding. Among the latter can be included: structure$\rightleftharpoons$function of antibodies; genetically controlled ocular pathology (e.g., cataract development in galactosemia); and the numerous pathological aberrations in the eyes that arise from endocrine disorders.

Pharmacology—Although physiological pharmacology is most commonly taught, biochemical pharmacology provides greater comprehension of drug effects at the molecular level. Two ideas need to be emphasized in pharmacology. The first, and most obvious, is the delineation of effects of various pharmacological agents on ocular functions as an aid to diagnosis. The second is just as important: perception of the effects of a variety of agents with pharmacological activity upon a patient's vision. Thus optometrists must be familiar not only with the effects of compounds administered specifically as pharmacological agents, but they must also be aware of the pharmacological effects of such agents as aspirin, caffeine, steroid contraceptives, allergy medicines, or alcohol upon their patients' vision.

Summary

In summary, biochemistry has a valuable role in the modern optometric curriculum; it provides students with an understanding of vision upon which to build as they become practicing optometrists. Biochemistry contributes directly to understanding the structures and functions of the eye that relate to transparency and vision, and it provides an informational basis on which to expand studies in the biological aspects of vision within the curriculum and practice of optometry.

Appendix-Materials

For this one semester course, I use the concise and well written textbook *Short Course in Biochemistry* by A.L. Lehninger. As a supplement, W.K. Stephenson's *Concepts in Biochemistry: A Programmed Text* provides organic chemistry review and structural information on biochemical molecules. A number of biochemistry textbooks are placed on library reserve, as are books, articles, and symposia relating to ocular biochemistry. Among the various journals, *Experimental Eye Research* has proven valuable for recent and current ocular biochemistry research. I prepare a syllabus, which is annually updated, that both provides structural molecular diagrams and also traces the ideas and concepts presented in the lectures. Students don't have to spend their time drawing structures, and thus miss why it is under consideration; and, since I make overhead transparencies from the same diagrams, I don't have to spend all of my time drawing structures and counting bond numbers. ●

Computer Assisted National Board Reviews in Optometry

By Vincent Giambalvo, Ralph S. Dippner and David Domnitch

The problem of preparing for National Board examinations has been approached in many ways by students of optometry. Among the more popular methods is reviewing questions from prior examinations. This is often done by small groups of students and can be very time-consuming. In order to make this process more efficient and rewarding, we set out to develop a method of presenting National Board questions in such a way that students could both test their knowledge and learn at the same time. We considered several alternative approaches and, with the co-operation of a group of dedicated students, decided to make use of the College's mini-computer.

As we began work on the project, we decided that our board review programs should be general enough so as to be useful to other schools with limited computer operations. The system that we developed allows for the construction and utilization of computer-assisted National Board reviews. It consists of three types of programs: 1) the tutorial builder (TBUILD), 2) the tutorial user (TUTOR), and 3) the National Board question reviews themselves.

Each National Board review tutorial consists of a series of frames, one frame for each board question. Each frame contains three sections: 1) the question section, 2) the answer section, and 3) the explanation section. The question section contains the question text. The answer section contains the possible answers to the multiple choice questions. The final section contains explanations for all the wrong answers and positive reinforcement for the correct one. Explanations are used for all possible answer choices so that whether or not students choose the correct answer, they will be presented with some information. The purpose of this, of course, is to provide a learning experience on every response, whether or not the correct answer was chosen.

Vincent Giambalvo, Ph.D., is a consultant in research design, quantitative analysis and computer implementation for PSI Associates in New York. Ralph S. Dippner, Systems Analyst, and David Domnitch, a second-year professional student, are both at the State University of New York, State College of Optometry.

Tutorial Builder

The first of the series of programs (TBUILD) is used to build a National Board review tutorial by creating a file on computer tape or disk. This file constitutes the review tutorial and can be read by the user program. Using TBUILD requires very little computer expertise as it contains its own set of instructions. All entries to and outputs from the program, once it is running, are in English. This feature makes TBUILD very useful. Our concept was to have all dialogue between the user and the machine conducted in the language of the user instead of the language of the machine. This feature makes the TBUILD program invisible to the user.

Figure 1 is a sample run which shows the man-machine dialogue involved in building a board review tutorial. The output shown in Figure 1 has been directed to a teletype; however, the standard dialogue is usually through an alpha-numerics CRT (cathode ray tube) terminal. To build a tutorial, the user first names it. Up to six letters or numbers are allowed, and the first one must be a letter of the alphabet. In the sample in Figure 1, OPT75 is our code for Theoretical Optics 1975. To write a frame the TBUILD user enters the question in the question section. The answer choices are entered into the answer section, with the correct answer always first. The user program rearranges (randomizes) the answers when they are presented to the tutorial user. A blank line signals the computer that all the answers have been entered. The explanation for the answer choices are entered into the explanation section in the same order as the answer choices. In all these sections TBUILD contains instructions which tell the user what information is required. The program also gives the user instructions on how to end the board review and exit the program (see Figure 1).

Tutorial User

The program which allows a student to use a board review tutorial is TUTOR. Like TBUILD, TUTOR contains its own set of instructions and all dialogue between the user and the computer is conducted in English. Board review tutorials are run in the following manner. Students specify which board review is desired and enter their last name (see Figure 2). Students then proceed through successive frames (board questions) by repeated presses on the return key, typing in answers when they are requested. Each frame begins with the question section. The question is presented without answer choices so that the student can take a minute or two to think about the question or perform any calculations which may be required (see Figure 2). There is currently

Figure 1

```
.R BASIC
NEW OR OLD--OLD TBUILD

READY
RUNNH
CONGRADULATIONS! YOU HAVE DECIDED TO USE THE TUTORIAL BUILDER.


ENTER TUTORIAL NAME PLEASE.
?TOPT75
ENTER FRAME NUMBER PLEASE (IF DONE ENTER 999)
?1
ENTER FRAME TEXT PLEASE.
?A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:
?
ENTER ANSWERS PLEASE (CORRECT ONE FIRST).
DO NOT ENTER NUMBERS OR LETTERS WITH YOUR CHOICES.
?BLACK
?YELLOW
?ORANGE
?GREEN
?VIOLET
?
ENTER EXPLANATION TEXT, IN SAME ORDER AS ANSWERS,
SEPARATE EACH EXPLANATION BY AN EXTRA RETURN.
   THERE MUST BE THE SAME NUMBER OF EXPLANATIONS AS
 THERE ARE ANSWERS.
  WHEN COMPLETED, PRESS RETURN UNTIL NEXT FRAME NUMBER IS REQUESTED.


?YES. A BLUE SURFACE WILL REFLECT ONLY BLUE LIGHT. IT ABSORBS ALL
?THE INCIDENT RED LIGHT, AND THEREFORE NONE WILL BE REFLECTED.
?
?NO. FOR THE OBJECT TO APPEAR YELLOW, IT WOULD HAVE TO REFLECT
?YELLOW LIGHT. SINCE THERE IS NONE, THIS CANNOT BE CORRECT.
?
?NO. FOR THE OBJECT TO APPEAR ORANGE, IT WOULD HAVE TO REFLECT
?ORANGE LIGHT. SINCE THERE IS NONE, THIS CANNOT BE CORRECT.
?
?NO. FOR THE OBJECT TO APPEAR GREEN, IT WOULD HAVE TO REFLECT
?GREEN LIGHT. SINCE THERE IS NONE, THIS CANNOT BE CORRECT.
?
?NO. FOR THE OBJECT TO APPEAR VIOLET, IT WOULD HAVE TO REFLECT
?VIOLET LIGHT. SINCE THERE IS NONE, THIS CANNOT BE CORRECT.
?
ENTER FRAME NUMBER PLEASE (IF DONE ENTER 999)
?999
THANK YOU. TO TEST TUTORIAL USE PROGRAM CALLED TUTOR
```

Figure 1 shows how a board file is created. The computer's instructions are simple and require only a minimal knowledge of computer operations. The board files are coded to include the section and year (e.g. OPT75 is Theoretical Optics 1975). In this sample, only one frame is shown. A more realistic lower limit would be 90,000 characters, or 150 frames at 600 characters per frame.

no provision for on-line calculations. Therefore, hand-held calculators or their equivalent may be used. The next press on the return key will cause the answer choices to appear with the correct answer in a random position (see Figure 3). The student then types the choice and presses the return key again. This causes the explanation associated with the answer chosen to be displayed (see Figure 4). If the answer chosen was incorrect, the student is presented with the explanation. The next carriage return entry by the student will cause the same frame to be repeated (see Figure 5). This cycling within a frame will continue until the correct answer is chosen, with each wrong answer being explained to the student. If the correct answer was chosen, the student will receive some kind of positive feedback, which may also include further explanation if desired, and the next carriage return will cause the next frame to be presented. If the tutorial is complete however, the program will display the "wrap-up" dialogue to the student.

We have chosen to build a rudimentary, yet generalized, pair of programs. Tutorials are easy to build and can be built by persons who know very little about computers. The same is true for using tutorials. We do not have a sophisticated system here, but we also do not have to support a large computer center, directly or indirectly, or pay substantial tie-in or telephone line charges on a continuing basis. Figure 7 is a system flow chart showing portions of the computer configuration used by these programs.

When this system was completed and ready for use, several of our students began to build tutorials for the National

Figure 2

```
READY
OLD TUTOR

READY
RUNNH
DO YOU KNOW HOW TO RUN THIS PACKAGE?
IF YOU NEED ASSISTANCE TYPE IN     HELP
IF NOT, TYPE IN    NO     THEN RETURN CARRIAGE.
?NO


 ENTER TUTORIAL NAME, PLEASE.
?TOPT75
PLEASE TYPE IN YOUR LAST NAME.
?DOMNITCH

FRAME #   1

A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:

?
```

Figure 2 shows a run of the program TUTOR. The code name for the board and the individual's last name are requested. This feature keeps track of the student's progress by printing each wrong answer on his/her individual file. The carriage return causes the first question to be presented, without the answer choices. This allows the student to figure out the answer first, a feature useful in the computational questions.

Figure 3

```
FRAME #   1
A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:

?
      1 YELLOW
      2 BLACK
      3 ORANGE
      4 GREEN
      5 VIOLET
?
```

When ready, the student presses the carriage return and the answer choices appear.

Figure 4

```
FRAME #   1
A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:

?
      1 YELLOW
      2 BLACK
      3 ORANGE
      4 GREEN
      5 VIOLET
?1

NO. FOR THE OBJECT TO APPEAR YELLOW, IT WOULD HAVE TO REFLECT
YELLOW LIGHT. SINCE THERE IS NONE, THIS CANNOT BE CORRECT.
?
```

The student types in his/her answer and the explanation associated with that answer is presented.

Figure 5

```
FRAME #   1
A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:

?
      1 YELLOW
      2 BLACK
      3 ORANGE
      4 GREEN
      5 VIOLET
?
```

If the wrong answer was chosen, TUTOR recycles and presents the question and answer choices again.

Figure 6

```
FRAME #  1
A PURE BLUE SURFACE VIEWED UNDER PURE RED LIGHT WILL APPEAR:

?
     1 YELLOW
     2 BLACK
     3 ORANGE
     4 GREEN
     5 VIOLET
?2

YES. A BLUE SURFACE WILL REFLECT ONLY BLUE LIGHT. IT ABSORBS ALL
THE INCIDENT RED LIGHT, AND THEREFORE NONE WILL BE REFLECTED.
?
CONGRADULATIONS! YOU HAVE SUCCESSFULLY COMPLETED
THIS TUTORIAL.

ENTER NEW FILE NAME PLEASE---IF NONE ENTER    NONE
 THEN RETURN CARRIAGE
?NONE

READY

.
```

The student makes a second choice. If correct, the correct explanation is printed and the student can go on to the next question. If the board review is completed, the student can exit from the program. The figure shows only one question since this was a test.

Figure 7

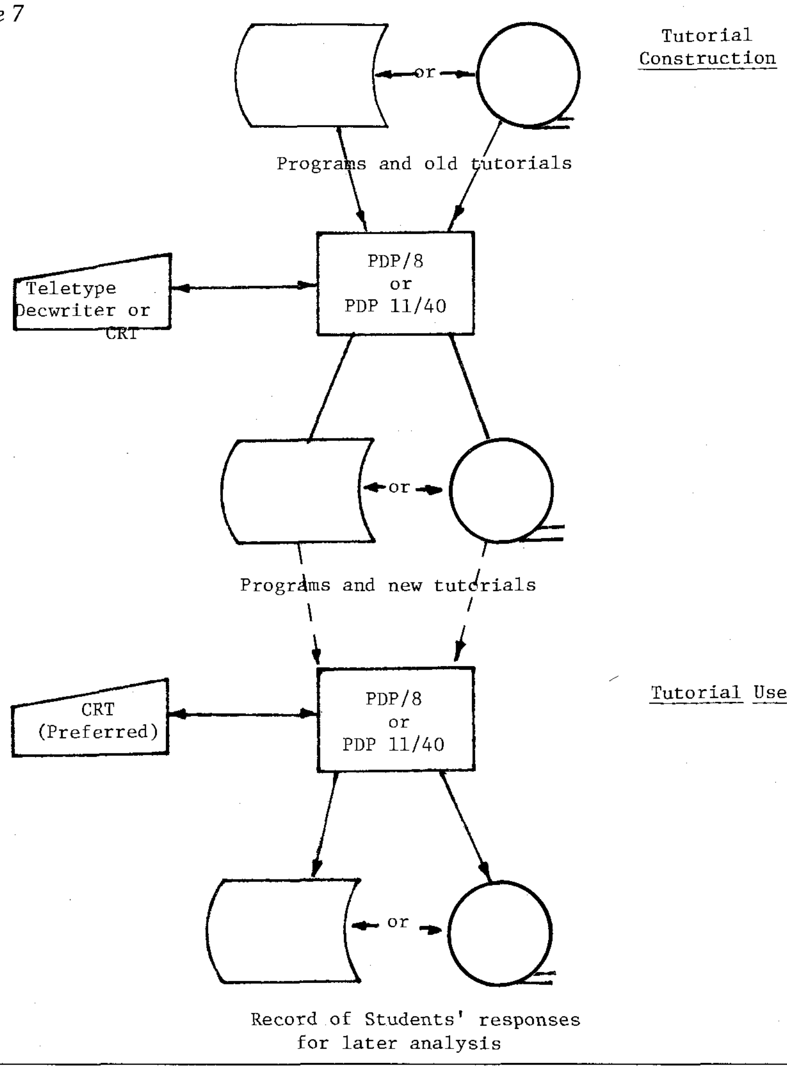


Figure 7 shows our system flow chart. Using any floppy or regular disc system on a PDP-8e or PDP 11/40 and these two programs (TUTOR & TBUILD), a user can build and/or run tutorials. Minimum core requirement is 12K for a single user system or 20K words for a multi-user system. Actual core requirement, of course, depends on the number of user stations in the system.

Board examinations. We have described one application of what is actually a larger system. The programs also access tutorials which teach students and professors about computer environments and usage, and we anticipate these programs as teaching adjuncts in at least statistics and geometric optics courses. Table 1 is a list of the boards which are completed or in progress. We are interested in continuing this work, preferably as part of a coordinated effort among several colleges of optometry. It is our hope that students at other colleges of optometry may be able to share the task and the benefits from the system described in this report.

Table 1

National Board Examination Reviews Completed Or In Progress

Ophthalmic Optics	1975
Visual Science I	1975
Theoretical Optics	1975
Visual Science II	1975
Theoretical Optics	1976

*Note

We can supply copies of programs, written in BASIC, at cost. These programs run on a PDP-8e with 12K core and Dectape under OS-8 or on a PDP 11/40 under RT-11 and can originate and run from disk or Dectape. When using single Dectape, however, the time interval between successive frames is excessive. Dual Dectape will improve this situation, but the time between frames will probably still be only marginally acceptable at best. We therefore recommend a random access mass storage device, such as disk or dual floppy disk. Multi-user operations have also been produced on the 11/40, but a minimum of 20K words of memory is necessary for a two-user system, as TUTOR will not run in 2.3K partition allowed each user on a 16K (words) system.

References

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Aspects of Optometric Education in Australia

By G. Woo

Three schools of optometry in Australia were visited by the author during his sabbatical leave in 1977. This report presents some aspects of optometry in three states of Australia— Victoria, New South Wales and Queensland.

Optometric education in Australia as in North America is conducted in universities and comes under the jurisdiction of individual states. There are six states in Australia, and optometric institutions are located in three of the states. This paper deals with educational aspects of optometry in those three states.

Part I: Victoria

In order to qualify as an optometrist in the State of Victoria, a potential candidate usually goes through the Optometry program at the University of Melbourne. This course is four years in duration. The prerequisite to entering the program is completion of the Higher School Certificate (Form 6) in five subjects. Typically, these subjects are: 1) English, 2) Chemistry, 3) Physics, 4) General Mathematics, and 5) Biology. General Mathematics and Biology may be substituted by Pure Mathematics and Applied Mathematics. Generally, counseling of students begins before they enter the University.

The four-year program is described in the Faculty of Science handbook. The Department of Optometry of the University of Melbourne teaches optometry courses. The number of optometry courses makes up 25 percent of the curriculum in Year II, 50 percent in Year III and 100 percent in Year IV. The Victorian College of Optometry, however, provides clinical facilities for training optometry students. Examination of the didactic portion of the optometry curriculum in Years II, III and IV reveals that the courses given are similar to those given at British universities. As an example, a course in Physiological Optics will encompass all aspects of physiological optics normally given at a North American optometry school in four or five separate courses. Another example is the Public Health course. This includes not only public health optometry, but also illumination, occupational and environmental optometry. At North American universities, these are taken as separate subjects.

The first-year program is similar to the pre-optometry program at the University of Waterloo. However, only a limited number of students are admitted into Year I since there is a quota, and these students are usually pre-selected. Relatively few students, who are enrolled in other universities, would be able to join the program in Year II. Provided a student passes the prescribed subjects of Year I, a seat in the optometry program will be ensured. Between the third and the fourth years, optometry students are required to attend clinical sessions (approximately three weeks in duration) in addition to the regular university year, which ordinarily begins in March and ends in December. By the time a student graduates from the program, he would have seen approximately 120 patients in the clinic.

At the end of their fourth year, students are asked to write a set of comprehensive examinations in various subjects which they undertook in the previous three years. They are also required to pass oral examinations. Upon completion of the program, the degree Bachelor of Science in Optometry is conferred upon the candidate by the University of Melbourne. No additional examination is required for licensure in the State of Victoria.

General clinical training facilities in the department seem to be more than adequate. Insofar as specialty clinics are concerned, the department is known for its participation in a joint Low Vision program sponsored by the Association for the Blind at Kooyong Centre for the Blind. Its contact lens clinic is also well equipped. Many papers in both low vision and contact lens areas have been published in international optometric journals. Active research is being carried out in these areas.

There is a register kept by the Registrar of the licensing body. Its main function is to register and deregister optometrists in the State of Victoria, as well as maintain the Optometrists Registration Act of 1958. The Registration Board also recognizes registrations in the other states of Australia by reciprocity. It considers specific programs in optometry in Canada, the United States, and the United Kingdom as being equivalent. In its 1976 regulations, a University of Waterloo graduate is eligible to register in the State of Victoria without further examination. Optometry programs in South Africa are excluded from this list.

The Board of Education of the Victorian College of Optometry arranges continuing education courses throughout the year. There is also a professional program held monthly. Practicing optometrists from the State of Victoria and neighboring states attend these

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The Low Vision Clinic, Association for the Blind, Kooyong, Victoria.

courses and meetings on evenings and weekends.

Although the undergraduate enrollment of optometry students is in the vicinity of 20 students per year, the department at present has five full-time graduate students working toward either the M.Sc. degree or the Ph.D. degree. There are a few research fellows from other agencies as well. Adjacent to the Victorian College of Optometry is the National Vision Research Institute of Australia founded by practicing optometrists throughout Australia and affiliated with the Victorian College of Optometry. It is still in its developmental stage and a director is yet to be announced.

The University of Melbourne offers programs in medicine and dentistry as well as optometry. Degrees conferred by the University in these other disciplines are M.B.B.S. (Bachelor of Medicine and Bachelor of Surgery) and B.D.S. (Bachelor of Dental Surgery). The duration of the medical program is six years and that of the dental program is five years.

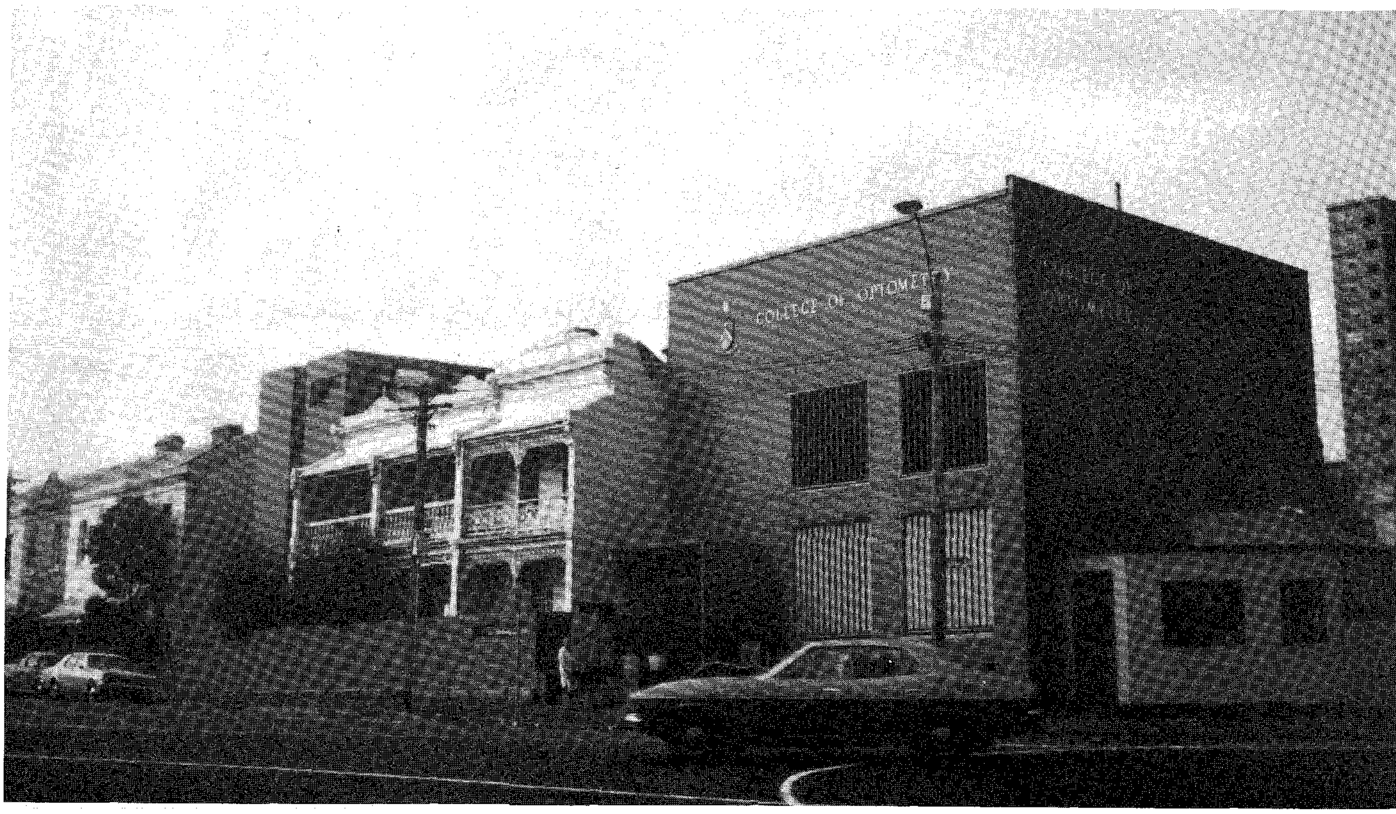
Part II: New South Wales

In the State of New South Wales, there is one School of Optometry within the University of New South Wales located in Kensington near Sydney. The "school" status was established in January, 1977. The head of the school is Professor J. Lederer who at present occupies the only professorial chair in optometry in Australia.

The program of optometry is four years in duration. University entrance requires completion of the Higher School Certificate. There is a quota on the number of students enrolled in the first-year optometry program. Failure or dropout rate is between 25 and 40 percent. Year II, or the first professional year, has a quota of an additional 20 students who transfer from other science programs either within the University of New South Wales or from any other Australian university. The first-year program includes Physics, Chemistry, Mathematics, and Biology. The second and third-year programs consist of three major subjects and an elective. The final year is made up of four subjects and one elective. A detailed description of these subjects is in the School of Optometry handbook. Each term or semester is 14 weeks in duration. Completion of the course normally takes eight terms. Students begin to see patients in their third year. A total number of 100 patients in general clinic and between 30 to 50 patients in specialized clinics are seen by a student before he graduates. There is also an externship program arranged by the department between students in optometry and private practitioners.

A socialized health care program (Medibank), equivalent to Ontario's OHIP, does not reimburse the University for services rendered by students although private optometrists are eligible for payment. Consequently, there is no actual fee for eye examinations at the optometry clinic. There are two groups of patients attending the clinic. The first group receives examinations only and necessary prescriptions are given to them to be filled elsewhere. The second group of patients receives examinations and spectacles without charge. These latter patients are either registered with various welfare agencies or with the Repatriation Department (veteran's affairs). Thus dispensing is not routinely performed, although students do get their experience in externship programs with practicing optometrists and with a limited number of patients from the second group of patients described earlier.

A number of well-equipped consulting rooms are in the general clinic. In addition, there is a pleorthoptic (pleoptics and orthoptics) clinic, a contact lens clinic and a low vision clinic. Each of these specialty clinics is headed by



The Department of Optometry, University of Melbourne, Melbourne

one of the faculty members. There is also an external clinic of pediatric optometry. An external low vision clinic is being developed jointly by the school and the Royal Society for the Blind in Sydney.

Upon completion of the optometry program, a student receives the degree B. Optom. (Bachelor of Optometry) from the University. With this degree, he may register with the New South Wales Board of Optometrical Registration where the register is kept without further examination. The New South Wales Board also considers specific programs in Canada, the United States and the United Kingdom as being equivalent. It works closely with the Committee on Overseas Professional Qualifications which is associated with the Immigration Department of the federal government of Australia in Canberra. It appears at the moment that both University of Montreal and University of Waterloo graduates may register in New South Wales without further examinations.

Although the New South Wales Optometry Act allows optometrists to use drugs, only those who have completed a course, "The use of drugs in refraction and examination of the eyes," may do so. The registrar keeps a list of optometrists who are eligible to use drugs. They need to show documentary evidence of their training and knowledge in ocular pharmacology. The University of New South Wales gives a course on pharmacology to optometrists from time to time and an examination is compulsory at the end of the course. A British graduate is generally considered proficient in the use of drugs by the Board, and he is exempted from the pharmacology course and the examination.

In 1977, there were 347 undergraduates enrolled in the program, and a total of ten part-time and full-time graduate students are enrolled either in the M. Optom. program or the M.Sc. or Ph.D. programs. The latter two degrees are research oriented degrees awarded by the Faculty of Science. The M. Optom. degree is a clinically oriented program. it consists of course work and a research project. The University of New South Wales has a medical program of five years duration, and the degree conferred by the University is M.B.B.S. (Bachelor of Medicine and Bachelor of Surgery).

The Optometric Vision Research Foundation is loosely affiliated with the University of New South Wales. It generates funds primarily from optical industries and private practitioners and supports various research projects in the Schools of Optometry at New South Wales and Queensland.

Part III: Queensland

A three-year diploma course in optometry has been available at the Queensland Institute of Technology since 1966. It is given in the Department of Paramedical Studies. Since August, 1977, a Section of Optometry has been created. Prerequisites for entry into the course are similar to the University of Melbourne and the University of New South Wales. The number of students in the three-year program is 64. Recently there were some discussions on the possibility of changing the curriculum of the course to a four-year degree program. A tour of the facilities in the optometry clinic revealed that all clinical rooms are well equipped. Research activities, however, are much less apparent than at other schools in Australia.

It is interesting to note that in the state of Queensland, there are no opticians. Optometrists not only fill their own prescriptions but also those generated by ophthalmologists. Some optical firms hire optometrists to serve specifically as dispensing opticians. ●

Acknowledgements:

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Photo courtesy of the Optometric Observer & Contact Lens News

Dr. Sidney Wittenberg (left), President of AOE, chats with Dr. Sam Brown of the UAB School of Medicine at the AOE National Meeting.

AOE Holds National Meeting

The editors of JOE extend their heartiest congratulations to Dr. Sidney Wittenberg, President of the Association of Optometric Educators and to his Executive Committee for accomplishing the first successful National Meeting of Optometric Educators. There has long been a need for a national meeting of optometric educators. There has long been a need for a meeting place for optometric educators to discuss optometric education with all its appurtenances and ramifications. We are most pleased to welcome AOE to the pages of JOE and hope that the organization itself and the members individually will look more and more upon JOE as their Journal. JOE will grow and develop to the extent that the faculties of our schools and colleges submit material pertaining to optometric education—from course outlines and evaluation of faculty to entrance examinations and National Boards. In this vein, we welcome and are pleased to publish the following report on the December meeting of the AOE.

By Sidney Wittenberg, O.D.

On December 14 and 15, 1977, an event occurred which, though small when measured by the cataclysmic events of our age, was momentous in the history of the Association of Optometric Educators. At the Birmingham Hyatt House, during the two days following the Annual meeting of the American Academy of Optometry, the AOE held its first annual meeting that was not nestled "comfortably" within the dates of the academy meeting.

The displacement of the meeting became necessary because of the expanded program scheduled for this meeting. Where previous meetings had dealt only with the organization and business of the group, this meeting struck out toward accomplishing a significant goal—self improvement. The program had two new elements. One was educational seminars conducted by Dr. Samuel Brown and his group from the Office of Educational Development of the University of Alabama in Birmingham. These included: Evaluation with Emphasis on the Clinical Setting, Self Instructional Programs in Optometry and a workshop on the Dynamics of Small Groups. The other component was made up of technical presentations by representatives of the ophthalmic industry. This component enabled manufacturers' representatives to take the opportunity to present technical information related to their products that they felt optometric educators should know. Presentations were made by Jerry Neilson of Allergan Pharmaceuticals, Henry Knoll of Bausch and Lomb, Carl Hoekstra of Corning Glass Works, Ed McQuade of Digilab Inc. and Karl Bergmann of American Optical.

While it was originally feared that the diversity of information that must be inherent in the spectrum of manufacturers listed above might cause some educators to become bored or disinterested, the opposite proved to be true. Where customarily each educator pursued knowledge only in his or her own area of specialization, here all had the opportunity to gain exposure in other areas. The response was almost universally positive and enthusiastic.

At the heart of making an independent annual meeting a reality was the economic assistance afforded to the AOE in support of the meeting. The approach will serve as a model for future meetings. The success of this meeting has us looking toward an even larger one in the summer of 1979.

Faculty interested in learning more about the business meeting or the AOE are invited to contact their faculty representative, Michael Cohen at PCO, or Sidney Wittenberg at NEWENCO. •

Enriching the Optometric Curriculum Through Student Research

By Steven H. Barry and Michael S. Shansky

At the Illinois College of optometry, students participate in a structured, independent research project guided by the faculty. The following article describes the theory and practice behind this successful Independent Student Research Program.

As supervisors of the Independent Student Research Program at the Illinois College of Optometry, it has been our experience that entering students may believe that the concept of doing research is mutually exclusive with their clinical goals. Through their active experience in a research project of their own choosing, however, many students come to appreciate the role that research can play in their professional development. This reversal in attitude has led us to believe that the mandatory research activities and preparatory courses which are part of our instructional curriculum are a necessary and vital part of the student's development as a professional. We feel it is worthwhile to discuss the nature and goals of the program we utilize at the Illinois College of Optometry in order to demonstrate how this program fosters an expanded consciousness in the developing clinician and provides a sound basis for continued growth within the profession.

In the late 1950s, ICO was among the first optometry colleges to establish a student research program. The program was designed to foster broad student development and to establish research as an important part of optometric education. All faculty were assigned advisor roles to stimulate faculty interest and involvement in the research process. With this support, student research has expanded from a predominance of literature reviews to encompass a wide range of experimental, clinical and basic studies.

In the beginning, our students often expressed negative feelings toward independent research. We have undertaken no formal investigation of reasons for this early attitude, but we have noticed two characteristics that may help to explain it. First, the admission process itself may select those students whose goal is the development of clinical skills, as opposed to those candidates with a strong research orientation; it is clear from many of our admissions interviews that this is partly due to the changing role of optometry and the changed role of the optometry school. Formerly, optometric training was purely clinical. Today, many basic science skills and much theory are taught to prepare the student for a broader role in the delivery of health care. Some applicants, however, who have had close contacts with long-established practitioners, may have a narrower view of the scope of the profession than do optometric educators. These students may enter professional school with attitudes leading to some resistance to the development of background not included in the traditional definitions of the profession.

The second factor that may influence the initial negative attitude toward research is the emphasis placed upon immediate decision making that is necessary for therapy decisions in patient care. The clinical decisions required of a practicing professional are often of a "black-or-white" nature. The doctor must confront a patient's problem and attempt a solution at the time of the patient's visit. The doctor can ill afford the luxury of equivocation or delaying treatment for the purposes of further investigation. For example, a patient who exhibits discomforting ocular symptoms requires an immediate attempt at a course of treatment. The clinician cannot wait months or years to follow the course of the disease and await a more firm decision on its etiology. On the other hand, in research the decisions are, by their nature, the result of prolonged observation and study under controlled conditions. Often, answers to questions are deferred for several years while further data are gathered and analyzed.

Thus, the entering optometry student may be predisposed toward the educational strategy that emphasizes immediately practical skills and black/white decision making in contrast to the systematic, relatively slow and highly cognitive process that constitutes research. In any attempt to infuse a highly structured professional curriculum with an independent research program, particularly a mandatory one, there should be a clear recognition of the apparent contrast between this activity and the usual clinical decision making that is encountered in optometric training. Responsible faculty members can help

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Illustration by David Kidd

the students see the relevance of research by emphasizing the step-by-step, hypothesis-testing approach toward diagnosis and by noting the many areas where research has had an impact on day-to-day clinical practice.

Goals of the Research Program

The research program at ICO has six basic goals: 1) To foster within the student an appreciation of the rigors involved in the evaluation and standardization of new equipment and techniques used by the clinician. Thus, the student may himself undertake to evaluate a new clinical procedure. 2) To allow the student to increase his or her depth of knowledge in a specialty area which is of particular interest. 3) To promote within the student the ability to think critically regarding clinical and basic visual science data as it relates to the practice of optometry. This involves the development of the student's capability to assess the reliability and validity of his own clinical data obtained from patients. 4) To promote the development of a disciplined, logical, problem-solving approach to clinical problems using both critical skills and basic research insights. This goal involves an attempt to balance the pragmatism of the clinical decision-making process with the more analytical approach utilized by most researchers. Thus, the student will have at his disposal two kinds of processes which should form a synergistic relationship. 5) To add knowledge to the various fields within optometry through carefully controlled, well designed and analyzed research investigations. 6) To promote the development of creative directions that keep optometry vital and at the forefront of the clinical visual sciences and to instill an appreciation of the role played by research in the future viability of the profession. Given the relatively structured curriculum found at most professional schools, research activity becomes an important means for the student to actively explore and elaborate on the ideas that have been learned in the academic and clinical curriculum. In turn, these explorations and new ideas may influence the future directions of the profession after the student goes on to practice. The research activity should help the practitioner to be a more careful, analytical and perceptive professional, able to analyze and appreciate the impact his measurement techniques themselves may have upon the data they produce.

Careful consideration of the above goals has led us to the conclusion that the mandatory research activity is a necessary and vital part of the optometric training each student experiences. This activity becomes as important to the development of a creative contributing clinician as any clinical skill he may learn during the course of his professional training. It is, therefore, important that all students experience this particular activity in one form or another and that it not be simply voluntary or an elective exercise. The student independent research program at ICO has been developed to allow the attainment of the above goals.

Support Facilities and Personnel

As with any educational strategy employed within the optometric curriculum, it is absolutely necessary that certain prerequisites be met in terms of personnel, facilities, and what one may call "institutional ambience," in order to promote student interest and the fulfillment of institutional goals for the student research projects. Among the most important of these goals is the instillation of a lifelong appreciation of the role research plays in the vitality of the profession as a whole. The elements that interact to produce the desired growth environment include a reasonable balance of faculty consisting of clinically as well as research-oriented persons and should include faculty with applied as well as basic interests in the area of vision.

Secondly, it is not enough for faculty to merely possess the proper credentials for supervisory roles in student research efforts. They must also be engaged in active research endeavors, even though in some cases these activities may consume a relatively small percentage of total faculty time. During his training, the student should observe that research is going on around him and is an integral part of the optometric educational experience and academic

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life in general. The research that is carried on must be of both an applied and a basic nature, so that the student observes the need for both kinds of research in developing new knowledge in optometry. This ensures flexibility in the kinds of projects that students may choose for their research. In turn, this gives the entire program the kind of flexibility that supports one of its main features, the encouragement of autonomy in student creative efforts.

The third prerequisite for a student research program is that the student must be academically prepared to undertake the kind of challenge that the independent research project presents. He must have learned, at some time in his academic background, rudimentary strategies of experimental design and statistical analysis (although these may not necessarily be within the optometric curriculum itself), as well as basic knowledge in the areas of physiological optics, perception, visual physiology, optics and theoretical optometry. At ICO, the primary introduction to optometric research and analytical method is in a first-year course entitled, "Optometric Data and Experimental Design." This course describes research studies, including design and basic analytical technique, in several optometric areas so that students may see the intimate relationship between the design of a procedure to answer a question and the numerical analysis that shows and supports the conclusions of the research. This course provides students with the tools to understand the strategy and methods of research presented in later courses in the curriculum. Given these prerequisites, a student acquires a foundation to begin to think creatively about answering questions utilizing an experimental strategy. With ample faculty planning, clinically oriented courses can encourage student involvement in answering important questions by emphasizing those areas in which answers are not as readily obtained and where knowledge is vague or incomplete.

The fourth prerequisite, and probably the most important in terms of the human element, is the presence of faculty members interested in and enthusiastic about the idea of supervising creative efforts by the students. The structured supervision by the advisor system (to be described below) is the most important part of a successful research program. It is from a close interaction with an experienced researcher that a student actually learns the most about an empirical approach to problem solving.

Finally, sufficient facilities should be available so that students with particular projects in mind are not foiled following the development of a proposal because of lack of space or simple equipment. The space may be obtained in special project areas, research areas within the province of certain faculty members, or in any other laboratory space unused during parts of the day. A reasonable internal budget should be made available for these projects and need not be large to accomplish the purposes of the program. Additional funding, of course, may come from external sources. It is important to note that a joint institutional and faculty commitment to provide ample supervisory time and support facilities is vital to the success of the goals of this program.

The ICO Student Research Program

The program utilized at ICO to meet the above objectives emphasizes a balance between the flexibility of creative endeavor and the structured supervision necessary to channel this creativity into successful completion of a research effort. Over the years, the flexibility of the framework has allowed changes to occur in the nature of the program as well as the manner in which the students utilize this program. In describing the structure of the student independent research program, we will include, where relevant, some of the changes that have occurred in the ICO program.

The administration of the entire program is under the authority of a research committee consisting of both full and part-time clinical and basic science faculty. Thus, the committee is also a forum for interaction between the strictly academic and clinical faculty within the school. Membership is voluntary, thus ensuring that uninterested faculty are not a part of this process. The committee's function is to determine the guidelines for an acceptable research project, assign advisors to those projects requiring specific kinds of supervision, evaluate all aspects of each project and set deadlines for completion of each phase of the project. Finally, the committee selects studies which are of award caliber at the completion of the year. In this way, the specific advisor for each project need not be concerned with having to vote awards for projects he or she has advised. This structure promotes more informal and, therefore, closer interaction between the advisor and the student. It is expected that the final project evaluation, both by the committee and by the advisor, will, in part, reflect the advisor's pedagogical success with the student.

During the middle of the third professional year, or in exceptional cases earlier, students submit a research proposal to the committee. The proposal consists of a brief literature search and rationale for the investigation they would like to undertake. At ICO, students are allowed to select an experimental type of study, or library (literature review) paper. If they choose experimental investigation, they may either work on a project that has already been designed by a faculty member, and thus work as an assistant to that faculty member, or they may choose to design their own experiment. Students generally choose active participation in experimental investigations in preference to library study.

After reviewing each proposal, the committee judges each as being acceptable, acceptable with modification, or unacceptable. In all cases, the student is assigned an advisor, either of his own choosing, or in lieu of this, an assignment based on the nature of the study itself. The committee reviews proposals

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for their pedagogical value, leaving originality, design and other considerations to the supervising faculty member. Unsuccessful proposals must be redone. The acceptability of a given proposal is based upon whether or not that study constitutes a legitimate and valuable learning experience for the student. It is not necessary that the proposal represent an entirely original piece of research, so replications of older studies are in some cases accepted (and may even be encouraged). As far as possible, the committee suggests modifications of these proposals based upon the knowledge of the student's capability and background in handling different kinds of data. Unsuccessful proposals must be redone in accordance with guidelines drawn by the committee and the advisor assigned to the research.

The second phase of the research follows, usually during the summer months. This phase consists of the development of a methodology for carrying out the proposed investigation. This methodology is worked out between the student and his advisor and is again submitted to the committee in written form for evaluation on the same basis as was the proposal. Thus, after having completed phase two, the student has written the introduction (rationale) and method section of the final paper.

It is not necessary that each proposal or method section contain the definitive quantitative evaluation procedures to be used nor is the use of statistics necessarily a prerequisite for each study. Faculty supervision of studies emphasizes guiding the student to a clear and concise statement of the problem, the methods used to study the problem and a tentative approach to the analysis and presentation of the data. The method section need not contain detailed evaluative or statistical procedures, and the study itself may not require these if it is qualitative or descriptive research. Frequently, and perhaps surprisingly, students often choose to design and analyze the studies using sophisticated procedures. The remainder of the summer months between the third and fourth professional years allows the student to collect data. This phase often continues into the fall of his fourth professional year.

The third phase of the project, or discussion phase, represents the initial presentation of the results and interpretation by the student to his or her advisor. The advisor then reviews the preliminary results and can either suggest additional analyses, directions, or interpretation, or if time permits, follow-up studies.

Following the return of phase three to the student, with appropriate modifications, the student can submit the complete study. This is then evaluated on a pass/fail basis by the committee. The study's relative merit is separately assessed by each advisor on an objective basis. There are a number of categories in which the advisor is asked to rate the study: the student's goals, the nature of the student-advisor interaction, the quality of lab work done, the quality of the written paper, and several other relevant variables that aid the committee in evaluating the final study. It is worth emphasizing that the merit of an individual study may not necessarily lie in its ultimate contribution to optometric science, but rather in its organization, attention to detail, appropriate use of experimental controls and analytical strategies, and the discussion of the data and its integration into current optometric concepts.

From among the completed studies, several are chosen to receive awards. These awards are made at commencement. There are awards for both general merit and for specialty areas within optometry. While these awards may provide some incentive for the successful completion of a research project, they nevertheless are not the main reason for the student carrying out this project. It is interesting to note that there has been a trend away from the emphasis on awards. Students, in fact, are rarely even aware of the existence of the award prior to the completion of the studies in the early spring.

Following the completion of the senior research study by each student or team of students, the original completed study is placed on file in the library to serve as a basis for future studies within that area. In this way, there is a continuity between ongoing projects within specialty areas. Few student experiments will ultimately be of publishable nature, since the educational goals above are the predominant reasons for carrying out this activity. Nevertheless, several ICO studies each year have been of sufficiently high quality to merit publication and integration into the optometric literature.

A survey of recent award-winning projects at ICO reveals student interest areas to be broad, ranging from the nature of the effects of basic physiological variables upon visual function to clinical evaluations of new ophthalmic materials and optometric techniques. Areas such as visual training, perceptual effects of nearpoint lenses and evaluative techniques in developmental optometry have received some attention in student research, as have studies of aspheric contact lenses, new contact lens materials, electrodiagnostic techniques, screening methods for amblyopia and studies on the relationship between overall subjective refractive status and the configuration of various refractive surfaces of the eye. In all, these studies represent a most diverse sample from the broad range of current optometric research interest.

The past several years have seen an increasingly positive view of the structure of the ICO student research program, the reviews produced by the program and the value of the research to the optometric community. There has been a clear shift in student opinion that is reflected in student performance. Faculty attitudes are also becoming more positive. The overall result has been improvements in student research produced at ICO, closer faculty-student relationships, and a good deal of satisfaction in this area. We believe that the student research program has proven itself a valuable aspect of a complete optometric education.

Profile: The Illinois College Of Optometry

By Kim M. Lillie

In 1972 the Illinois College of Optometry celebrated its first century as an educational institution. Now in its second century, the College renews its twofold purpose to provide the highest standard of optometric education to its students, and to provide a high standard of professional care to its patients.

The history of the Illinois College of Optometry dates back to 1872 and the pioneer institution, the Chicago College of Ophthalmology and Otology. Dr. Henry Olin, a noted oculist and aurist of the time was responsible for founding the school dedicated to teaching the special skills required in visual examination and correction.

Following the death of Dr. Olin in 1891, the College became known as the Northern Illinois College of Ophthalmology and Otology. In 1926, with the consolidation of the Northern Illinois College of Ophthalmology and Otology, and the Needles Institute of Optometry, the College became known as the Northern Illinois College of Optometry (NICO).

NICO, along with the Chicago College of Optometry, originally known as the Monroe College of Optometry founded in 1937, both established exceptional records of performance in optometric education. In 1955, the respective Boards of Trustees voted to consolidate the two institutions into one outstanding, independent college under the new name of the Illinois College of Optometry.

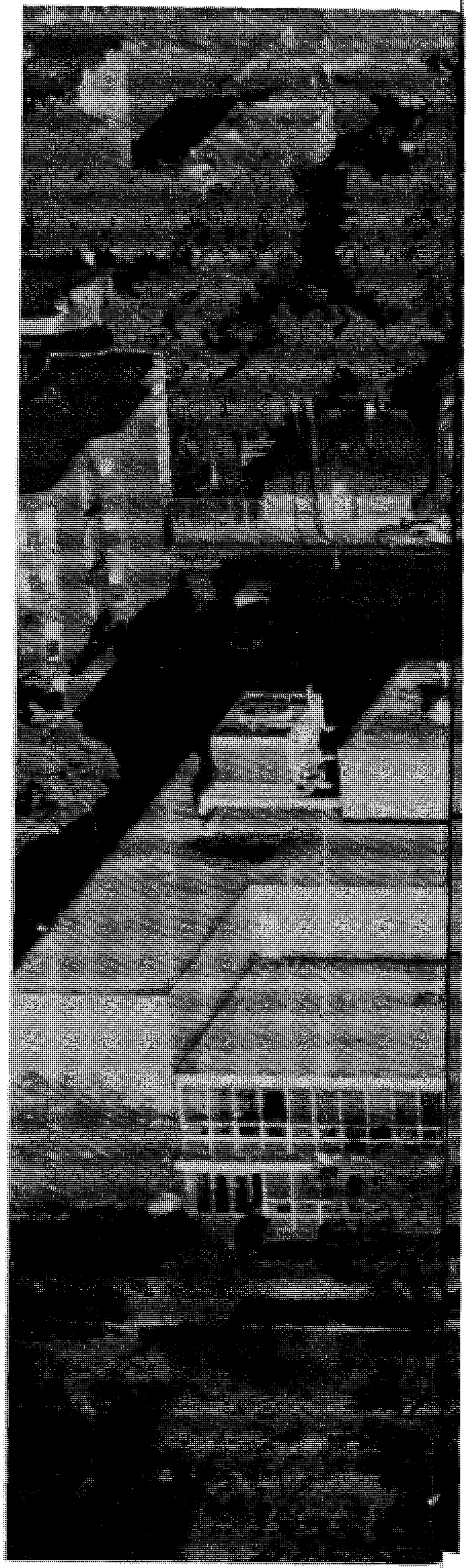
ICO has been located for the past twenty-five years in an area of steady growth and redevelopment. The College takes pride in having been a strong influence in the continued improvement of an important section of Chicago. The area is one of the most varied districts in Chicago, including heavy manufacturing plants and small industry, five medical centers, the University of Chicago, Illinois Institute of Technology, and the Illinois Central Gulf Railroad. Long range planning indicates that ICO will continue to play a major role in further upgrading the area.

The newly expanded college facility was completed in 1969 and includes the original building erected in 1954. The remodeled main building complex now contains administrative offices, faculty offices, classrooms, and laboratories. This three-story structure contains a total of 96,000 square feet. The Alumni Memorial Educational Wing of the building features the Carl F. Shepard Memorial Library, Albert H. Rodriguez Memorial Auditorium, three large classrooms, student lounge, bookstore, faculty offices, five teaching laboratories in the biological sciences, and four research laboratories. This section of the building also includes the learning resources department and control room for closed circuit color television.

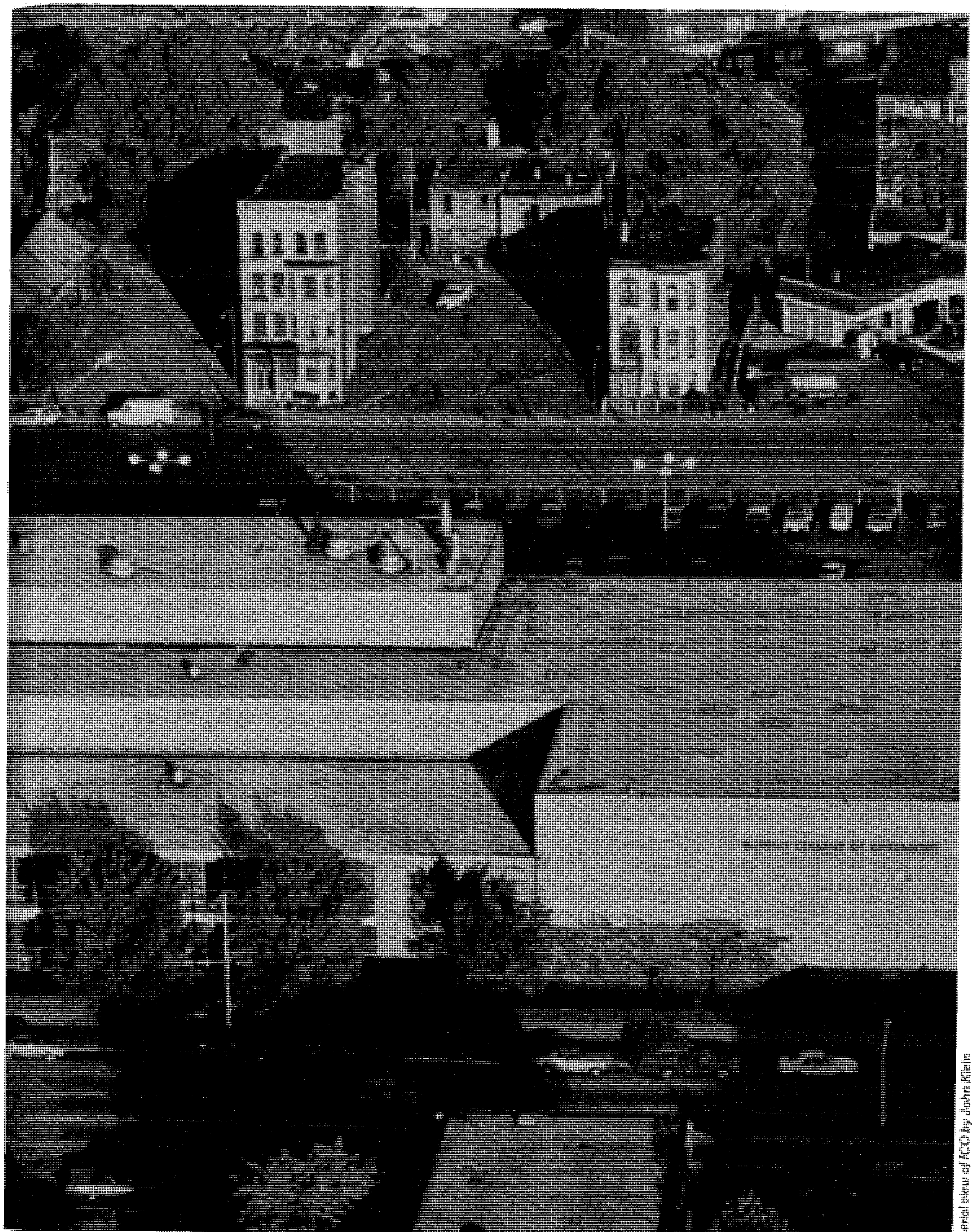
Although ICO accepts a limited number of state contracts, it remains one of the most accessible optometry colleges for students from all geographic locations. The entering class of Fall, 1977, included 45 Illinois residents, and 105 from 24 other states and one foreign country.

The Alumni Association support of the college is extensive, with a majority of ongoing programs and contributions geared toward providing "extras" not readily attainable under the budget restraints of the 1970s.

Due in part to the fact that approximately one-third of all optome-



Kim M. Lillie is Public Relations Coordinator for the Illinois College of Optometry.



Aerial view of ICO by John Klein

trists in the nation are graduated from ICO or one of its predecessor institutions, the ICO Alumni Association has the largest member and potential membership of all the schools and colleges of optometry. At present, over 7200 graduates remain in active files of the Alumni Association.

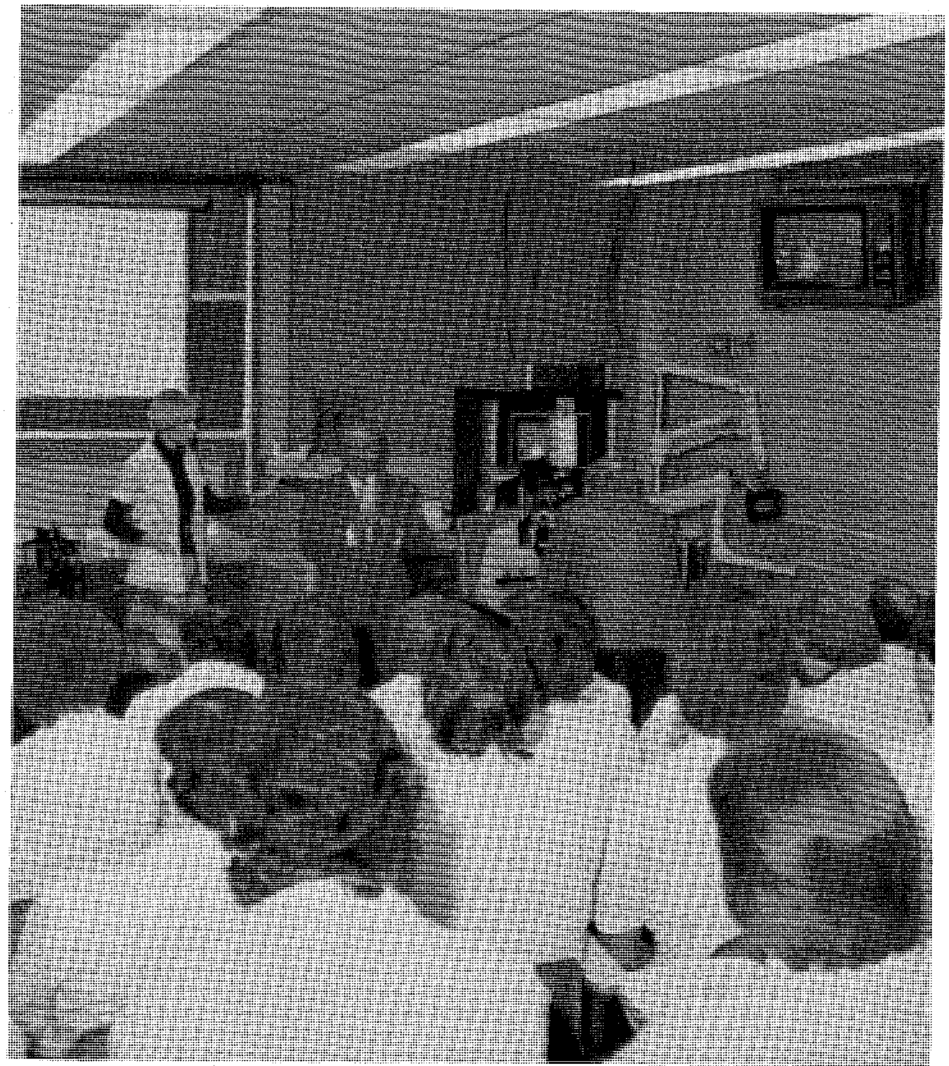
In addition to longstanding commitments for support of ICO externship programs and annual contributions to the United Student Aid Fund for generation of additional student loan monies, the Alumni Association has provided: refurbishing and refurnishing of study rooms for each floor of the dormitories, $9,000 in matching funds for the purchase of an electrodiagnostic unit for clinical application and research, and purchase of a mini computer system for use in student research projects and in Visual Science Department research.

ICO has been fully accredited by the Council on Optometric Education of the American Optometric Association since its founding in 1955. The College became the first health professions institute to meet the rigid standards of the North Central Association when it was awarded accreditation by that regional accrediting body in 1968.

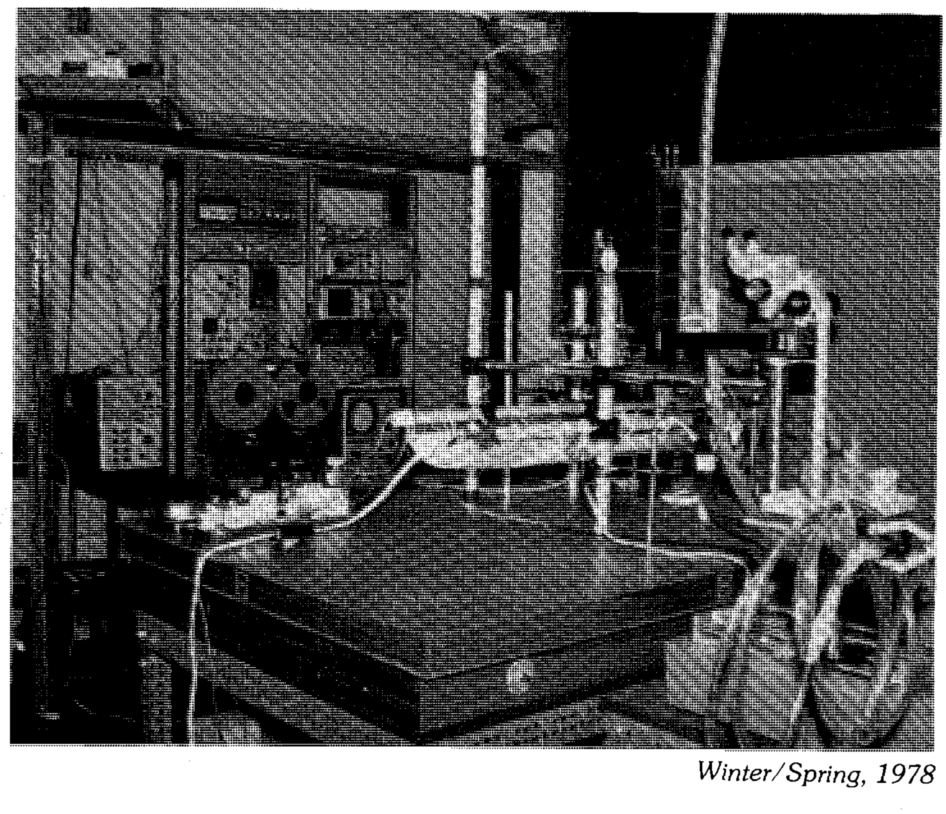
Dr. Alfred A. Rosenbloom, President of ICO since 1972, is a 1948 alumnus and Dean of the College from 1957 to 1977. Dr. Rosenbloom earned international recognition in lecturing on low vision and geriatric care and served the AOA as a member of COE from 1958-1976. He currently serves as a member of the AOA's Council on Clinical Optometric Care and as Vice-President of the Association of Schools and Colleges of Optometry.

With increasing emphasis on the role of the optometrist as a member of the primary health care team, the major thrust in the College's curriculum planning now is to train students in the concept of the team approach to the delivery of health services including interdisciplinary training and the provision of vision care services to patient populations exhibiting specialized kinds of health problems and needs.

The academic program is organized on the basis of four divisions. The Division of Visual Science has seen rapid growth in its course offerings and research. The division now comprises three additional psychologists and boasts several well-equipped



Above, the ICO Pathology Amphitheater allows students to watch the examination on monitors. Below, research lab for the study of neurophysiological bases of oculomotor disorders.



Photos by Kim M. Lillie

labs used for research as well as teaching. With the increasing role of the optometrist as a primary care practitioner, the Division of Health Sciences plans additional appointments of health sciences faculty members, as well as expanded research facilities in the areas of physiology, pharmacology and pathology.

The teaching program in the Division of Health Sciences has also been expanded during the past year to include a course in physical diagnosis and added emphasis on the use of diagnostic pharmaceutical agents and technology such as binocular indirect ophthalmoscopy and gonioscopy.

The largest division is the Division of Optometry Science. The teaching program in the Division of Optometry Science has been strengthened in recent years by increased emphasis of the graphical analysis and binocular refraction techniques. Other areas of development have included increased emphasis on contact lens fitting and an expanded clinical technology laboratory.

The Division of Patient Care is responsible for operating all of the College's clinical programs. The main clinic, located on the north side of the college building at 3239 South Michigan Avenue, has the latest and most modern of clinical facilities for instructional purposes. In addition to the reception and administrative areas, the clinic has over 60 examining rooms, a Vision Therapy department, and a Contact Lens department.

Here interns examine and prescribe for virtually every type of visual problem. Supervised by faculty members who serve as clinical instructors, each student is responsible for the complete professional care of at least 200 patients before graduation.

Patient care in the general clinic is being organized into a modular system with specific areas of clinic care consolidated and staffed with faculty members having expertise in these areas. One section of modular units is organized as the Pediatric Optometry Department. This contains the diagnostic and treatment areas that are involved in providing a full scope of optometric care for the pediatric patient with special emphasis on functional and developmental vision problems common to younger age groups. Diagnostic services include 11 general exam rooms for patients ages three to twelve, two rooms for developmental vision evaluation, two rooms for strabismus/amblyopia examinations, and two additional rooms equipped for the examination and treatment of visual problems in the infant patient.

Treatment facilities for children's vision problems are also centralized in this area. This includes the Vision Therapy Clinic providing treatment for a wide range of functional and developmental vision problems. Each intern has a minimum graduation requirement in the VT Clinic to provide the complete optometric care of three patients including the initial diagnosis and workup, the design and completion of a vision therapy program, and the subsequent progress evaluation and supervision of ongoing care.

The Pediatric Optometry Department is an integral part of the total clinical services available at ICO. During recent years approximately 30 percent of the 7500-8000 patients receiving vision care yearly at the Eye Clinic are age 12 or under. Nearly 1000 of these receive additional specialized testing. An additional 1500 receive care in the Vision Therapy Clinic.

Greater emphasis is now given to improved integration between the different clinical specialties in the clinic. This intraclinic referral results in some children receiving concurrent care in the Visual Therapy Clinic and other clinics including the Contact Lens and Low Vision Clinics.

The nine affiliated clinics in the College's program were developed with the specific goal of exposing the intern to multidisciplinary health settings and bringing the intern in contact with patients needs which are not commonly encountered in the College clinic program. These affiliated clinics are usually specialty clinics serving patients with specific kinds of visual problems. One such clinic is located at the Chicago Lighthouse for the Blind, where patients classified as legally blind are fitted with vision aids and then taught useful vocational skills.

As a result of ICO's academic affiliation with the West Side Veterans Administration Hospital, a pilot program of weekly rotating student internships has been established through the Ophthalmology Program.

ICO is also assisting the VA Hospital in filling the recently established optometric staff positions. It is planned that after the staff positions have been filled, an optometric residency program will be developed and that eventually the rotating student internships will become a part of the ICO affiliated clinic program.

Vocational training at the Chicago Lighthouse For The Blind, an ICO affiliated clinic.

In September of last year ICO established a formal affiliation with the Triton Community College Optometric Technician Program. Several ICO faculty members now travel to Triton College on a regular basis to provide lecture and laboratory instruction to optometric technician students, and Triton students now work with ICO clinical interns in the clinical portion of their program.

In the last six years there has been a steady and dramatic growth in the amount and quality of both basic and clinical research performed at ICO. Each of the four Ph.D.'s in the Visual Science Department are currently involved in several research projects funded by federal grants.

The major research project being conducted is on the neurophysiological bases of such oculomotor disorders as strabismus, amblyopia, and anisometropia.

Additional research projects include temporal processing in amblyopia, infant color vision, the effects of nearpoint lenses on visual masking, and a survey of diagnostic tests to evaluate amblyopia.

Clinical faculty members at ICO are investigating the visual, developmental, and perceptual abilities of Down's syndrome children, hydrophylic contact lenses, a clinical method for the detection and measurement of aniseikonia, functional vision, learning disabilities, ocular pathology, and low vision.

A vital part of the academic program at ICO is the requirement that each fourth year student complete an independent research project of his/her choice. The project must be approved in advance by the faculty advisor and the research committee of the faculty organization. Not only has this requirement contributed to the quality and breadth of student research produced at the College, but it has also become a vital part of the student's development as a professional.

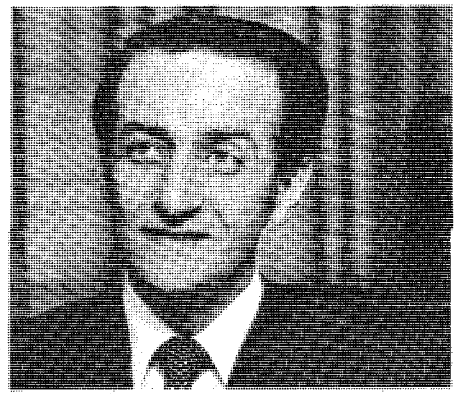
In an effort to maintain the high standard of education at ICO, the college is now equipped with several innovations. In March, 1978, the College's Electrodiagnostic Clinic will become operational. Three techniques; electroretinography (EGR), electrooculography (EOG), and visual evoked response (VER), provide a battery of tests for early detection of ocular pathology. The facility is used to examine patients who are unable to provide the normal feedback necessary in conventional examination procedures. Young children and handicapped or disabled patients are good examples of electrodiagnostic clinic patients.

Another recent addition at ICO is the SOARS computer system, expected to be operational by April. The computer's primary areas of application include the Business Office, Registrar's Office, Admissions Office, and the Alumni Office. The computer will handle three printing terminals and three CRT video screens installed at various locations in the college. The computer has the potential to handle 32 terminals and print out units which produce information at rates of up to 120 characters per second.

Innovations like the SOARS computer, electrodiagnostics, modular clinic units, interdisciplinary and affiliated clinics, and a tradition of academic excellence combine to make the Illinois College of Optometry an institution with a "focus on the future." •

ASSOCIATION of SCHOOLS and COLLEGES of OPTOMETRY

The Association of Schools and Colleges of Optometry (ASCO) represents the professional programs of optometric education in the United States and Canada. ASCO is a non-profit, tax-exempt professional educational association with national headquarters in Washington, D.C.



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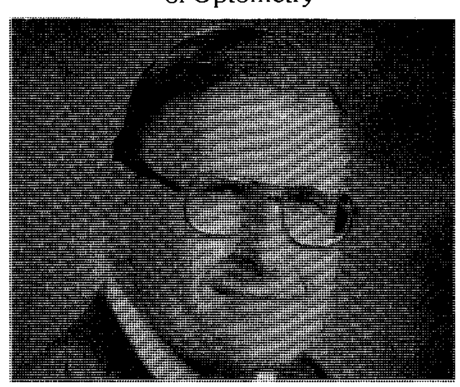

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