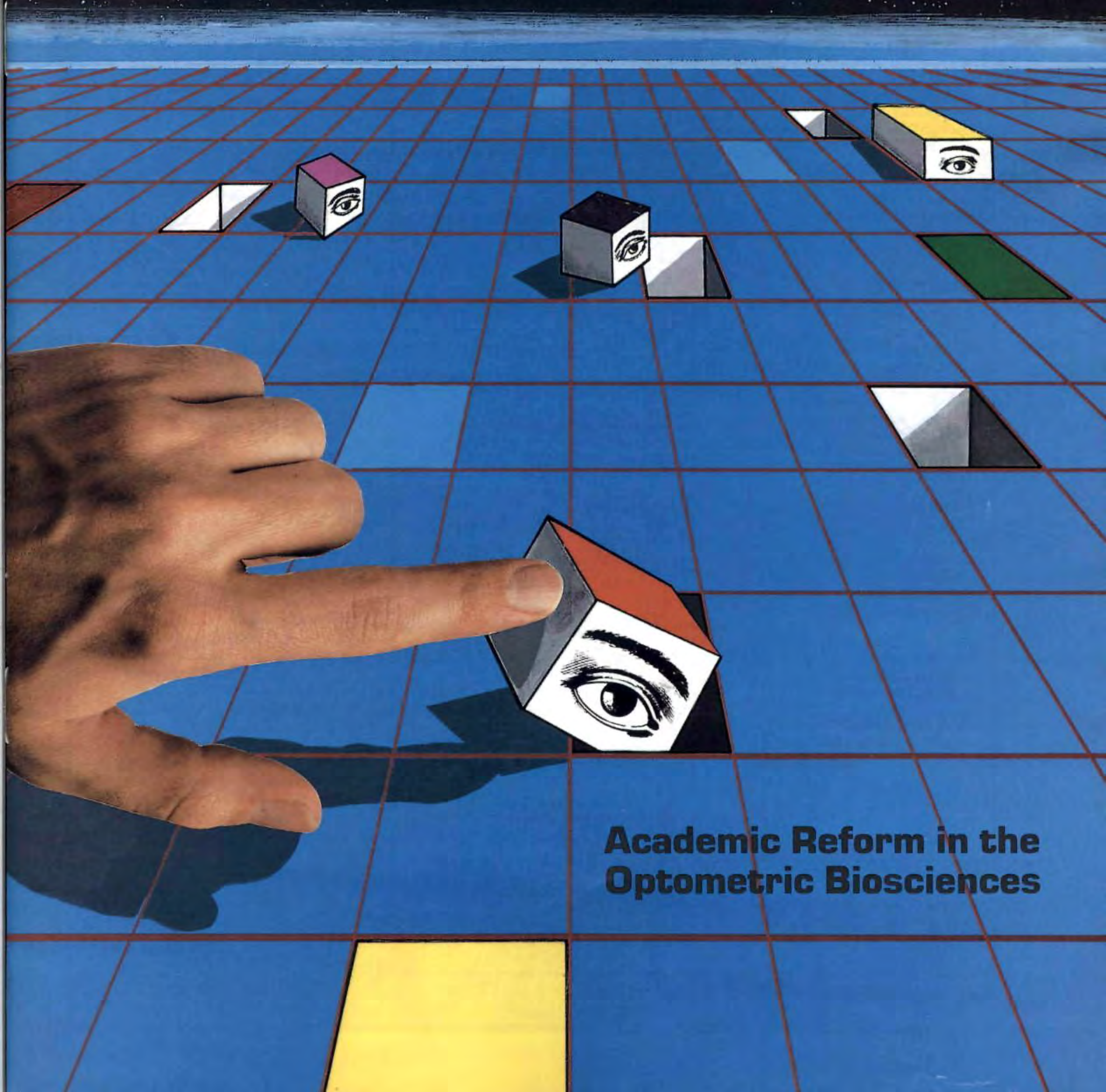
JOURNAL OF OPTOMETRIC EDUCATION

Summer 1991
Volume 16, No. 4



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ISSN 0098-6917

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JOE is pleased to publish the following papers based on presentations delivered by participants at the meeting of the Education Section of the American Academy of Optometry in December 1990.

Departments

The **JOURNAL OF OPTOMETRIC EDUCATION** is published by the Association of Schools and Colleges of Optometry (ASCO). **Managing Editor:** Patricia Coe O'Rourke. **Art Director:** Dan Hildt, Graphics in General. Business and editorial offices are located at 6110 Executive Boulevard, Suite 690, Rockville, MD 20852 (301) 231-5944. **Subscriptions: JOE** is published quarterly and distributed at no charge to dues-paying members of ASCO. Individual subscriptions are available at $15.00 per year, $20.00 per year to foreign subscribers. Postage paid for a non-profit, tax-exempt organization at Rockville, MD. Advertising rates are available upon request. *The Journal of Optometric Education* disclaims responsibility for opinions expressed by the authors. Article copies, 16mm microfilm, 35mm microfilm and 105mm microfiche are available through University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

A National Resource Center for Optometric Basic Science

The major symposium of the Education Section of the American Academy of Optometry meeting of December 1990, reported in this issue of the *Journal of Optometric Education*, brought together a diverse group of optometric educators and clinicians. The assembled panel explored the status of the optometric curriculum, the imperatives for change and the ways and means of academic reform. Panelists, discussants and attendees exchanged distinct and sometimes conflicting views. Yet, some common themes emerged. Clearly, the shared goals of academic excellence and curricular innovation instilled the group with a common purpose.

Confronting the immense task ahead, however, brought to the surface the profound constraints imposed by scarce resources. The schools and colleges of optometry have only very limited funds to implement new courses and programs. Futhermore, no one school or college of optometry has the critical mass of faculty expertise so essential to conduct extensive academic renewal in the basic Biosciences and Vision Sciences. The symposium presenters, appreciating the immense challenge of planning and implementing major innovation and expansion, kept coming back to the idea of an ongoing national effort.

A National Resource Center for Optometric Basic Science could be the vehicle to converge current resources in optometry, raise new planning and development funds, and lead a national effort that benefits all the schools and colleges of optometry. Building on the groundwork laid by the ASCO Taskforce on Bioscience Education and the ASCO Committee on Academic Affairs, the Center could conduct additional studies, devise reform strategies and disseminate findings and recommendations. Drawing upon the collective scientific, pedagogical, and health policy expertise in the schools and colleges of optometry, the Center could institutionalize the sharing of experience and knowledge in optometric curriculum. By reaching out to the other health professions, the Center could bring the lessons from other professional disciplines to bear on the specific tasks of improving optometric education.

Since optometry is a major contributor to the health of the American public, the Center would also be justified to seek private foundation and public funds available for projects of great public health benefit. Optometrists are independent health care professionals who apply unique clinical skills to the diagnosis and management of vision conditions and eye disease for millions of Americans each year. The American public rightly expects optometrists to be competent and caring health care professionals with specific clinical expertise in eye and vision conditions who innovate new diagnostic procedures and treatments. These public expectations mandate that optometric education expands and strengthens the basic science education of optometrists because innovative patient care skills stem from a sound education in the basic biosciences and the basic vision sciences.

The profession of optometry as represented by the American Optometric Association and the American Academy of Optometry, has the ultimate responsibility to promote academic excellence in optometric professional programs by helping to obtain new private and public monies to fund the work of the National Resource Center for Optometric Basic Science. Only a National Resource Center can keep hope alive for the new era of academic reform so enthusiastically embraced at the Academy Symposium on Bioscience Curriculum.

I call upon the leadership of the American Optometric Association and the American Academy of Optometry, to join the Association of Schools and Colleges of Optometry in an effort to establish a National Resource Center for Optometric Basic Science. Together, we can successfully renew the vitality of basic science education for optometrists, uphold academic excellence in optometric professional education, and ultimately, better serve the public.

Barry J. Barresi, O.D.
Vice President and Dean for Academic Affairs
State College of Optometry, State University of New York
Co-chair, ASCO Task Force on Bioscience Education

LETTERS

Dear Editor:

I wanted to support the concerns expressed by Drs. Catherine Hines and Lynn Cyert in their recent editorials. Optometric education is feeling the intense pressure of continuing to teach the elements of traditional optometry, while keeping pace with the exponential expansion of the realm and depth of practice.

Adding traditional lecture and laboratory hours to already seriously burdened workloads can only be counterproductive in its outcome. Five-year or twelve-month academic programs will negatively impact the already declining *qualified* applicant pool. Students need to be stimulated through guided self-learning and other innovative modes of education. In the medical education arena, schools like Harvard, MacMaster and Tufts Medical have significantly reduced classroom hours (e.g. Tufts has a maximum of three lecture hours per day in years 1 and 2) by instituting a Problem Based Learning (PBL) format using trained facilitators (mentors) and making increased library and other non-classroom resources available to their students. The Pennsylvania College of Optometry has already shown that this format can work in selected course situations. Problem based learning techniques can be applied to both the biological and non-biological basic sciences as well as the clinical diagnostic and therapeutic curriculums. In fact, cases can be presented in such a way that the students are directed to consider each of these areas as components of the problem solving exercise.

Optometry cannot afford to forget its traditional but still active aspects of practice, nor should it try to slow the present momentum towards increased therapeutics and other 21st century technologies. We must develop efficient, and stimulating mechanisms of teaching the expanded curriculum necessary to take optometry into the future.

Sincerely,
Walter Potaznick, O.D.
Associate Clinical Professor
New England College of Optometry

ASCO NEWSMAKERS

Proceedings Available for Aging Symposium

On 8th/9th March, 1990, the National Centre for Aging and Sensory Loss—Australia conducted a two-day International Symposium on Aging and Sensory Loss.

The Symposium was designed to address both a national and international perspective in examining trends in aged care services, research initiatives, innovation, rehabilitation, service approaches to independent living, and functional aspects of Aging and Sensory Change.

The proceedings of the Symposium are now available in print or on cassette tape. This compilation of papers highlights the impact of sensory loss and the diverse needs of individuals; how services respond to needs; and policy and research issues that require future attention. Audio tapes are available at A$7.00 per tape; or A$58.00 for set of nine tapes. Printed proceedings are available at A$25.00.

For orders and further information, contact:

The Administrator
National Centre for Ageing and Sensory Loss
7 Mair Street
Brighton Beach Vic 3186
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INTERNATIONAL: +613 598-8555

Optometry Students Attend FASHP Symposium On Pending Legislative Issues

Six students from the schools and colleges of optometry joined with other health professions students April 9-11, 1991, in Washington, D.C. for the Student Symposium. The symposium is sponsored annually by the Federation of Associations of Schools of the Health Professions (FASHP) to educate health professions students on pending legislative issues.

The students representing optometry were: Timothy O'Connor and Dan Stoltze from the State University of New York, State College of Optometry; Debra Pattison from The New England College of Optometry; Richard M. Hope and James T. Beverly from the Pennsylvania College of Optometry; and Celeste Freeman from The Ohio State University College of Optometry.

Two and a half days of activities were scheduled including Hill visits to the offices of key health legislators and guest speakers from the public and private sectors. Speakers this year focused on the impact of social and economic issues on the practice of health care and provided an inside look at the authorization and appropriations committees.

Some of the trends noted by the speakers included: (1) a new focus on program accountability, with the approval of grants tied into the provision of substantive data; (2) a feeling that the HEAL program should be phased out and replaced by something geared more toward disadvantaged students (The HEAL program is seen by legislators as more of an institutional subsidy than a direct aid to students); and (3) the polarization between liberal Democrats and conservative Republicans on the U.S. House of Representatives Subcommittee on Health and the Environment will mean that legislation such as Title VII of the Public Health Service Act, which includes programs affecting health professions schools and students, may have a difficult time being reauthorized without substantial reduction or modifications, given the focus on disadvantaged students.

In their meetings on the Hill, the students specifically supported National Health Service Corps funding for scholarships at FY 1991 levels increased by 10 percent for 1992; supported H.R. 179 and S. 102 which are intended to extend student loan deferments for residents; and supported H.R. 747 and S. 542 which would restore an income tax deduction for interest paid on educational loans.

Varilux Reports Patient Acceptance Rate High With Infinity Lenses

Dr. Rod Tahran, director of professional services and Danne Ventura, manager of professional services with Varilux Corporation recently published a study reporting a 92% patient acceptance rate with Varilux Infinity lenses. The study was conducted at eleven clinics at schools and colleges of optometry across the United States to determine success factors and satisfaction rates with Varilux Infinity. Although fittings were done by relatively inexperienced clinicians, and the patient population was not screened, success rates averaged 92%. The multidesign system of Varilux Infinity together with a positive presentation of potential benefits are thought to be the leading contributors to high patient acceptance.

"Studies such as this demonstrate that virtually all presbyopes are candidates for progressive addition lenses, and that success rates above 90% are readily attainable in the United States," said Dr. Tahran.

A total of 89 patients were fit with Varilux Infinity. Adaptation periods ranged from one hour to two weeks. Patients reported the greatest benefit of the lenses was the smooth, uninterrupted range of vision, followed by the cosmetic benefits of a "no-line" bifocal.

Volk Optical Introduces New Lens Cleaner

Volk Optical announced the introduction of its revolutionary new Laser and Precision Optical Lens Cleaner for AR coated, laser lenses and precision optical surfaces. The new lens cleaner, manufactured exclusively by Volk, was developed to be a one-step cleaning process that can quickly and easily clean lenses.

Donald Volk, president of Volk Optical and the developer of Precision Optical Lens Cleaner, describes the product as "a special, highly absorbent, lint-free optical towel moistened to an exact saturation level with a unique combination of oil removers and cleaning agents. Lenses clean and dry instantly, completely free of smudges, haze, lint and water spots, restoring light transmission to maximum levels for optimum lens performance."

Volk Precision Optical Lens Cleaner can be ordered from any authorized Volk distributor or by calling Volk direct at 1-800-345-VOLK.

Volk Optical is a high-tech manufacturer of diagnostic and therapeutic lenses used by eye care professionals. All Volk products are manufactured in the United States of America.

CIBA Vision® Offers Findings of Saline Solution Roundtable

CIBA Vision® Corporation is offering eye care practitioners a report that highlights findings from a roundtable held on the laboratory and clinical perspectives of saline solutions. The discussion focused on the importance of saline as a key solution in the lens care regimen.

The meeting, *Clinical Perspectives on Saline Solutions: A Roundtable Discussion,* included six eye care practitioners and was moderated by Gerald E. Lowther, O.D., Ph.D., F.A.A.O., professor and associate dean of the School of Optometry for the University of Alabama at Birmingham.

The purpose of the roundtable was to convene six experienced eye care practitioners to review the criteria of currently available salines and summarize the laboratory and clinical studies on a new product from CIBA Vision, SoftWare® Saline.

"We are extremely pleased with the clinical and laboratory results of the SoftWare Saline testing," Mark Hollands, CIBA Vision product manager, said. "The participating practitioners announced that in clinical studies their patient comments were overwhelmingly positive for SoftWare Saline. When asked to compare it to the saline used prior to the study, patients rated SoftWare Saline significantly higher (95 percent confidence level) on the following important attributes: non-irritating; lenses feel comfortable; lenses feel clean; good rinsing ability; and an easy-to-use container."

"In our discussion, we concluded that SoftWare Saline is a welcome addition for proper care of soft contact lenses," roundtable moderator Lowther said. "It not only demonstrated efficacy, safety, and comfort—even for patients with a history of sensitivity reactions to solutions—but retarded the growth of pathogens in open bottles."

CIBA Vision is offering the findings from the roundtable discussions in two formats, a transcript book titled *Clinical Perspectives on Saline Solutions: A Roundtable Discussion* and highlights of the discussions on audiotape titled *SoftWare Saline, An Audio Roundtable Discussion.* To obtain a transcript or audiotape, please contact your local CIBA Vision sales representative or phone CIBA Vision customer service at (800) 241-5999.

Allergan Optical Sponsors Visit of Optometry Students to SCCO.

Sixteen senior professional students and one faculty member from the Finnish School of Optometry visited the Southern California College of Optometry (SCCO) on Thursday, April 11. They were accompanied by SCCO alumnus Joe Vehige, O.D., manager, Allergan Research Clinic.

The visit, made possible by Allergan Optical, featured a lecture, "Optometry Today," by Morris S. Berman, O.D., M.S., dean of Academic Affairs. A tour of the teaching and research laboratories, Optometric Center of Fullerton, M.B. Ketchum Memorial Library, Bookstore and Student Lounge, as well as a buffet luncheon, followed.

Vistakon Initiates New Customer Service System

Vistakon, a division of Johnson & Johnson Vision Products, Inc., has initiated a new customer service system designed to ensure prompt response to telephone orders for its products and services.

By quickly identifying incoming calls by the customer's phone and account numbers, the enhanced computer system automatically forwards calls to the appropriate Vistakon customer service representative. These specialized personnel are designated to respond rapidly to orders from either independent eye care practitioners, retail or distributor accounts.

"Continuous enhancements in providing accounts with the best quality of service and products result in customer satisfaction," said Philip R. Keefer, Vistakon executive vice president of marketing. "By minimizing administrative tasks, the new computer system will provide even faster service to Vistakon customers."

The company said that its customer service enhancements played a key role in the significant growth within the last year as ACUVUE® became the number one prescribed soft contact lens for new patients and those refit from other lenses.

"Looking ahead to the new year, we are continuing to explore new programs and services that will help provide excellent service to Vistakon accounts," Keefer said.

Tura Acquires Exclusive Rights to Distribute Menrad Eyewear in the United States and Canada

Joe Largen, president of Tura, a leading supplier of fashion eyewear frames, announced that Tura has become the exclusive distributor of Menrad eyewear in the United States and Canada. He stated, "The combination of Menrad and Tura products creates what we believe to be the optical industry's most outstanding and complete line of men's and women's eyewear fashions. Superb styling and highest quality are the hallmarks of the united collections."

For years, Menrad has been considered to be the highest quality frame producer in the world. Under its new arrangement with Tura, Menrad will continue to control the manufacturing of frames. The Menrad design and production operations are located in the Stuttgart area of Germany. All Menrad warranties will continue to be honored.

Tura is one of the five largest eyewear companies in America, and in a recent industry-wide survey (*20/20* magazine) has been ranked number one in frame "style." Tura's attention to frame detail, aesthetics, and highest quality materials has resulted in it achieving its popularity and fast growth. John Weir, Tura general manager, stated, "Tura and Menrad each have traditions which reach back over 100 years. But we think that their brightest year will be the future. Tura and Menrad lines, sold by the knowledgeable and personable Tura rep force of 200, fulfill the needs of optical practices and of their patients for optical quality, comfort, and popular eyewear fashions for men, women and children."

Logo Paris Seminar Focuses on Marketing Support Strategies

Logo Paris recently completed an in-house training seminar for members of its national sales force. Included in the four-day session were an intensive overview of basic ophthalmology and a hands-on workshop to learn the basics of opticianry. The sales consultants were given detailed instruction in how Logo's Customer Service Department supports its customer base—from expediting orders to furnishing P.O.P. materials.

Presentations were given on different selling methods and marketing support strategies. Ray Elgin, senior regional manager, emphasized how to work a territory to be most responsive and efficient to the customer. The L'Original collection and related visual merchandising support materials were previewed. All of Logo's products were reviewed focusing on their features, benefits and quality craftsmanship. A video from Logo's French headquarters was shown on eyewear manufacturing processes with a heavy emphasis

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Academic Reform in the Optometric Biosciences

Bioscience education in optometric professional programs must be expanded and strengthened with new faculty and learning resources, but no single route of curriculum reform will guarantee successful academic innovation.

Clinical Imperatives for Academic Reform in the Optometric Biosciences

Barry J. Barresi, O.D.

Introduction

The theme of this symposium is academic reform in the optometric biosciences. We will explore the current status of the bioscience curriculum in optometric professional programs, consider options and strategies to strengthen courses and curricula, and review ways to improve instructional quality and teaching effectiveness.

Be prepared for presentations that will be forthright and pragmatic, sometimes bold and visionary. Those here assembled to present papers and serve on the discussion panels are of diverse academic and professional backgrounds with correspondingly divergent views on the best ways to implement academic renewal and reform.

We do share, however, a devotion to academic innovation. We are willing to examine the educational needs of optometry, a profession that 20 years ago accepted the mandate of new public policies to expand the scope of clinical responsibility and improve public access to high quality eye and vision care. We have, each in our own way, reached two conclusions that will emerge as the theme of today's symposium. First, bioscience education in optometric professional programs must be expanded in scope, raised to a higher level of academic rigor and strengthened with new faculty and institutional learning resources. Second, no single route of curriculum reform will guarantee successful innovation in the basic bioscience education of optometrists.

Dr. Barresi is vice president and dean for academic affairs at State College of Optometry, State University of New York. Dr. Barresi co-chaired the ASCO Task Force on Bioscience Education.

My task is to set the stage. Before exploring how to achieve academic excellence in optometric bioscience education, we must first appraise the objectives of the education enterprise and consider why academic reform is so critically important. I have approached this task from the same analytic perspective I use for any question of educational accountability. My analytic rule is that educational objectives in optometric professional programs must be based on the elements of good doctoring. Health professional programs best meet the needs of students by looking to the needs of the patients they will ultimately serve. The future patients of our students rightfully expect competent diagnosis, effective treatment and compassionate care. I call this rule of education for good doctoring, the clinical imperative for academic reform.

Let us start this exploration of the clinical imperative for academic reform by considering the following statement.

Optometrists are independent health care professionals who apply unique clinical skills to the diagnosis and management of vision conditions and eye disease.

Considering the goals of good doctoring and serving patients I conclude the following. Acquisition of knowledge, retention of professional competence, and innovation in optometric clinical skills make imperative a sound educational base in the human biology of health and illness. Moreover, the knowledge of current concepts in human biology provides clinically vital insights into disease and treatment mechanisms.

Optometrists have general obligations as health care professionals. In practice, we assess function, diagnose disease, educate patients about health conditions and manage patients. Patient management takes the form of specific treatment within our scope of expertise and legal authority, and may include consultation with or referral to optometric colleagues and other health professionals. Upon referral we often coordinate the secondary level care, monitoring patient progress and fulfilling our duty as primary care case managers. Often we are called upon for leadership in our community on health care issues by serving on public agency staffs, health facility boards or as members of community health organizations. We share these same general obligations with other independent health professionals, such as physicians, podiatrists and dentists. Since we have much in common with the clinical responsibilities of other independent health professions and in our attention to the systemic health of our patients, it follows that all health professions should share a common educational base in human biology and clinical skills in systemic physical diagnosis. Also bioscience contributes to contemporary general clinical practice by showing the way to be a thinking diagnostician who knows how to deduce expected signs and symptoms from the knowledge of pathobiology and knows how to induce from presenting clinical observation the natural history and sequelae of illness.

In addition to the clinical demands we share with all independent health professions, some specific obligations as optometrists, as the eye and vision experts, place unique demands on the optometric professional curriculum. Here basic bioscience contributes to better understanding of ocular biology—the specific background on vision, ocular function and eye disease. Bioscience knowledge also prepares the future practitioner to anticipate new clinical strategies; to understand new basic and clinical science developments; to stimulate graduate study and research in the biology of vision, eye health and disease; and to prepare for continuing professional education as the clinical scope of practice expands to new boundaries.

Public appraisal of these specific obligations of optometrists is reflected in actions by organized optometry, legislative bodies, regulatory agencies, other public authorities and organizations. Furthermore, the American public is making new demands of optometry. Public agencies are elevating community practice standards, state statutes are specifying expanded diagnostic and community health professional duties, new state laws are granting therapeutic prescriptive authority, insurance coverage is extending to full scope optometric care, and leadership roles for optometrists are evolving in hospital and health facility based practice settings.

The social mandate for optometry in the 1990s is clear. Optometrists are expected to serve society as the premier experts in clinical vision science, the community health leaders in preventing eye disease and vision dysfunction, and the entry level providers for high quality, comprehensive eye and vision patient care.

Examples of optometry's new social contract include the definition of optometry adopted by the American Optometric Association in 1989, the federal government's action to redefine optometric care eligible for reimbursement with public funds, and the most recent national resolution adopted by the American Public Health Association that addresses eye and vision care public policy.

AOA Definition of Optometry

"Doctors of Optometry are primary health care providers who diagnose, manage and treat conditions and diseases of the human eye and visual system, as regulated by law."

(Adopted by the AOA Board of Trustees, March 1989)

Federal Definition of Optometry

Consider the profound mandate for optometrists in the care of our most vulnerable population—the elderly. Since April 1, 1987, when the Medicare act was amended, optometrists have been considered physicians with respect to all services they are authorized to perform under state law or regulations. Section 9336 of the Omnibus Budget Reconciliation Act (OBRA) of 1986 (Public Law 99-509) provides that "payment would be made under Medicare for vision care performed by optometrist, if those services are among those already covered by Medicare when furnished by a physician and if the optometrist is authorized by state law to provide such services." By legislative fiat the federal government in effect aligned insurance reimbursement policy to keep pace with state mandated expansion in the scope of clinical responsibility of the optometrist. In another federal action to equate the professional duties of optometrists and physicians, the OBRA of 1990 set in motion the elimination of medicare specialty differentials in fees between optometrists and physicians.

American Public Health Association Resolution on Eye and Vision Care

The American Public Health Association,*

Noting that more than one-third of all Americans have a disease or physiologic abnormality in one or both eyes; and

Recognizing that only about one-half of the total population in the United States needing treatment for eye disease is receiving it; and

Noting that eye disease and blindness cost the nation an estimated sixteen billion dollars a year; and

Realizing that eye health problems and vision care demands will increase significantly in the future as the US population ages; and

Observing that optometric services are available in approximately 6,400 communities in the United States and that doctors of optometry are the only primary eye care providers in nearly 4,000 communities, and that nationwide optometrists outnumber ophthalmologists nearly two to one; and

Noting that 60 percent of primary diagnostic eye examinations in the United States are provided by the 25,000 active optometrists; and

Realizing that many people who need medical eye care are already being treated by optometrists in many states; and

Noting that optometric reimbursement rates are typically lower than those of other providers of comprehensive eye care; and

Realizing that many people who want to receive medical eye care are now being treated by optometrists; and

Recognizing that it is prudent public policy to utilize appropriately trained and licensed health professionals at their highest level of skill and training as determined by state licensing laws; and

Noting that Medicare reimburses diagnostic and therapeutic eye care services delivered by optometrists as authorized by state practice acts; and

Noting that 25 states have passed laws and regulations that allow optometrists to use therapeutic pharmaceutical agents after completing appropriate training and testing requirements; and

Observing that the Department of Veterans Affairs, the US Armed Forces, and the United States Public Health Service have regulations or credentialing statements that allow optometrists to utilize therapeutic pharmaceutical agents to the benefit of their patients, and noting that this expansion of the clinical privileges of optometrists has increased the availability and cost-effectiveness of eye care to the American public through lower fees for services and by a reduction in double visits and hospital emergency room visits; therefore

1. Recommend that legislators update their state optometric practice acts to allow for optometric use of those diagnostic and therapeutic pharmaceuticals which have been determined by the State Board of Examiners in Optometry as being within the scope of competency of pharmaceutically certified optometrists; and

2. Recommend that dispensing of such pharmaceuticals be regulated by state pharmacy laws.

*Resolution adopted October, 1990 by the American Public Health Association

Clinical Imperative to Serve the Health of the Public

Another approach to gauging the clinical imperative for academic reform is to consider the emerging health needs of high health risk populations. *Eye disease and vision disorders are a major* *public health problem that causes disability, suffering, and loss of productivity.* Eye diseases and blindness cost the Nation an estimated $16 billion per year. Over 11 million people are visually impaired and over 100 million wear eyeglasses or contact lenses. Patients with visually related learning problems, occupational visual performance problems, binocular vision conditions, visual impairments, and contact lens related problems remind us of the ongoing need for an appropriate educational base in the vision sciences of applied optics, physiological optics, cognitive psychology, behavioral sciences of vision, optometry theory of lens correction and visual therapy. Likewise, high health risk populations present with a spectrum of clinical needs that demand of us a good working knowledge of disease mechanisms and basic biological principles in diagnosis and management.

New demands and responsibilities are converging on optometry at a time when a major public health initiative is needed to diagnose and treat the specific eye and vision problems of high health risk populations. Some of these special populations in need include infants and children, adults with chronic disease, frail elderly, HIV and AIDS patients, and substance-abusing individuals.

Conclusions

Public Obligations, Clinical Imperatives and Academic Reforms

The optometrist as a primary care health care provider is in a unique position to make the early diagnosis and effectively manage patients from high-risk populations. Optometrists provide the majority of eye and vision care in the United States. For many high-risk patients, the vision exam may be the only regular contact with the health care system. The new social contract established between the profession and the public over the last several decades obligates optometry to serve high health risk populations. Moreover, the new social contract demands that today's optometric graduates will lead innovation in the patient care technologies of the future.

The most important asset of any profession is the capacity to initiate meaningful change in response to societal needs. Considering the views I have expressed, I offer a six-point challenge list for optometry. I call upon all constituencies in optometry to reflect on and respond now to these challenges.

1. Optometrists have a professional duty to serve as care givers and innovators.

The American public expects optometrists to be competent and caring health care professionals with specific clinical expertise in eye and vision conditions who innovate new diagnostic procedures and treatments. Public expectations and professional duty mandates that optometric education expand in scope, increase academic rigor, and strengthen, with new faculty and institutional learning resources, the teaching of bioscience.

2. America's health care needs mandate sound education in basic bioscience and preparation of thinking clinicians.

The clinical needs of high health risk populations require the optometrist to be clinically proficient in a functional health model of diagnosis and management well rooted in a working knowledge of the biology of health and illness and the basic sciences of vision function. Bioscience curriculum changes are required now because of both the expansion in diagnostic responsibilities and therapeutics prescriptive authority. A clear understanding of the underlying basic biosciences is needed to efficiently perform disease differential diagnosis and to select treatments, rather than relying on the inefficient and error prone technician approach of memorizing lists and recalling simplistic drug protocols.

3. Professional programs should prepare clinicians with tools for lifelong learning.

The basic science curriculum (bioscience and visual sciences) should provide students with the building blocks to develop lifelong habits of learning from clinical experience and from the critical reading of current research literature. The optometrist who understands today's advances in the basic sciences will have a preview of tomorrow's clinical innovations.

4. Bioscience education in optometric professional programs need not compromise vision science curricula.

A professional program with properly balanced coverage of basic bioscience, basic vision science and clinical science can be implemented to fully support the unique functional health care model for optometric clinical practice. College faculties and administrators should insist that the same type of rigorous basic science foundation that optometry has in physiological optics be established in the optometric basic biosciences.

5. Excellence in optometry programs requires high academic standards and curricular integration.

Clinical acumen in diagnostic and therapeutic decision making is best acquired when optometric education exposes the student to rigorous and integrated teaching at all three curriculum levels: (a) graduate level bioscience and vision science knowledge of the principles and mechanisms of health, dysfunction, and disease; (b) problem-based learning of clinical sciences; and (c) intensive clinical training with high health risk populations.

6. Leadership in academic excellence is needed from all sectors of the profession.

Leaders in organized optometry, optometric education, state boards and the NBEO should come forward to clearly state that knowledge of treating eye disease is nationally part of the practice of optometry and that acquisition of knowledge, retention of professional competence, and innovation in diagnosing and treating eye disease make imperative a sound education in the basic biosciences—the human biology of health and illness. Moreover, organized optometry, the American Optometric Association, and the American Academy of Optometry bear the ultimate responsibility as the patrons of academic excellence in optometric professional programs.

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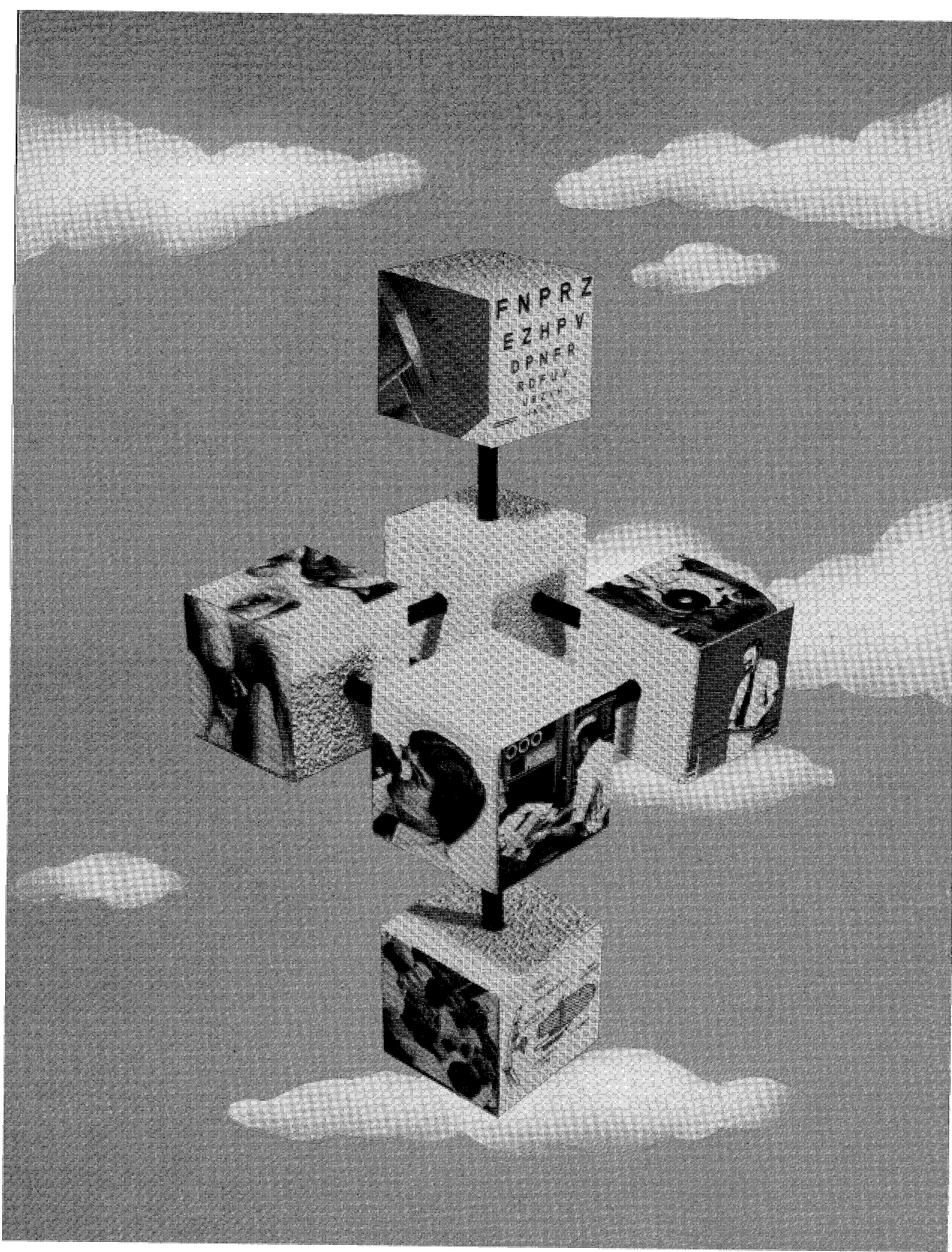
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Optometry Basic Science Curricula: Current Status

Morris S. Berman, O.D., M.S.

Abstract

Optometry education faces a crisis in the basic biological sciences. As the scope of the profession expands, a concurrent change in the education and training of professional students must occur. A national task force has recommended a curriculum model which far exceeds the basic biological science programs curriculum which most schools and colleges presently offer. The current status of the basic biological sciences at optometric institutions was studied by means of a questionnaire. The results provide insights on manpower, curriculum, learning resources and budgetary support currently available. Conclusions indicate that major changes in biological sciences education must occur and that a national effort will be needed to support these changes.

Introduction

There is mounting evidence that the schools and colleges of optometry need to advance their educational programs in the basic biological sciences to meet the challenges of contemporary practice. A number of factors are collectively determined to be influencing the status of the biological sciences as presently taught in the schools and colleges of optometry. These factors include the primary health care provider status of the optometrist, the movement towards therapeutic privileges in the majority of states, the national health care movement and optometry's role in such a system, the influence of insurance programs and third party payments on the future of the profession, the influence of technology, reported demographic trends, and the impending changes in external examinations at the state, regional, and national level.

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The Association of Schools and Colleges of Optometry (ASCO), the parent organization of accredited optometric educational institutions, adopted a Strategic Plan for Optometric Education[1] in 1987 which provides a template for the basic and clinical sciences, and specialty training. As a follow up to this important document, ASCO has promoted several initiatives related to enhancing the state of optometric education. Several educator workshops and programs have been arranged to bring together faculty who share expertise and interests in like disciplines. These programs include:

- Gerontology Curriculum Workshops, 1988
- Binocular Vision, Vision Development Workshops, 1988
- Practice Management Curriculum Workshops, 1989, 1991
- Biological Science Curriculum Task Force Workshop, 1990
- Clinical Directors Conference, 1990
- Ophthalmic Optics Curriculum Workshop, 1990

In the fall of 1989, ASCO appointed a standing Committee on Academic Affairs (CAA) with members from private and public institutions representing basic, visual and clinical sciences. The Committee was charged with studying and recommending academic priorities for optometric education—these included the curriculum, educational manpower, teaching innovations, faculty recruitment, and faculty development. A short time later, ASCO and the National Board of Examiners in Optometry (NBEO) cosponsored a separate Task Force to study the basic biomedical science curriculum model in optometry.

When the CAA first assembled, it was quickly recognized that a need existed to investigate the present and continued role of the basic biological science component in the optometric curriculum. To this purpose, the CAA initiated a number of approaches to ascertain the current and future requirements in the biological sciences.

Questionnaire

Inasmuch as the determination of topics in the various disciplines and the number of hours to be assigned to each was eventually defined by the ASCO/NBEO Task Force, the CAA proceeded to survey the schools and colleges on some of the administrative, faculty, and budgetary factors pertinent to the teaching of the biomedical sciences. In formulating some of the questions, the CAA was guided by the AOA definition of an optometrist as one who: "is a primary health care provider who diagnoses, manages and treats conditions and diseases of the human eye and visual system as regulated by the state law." Therefore, biomedical areas that are apt to have significant impact on the newly-found understanding of numerous diseases were also surveyed. These included immunology, embryology, and molecular biology.

To date, the CAA has received responses from ten of the seventeen schools and colleges of optometry surveyed in June 1990, and it is these data that are presented.

Results

The first question sought the departmental status of the biological sciences at each institution.

The responses indicate that 45% of the schools/colleges have a free-standing department of biological science; 22% house the department as part of the basic and visual sciences; 23% exclusively use other university departments; and 10% list no specific "home" for the biological sciences.

There appears to be little uniformity as to the departmental status of the biological sciences at the various optometric institutions. The implication is that there may be a lack of interaction among faculty teaching the courses. This will likely change in the future as the biological sciences take on added significance in the curricula at the various schools and colleges. What is recommended is that more dialogue between administration and faculty occurs to determine the appropriate status of the biological sciences and effective curricular integration with the basic and clinical sciences.

The second question inquired as to who takes primary responsibility for managing the biological science program.

The responses indicate management by the dean or the dean's office occurs at 56% of the institutions; 34% have shared responsibility between the administration and faculty; and in 10% of the cases, it is the exclusive responsibility of the curriculum committee.

These responses demonstrate that the direction and advocacy of the biological sciences is largely in the hands of deans or department chairs. What may be needed is a greater role for the faculty through their involvement and participation on curriculum committees.

The third question was directed at discovering the breadth of the basic biological science curricula at each institution.

Table 1 provides a summary of the responses from ten of seventeen schools surveyed with comparisons to contact hours as recommended by the ASCO/NBEO Task Force.

Responses indicate that a wide disparity in the biological sciences curricula exists among institutions; the number of hours reported equals 70% of those recommended by the ASCO/NBEO Task Force (i.e., 318 hours compared to 455 hours); particular areas that are taught in significantly fewer hours than recommended by ASCO are biochemistry, general microbiology, general pharmacology, and general pathology.

What is recommended is that more dialogue between administration and faculty occurs to determine the appropriate status of the biological sciences.

There are some optometry programs that rely more heavily on prerequisite courses to meet these basic biological science needs. Medicine and dentistry rejected this approach several years ago for reasons that are relevant to optometry today—these include the lack of uniformity of biological sciences in undergraduate programs and the inability of undergraduate programs to offer courses that provide clinical correlates which are considered critical in the development of professional students.

The fourth question sought information on the resources that are currently available in optometric biological science laboratories.

There is a wide disparity in the available equipment in these laboratories as well as budgetary outlay for each fiscal year. Annual capital expenditures are modest, falling below $10,000 per year at some institutions. Despite having limited resources, a significant investment in equipment will be necessary by most schools/colleges as their biological science curriculum expands. A practical approach to this dilemma is the development of alternate methods of teaching including greater emphasis on "demonstration" type laboratories.

The fifth question studied the biological science manpower in optometric education and was designed to determine the credentials, faculty status, and teaching experience of these faculty in the various schools and colleges of optometry.

Two staffing patterns emerge from the responses. The first is associated with university affiliated programs where faculty assigned to teach the biological sciences to optometry students are generally drawn from other departments on campus. The second pattern is more characteristic of private colleges of optometry where the instructors generally have their primary appointment at the college of optometry. These instructors are augmented by a number of subspecialists from neighboring medical or health science schools. An overwhelming number of the basic biological science instructors have Ph.D. degrees; a much smaller number have combination O.D., Ph.D., or M.D., Ph.D. degrees, and a few have the combination O.D., M.S. or singular M.D. degree. The average teaching experience for faculty reported in this survey is 11.7 years with a range of 1-29 years. For the present and the foreseeable future, optometry will continue to rely heavily

TABLE 1
Basic Biological Science Courses

Course	Hours	Mean		ASCO Recommended
Anatomy	11-80	30		40
Histology	11-40	25		30
Neuroanatomy	10-60	32		45
Physiology	11-72	41		
Endocrinology	6-30	17	78	80
Neurophysiology	10-36	34		
Biochemistry	10-60	34		60
General Microbiology	8-57	27		45
Immunology	8-27	17		20
General Pharmacology	30-80	45		65
General Pathology	20-48	32		70
	Totals	318		455

on faculty whose primary academic affiliation is outside the school or college of optometry. This is advantageous when individuals bring "cutting edge" information to the program, but a disadvantage is that these individuals may not have a vested interest in optometry, nor do they participate actively in faculty governance or service to the institution. In the future, optometric institutions must develop a larger core of biological sciences faculty and this shortage of manpower must be addressed by ASCO, the American Optometric Association, as well as the graduate programs in optometry and health sciences.

The sixth question related to the availability of learning resources for the biological sciences.

All optometry schools make use of a wide selection of available slides, models, and video cassette tapes. The largest audio visual collections in biological science subject areas are anatomy and neuroanatomy. Some optometry schools indicate that they have purchased or are developing computer software and laser videodisc programs for teaching purposes. Notwithstanding the need for significant investments by most schools and colleges, the CAA endorses the suggestion that institutions use alternative teaching methods to somewhat alleviate the budgetary demands for costly equipment used in biomedical science laboratories. Indeed the rapidity with which technology is changing would suggest less investment in short-lived instrumentation and more prudent investment in teaching approaches which permit the student to access information and integrate this for purposes of clinical problem solving.

Conclusion

Increased institutional curricular commitment to the biological sciences is unavoidable given the movement of the profession towards ocular therapeutic management. Problems can be anticipated during the transition to an expanded biological sciences curriculum and the administration and faculty at each school or college must work in a supportive way to implement the needed changes. Curricular disparities in the biological sciences exist within each optometry program, and all schools and colleges will need to reorganize and expand their biological sciences curricular commitment.

The transition to an expanded biological curriculum raises four issues:

1. FACULTY

The importance of having full-time faculty with vested interests in optometry must be a priority for those involved in academic planning and recruitment.

Solutions which have been prepared include the following:

- Sharing of faculty among regional institutions.
- Development of O.D.-Ph.D. programs in biological sciences.
- Providing support to gifted, motivated professional and graduate students.
- Aggressive recruitment of Ph.D.'s to teach at optometric institutions.
- Increase the number of biological science trained Ph.D. applicants accepted into accelerated O.D. programs (e.g., as presently offered by the New England College of Optometry).
- Providing programs aimed at faculty development and retention of quality faculty in the basic biological sciences.
- Emphasizing biological sciences as part of the educational and professional programs associated with the American Optometric Association and the American Academy of Optometry.

2. FACILITIES

Increased budgetary outlay for equipment and expanded laboratory space will be needed at many optometric institutions. Simultaneously, demonstration laboratories and the use of alternate teaching methods may reduce prohibitive costs of acquiring new biological instrumentation.

3. CURRICULUM DESIGN

Part of the challenge for the schools and colleges of optometry will be the development of an expanded basic biological science curriculum and the placement and integration of these courses within a packed curriculum. The CAA recognizes that this restructuring must be accomplished within each four-year optometry program and the Committee advocates an enhancement of pedagogical methods to streamline this process. To assist in these efforts, the Committee recommends that a national educational congress for optometry be convened for purposes of developing educational strategies to better meet the present and future needs of optometry graduates.

4. TIME FRAME

There is a need to balance the changes within a profession with those occurring in the educational system. It is imperative that each school and college study its curriculum and determine how to implement these biological sciences changes. This process may be disruptive to faculty and students, but it will serve the graduates' best interests as they prepare for national and state licensing examinations to practice in the location of their choice.

Acknowledgement

I wish to thank all members of ASCO's Academic Affairs Committee for their dedicated efforts and contributions to this report. These individuals include Pierette Barker, Ph.D., David Heath, O.D., and Earle Smith, O.D., Ph.D.

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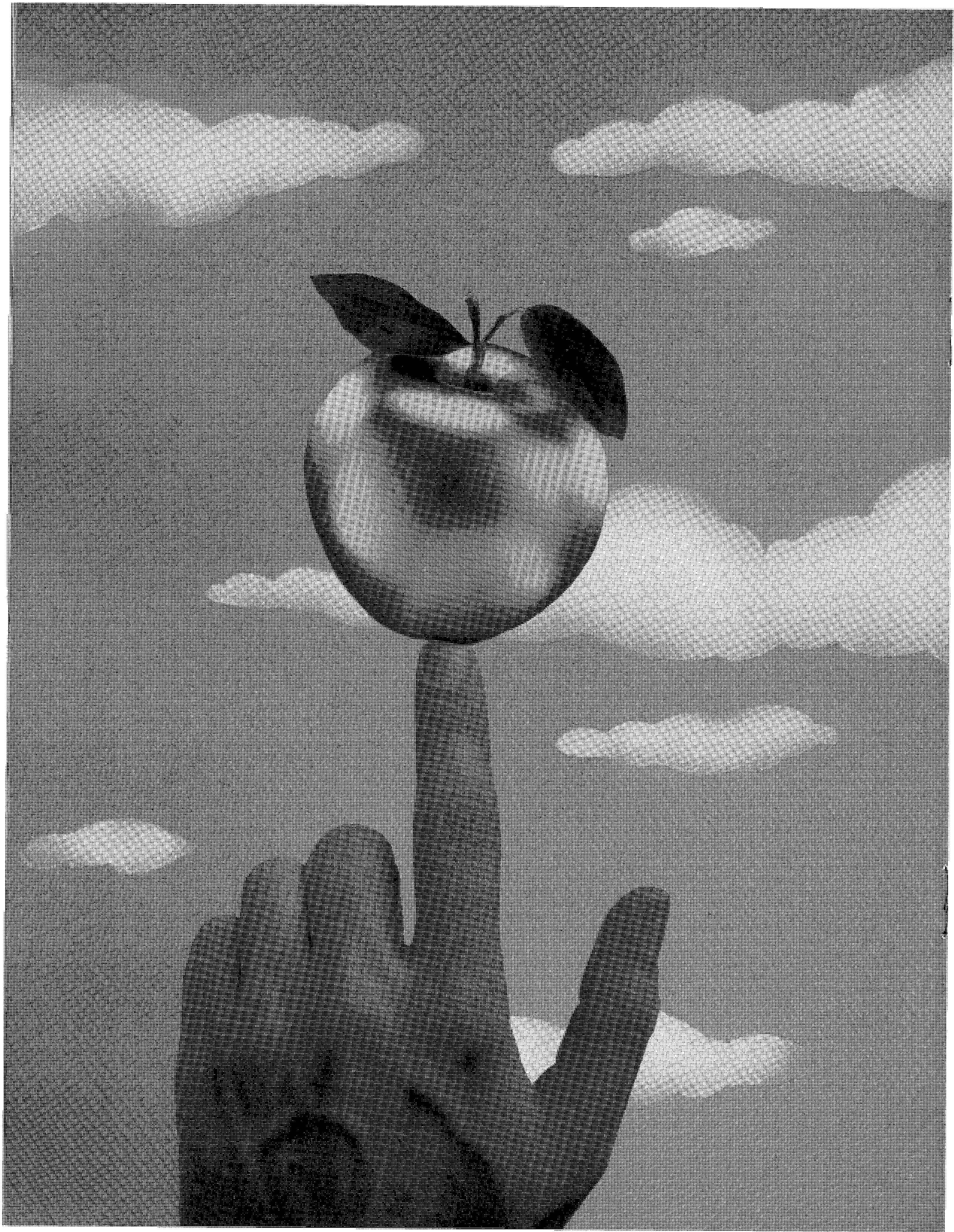

Academic Restructuring: Options and Strategies

Thomas F. Freddo, O.D., Ph.D.

Introduction

Academic restructuring implies more than simple modification or "updating." Instead the inference is one of rather substantial alteration, potentially including reconsideration of the fundamental bases of an educational process. One undertakes such a process only after substantial debate, a debate which, for the purposes of this discussion, will be considered to have been resolved in the only manner consistent with the recent past and the present thrust of this profession to assume a role as the primary entry-point into the eye care system of the United States.

No outside force drove this profession to change itself from one which was non-medical to one which is now medical. Indeed, it is relevant to note that it was actually not the initial introduction of drugs into the profession that changed it from non-medical to medical. For even with introduction of diagnostic drugs, the profession was still essentially non-medical. Only a cursory understanding of the most basic tenets of human biology in its various facets was necessary to use diagnostic drugs, and the fundamental basis of the practice of optometry had not been altered.

It was only with the passage of therapeutic legislation that the profession of optometry changed ITSELF in this most fundamental way, from that of a non-medical to a medical profession. Recent pronouncements by officials of the AOA[1] and a resolution recently passed by the American Public Health Association supporting the use of therapeutic medications by optometrists[2] make it clear that optometry will continue to move aggressively into the medical arena. Optometry muse take these new responsibilities very seriously. Failure to adequately train optometrists to meet these fundamentally different roles will have significant consequences as more states include language in their enabling legislationn that holds optometrists to the same level of medical responsibility as physicians. As a profession now entrusted with medical responsibilities, the practice of optometry has been changed and so too has its requisite educational foundation. So much, that:

FOR THE PRIMARY EYE CARE PRACTITIONER IN THE 1990s AND BEYOND, IT MUST BE CONCEDED THAT THE BASIC BIOMEDICAL SCIENCES HAVE SUPPLANTED PHYSIOLOGICAL OPTICS AS THE PRIMARY ACADEMIC DISCIPLINE UNDERLYING THE PRACTICE OF OPTOMETRY.

It is peculiar to witness some optometric educators joining the majority of ophthalmologists wringing their hands, asking the same question. How could such a change ever have been allowed to happen? No one expects ophthalmologists to acquiesce for the good of the optometric profession. Nonetheless, many will admit that the best that they can achieve is to delay the inevitable. Recalcitrant optometric educators will be no more successful, but they run the decided risk of backlash from practicing optometrists—the group that, by passing legislation, has long ago settled the question of whether academic restructuring is needed. All that remains for responsible educators to do is to implement these changes in the most rapid and efficient manner possible.

Several years ago, at a time when only six states enjoyed therapeutic privileges, one optometric educator, writing in *The Journal of Optometric Education,* had already concluded that "The topic of whether curricular change is needed is no longer one of a philosophical nature, but must be viewed as one of implementation."[3]

In this manuscript a series of options are discussed that logically present themselves for consideration in making requisite changes. Some of these are already in existence at certain institutions. Obviously, no one solution will work equally well for all institutions and, for this reason, none are presented as being necessarily the best for all. Also included are certain opinions of the author as to the relative desirability of certain options, including at least a couple of options currently being employed that are no longer tenable.

Options for Change

Given the amount of material that must be added to optometric curricula, the obvious central question becomes —HOW CAN WE POSSIBLY SQUEEZE IT ALL IN? Logically, only a limited range of options emerges that will provide the added time. These are:

OPTION #1: Increase the total time necessary to earn the O.D. degree.

OPTION #2: Decrease the amount of time devoted to other curricular areas.

OPTION #3: Find ways to increase the efficiency of all aspects of optometric training.

OPTION #1: *Increasing the total time necessary to earn the O.D. degree.* Clearly one way to deal with the prob-

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lem of squeezing everything in, is to avoid the problem entirely by simply adding another six months or a year to the pre-doctoral program. Ophthalmology is moving toward increasing residency programs to four years from the current three. With residencies becoming more common as a part of optometric training, however, little sentiment exists for pursuing a 5th pre-doctoral year in optometry unless all other options have been exhausted, and for good reason. Given the dwindling applicant pool and the enormous burden of debt already incurred in a four-year program, it is reasonable to predict that applicant numbers would fall precipitously were this option to be exercised.

One variation on this theme is to remain at four years but to have students attending year-round, from the very beginning of their optometric education. Most schools already require summer attendance between the third and fourth professional year and some require attendance between the second and third years as well. Since overhead costs at most institutions can be reduced only marginally during the summer, this option has the appeal of being possibly more cost effective.

The drawbacks of this option are its potentially adverse effects on BOTH students and faculty. For students, the option is lost to work during the summer to offset some of their debt. One cannot overlook the importance of summer income as a means of ensuring continued enrollment. Drawbacks regarding faculty, at least at some institutions, are that summer may represent the only time available for individual development, organization of new curricular material, completion of manuscripts and time for intensive full-time research. All of these are essential to maintenance of a vibrant faculty and should not be compromised, if possible. Even if the non-teaching aspects of faculty and curricular development can be achieved at times other than summer, the adverse impact on students should keep this option as one also reserved for use as a last resort.

The consensus in optometric education favors the notion that the necessary educational components can be taught within the traditional four-year program, but that difficult decisions and hard choices will have to be made. As a practical matter, this means that the requisite changes must be achieved through some combination of Options 2 and 3.

OPTION #2: *Decreasing the amount of time devoted to other curricular areas.* In discussing this option, it is important that we not hide from the fact that some of this is going to have to be done and that, for some faculty members, these changes may cost jobs or, at least, full-time equivalencies.

At most institutions, the biomedical science faculty are either among the most junior, or are the part-timers, who are not in positions to mandate curricular reform over the objections of more senior, often tenured, full-time faculty from the historically more traditional disciplines that are now feeling threatened. As such, making the needed changes will require real leadership and commitment from academic administrators, in some cases requiring them to make changes contrary to their own personal convictions regarding the direction the profession has chosen to pursue.

The full-time faculties of many institutions are currently overloaded with people trained in physiological optics and visual science, at a time when the proportion of the curriculum that will be devoted to these disciplines will need to be reduced. One obvious way to deal with this mismatch would be to permit available faculty to teach courses in the basic medical sciences. Although there are occasional exceptions, such conversions, must, in the author's opinion, be coupled with mandates for additional, extensive, *formalized* training at a department qualified to provide graduate training in the new discipline. Self-study or self-education should not be an option, and institutions should be willing to invest in their faculty who are willing to complete additional training. It should be the general policy of each institution that only individuals who are truly qualified and credentialed in the basic medical sciences should be assigned teaching responsibilities in these areas. In this regard, it is important to note that neither an O.D. nor, for that matter, an M.D. degree alone, necessarily represents sufficient credentials to teach the biomedical sciences.

Finding the new faculty that are needed will not be easy. The profession has been negligent in anticipating this need. For example, until very recently there has not been a single program in the country designed to provide graduate training to optometrists in other than physiological optics or visual science. Encouraging young optometrists to pursue graduate studies in the basic medical sciences must become a priority if the faculty needs of the profession are ever to be met.

Although wholesale cuts in traditional curricular areas would clearly achieve the requisite restructuring in the most efficient fashion, use of this method as the sole option for change is simply not appropriate. The disruption of careers and people's lives would prove too high a price, even to administrators committed to the substantial amounts of change that most institutions must face. No one takes delight in having to let people go. What this means is that, while a certain amount of the traditional curriculum will have to be eliminated and/or compressed, Option #3 may prove to offer the dual advantage of being BOTH more effective in achieving change and also more compassionate, if conscientiously, and self-critically implemented and not used merely to subvert the process.

THE PRETENSE OPTION: *Making the Biomedical Sciences Prerequisites.* Before going on to discuss the third option, and some of the strategies that can be employed to free up teaching hours in the academic program, one option that has been used at some institutions to stave off the introduction of virtually all biomedical sciences into the curriculum must be addressed. This is the Pretense Option, in which the issue of biomedical science education is simply finessed by listing virtually all such courses as prerequisites for admission. This misguided and illusory option must be halted at all costs, even if it means that certain institutions will be forced to close their doors. Equivalent courses to those which must be implemented at optometric institutions are not taught at the undergraduate level.

One course that has been particularly prone to such mishandling has been microbiology. Undergraduate courses in microbiology are simply not geared to medical microbiology. The most common group of diseases that optometrists treat are infectious diseases such as blepharitis and conjunctivitis. As pharmacologist Dr. Jimmy Bartlett has correctly observed, "we should stop talking about pharmacology as the only course objective preparing our students to provide competent therapeutic eye care."[4] Knowing the pharmacology of every antibiotic available is of little value if your background doesn't include an equally complete knowledge of the microorganisms that these drugs are designed to eliminate. Medical microbiology, including laboratory experience with culture media, immunofluorescent methods and sensitivity testing is now an absolutely essential and indispensable element of the optometric curriculum. Like the other biomedical sciences, it cannot be replaced by coursework completed in college.

OPTION #3: *Increasing efficiency in all aspects of optometric training.* Because of the way in which the biomedical sciences have been introduced into the optometric curriculum, they have been required to enter devoid of fat, and, in most cases, pared down to the bone in order to even gain a foothold. On the other hand, because of their historical pre-eminence, more traditional areas have rarely been subjected to similar scrutiny, requiring of them clear justification for their continued presence in the curriculum. During academic restructuring, no portion of the optometric curriculum can any longer be considered immune to challenge and, because of the prior discrepancies in the levels of scrutiny, it should reasonably be expected that the greatest reductions will come from the traditional areas.

This being the case, it would be understandable for traditional area faculty to see little practical difference between OPTIONS #2 and #3 where their courses are concerned. There is a very big difference, however, for in Option #3, the affected faculty are accorded the opportunity to trim themselves down, as opposed to OPTION #2 in which the changes would be mandated by administrators.

In the author's opinion, OPTION #2 should be used by administrators to set goals for necessary reductions. Once these have been established, faculty in traditional areas should be permitted a relatively free hand in exercising OPTION #3 to revise their curricula to reach these goals. Placed in its proper historical context, this is not an inappropriate requirement since it is exactly the same process that basic medical science faculty have had to go through to even get started. Despite this, it must be made clear that biomedical science faculty should not henceforth be freed from the already existent pressure to keep their material as streamlined as possible. No one should be declaring open-season on the optometric curriculum for biomedical science faculty.

In the final analysis, the entire curriculum needs to be put on a diet and the strategies that will be needed must include some novel and creative solutions. To ensure that an unwieldy glut of biomedical sciences is not simply added *en bloc* to the curriculum, a financial commitment will be needed for developing new resources to permit the biomedical sciences to be taught in the most efficient manner possible. The Academy, ASCO and AOA should join forces to create and fund a biomedical science teaching resource center. Each optometric institution should be visited (not just surveyed) to root out singularly creative programs that can be made available for general use. The program must be a systematic and on-going program to seek out creative educational strategies both within and outside of optometry. Medicine is facing similar problems of curricular overload and we should not deny ourselves opportunities to tap into any of the innovative changes that may arise from their efforts.

Regarding implementation, concerns are often voiced that increases in basic medical science curricula cannot be achieved because the laboratories associated with these courses take too much time. As a result, some institutions have tried to introduce basic medical science curricula with minimal, if any, associated laboratory experiences.

As stated by Jimmy Bartlett in his article entitled, *The Didactic Therapeutics Curriculum,* "even the best-designed didactic curriculum will fail if it's not supported and followed by quality clinical instruction using sufficient numbers of patients with ocular disease."[4] The concept embodied here has a perfect analogy in basic science education as well, pertaining to laboratories. Properly organized, and taught by qualified faculty, this author believes that laboratory experiences may be substituted for substantial blocks of lecture material. In the end, not only has the total number of contact hours been reduced, but the experience will be of more value to the student. Whether it is visual evoked potentials, the anatomy of the heart, or retinoscopy, many hours of lecture, accompanied by even the most magnificent slides, cannot convey the appreciation for a topic that can be achieved from a single hour spent in a well-designed laboratory. As just one traditional example, until the student has actually seen *with and against motion* for the first time, lectures on the subject simply aren't as valuable. The biomedical sciences are no different.

Adding laboratories and cutting lecture time could prove to be one of the most efficient time-savers in the curriculum. Currently, at several institutions, however, many hours of usable teaching time are wasted because of insufficient laboratory facilities. The lack of these facilities often requires each laboratory session to be taught 3-5 times for each class. Even the most dedicated faculty member finds it hard to generate enthusiasm by the fifth time that the same lab is given. We must look to expand and improve our laboratory facilities in every curricular area, if such expenditures can be shown to permit net reductions in teaching time. Properly managed, such expenditures could also serve as a means of increasing the facilities and equipment available for pilot research projects—addressing two pressing problems simultaneously.

The Imperative for a Core Curriculum at All Institutions

There is one aspect of academic restructuring that may initially seem a minor detail but which, if left unattended, will have dire consequences in the new arena that optometry has entered. This is the issue of uniformity in the educational process. Solving the problems relating to academic restructuring may require very different combinations of options and strategies at each institution. What is MOST important is that these differing solutions not result in differences in the training and experience of the graduating optometrist.

Although model curricula have been adopted by ASCO over the years, there has never really been uniformity of even a core curriculum in the past, and if the Interim Report of the Committee on Academic Affairs is any indicator, we may be further from this goal now than at any time in our history.[5] We have recently been reminded that the lack of uniformity in our scope of practice has been costly to us, creating confusion within consumer groups, and third party payers.[6] Lack of adherence to a core curriculum by ALL of our institutions can only compound these problems, for it creates confusion even among optometry students as to what constitues the core training of the optometrist. Optometry has (or should have) reached a stage of development that the graduating optometrist from each institution must be essentially the same in their basic education, training and clinical experience.

Striving for uniformity in a core curriculum need not preclude each institution from providing additional exposure to areas in which they feel they offer particular strength, but these should be elective offerings, available to each student only AFTER a core curriculum has been mastered. Without specific, uniform standards, the result of even good faith efforts toward academic restructuring at each institution will, on a national level, provide only chaos.

Finally, whether it's basic science or clinical education, broad generic goals such as those currently under consideration by The Council on Optometric Education, while important, are no longer sufficient.[7] More specific standards must be delineated and *enforced,* especially for clinical experience. A minimum number of specific procedures to be performed and of types of cases that must have been managed by each optometry student during his or her training must be implemented.

The challenges ahead for everyone involved in optometric education are formidable. Trying to meet these challenges, particularly at a time when resources are scarce to non-existent, will require singularly creative solutions. Optometry has not abandoned its heritage or its traditions; it is merely building upon them to respond to an ever-changing health care system. The profession will continue to have enormous untapped potential and will prosper if it continues to be guided by the needs of patients rather than by the needs of its professional ego.

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Improving the Quality of Teaching

Pierrette Dayhaw-Barker, Ph.D.

Introduction

It is always difficult, not to say foolhardy, to attempt to predict the future, but that is what educators are consistently asked to do. Professors and institutions are collectively determining the skills, knowledge and attributes that a graduate will need to appropriately execute his/her professional responsibilities in a future career that extends over 30 years. In four years of controlled education by the institution, the student must be exposed to and master knowledge, clinical proficiencies, communication skills, business management skills and a host of other competencies including philosophical issues, collectively called the curriculum. And it is the faculty who are placed in the role of the oracle.

Since the design of the curriculum is a faculty responsibility, we can begin by reminding ourselves of the goal of an education albeit a professional one. Samuel Hellman, the dean of the Division of Biological Sciences and the Pritzker School of Medicine, in a recent address first identified the global nature of present biomedical education as follows: "We are living during a revolution in biological knowledge that has been compared to that seen in the nuclear physics in the 1930s. . . . Further technical advances are coming so rapidly that new possibilities for learning and creating are occurring faster than can be incorporated into the discipline or to useful application."[1]

We as optometric educators must deal with this revolution. We must teach its essence even given the impossibility of covering all of the details. Addressing specifically the aims of education, Hellman continues, "Knowledge, the state of knowing or understanding, is a goal of education. What has not been mentioned, but is perhaps the main goal of education is wisdom." The means of incorporating the quest for wisdom is outside the scope of this discussion. However, in regards to knowledge, Hellman points out that "education must provide the necessary rudiments and tools required to partake of certain disciplines. . . . Education must provide insight into the relationships of what appear to be separate subjects. In many ways the separation of disciplines is misleading; they are in fact interactive. . . . Fields develop at interfaces . . . including biophysics and psychobiology."

I believe that optometry is a profession that has historically been at a number of interfaces, be they physics or optics, interacting with the biological (biomedical) sciences, behavioral sciences and clinical science. It has gotten its viability from its ability to see and develop relationships between bodies of knowledge and finds itself presently challenged by an overwhelming mass of information in all fields.

One means of assessing the scope of knowledge is to look at our curriculum. This has been done by the ASCO task force, and its recommendations are presented elsewhere in this symposium. We also need to look at the teaching methods employed to ascertain if they are truly achieving the intended goals of not only conveying knowledge but ensuring that the student can organize it and retrieve it at a later date. Indeed there are a number of alternative instructional strategies presently available that can be utilized very effectively and may indeed enhance our teaching.

Alternative Teaching Methodologies

What have we been teaching and how have we taught? These are key questions. Let us look at just one example, the concept of "validation," meaning the application of knowledge to meaningful context. This can occur in the classroom, in the examination, in the laboratory or in any other setting where the experience enhances the acquisition of relationships between the knowledge and other activities.

The time spent on acquisition of a science-specific vocabulary is very much like learning a new language. If you simply memorize the words and do not use them in the proper context repetitively within a defined time span, the knowledge quickly disappears once the exam is over. To what degree are we teaching a "foreign language"? It may seem logical that the clinical setting is the validation for much of what we teach. But if the clinical experience is separated in time or context from the basic science or the faculty cannot, for a variety of reasons, take the time to question the breadth and depth of the student's understanding within a relatively short period of time, I suggest to you that we may be deceiving ourselves and really be teaching what turns out to be limited use vocabulary.

Another way of judging this is to take a look at the examinations. How much of the examination directs itself toward conceptual understanding versus a familiarity with science-specific vocabulary? Validation should be one of the key processes incorporated into the examination. Unfortunately, the objective format examination as commonly utilized facilitates the testing of independent bits of knowledge. More complex testing formats are possible even in the objective format but require a good deal of preparation and skill. The questions we need to ask are: "Are we testing concepts and interrelationships as well as science-specific vocabulary? Should be utilize subjective, essay type or assignment type examinations in addi-

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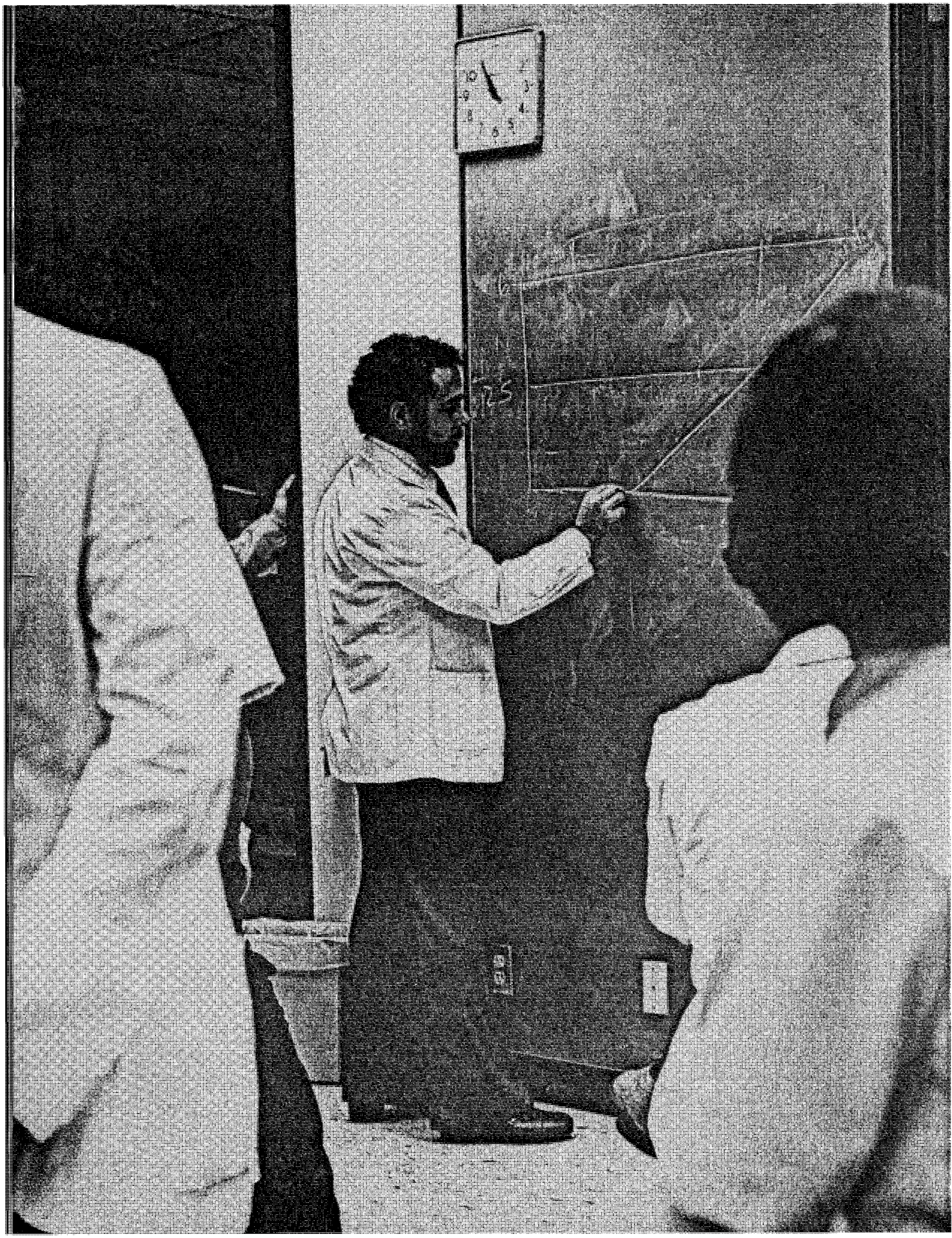

tion to our present formats in order to ensure the student's ability to correlate information?"

If one answer is that the laboratory, wherever appropriate, should handle much of the validation, then let us ask the question: What pedagogical philosophy is presently driving the laboratory experience? Many of the laboratories have evolved into teaching the use of a particular piece of equipment to perform a measurement. The pedagogical basis has been, at least in part, that performing the measurement is key to the student's understanding of the concept. Let me suggest, as others have, that the pedagogical value may well have been that in performing the measurement the student/teacher solidified the knowledge base, each becoming aware of deficiencies. Because of the proximity of faculty and/or laboratory teaching assistant, any deficit can be readily addressed. This is a useful activity. However, one still has to ascertain whether the laboratory is sufficient or must other tasks be identified for the student to further manipulate the knowledge. Furthermore, could the laboratory time be used for recitation or other activities that may be more beneficial than the learning of a technique?

There are a number of other teaching criteria that bear reviewing especially as we expand into sciences that are encyclopedic in their breadth. The opportunity exists to critically evaluate methods of teaching as well as content. The guiding standard that some believe has been missing from our present strategy is the incorporation of critical thinking objectives. But how does one teach critical thinking? Barrows has espoused the philosophy that this occurs when the methodology employed is problem-based. Thus "problem-based learning, properly designed, should allow students to integrate, use and reuse newly-learned information in the context of patient problems, the symptoms, signs, laboratory data, course of illness, etc., (and) provide cues for retrieval in the clinical years."[2]

While Barrows suggests that the whole pre-clinical medical curriculum be reorganized to utilize his methodology, others have endorsed some of this philosophy and applied it in a more limited aspect to parts of the curriculum. For example, one can utilize physiology laboratory time to stimulate discussion and understanding of specific topics. In order to effectively control and direct

At a time when faculty and resources are at a premium, we should consider the possibility of forming our own consortium that could provide a means of developing a number of teaching alternatives using different educational technologies.

the discussion, the students are placed in small groups. Each group has one case presentation that revolves around key pathophysiological principles and each person within the group is assigned a specific question to answer. Presentations occur in front of other students just prior to examinations, which also ensures that the students are reviewing appropriate material for the test, as well as solving case presentations. The actual cases and the assignments are provided to the students at the beginning of the course. The student is made aware that specific concepts and material, key to answering their particular questions, will be introduced during the lecture part of the course. The students may help one another in identifying data bases and referenced material but must present their own answers following which additional questions and discussion are encouraged. By carefully selecting the questions and the timing of the presentations, the professor can guide the students through the importance of anatomical, pathological and pharmacological correlates which facilitate the integration of the knowledge into a cohesive cluster. After a few such exercises, the students demonstrate a more global approach to their learning. They are also more self-confident, as demonstrated by our experience at the Pennsylvania College of Optometry.

Another methodology that has been used is to provide the student with the professor's classroom notes and directives for study on a particular topic, thereby also providing a guide to additional referenced material for more focused learning. Assignments are made for a particular week and the students come to the "lecture" where informal discussions on the topic are led by the professor. Thus the student takes on more of the responsibility in the learning experience. Lack of understanding can be rectified and the discussion mode emphasizes inquiry. This method also has the advantage of placing the instructor in the role of a "hospitable host." Many students respond very well to this type of mentoring, reasonably akin to the mentoring done in English universities though not as individualized. It should be emphasized that the professor's role can be abused if he/she chooses to use the time to impress and control the class. As Meyer[3] puts it: "Much of the success in critical thinking rests with the tone the teachers set in their classrooms. Students must be led gently into the active roles of discussing, dialoging, and problem solving. They will watch very carefully to see how respectfully teachers field comments and will quickly pick up nonverbal cues that show how open teachers really are to student questions and contribution."

The Classroom Environment

With the development of new technologies it is also possible to alter the classroom environment to provide more integrated and related topics. For example, in discussing cellular alterations related to pathological states, the introduction of video microscopes or similar modalities allows for group study of slides without the need to provide for each student to have their own microscope. The teacher can see what the students are viewing, switch from the normal to the pathological specimen and even tape a presentation for later review by the students. Similarly, the use of videotaping can provide additional material that would not normally be available, e.g. the handling of a laboratory specimen by a medical laboratory or the demonstration of procedures with equipment not available at the home institution. In many medical schools, an introduction to laboratories is now taped and the student can perform independently the laboratory-related tasks with the help of reviewable directives. Additionally, many lecturers have routinely introduced videotapes of clinical conditions as a means of depicting the clinical presentation of a patient.

The advent of computers has revolutionized education, not only because of the services it can provide, but also because it is a tool which the student will use and must be prepared to use after graduation. In the last few years specific software packages have been developed for use especially with the Macintosh computer. In the biomedical sciences, the study of neuroanatomy and the effects of disease or trauma on the nervous system has served as a focus for the development of a number of educational tools, many of which are aimed at independent learning. Some tools[4] are strictly anatomical in their scope but extend from the traditional large structure identification to complete mapping of specific neurotransmitter receptor locations throughout the brain. Others[5] attempt to simulate the diagnostic process through the neurologic examination using a case presentation format. One HyperCard™ based system (Principles of Neuro-ophthalmology)[6] presents information on neural pathways controlling eye function. Further development of similar programs, specific to optometric needs, could greatly enhance the effectiveness of learning.

Finally, the development of interactive videodisc as an educational tool is beginning to gain in popularity. A Healthcare Interactive Videodisc Consortium was organized in 1987 consisting of fourteen American and four Canadian medical and nursing schools.[7] The purpose was to produce high quality interactive videodisc courseware for the health sciences including modules on the pathology of the eye, neuroanatomy, and human embryology among others. The advantage of the videodisc, as discussed in a video developed at Ferris State,[8] is that it provides the means of incorporating both still and moving images into a text that is written on floppy disc. The text can be re-edited at will and images that have been referenced by index number can be retrieved in a matter of seconds providing a great deal of versatility. Videodisc examinations can utilize some of the same material and have the added advantage of being corrected automatically. The system can be programmed to allow the student to review poorly-understood material as indicated by the examination scores and provide a retest. Both Ferris State College of Optometry and the University of Alabama School of Optometry have utilized this type of technology.

At a time when faculty and resources are at a premium, we should consider the possibility of forming our own consortium that could provide a means of developing a number of teaching alternatives using different educational technologies. Such a proposal has been presented by Barry Barresi, dean of the School of Optometry at SUNY, and bears further discussion.

Conclusion

In summary, it has been said several times and in varying ways that traditional methods of teaching are not meeting the needs in many medical and health-related professional schools. As optometry embarks on an expanded health science curriculum, it would appear to be the time for a judicious appraisal of how we choose to go about teaching biological sciences. One cannot utilize a new technology because it is the new toy or because it is an attractive and popular way of teaching any more than one should continue to lecture just because this is what has been done in the past. The modality must fit the teaching needs. It must facilitate and improve the learning capability of the student, and wherever possible it must allow the student to proceed at an appropriate pace that takes in both the educational demands and the student's ability. And it must do so in an economical fashion in terms of time. In view of the need for economy of time, linkage between basic biological sciences is important as is the integration and reinforcement between the basic courses and those that follow after it.

The student must be as active and participatory as is physically possible since this appears to be a factor in motivating both immediate and sustained learning behaviors.

Faculty must be cognizant of what their colleagues are teaching within the same curriculum. They must be able to gauge the effort and success of the student and intervene if the process is not proceeding appropriately. They must also be receptive to new teaching modalities, especially those that the student has been schooled to use in his/her previous experience.

As a final point, it should be emphasized that it is our professional responsibility as educators to strive to improve the quality of learning in our students and thereby improve the quality of teaching. This will continue to be a challenge not only for the biomedical sciences but for all of the optometric curriculum in the 21st century.

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Panel Discussion

Following the presenters' remarks, a panel of guests was invited to respond. Invited as discussants were: Paul Abplanalp, Ph.D., O.D., professor/chair, basic and health science, Illinois College of Optometry; Irene Nunes, O.D., M.S., clinical instructor, State College of Optometry, State University of New York; and Lesley L. Walls, O.D., M.D., dean, Northeastern State University College of Optometry. Responding from the audience were: William E. Cochran, O.D., president, Southern College of Optometry; David A. Greenberg, O.D., M.P.H., vice president for academic affairs/dean, Illinois College of Optometry; and Sidney Wittenberg, O.D., M.S., former educator and currently consultant to the ophthalmic community.

Dr. Walls: I thoroughly enjoyed the comments and I think that the deans and leaders at our various institutions are going to have some very interesting challenges over the next couple of years. I think the most interesting challenges are going to occur within the next year.

Many of us are very concerned about the applicant pool. At our own institution, Northeastern State University, in Northeastern Oklahoma, the university increased the requirements for admission. It was a time when Oklahoma was obviously in a very bad economic situation, and there had been decreased enrollments at all the colleges and universities. Our institution increased the scores required from the SAT and the ACT substantially. An interesting thing happened: enrollment increased at our institution, and there is a greater sense of pride and camaraderie. In short, it had a very positive impact on the entire campus. Increasing requirements and other demands doesn't necessarily decrease the applicant pool. It actually may have a positive impact on recruitment through increased status of the institution.

Dr. Aplanalp: I think that we would do well indeed to attend closely to my distinguished young colleague, Dr. Freddo. How are we going to put five and a half or six years of curriculum into four years? Something has got to give. It would be shrewd to have a decision-making process by which we make difficult choices because they simply have to be made. There are a number of alternatives, as Dr. Freddo has outlined. Some of them are much more attractive than others. One of the alternatives is to make a lot of coursework pre-requisites. But as Dr. Freddo was remarking, that's not a particularly shrewd choice for a number of reasons. One reason is that, by escalating the requirements, in spite of what Dr. Walls has said, you cut into some members of the applicant pool.

Consider students deciding to become optometrists. If they don't make that decision when they are freshmen or sophomores in college, they cut themselves out of the applicant pool. They have to have made up their minds very early on, and many of them apparently don't decide until they are juniors or seniors, in which case they have a difficult task of fulfilling a long list of pre-requisites. You also cannot control the content of the pre-requisites. A biochemistry course at an undergraduate school can emphasize industrial applications or botany. You still haven't quite got what you want.

Dr. Nunes: More pre-requisite undergraduate courses aren't enough because they do not emphasize the clinical correlates. I think one thing that is very important is to emphasize the fact that bioscience courses in optometry school need to be taught at a graduate level, not merely at an undergraduate level with clinical correlates.

One of the things the ASCO report didn't mention was the presence or lack of molecular biology, one of the most exciting fields in medicine. I assume from looking at the report that it is not present. One of the phenomenal areas that is emerging is genetic therapy. Graduates who do not understand cell and molecular biology will not have the background to manage a genetic therapy case.

So, we should develop graduate level courses, and we should introduce new developments like molecular biology into our courses. We must take a more scientific view of clinical medicine, rather than just memorizing lists.

Dr. Wittenberg: I would like to see us examine this question of uniformity. If the optometric profession and the schools and colleges of optometry had been in conformity, the profession would most likely not have the opportunity to explore some of the issues it is looking at today. Uniformity within a group enables people with a similar perspective to take action and that's great. However, to the extent that you have uniformity, you tend to inhibit, if not prevent, responsive growth. I think that without the challenges that some colleges created in the early years by moving toward a more medical model of practice, we would not be as advanced as a profession as we are today.

Dr. Walls: The curriculum is not driven by anything uniform across the country. It's driven by our practitioners putting pressure through state associations on the schools, by the state boards which are asking the questions that allow people entry level into the profession, and by the National Board of Examiners in Optometry and the International Association of Boards of Examiners in Optometry.

In Oklahoma, the people I listen to most often are the practitioners. They tell me what they want in an optometry graduate and I am somewhat responsive to that. Also I have to be sensitive to the fact that our students have to pass the National Boards and/or state licensing examinations.

Dr. Nunes: I agree with the statement that pre-requisites serve a purpose, to familiarize a student with underlying concepts of mechanisms. Let's take the example of microbiology. The student comes to the optometry school to learn the microbiology correlates, or I should say, the microbiology optometric clinical correlates. The student also has to learn about detailed microbiology. The undergraduate microbiology course serves as a foundation; in optometry school, the course becomes much more detailed.

If, for instance, students learn about the life cycle of retroviruses as undergraduates, then in the optometry school microbiology course, they will learn about the utilization of a retrovirus in genetic therapy. You want to bring the student up from the undergraduate level to the cutting edge of the science so that the student, after completing that course, will be able to pick up a journal, read it scientifically, interpret it, and then be able to apply it. We are not talking about just familiarizing yourself with the knowledge. You really need to prepare students to read a scientific paper, analyze it, form a scientific opinion about it, and then be able to utilize the information in a clinical setting.

Dr. Barresi: I am going to take the liberty of making an editorial comment. Recalling Dr. Berman's slide comparing the mean contact hours or credit hours to an ASCO model, I would say that that is a gross understatement of the problem because of the issue raised by Dr. Nunes regarding the level of instruction. Are we teaching graduate level bioscience? Are we teaching graduate level vision sciences?

Dr. Cochran: I want to compliment you and your committee for an excellent and stimulating discussion. But lest this discussion proceed too easily and everybody gets too carried away, I would like to inject a caveat. Yes, we, the clinical health professions, should share a common educational experience. There is no question about that. The question is to what extent optometry should share those common educational experiences with the other health professions. Why do we as a profession feel that we must copy, not pattern, our curriculum after those of the other health professions? We are unique, I believe, in our strong behavioral component. With all good intentions, some are very concerned that we may once again be following along the cow path, one behind the other, just because everyone else does. Yes, we do need curriculum reform, but as many people have said, "Let's not throw the baby out with the bath water."

Dr. Greenberg: Dr. Barresi, in his opening comments, used the adjective, the "unique" profession. In the context that he used it, I have no discomfort. I do have discomfort with the fact that for many, many years I heard many in our profession talk about how we shouldn't lose our "uniqueness." That's fine, but for too many years that uniqueness has translated into isolation. Many of the same people who are saying we must not lose our uniqueness are the same ones who are raising the hue and cry: why aren't we included in Medicare? Why aren't we reimbursed for vision training by Blue Cross/Blue Shield? Why? Because that uniqueness has allowed us to hide in the comfort of isolation. As a profession we must first be understood, and in turn, respected by the health care complex. Today's healthcare environment does not allow for our old comfortable definition of uniqueness.

(continued from page 103)

on quality control and hand work that clearly demonstrated why Logo's products have such a fine reputation in the industry. Ray Robison, Logo's 1990 Sales Consultant of the Year, spoke on "concept selling" or using creative marketing ideas to find ways to bring more advantages to the customer.

W-J Announces Prosthetic Lens Program; All Profits to Go to Vision Education

Patients with injured, diseased or otherwise disfigured eyes are the target of a special Wesley-Jessen program, all profits from which will be donated by W-J to vision education.

Unveiled in January, W-J's Prosthetic Lens Program is designed to make DuraSoft® Colors prosthetic lenses available to more practitioners and their patients.

To do just that, W-J is offering to make any custom prosthetic soft contact lens required, within stated parameters. All profits from the sale of the lenses will be donated to one of the following organizations, as designated by the practitioners when ordering the lens(es): the Contact Lens Association of Ophthalmologists (CLAO), the Contact Lens Section of the American Optometric Association (AOA-CLS), and the Contact Lens Society of America (CLSA).

According to W-J's director of professional services, Dr. Dwight H. Akerman, this program allows all contact lens practitioners, through treatment themselves or referral, "to make a big difference in the life of someone with special eyecare needs by providing them a lens that gives the most natural appearance."

He added: "W-J is proud to help patients with injured or diseased eyes enjoy natural ocular appearance. We are also pleased to donate all profits from the sales of our prosthetic lenses to organizations dedicated to vision care education."

All lens orders will be customized, requiring 6 to 10 weeks for delivery. The price will be $150 per lens.

Orders and information requests will be taken through a newly-established toll-free telephone number for W-J's Prosthetic Lens Service, 1-800-488-6859.

In early 1991, CLAO, the AOA CLS and CLSA will be mailing to its members full details of the W-J Prosthetic Lens Program.

BOSTON® Scleral Lens Achieves Dramatic Results

A new gas permeable scleral contact lens has achieved dramatic results in correcting irregular astigmatism in eyes that were unable to benefit from conventional vision correction modalities. Developed by Perry Rosenthal, M.D., in collaboration with Polymer Technology Corporation, the BOSTON® Scleral Lens improves the vision of eyes suffering from the effects of corneal disease, surgery or trauma which cannot be corrected with spectacle lenses or other types of contact lenses.

"The BOSTON Scleral lens proved helpful for patients unable to be fitted with other contact lens modalities, because of the failure to achieve adequate positional stability or the inability of damaged corneal tissue to tolerate the friction and pressure of a corneal contact lens or exposure to air," noted Dr. Rosenthal. Cases successfully fitted with this device include high post PK astigmatism, keratoconus, ocular surface diseases such as keratitis sicca, neurotrophic keratitis, certain congenital anomalies, corneal degenerations and dystrophies as well as patients with impaired lid function.

In addition to its vision correction and protective capabilities, studies will soon be initiated to determine the feasibility of utilizing The BOSTON Scleral Lens as a vehicle for the sustained delivery to the cornea of a high concentration of drugs in appropriate cases.

Upon FDA approval, the lens will be manufactured by a non-profit foundation to be established by Dr. Rosenthal. Through the foundation, Dr. Rosenthal will conduct fitting seminars to train qualified practitioners in certain eyecare centers nationwide.

Corning Offers Two Versions of Reminder Postcards to Optometrists and Opticians.

Two lucky winners of drawings for dispensers will each receive $500 in 1991.

For the thirteenth consecutive year, Corning is again offering its patient Reminder Postcards free of charge to eyecare professionals. These postcards are one of the most popular items in the array of support materials that Corning provides to dispensers. Last year, over two million of these Reminder Postcards were ordered by optometrrists and opticians across the country.

This year, for the first time, two dispensers will receive along with their orders of Corning Reminder Postcards a check from Corning for $500. That is because Corning will hold two drawings on all order cards with the dispenser's personal Account Number included (this number appears on the mailing address label of every Corning direct mail piece), and the two dispensers with the winning numbers will each be awarded $500. A drawing will be held on June 30, 1991 for orders received by that time. There will then be a second drawing, also for $500 on December 15, 1991, for orders received after June 30, 1991.

These Reminder Postcards will continue to feature Corning's merchandising theme for its line of photochromic products: "PRACTICAL LENSES FOR PRACTICALLY EVERYONE." This theme is visually reinforced by photographs of consumers dressed for various occupations and leisure activities, each wearing one of the Corning family of photochromic lenses: PhotoGray Extra®, PhotoBrown Extra®, PhotoGray II®, and PhotoSun II®.

Dispensers may order additional copies of either version of this colorful Reminder Postcard as often as they need them, by writing to Corning Incorporated, Optical Products Department, P.O. Box 40, Corning, N.Y. 14830. Ask for Form OPO-227 for the optometrist's version.

Sola Video Available on Progressive Lenses

Sola Optical is now offering a video tape of the "LifeLine" television segment featuring its XL and VIP progressive lenses. The segment aired on February 17th on the Lifetime network.

"LifeLine" is a national medical documentary that airs each week on the Hospital Satellite Network, a nationwide, 24-hour medical television network that broadcasts to over 2,000 hospitals and nearly 2 million health care professionals. The network also has a subscriber base of over 46 million people.

This highly regarded series showcases manufacturers whose products offer health care professionals state-of-the-art, high-quality technology. Manufacturers are selected to appear on the program by the show's Board of Advisors, consisting of a select group of physicians and medical institutions.

The segment features Mark Mattison-Shupnick, Sola's vice president of new products, who discusses XL and VIP, polycarbonate lenses, and SmartSeg®, the new advanced flat-top.

"This video is an excellent opportunity for dispensers to educate consumers about the benefits of progressives," says Janice de Ryss, marketing communications manager. "We've already received phone calls from M.D.'s and consumers requesting more information about progressive lenses."

The video is available in VHS format and on continuous loop for in-store use. To purchase a copy, call Sola at (800) 358-8258, press 8.

Illinois College of Optometry Receives Sunsoft Contribution

Dr. Rod Porter, director of professional services at Sunsoft, visited the Illinois College of Optometry to present a $1,000.00 contribution. This generous contribution will be utilized as a grant toward contact lens clinical education.

Also participating in the presentation were Jerry Sustakovitch, Eastern Region sales director of Sunsoft; Dr. Dennis Siemsen, chairman, Department of Clinical Education, I.C.O., and Dr. Janis Jurkes, chief of Contact Lens Service, I.C.O.

Varilux Announces the Newest in Lens Design Technology—Varilux Infinity® 1.6 High Index Lens

Varilux Corporation, leader in progressive spectacle lens technology, announces the availability of Varilux Infinity 1.6 High Index Plastic, the only multi-design progressive lens currently available in 1.6 high index plastic. Up to 25% thinner and lighter than traditional plastic, Varilux Infinity 1.6 High Index Plastic has the most extensive Rx range available: -12D through +8D expanding the potential range of patients that professional eyecare practitioners can fit with Varilux Infinity.

"Initial response to this new material availability has been tremendous," said Bob Colucci, vice president of sales. "The market has been asking for a progressive lens in high index plastic because of its improved lateral visual acuity and ease of surfacing compared to polycarbonate. High Rx patients can now have the benefit of a thinner and lighter lens as well as improved visual comfort."

Varilux Corporation has provided individualized high index plastic surfacing training to all Varilux laboratories nationwide ensuring the highest product quality and most efficient service available to eyecare professionals. Sales aides, product specifications are available through local Varilux laboratories: 1-800-BEST-PAL.

Wesley-Jessen Sponsors Symposium on Managing Astigmatic Patients

The state of the art in treatment of astigmatism with soft toric contact lenses was explored by 100 O.D.s from the U.S., Canada and United Kingdom, March 22-25, in Phoenix, AZ.

The educational symposium, sponsored by Wesley-Jessen, featured interactive polling of delegates and presentations by leading clinicians on clinical as well as practice management aspects of treating astigmatic patients.

In addition, the delegates worked in small groups to develop problem-solving slide presentations on specific topics. In turn, each delegate will be using the slide materials to present evening seminars in their home cities between May and July. In so doing, it's estimated that nearly 3,000 O.D.s will receive first-hand reports from the symposium, known as Insight '91.

Manual of Visual Fields, Elliot B. Werner, Churchill Livingstone, New York, 1991. Soft cover, 237 pages. $39.

Recent technological advances in perimetry require the practitioner to have access to current clinical guidelines for accurate interpretation of visual field information. In "Manual of Visual Fields," Dr. Werner has succeeded in providing these guidelines in a text which contains over 200 figures, mostly visual fields obtained from actual patients, and 24 tables.

In the first part of the book, individual chapters are dedicated to the Goldmann, Octopus, and Humphrey perimeters. These are followed by a chapter presenting normal visual fields obtained with these perimeters. The remainder of the book roughly follows the visual pathway, discussing the visual field defects caused by disease in their appropriate anatomical context. This is similar to the format in Dr. Harrington's text. Visual fields are consistently presented from all three perimeters so the clinician will become familiar with similar defects measured on each device.

The material in the sections on automated visual field interpretation are particularly informative. The functional explanations of the statistical translation of raw data into visual field indices are clinically applicable and easy to understand. Two of the contributing authors, Drs. Balwantray Chauhan and Raymond LeBlanc, wrote the chapter on the Octopus perimeter, while Dr. Werner wrote the corresponding material on the Humphrey. Dr. Werner's succinct discussion of the detection of glaucomatous defects and progressive visual field loss is another excellent chapter.

The last three chapters, on diseases of the optic nerve, diseases of the chiasm, and the retrochiasmal visual pathways, were contributed by Dr. Richard P. Mills. Dr. Mills covers the expected pathological entities and includes many subtle clinical "pearls" that can be valuable in the differential diagnosis of visual field defects.

Although other texts are available, "Manual of Visual Fields" presents the actual results from manual and automated visual field assessment of patients with disease. The text is easy to read and although several typographical errors are present, they do not deter clarity. In addition, the large quantity of representative visual fields guarantees that the reader will refer back to this book on a regular basis. Therefore, this book is highly recommended as a clinical guide to supplement reference texts in perimetry for both practicing optometrists and students.

Guest Reviewer:
Lewis Reich, O.D., M.S.
Pennsylvania College of Optometry

Optics, 10th ed., M.H. Freeman. London: Butterworths, 1990. 520 pages + index, $65.

This is the present incarnation of *Fincham's Optics,* which first appeared in 1934.

Freeman's name made its appearance along with Fincham's in association with the 8th edition of the book. I note with interest that the 10th edition is copyrighted by Freeman and B.L. Hasler. Perhaps we will learn more about Hasler in time.

In his preface, Freeman advances the position that the best way to learn optics is the "bare hands" way, that is, using the book, a calculator (with a reciprocal function), and a writing pad. I could not agree more. He states quite baldly that the text avoids the use of higher mathematics, and points out that these may be used on a computer if the reader wishes. It will come as no surprise, then, that the trigonometric ray tracing of earlier editions has quietly vanished.

The addition of color to diagrams in the 10th edition is helpful; the uniform use of blue for optical elements and black for ray tracing gives a desirable unity to the book's numerous illustrations.

Comparing the text of my old 6th edition to that of the 10th is like comparing the King James version of the Bible with its modern-day counterparts; however, today's students will doubtless appreciate the plain language of the 10th edition. The (older) reviewer still regrets the loss of the more elegant turns of phrase.

One difficulty of older versions which no one will be sad to see the end of is the former difficulty due to the British vs. the North American concept of billion. For example, the 6th edition refers to the frequency of infrared as 30 billion cycles per second, while the 10th edition gives it as 30×10^{12}Hz.

A curious finding for the reviewer relates to Fincham's dreaded phrase "it is obvious that," which was usually followed by a lot of head-scratching. In preparing the review, I looked again for examples of this phrase (to see if it continues in Freeman's version), and I was unable to find any good examples (without going over the texts with a fine-tooth comb). I suppose that those points were obvious after all.

The 10th edition contains 520 pages (+ index) vs. the 418 (+ index) of my 6th, and there is much new and useful material. The addition of several color plates is welcome.

Despite Freeman's initial comment that problem-solving is a major part of mastering optics, there is a considerable decrease in the number of problems in the 10th edition (343 vs 568 in the 6th ed.). A surprising number of typographical errors have crept in, and these affect not only words (e.g. phemonena on p. 493) but also major concepts such as Newton's Relation on p. 74. The diagram concerning the angular sign convention at the bottom of p. 65 is confusing, while the captions for Fig. 4.3 are just plain wrong.

These blemishes would be inconspicuous were it not for the otherwise clear and faultless presentation of the foundations of optometry. I am confident that they will be dealt with in future editions, and that this text will continue to stimulate the lively interest of future generations of aspiring optometrists.

Guest Reviewer:
David Williams
University of Waterloo
School of Optometry

Amblyopia—Basic and Clinical Aspects, KJ Ciuffreda; Dennis M. Levi; Arkady Selenow. Butterworth-Heinemann 1991, 507 pp., hardbound, illus., $75.

It has been 20 years since the publication of Schapero's comprehensive book on amblyopia. During that time, however, the research community has not been stagnant in its continued efforts to bring forth new information on the characterization, development, consequences and treatment of amblyopia. *Amblyopia—Basic and Clinical*

Aspects—effectively fills the gap between what was known about amblyopia in 1971 and what has been learned in the intervening years.

This book begins with a comprehensive and informative chapter on the history, definitions, classifications and prevalence of amblyopia. This includes a thorough historical review with results of original research on amblyopia and various classification schemes. Throughout the book, the authors attempt to clarify, support or refute the historical and research data which provides the reader with a broader perspective on each topic. As an example, in the case of classification of amblyopia, the reader is presented with a review of previous classifications and the difficulties inherent in each one. This is followed by a new classification scheme addressing each of these issues.

The second chapter presents research on normal visual development while the following chapters specifically and in great detail address other factors in amblyopia. These include sensory processing, anatomic and physiologic effects on the visual pathways, eye movements, accommodation and the pupillary system. While each of these chapters is technical in nature, they are easily readable by both clinician and student. The readability is a result of the effective use of graphs and charts, periodic summary statements in each chapter, and discussions on clinical applications.

The final chapters relate specifically to clinical diagnosis, prognosis and treatment. A historical overview on previous treatment modalities is presented along with arguments supporting or refuting each treatment approach. The authors make excellent use of photographs and diagrams of actual treatment techniques with each referenced for further review. Beginning with the first chapter and continuing throughout the book, the authors use clinical examples or case reports to help clarify the material presented. This is particularly evident in the last chapter which presents several case reports including history, diagnosis, monocular and binocular treatment plan, training sequence, results and significant points.

Amblyopia—Basic and Clinical Aspects is an important contribution to the vision science literature. The first half of the book presents a thorough, well organized review and discussion of ambyopia based on current research, which is suitable for use by students, educators and researchers. The second half of the book makes this information clinically relevant. Practicing optometrists can easily apply this information in educating their patients and effectively evaluating and managing amblyopia. In conclusion, this book is well suited for a broad audience. It is the most comprehensive and up-to-date text currently available on amblyopia. It is well organized and can easily be used as a reference text, teaching tool or resource for clinical practice.

Guest Reviewer:
Elise Ciner, O.D.
Pennsylvania College of Optometry

The Neurology of Eye Movements—Edition 2, R. John Leigh and David S. Zee, F.A. Davis Co., Philadelphia, 1991, 561 pp. Illustrated in black and white, hardbound, $80.00

The Neurology of Eye Movements is an interesting book on the subject which is subdivided into the following chapter topics: survey of eye movements, vestibular-optokinetic system, saccadic system, smooth pursuit and visual fixation, gaze holding, conjugate eye movements, eye-head movements, vergences, strabismus diagnosis, and central motility disorders.

This text is a very serious treatise on the subject that is suitable as a course text. The discussions are at a high level and are well referenced so that the average student using this text would require some guidance by the professor in using the material.

The text covers the technology of eye movement assessment well, although much effort is spent on what are more properly research techniques. There is clinical reference value in the work because many complex clinical neuro-eye problems are covered in the later chapters. The book is not, however, designed as a clinical reference text, nor is it for the casual reader.

I don't want to put the clinicians in our readership off this fine text. It is clearly very informative and helpful with specific advice about patients, their testing and their diseases. It is a thorough and heavyweight book, however, which will not appeal to all readers as an office companion.

Dictionary of Optometry, Michel Millodot, Butterworths, London, 2nd edition, 221 pp., $24.95.

Professor Millodot's *Dictionary of Optometry* does an excellent job of providing the necessary terminology for the wide range of disciplines that our profession embraces—optics (geometrical, physiological, and ophthalmic) refraction, binocular vision, ocular anatomy, ocular physiology, ocular pathology, ocular pharmacology, and many others. Described as "pocket-size" (which would require a rather large pocket), this dictionary provides well-written definitions for more than 3,000 terms that are routinely used in optometry.

The first edition of *Dictionary of Optometry* was published in Spanish as well as English, and was purchased by readers all over the world. As the author states in the preface, many of the definitions appearing in the second edition were suggested by letters received from readers. In particular, emphasis has been placed on terminology in the areas of ocular disease—including disease management—and pharmacology. Definitions of many ophthalmic drugs have been added.

Of particular interest are a number of "extras," not ordinarily found in dictionaries. These include (1) a comprehensive listing of abbreviations, acronyms, and symbols used in optometry; and (2) a number of panels providing lists of terms—for which definitions are given—in the areas of contact lens fitting, orthoptics, eye diseases, and ophthalmic drugs.

I predict that *Dictionary of Optometry* will become a constant companion of many optometry students, practitioners, and educators.

Guest Reviewer:
Dr. Theodore Grossman
School of Optometry
Indiana University

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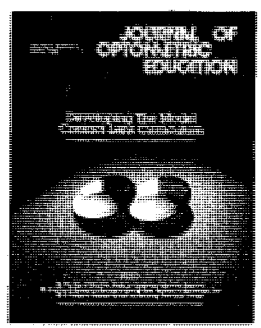
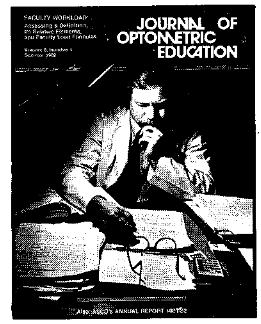
Author Index



Subject Index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