2. Design criteria for artificial epithelia (epikeratoprostheses, EKP's). In conditions where the epithelium has deteriorated irreversibly to the point that vision is significantly impaired, one possible course of action is to remove this layer entirely and replace it with a contact lens glued permanently to the anterior stroma. In doing so, one would like to design the prosthesis to mimic as faithfully as possible the function performed by normal epithelium. Since the materials of which such a prosthesis may be constructed are limited, the frictional properties of the epithelium cannot be reproduced exactly, and of course the EKP has no sodium pump. The present analysis can serve as a guide to the development of prostheses and prosthetic materials which maintain the corneal milieu in spite of their unnatural transport properties.

PUBLICATIONS

Compilation of recently published books and technical articles written by APL staff members.

R. B. McDowell, "The APL Technical Approach to Real-Time, Interactive Multiple-Computer Simulation Systems," *Simulation* **17**, No. 1, Jul. 1971, 3–18.

A. G. Witte, "Hardware Implementation of Three Computer Links to the IBM 360/91 Digital Computer," *Simulation* **17**, No. 1, Jul. 1971, 19–31.

N. K. Brown, "Software Considerations for Simulation Hardware in the Supercomputer Environment," *Simulation* **17**, No. 1, Jul. 1971, 33–38.

P. F. Bohn, "Interactive Simulation Terminals to the IBM 360/91 Computer," *Simulation* **17**, No. 1, Jul. 1971, 39–44.

D. M. White, "A Real-Time Radar Simulation Using the APL Digital Computer Links," *Simulation* **17**, No. 1, Jul. 1971, 45–51.

J. A. Schetz and S. Favin, "Numerical Calculation of Turbulent Boundary Layers Including Suction or Injection with Binary Diffusion," *Astronautica Acta* **16**, No. 6, Dec. 1971, 339–352.

A. L. Burns (Univ. of Iowa) and S. M. Krimigis, "Changes in the Distribution of Low-Energy Trapped Protons Associated with the April 17, 1965 Magnetic Storm," *J. Geophys. Res.* **77**, No. 1, Jan. 1, 1972, 112–130.

T. O. Poehler, "Far-Infrared Cyclotron Resonance in GaAs," *Appl. Phys. Lett.* **20**, No. 2, Jan. 15, 1972, 69–70.

D. G. Grant, "Tomosynthesis: A Three-Dimensional Radiographic Imaging Technique," *IEEE Trans. Biomed. Eng.* **BME-19**, No. 1, Jan. 1972, 20–28.

J. G. Parker and D. N. Ritke, "Vibrational Relaxation Times of Methane and Oxygen at Increased Pressure," *J. Acoustical Soc. Am.* **51**, No. 1, Jan. 1972, 169–181.

W. G. Spohn, "On the Integral Cuboid," *Am. Math. Monthly* **79**, No. 1, Jan. 1972, 57–59.

R. E. Walker and T. L. Litovitz, "An Experimental and Theoretical Study of the Pneumatic Tonometer," *Exp. Eye Res.* **13**, No. 1, Jan. 1972, 14–23.

T. A. Potemra and A. J. Zmuda, "Nightglow Evidence of Precipitating Energetic Electrons in the Midlatitude Nighttime *D* Region," *Radio Sci.* **7**, No. 1, Jan. 1972, 63–66.

M. H. Friedman and R. L. McCally, "Sieving Behavior of a Series Membrane System," *Science* **175**, No. 4021, Feb. 4, 1972, 556–557.

T. O. Poehler and C. H. Wang, "Low Temperature Scattering in InSb Measured by Infrared Faraday Rotation," *Phys. Rev. B* **5**, No. 4, Feb. 15, 1972, 1483–1489.

APL COLLOQUIA

Jan. 7—"Tunable Raman Lasers," by C. K. Patel, Bell Telephone Laboratories.

Jan. 14—"Adelie Penguins and Whistling Swans: A Study of Gregarious Individuals," by W. Sladen, The Johns Hopkins University.

Jan. 28—"Is the World Livable?" by M. G. Wolman, The Johns Hopkins University.

Feb. 4—"Our Understanding of the Cometary Phenomena," by A. H. Delsemme, University of Toledo.

Feb. 11—"The Measurement of the Gravitational Constant," by J. Beams, University of Virginia.

Feb. 18—"A Physician's Report on His Visit to China," by S. Rosen, Mt. Sinai Hospital Medical School.

Feb. 25—"Surface Chemistry and Practical Adhesion," by H. Schonhorn, Bell Telephone Laboratories.

ADDRESSES

Principal recent addresses made by APL staff members to groups and organizations outside the Laboratory.

Jane Olmer, "INFO 360, The Applied Physics Laboratory Information Package," *University of North Carolina School of Medicine,* Chapel Hill, January 19, 1972.

W. H. Avery, "Practical Requirements for Advanced Public Transportation Systems," *Highway Research Board Transportation Meeting,* Washington, D.C., January 20, 1972.

The following four addresses were presented at the Annual Meeting of the *American Physical Society,* January 31 to February 3, 1972, at San Francisco:

N. A. Blum, C. Feldman, and K. Moorjani, "Optical Properties of Amorphous Silicon Films;"

K. Moorjani (APL), T. Tanaka (Catholic U. of America), M. M.

ADDRESSES *(continued)*

Sokoloski (Harry Diamond Laboratories), and S. M. Bose (Drexel U.), "Two-Sites Cluster Effects in the Coherent Potential Theory of a Random Binary Alloy;"

K. Moorjani, T. Tanaka, M. M. Sokoloski, and S. M. Bose, "The Electronic Conductivity of a Random Binary Alloy in the Two-Site Coherent Potential Approximation;"

J. C. Murphy, L. C. Aamodt, and C. K. Jen, "Microwave Induced Modulation of R_1 Emission in Ruby above the Critical Concentration."

Vivian O'Brien, "Viscous Flow," *The Johns Hopkins Hospital Special Center of Research Seminar,* Baltimore, February 2, 1972.

R. E. Hicks, "Polyimide Films for Hybrid Circuits," *National Electronic Packaging and Production Conference,* Anaheim, California, February 8–10, 1972.

F. S. Billig, "Supersonic Combusion Ramjet Research," *University of Maryland Aerospace Engineering Department Seminar,* College Park, February 14, 1972.

B. F. Kim, J. Bohandy, and C. K. Jen, "High Resolution Optical Spectra of Cytochrome c at Low Temperatures," *Biophysical Society,* Toronto, Canada, February 24–27, 1972.

F. C. Paddison, "The Arctic Surface Effect Vehicle," *9465th Air Reserve Squadron,* National Airport, Washington, D.C., February 28, 1972.

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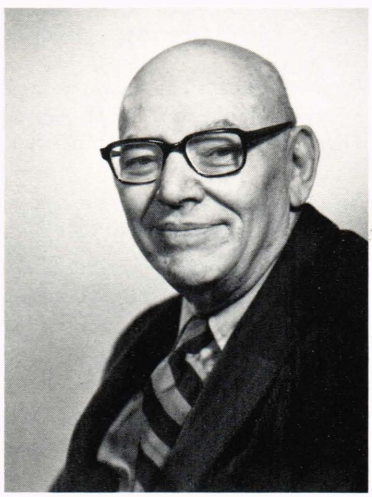

William Liben, co-author of "An Argon Laser Photocoagulator," was a previous contributor to the *Digest*. He was the author of the article titled "Microelectronics at the Applied Physics Laboratory," published in the September-October 1963 issue. Born in Malden, Mass., he received the B. S., M. S., and D. Sc. degrees in physics from the Massachusetts Institute of Technology. Prior to coming to APL, Dr. Liben was a laboratory assistant at MIT, an instructor in physics at Middlesex College, and served in various research and administrative capacities in the U. S. Corps of Engineers, Simmonds Aerocessories, Inc., Premier Crystal Laboratory, and Brookhaven National Laboratories. A specialist in optics, photography, high vacuum engineering and sputtering of thin films, and oil well instrumentation, Dr. Liben was employed by APL in 1950. He left in 1954 for a position with the Schlumberger Well Surveying Corporation, returning to APL in 1958. His other assignments at APL included Supervisor of the Microelectronics Group from 1960 to 1966. Since then he has been a member of the Excitation Mechanisms Group in the Research Center where he has been responsible for the development of the argon laser photocoagulator. Dr. Liben is a member of the American Physical Society, the Optical Society of America, and the American Vacuum Society.

B. F. Hochheimer, co-author of "An Argon Laser Photocoagulator," has contributed three earlier papers to the *Digest*. He was co-author of "Laser Modes," which appeared in the January-February 1964 issue, and was the author of "Fourier Transform Spectroscopy" and "A Camera for Recording the Dynamic Blood Circulation of the Eye" which appeared in the November-December 1967 and November-December 1969 issues, respectively. Mr. Hochheimer was born in Rochester, N. Y., graduated from St. Bonaventure University with a B. S. in physics and received an M. S. degree in optics from the University of Rochester. Mr. Hochheimer was originally employed at APL in 1954 but left in 1956 to go to Hayes Aircraft Corporation. He returned to APL in 1960 as a physicist in the Excitation Mechanisms Group of the Research Center. He is a specialist in design and experimental work in optics, spectroscopy, infrared physics, and ophthalmology. He is a member of the Optical Society of America.

ADDRESSES *(continued)*

Sokoloski (Harry Diamond Laboratories), and S. M. Bose (Drexel U.), "Two-Sites Cluster Effects in the Coherent Potential Theory of a Random Binary Alloy;"

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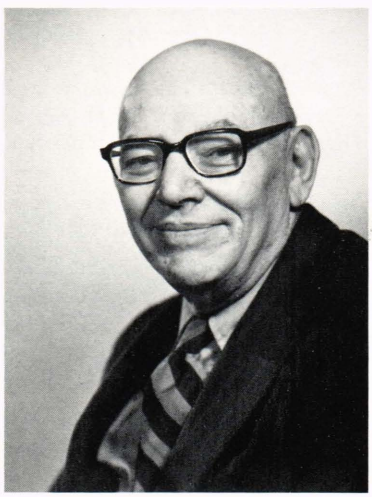

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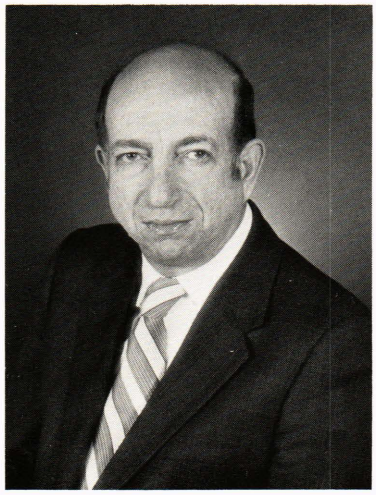

Dr. Arnall Patz, co-author of "An Argon Laser Photocoagulator," is a native of Georgia. He received the B. S. and M. D. degrees from Emory University and the Emory University School of Medicine, respectively. After completing appointments as Resident in Ophthalmology at the D. C. General Hospital and the Walter Reed Army Medical Center and a Research Fellowship at the Armed Forces Institute of Pathology, he entered private practice and was appointed Instructor of Ophthalmology at The Johns Hopkins University School of Medicine in 1955. He advanced to the rank of Associate Professor and on July 1, 1970 he discontinued his private practice to accept a full-time appointment at The Johns Hopkins Medical School and Hospital. In this position, he became the first person to occupy the Seeing Eye Research Professorship Chair in Ophthalmology. He is also Director of the Diabetic Retinopathy Center and Laser Research Laboratory at the Wilmer Institute of the Johns Hopkins Hospital. Since 1969 he has been Chairman of the National Institutes of Health Collaborative Study Group on oxygen therapy for the premature infant. Dr. Patz has been the recipient of several awards for studies on retrolental fibroplasia, including the Albert Lasker Award in 1956 for a nursery study on the use of oxygen in retrolental fibroplasia and the E. Meade–Johnson Award also in 1956. He is a member of the Association for Research in Vision and Ophthalmology, the American Ophthalmological Society, and since 1969 has been President of the Maryland Society for the Prevention of Blindness.

M. H. Friedman, author of "Thickness Control in the Living Cornea," is a native of New York City. He received the B. Ch. E. degree from Cornell University and the M. S. E. and Ph. D. degrees from the University of Michigan. A specialist in biological transport, chemical propulsion, explosive initiation and behavior, and hypervelocity impact, Dr. Friedman spent five years as a senior chemical engineer with the Minnesota Mining and Manufacturing Company. He then joined APL in 1965 as an engineer in the Fluid Mechanics Group where he was responsible for programs in explosives initiation and hydrocode

development. In 1967 Dr. Friedman joined the Theoretical Problems Group of the Research Center where he has done fundamental and applied research in ophthalmology, physiological transport processes, and arteriosclerosis. In 1971 he was appointed Associate Professor of Ophthalmology in The Johns Hopkins School of Medicine. Dr. Friedman is a member of the American Chemical Society, the American Institute of Chemical Engineers, the Biophysical Society, the Association for Research in Vision and Ophthalmology, and the American Association for the Advancement of Science; he is also a Fellow of the American Institute of Chemists. In 1970 he was given the National Capital Award of the District of Columbia Council of Engineering and Architectural Societies.