

EDITORIAL BOARD CHANGES

Dr. A. Kossiakoff, Director of the Applied Physics Laboratory, recently announced changes in the composition of the Editorial Board of the *APL Technical Digest*, as reflected on the Contents page of this issue. Dr. Walter A. Good has accepted an overseas assignment, and Dr. Alvin G. Schulz has joined the Director's staff as Assistant to the Director for Environmental Programs. Dr. Vincent L. Pisacane and Mr. Woodrow Seamone have been named to Board membership.



Dr. Walter A. Good, formerly Assistant Division Supervisor of the Missile Systems Division, has served on the Editorial Board of the *Digest* since his appointment in mid-1967. He was also a contributor to the *Digest*, with "A Scientist and His Hobby" in the January-February 1963 issue and "How High Does the Whistling Swan Fly" (with J. W. Hamblen) in the November-December 1970 issue.

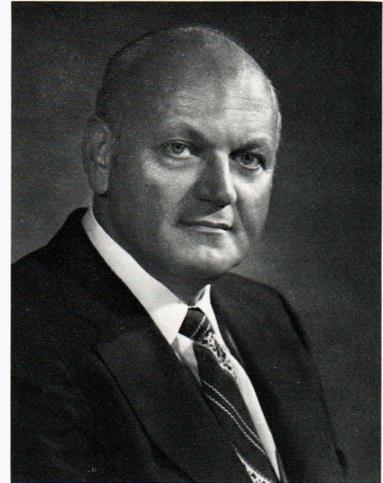
A native of Michigan, Dr. Good received the A. B. degree from Kalamazoo College and the M. S. and Ph.D. degrees in physics from the University of Iowa. During the year 1941-42 he was employed as a physicist in the Department of Terrestrial Magnetism of the Carnegie Institution in Washington. He joined APL in 1942 as a physicist and originally worked on the proximity fuse, the design of oscillators and

ruggedized vacuum tubes. He then worked on the fire control, gyro, and computer sections of the Navy Mk 57 Gun Fire Control System and designed a precision electromagnetic gyro pickoff. A specialist in missile control systems, in 1950 Dr. Good was named Supervisor of the Control Systems Group in which control systems were developed for such missiles as Terrier and Talos, as well as for the Polaris Submarine Hovering System. From 1966 to 1972 he was Assistant Division Supervisor of the Missile Systems Division. In February 1972 he was appointed Supervisor of the APL European Field Office of the Pershing Program in the Strategic Systems Division. He is currently living with his family in Heidelberg, Germany.

In addition to his professional activities, Dr. Good has been a model airplane enthusiast since the mid-1930's. He is a Fellow and Life Member of the Academy of Model Aeronautics and received the Fédération Internationale Aéronautique-Tissandier Award in 1960. From 1965 to 1966 he was President of the Committee for International Aeromodels and was elected to the Model Aviation Hall of Fame in 1969. Dr. Good is a member of the American Physical Society.

Dr. Alvin G. Schulz, Assistant to the Director for Environmental Programs, was appointed to the Editorial Board of the *Digest* in 1963. He was co-author, with L. G. Knowles and L. C. Kohlenstein, of "Simulation Studies of Nuclear Medicine Instrumentation" in the January-February 1971 issue of the *Digest*.

A native of California, Dr. Schulz holds the A.B. and Ph.D. degrees in physics from the University of California at Berkeley. He was originally employed at APL from 1945 to 1947, assigned to flight-test telemetering of supersonic ramjet development vehicles. He left to go back to school, and after receiving the Ph.D. degree in 1952 he re-



turned to APL as Supervisor of the Missile Test Group. He has held several other supervisory positions, including the following: From 1954 to 1956 he was Supervisor of the Transistor Circuit Development Group; from 1956 to 1958, Supervisor of the Missile Guidance Counter-Countermeasures Group; from 1958 to 1960, Supervisor of the Typhon Radar and Fire Control System Division; and from 1960 to 1962, Supervisor of the Typhon Missile Guidance Division. From 1962 to March 1972 he was Co-Supervisor of Excitation Mechanism Research in the Research Center. He was then appointed to his present position of Assistant to the Director for Environmental Programs to coordinate APL activities in this rapidly expanding field.

Having engaged in research in nuclear medicine for several years under the auspices of The Johns Hopkins Medical Institutions, Dr. Schulz holds appointments as Associate Professor in the Department of Radiological Sciences in The Johns Hopkins University School of Hygiene and Public Health and in the Department of Radiology in the School of Medicine. He is a member of the American Physical Society, the Philosophical Society of Washington, the Society of Nuclear Medicine, and the American Association for the Advancement of Science.

AWARDS AND APPOINTMENTS

The *Variable Speed Walkway* invented by *W. H. Avery* and *R. D. Burson* was selected as one of the 100 most significant technical products of the past year by *Industrial Research Magazine*. An IR-100 award was presented by *Industrial Research, Incorporated*, at a dinner at the *Museum of Science and Industry* in Chicago, Illinois. Dr. Avery is supervisor of the *Aeronautics Division* and Mr. Burson is on the staff of the *Bumblebee Engineering Group*.

R. M. Fristrom, a member of the staff of the *Research Center, Chemical Physics Group*, is the recipient of one of the first *Senior Fellowship Awards* sponsored by the *Alexander von Humboldt Foundation of Germany* for the "promotion of scientific cooperation between German and American research institutes." Under the *Humboldt post-doctorate fellowship program*, Dr. Fristrom will have the honorary title of *visiting professor* at the *Max-Planck Institute* in *Gottingen, Germany*, during the current year.

In a recent contest held by the

Washington, D.C. Chapter of the Society of Technical Writers and Publishers, APL publications won an award in each of five categories, and a special award was given APL in recognition of its high performance as a multiple winner for two consecutive years. An *Award of Excellence* was given in the *Technical Reports* category for "Heat-Engine/Mechanical-Energy-Storage Hybrid Propulsion Systems for Vehicles—Final Report," by *G. L. Dugger, A. Brandt, J. F. George, L. L. Perrini, D. W. Rabenhorst, T. R. Small, and R. O. Weiss*, and edited by *R. T. Kroll*. An *Award of Excellence* was also received in the *House Organ* category for the *APL Technical Digest*, Vol. 10, no. 4/5 (*S. N. Foner*, Chairman of the Editorial Board; *P. E. Clark*, Managing Editor; *J. H. Hartle*, Illustrator). Three *Awards of Merit* were received: in the *Technical Brochure* category, for "The Evolution of the Computer from the Abacus to the ENIAC" by *Jeanne V. Von Schulz*, edited by *V. M. Root* and designed by *S. G. Smith*; in the *Technical Manual* category for "The Motion of Ballistic Mis-

siles" by *L. S. Glover* and *J. C. Hagan*, and edited by *Adele L. Machurek*; and in the *Journal Article* category, for "The Effect of Hyperbaric Oxygenation on Retinal Ischemia" by *R. W. Flower* and *A. Patz*.

W. H. Avery, Supervisor of the *Aeronautics Division*, has been appointed to membership on the *NASA Research and Technology Advisory Committee on Aeronautical Propulsion*, and on the *Defense Advanced Research Projects Agency Arctic SEV Program Review Committee*.

R. T. Ellis, Supervisor of the *Engineering Facilities Division*, has been named to serve on the *Johns Hopkins Public Interest Investment Advisory Committee*.

J. C. Zocchi, a member of the staff of the *Payload Systems Group* in the *Space Development Department*, was presented the *Naval Astronautics Award*, citing him for his outstanding service while serving as *APL Field Office Manager* and *Launch Coordinator* at *Lompac, Vandenberg, California*.

PUBLICATIONS

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

F. S. Billig, R. C. Orth, and M. Lasky, "Reply by Authors to E. E. Zukoski and F. W. Spaid," *AIAA J.* **10**, No. 8, Aug. 1972, 1134–1135.

E. L. Cochran, V. A. Bowers, and F. J. Adrian, "ESR Study of the Pyrolysis of Hydrogen on Tungsten," *J. Chem. Phys.* **57**, No. 6, Sept. 15, 1972, 2384–2388.

P. M. Bainum (Howard Univ.), P. G. Fuechsel (APL), and V. J. Fedor (Goddard Space Flight Center), "Stability of a Dual-Spin Spacecraft with a Flexible Momentum Wheel," *J. Spacecraft and Rockets* **9**, No. 9, Sept. 1972, 640–646.

F. S. Billig, "Two-Dimensional Model for Thermal Compression," *J. Spacecraft and Rockets* **9**, No. 9, Sept. 1972, 702–703.

C. C. Kilgus (APL) and W. C. Gore (The Johns Hopkins Univ.), "A Class of Cyclic Unequal-Error-Protection Codes," *IEEE Trans. Information Theory* **IT-18**, No. 5, Sept. 1972, 687–690.

R. L. Konigsberg, "Electromyographic Sensor Design for Use with an Externally Powered Prosthetic Arm," *J. Assoc. Advancement Medical Instrumentation* **6**, No. 5, Sept.–Oct. 1972, 347–351.

H. E. Reichenberg, "Introduction and Implementation of Reliability

Requirements," *Proc. 10th Annual Workshop of Government-Industry Data Exchange Program*, San Diego, Oct. 18–19, 1972, 33–48.

R. R. Newton and R. E. Jenkins, "Possible Use of Stonehenge," *Nature* **239**, No. 5374, Oct. 27, 1972, 511–512.

T. G. Konrad and F. L. Robison, "Simultaneous Measurements of Radar Reflectivity and Refractive Index Spectra in Clear Air Convection," *J. Appl. Meteorology* **11**, No. 7, Oct. 1972, 1114–1119.

N. Rubinstein and J. T. Stadter, "Bounds to Bending Frequencies of a Rotating Beam," *J. Franklin*

PUBLICATIONS *(continued)*

- Inst.* **294**, No. 4, Oct. 1972, 217–229.
- R. W. Flower, "Infrared Absorption Angiography of the Choroid and Some Observations on the Effects of High Intraocular Pressure," *American J. Ophthalm.* **74**, No. 4, Oct. 1972, 600–614.
- D. D. Zimmerman, "Evaluation Study of Epoxy Materials for Use in Hybrid Assembly Processes," *Proc. 1972 Internatl. Microelec. Symposium* 3-A-2-1–3-A-2-6.
- L. Monchick, "Rotational Transitions and Thermal Diffusion in Ortho and Para Hydrogen," *Chem. Phys. Letters* **17**, No. 2, Nov. 15, 1972, 241–244.
- D. W. Fox, "Lower Bounds for Eigenvalues with Displacement of Essential Spectra," *SIAM J. Math. Anal.* **3**, No. 4, Nov. 1972, 617–624.
- M. L. Hill, "Introducing the Electrostatic Autopilot," *Astronautics & Aeronautics* **10**, No. 11, Nov. 1972, 22–31.
- G. J. Laughlin, E. V. Byron, and T. C. Cheston, "Very Wide-Band Phased-Array Antenna," *IEEE Trans. Antennas and Propagation* **AP-20**, No. 6, Nov. 1972, 699–704.
- A. J. Zmuda and T. A. Potemra, "Bombardment of the Polar-Cap Ionosphere by Solar Cosmic Rays," *Rev. Geophys. and Space Phys.* **10**, No. 4, Nov. 1972, 981–991.
- V. L. Pisacane and M. M. Feen, "Potential of the Navy Navigation Satellite System in Predicting Ionospheric Characteristics," *Signal* **27**, No. 3, Nov. 1972, 14–18.
- M. M. Robison, R. M. Fristrom, A. G. Schulz (APL) and P. E. Wagner (The Johns Hopkins Univ.), "The Accumulation of Gases on an Upper Floor during Fire Buildup," *Fire Tech.* **8**, No. 4, Nov. 1972, 278–290.
- J. A. Schetz (Virginia Polytechnic Institute and State University) and S. Favin (APL), "Analysis of Free Turbulent Mixing Flows with a Net Momentum Defect," *AIAA J.* **10**, No. 11, Nov. 1972, 1524–1526.
- E. Shotland, "Three Angles Significant in Radio Propagation," *IEEE Trans. on Antennas and Propagation* **AP-20**, No. 6, Nov. 1972, 798–801.
- C. J. Swet, "Curbside Service Subways," *Transp. Eng. J.* (ASCE) **98**, No. TE4, Nov. 1972, 941–952.
- T. A. Potemra and A. J. Zmuda, "Solar Electrons and Alpha Particles during Polar-Cap Absorption Events," *J. Geophys. Res.* **77**, No. 34, Dec. 1, 1972, 6916–6921.
- F. J. Adrian, "Singlet-Triplet Splitting in Diffusing Radical Pairs and the Magnitude of Chemically Induced Electron Spin Polarization" *J. Chem. Phys.* **57**, No. 12, Dec. 15, 1972, 5107–5113.
- A. A. Westenberg and N. DeHaas, "Rate Measurements on OH + NO + M and OH + NO₂ + M," *J. Chem. Phys.* **57**, No. 12, Dec. 15, 1972, 5375–5378.
- Vivian O'Brien, "Closed Streamlines Associated with Channel Flow over a Cavity," *Phys. Fluids* **15**, No. 12, Dec. 1972, 2089–2097.
- K. S. Bonwit (APL) and E. L. Phillips and D. L. Williams (School for Contemporary Educ.), "The Electric Pencil—A Device for Training in Fine Motor Skills," *Proc. 1972 Carnahan Conf. on Electronic Prosthetics, Univ. Kentucky*, UKY TR60-72-EE4, Dec. 1972.
- J. R. Morrison, "Excessive Neuromuscular Time Delay as a Possible Cause of Poor Hand-Eye Coordination and Hyperactivity," *Proc. 1972 Carnahan Conf. on Electronic Prosthetics, Univ. Kentucky*, UKY TR60-72-EE4, Dec. 1972.
- N. A. Blum and C. Feldman, "The Crystallization of Amorphous Silicon Films," *J. Non-Crystalline Solids* **11**, 1972, 242–246.
- C. Feldman (APL) and F. G. Satkiewicz (GCA Technology Division), "The Study of Amorphous and Crystalline Silicon Thin Films by Sputter-Ion Source Mass Spectrometry," *Thin Solid Films* **12**, 1972, 217–222.

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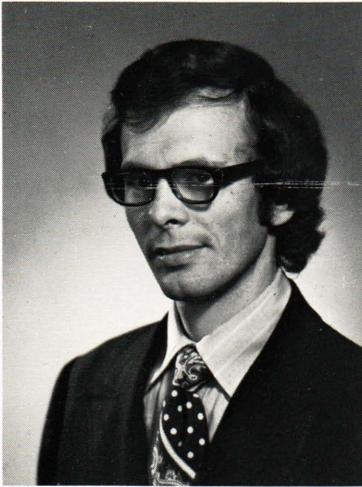
- Oct. 6*—"Laser Fusion," by J. W. Nuckolls and L. Wood, University of California, Lawrence Livermore Laboratory.
- Oct. 13*—"Triad—A 4-Ounce Satellite in a 200-Pound Box," by R. E. Fischell, APL.
- Oct. 20*—"Computer Music and Other Unusual Computer Applications," by M. V. Mathews, Bell Telephone Laboratories.
- Oct. 27*—"My Impressions of Science and Technology in China," by C. K. Jen, APL.
- Nov. 3*—"The Biology of Behavior," by R. Ardrey.
- Nov. 10*—"A Cost/Benefit Analysis of the Space Shuttle," by O. Morgenstern, New York University.
- Nov. 17*—"The Physical Study of the Earth and the Scientific Revolution It Has Caused," by J. T. Wilson, University of Toronto.
- Dec. 1*—"New Approaches to the Selective Control of Insect Pests," by C. M. Williams, Harvard University.
- Dec. 8*—"The Properties and Structure of Liquid Crystals," by G. H. Brown, Kent State University.
- Dec. 15*—"The Effect of Hurricane Agnes on the Chesapeake Bay," by D. W. Pritchard, The Johns Hopkins University.

ADDRESSES

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

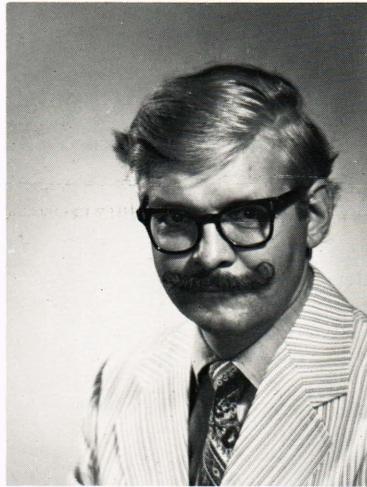
- R. A. Meyer and D. G. Grant, "Two-Dimensional Optical Phased-Array Beam Steering," *Electro-Optical Systems Design Conference*, New York, September 12, 1972.
- E. E. Westerfield, "Determination of Position of a Drifting Buoy by Means of the Navy Navigation Satellite System," *IEEE International Conference on Engineering in the Ocean Environment*, Newport, Rhode Island, September 13-15, 1972.
- R. A. Makofski, "Personnel Rapid Transit: A Critical Review," *1972 Transportation Seminar Series, Princeton University*, Princeton, New Jersey, September 14, 1972.
- S. E. Anderson, "Computer Animation," *Association for Computing Machinery*, Rochester, New York, September 15, 1972.
- J. R. Stevens, J. L. Keirse, R. L. Rumpf, and F. Jurgens, "Transonic Inlet Investigations," *Navy Aeroballistic Advisory Committee Panel Meeting, Naval Weapons Laboratory*, Dahlgren, Virginia, September 19, 1972.
- R. C. Orth, F. S. Billig, and S. E. Grenleski, "Measurement Techniques for Supersonic Combustor Testing," *Symposium on Instrumentation for Airbreathing Propulsion*, Naval Postgraduate School, Monterey, California, September 19-21, 1972.
- A. A. Westenberg, "Some Recent Chemical Kinetic Studies," *Chemistry Colloquium, Naval Research Laboratory*, Washington, D.C., September 21, 1972.
- M. H. Friedman, "Unsteady Aspects of Corneal Thickness Control," *International Committee for Eye Research Symposium on Transport Processes in the Eye*, Charleston, South Carolina, September 22-24, 1972.
- B. W. Kuvshinoff, "Federal Library Automation," *Symposium on Federal Library Automation, U.S. Army War College*, Carlisle, Pennsylvania, September 25-27, 1972.
- R. M. Fristrom, "National Fire Problems," *Committee on Fire Research, National Academy of Sciences*, Washington, D.C., September 27, 1972.
- The following three addresses were presented at the *25th Annual Conference on Engineering in Medicine and Biology*, Miami, Florida, October 1-5, 1972:
- B. F. Hochheimer, "An Argon Ion Laser Photocoagulator";
- L. W. Ehrlich, M. H. Friedman, and Vivian O'Brien, "Digital Simulation of Periodic Blood Flow in a Bifurcation";
- M. H. Friedman, "Corneal Hydration Dynamics and Thickness Regulation."
- Ella B. Dobson, "Doppler Radar Measurements of Clear Air Turbulence," *University of Maryland Departments of Seismology and Applied Mathematics*, College Park October 5, 1972.
- G. D. Mitchell, C. Feldman, and R. T. Foley, "The Piezogalvanic Effect," *Fall Meeting of the Electro-Chemical Society*, Washington, D.C., October 9-12, 1972.
- J. B. Oakes, "Clinical Engineering at Johns Hopkins Hospital," *1972 International Conference on Cybernetics and Society*, Washington, D.C., October 9-12, 1972.
- C. Feldman, K. Moorjani, and N. Blum, "Mass Spectrometry, Optical Absorption and Electrical Properties of Amorphous Boron Films," *International Symposium on Boron*, Tbilisi, Georgia, USSR, October 9-15, 1972.
- The following four addresses were presented at the *Fifteenth Radar Meteorology Conference*, University of Illinois, Urbana, October 10-12, 1972:
- Ella B. Dobson and J. H. Meyer, "Doppler Radar Measurements of the Velocity Field Associated with a Turbulent Clear Air Layer";
- J. C. Howard and T. G. Konrad, "Multiple Contrail Streamers Observed by Radar";
- T. G. Konrad and F. L. Robison, "Simultaneous Measurements of Radar Reflectivity and Refractive Index Spectra in Clear Air Convection";
- J. R. Rowland, "Intensive Probing of Clear Air Convective Fields by Radar and Instrumented Drone Aircraft."
- A. I. Mahan, "Optical Properties of Cylinders," *Naval Postgraduate School*, Monterey, California, October 14, 1972.
- A. I. Mahan and C. V. Bitterli, "Complex Propagation Constants for Ruby Cylinders from Boundary Considerations," *Fall Meeting Optical Society of America*, San Francisco, California, October 17-20, 1972.
- K. Moorjani, "Coherent Potential Theory of Disordered Solids: Composition and Magnetic Disorder," *Institute of Physics of the Romanian Academy of Sciences*, Bucharest, October 19, 1972.
- L. G. Knowles (APL) and H. N. Wagner, Jr. (JHMI), "Practical Applications of the Computer in Radionuclide Imaging," *Symposium on Medical Radioisotope Scintigraphy, International Atomic Energy Agency*, Monaco, October 23, 1972.
- S. E. Anderson, "Plotting Software for the 4020 Microfilm Recorder," *Users of Automatic Information Display Equipment (UAIDE)*, Lake Geneva, Wisconsin, October 23-26, 1972.
- L. F. Fehlner and T. A. McCarty, "A Precision Time and Position Service for the Support of Air Traffic of the Future," *International Air Transport Association, Nineteenth Technical Conference*, Dublin, Ireland, October 23-28, 1972.
- R. M. Fristrom, "Fire and Flame Studies," *Molecular Beam Sampling Conference*, Lake of the Ozarks, Missouri, October 25, 1972.

WITH THE AUTHORS



G. L. Pitts, co-author of "Augmented Block Guidance—A Control Concept for Automated Urban Transit," was born in Lansing, Michigan. He received the B.S. degree in electrical engineering in 1967 from Michigan State University and the M.S. degree in electrical engineering in 1968 from Northwestern University. Mr. Pitts joined the Missile Control Systems Group at APL in 1968. As a member of the Engineering Dynamics Project in that Group, his primary assignment since 1969 has been to apply classical and modern control theory to the development of urban transit systems. He is a member of the Institute of Electrical and Electronic Engineers.

E. J. Hinman, co-author of "Augmented Block Guidance—A Control Concept for Automated Urban Transit," is a native of Rochester, New York. He received the B.A. degree from St. John Fisher College in Rochester, the B.E.E. degree from



the University of Detroit, and the M.S.E.E. degree from the University of Illinois. He joined APL in 1962 and has been a member of the MCS Group since completion of the Associate Staff Training Program in November 1962 and was appointed Assistant Group Supervisor in 1972. Mr. Hinman has worked on a variety of control system problems associated with tactical missile autopilots, submarine hovering control, and automated transit command and control technology. Since 1970 he has devoted his major effort to investigation of the requirements and constraints imposed on automated transit vehicles operating at short headways.

R. R. Newton, author of "Applied Ancient Astronomy," was born in Chattanooga, Tennessee. He received the B.S. degree in electrical engineering in 1940 from the University of Tennessee, and M.S. and



Ph.D. degrees in physics from Ohio State University. Prior to joining the APL staff in 1957, Dr. Newton taught at the University of Tennessee and Tulane University and was on the staffs of Allegany Ballistics Laboratory and Bell Telephone Laboratories. He was also a consultant at Cornell Aeronautical Laboratory and directed the research program in theoretical ballistics at Redstone Arsenal. He has held a variety of positions at APL related to the Laboratory's space research activities, and is currently supervisor of the Space Research and Analysis Branch. Dr. Newton is a specialist in molecular structure, theoretical ballistics, electron physics, celestial mechanics, and satellite tracking. He is a member of the American Physical Society, the International Astronomical Union, the Medieval Academy of America, and is a Fellow of the American Geophysical Union and of the Royal Astronomical Society.