APL COLLOQUIA SUMMARIES

Dr. S. Fritz, chief scientist at the United States Weather Bureau, discussed the present capabilities and uses of the Tiros meteorological satellite at the October 26 Colloquium in Parsons Auditorium.

His lecture, profusely illustrated with photographs taken from Tiros, showed cloud formations which have been used in weather prediction, several meteorological phenomena, and contrasts between land and water features as seen via telemetry from the satellite. Dr. Fritz mentioned among future developments that Nimbus, an advancement over the Tiros, will be launched late in 1962. He also described measures now being taken by the Weather Bureau to attempt achievement of higher photographic resolution of the infrared radiation which Tiros detects.

Finally, the speaker noted the importance of upper-atmosphere temperature measurements and the fact that a method of making such measurements on a daily basis is under investigation.

The November 3 Colloquium featured the fascinating world of the dolphin, as described by Dr. J. C. Lilly, Communications Research Institute, St. Thomas, Virgin Islands. The overflow audience heard Dr. Lilly discuss at length the physiological and psychological characteristics of the dolphin currently under study. Tapes of dolphins "talking" and behaviors which can be thought of as "intelligence" are being studied by scientists in an attempt to probe the dolphin's being and the motivations which excite him to certain patterns of activity. The bottle-nosed blue dolphin was selected for these studies since its brain weight of 1600 grams is the closest approximation, among mammals, of the human brain weight of 2000 grams and because its complexity is comparable. Because of these similarities, which, it should be noted, are not considered in relation to body weight, it is believed that studies of the dolphin's learning processes and means of communication can ultimately dispel some current mysteries of human behavior.

Dr. P. J. Debye, 1936 Nobel Prize winner in chemistry and now Professor Emeritus at Cornell University, spoke on "Critical Opalescence and Molecular Interactions" at the November 17 Colloquium.

He lectured on a technique for measuring molecular weight of polymers which is based on the intensity of light scattering by particles in solution. The light scattering properties of polymer solutions are related to the molecular weight of the polymer; therefore, measurements of scattered light can be used to deduce the molecular weight of the polymer.

A problem occurs, however, in measuring polymers with large molecules where the particle size is comparable to the wavelength of the light. In such cases the particle size must be estimated, which, therefore, requires a change in the original measuring technique. The current problem in his investigations, as Dr. Debye pointed out, is to determine the exact particle size of the larger molecules. This he hopes to accomplish when he has been able to obtain a polymer with a fixed molecular weight.

Dr. E. L. O'Neill of Boston University discussed modern developments in optics and communications theory at the November 10 Colloquium.

Dr. D. J. Rose, Professor of Nuclear Engineering at the Massachusetts Institute of Technology, spoke at the November 26 Colloquium on the subject of "Some Recent Advances and Future Prospects in Controlled Thermonuclear Fission."

Dr. G. Feldman, Associate Professor of Physics, The Johns Hopkins University, was the speaker at the December 1 Colloquium. His topic was "Structure of the Nucleon in New Elementary Particles."

Dr. G. K. Wessel, Professor of Physics at Syracuse University, presented as his topic for the December 8 Colloquium a discussion of "Some Recent Developments in Optical and Infrared Masers."

JOURNAL PUBLICATIONS

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

Gertrude S. McMurray, "The Solid and Liquid Propellant Information Agencies," *ARS* Technical Paper 2198-61.

D. W. Fox (APL) and R. M. Rivello (University of Maryland), "Torsional Analysis of Thin-Walled Shells with Many Closely Spaced Webs," *Journal of the Aerospace Sciences,* Vol. 28, No. 9, September 1961, 725-731.

E. A. Bunt and H. L. Olsen, "Plasma Arc Heating for Hypersonic Wind Tunnels," *Research,* Vol. 14, September 1961, 353-366.

D. W. Fox (APL) and N. W. Bazley (National Bureau of Standards) "Lower Bounds for Eigenvalues of Schrödinger's Equation," *Physical Review,* Vol. 124, No. 2, October 1961, 483-492.

R. E. Walker, "Chemical Reaction and Diffusion in a Catalytic Tubular Reactor," *Physics of Fluids,* Vol. 4, No. 10, October 1961, 1211-1216.

A. J. Cote, Jr., "Simulating Nerve Networks with Four-Layer Diodes," *Electronics,* Vol. 34, No. 41, October 13, 1961, 51-53.

W. H. Guier, "Ionospheric Contributions to the Doppler Shift at VHF from Near-Earth Satellites" (Letter), *Proceedings of the IRE,* Vol. 49, No. 11, November 1961, 1680.

E. A. Bunt (APL) and M. F. Kirk (Satman Oil Co., Boksburg North, Transvaal), "A Correlation of Various Types of Axisymmetric Overflows of Small Vorticity," *Journal of Mechanical Engineering Science,* London, England, December 1961.

G. J. Pietrangeli and Eunice V. Nice, "Mach 7 Transport Waits in the Wings," *S.A.E. Journal,* December 1961, 47-53.

T. A. McCarty and Ann C. Weingartner, "Insulation Burdens Mach 7 Ramjet," *S.A.E. Journal,* December 1961, 48-49.

S. A. Elder, "Design of Two Phototransistor Pyrometers," *Electronics,* Vol. 34, No. 49, December 8, 1961, 56-60.

Books

G. H. Mowbray and J. W. Gebhard, "Man's Senses as Informational Channels," Paper 5 in "Selected Papers on Human Factors in the Design and Use of Control Systems," Dover Publications, Inc., New York, New York, 1961, 115-149.

AWARDS AND HONORS

In November 1961, R. K. Dahlstrom, Assistant Supervisor of the Polaris Division, became the third 1961 recipient at APL of the Navy's Distinguished Public Service Award. This, the Navy's highest civilian award, was bestowed in recognition of his work in evaluating flight test results of Polaris submarine underwater launchings. In citing Dr. Dahlstrom, Vice Admiral William F. Raborn, Jr., Chief of the Polaris Program, noted that the contributions he had made in detailed analysis of missilry phenomena, as well as his sound recommendations derived from these analyses, "were essential . . . . to the improved performance and reliability of the fleet ballistic missile system, particularly the Polaris missile."

Navy Distinguished Public Service Awards had been given earlier this year to W. H. Goss, Assistant Director (Technical Evaluation), for his individual contributions and leadership in guided-missile research and development, and to R. B. Kershner for organizing and directing the program evaluation for Polaris.

PATENTS

U. S. Government patents recently issued to Laboratory staff members for inventions produced in support of APL objectives.

F. Bader—*Variable Area Nozzle Arrangement,* Patent No. 3,005,308.

W. G. Berl and D. W. Dembrow—*Method of Bonding Solid Oxidizer Particles Together to Manufacture Propellant Charges,* Patent No. 2,993,767.

K. J. Bialy—*Missile Launcher,* Patent No. 2,998,754.

F. A. Dean and E. J. Hardgrave, Jr.—*Ramjet Diffuser,* Patent No. 2,998,702.

B. D. Dobbins, A. C. Tregidga and G. W. Luke, Jr.—*Antenna,* Patent No. 2,998,943.

E. J. Hardgrave, Jr.—*Device for Measuring Mach Number,* Patent No. 2,995,932.

S. A. Jordan, Jr. and E. D. Robinson—*Simulated Missile Homing System,* Patent No. 2,995,830.

J. H. Kuck—*Autocorrelation Discriminator,* Patent No. 2,998,942.

J. H. Loveless—*Air Servo Valve,* Patent No. 2,994,334.

A. H. Miller—*Grain Immobilizer,* Patent No. 2,996,879.

H. S. Morton—*Nomograph Calculator,* Patent No. 2,991,934.

R. O. Robinson, Jr.—*Roll Indication System,* Patent No. 2,995,749.

F. H. Swaim and R. B. Kershner—*Pre-Boost Control Device for Aerial Missiles,* Patent No. 2,995,-319.

P. D. Ulm and H. H. George—*Roll Stabilization System for Guided Missiles Utilizing Simplified Microwave Modulating Attenuator,* Patent No. 2,994,494.

J. H. Walker—*Supersonic Aircraft,* Patent No. 2,997,256.

ADDRESSES

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

D. W. Fox, "Estimation of Eigenvalues and Eigenvectors of Self-adjoint Operators" (lecture series), *Theoretical Group, Institut Battelle,* Carouge-Genève, Switzerland, May-June, 1961.

D. W. Fox, "Lower Bounds for Eigenvalues of Self-adjoint Operators," *Mathematiches Kolloquium Zürich, Eidgenössiche Technische Hochschule,* Zurich, Switzerland, June 1961.

R. M. Fristrom, "Flame Structure Studies," *Colloquium of the Institut für Physikalische Chemie,* University of Goettingen, Goettingen, Germany, September 5, 1961.

R. B. Kershner and R. R. Newton, "The Transit Navigation Satellite System," *Advisory Group for Aeronautical Research and Development,* Paris, France, October 2-3, 1961.

G. L. Dugger, "High Performance Combustion Systems," *Twelfth International Astronautical Congress,* Washington, D. C., October 3, 1961.

A. A. Westenberg, "In Situ Studies of Flame Kinetics," *Central Pennsylvania American Chemical Society Section,* Pennsylvania State University, University Park, Pennsylvania, October 5, 1961.

R. M. Fristrom, "Flame Structure Studies," *Department of Chemical Engineering,* Imperial College, London, England, October 9, 1961.

T. A. McCarty and Ann C. Weingartner, "Heat Transfer and Insulation Considerations for an External Expansion Ramjet with Specific Application to Mach 7.0 Flight," *S.A.E. National Aerospace Engineering and Manufacturing Meeting,* Los Angeles, California, October 9-12, 1961.

R. E. Fischell, "Nuclear Powered Thermoelectric Generator for the Transit Satellites," *ARS Space Flight Report to the Nation,* New York, New York, October 9-15, 1961.

Gertrude S. McMurray, "The Solid and Liquid Propellant Information Agencies," *ARS Space Flight Report to the Nation,* New York, New York, October 9-15, 1961.

R. M. Fristrom, "Flame Structure Studies," *Houldsworth School of Applied Science,* University of Leeds, England, October 11, 1961.

R. E. Gibson, "Space, Time, and Gravitation," *National Association of Seventh Day Adventist Dentists,* Philadelphia, Pennsylvania, October 14, 1961.

I. Katz, "Bistatic Reflectivity of the Ocean Surface," *Fall Meeting of the URSI-IRE,* University of Texas, Austin, Texas, October 23-25, 1961.

E. P. Gray, "A Numerical Trajectory Analysis of Charged Particle Motion in Cusped Magnetic Fields," *American Physical Society Division of Plasma Physics,* Colorado Springs, Colorado, November 15, 1961.

Vivian O'Brien, "A New Instability Problem: Vortex Breakup," *American Physical Society Division of Fluid Dynamics,* Berkeley, California, November 20-22, 1961.

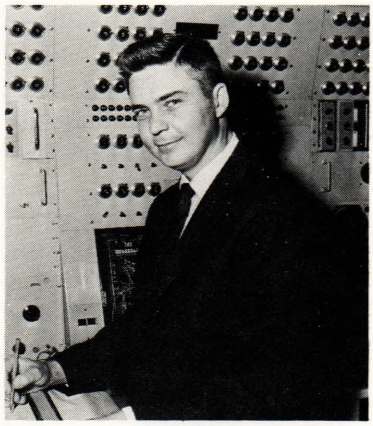
R. M. Fristrom, "Flames, Their Structures and Processes," *American Institute of Chemical Engineers,* Symposium on Flames and Plasmas in Chemical Processing, New York, New York, December 6, 1961.

G. L. Dugger, "Hypersonic Propulsion Studies at APL," *Atlantic Research Corporation,* Alexandria, Virginia, December 14, 1961.

WITH THE AUTHORS

The author of "An Airbreathing Mach 7.0 Transport," *G. J. Pietrangeli,* native of Kenosha, Wisconsin, received his B.S. degree in Aeronautics at the University of Michigan in 1942, and an M.S. in mathematics at Ohio State University in 1951. He began his career as an aeronautical engineer at Wright-Patterson Air Force Base, Ohio, and also served as an instructor in mathematics at Ohio State University. Coming to APL in 1950, Mr. Pietrangeli has specialized in diffuser design, wind tunnel testing, and propulsion performance analysis. More recently he has been concerned with composite design and performance.

The author of "Low-Angle Beam Riding Over the Ocean," *W. S. Thompson,* is from Goldsboro, North Carolina, and received his B. S. degree from the North Carolina State College in 1956. He continued his studies under a research assistantship in the field of nuclear physics, specializing in gamma ray spectroscopy, and received his M. S. in 1958. Coming to APL in 1958, his work has included weapon system analysis and missile dynamic studies in both homing and beam-riding guidance. Mr. Thompson is a Senior Engineer in the Design Analysis Project of the Bumblebee Dynamics Group. He is a member of the American Physical Society.



E. A. Bunt, co-author of "Plasma Arc Heating for Hypersonic Wind Tunnels," is Project Supervisor, Advanced Facilities, in the Bumblebee Flight Research Group. Born in Johannesburg, he received B.Sc., M. Sc., and Ph.D. degrees in mechanical engineering from the University of the Witwatersrand, South Africa. A flight sergeant and later flying boat commander in the Royal Air Force from 1941-1945, he lectured in fluid mechanics at the University of Witwatersrand from 1947 to 1958, and was also an Assistant Research Officer at the High Speed Aerodynamics Laboratory of the Canadian National Research Council before joining APL in 1958. Dr. Bunt is a member of the Institute of Mechanical Engineers, the Royal Aeronautical Society, and the South African Institution of Mechanical Engineers.

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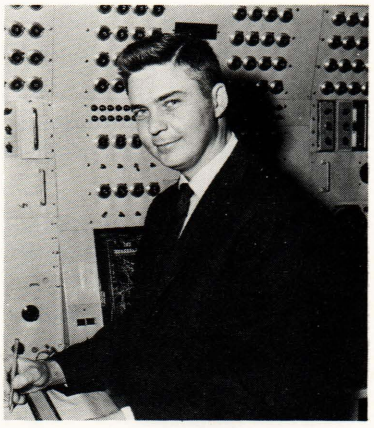

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