

JOURNAL PUBLICATIONS

The following list is a compilation of recently published books and technical articles written by APL staff members.

- R. A. Sparks, "A Technique for Obtaining DC Isolation in Coaxial Cable RF Transmission Lines," *IRE Transactions on Microwave Theory and Techniques*, Vol. MTT-9, No. 4, July 1961, 360.
- R. A. Sparks, "X-Radiation from High-Power Traveling-Wave Tubes," *Digest of 1961 International Conference on Medical Electronics*, July 1961, 230.
- V. O'Brien, "Steady Spheroidal Vortices—More Exact Solutions to the Navier-Stokes Equation," *Quarterly of Applied Mathematics*, Vol. XIX, No. 2, July 1961, 163-168.
- R. G. Grossman (Walter Reed Army Institute of Research) and L. J. Viernstein (APL), "Discharge Patterns of Neurons in Cochlear Nucleus," *Science*, Vol. 134, No. 3472, July 14, 1961, 99-101.
- J. H. Kuck, "Automatic Gain Control for Superregenerative Amplifiers," *Electronics*, Vol. 34, No. 29, July 21, 1961, 76-79.
- W. G. Berl, "Formation of Boron Nitride in Diborane-Hydrazine Flames," *Nature*, Vol. 191, July 22, 1961, 380.
- R. L. Konigsberg, "Designing Hybrid DC Amplifiers to Withstand Missile Environment," *Electronics*, Vol. 34, No. 32, August 11, 1961, 157-160.
- A. J. Cote, Jr., "A Neuristor Prototype" (Letter), *Proceedings of the IRE*, Vol. 49, No. 9, September 1961, 1430-1431.
- R. E. Fischell, "Magnetic Damping of the Angular Motions of Earth Satellites," *Journal of the American Rocket Society*, Vol. 31, No. 9, September 1961, 1210-1217.

— Books —

- A. J. Cote, Jr. and J. B. Oakes, "Linear Vacuum-tube and Transistor Circuits," McGraw-Hill Book Company, New York, New York, August 1961.

ADDRESSES

The listing below comprises the principal recent addresses made by APL staff members to groups and organizations outside the Laboratory.

- V. A. Bowers, S. N. Foner, and C. K. Jen, "Spin Resonance of Alkali Atoms in Inert-Gas Matrices;"
and
C. K. Jen, "A Survey of ESR Studies of Radicals Trapped at Low Temperatures;"
and
E. L. Cochran and F. J. Adrian, "ESR Studies of Radicals Formed by Secondary Processes in Photolytic Systems at 4.2°K.," *Fifth International Symposium on Free Radicals*, Uppsala, Sweden, July 6-7, 1961.
- R. A. Sparks, "X-Radiation from High-Power Traveling-Wave Tubes," *Fourth International Conference on Medical Electronics*, New York, New York, July 16-21, 1961.
- E. T. Marley, "Aerodynamic Stability and Performance Characteristics Obtained from Autopilot-Controlled Supersonic Test Vehicles," *Advisory Group for Aeronautical Research and Development of the North Atlantic Treaty Organization, Specialists' Meeting on Aircraft Stability and Control*, Scheveningen, Netherlands, July 17-21, 1961.
- R. B. Kershner, "Transit Navigation System," *American Rocket Society Guidance and Control Conference*, Stanford University, Stanford, California, August 9, 1961.
- D. Rabenhorst, "General Aspects of Transit," *Transit Navigational System Monthly Seminar for Executives of ARMCO Steel Corporation*, Baltimore, Maryland, August 10, 1961.
- R. E. Gibson, "A Systems Approach to Research Management," *Second Research Reserve Seminar on Research Planning and Management*, Princeton, University, New Jersey, August 23, 1961.
- R. B. Kershner, "Systems Engineering," *Workshop on Systems Engineering*, University of Pennsylvania, Philadelphia, Pennsylvania, August 28, 1961.
- J. R. Apel (APL) and S. F. Singer (University of Maryland), "Geomagnetic Field Perturbations Due To Trapped Particles," *1961 AFBMD/Aerospace Symposium on Ballistic Missile and Aerospace Technology*, Los Angeles, California, August 28-30, 1961.
- A. J. Cote, Jr., "Machines and Interpretation of Radar Display," *Bionics Symposium*, Cornell University, Ithaca, New York, August 30-September 1, 1961.
- R. B. Kershner and R. R. Newton, "The Transit Navigation Satellite System," *Institute of Navigation*, with the *Electronic Engineering Association*, London, England, September 26, 1961.
- R. E. Gibson, "The Role of the Scientist in National Security Policy Planning," *Industrial College of the Armed Forces*, Washington, D. C., September 27, 1961.

APL COLLOQUIA SUMMARIES

The Friday afternoon Colloquium has become, over the past fifteen years, an established part of the intellectual activity of APL, and it has been notably successful in maintaining a high order of staff interest and participation. Through these meetings Laboratory members are kept informed of important developments in all of the rapidly changing and growing fields of science and technology. And, in addition, to a considerable audience from the Washington-Baltimore scientific community these meetings have become a valued and respected source of knowledge. The Colloquium Committee is headed by E. P. Gray, Chairman for 1961-63, and includes J. W. Follin, Jr., W. Liben, and G. L. Pieper, with A. M. Stone as permanent Advisor.

In this and succeeding issues of the *Digest* there will be presented a brief summary of one or more Colloquia that have taken place during the current period.

The history of digital computers, their present capabilities, and foreseeable progress were covered by R. P. Rich in a talk on "Computer Trends" at the October 6 Colloquium in Parsons Auditorium. Dr. Rich, supervisor of the APL Computing Center, made the strong point that computers are ushering in a cultural revolution which could well become as far-reaching as that brought about by the automobile. He remarked further that forecasts of the role of computers in our culture 50 years hence are likely to be grossly conservative, just as in 1910, no one in his right mind could have forecast either the tremendous increase in numbers of automobiles or the total miles traveled in them in only 50 years.

Dr. Rich went on to discuss the fact that computers were becoming faster and smaller through better design, that computations themselves were becoming cheaper, that memories were growing larger, and that techniques of remote control and correction-making were developing rapidly.

Extension of digital computer applications to video and audio inputs and outputs, development of computer languages, and remote programming, led Dr. Rich to a discussion of more sophisticated computer uses. He suggested, among many such applications, their employment in handling airline reservations, payrolls, licenses, and as teaching machines, etc. As he pointed out, "our culture has reached a point where we can stand that sort of thing."

One aspect of the science of operations research—"Unsolved Problems in Production Scheduling"—was the topic of the October 13 Colloquium, in a talk given by Dr. G. E. Kimball. Drawing on his experience with the A. D. Little Co., Boston, Massachusetts, Dr. Kimball stated that the 10-year-old science was "very similar to physics and chemistry since it too makes a distinction between basic and applied science." There is, however, one important difference between operations research and the physical sciences: "By no means are we sure that the fundamental laws of operations research are right yet."

The speaker devoted the major portion of his remarks to summarizing the many problems of production scheduling. These, noted briefly, were the following: *costs*, such as inventory, back orders, production rate, and changeover; *rate*, or programming production to meet demand, and carrying the requisite inventory; *rate adjustment*, or trying to plan according to an unpredictable future; *discreteness*, or adjusting to discrete demand and quantized production rates; *changeover*, or the problems introduced by sequential production; *network*, or how to integrate completely the production of every unit; and *bottlenecks*, being the use of information and scheduling to avoid production tieups.

Through a complete and detailed understanding of these problems, their effects, and the methods of their solution through operations research, Dr. Kimball maintained that the path to economic production can be very substantially eased.

WITH THE AUTHORS

G. F. Pieper is the author of "Injun, A Radiation Research Satellite." His first scientific position was as a staff member at the Radiation Laboratory at MIT during the last two years of World War II. After the war he completed undergraduate work at Williams College in 1946,



remained there a year as instructor in physics, and then took an M.S. in Engineering at Cornell University in 1949. After a year in industry he went on to Yale University where he completed his Ph.D. in nuclear physics in 1952. Dr. Pieper remained at Yale as instructor and assistant professor of physics until September 1960, when he joined APL as a senior physicist in the Space Research and Analysis group. He is a member of Phi Beta Kappa, Sigma Xi, and the American Geophysical Union; he is a Fellow of the American Physical Society and a former Fellow of the Carnegie Institution of Washington.

J. P. Randolph, Jr., a native of Arkansas, received a B.S. degree in Electrical Engineering at the University of Arkansas in 1942 and an M.S. in Electrical Engineering from the University of Maryland in 1954.

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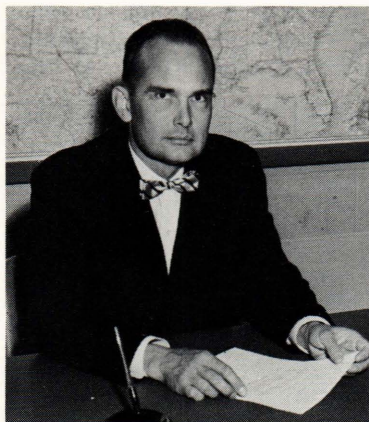
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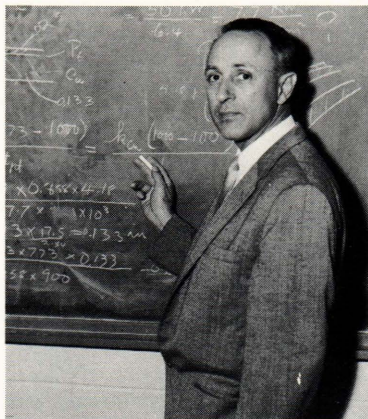
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Mr. Randolph became affiliated with APL in 1948, where he now is Supervisor of the Bumblebee Instrumentation Development Group. His special interests are primarily in telemetering and data processing. He has helped develop such devices as an automatic recording wave analyzer, a semiautomatic curve reader and digitizer, a missile-in-flight indicator,



and a multiple pulse generator. Mr. Randolph is the author of "New Trends in Telemetry" which appears in this issue.

H. L. Olsen, co-author of "APL Propulsion Research Laboratory", is Group Supervisor, Bumblebee Propulsion Research Facilities. A native of Santaquin, Utah, with B.S. and M.S. degrees in physics from Brigham Young University, he received a Ph.D. in physics from the University of Wisconsin in 1949. After serving as a research scientist with NACA and as Research Instructor at the University of Wisconsin, he joined the Laboratory staff in 1949. His professional specialties include basic studies of the nature of flame propagation, ignition phenomena, and turbulence. Dr. Olsen has over-all direction of advanced propulsion



research and development facilities and supervises operation of the newly completed Propulsion Research Laboratory. He initiated the flame-kernel technique and worked on optical methods of flow visualization. His professional affiliations include Sigma Pi Sigma, Gamma Alpha, Sigma Xi, and the American Physical Society.

H. F. Kirk, Jr., co-author of "APL Propulsion Research Laboratory," received a B.S. degree in Aeronautical Engineering from the University of Michigan in 1940. He is a native of Newark, New Jersey. After



-serving as a chief test engineer with the Aircraft Gas Turbine Division, DeLaval Steam Turbine Co., he joined the Laboratory in 1948, where he is now Supervisor of Technical Facility Planning. Mr. Kirk's professional specialties include facility planning and contract management. He is a member of the Institute of Aeronautical Sciences, the Society of Automotive Engineers, and the Association for Applied Solar Energy.

M. C. Waddell, author of "A Strategic Force Deterrence Model," is a native of St. Paul, Minnesota, coming to APL in 1951, where he now is Assistant Supervisor of the Assessment Division. He took his B.A. degree at Hamilton College, and his M.A. and Ph.D. degrees in Mathematics at the University of Minnesota and The Johns Hopkins Uni-



versity, respectively. Dr. Waddell was formerly associated with the Minnesota Mutual Life Insurance Co. Actuarial Dept., and was a mathematics teacher at Western Reserve University. At the Laboratory he has specialized in operations research, specifically the tactical analysis of APL-developed missiles and weapons systems.