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COSATI Designates Panel Members to Aid National Effort

Formation is now complete of three of eight projected panels to assist the Committee on Scientific and Technical Information (COSATI), Federal Council for Science and Technology, in planning and developing a coordinated, integrated Federal agency program for improved use of information resources.

COSATI Chairman Willim T. Knox, who functions also as a technical assistant for scientific and technical information on the staff of Dr. Donald F. Hornig, Presidential Science Adviser, announced the membership of the new panels late in July.

"Much reliance" will be placed in the panels whose members constitute a carefully selected group chosen for their individual specialized talents as recognized by the professional respect they have achieved, it was explained.

Establishment of the panels was termed an acknowledgement of the thrust toward better coordination of Government scientific and technical information activities, and recognition that coordinated joint effort can be fruitful.

Membership of the first three COSATI panels and others to be formed in the major areas of the na-

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Featured in This Issue . . .

7 New Members Selected For ASAP; 13 Appointees Raise Consultants to 41

Expiration of the terms of 11 members of the 25-member authorized strength of the Army Scientific Advisory Panel has resulted in designation of seven new appointees, leaving seven vacancies to be filled. Thirteen new consultants have been appointed, raising the current total to 41.

Maj Donald E. Rosenblum, new executive secretary of the ASAP, announced appointment of the following new members: Dr. Anthony Curreri, director, Division of Clinical Oncology and professor of surgery at the University of Wisconsin Hospitals; Dr. Jacob E. Goldman, director, Scientific Laboratory, Engineering and Research Staff, Ford Motor Co.;

Dr. Herbert L. Ley, Jr., a former branch chief in the Life Sciences Division of the U.S. Army Research Office and now chairman of the Department of Microbiology, Harvard University School of Public Health; Dr.

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Gen. Lotz Reports Sept. 18 To Joint Staff in Viet Nam

Director of Army Research Brig Gen Walter E. Lotz, Jr., will report for duty Sept. 18 in a new assignment as J-6 (Communications-Electronics) on General William C. Westmoreland's Joint Staff, Headquarters, U.S. Military Assistance Command, Viet Nam.

In that MACV assignment, described as a new position of substantially expanded responsibility, General Lotz will succeed Col Robert E. Kimball, who served as Assistant Director of Army Research in 1958-59.

General Lotz has served as Director of Army Research since October 1963, following duty as Acting CG of the U.S. Army Electronics Command, Fort Monmouth, N.J. From 1959 to 1962, he was assigned to the U.S.

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DoD Shifts Topped by Brown Change to AF Secretary

(See story on p. 4)

Thomas D. Morris

Dr. Eugene Fubini

Dr. Alain Enthoven

Dr. Robert Anthony

Norman S. Paul

Charles J. Hitch

Army R&D Newsmagazine

Vol. 6, No. 8 August 1965

Editor.....Clarence T. Smith
Ass't Editor.....George J. Makuta
Editorial Ass't ....Joseph R. Weikel

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Purpose: To improve informal communication among all segments of the Army scientific community and other Government R&D agencies; to further understanding of Army R&D progress, problem areas and program planning; to stimulate more closely integrated and coordinated effort among the widely dispersed and diffused Army R&D activities; to maintain a closer link from top management through all levels to scientists, engineers and technicians at the bench level; to express views of leaders, as pertinent to their responsibilities, and to keep personnel informed on matters germane to their welfare and pride of service.

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DoD, Medical Leaders Honor ASAP Consultant, Adviser

Noted medical leaders joined with Department of Defense officials to honor Dr. Stanhope Bayne-Jones at a recent luncheon sponsored by Chief of Reseach and Development Lt Gen William W. Dick, Jr., to present the Outstanding Civilian Service Award.

Dr. Bayne-Jones was recognized for sustained outstanding service to the Army Scientific Advisory Panel from July 1, 1956 to Mar. 31, 1963.

Distinguished guests who turned out to pay their respects to the much-honored scientist, physician, teacher, administrator and retired brigadier general of the U.S. Army included:

Former Secretary of State Dean Acheson, former Deputy Assistant Secretary of Defense Dr. Frank Berry, Army Surgeon General (Lt Gen) Leonard Heaton, Surgeon General of the U.S. Public Health Service Dr. Luther Terry;

Dr. Joseph F. Sadusk, Medical Director of the U.S. Food and Drug Administration; Dr. Thomas Turner, Dean of the Johns Hopkins University School of Medicine; and Dr. John H. Parks, Dean of the George Washington University School of Medicine.

Dr. Bayne-Jones retired as a brigadier general after service that spanned both World Wars. Military honors accorded him include the Distinguished Service Medal and Silver Star with two Oak Leaf Clusters from the United States, the Military Cross and Order of the Empire from Great Britain, and the French Croix de Guerre.

Known for publication of some 75 important papers in technical journals, Dr. Bayne-Jones holds three professional degrees and eight honorary degrees from such universities as Yale, Johns Hopkins, Tulane and Rochester.

Dr. Stanhope Bayne-Jones receives Outstanding Civilian Service Medal from Chief of Research and Development Lt Gen William W. Dick, Jr., in recent ceremonies at the Pentagon.

Much in demand as a consulant and adviser during his long career, Dr. Bayne-Jones served on numerous advisory committees of the Department of Defense, Department of the Army, and the U.S. Department of Health, Education and Welfare.

Active in numerous professional organizations, he served as president of the American Association of Immunologists, president of the Society of American Bacteriologists, president of the American Association of Pathologists and Bacteriologists, and director of the United States of America Typhus Commission.

Seminars Explain DoD Directive's New Policy

Policies for initiating major engineering and operational systems development projects have been clarified by the Department of Defense revised Directive 3200.9.

Signed by Secretary of Defense Robert S. McNamara, the Directive changes the name of the procedure for initiating major projects from Project Definition Phase to Contract Phase.

Indoctrination seminars for industry and Department of Defense personnel to explain the new policies are scheduled as follows:

Top Management Seminars—Washington, D.C., Aug. 17-18; Los Angeles, Calif., Aug. 20.

Middle Management Seminars—Los Angeles, Calif., Aug. 23-24; San Francisco, Calif., Aug. 26; Washington, D.C., Aug. 30-31 and Sept. 1; Fort Monmouth, N.J., Sept. 2; Boston, Mass., Sept. 8; Philadelphia, Pa., Sept. 10; Denver, Colo., Sept. 13; Dallas, Tex., Sept. 15; St. Louis, Mo., Sept. 17; Dayton, Ohio, Sept. 20; Detroit, Mich., Sept. 22; Huntsville, Ala., Sept. 24.

Instructor Workshops (3 days each)—Washington, D.C., Sept. 27-29 and Oct. 11-13; Los Angeles, Calif., Oct. 4-6.

The top management seminars will be headed by Dr. J. Sterling Livingston, president of the Peat Marwick Management Systems Co., and James W. Roach, assistant director for Engineering Management, Office of Defense Research and Engineering.

Representatives of Peat Marwick Management Systems Co. and the Department of Defense will lead the middle management and instructor workshop sessions.

COSATI Designates Panel Members to Aid National Program

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tional program effort is limited to Federal employees.

COSATI panels will continue to function only as long as joint action is required to resolve problems and develop methodology for efficient handling of scientific and technical information, it was emphasized. Panels will consider the most pressing problems and develop recommendations. When their assigned work is completed, the panels will be dissolved.

To accomplish their work expeditiously, several of the COSATI panels will function with full-time secretaries. When deemed necessary, their work will be facilitated by formation of subpanels or ad hoc task groups for special studies, such as national systems for scientific and technical information, the problems of journal literature and science newspapers, and microfiche production standards.

Two of the three panels are headed by Department of Defense employees, which reflects the strong role taken by the Army and other DoD agencies in developing scientific and technical information program concepts keyed to national information system needs.

Dr. Ruth Davis, Office of the Director of Defense Research and Engineering, is chairman of the Panel on Information Sciences Technology. Armen G. Abdian, deputy administrator of the Defense Documentation Center since December 1963, heads the Panel on Operational Techniques and Systems. Chairman of the Panel on Education and Training is John Sherrod, assistant director for Systems Development, Division of Technical Information, U.S. Atomic Energy Commission.

The distinction of being the sole representative of the Department of the Army on the three panels goes to Gerald W. Beveridge, chief of the Technical Information Division, Fort Detrick, Md. He served on the Office of the Chief of Research and Development Ad Hoc Group on Scientific and Technical Information which developed the Army STI Program concept approved by the Department of Defense in February 1964.

Assigned missions and membership of the panels are as follows:

INFORMATION SCIENCES TECHNOLOGY. Mission: To assist the Federal Council for Science and Technology (FCST) by recommending means to (1) ensure an orderly development of information sciences technology; (2) avoid unnecessary duplication of R&D efforts; (3) identify and eliminate gaps in technology so as to improve the effectiveness of Federal Agencies; (4) ensure an orderly transition from obsolete to improved systems.

Armen G. Abdian

Dr. Ruth Davis

John Sherrod

Members: Dr. Ruth Davis, chairman; Dr. Harold Wooster, director of Information Sciences, Office of Aerospace Research, Air Force Office of Scientific Research, secretary;

Charles J. Austin, National Library of Medicine; Curtis L. Fritz, chief, Foreign Affairs Information Management Effort, Department of State; Dr. Joel O'Connor, Division of Technical Information Extension, Atomic Energy Commission; Van A. Wente, chief, Documentation Branch, Scientific and Technical Information Division, National Aeronautics and Space Administration;

Richard See, director, Information Systems Program, Office of Science Information Service, National Science Foundation; Miss Mary Stevens, National Bureau of Standards; Dr. Bruce Waxman, Division of Research Facilities and Resources, National Institute of Health; Dr. Richard Wilcox, Office of Naval Research.

EDUCATION AND TRAINING. Mission: Identify educational and training activities now supporting scientific and technical information (STI) programs of the Federal Agencies; ascertain needs for improvements in agency policies, programs and practices pertaining to education and training in STI; develop and recommend actions to improve education and training policies and programs in the use of STI for R&D personnel, and for those in the STI field.

Members: John Sherrod, chairman; Charles M. Gottschalk, Division of Technical Information, Atomic Energy Commission; Joseph Becker, Central Intelligence Agency; Miss M. Joan Callanan, National Science Foundation;

Edward K. Grimes, Directorate of Science and Technology, Hq U.S. Air Force; Kirby B. Payne, assistant director, Field and Special Services, National Agricultural Library; Dr. Frank L. Schick, assistant director, Library Services Branch, Office of Education, Department of Health, Education and Welfare.

OPERATIONAL TECHNIQUES AND SYSTEMS. Mission: Identify the need for improved agency policies, programs and practices pertaining to STI; develop and recommend new programs to bring about desired improvement; facilitate more effective overall planning, management and evaluation of STI efforts of the Federal Agencies; recommend new policies and practices to improve effectiveness and efficiency of operational systems.

Members: Armen G. Abdian, chairman; Budd C. Moyer, Defense Documentation Center, secretary; Gerald W. Beveridge, Fort Detrick, Md.; John Forbes, chief, Division of Indexing and Documentation, National Agricultural Library; Paul C. Janaske, Clearinghouse for Federal Scientific and Technical Information;

Eugene P. Kennedy, Federal Aviation Agency; Hubert Sauter, chief, Technical Services Branch, STI Div, NASA; Robert L. Shannon, assistant director, STI Division, Oak Ridge Operations Office, Atomic Energy Commission; Seymour I. Taine, director, Federal Science Information Program, National Science Foundation.

Pendum Astrolabe Developed

A 60-Degree Pendulum Astrolabe, designed to determine astronomic latitude and longitude by observing position of celestial bodies, has been developed under a contract with the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va. The instrument weighs 34 pounds and can operates at temperatures from −41° to +125° F.

Department of Defense Shifts Topped by Brown as AF Secretary

Appointment of Dr. Harold Brown as Secretary of the Air Force to succeed Eugene M. Zuckert, effective Sept. 30, and the resignation of Dr. Eugene G. Fubini, effective July 15, left the two top Defense Research and Engineering positions open to aspirants.

Successors to Dr. Brown as Director of Defense Research and Engineering, a position he has held since May 3, 1961, and Dr. Fubini, who took office as Deputy DDRE in March 1961, had not been announced as this publication was sent to press.

Dr. Brown, 38, has served as DDRE only three months less than Mr. Zuckert, whose service since Jan. 23, 1961, gives him the longevity record for the Secretary of the Air Force office.

President Lyndon Johnson's announcement of personnel changes included:

Dr. Alain C. Enthoven has been elevated from Deputy Assistant Secretary to Assistant Secretary of Defense for Systems Analysis;

Charles J. Hitch has resigned as Assistant Secretary of Defense (Comptroller) and will be succeeded Aug. 31 by Robert N. Anthony, of Harvard University;

Norman S. Paul, Assistant Secretary of Defense (Manpower) since July 1962, has been selected as Under Secretary of the Air Force, succeeding Dr. Brockway McMillan;

Thomas D. Morris, who was Assistant Secretary of Defense (Installations and Logistics) until his resignation last December, is being brought back to the Pentagon to take over as Assistant Secretary of Defense (Manpower).

DR. BROWN, prior to appointment as DDRE, served for a year as Director of the University of California Lawrence Radiation Laboratory site at Livermore, after a year as deputy director, a year as associate director and three years as a division leader.

A native of New York City, he earned an AB degree in 1945, AM in 1946 and a Ph. D. in physics in 1949 from Columbia University. After three years as a lecturer in physics and member of the scientific staff, and a year of post-doctoral research at Columbia, he joined the University of California Radiation Laboratory at Berkeley.

Dr. Brown's work there included research in a project aimed at using high-intensity beams of particles

Dr. Harold Brown

from nuclear accelerators to produce isotopes in large quantities; also, research on neutron physics and activities in nuclear reactor designs. He transferred to the Livermore facility when it opened in 1952.

Dr. Brown was associated with the Government in a variety of advisory capacities from 1956-61, including: member of the Polaris Steering Committee; consultant, then member, the Air Force Scientific Advisory Board; member of the Scientific Advisory Committee on Ballistic Missiles to the Secretary of Defense;

Also, adviser to the U.S. Delegation to the Conference of Experts on the Detection of Nuclear Weapons Tests in Geneva; a scientific adviser to the U.S. Delegation to the Conference on Discontinuance of Nuclear Weapons Tests, then senior scientific adviser; consultant to the Department of State and to several panels of the President's Science Advisory Committee before he was appointed a member.

He is a member of the American Physical Society, Sigma Xi and Phi Beta Kappa.

DR. FUBINI, before appointment as Deputy DDRE, served as Deputy Director for Research and Information Systems, ODDRE. His responsibilities in that position encompassed the entire field of military research and development programs.

Born in Turin, Italy, Apr. 9, 1913, Dr. Fubini attended the Technical Institute at Turin (1929-31) and received his doctorate in physics from the University of Rome in 1933. From 1935-38, he was employed at the National Institute of Electrotechnics in Rome and from 1939-42 as an engineer at the Columbia Broadcasting System in New York.

For the next three years, Dr. Fubini was a research associate of the Harvard University Radio Research Laboratory. He was a scientific consultant and technical observer to the U.S. Army and U.S. Navy in the European Theater during World War II.

Dr. Fubini acquired his U.S. citizenship in 1945 and joined the Airborne Instruments Laboratory, Melville, Long Island, N.Y., rising in 1960 to vice president for Research and Systems Engineering, AIL Division when the Laboratory became part of Cutler-Hammer Corp.

A Fellow of the Institute of Radio Engineers, he has authored about 30 technical publications and holds 11 patents. He has been a member of the Air Force Scientific Advisory Board, the Advisory Group on Special Projects of the Department of Defense, chairman of the Electromagnetic Warfare Advisory Group of the Air Research and Development Command;

Also, consultant to the President's Science Advisory Committee, member of a panel of the National Security Agency Scientific Advisory Board and member of the Advisory Council for the Advancement of Scientific Research and Development in New York State.

CHARLES J. HITCH, Assistant Secretary of Defense (Comptroller) from January 1961 until his recent resignation, previously spent 13 years with the RAND Corp., rising to chairman of its Research Council.

A native of Missouri, he received his BA degree from the University of Arizona in 1931. After a year of graduate study at Harvard, he went to Oxford University on a Rhodes scholarship and received his master's degree there. He was elected a Fellow of Queens College, Oxford in 1935, a position he held until joining the RAND Corp. in 1948.

During World War II, Mr. Hitch served on Averell Harriman's first lend-lease mission in London, then with the War Production Board, the Office of Strategic Services, and a year as chief of the Stabilization Control Division, Office of War Mobilization and Reconversion.

He has written two books: *America's Economic Strength* in 1941 and (with Roland N. McKean), *The Economics of Defense in the Nuclear Age*, 1960.

DR. ALAIN C. ENTHOVEN has been Deputy Assistant Secretary of Defense (Systems Analysis), Office of

the Assistant Secretary of Defense (Comptroller) since Oct. 18, 1962.

Dr. Enthoven has served as an economist with the RAND Corp., a consultant to the Brookings Institution and a member of the Office of the Director of Defense Research and Engineering. He was appointed Deputy Comptroller for Systems Analysis (Programing) in the Office of the Assistant Secretary of Defense (Comptroller) on May 23, 1961.

Dr. Enthoven received The President's Award for Distinguished Federal Civilian Service on June 12, 1963. He holds a BA degree from Stanford University, a BPhil degree from Oxford University, which he attended on a Rhodes Scholarship, and a PhD in economics from the Massachusetts Institute of Technology.

DR. ROBERT N. ANTHONY, the new Assistant Secretary of Defense (Comptroller), formerly was a professor of business administration at Harvard University, specializing in management control systems. He received an AB degree from Colby College in 1938, an MBA (1940) and PhD (1952) in commercial science from Harvard University.

During World War II he was a lieutenant commander in the U.S. Navy. He has served as a consultant to various Government agencies, including the Departments of the Navy and the Air Force, as well as the Atomic Energy Commission.

The Defense Department has proposed dividing the responsibilities formerly carried by Mr. Hitch between Dr. Anthony and Dr. Enthoven. Dr. Anthony will be responsible for the preparation and administration of the annual Defense Department budget; for the Five Year Force Structure and Financial Program; for the development of management control systems; accounting and audit policy within the DoD; and for internal audit and statistical services in the Office of the Secretary.

Dr. Enthoven will monitor and review for the Secretary of Defense analytical studies of the defense program made throughout the Department; improve techniques for estimating costs of forces and weapon systems; and conduct studies of the economic impact of the defense program and such other economic studies as the Secretary may request.

NORMAN PAUL, until his appointment as Under Secretary of the Air Force, served as Assistant Secretary of Defense (Manpower) for three years and as Assistant to the Secretary of Defense for Legislative Affairs, following five years with the Central Intelligence Agency.

A native of Stamford, Conn., he graduated from the Choate School in 1936, Yale University in 1940 and received an L.L.B. degree from the University of Virginia in 1946.

During World War II, he served in the U.S. Navy, principally in the Southwest Pacific, followed by two years with the New York City law firm of Bleakley, Platt and Walker. In April 1948, at the beginning of the Marshall Plan, he joined the staff of the Economic Cooperation Administration as an attorney and subsequently served that Agency and its successors in a number of administrative positions.

In 1952, he became program adviser in the Office of the Director for Mutual Security on military and economic assistance matters in Asia, Africa and Latin America.

Appointed regional director for Near East, Africa and South Asia in the Foreign Operations Administration, he later served as deputy director of FOA for Congressional Relations. In 1955 he received the William A. Jump Memorial Award for "Exemplary Service in Public Administration."

THOMAS D. MORRIS served as Assistant Secretary of Defense (Installations and Logistics) from Jan. 20, 1961, until his resignation to return to his management consultant firm in December of 1964. At that time he was presented the Department of Defense Distinguished Public Service Medal by Secretary of Defense McNamara.

Previously, he spent a year as Assistant Director for Management and Organization, Bureau of the Budget, and two years in the Office of the Secretary of Defense in several capacities, including Deputy Assistant Secretary for Supply and Logistics.

A U.S. Navy veteran of World War II, he subsequently became a partner in the consulting firm of Cresap, McCormick and Paget. He participated in the studies of both Hoover Commissions and conducted management surveys for a number of Federal agencies and private organizations. He graduated from the University of Tennessee in 1934 and subsequently worked for several industrial firms.

Alexander Assigned to Head Logistics Management Center

New commandant of the U.S. Army Logistics Management Center, Fort Lee, Va., is Col Joseph P. Alexander, Jr., who previously served as director of the Center's Logistics Research and Doctrine Division (1958 to 1961).

Col Alexander was commander of the Atlanta Army Depot until reassigned. He succeeds Col Felix J. Gerace, now assigned as the executive to the Assistant Secretary of the Army (Installations and Logistics).

Col Alexander is a graduate of Wofford College, Spartanburg, S.C., the Quartermaster School, the Command and General Staff College, Armed Forces Staff College and the National War College.

CHIEF OF RESEARCH AND DEVELOPMENT Lt Gen William W. Dick, Jr., congratulates Meritorious Civilian Service Award winners (l. to r.) Dr. C. Jelleff Carr, Dr. Ivan R. Hershner, Jr., and Dr. John W. Dawson, during recent awards ceremonies in the Office of the Chief of R&D (OCRD). Dr. Carr was cited for his administrative, planning and organizing performance as chief of the Scientific Analysis Branch, Life Sciences Division, U.S. Army Research Office (ARO), OCRD. Dr. Hershner's citation covered his contributions to OCRD and the U.S. Army as chief of the Physical Sciences Division from May 18, 1958 to July 29, 1963 and from July 29, 1964 to Dec. 31, 1964, and scientific director of ARO from July 29, 1963 to Apr. 30, 1964. Dr. Dawson received the award for his achievements in the synthesis, identification, and characteristics of new and previously unknown systems of boron-nitrogen compounds, and for his professional competence and "untiring devotion to duty" as chief scientist, U.S. Army Research Office-Durham, Oct. 8, 1958 to Mar. 21, 1964.

Army Scientific Advisory Panel Adds 7 New Members

(Continued from page 1)

Allen E. Puckett, executive vice president, Hughes Aircraft Co.;

Dr. Richard C. Raymond, consultant-information, General Electric Co.; Dean Edward A. Trabant, School of Engineering, State University of New York at Buffalo; Dr. David T. Griggs, professor of geophysics, University of California.

Army Scientific Advisory Panel membership is currently completed by the following holdovers under the plan of 2-year appointments, a tenure which recently became effective also for consultants under provisions of Army Regulation 15-8:

Dr. Harwood S. Belding, professor of environmental physiology, Department of Occupational Health, University of Pittsburgh; Dean Ralph E. Fadum, dean of the School of Engineering, North Carolina State University;

Dr. Antonio Ferri, director of the Guggenheim Aerospace Laboratories, New York University School of Engineering Sciences; Dr. Paul M. Gross, Department of Chemistry, Duke University; John G. Holmstrom, vice president, Pacific Car and Foundry Co.;

Dr. Andrew Longacre, professor of engineering sciences, Syracuse University; Maj Gen L. E. Simon (USA, Ret.); Dr. William C. Tinus, vice president, Bell Telephone Laboratories, Inc.; Eugene L. Vidal, freelance consultant.

The recent realignment of the ASAP resulted in the designation of three senior consultants, namely: Dean Morrough P. O'Brien, who recently terminated his chairmanship of the ASAP after nearly four years service and continuous duty since 1951; Dr. K. T. Keller, a Member Emeritus of ASAP since 1960; and Dr. Charles C. Lauritsen. All are among the 10 original members of the ASAP.

Since Dr. Finn J. Larsen, former Assistant Secretary of the Army (R&D), succeeded Dean O'Brien as chairman, Dr. Harold M. Agnew has replaced Dr. William Van Royen as vice chairman. Dr. Agnew is with the University of California Los Alamos (N. Mex.) Scientific Laboratory.

Newly appointed consultants are: Dr. John D. Baldeschwieler, professor of chemistry, Stanford University; Dr. Carroll B. Gambrell, Jr., chairman, Industrial Engineering, College of Engineering Sciences, Arizona State University; Dr. Max Garbuny, consultant, Westinghouse Electric Corp. Research and Development Center;

Dean David Halliday, Division of Natural Sciences, University of Pittsburgh; Robert E. Hage, vice president for Advanced Product Planning, McDonnell Aircraft Corp.; Dr. Gilbert W. King, vice president, ITEK Corp.; Dr. Paul W. Kruse, Jr., staff scientist, Honeywell, Inc.;

Dr. William D. Murray, director, Technical Programing, Burroughs Corp.; Dr. Bernard M. Oliver, vice president, Research and Development, Hewlett-Packard Co.; Dr. Lawrence H. O'Neill, director, Electronics Research Laboratories of the School of Engineering and Applied Science, Columbia University;

Dr. John L. Schwab, vice president and research director, The William S. Merrell Co.; Dr. Joseph E. Sternberg, manager of research, Martin Co.; Dr. Maurice J. Zucrow, Atkins professor of engineering, School of Mechanical Engineering, Purdue University.

LOH Design Competition Ends With OH-6A Contract

Competition for a multimillion dollar Light Observation Helicopter (LOH) contract ended recently with award of a fixed-price, 3-year purchase order for 714 OH-6A aircraft.

Under terms of the contract, the Hughes Tool Co. will begin deliveries of OH-6A's in mid-1966 and complete delivery by December 1968. Procurement of additional quantities of the LOH is planned, the Army announced.

The OH-6A will fulfill the Army's requirement for a new LOH to replace the aging fleet of OH-13, OH-23 and O-1 observation aircraft. The primary missions of the LOH are visual observation and target acquisition, reconnaissance, and command and control.

The LOH competition to meet required military characteristics called for distinct advancement in the state-of-the-art for light helicopter design. Army leaders of the design and developmental program believe the OH-6A incorporates "tremendous strides."

For example, the new aircraft has less than half the equivalent flat plate drag area, half the maintenance man-hours per flight ration, and approximately twice the useful load to empty weight ration of that of the aircraft it will replace, an Army spokesman said.

Some specific design characteristics of the production OH-6A are listed as: cruise speed, 120 knots; maximum speed, 130 knots; powerplant, T-63 250 hp.; number of places, four including pilot; empty weight, 1,163 pounds; mission weight, 2,163 pounds (pilot, full fuel, 400 pounds payload); overload gross weight, 2,700 pounds (pilot, full fuel, 937 pounds payload; endurance, 3.4 hours; range, 280 nautical miles; hover ceiling, Std Day, OGE, 11,400 feet—Std Day IGE, 15,-100 feet—95° OGE, 5,000 feet—95° IGE, 6,700 feet; rotor diameter, 26.3 feet; overall height, 8.5 feet; fuselage length, 21.2 feet; overall length, 30.3 feet.

The OH-6A was displayed in June at the 26th Paris International Aviation and Space Salon at Le Bourget Airport, Paris, France and later was taken on a demonstration tour of major installations of the U.S. Army Europe.

Army OH-6A

Industrial Briefings Scheduled On DoD Advanced R&D Planning

Two one-day Research and Development Advanced Planning Briefings for Industry will be conducted Sept. 21 and 23 by the U.S. Army Weapons Command (AWC), Rock Island (Ill.) Arsenal.

Cosponsored by AWC and the American Ordnance Association, the classified briefings are expected to attract nearly 700 invited representatives from AWC's Research and Development selected bidders list.

Industry representatives will be given formal presentations describing long-range research and development plans and programs related to future military requirements of the Weapons Command.

Deere and Co. has invited the group to hold the meetings at their new multimillion-dollar Administrative Center in Moline, Ill.

Thorlin Retires at WSMR, Yielding CG Duties to Cone

Maj Gen J. F. Thorlin

Maj Gen J. M. Cone

Retirement of Maj Gen J. Frederick Thorlin terminated 32 years of military service on July 31 and set the stage for Maj Gen John M. Cone to become commanding general of White Sands Missile Range.

Until reassigned, General Cone was Director of Quality Assurance, U.S. Army Materiel Command Headquarters, Washington, D.C. Earlier he was Director of Maintenance, Supply and Maintenance Command.

Following graduation from the United States Military Academy in 1937, General Cone served as an Artillery officer for two years until detailed to the Ordnance Department. For the next 23 years, he served mainly in Ordnance Corps assignments, until the 1962 Army-wide reorganization.

During World War II, General Cone was with the IX Tactical Air Command as an Ordnance officer throughout operations in France, Belgium, Holland and Germany, including duty from August to October 1945 with the Ninth Air Force.

Returned to the United States in 1947, he served in successive assignments as commander of the Detroit Ordnance District, with the General Staff in the Office of the Assistant Chief of Staff, G-4, Washington, D.C., and as Chief, Purchases Branch.

After completing a 10-month course at the Army War College, Carlisle Barracks, Pa., in June 1956, he became Ordnance Officer, U.S. Army, Japan until returned to the U.S. to take command of Anniston (Ala.) Ordnance Depot in January 1959. In August 1960, he was assigned to the Office of the Chief of Ordnance, Washington, D.C., and later became chief of the Plans and Programs Division of that office.

Among General Cone's decorations are the Bronze Star, French Croix de Guerre, and the European-African-Middle East Campaign Medal with five bronze stars.

GENERAL THORLIN, during his 3-year tenure at White Sands, hosted two presidents, two Secretaries of the Army, plus a variety of top military and civilian leaders of many nations. President John F. Kennedy visited the missile range in June 1963, the first Chief Executive to do so in its 20-year history, followed by Lyndon Johnson while he was vice president.

While serving as CG of the Army Tank Automotive Center in Detroit, Mich., prior to assignment to WSMR, General Thorlin won an honor never before awarded an active officer in that city. Detroit proclaimed a General Thorlin Day and presented him with a Distinguished Service Award.

Graduated from the United States Military Academy in 1933, he later earned a master's degree in mechanical engineering from Massachusetts Institute of Technology and in 1964 received a doctor of laws honorary degree from New Mexico State Univ.

During World War II, he served on the Joint Army-Navy Staff of Fleet Admiral Chester W. Nimitz in planning the Kwajalein, Marianas, Iwo Jima, Palau, Philippines and Okinawa campaigns.

Subsequent major assignments included: Head of the Tank-Automotive Testing Division, Aberdeen Proving Ground, Md.; four years as director of Tank-Automotive Research and Development Activities for the Chief of Ordnance; and two years as chairman of an Advanced Study Group for the Chief of Ordnance.

Dr. Stanley Selected to Aid McNamara on NATO Force Plan

Dr. Timothy W. Stanley was appointed recently to the new position of Assistant to the Secretary of Defense for NATO Force Planning. Serving in Paris, he will be director of the U.S. NATO Force Planning Group and U.S. Representative on the NATO Defense Planning Working Group.

Dr. Stanley will be the principal representative of Secretary of Defense Robert S. McNamara for advising and assisting the U.S. Permanent Representative on the North Atlantic Council in the defense aspects of NATO force planning.

A graduate of Yale, he holds an L.L.B. degree from Harvard Law School and a Ph.D. in political science, also from Harvard. He was a founder of and teacher in the Harvard Defense Studies Program.

Author of several books and articles on national security, he recently completed a book on NATO while serving as a Visiting Research Fellow at the Council on Foreign Relations in New York. He spent most of the last 10 years in the Office of the Secretary of Defense, working in the International Security Affairs area, and was a special assistant on the White House Staff from 1957 to 1959.

Army Assigned SYNCOM Duties as DoD Takes Control

The U.S. Army has received specific assignments in the transfer of control of the SYNCOM II and III satellites from the National Aeronautics and Space Administration (NASA) to the Department of Defense.

The transfer marks completion of the SYNCOM experimental research and development program, and gives the Army responsibility for the satellites' earth communications facilities with the exception of two Navy shipboard terminals.

The earth complex consists of a fixed station at Camp Roberts, Calif.; transportable stations on Hawaii, at Clark Air Base, in the Republic of the Philippines, and in East Africa at Asmara, Eritrea; and two highly transportable stations in Southeast Asia.

Under Defense Communications Agency direction, the Air Force will operate the telemetry and command stations of SYNCOM which maintain precision control and positioning of the satellites. The Navy will provide support through such facilities as the terminal aboard the *USNS Kingsport*, to aid in tests conducted via the SYNCOM satellites.

Sponsored by NASA, SYNCOM II was launched July 26, 1963, and SYNCOM III was orbited Aug. 19, 1964. Both are now orbiting at altitudes of about 22,300 miles.

Although the satellites are under Department of Defense control, that Department will report to NASA on the telemetry from the satellites. NASA will continue to evaluate their performance in space.

Publication Outlines Work Units for ATLIS 5-Year Program

Seventeen work units are outlined in the Army Technical Library Improvement Studies (ATLIS) Five-Year Program published recently by the Director of Army Technical Information, who doubles as chief of the Scientific and Technical Information Division, U.S. Army Research Office.

Each work unit is briefly described, including a statement of purpose, priority, the assumption on which the work is based and the product to be derived.

The purpose of the Army-wide ATLIS program is to improve the effectiveness and efficiency of Army technical library services and operations. Established as part of the Army Scientific and Technical Information Program, the project has been assigned to the Office of the Chief of Engineers for management.

The Chief of Research and Development maintains Department of the Army staff supervision and provides and programs funds for the project. The Chief of Engineers responsibility is stated as:

- Implements the ATLIS 5-year program of activities as recommended by the ATLIS Steering Group, subject to the concurrence of the major commands involved and approval of the Chief of Research and Development.
- Assigns, schedules and coordinates the work units and recommends funding required.
- Convenes the ATLIS Steering Group at appropriate intervals for review of work accomplished and further planning as appropriate.
- Provides appropriate progress and technical reports in accordance with Army Regulations 70-9 and 70-31, respectively. Primary distribution of five copies of these reports are made to the Chief of Research and Development.

One of the work units in the 5-year program will develop a plan of action to provide criteria for performance evaluation of Army technical library operations and services. Another will develop techniques for distribution of technical reports and other documents; also, to define methods of measuring the effectiveness and appropriateness of the distribution. A third work unit will conduct studies and recommend techniques for the automation of library operations.

The other 14 work units will be concerned with technical library problem identification; dissemination of library operational information; preparation of a library regulatory publications guide; establishment of an installation selective dissemination plan; procurement and distribution of advanced abstracts;

Development of a user's guide to library services; interlibrary mutual support; technical library and other information system interfaces; standard operating procedures for technical library services; technical library personnel training;

Establishment of a library and information sciences information center; feasibility of a central catalogue; procedure for preparing micro-thesauri; and continued research and development in library science.

Col Pettit Named Office Head In U.S. Army Missile Command

The Air Defense Fire Distribution Systems Office, Army Missile Command at Redstone Arsenal, Ala., is now headed by Col Morris W. Pettit.

A graduate of Texas A&M University and the University of Southern California, with an M.S. degree in mechanical engineering, he served until recently as the inspector general at Headquarters, U.S. Army Communications Zone, Europe at Orleans, France, following a tour as commander of the 69th Artillery Group in Wurzburg, Germany.

Col Pettit was assigned earlier to the Office of the Chief of Research and Development, Department of the Army as military adviser, Operations Research Office and Research Analysis Corp., Washington, D.C., with the Hart Committee for Civil and Air Defense of CONUS (1960), the Committee on Army Requirements for Scientific Support (1961), and the Project 80 Committee on Reorganization of the Army (1961).

CIDS Orientation Attracts Diversified Audience

Representatives of the defense establishment, other Government agencies and the academic community attended a recent orientation on the Chemical Information and Data System (CIDS) at Edgewood (Md.) Arsenal.

The CIDS program is a 2-year exploratory development project to provide the basis for chemical information to be gathered, processed, stored in a computer bank and retrieved when needed by scientists.

Col James H. Batte, Arsenal CO, Dr. S. D. Silver, technical director of the Chemical Research and Development Laboratories, and James P. Mitchell, director of CRDL Technical Services, who served as coordinator for the CIDS orientation, welcomed the visitors.

Speakers included Walter M. Carlson, Defense Director of Technical Information; P. N. Vlannes, Deputy Director of Army Technical Information; Col Ernest A. Nagy, Office of The Surgeon General; Dr. David P. Jacobus, Walter Reed Army Institute of Research; Paul D. Olejar, National Science Foundation;

Dr. Fred A. Tate, Chemical Abstract Service; Dr. George P. Hager, dean of the College of Pharmacy, University of Minnesota; Dr. David Lefkovitz, University of Pennsylvania; Dr. Joseph Leiter and Mrs. Barbara Murray, National Institutes of Health.

CIDS ORIENTATION participants chatting informally prior to opening of recent meet include (l. to r.) Paul Olejar, National Science Foundation; Dr. S. D. Silver, technical director, Chemical R&D Laboratories; Col James H. Batte, CO, Edgewood Arsenal; Peppino Vlannes, U.S. Army Research Office.

OCRD Lists Extensive Personnel Changes

Office of the Chief of Research and Development personnel changes in recent weeks have been so extensive that space does not permit the inclusion of biographical material.

Two veterans of OCRD recently exchanged positions in a normal rotational switch. Formerly chief of the Research Programs Office and assistant executive of Army Research, Lt Col Frank L. Taylor is now executive of Army Research, succeeding Lt Col Wendell G. Van Auken, who assumed his two titles.

Col Van Auken previously served in the U.S. Army Research Office (USARO) as chief of the Special Activities Branch, Scientific and Technical Information Division, and earlier as chief of the Foreign Research Branch. Before his tenure as chief of the Research Programs Office, Col Taylor served in the Human Factors and Operations Research Division.

The new chief of the Combat Materiel Division is Col Charles M. Young, Jr., formerly chief of the Mid-Range Plans Branch, OCRD. He succeeded Col Howard H. Cooksey, the new OCRD executive.

Lt Col William K. Marr was reassigned from the Scientific and Technical Information Division, USARO, to the Social Science Research Division. Lt Col Robert D. Lambourne was reassigned from the Physics and Engineering Branch, Physical Sciences Division, USARO, to the Communications-Electronics Division, OCRD.

Combat Materiel Division new arrivals include Lt Col Joseph E. Fix, III, Lt Col John J. Doody, Lt Col Briggs H. Jones and Maj Stan R. Sheriden. *Nike-X and Space Division,* Lt Col Thomas E. Fitzpatrick, Jr., returning to OCRD after a year at the Army War College; *Special Warfare Division,* Maj Earl L. Keesling; *Air Defense and Missile Division,* Maj Eugene L. Naegele; *Programs and Budget Division,* Lt Col Albert Metts, Jr., after a year at the Army War College, and Maj Marshall D. Talbott, from the Command and General Staff College.

Additional new arrivals include Lt Col Donald F. Bletz, assigned to the Long-Range Plans Branch, Plans and Programs Division, and Lt Col Frederick G. Bohannon as chief, Foreign Developments Branch, International Division.

Capt Robert L. Dilworth, formerly chief, Administrative Services Division, U.S. Army Security Agency, Pacific Command, succeeded Maj Paul W. Wildman as adjutant, U.S. Army Research Office. Maj Wildman was assigned to Headquarters, U.S. Army Pacific.

Other recent OCRD changes include: Lt Col John B. Dayton, from the Nuclear-Chemical-Biological Division to Office of the Army General Staff; Lt Col Edwin A. Rudd to the Army War College; Lt Col W. H. Vinson, Jr., from the Nike-X and Space Division to the National War College; Lt Col Wilmer R. Lochrie from the Review and Analysis Division to the Army War College;

Lt Col Harris H. Woods from the Plans and Programs Office to Hq., U.S. Army Southern Command, Fort Amador, Canal Zone; Lt Col Karl H. Borcheller, from the staff of the Army Scientific Advisory Panel to Central Army Command, Heidelburg, Germany; Lt Col Charles K. Heiden, from the Combat Materiel Division to U.S. Army Element, U.S. European Command, Paris, France;

Lt Col Frederick C. Spann, from the Communications-Electronics Division to the Army War College; Lt Col Lewis R. Baumann, from Combat Materiel Division to the Army War College; Lt Col Joseph O. Wintersteen, Jr., from Programs Branch, Research Programs Office, USARO, to be U.S. Army attache, Vienna, Austria; Lt Col William A. Walker, from the Nuclear-Chemical-Biological Division to the Army War College.

Automotive Crash Research Group Conducts Seminar

A seminar on automotive crash research was held at the U.S. Army Research Office in conjunction with a recent meeting of the committee planning the 1965 Stapp Automotive Crash Conference at the University of Minnesota, Oct. 20-21.

The first Stapp conference was held 10 years ago at Holloman Air Force Base, N. Mex. Since then it has been an annual event for communication and exchange of scientific information and free discussion of crash prevention problems. It serves as a forum for industry, universities and professional and research people in the area of automotive crash protection.

Col John P. Stapp, USAF, who organized the first conference and is best known for having ridden the rocket car at the speed of sound, spoke to Army Research staff members on body tolerance to forces of deceleration and the importance of such restraining devices as seat belts and shoulder harnesses. Col Stapp is presently chief, Impact Injury Branch, Armed Forces Institute of Pathology, Washington, D.C.

Other seminar were:

Dr. Joseph M. Janes, Section of Orthopedic Surgery, Mayo Foundation, Rochester, Minn., on whiplash injury; Prof. James J. Ryan, Department of Mechanical Engineering, University of Minnesota, on development of the hydraulic bumper and rollover bars for military vehicles to decrease injuries. He also showed a film on "Packaging People."

Derwyn M. Severy, research engineer, Institute of Transportation and Traffic Engineering, University of California at Los Angeles, showed films and spoke on automotive crashes at intersections.

Dr. Edward J. Baldes of the Scientific Analysis Branch, Life Sciences Division, Army Research Office, a member of the Conference Advisory Committee, was host for the seminar. He will chair the session on torso injuries and restraints at the 1965 Stapp Conference.

Other sessions include those on instrument panels and glass, motorist exposure, and a concluding session of related papers. A panel discussion will be moderated by Col Stapp.

Director of Army Research Brig Gen Walter E. Lotz signs the Seventh Army guest book as Lt Gen William W. Quinn, Seventh Army commanding general, looks on. General Lotz recently visited Stuttgart, Germany, Seventh Army headquarters, and five other European countries participating in the program administered by U.S. Army R&D Group Europe.

DoD Order Spurs Combat Readiness Action on 1st Cavalry (Airmobile)

The U.S. Army 1st Cavalry Division (Airmobile) will be organized and made combat ready as expeditiously as possible at Fort Benning, Ga., as part of the Army's authorized strength of 16 divisions.

Secretary of Defense Robert S. McNamara announced:

"The introduction of this new kind of division into the Army will greatly increase our growing capability to meet all kinds of threats. It places the Army on the threshold of an entirely new approach to the conduct of the land battle.

"Use of the helicopter to deliver men and weapons on the battlefield will result in greater freedom of movement and exploitation of the principle of surprise to an unprecedented degree. The initiative and imagination of the officers who pioneered this concept are especially to be commended."

The new division will be formed from resources now available within the Army. Personnel and equipment will come from both the 2nd Infantry Division and the experimental 11th Air Assault Division now at Fort Benning. The 1st Cavalry Division, now in Korea, will be redesignated the 2nd Infantry Division.

Secretary McNamara also has asked the U.S. Army Chief of Staff to recommend to the Joint Chiefs of Staff by not later than Jan. 1, 1966, the specific major airborne and airmobile units to be included within the Army's 16-division structure.

Development of the airmobile division is the result of three years of study, experiment, test and evaluation by the Army, the Air Force, and the U.S. Strike Command since April 1962, when Secretary McNamara asked the Army to take a new look at its tactical mobility, including the greater use of aviation.

The basic concept evolved from the comprehensive program of studies and tests conducted by the Army's Tactical Mobility Requirements Board, also known as the Howze Board, formed in response to the Secretary's request. The concept was subsequently evaluated by the Joint Chiefs of Staff, after which the Army organized the experimental 11th Air Assault Division and the supporting 10th Air Transport Brigade in February 1963, to test and develop it.

The new 1st Cavalry Division (Airmobile) will have a strength of 15,787 personnel and will be equipped with 434 aircraft, almost all of which will be helicopters. One-third of the division's combat elements will be able to move simultaneously in the division's own aircraft while the remainder can be moved on a shuttle basis or by supporting Army or Air Force aircraft. One of the division's brigades will be capable of parachute operations. The division will be equipped with approximately 1,600 ground vehicles.

By comparison, the present Army ROAD Infantry Division has about 15,000 personnel, 101 aircraft and 3,200 ground vehicles.

This new type of division, it was explained, will make its greatest contribution to improved combat effectiveness in operations where terrain obstacles and undeveloped communications networks could give enemy guerrilla or light infantry forces an advantage over standard formations.

The tactics, techniques and procedures to be employed by an airmobile division result in a markedly different approach to the solution of these tactical problems. Use of aircraft to bring units directly to the battlefield and to remove them provides a capability that did not previously exist to redeploy our combat forces immediately to other areas.

The airmobile division will be capable of conducting operations in all types of terrain. It can react quickly and maneuver rapidly over large areas. It can reconnoiter, screen wide fronts, delay hostile forces, and conduct raids behind the enemy lines.

The division is considered particularly effective in locating and maintaining contact with the enemy or between other friendly forces, and in countering hostile airmobile, airborne, and irregular forces.

The new division does not replace the standard and heavier infantry, armored or mechanized divisions, it was stated, and is being adopted because of special capabilities not found in the other divisions.

Cantilevered Dolly Designed to Speed Cargo Transfer

Effects of adverse shore conditions on ship-to-shore cargo operations may be eliminated by a cargo transfer platform developed by the U.S. Army Aviation Materiel Laboratories, Fort Eustis, Va.

Termed the Mark IV Ship's Wing, the platform consists of an 8 x 14-foot cargo dolly extended away from a ship by a cantilever girder so that a helicopter in flight can pick up cargo without getting fouled in the ship's rigging or superstructure.

MARK IV SHIP'S WING, extending 65 feet from hull of cargo vessel, acts as cargo transfer platform during engineer service tests conducted by the U.S. Army General Equipment Test Activity, Fort Lee, Va.

The 40-foot-long girder has a telescoping 25-foot extension, giving it a total length of 65 feet. It will support 14,000 pounds and can be installed aboard most cargo vessels in less than an hour, using stevedore labor and the ship's boom.

The device will permit landing operations to take to the air, thereby reducing the need for port facilities and assisting in eliminating the familiar hazards of uncooperative tides, rough surf, fouled beaches, mined landing areas, etc. Vessels can remain under way while helicopters make their pickups using external sling techniques.

The device can also be used to transfer troops to the beaches, to get casualties to hospital ships and for helicopter messenger service.

Already engineer tested by the U.S. Army General Equipment Test Activity (GETA), Fort Lee, Va., the wing is now being service tested in the Far East.

Picatinny Sponsors Seminar

A symposium to familiarize design engineers with advanced technological information on structural adhesives bonding will be held at Stevens Institute of Technology, Hoboken, N.J. Sept. 15-16. Sponsor of the symposium is the U.S. Army Munitions Command's Picatinny Arsenal, Dover, N.J.; with Michael J. Bodner, chief of Picatinny's Materials Research Branch as chairman.

DoD Memorandum Provides Foreign Research Guidance

"Policy Guidance for Research Investment Abroad by Department of Defense Components" is the title of a recent memorandum from the Director of Defense Research and Engineering to major agencies.

The memorandum was addressed to the R&D secretaries of the Army, Navy, and Air Force, the ASD for Installations and Logistics, the ASD for Manpower and the directors of the Defense Atomic Support Agency, Defense Supply Agency.

The policy guidance statement was prepared by the International Committee of the Federal Council for Science and Technology. It states:

"Today scientific excellence is widely dispersed and the programs of Federal agencies will be hampered if they remain aloof from scientific contact with foreign laboratories. Major areas of inquiry, such as oceanography, geophysics and meteorology, take meaningful form only on a broad regional or global basis.

"In addition, there exist outside our borders unique opportunities in the form of natural conditions, unused materials, unusually well-qualified people and specialized facilities. These factors which characterize the contributions from research carried on outside the United States are at the same time the criteria which define the types of foreign research with which the Federal technical agencies should be involved. . . ."

Additional aspects of Federal agency involvement in foreign research, outlined in the policy statement, are:

- Furthering our foreign policy objectives through increasing international scientific contacts, developing common goals with other nations, enhancing the image of U.S. science abroad and by assisting developing nations.
- Strengthening our general security by ensuring a strong scientific base in allied countries.
- Contributing to our long-term goal of bettering man's intellectual and material well-being.
- Enhancing opportunities for advanced training of U.S. scientists in research facilities outside the U.S.

Army Meteorologist Resigns To Head Weather Bureau Unit

One of the U.S. Army's leading meteorologists, Dr. Helmut K. Weickmann, resigned in mid-July to become director of the U.S. Weather Bureau's Atmospheric Physics and Chemistry Laboratory, Washington, D.C.

Considered a foremost expert in the field of cloud and precipitation physics, Dr. Weickmann was chief, Atmospheric Physics Branch, Meteorological Division, U.S. Army Electronics R&D Laboratory, Fort Monmouth, New Jersey.

Since coming to the United States from Germany in 1949 under the Paper Clip Agreement, which enabled German scientists to continue their work in the U.S., Dr. Weickmann gained wide acclaim for his work at Fort Monmouth. He became a U.S. citizen on Mar. 3, 1958.

Son of an internationally known German meteorologist, Ludwig Franz Weickmann, he received his Ph.D. degree summa cum laude in 1939 from the University of Frankfurt. Formerly chairman of the Cloud Physics Committee, American Geophysical Union, he is presently a member of the Committee on Cloud Modification, American Meteorological Society.

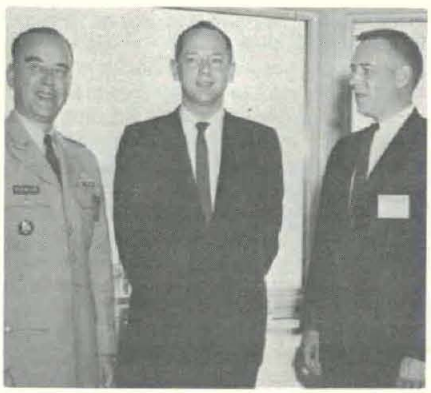
In 1961 he received the Electronics R&D Laboratories' first Laboratory Achievement Award. Last year he was invited to participate in the National Academy of Sciences Panel on Weather and Climate Control.

WES Leader Takes Panama Job

The U.S. Army Chief of Engineers has established a new Office of Interoceanic Canal Studies to help examine the feasibility of a sea-level canal between the Atlantic and Pacific Oceans. Col Alexander G. Sutton, Jr., who for the past four years directed the U.S. Army Waterways Experiment Station at Vicksburg, Miss., has been assigned field director of the office headquartered in the Panama Canal Zone.

ECOM Hosts 400 at Tri-Service Radar Symposium

About 400 scientists, engineers and researchers from Federal Government agencies, industry, universities and other organizations attended the recent 11th annual Radar Symposium at Fort Monmouth, N.J.



CONGRESSMAN Weston E. Vivian of Michigan, featured speaker at the 11th annual Radar Symposium at Fort Monmouth, N.J., is flanked by Brig Gen Paul A. Feyereisen, deputy CG of the Electronics Command for Plans and Programs and Dr. Robert L. Hess, Project Michigan director.

Conducted by Project Michigan, the symposium was tri-service sponsored, with the U.S. Army Electronics Command serving as host.

Representative Weston E. Vivian from Michigan's Second Congressional District, who originated the idea of an annual radar symposium when he was a researcher working on Project Michigan, was the speaker at the symposium banquet. One of the few Ph. D.'s in Congress, Dr. Vivian contributed to the development of the Project Michigan high-resolution, side-looking airborne radar.

Project Michigan is conducted under an Army Electronics Command research contract with the University of Michigan Institute of Science and Technology. Research is oriented toward achieving new and improved techniques for combat surveillance and target acquisition to meet long-range operational requirements of the Army in the field.

Research Support Group Responds to Distress Call

Responding to emergency situations in northern Greenland's isolated communities is not written into the mission statement of the Aviation Branch, U.S. Army Research Support Group, but it does help to promote cooperative support of that mission.

In 68-below-zero weather, the Aviation Branch recently answered a call for help by airlifting 21 drums of heating oil (1,155 gallons) to a remote village far from the usual base of operations of the U.S. Army's Camp Tuto. A CH-34C "Choctaw" helicopter was used to make four trips to Savigsivek, located about 80 miles southeast of Thule Air Base, Greenland.

That mission was but one of the numerous examples of the U.S. Army Research Support Group's cooperative working relationship with the Danish Government in the research program.

The Headquarters U.S. Army Research Support Group, a Class II activity reporting directly to the U.S. Army Materiel Command in Washington, D.C., recently completed its seasonal move from Fort Belvoir, Va., to Camp Tuto to provide administrative and logistical support for the Army's research and development program in Greenland.

House Report Documents Growth of U.S. Weather Program

A comprehensive insight into activities obligated at $431.5 million for FY 1965 to learn more about the weather, forecast it more reliably, use it to better advantage, and develop methods of modification is given in "Government Weather Programs."

Published recently as House Report No. 177 (first report of the Committee on Government Operations) to the 89th Congress, the document show the rapid growth in Federal weather programs during recent years.

From 1959 to 1965, it states, the U. S. Weather Bureau expenditures for weather services increased by 75 percent. Meanwhile, obligations by Federal agencies for research and development in the interrelated atmospheric sciences, including meteorology, gained 440 percent.

The report shows that of the 17 major agencies engaged in weather programs the Air Force has the biggest FY 1965 investment at $128.4 M, compared to the Weather Bureau at $103.8 M, NASA at $75.4 M, Navy at $35.5 M, Federal Aviation Agency at $20.7 M, and the Army at $16.0 M.

The growth pattern is expected to continue, the report states, with the total Federal weather program expenditures in FY 1966 projected to increase by $31.5 million ($25.1 M for research and development in the atmospheric sciences, $6.4 M for the Weather Bureau alone for weather services). It explains:

"Another familiar factor in the present status of weather programs is that the Air Force, on behalf of the Defense Department, has the bulk of the Nation's resources for weather services related to military operations.

"This is one of the necessities of cold war readiness imposed on the Nation. The Air Force, Army and Navy account for the largest single share of the Nation's aircraft and pilots, not to mention ships, transport, aircraft carrier forces, and other military forces that must operate and maintain readiness for war.

"The safety of these military personnel and equipment, together with the continuing need for planning or use of these forces in military operations, produces a national military requirement of the most urgent kind.

"Along with the conduct of weather services, the Military Departments have developed equipment, techniques, and research to improve weather forecasting, dissemination, and use of data. The military is also responsible for developing worldwide communication which, in part at least, contributes to transmission and use of weather data, and to foresee and examine possible use of weather modification techniques in war.

"Military requirements for the best possible weather data upon which to base planning and operations, as well as material and equipment specifications and other more specific missions, still exist. The weather data required for conventional or nuclear war, for aircraft or missile, for sea-based or land-based operations, will differ in some respects, but certainly no lessening of need can be foreseen. . . ."

Activity in meteorological services and atmospheric sciences has two purposes, the report states, the first being scientific and the second practical, the latter both military and economic. Regarding the need for greater reliability in weather forecasting, it comments:

". . . Thus it may be possible, using only one's experience, to predict successfully tomorrow's weather 70 percent of the time. But to be wrong less than 30 percent of the time, and not one day in advance but a week, a month, or six months, represents a capability with enormous implications both for planning and for reducing the economic loss than can be directly related to ignorance of future weather conditions.

"National security is the aim of military planning; potential economic savings from improved forecasting skill are frequently estimated in billions of dollars annually. President Johnson has emphasized this potential economic benefit and the public importance of the field (see annex 1, p151).

"Scientists tell us that if we could accurately predict the weather five days in advance, it would mean cost savings of $2.5 million annually in agriculture, $45 million in the lumber industry, $100 million in transportation, $75 million in retail marketing, and more than $3 billion in management of our water resources. This is for the United States alone. The total worldwide benefits are beyond calculation."

Former Secretary of the Army Stephen Ailes, in a letter to the Committee on Government Operations regarding HR No. 177, commented that it contains "more information pertinent to the Federal atmospheric sciences activities than any other publication has ever assembled. It will be a very useful document. . . ."

While highly commendatory of the contents of HR No. 177 for showing "astute understanding of Federal agency problems, some leading Army meteorologists caution that it is not a complete summation of all pertinent considerations and "should not become a bible upon which decisions are rendered without further investigation."

Nonmeteorologists frequently expect more than is possible in weather programs, it was pointed out, particularly with respect to the possibilities of developing effective and practicable methods of weather modification. Tremendous sources of energy not currently available are required, and consideration always must be given to the possibility of effecting desired changes at the risk of undesired changes.

The Army research and development activities on weather and in the atmospheric sciences are concerned not so much with changing the weather, it was explained, as is learning to use weather factors to best strategic advantage.

The National Science Foundation, which has overall Federal agency coordination for weather modifications, in its sixth annual report on "Weather Modification," covering 1964, discusses the various programs of the agencies. The report points out that Army research in weather modification has been centered primarily at the Army Electronics Command R&D Laboratories at Fort Monmouth, N.J.

Army activity in weather modification has been centered in three particular areas of effort, namely, the basic studies of cloud physics mechanisms, the basic understanding of precipitation phenomena, and the basic concepts of modification. A program of thunderstorm research was conducted during the summer of 1964 at Flagstaff, Arizona, and various studies of cloud seeding were made in the Great Lakes region.

Regarding these experiments, it was commented that they show interesting possibilities for the study of changing mechanisms and the possible influence of the electrical fields upon coagulation of cloud drops within thunderstorms.

Army Buys Helicopter Trainers

The Army Aviation Materiel Command at St. Louis, Mo., announced in July an order for 24 TH-55A primary helicopter trainers from the Hughes Tool Co., Aircraft Division.

The $613,284 order, calling for July 1966 delivery, is a supplemental agreement to the original 1964 contract for 20 trainers. The Army used an option to buy 215 of the trainers in April of this year, all to be used at the Army Primary Helicopter School, Fort Wolters, Tex.

Contract Awarded for Pulse Reactor Facility at APG

A $1,787,000 contract for the construction of a nuclear pulse reactor facility at Aberdeen Proving Ground, Md., was awarded recently by the Department of the Army to Security Construction Co., Inc., Richmond, Va.

The first building to be erected will be a secondary laboratory, at the edge of the required exclusion area. Of steel and masonry construction, it will contain 6,500 square feet of administrative floor space.

The primary laboratory, of concrete, steel and aluminum construction, will provide 10,200 square feet of floor space for administrative and control operations and 12,500 square feet of floor space for test operations. It will be placed in the center of a fenced exclusion area having a radius of 1,500 yards.

The reactor proper will be a completely self-contained unit small in radiation capacity and physical size. Providing limited radiation potential for laboratory use, it will occupy about three cubic feet when completed by the Atomic Energy Commission.

When completed for use sometime in 1967, the research facility will be available for use by Army and Department of Defense activities and contractors on radiation exposure studies of national interest. The entire project will be operated by the U.S. Army Ballistic Research Laboratories at Aberdeen Proving Ground.

Planning for the construction and use of the reactor facility has considered all safety and security aspects of the Atomic Energy Act and other pertinent Army and Department of Defense regulations.

A similar reactor has operated successfully for more than three years at the Oak Ridge National Laboratory for health physics research.

The Aberdeen Proving Ground installation reportedly will provide researchers with a safe and economical means of evaluating the effects of high-intensity radiation on the performance of weapons, electronic equipment, and other defense materiel.

The facility will make possible, within cost limitations, the use of statistical methods for the interpretation of data—long an area of expertise at the Ballistic Research Laboratories— in nuclear radiation exposure studies.

The radiative environment that can be produced under controlled laboratory conditions with the reactor reportedly minimizes the need for high-cost field testing and logistics support required for nuclear effects testing of military interest.

ERDL Concept of Impact Power May Cut Weight of Bulldozer

An impact assist theory that may increase efficiency and reduce weight of bulldozers and other types of soil cutting and moving equipment is programed for bench tests at the Army Engineer R&D Laboratories.

Mathematical studies of the concept at the Fort Belvoir, Va., installation indicate that a 20,000-pound tractor may be reduced 13 percent in weight and retain the same production rate, or that production can be increased 15 percent when weight is not reduced.

The concept calls for application of impact force to the cutting blade, that is, using momentum as a hammer. Two specially designed hydraulic pistons and cylinders are being procured to test the theory on work benches.

If the concept proves feasible, the impact assist technique will be subjected to field tests in which the hydraulic pistons and cylinders will be mounted on modified tractor push arms and dozer blade.

Contract Signed for Mobile Medical Laboratory

Design and development of a mobile medical laboratory to serve field armies or separate commands are required by a contract awarded recently by the U.S. Army Medical R&D Command, Office of The Surgeon General.

Features to be incorporated in the laboratory under terms of a $2.1 million contract with the North American Aviation, Inc., Space Information Division at Downey, Calif., are:

- Lightweight and portable equipment to provide rapid identification of causative agents detrimental to the health of personnel.
- Reduction of weight and cube through miniaturization of equipment.
- Automated equipment wherever possible to reduce technician requirements.
- Capability for procedures in bacteriology, chemistry, entomology, serology, parasitology, pathology, virology, radiobiology, blood banking and environmental hygiene.
- Preweighted and prepackaged supplies, culture media and reagents furnished to reduce bulk requirements.
- Suitable lightweight, easily transportable containers for equipment and supplies.

The concept of utilization envisages the rapid movement of laboratory elements to any location by air or surface means to investigate the presence of infectious disease agents; to identify those agents and to evaluate their actual or potential hazard to personnel, food, water and animals.

The equipment is to be capable of operation in any reasonable dust and contamination-free shelter where an inside temperature range between +65° to +120° F. is maintained; no shelter or controlled temperature/humidity requirement is visualized, although the laboratory will utilize shelters, power supply, and other ancillary necessities as are available in the 1970 period.

The latest techniques and materials will be used in manufacture of equipment to permit maintenance-free operation for extended periods of time, and design will permit maximum utilization of modular replacement to facilitate maintenance.

Laboratory equipment and supplies will be packaged to facilitate transportation by aircraft and ground vehicles available in the 1970 period.

Former USARO Officer Heads R&D Group (Far East)

Col Charles W. Cook, the new commander of the U.S. Army Research and Development Group (Far East) at Camp Zama, Japan, recently concluded a 3-year tour with the Medical and Biological Sciences Branch, Life Sciences Division, U.S. Army Research Office, Arlington, Va.

Graduated with a B.S. degree in chemistry from Auburn University in 1940, he was the top graduate in 1952 at the University of California, Berkeley, where he received an M.S. degree in bioradiology. He also has completed the Army Command and General Staff College course.

Entering active duty in 1942, he served as commanding officer of an Engineer Combat company in the European Theater during World War II. Prior to his military career, he was assistant research director for a Georgia firm.

Col Charles W. Cook

Gen Lotz Reports Sept. 18 to Joint Staff in Viet Nam

(Continued from page 1)

Army Electronic Proving Ground, Fort Huachuca, Ariz.

While at Fort Huachuca, he served successively as chief of Electronic Warfare, director of Systems Development, commanding officer of the Combat Developments Command at the USAEPG, and deputy commander of the USAEPG.

Academic achievements of General Lotz include a B.S. degree from the U.S. Military Academy in 1938, an M.S. degree from the University of Illinois in 1947, and a Ph.D. from the University of Virginia in 1953. After earning his doctorate, he was assigned to the Research and Development Division, Office of the Chief Signal Officer for two years in Washington, D.C.

In June 1956, he was graduated from the Industrial College of the Armed Forces and assigned to the Eighth U.S. Army in Korea as Signal Officer for one year, followed by two years in the same role with the U.S. Army Pacific at Fort Shafter, Hawaii.

Other key assignments include a 1947-50 tour at the U.S. Army Signal Corps Research and Development Laboratories, Fort Monmouth, N.J., during which he served first as chief of the Meteorological Department and later as deputy director of Evans Laboratory.

As Director of Army Research, General Lotz has accentuated improved planning and management of the over-all Army research efforts. The Army Research Council (TARC), consisting of 11 of the Army's senior scientists, each selected for qualifications in a special field, was formed as a result of his recommendation to the Chief of Research and Development and the Assistant Secretary of the Army (R&D).

TARC has provided the opportunity for the Army in-house scientist to participate actively with top management of Army research in the review and evaluation of the Army Research Program. TARC also has served another major role in that members serve also as Army representatives on the Joint Advisory Forums, Office of the Director of Defense Research and Engineering. General Lotz has served as coordinator for TARC since its inception in January 1963.

TARC's intensive labors over a period of seven months in daily sessions, often extending far into the night, culminated in publication of a 434-page "Army Research Program Covering 6.11 Activities for Fiscal Years 1965-1969."

Publication of the classified "Army Research Plan" associated with this effort was followed by release of an unclassified version to industry, as part of the Army's continuing endeavor to improve liaison with the general scientific and industrial community.

Another effort to which General Lotz has devoted much of his time during the past two years is the Army Scientific and Technical Information Program. The Army played a key role in cooperation with the Director of Defense Research and Engineering in developing DD Form 1498, "Research and Technology Resume."

DD Form 1498 is now the basic document for reporting all Department of Defense information regarding ongoing tasks at work unit level in research and exploratory development. Currently becoming operational for all Military Departments, the DD Form 1498 system also has been adopted by the National Aeronautics and Space Administration for interagency exchange of information and is being considered by other Federal agencies.

In commenting on the Army research program, General Lotz said he has found that it is so complex and diverse that considerable time is required to become familiar with overall problems. He expressed regret that his new assignment in Viet Nam cuts short a tour on which he served his "apprenticeship" in learning how research personnel are making commendable progress on many fronts in meeting the real needs of the Army.

ARO-D Sponsors Mathematicians Meeting

Twenty-two papers were presented during the recent 11th Annual Conference of Army Mathematicians at Frankford Arsenal, Philadelphia, Pa.

Sponsored as in previous years by the U.S. Army Research Office-Durham (N.C.), the conference was held to stimulate the interchange of ideas among the Nation's mathematicians. About 100 military and academic representatives from across the country attended.

Prof. Frank Harary, University of Michigan, discussed "The Mutual Applications of Graphs and Matrices" in a major address. Henry Kahn, chief of the Mathematicians Branch, Pitman-Dunn Research Laboratories, Frankford Arsenal, was chairman.

Other papers were presented by: Alan S. Galbraith, Army Research Office-Durham; Irving J. Epstein, Army Electronics R&D Labs, Fort Monmouth, N.J.; Joseph M. Bloom, Edward W. Ross and John F. Mescall, Army Materials Research Agency, Watertown, Mass.; M. A. Sadowsky, M. A. Hussain, R. D. Scanlon and Akira Inomata, Watervliet (N.Y.) Arsenal; Siegfried H. Lehnigk, D. W. Howgate and C. A. Coulter, Redstone (Ala.) Arsenal; Shunsuke Takagi, Army Cold Regions R&E Labs, Hanover, N.H.; and Julian Davis, Picatinny Arsenal, Dover, N.J.;

Also, Thomas H. Slook, Frankford Arsenal; Jon E. Gibson, White Sands (N. Mex.) Missile Range; Peter J. Smith and Ceslovas Masaitis, Aberdeen Proving Ground, Md.; Michael Papadopoulos, Ben Noble and Geraldo S. Avila, Army Mathematics Research Center, University of Wisconsin; Alfred Lehman, Walter Reed Army Medical Center; and Alfred N. Bloch, Edgewood Arsenal, Md.

Col Scurlock Appointed Chairman of ASPR Committee

Air Force Col Reagan A. Scurlock is the new chairman of the Armed Services Procurement Regulation Committee (ASPRC), Office of the Assistant Secretary of Defense (Installations and Logistics). Col Roger H. Terzian, who held that office, recently returned to the Air Staff.

Col Scurlock joined the Procurement Office at Headquarters, Air Materiel Command in 1951 and has occupied several posts in the procurement field. He is a graduate from the University of Texas Law School and a member of the Texas Bar.

The ASPRC, consisting of representatives of the Office of the Secretary of Defense, Army, Navy, Air Force and Defense Supply Agency, develops and maintains uniform policies and procedures for procurement of all defense supplies and services. It also establishes standard contract forms and clauses.

Current ASPRC members are: Louis A. Cox, Office of the Assistant Secretary of Defense (Installations and Logistics), alternate chairman; Edward C. Cox, Army policy member; Col Arthur Slade, Army legal member; LeRoy Haugh, Navy policy member; Albert Green, Navy legal member;

Maj J. B. Pompan, Air Force policy member; Edmund Kelly, Air Force legal member; Robert Lintner, Defense Supply Agency policy member; Maurice Paradis, Defense Supply Agency legal member; Alfred B. Carter, Office of the Assistant Secretary of Defense (Installations and Logistics), executive secretary.

DoD FY 65 Cost Reduction Cuts $4.6 Billion

Savings of $4.6 billion, $2.1 billion more than estimated, were realized during Fiscal Year 1965 under the Department of Defense Cost Reduction Program, Secretary of Defense Robert S. McNamara has reported to President Johnson.

Published as the third annual progress report on the program, the July 12 memorandum revealed details of future cost reduction expectations. The long-range goal was revised for the third time to project savings of $6.1 billion a year by FY 1969 and each year thereafter, an increase of $1.5 billion over the previous objective.

The savings were accomplished, Secretary McNamara emphasized, without any adverse effect or decrease in military strength and combat readiness. To the contrary, gains ranging from 45 to 1,000 percent, he said, were achieved in such areas as combat-ready Army divisions, airlift capability and Special Forces.

The Cost Reduction Program, the report stated, has been carefully planned and thoroughly organized within the Defense Department and is being vigorously supported in all management levels. Clearly defined goals have been set at each echelon.

Among the numerous examples of savings in the military services and the Defense Supply Agency recounted in the report, the following for U.S. Army are of interest:

- An Army study of the factors used to compute the reserve stocks needed to replace high-value equipment withdrawn from operation for repair reduced the "maintenance float" for avionics items by one-quarter and for fire-control items by one-half—with resultant savings of $4.1 million.
- The Army acquired 236 missile targets which were excess to Air Force needs, saving $560,700.

Areas in which major savings have resulted in the DoD Cost Reduction Program and which can be counted on for larger future savings include:

Eliminating goldplating or value engineering. (Secretary McNamara envisions savings as high as $500 million annually by 1969.)

Inventory items reduction with such basic approaches of attack as purging existing inventories of duplicative items (over 370,000 items were eliminated during the first nine months of FY 65); controlling the entry of new items (supply systems have been reduced from 4 million to 3.9 million); limiting the creation of new items through standardization of components and parts; avoiding parallel development projects.

Shifting from non-competitive to competitive procurement saved an estimated $550 million in FY 1965. Shifting from cost-plus-fixed-fee to fixed-price contracts reportedly saved an additional $658 million.

Terminating unnecessary operations reduced costs by $483 million. Consolidation and standardization of operations, such as single management of contract award and administration and creation of the centralized Defense Contract Audit Agency, are expected to produce substantial future savings.

In summary, Secretary McNamara stated that the DoD Cost Reduction Program has exceeded even the most optimistic projections made when the program was launched in 1962. Through the solid support of personnel at all levels, it became possible to raise the long-range goals.

ATAC Introduces Bid-Package Data Processing System

A new system of processing bid-package data expected to save the Government $500,000 annually is being introduced at the U.S. Army Tank-Automotive Center (ATAC), Warren, Mich.

The system provides for including all engineering drawings and other technical data associated with ATAC activities on duplicate 35mm. microfilm cards. Firms preparing bids on ATAC hardware requirements will no longer have to receive bulky packages of engineering drawings and technical information.

ATAC spokesmen expressed confidence that the procedure will be of benefit to industry, Government and the American taxpayer. It is estimated that time requirements for the reproduction of technical data will be reduced by 50 percent and that mailing costs will also be cut.

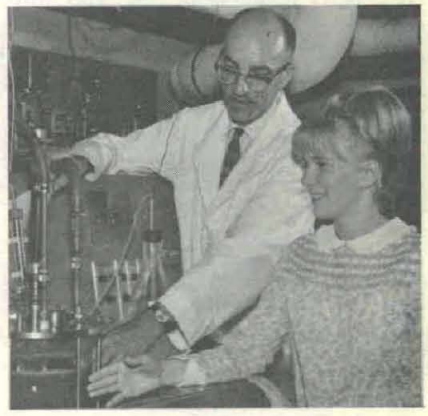
Under the old system, about five days were required to prepare complete bid packages. With the microfilm aperture cards, the same information can now be prepared for mailing in only two days.

Prospective bidders receiving the microfilm material will find the drawings and data are more legible than the old paper prints that often required photocopy steps, it was announced.

In a letter addressed to private industry, ATAC deputy commander Col Glenn S. Finley, Jr., observed that the new method makes it possible to improve service to firms doing business with the Government while significantly cutting the Government's operating costs.

AMONG SCORES of summer employees at the U.S. Army Missile Command, Redstone Arsenal, Ala., Mary Jo Brazelton, a blue-eyed blonde mathematics major, carries the singular title of "Sweetheart of Sigma Chi, 1965." Employed in the Structures and Mechanics Laboratory of the R&D Directorate, Mary Jo is enrolled in two courses at the University of Alabama Huntsville campus.

NSF-I Winner Visits Natick Labs



TOP ARMY WINNER at the 16th National Science Fair-International, Barbara Ann Bennett, 18, of Terre Haute, Ind., who won an all-expense paid visit to Natick (Mass.) Laboratories, is shown during her recent tour with Robert Matthern, who explains a Natick experimental system for algae culture. Barbara also will represent the U.S. Army at the Japan Student Science Awards Exhibit to be held in Tokyo early in November.

John Drougalis

Braxton S. Burt

Samuel Berger

ECOM Continuing Job Rotation of Executives

The latest exchange in a job rotation program established recently at the U.S. Army Electronics Command (ECOM), Fort Monmouth, N.J., is a 3-way move extending into Army Materiel Command project management organizational structure.

The rotation plan is designed to advance career development interests of principals and to enhance the interworkings of functional and managerial activities in military electronics. The first exchange, effected in March, was a straight 6-month job trade between Arthur F. Daniel and Abraham E. Cohen, each a division of office director. No definite time limit is scheduled for the recent job exchange of three employees.

JOHN DROUGALIS moved from chief of the Combat Area Communications Branch in the ECOM Procurement and Production Directorate to commodity manager of net radio projects in the Commodity Office. This office carries out life-cycle management of communications and automatic data processing equipment and systems.

Drougalis went from Brooklyn Technical High School to RCA Radio Institute (now RCA Institute), direct descendent of the Marconi Institute. He was engaged in transatlantic operations with Radiomarine Corp. from 1929 until entry into Civil Service in 1942. That started him in a succession of jobs in production engineering, primarily with communications equipment.

BRAXTON S. BURT, as part of the triple move, shifted from the Commodity Office to chief of the Technical Management Division in the Office of the AMC Project Manager for Selected Tactical Radios.

Burt has served at Fort Monmouth since 1951, after attaining the rank of major during 10 years' service in the Army Signal Corps and the Air Force. As a civilian employee, he held positions in production engineering and in communications R&D prior to joining the Communications-ADP Commodity Management Office in March 1963.

Backed by a B.S. degree in electronics engineering from North Carolina State University, and an M.S. from the University of Illinois, he has engaged in advanced studies in electronics at Harvard and Massachusetts Institute of Technology. He has also completed several Army courses in communications, supervision and logistics.

SAMUEL BERGER, chief of the Technical Management Division in the Project Managers Office for the AN/VRC-12 and AN/PRC-25 forward-area radios since August 1963, moved to the Procurement and Production Directorate.

In Civil Service at Fort Monmouth since 1941, he has acquired experience in production engineering and has performed engineering liaison with the Army in Europe.

Berger received his education at RCA Institute, Rutgers University, and Monmouth College. Recently he completed a 3-month DoD course in systems, programs, and project management at the Defense Weapons Systems Management Center, Air Force Institute of Technology, Wright-Patterson AFB, Ohio.

Col Gonseth Named Manager of UNICOM/STARCOM

UNICOM/STARCOM project manager for the Army Materiel Command is Col Kenneth M. Gonseth, formerly chief of the U.S. Army Supply and Maintenance Agency, Orleans, France. He succeeded Col H. F. Foster, now assigned to Korea.

The UNICOM/STARCOM (Universal Integrated Communications/Strategic Army Communications) Project Management Office is engaged in the development, procurement and production of a large complex of communications equipment associated with strategic communications systems.

The U.S. Army Materiel Command (AMC) combat communications project, is headquartered at Fort Monmouth, N.J., and is supported by the U.S. Army Electronics Command, a major element of AMC.

The communications equipment consists of continental, overseas and intercommand electronic facilities essential to the strategic command and control of the Army. The STARCOM program of the AMC involves system design, engineering, procurement and production of the individual items required for Strategic Army Communications.

Col Gonseth recently received the Legion of Merit. He is a 1939 graduate of the University of Illinois, a 1948 MBA graduate of the Harvard Graduate School, and has completed the National War College course.

Previous assignments have included member of the staff and faculty of the Army Supply Management Course (now Army Logistics Management Center) and commanding officer of the Lexington Signal Depot 1958-60.

During his 4-year tour in France, he was consecutively commander of the Army Signal Supply Control Agency in Poitiers, signal officer for the Communications Zone, Europe, chief of the Army Systems Development Office in Orleans, and Supply and Maintenance Agency chief.

ERDL Awards 5 Contracts For R&D Totaling $1.3 Million

Five contracts totaling $1,353,928 were issued recently by the R&D Procurement Office at the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

A $650,000 contract went to AiResearch Manufacturing Co., Phoenix, Ariz., to design, fabricate, test and deliver a 275 hp. recuperated gas turbine and a speed-reduction gear box.

General Motors Corp., Allison Division, Indianapolis, Ind., was awarded a $402,867 contract for the investigation of hydrogen production by water electrolysis.

North American Aviation, Inc., Canoga Park, Calif., received a $162,809 contract to design, fabricate, test and deliver a gas turbine starting system.

A $98,070 study contract was awarded to United Aircraft Corp., Pratt & Whitney Aircraft Division, East Hartford, Conn., for studies of a silent power plant hydrocarbon air fuel cell.

Melpar, Inc., Falls Church, Va., received a $40,182 contract to conduct a study on preparing a single crystal.

Army Grants Contracts Totaling $311 Million

Two contracts totaling $59,085,665 awarded to Kaiser Jeep Corp. highlight the $311 million total of recent Army contracts for research and for materiel production.

The Kaiser awards include a $1,384,957 modification for 232 trucks with Government-furnished engines and a $57,700,708 first increment of a 2-year buy of M44 series 2½-ton trucks.

General Dynamics Corp. was issued a $44,977,568 contract for 1,017 digital subscriber terminal items and ancillary equipment for the Automatic Digital Network (AUTODIN).

Raytheon Co. received three contracts totaling $23,809,995, two of which concern the HAWK missile system: $17,865,016 for ground and field maintenance equipment and $2,102,733 for engineering services. The third contract of $3,842,246 is for air transportable radio communication equipment (AN/TSC-38).

Sylvania Electronics Systems is receiving $16,252,347 for the design, fabrication and installation of the new ARPA Long Range Tracking and Instrumentation Radar (ALTAIR). Hupp Corp., Hercules Engine Division, Canton, Ohio, was granted $16,126,109 for the first increment of a two-year buy of multi-fuel engines for the 2½-ton truck. Remington Arms Co., Inc., won a $9,562,865 modification for miscellaneous small arms ammunitions.

Chrysler Motor Corp. received three contracts to produce 2,023 one-ton trucks and 75 one-ton ambulances for $6,234,778; to provide refurbishment, checkout and launch services for Redstone missiles and related ground support equipment for $1,310,346; and to provide production engineering services for the M60 series tank, combat engineer vehicle and armored vehicle bridge launcher for $1,851,422.

Consolidated Diesel Electric Corp. will produce 10-ton trucks with Government furnished engines, transmissions and axles for $8,210,128, the first increment of a multi-year contract.

General Motors Corp. won contracts totaling $7,314,936. GM will design, develop, fabricate and test an engine for the US/FRG (Federal Republic of Germany) Main Battle Tank for $1,069,750 and will furnish 331 rebuilt/retrofit transmissions for various combat vehicles for $1,671,492 and 188 transmissions and related spares for the XM551 vehicle for $4,573,694.

Ford Motor Co. signed a $6,876,026 contract for 1,552 cargo trucks. FMC Corp. was awarded $6,582,851 as part of the second increment to a 3-year buy of M113A1 Armored Personnel Carriers.

Model Engineering and Manufacturing Corp. received $6,106,177 as the second increment of a 2-year buy of radio sets (AN/PRC-25) and receiver-transmitters (RT505). Firestone Tire and Rubber Co. was issued a $5,669,190 contract as the second increment of a 2-year buy of repair parts for the M-60 Tank.

Richardson Merrell, Inc. was awarded a $5,583,300 contract for continuation of a project requiring certain facilities and experience in handling techniques acquired in earlier research. Del Webb and Norman Engineering Co. will construct a toxic altitude propulsion research facility for $5,379,533.

Mack Truck Co. is receiving $5,349,682 for 649 axle sets with related items for the 10-ton truck, M123A1C. Southern Airways of Texas, Inc. was granted a $4,773,686 contract for training of helicopter pilots and for maintenance of related aircraft.

Bell Aerospace Corp. received a $4,603,405 award for UH1B and UH1D helicopters and Texas Instruments, Inc. signed a contract for $4,500,000 for classified electronic equipment. General Electric Co. was awarded a $3,653,200 (Air Force Funds) contract for 20mm. automatic guns and armament pods.

Ling-Temco-Vought, Inc. accepted a $3,493,107 contract for advanced production engineering programs for 1¼-ton (XM561) cargo trucks. Cummins Engine Co. signed a $3,437,898 agreement for 691 diesel engines and related items for the 10-ton truck M123A1C.

Collins Radio Co. won two contracts totaling $3,082,453 to produce automatic direction finder sets (AN/ARN-83) for $1,542,488 and radio receiving sets (AN/ARN-82) for $1,539,965 both as the first increment of a 3-year buy.

Western Electric Co. received a $2,928,066 modification to alter a target track radar in the Kwajalein Islands. I. D. Precision Components Corp. signed a $2,900,028 contract for ordnance items. Baifield Industries, Inc. will get $2,478,109 as the first increment of a 3-year buy for ½-ton utility trucks.

Fontaine Truck Equipment Co. was granted a contract to build 500 semitrailers for $2,348,700 and Supreme Products Corp. received a $2,087,650 contract for ordnance items. Canadian Commercial Corp. will produce Doppler Navigation Radar components for use with the Mohawk aircraft for $1,918,833.

La Pointe Industries, Inc., was issued a 2-year buy contract to produce radio sets and ancillary items (AN/ARC-73) for $1,821,327. Eidal International, Inc. will provide 210 trailer-mounted laundries for $1,800,975 and Highway Products, Inc., Kent, Ohio, will receive a $1,778,907 contract for guided missile launchers.

Johnson Furnace Co., Bellevue, Ohio, is being awarded a $1,759,458 contract for 2,996 2-wheel trailer chassis and Grumman Aircraft Engineering Corp. will modify the OV-1B and OV-1C Mohawk aircraft for $1,758,833.

Union Carbide Corp. won a $1,748,250 contract for 450,000 dry batteries for tactical radio sets (AN/TRC-8, 9 and 10). U.S. Forgecraft Corp., Fort Smith, Ark., was issued a $1,588,040 contract for 4.2 inch projectiles. Capital Radio Engineering Institute, Washington, D.C., signed a $1,500,000 contract for classified services.

Minnesota Mining and Manufacturing Co. will produce classified electronics equipment for $1,500,000. Bermite Powder Co., Saugus, Calif., was awarded a $1,497,600 modification for photo-flash space cartridges. Silas Mason and Co., Inc. will produce classified ammunition on a $1,457,255 modification.

Electromagnetic Industries of Georgia was granted a $1,444,618 2-year buy contract for semitrailers. Airport Machining Corp., Martin, Tenn., will receive $1,371,500 and American Manufacturing Co., Fort Worth, Tex., will get $1,367,000 to produce 2.75-inch rockets.

Sperry Rand Corp. received a $1,320,000 contract for rental of data processing equipment, Caterpillar Tractor Co. $1,318,637 for 47 tractors, and Telecomputing Services, Inc., Panorama City, Calif., $1,300,000 for data reduction services.

Massachusetts Institute of Technology won a $1,275,000 modification for extension of research work covering electronics physics, molecular physics, and communication sciences. Day and Zimmerman, Inc. will produce miscellaneous conventional items, ammunition and components for $1,213,753. Stelman, Inc. was issued a $1,031,637 contract for equipment for the Automatic Digital Network (AUTODIN).

Chamberlain Corp., Waterloo, Iowa, was awarded a $1,014,000 contract for ordnance items, Loadcraft, Inc., Augusta, Kan., $1,013,610 for 162 semitrailer vans, and Honeywell, Inc., St. Petersburg, Fla., $1,000,000 for classified electronics equipment.

Ballistic Research Laboratories Deal With Weapons Technology

U.S. Army Ballistic Research Laboratories personnel have a solid base of scientific success over three decades upon which to join with prideful politicians who proclaim, "Let the record speak for itself."

Actually, the nucleus of the present work force of some 1,100 employees, more than half of them on the professional research staff, dates back to 1918. But it was the advance of modern weaponry in World War II that gave major impetus to BRL progress.

Scientists and engineers at the BRL deal not with specific weapon componentry, except as pertains to the basic physical and mathematical sciences behind the design and use of today's weapons—and those of tomorrow. The BRL are recognized as the Army's basic and applied research center for the problems of greater firepower.

Operating directly under Headquarters, U.S. Army Materiel Command, as established by the Army-wide reorganization of 1962, the Laboratories are charged with responsibility for:

- Conducting basic and applied research in weapons technology, ballistics and related sciences.
- Evaluating weapons systems.
- Providing technical services to the Army Materiel Command, the Department of the Army, and to the Department of Defense and other Federal Government agencies when requested.

Col Charles D. Y. Ostrom, Jr., who formerly commanded the U.S. Army Research and Development Group (Europe), has headed the six specialized and diversified Ballistic Research Laboratories since September 1963. He also heads the U.S. Army Human Engineering Laboratories and the U.S. Army Coating and Chemical Laboratory at Aberdeen Proving Ground, Md. Dr. C. W. Lampson is BRL technical director.

Col D. Y. Ostrom, Jr.

The forerunner of the BRL was a division of Aberdeen Proving Ground's Weapons and Ammunition Proof Department, which pioneered ballistics research for World War I. Since then the Laboratories have become known the world over for the scope and complexity of research in many phases of ballistics and instrumentation.

BRL "firsts" are recognized in the national and international scientific communities in the fields of supersonic continuous-flow wind tunnels, electronic digital computers, and damage assessment.

In 1943, the first continuous-flow, supersonic wind tunnel in the U.S. was installed at BRL. Pre-World War II efforts of Lt Col Hermann H. Zornig, since acclaimed as one of the Army's most distinguished authorities on ammunition, the Laboratories' first director, staffed and organized the embryonic research center.

Following the attack on Pearl Harbor and U.S. entry into the war, BRL was prepared to expand rapidly enough to carry the brunt of ballistics research for the Allies.

One of the most zealous workers for BRL's early wind tunnel was the late world-renowned aerodynamicist, Theodor von Karmen of Germany. In 1940 he had met on the Laboratories' first Scientific Advisory Committee with fellow scientists Harold C. Urey, Nobel Prize winner for the discovery of the deuterium isotope, Isador I. Rabi, later to win the same prize in physics, John von Neumann, the noted mathematician, and the famed astronomer, Henry Norris Russell.

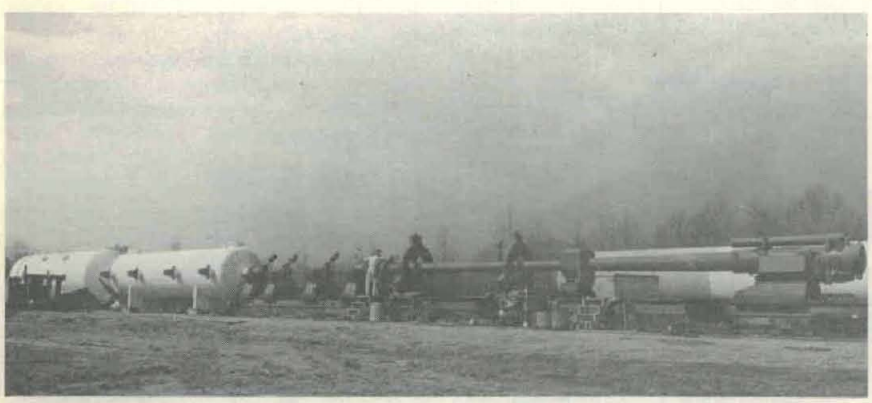
Wind tunnels and the mass of flight effects data obtainable from them have been an integral part of BRL operations. Several wind tunnels are feeding to scientists basic and applied research data without which present-day missiles, satellites, and manned space vehicles could not have materialized.

BRL's newest wind tunnel is one of two Mach 10 hypersonic continuous-flow tunnels in existence in the country today. Full operations with the tunnels were achieved about three years ago.

In the computing field, today's electronic computer industry can be traced directly to BRL's World War II requirement for greatly increased computer facilities. As weapons became more complex to meet peak wartime requirements, the BRL-developed Bush Differential Analyzer became overloaded with firing table computations—the ballistics area out of which the Laboratories evolved.

When development of the now historic ENIAC, the world's first all-electronic computer, was proposed by the University of Pennsylvania, the idea was backed by BRL and an Army contract was awarded for development and construction. The machine was accepted by the Army in July 1946 and went into operation at BRL the following year.

Today BRLESC — a third-generation miniaturized, faster, and more versatile computer—operates in the pioneer's place. Unveiled to the press in March 1962, BRLESC is a high



3-STAGE, LIGHT-GAS GUN, used in obtaining exterior ballistics data at BRL, combines a 240mm. howitzer, a 175mm. gun, and a 76mm. gun. A 76mm. sphere is fired into a controlled pressure chamber at 16,000 feet per second. The chamber can simulate atmospheric conditions to 25,000-feet altitude.

performance computer with unusual features.

For example, a very long word-length capability tends to make the single-precision arithmetic of BRL-ESC comparable to double-precision arithmetic on other computers. Its 63-index register makes compilation of programs unusually fast. In June 1964, the BRLESC memory was expanded from its original size of 4,000 words to about 53,000 words.

In the field of damage assessment, BRL scientists can properly claim more experimental work than any other group in the world. Physicists, engineers and mathematicians have pooled their areas of knowledge to put damage assessment, or terminal ballistics, on a quantitative basis — regardless of whether the damage will be to people or materiel, or whether it will be by blast or some other specific weapons effect.

In support of the country's defense effort, the Laboratories comprise one of the finest assemblies of equipment and facilities to be found anywhere in the world. Scientists can pursue hundreds of projects as varied as the current technology of firepower in an ever-changing modern environment.

Organized into separate, yet interrelated activities and a surveillance group—each with a clearly defined mission in its particular area—the six laboratories are Ballistic Measurements, Computing, Exterior Ballistics, Interior Ballistics, Terminal Ballistics, and Weapons Systems.

The Ballistic Measurements Laboratory is responsible for basic studies of the radiation emission and reflection characteristics of military equipment and personnel, including the influence of environmental conditions upon means of detection and identification.

In addition, the BML conducts basic studies in the theory of measurements and in new methods for obtaining upper atmosphere flight data and environmental characteristics.

Among significant current studies is the Laboratory's work with the propagation of beams, ranging from millimeter wave frequencies through infrared into and including the optical region. Such special radiations as Laser beams are among those studied.

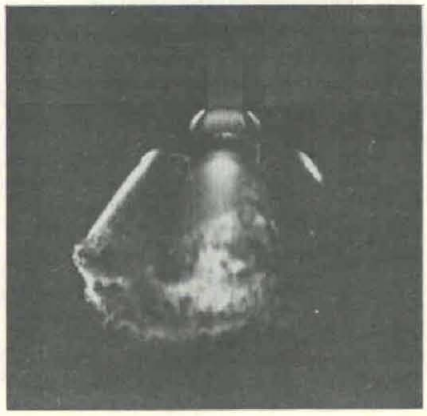
Beams are transmitted over a unique "firing range" 400 feet wide and 2,400 feet long, allowing researchers to measure beam behavior in relation to atmospheric conditions at heights up to 50 feet.

Dr. C. W. Lampson

Sensors on the range produce electrical outputs that are fed into a high-speed data processing point. Here 150 items of data can be collected simultaneously, at a rate of 1/20,000 of a second per bit of information, and converted into a form usable by computers.

Ground control is also a feature of the range. Plans are under way to have available at one time a variety of ground covers, such as bare soil, asphalt or vegetation, over which waves can be transmitted and their behavior measured. Studies produce physical data on which weapons design is based.

The Computing Laboratory—home of BRLESC and a variety of other computing equipment—provides mathematical and computational assistance for solution of problems in missile/projectile trajectories, aerodynamics and aerophysics, weapon systems, analysis, war gaming, nuclear shielding, and statistics. It also carries on the BRL original mission of firing table preparation and investigates problems in applied mathematics.



FRAMING CAMERA records detonation of a stick of high explosive during a BRL project pertinent to the initiation and detonation of military explosives and explosive devices. The picture was taken with a camera capable of taking approximately one million pictures per second.

In 1963, the BRL mathematics branch was expanded from a small group to more than a dozen scientists, primarily to enable the group to work accurately in computation studies related to explosion theory and to problems of hypervelocity impact. The group is also engaged in problems of linear and dynamic programing, communication and control theory, and in the general theory of numerical analysis.

The Exterior Ballistics Laboratory conducts studies of aerodynamics and classical mechanics of the flight performance of bombs, shells and other missiles. It provides improved weapons design techniques through the conduct of theoretical research in the field of exterior ballistics.

BRL's wind tunnels, including three supersonic ones with flexible nozzles permitting continuous variation of the Mach number over the entire range from 1.3 to 4.5, are characteristic research facilities of this laboratory. In a current effort to provide a facility for research and development testing at hypersonic Mach numbers from 10 to 20, laboratory scientists are developing a device known as an expansion tube.

Feasibility studies are in progress to determine whether flows so far produced in the test section of the tube are sufficiently uniform to allow high-quality measurements.

Preliminary tests with optical frame and streak interferometry show that good-quality flow data can be obtained in some cases. Further studies are in progress to determine the upper limit to Mach number.

The Interior Ballistics Laboratory's basic research is in the area of physical and chemical properties of solid- and liquid-propulsion processes. Theoretical and experimental studies are made of the interior ballistics of guns and rockets. Research in applied mechanics seeks to obtain fundamental data and establish a basis for guidance of future weapons development.

In connection with BRL's overall mission, new and novel apparatus is developed to investigate the large-magnitude, short-duration phenomena associated with ballistics. As an example of recent effort, an optical

(Continued on page 20)

Ballistic Research Labs Deal With Weapons Technology

(Continued from page 19)

lever system has been developed for measuring the angular motion of a projectile during launch and during flight through the muzzle blast. An understanding of the phenomena in this intermediate ballistics zone provides the basis for improving the accuracy of fire.

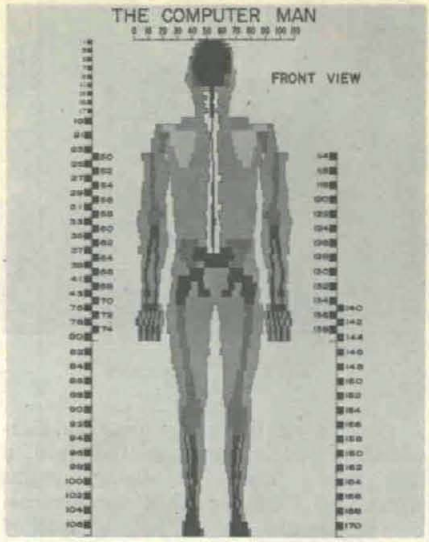
The Terminal Ballistics Laboratory, the largest of the six BRL operations, conducts research in terminal effects of conventional and special weapons upon materiel and personnel targets. Included in current studies are such phenomena as penetration, fragmentation, blast, radiation, wound ballistics, and methods of simulating effects. The laboratory also acts as consultant to the Army Materiel Command and the Department of Defense organizations on special problems related to shielding and performance of specialized weapons and materiel.

Major research currently is being conducted on the development of computing machine codes to establish free field radiation effects, and a method for analysis of Argus IV satellite data; also, crack formation and propagation in metals, response of structures to internal and external blast, Laser effects, and coordination of field tests conducted to determine structural response and free field effects using large HE charges to simulate nuclear blasts.

Other areas currently under Terminal Ballistics Laboratory study include the effect of high altitude on the effectiveness of air blast as a damage mechanism, the nature of detonation phenomena in solid explosives, methods transformation of explosive energy to electrical energy, the effect of shock waves in various plastic and inorganic materials, and penetration of targets by fragments and other penetrative mechanisms.

The Weapon Systems Laboratory performs overall weapon systems evaluation and operations research investigations and conducts applied research on factors affecting system performance. From the results of these efforts, desirable characteristics and optimum design parameters for new and improved weapons are established.

BRL's Surveillance Group evaluates the reliability and ballistic characteristics of rockets, guided missiles, and other types of ammunition retained in stockpiles; it also performs research in mathematical statistics in the design of experiments and analysis of data.



FRONT VIEW OF MAN as programed for the BRLESC. Each block has been assigned a value corresponding to the vulnerability of the respective anatomical area, resulting in a mathematical description of man's vulnerability to terminal ballistic effects. This description is coupled with terminal ballistics data to measure effectiveness of various weapons.

One problem on which the group is currently engaged concerns the study of changes in reliability and ballistic characteristics of surface-to-air and surface-to-surface missiles. Many current projects also deal with development of mathematical statistical methodology for sampling, testing, analyzing, and evaluating the reliability and ballistic characteristics of munitions.

For tomorrow's research—the nature of some of it undoubtedly not yet revealed—BRL investigators look forward to operating in three new physical plants. A separate Weapons System Laboratory building will be completed in December, with a Radiation Application Laboratory completed shortly thereafter, in January-February 1966. Construction of a nuclear pulse reactor facility—one of some eight reactors of this type in the country now in operation or programed—scheduled for 1967 completion.

The reactor will be available for use by Army and Department of Defense agencies and contractors on problems of urgent national interest. It will provide researchers with a safe and economical means of evaluating the effects of high-intensity radiation on the performance of weapons, electronic equipment, and other materiel.

The radiative environment that can thus be simulated under controlled laboratory conditions will minimize the need for high-cost field testing and logistics support. More important, it will allow research to continue within terms of the Nuclear Test Ban Treaty.

Simulation of nuclear weapon radiation effects will be as close as possible to actual radiation effects as allowed by the current state-of-the-art. The low cost per "shot" will be favorable to statistical methods.

The entire reactor and laboratory facility will be contained at the Proving Ground. Construction and operation will be in accordance with the Atomic Energy Act, as well as Department of the Army and Department of Defense regulations.

AMRA Metallurgist Named to Inter-American Group

Samuel Valencia, of the U.S. Army Materials Research Agency (AMRA), Watertown, Mass., has been appointed to membership on the Inter-American Relations Committee of the American Society for Metals (ASM).

The committee works with representatives of other engineering and technical groups in both North and South America to promote the objectives of ASM in all areas of the hemisphere, and assists in formation of new ASM chapters.

Graduated from Western College of the University of Texas at El Paso in 1939, Valencia worked as a metallurgist in Mexico until 1948, then returned to the United States. In 1951 he joined the staff of the Watertown Arsenal Laboratories as a metallurgist.

Following the establishment of AMRA as one of the independent research laboratories of the U.S. Army Materiel Command in 1962, he became technical relations adviser to the technical director of AMRA.

Samuel Valencia

Picatinny Develops Novel Nuclear Particle Altimeter

Ingenious use of nuclear energy in an altimeter for high-velocity missiles, described in a technical paper at the 1962 biennial Army Science Conference, has been advanced by recent extensive work at Picatinny Arsenal, N.J.

Certain limitations on the use of the novel altimeter have been identified by Picatinny engineers. The 1962 paper, which stimulated considerable interest, described how they had designed, fabricated and tested a nuclear altimeter to sense altitude by means of back-scattering of beta radiation.

The underlying principle is that the amount of absorption and scattering of nuclear particles in air is a function of atmospheric density; that is, atmospheric density always decreases with altitude and a change in altitude is associated with a significant change in density.

The nuclear altimeter consists of a radioactive beta source and detector, placed side by side in the missile at a point where the external surface of the altimeter is flush with the missile's skin.

Beta particles pass through the source window into the air stream flowing around the missile. Some of these (beta) particles emitted are absorbed in transit and others are scattered by the air in front of the source.

A percentage of the scattered radiation is back-scattered into the detector, which is an ionization chamber containing Argon, an inert gas. The ionization current produced is a function of the amount of back-scattering.

Although the concept is sound, it was found in recent extensive investigations that the missile aerodynamic characteristics would have to behave in a consistent and predictable manner in order for the altimeter to function properly. This limits significantly the actual application of the altimeter in the determination of a missile's altitude.

Accurate altitude determination is further limited because of the meteorological variation of density with altitude that exists in the actual atmosphere.

The feasibility study was made by engineers of Picatinny Arsenal's Long Range Atomic Warheads Laboratory, a segment of the Nuclear Engineering Directorate. George Taylor was project engineer, assisted by Piave Corradi.

Military Specifications Filed To Serve Contractor Needs

An archival service for industry on superseded military specifications and other standard documents required for contractual obligations became operational July 1.

The repository is located at the Naval Supply Depot, Philadelphia, Pa., along with the Defense Single Distribution Point for Specifications.

The archival service will provide for the first time a single source for copies of old specifications issued by all military services. For ease of handling and retrieval, microfilm is being used for storage and record of the canceled documents, thereby eliminating need for large volumes of old printed copies.

Records of approximately 20,000 specification documents are on hand. This quantity is expected to increase rapidly since about 35,000 specifications or related documents are stocked and issued. A large proportion of them are continually subject to change to meet new requirements.

The Office of Technical Data and Standardization Policy, Office of the Assistant Secretary of Defense (Installations and Logistics), has issued procedures for use of the new service. Industrial firms requiring copies of canceled documents in fulfillment of contractual obligations may obtain these on a certified need-to-know basis from the director, Navy Publications and Printing Service Office (NPPSO-4ND), Philadelphia, Pa.

Dr. Killion Detailed, Not Assigned, as Chief Scientist

Apologies are in order to Lt Col Felix L. Goodwin, information officer at the U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz., for an error made by the Army Research and Development Newsmagazine.

Attribute it to ignorance of the precise meaning of military terminology, we must, but the guilty party took the liberty of substituting assigned *for* detailed *in rewriting a release issued by Col Goodwin's office on selection of Dr. L. E. Killion to function as USAEPG chief scientist.*

Since that position involves the prestige and salary of PL-313 status, and nominees for appointment to such positions must be approved in the highest echelons of Army R&D, certain individuals responsible for such approval were understandably concerned about the Dr. Killion article which appeared on page 11 of the June edition.

Just to set the record straight, Dr. Killion is detailed, *not* assigned, *as the USAEPG chief scientist.*

GIMRADA Initiates Work-Study Program With VPI

Two undergraduate students are working at the U.S. Army Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va., as the first participants in a cooperative work-study program arranged with Virginia Polytechnic Institute.

FIRST PARTICIPANTS in a VPI-GIMRADA cooperative educational program, Charles O. Brown, Jr. (left) and Jack Smith, are welcomed to GIMRADA by Robbins G. Hickson, GIMRADA Tactical Systems director.

Based on the "earn while you learn" concept, the program enables participants to acquire a college degree while working part-time on job assignments related to their scientific and engineering fields.

Jack Smith, assigned to GIMRADA's Graphics Division, is a sophomore at VPI majoring in mechanical engineering. Charles O. Brown, working with the Surveying and Geodesy Division, is a freshman majoring in electrical engineering.

In addition to meeting Civil Service requirements for selection, students must be in the upper half of their class. Although five years are required to complete a college education under the plan, the enrollee is compensated for the additional year.

Wages often cover all college expenses, he gets valuable on-the-job training in his career field, and he benefits from association with experienced engineers and scientists. After graduation, he is able to enter Government service at a higher grade than offered to college graduates without this experience.

AFIP Medical Museum Designated Landmark

Backed by a century of growth since its "bare bones" beginning as the Army Medical Museum, the Armed Forces Institute of Pathology Medical Museum has gained the apogee of historical prominence—designation as a Registered National Historical Landmark.

That honor, accorded recently by the Department of the Interior through the National Park Service, has been extended to only eight historical sites in the area of Washington, D.C., and to 575 throughout the United States.

The AFIP Medical Museum is housed in a 78-year-old building affectionately termed "The Old Red Brick," located on Washington's famed "Mall."

The "bare bones" beginning was literal. During the Civil War, Surgeon General William A. Hammond ordered Brigade Surgeon John Hill Brinton to start a museum in which specimens of military wounds could be collected.

That collection began with three bones. Grown to more than 1.5 million specimens, together with extensive case histories, the current collection is considered one of the world's finest sources of information on disease and trauma in men of military age.

Rapid expansion of the museum's laboratory and research activities during the period bridging two world wars led to reorganization and redesignation in 1946 as the Army Institute of Pathology. In 1949 it was renamed the Armed Forces Institute of Pathology, and the Medical Museum became one of its four major departments.

The profusion of brick and terra cotta embellishment on "The Old Red Brick" makes it one of the most elaborate buildings in Washington. Still the structure was described at the time of its construction in 1887 as "exceedingly plain, without ornamentation and severely simple in style."

During its lifetime, "The Old Red Brick" also has housed the present National Library of Medicine (formerly The Army Surgeon General's Library), the Army Medical School, the central bureau of the International Association of Medical Museums and, for some time, the Army Institute of Pathology.

A plaque and certificate noting the designation of Registered National Historical Landmark were presented to Brig Gen Joe M. Blumberg, director of the AFIP, by T. Sutton Jett, director of the National Capital Regional Office of the Park Service.

Sponsors of the Landmark program reportedly hope to stimulate public interest in America's past and its historic sites. The Museum, which still houses some of the offices and laboratories of the Armed Forces Institute of Pathology as well as three main public exhibit halls and several smaller exhibit rooms, already attracts over 700,000 visitors each year.

AFIP director Brig Gen Joe M. Blumberg accepts certificate and plaque from T. Sutton Jett, director of the National Capital Regional Office of the National Park Service, designating AFIP Medical Museum a Registered National Historical Landmark.

Success of Army MAR Held Major Radar Breakthrough

One of the critical components of the Army's Nike X antimissile missile system, the massive Multi-function Array Radar (MAR), recently completed a year of testing with results that lead developers to believe major problems are being surmounted.

The U.S. Army Missile Command project officer for the Army Materiel Command, Col I. O. Drewry, recently stated that he considers the successful development and testing of the MAR to be a major breakthrough not only in the Army's missile defense effort, but also in the entire field of radars.

The obstacle which the MAR is designed to overcome is that of traffic handling, and being able to distinguish between real and decoy missiles in providing an adequate U.S. defense against intercontinental missiles.

Unlike conventional radars, the MAR has virtually no moving parts. The steering of its beam is done electronically and, for all practical purposes, instantaneously. Developers say it will detect and identify targets at long range, track targets with pinpoint accuracy, sort targets into various behavior patterns, and guide intercepter missiles to within killing distance.

Whenever possible in the rush development of its entirely new electronic components, the MAR circuits have been transistorized and miniaturized. Still the MAR at White Sands (N. Mex.) Missile Range requires some two acres of underground floor space to house all of the equipment.

MAR, for example, has several hundred transmitting tubes and receiving elements. Most radars have only one each. MAR transmitter tubes are encased in the world's largest permanent magnet—100 tons of water-cooled steel.

One of the problems encountered in MAR development was preventing "cross talk" or interference between these transmitter elements. This led to improved electrical shielding around some components and relocation of others.

Knowledge gained in testing and operating the MAR is being incorporated into the Tactical MAR planned for the Nike X system's Kwajelein Island Test Site in the Pacific. The WSMR MAR is used to prove in actual use pieces of hardware and methods of operation on which no functional experience is available, thereby decreasing the time tactical equipment is off the air for changes.

Dover Pridefully Proclaims 'Home of Picatinny Arsenal'

Cordial community relations existing between the U.S. Army's Picatinny Arsenal and residents of Dover, N.J., were illustrated recently when the town erected street signs proclaiming: "Dover, N.J., Home of Picatinny Arsenal."

The insignia of the U.S. Army Munitions Command and the Picatinny Arsenal name have been added to two dozen street signs in downtown Dover to demonstrate the historical identity with the Arsenal, which has a weekly payroll of about $1 million.

Maj Gen F. A. Hansen, U.S. Army Munitions Command CG, Col H. H. Wishart, Picatinny CO, Dover Mayor Leslie P. Stringer and National Union Bank President Alvin Fehn of Dover officiated at the erection of the first sign on Dover's main street.

General Officers Address Oak Ridge R&D Unit Seminar

Army general officers headed the principal speakers at the annual U.S. Army Research and Development Reservists' Nuclear Science Seminar, July 18-31, at Oak Ridge, Tenn.

The seminar is presented by the 3252nd USAR R&D Unit, Oak Ridge, commanded by Col D. F. Cope, to provide research and development Reservists an opportunity to receive current data in nuclear science and related fields. Col Cope made introductory remarks and a closing summary statement.

Sponsors were the Office of the Chief of Research and Development, Department of the Army, the Third U.S. Army and the XII U.S. Army Corps. Assistance was provided by the U.S. Atomic Energy Commission (AEC), Oak Ridge National Laboratory (ORNL), Nuclear Division of Union Carbide Corp., the Oak Ridge Institute of Nuclear Studies and the University of Tennessee-AEC Agricultural Laboratory.

Welcoming remarks were extended by S. R. Sapirie, manager, Oak Ridge Operations, AEC, and C. E. Larson, president, Union Carbide Corp., Nuclear Division. Maj Gen W. C. Bullock, deputy CG, Third U.S. Army, gave the opening address.

Brig Gen William C. Gribble, director of Research and Development, U.S. Army Materiel Command, spoke on "Army Materiel Command Research and Development Programs."

Maj Joseph T. Gibson and Capt Joseph J. Skaff, Nuclear Group, U.S. Army Combat Developments Command, discussed "Army Nuclear Weapons and Nuclear Effects" (classified). Lt Col William B. Murray, assistant for Reserve Affairs, Office of the Chief of Research and Development, spoke on "The USAR R&D Unit Programs."

Other speakers during the 2-week period represented the Oak Ridge National Laboratory, Atomic Energy Commission, Tennessee Valley Authority, the University of Tennessee-AEC Agricultural Laboratory, Oak Ridge Institute of Nuclear Studies, and the Defense Atomic Support Agency.

Seminar participants toured the Atomic Energy Museum, Oak Ridge National Laboratory, Tower Shielding Facility, Molten Salt Reactor Experiment, High Flux Isotope Reactor, Transuranium Facility, Experimental Gas-Cooled Reactor, AEC Technical Information Division, TVA Bull Run Steam Power Plant Facility, the ORNL Biology Division, and the University of Tennessee-AEC Research Laboratories.

Reserve Officer Investigates Fat Metabolism in Mammals

A dairy scientist who is a first lieutenant in U.S. Army Reserve Research and Development Unit 2101, State College, Pa., Dr. Paul S. Dimick, is conducting experiments for the U.S. Public Health Service to determine how mammals, including man, metabolize fat.

Dr. Dimmick described his investigations into the complex nature of milk fat of cows, goats and sheep before recent meetings of the American Dairy Science Association at the University of Kentucky. Hopefully, the study may yield knowledge on milk fat globule synthesis.

As a research associate of Pennsylvania State University's Agricultural Experiment Station, he is performing the research in association with Dr. Stuart Patton and Robert D. McCarthy under a grant from the U.S. Public Health Service.

Work is reported to have resulted in a number of important discoveries regarding milk fat. Moreover, an inter-disciplinary lipids (fats) research laboratory has been established at the University Park in Pennsylvania.

USA CRREL Team Studies Mt. Logan Snow

Four geologists from the U.S. Army Cold Regions Research and Engineering Laboratories (USA CRREL), Hanover, N.H., are making a 45-day study of properties of snow on 19,850-foot-high Mount Logan, Yukon Territory, Canada.

Starting in mid-June, the 4-man team of U.S. Army Materiel Command researchers, accompanied by a mountaineer, began their task at the 10,000-foot level of the second highest mountain in North America. That level provided the best facility for landing of an aircraft with their equipment.

Actually, they worked backward before they worked upward—that is, they initially extended their studies to the 7,500-foot level. Literally, they dug their way up. Every 1,000 feet they dug a 13-foot pit in the snow to obtain data on stratigraphy, crystal structure, density, sheer strength and the annual amount of snowfall.

GEOLOGISTS Dr. Robert C. Reynolds (left) and Donald L. Alford check photos and maps of 19,850-foot-high Mount Logan prior to departure for snow studies on the second highest mountain peak in North America.

Engaged in the studies are Donald L. Alford, project leader, Dr. George Denton and Charles Keeler, staff geologists from USA CRREL; Dr. Robert C. Reynolds, assistant professor of geology at Dartmouth College; and Peter Lev, Jackson, Wyo., a professional mountaineer.

The ascent up the rugged slopes required toting about a ton of equipment on their backs over the 200-mile route to the peak. Their report will include a determination of what amount of high quality research is feasible and the degree of technical difficulty involved.

All members of the CRREL team are experienced in conducting research in both polar and mountainous areas. For the past two years CRREL studies have been conducted at a springtime research camp in the Rocky Mountains at the 10,000-foot level near Cooke City, Wyo. The purpose was to gain data on properties of snow at that level and to develop lightweight, portable equipment for high-elevation studies.

James A. Bender, chief of the CRREL Research Division, said the Rocky Mountain-Mount Logan studies are a prelude to a proposed program of high-altitude research by CRREL in the Andes and the Himalayas. Very little technical knowledge about snow properties is available in those regions.

The high-altitude, low-latitude studies will take CRREL researchers as far away as is possible from the polar influence to provide comparative data on the Alpine or mountain-type snow as opposed to polar snow, it was explained.

ARO-D Program at USMA Leads to Oxford

A program of sponsored research initiated at the United States Military Academy through efforts of the U.S. Army Research Office-Durham has enabled Capt William B. Streett to win a one-year NATO Postdoctoral Fellowship in Science at Oxford University.

Currently assigned at the Academy as assistant professor, Department of Space and Graphic Science, Capt Streett will enter the Department of Chemistry at Oxford in January 1966. His research at West Point has been in the field of cryogenics, and his research project is titled "Phase Equilibrium at Low Temperatures and High Pressures."

The sponsored research program under which Capt Streett has been studying was initiated by the U.S. Army Research Office-Durham in 1962. Assisted by Capt C. H. Jones of the Department of Chemistry at the Academy, Capt Streett has experimented with equilibrium phase compositions, in several low-temperature binary systems, at temperatures down to 24 K and pressures as high as 10,000 p.s.i.

The studies with Capt Jones on liquid-vapor phase equilibrium in the neon-hydrogen system were conducted in cooperation with the Physics Department of Brookhaven National Laboratory, as part of a program to determine the feasibility of using such mixtures in liquid hydrogen bubble chambers.

A complete description of the liquid-vapor phase behavior in this system was obtained over the temperature range 24.59° to 33.73° K. Findings were presented to physicists of the bubble chamber group at a conference held at Brookhaven in December 1964.

Subsequently, successful experiments were made with neon-hydrogen mixtures in the 20-inch chamber at Brookhaven. It is expected that the design of a planned 14-foot diameter chamber will be modified to permit their use.

Neon-hydrogen mixtures may improve the performance of liquid hydrogen chambers, it was explained, and also eliminate the need for separate "heavy liquid" chambers employing propane, with a considerable saving in equipment and money.

Articles by Capt Streett have appeared in the *Journal of Chemical Physics*, and in the journal *Cryogenics*. His latest paper, on the neon-oxygen liquid-vapor system, has been accepted for presentation at the 1965 Cryogenic Engineering Conference to be held at Rice University, Houston, Tex., this month.

ERDL Procurement Unit Set Up To Handle New Items Purchases

A new-items procurement unit has been established at the U.S. Army Materiel Command's Engineer Research and Development Laboratories, Fort Belvoir, Va.

Composed principally of contract specialists, the unit will make first-time quantity procurements of new items released by the Laboratories for introduction into the supply system, and will administer first-production-run contracts.

A detachment of the Procurement and Production Directorate of the U.S. Army Mobility Equipment Center, St. Louis, Mo., the unit has been located at the Laboratories to provide close coordination between procurement and technical personnel through first production of new items.

The R&D Procurement Office, an integral part of the Laboratories, will continue to let R&D and production-engineering type contracts.

Fireflies Needed to Facilitate 'Cold Light' Research

Researchers at the U.S. Army Biological Laboratories, Fort Detrick, Md., report a temporary stymie in their study of "cold light"—a shortage of captive fireflies.

The firefly has long been observed by scientists as a first-order example of the many living organisms which produce "cold light"—that light produced with no accompanying generation of heat.

Dr. William McElroy and associates at Johns Hopkins University have determined that firefly light is produced by specific chemicals in the insect's tail: an organic molecule called luciferin, ions of magnesium, oxygen, an important molecule called ATP (adenosine triphosphate), and an enzyme called luciferase. Unless all of these are present, and in the correct proportions, no light is produced.

Luciferin has been synthesized and ATP occurs so often in nature that it is readily available. The stymie is luciferase. As an enzyme it cannot be synthesized, nor does it occur very often in nature. The only source is the firefly.

Dr. Harold A. Neufeld of the Fort Detrick Laboratories said recently that the study of "cold light" will have to stop unless more fireflies become available. So critical is the need that 50 cents per hundred is offered for the little "flambeaux."

Youth groups and individuals are encouraged to exchange their catches for cash, thereby doing a service to themselves and to science.

Interested parties may write to the Laboratories at Fort Detrick for further information.

Woman Designs Electronic Printed Circuit for Missiles

As an electronics engineer serving the U.S. Army, Miss Elspeth Leslie is apparently undaunted by the statistic that, as a woman, she is a member of a one percent minority within her profession.

Elspeth Leslie

By way of practical demonstration of her capability, she recently designed an electronic printed circuit which ultimately is expected to become part of Army missiles.

A young, shapely blond, she works at the Atomic Ammunition Development Laboratory, Picatinny Arsenal, Dover, N.J.

An attraction for mathematics and science led her to design and construct her own stereo equipment while in high school, and carried her to a degree in electronics at Newark College of Engineering.

Credited by her male working associates with a thorough knowledge of magnetic circuitry, fuzes and components for integrated circuits, "Ellie" often travels around the country for Picatinny Arsenal to participate in negotiations with contractors and subcontractors in electronics evaluation and testing.

Foreign Scientists Join in Fort Churchill Studies

A rocket research facility at Fort Churchill, Canada, operated by the Army Ordnance Corps during the International Geophysical Year (1958-1959) and for some time afterward, was the scene of a recent 5-week series of international tests sponsored by the U.S. Air Force.

Now designated the Churchill Research Range, the facility passed from U.S. Army to Air Force control in 1962. The recent Aerobee rocket-firing program was conducted by the Office of Aerospace Research Air Force Cambridge Research Labs.

Joining with the AFCRL in the experiments, beginning late in June, were the National Aeronautics and Space Administration, the U.S. Geological Survey, several other American research laboratories, and scientists from Australia, France, Germany, Israel and Sweden.

The research project involved the collection of extraterrestrial dust particles by use of rockets launched into the upper atmosphere. Dr. Robert K. Soberman of AFCRL, who directed the program, designed the particle-collecting nose cones, designated "Venus Flytraps," which open up like a blossoming petal to expose 500 square inches of collecting surface.

Objective of the experiments was to gain more precise information on the size, concentration and composition of particles at various altitude strata up to 100 miles, by exposing the trays sequentially at various altitudes.

To avoid contamination by dust at lower altitudes in such tests, the petals are carefully sealed in the sheath of the nose cone until a programed altitude of 45 miles is reached. The surfaces are then exposed up to a trajectory peak of 100 miles. On descent, the petals recede into the nose cone sheath at 65 miles altitude.

Micrometeorites and notilucent cloud particles are collected. From a series of experiments conducted by Dr. Soberman in 1961, using a similar Venus Flytrap, it was discovered that at high altitudes the earth is shrouded in a cloud of micrometeoritic particles.

Similar experiments were conducted in 1962 and 1964 with atmospheric sounding rockets launched from northern Sweden, under an agreement between NASA and the Swedish Space Research Committee. Dr. Soberman was the principal investigator, assisted by researchers from the University of Stockholm Institute of Meteorology and the Dudley Obesrvatory, Albany, N.Y.

Engineer R&D Labs List Contracts for $330,440

The U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., recently announced award of contracts totaling $330,440.

Aerojet Delft Corp. will receive $94,925 for fabrication of an advanced image intensifier evaluation facility. Thermo Electron Engineering Corp. won an $87,000 contract to design, fabricate, test and deliver an experimental model of a 0.6 hp. steam power unit with 300 watt loading generator and acoustic housing.

Allis-Chalmers Manufacturing Co. was granted a $55,769 contract for a hydrogen generator and the Garrett Corp. (AiResearch Manufacturing Co.) will build, test and deliver a 60,000 b.t.u./hr. horizontal compact air conditioner for $55,746. Massachusetts Institute of Technology, Division of Sponsored Research, received a $37,000 contract for a study on phosphor powder.

In addition, ERDL announced that the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va., recently granted contracts totaling $253,956.

Two contracts were awarded to the Raytheon Co. Space and Information Systems Division in the amount of $125,684—for the study of stereo radar techniques, $66,263, and for experimental production of military geographic intelligence from side-looking airborne radar imagery, $59,421.

Other GIMRADA awards: Hughes Aircraft Co. for optimum intelligence exploitation of coherent radar signal data, $47,336; Philco Corp., Aeronutronics Division, to study and analyze multiband photographic techniques, $43,401; Airborne Instruments Laboratories, Division of Cutler-Hammer, Inc., to develop a Laser interferometer, $37,535.

General Howze Retires, Joins Helicopter Firm

General Hamilton H. Howze

General Hamilton H. Howze, who retired from the Army June 30 after a 39-year military career, has been appointed vice president for product planning with Textron's Bell Helicopter Co., Fort Worth, Tex.

Bell President E. J. Ducayet stated: "General Howze's many years of close association with rotary-wing operations in the military make him eminently qualified to direct the long-range product planning for our company."

Until his retirement, General Howze was commander in chief of the United Nations Command, commander of U.S. Forces in Korea and commanding general of the Eighth U.S. Army in Korea.

The son of an Army general, he was born in West Point, N.Y., and graduated from the U.S. Military Academy at West Point, N.Y. in 1930.

Gas Turbine Generator Tests Aimed at Use on Battlefield

Designed for use in mobile battlefield systems, a portable 100 kw. generator set driven by a gas turbine engine is undergoing engineering design tests at the Army Engineer Research and Development Laboratories (ERDL), Fort Belvoir, Va.

The single-cycle 270-hp. engine is designed to operate on any liquid fuel, including diesel oil, kerosene, JP-4 and combat gasoline. Other advantages are its lighter weight and fewer moving parts. The generator unit, 7½ feet long and 3 feet in width and height, weighs 1,300 pounds.

The gas turbine uses three to four times as much fuel as a diesel engine, but engineers expect that problem to be short-lived. Countering this disadvantage is that the gas turbine generator offers the precise frequency and voltage control characteristics required for use with radar, missile ground support and checkout and launching equipment.

The unit undergoing test was built by Solar, San Diego, Calif., under a contract with the Laboratories. If the set is standardized, the drawings and specifications will be owned by the Government.

Heads Preventive Medicine Branch

Maj Robert R. Cutting, recent graduate of the Command and General Staff College, has been assigned as chief of the Preventive Medicine Research Branch, U.S. Army Medical R&D Command, Washington, D.C.

White Sands Missile Range Marks 20th Anniversary

BACK IN 1946 when WSMR came into existence, buildings like the Post Headquarters (pictured above) comprised a large portion of the range.

White Sands (N. Mex.) Missile Range on July 9 celebrated the 20th anniversary of its inception as the first missile and rocket testing site established by the U.S. Government.

One week after White Sands became operative, the world's first atomic bomb was detonated at the Trinity Site. Ten weeks later, the U.S. entered the realm of aerospace science when a Tiny Tim rocket was fired down the Range.

In its first year, WSMR completed 32 rocket firings. In recent years the average has been about 2,000 firings a year, making the Range one of the busiest test centers in the country.

White Sands is currently supporting approximately 100 separately identifiable test programs for the Department of Defense, the National Aeronautics and Space Administration and other Federal Government agencies.

TODAY, modern facilities and activity mark the growth of the Nation's first missile testing site from a few barracks to the Free World's largest overland test range and the largest U.S. military reservation with more than 15,000 employees. Missile in foreground is the Redstone, capable of delivering an atomic warhead over a 200-mile range precisely to target.

Test activities include surface-to-surface and surface-to-air missiles and programs such as the Advanced Ballistic Re-Entry Systems (ARES), Nike-X with its Sprint and Squirt vehicles, the Advanced Research Project Agency's HIBEX, and the Navy's Aerobee and Talos.

Of the five national missile testing sites, only WSMR is an overland range. Its 4,000-square-miles area makes it the largest overland test range in the Western Hemisphere and the largest military reservation in the United States.

Two major steps were taken in the modernization of the Range during its 20th year. The Nuclear Effects Branch was opened in August and began operations in studies of radiation effects on missile components. The branch is equipped with the U.S. Army's only unshielded fast-burst reactor which can generate the radiation effects of a nuclear explosion without heat and blast.

In June, ground was broken for a $2.38 million Consolidated Computer and Control Center. The building, scheduled for completion next year, will be a key part of the Advanced Test Range Testing, Reporting and Control (ARTRAC) program.

Another important first at the Range this year was the successful firing of a Sprint Missile, the Nation's most advanced ICBM-killer. The ice-cream cone shaped missile is designed to destroy enemy warheads at low altitudes. Part of the Nike-X system, the Sprint will be the fastest-accelerating guided missile when it enters the Army's arsenal.

The first test firing of the Lance ballistic missile in March 1965 was termed "highly successful."

In addition, the National Aeronautics and Space Administration used the Range for the first test firing of the ascent engine of the Apollo Program's Lunar Excursion Module, the vehicle designed to lift U.S. astronauts off the moon and return them to Earth. The Range also was instrumental in the communication and tracking network for Gemini II, this country's first 2-man orbital flight.

In recent years White Sands has extended its range for missile tests. A full launch complex established at Green River, Utah, more than 400 miles to the northwest, fires the Athena missile to impact on WSMR.

Fort Wingate, N. Mex., Blanding, Utah, Gilson Butte, Utah, and the Plains of St. Augstin have served as launch sites for other missiles that impacted on White Sands. The off-range firings have increased the importance of the Range by extending the distances missiles may be fired without limitation to the boundaries of the primary range.

Col Eklund Takes Over as WSMR Deputy CO

Col Karl F. Eklund, whose studies and direction of research have contributed to much of the Army's doctrine on nuclear-weapons-employment, is the new deputy commander at White Sands Missile Range (WSMR), N. Mex. Col John C. Bane held that post until his recent retirement from active service.

When he reported to WSMR in 1963 to serve as director of Army Missile Test and Evaluation, Col Eklund brought the knowledge gained from a 30-year Army career. The following year he became director of Plans and Operations in charge of operations.

As a faculty member at the U.S. Army Command and General Staff College and at the Army War College for eight years, he established and then directed the Army's nuclear-weapons-tactical-employment courses. He also directed nuclear-weapons-employment instruction within the Allied Command Europe while assigned to U.S. Army Europe, 1954-56.

Col Eklund was responsible for Special Forces planning for U.S. Army Europe and, in addition, was chief of the Advanced Weapons Division under the assistant chief of staff for Operations. In that capacity he was the chief nuclear-operations planner for U.S. Army Europe and Central Army Group, NATO.

That planning included the buildup of missile forces for surface-to-surface and surface-to-air employment in support of the Central and Northern Army Groups of NATO. The colonel also was nuclear-weapons-employment adviser to the various headquarters of those two Groups, including the British, French, Dutch and Belgian Commands.

Several missile-launching sites for U.N. and U.S. Forces in Korea were constructed under his direction while he served in three capacities as Army engineer with the Eighth U.S. Army, the U.S. Forces and the UN Command, Korea.

He holds an MS degree in engineering and is a graduate of the University of Illinois, Cornell University and several U.S. Army schools.

Program Drawn for Design of Experiments Sessions

The Eleventh Conference on the Design of Experiments in Army Research, Development and Testing will be held Oct. 20-22 at the Stevens Institute of Technology, Hoboken, N.J.

Sponsored by the U.S. Army Mathematics Steering Committee and hosted by the U.S. Army Munitions Command Headquarters, the conference is being arranged by a committee chaired by Dr. Frank E. Grubb, Army Ballistic Research Laboratories, Aberdeen Proving Ground, Md.

Following its established format, the conference will include technical sessions to permit an exchange of ideas anld findings among Army scientists and clinical sessions on unsolved problems and pre-design stage experiments.

Featured will be a number of papers presented by eminent statisticians. Dr. Joan Rosenblatt, National Bureau of Standards, will discuss "Confidence Limits for the Reliability of Complex Systems," followed by Dr. J. Stuart Hunter, Princeton University, speaking on "Non-Linear Models: Estimation and Design."

Prof. R. E. Bechofer, Cornell University, is scheduled to chair a panel discussion on "Selecting the Best Treatment" and to present "Selecting the Population with the Largest Parameter." Prof. Shanti S. Gupta, Purdue University, is programed for "Selecting a Subset Containing the Population with the Largest Parameter." Contributing to the panel will be Prof. Milton Sobel, University of Minnesota.

Prof. William C. Guenther, University of Wyoming, will discuss "Target Coverage Problems." Prof. H. O. Hartley, Texas A. and M. University, had not announced his subject at press time.

The Army Mathematics Steering Committee urges members of Army Research, Development and Testing organizations who have not already submitted papers to do so prior to Aug. 27. Information relative to the submission of papers or the conference can be obtained from Dr. Francis G. Dressel, Assistant, Mathematics Division, U.S. Army Research Office-Durham, Box CM, Duke Station, Durham, N.C. 27706.

MTMTS Takes Control Of DoD Traffic Problems

The new Military Traffic Management and Terminal Services (MTMTS), established to consolidate under one command the many problems of military traffic, recently became fully operational.

The Secretary of the Army was designated as single manager to establish and organize the MTMTS with the assistance of the Secretaries of Navy and Air Force, the director of the Defense Supply Agency, and heads of other DoD components.

With headquarters in the area of Washington, D.C., the jointly staffed MTMTS is commanded by Maj Gen John L. Lance, USA. MTMTS has already assumed command of three Army terminal commands, five defense traffic regions and six ocean terminals.

Reorganized under three command headquarters at Brooklyn, N.Y., St. Louis, Mo., and Oakland, Calif., these commands cover the eastern, central and western areas. Created also in the organization of the components listed above are four military ocean terminals and air traffic coordinating offices at four Air Force Bases.

MTMTS will be responsible for worldwide management of household goods moving and storage and for specified overseas Army Terminal Units in Support of the Department of the Air Force.

CRDL Science Conference Award Papers Selected

"The Isolation of the Components of Cobra Venom" was judged the best technical paper presented at the recent third Army Chemical Research and Development Laboratories (CRDL) Science Conference at Edgewood Arsenal, Md.

The winning scientific paper was presented by Dr. Clarence A. Broomfield, who coauthored it with Byron T. Currie.

The second-place award to Dr. John I. Stevens and Lt Kenneth L. Shepard was for a paper dealing with a new mechanism for the synthesis of an organic chemical compound. Lt. Shepard gave the presentation.

Competition for the third-place award ended in a tie. Dr. Carl Jelenko, III, and Morgan L. Wheeler authored a paper dealing with the loss of water from the body surface as a result of burns. Dr. Harry O. Michel, Gary List, Mrs. Ethel B. Hackley, and Sp/5 Warren Gillilan shared the award with a paper on the reaction of enzymes and military chemical nerve agents with inhibitors. The reports were presented by Dr. Jelenko and Dr. Michel.

The conference was opened by Col James Batte, Edgewood Arsenal commander, who cited the advancement of science and technology during the past few decades and cautioned that military scientists in their quest for knowledge must not lose sight of their prime objective: to supply the fighting man with the items he needs to do his job, and to ensure that these items can withstand the rigors of the battlefield.

Dr. S. D. Silver, CRDL technical director, was general chairman of the conference. Chairmen for the various sessions were Dr. B. J. Jandorf, Bernard Gerber, Dr. George Guilbault and Dr. Milton Joffe.

The 20 technical presentations were judged by Dr. Bernard Jandorf, deputy director of Weapons Systems; Dr. Carl Herget, associate technical director for Research; and Dr. Bertram Sacktor of the Directorate of Medical Research.

SATCOM Appoints Lt Col Cummings Executive Officer

The new executive officer of the U.S. Army Satellite Communications Agency is Lt Col Arthur T. Cummings, until recently chief of SATCOM's Program Analysis Division, who relieved Lt Col Howard T. Shafer.

Col Shafer's completion of 30 years of service was marked at a retirement ceremony at which he received the Army Commendation Medal with Third Oak Leaf Cluster and a SATCOM Certificate of Appreciation for "the efficient and meticulous manner in which he performed his duties."

Lt Col A. T. Cummings

As a Signal Company commander with the 45th Infantry Division (Okla.) during World War II, he served in Italy, Sicily, France and Germany. He joined SATCOM in 1963 after having served for two years as commanding officer of the U.S. Army Signal Fire Distribution Systems Training Activity.

COL CUMMINGS' more recent assignments include Inspector General of the Alaska Communications System and Inspector General for the Chief Signal Officer, Field Station No. 3, Sacramento, Calif.

Immediately prior to joining SATCOM in 1963, he served in Korea as chief, Logistic Support Division, Signal Office, Eighth Army, and earned a Certificate of Achievement.

HumRRO Begins 15th Year as Army Contract R&D Agency

The Human Resources Research Office of the George Washington University has entered its 15th year of service to the Army as a contract R&D agency in the fields of training, needs for training devices, motivation and leadership.

HumRRO's mission is to discover, develop and apply human factors and social science principles and techniques to improve Army training and operational performance. HumRRO seeks to develop methods for teaching military skills and knowledge, procedures for insuring their retention, and ways to permit their maximum use in military duty performance.

Like other members of the Army's human factors research "team," HumRRO focuses its attention on the individual soldier and on groups of soldiers in teams and units—on the man in the Army's many man-machine and man-weapons systems.

Over the years, the HumRRO staff, now numbering about 285 persons, has represented a unique and productive resource for the Army, combining a wide range of scientific and military expertise and experience.

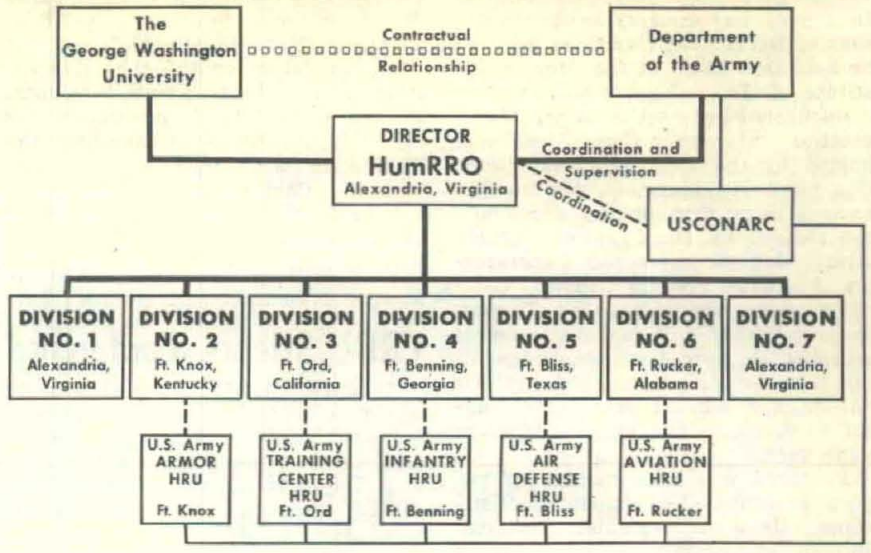
An accurate list of HumRRO accomplishments on behalf of the Army would be difficult, if not impossible, to compile.

In some instances, it is relatively easy to point to complete HumRRO-developed "packages" which are now in daily Army use — such as the TRAIN-FIRE program of basic rifle marksmanship instruction, the Leader Preparation Schools for potential noncommissioned officers, and the program of land navigation instruction now used in Army Training Centers.

In many other instances, however, HumRRO may not have been the "prime mover," but may have played the role of catalyst by providing scientific evidence which influenced the Army to select a particular course of action.

Among the readily-identifiable HumRRO-developed products now being used by the Army are the following:

- A 16-hour program of officer leadership instruction which has been used by all Army senior ROTC units since 1963;
- A quality control program in effect at the Army Primary Helicopter School since 1963;
- A new method for teaching the soldier to aim and fire his rifle at night with increased effectiveness;
- New methods of instruction and proficiency measurement for tank crews;



Dr. Meredith P. Crawford

Dr. Meredith P. Crawford, director of the Human Resources Research Office since it was established in 1951, was presented the Distinguished Civilian Service Medal by the Secretary of the Army in 1961. He previously served as a professor of psychology (1940-45) and dean of the Junior College, dean of instruction and dean of the College of Arts and Sciences (1945-51) at Vanderbilt University. During World War II, Dr. Crawford served in the U.S. Army Air Corps, rising to the rank of lieutenant colonel. He holds a B.A. degree from Vanderbilt and M.A. (1932) and PhD (1935) degrees from Columbia University. He is affiliated with numerous professional groups.

- A new method of instruction for guided missile operators.

In addition, findings from HumRRO work in electronics maintenance training (representing about 10 percent of HumRRO's entire 14-year effort) have been implemented at the Signal School, Ordnance Guided Missile School, Air Defense School, and Armor School.

HumRRO R&D findings are also being used by the Navy and Marine Corps, and by the military services of a number of NATO allies.

The HumRRO research staff is comprised primarily of experimental psychologists. It includes representatives of other social science disciplines as well as retired military officers, engineers and technicians.

The annual HumRRO work program is administered from the director's office in Alexandria, Va. Research is accomplished largely in the field with the Army—tackling problems where they occur and working with the officers and men most immediately concerned. Five of HumRRO's seven research laboratories (divisions) are located at Army installations, specifically:

Div. No. 1 (Systems Operations), Alexandria; Div. No. 2 (Armor), Fort Knox, Ky.; Div. No. 3 (Recruit Training), Presidio of Monterey, Calif.; Div. No. 4 (Infantry), Fort Benning, Ga.; Div. No. 5 (Air Defense), Fort Bliss, Tex.; Div. No. 6 (Aviation), Fort Rucker, Ala.; and Div. No. 7 (Language and Area Training), Alexandria.

Approval and supervision of the annual work program is a responsibility of the Chief of Research and Development, exercised through the Human Factors and Operations Research Division in the Army Research Office.

HumRRO's five field divisions are co-located with Army Human Research Units which, under the control of the U.S. Continental Army Command, provide guidance, support, and interpretation of research results to increase the likelihood that successful work can be smoothly implemented by the Army.

Some of the commands and agencies that sponsor HumRRO research include Office of the Chief of Research and Development, U.S. Continental Army Command, Assistant Chief of Staff for Force Development, Deputy Chief of Staff for Operations, Deputy Chief of Staff for Personnel, and U.S. Army Combat Developments Command.

FY 1966 Work Program. HumRRO's FY 1966 work program has been based on ongoing tasks and specific new research requirements suggested to the Office of the Chief of Research and Development by various Army agencies. Because the work program is based on objectives derived from Army planning documents, it is responsive to future problems as well as those requiring immediate solution.

HumRRO groups its projects into seven major "work areas," FY 1966 projects include:

Work Area One—Individual Training for Equipment Operation and Maintenance. Training of radar technicians, helicopter mechanics, operators of aerial weapons systems, aviators in low-level flight; training device requirements for aviation; proficiency-based graduation in Army aviation; visual surveillance in the operation of forward-area air defense weapons; and effects of night-vision devices on night performance.

Work Area Two—Orientation and Training in Army Training Centers. Proficiency-based graduation from Basic Combat Training (BCT); training programs for particular subgroups among BCT soldiers; training marginal enlistees; the relationship of BCT content to the Advanced Individual Training programs; training of potential noncommissioned officers and light weapons infantrymen; visual training and aircraft identification.

Work Area Three—Small-Unit Training. Tactual communication; training small Infantry-type teams for greater cohesion and efficiency; around-the-clock armor operations; training for armored cavalry platoons; increasing the effectiveness of electronics maintenance units.

Work Area Four—Training for Leadership, Command, and Control. Training to improve combat skills of junior Infantry officers; training for high-level leadership; measuring and improving ROTC output; career NCO training; warrant officer aviators in Army aviation; training requirements for positions in the Army's Scientific and Technical Information (S&TI) network.

Work Area Five—Language and Area Training. Self-instructional techniques for learning a foreign language; selected factors involved in learning a second language; a short, automated course in Viet Namese; training Army personnel for civic action, for military assistance advisory assignments, and for area indoctrination programs; and military technical training in developing nations.

Work Area Six—Training Technology. Development of principles and techniques for programed instruction; effective organization of written instruction; simulation and miniaturization of tactical training; student motivation in technical training; improving the effectiveness and efficiency of Army training systems; and human factors in combat effectiveness.

Work Area Seven—Basic Research. Probability estimates of complex events; presentation of technical textual materials; categorization and relation of training tasks with training methods; relationships between reinforcement and individual and group performance; and long-term retention of skills and knowledges.

The HumRRO FY 1966 work program, although it contains many different kinds of research projects, finds a central unity in its concern for improving human performance—the performance of the soldier in today's Army, and tomorrow's. This improvement comes about largely through improvements in training, a major concren of all military services.

HumRRO's ability to help the Army improve its training has been demonstrated by renewal of its contract continuously over the past 14 years. HumRRO leaders believe this capability is constantly increasing as personnel acquire greater scientific and technical expertise, learn to know and understand the Army better, develop greater efficiency of operation, and build "stockpile" knowledge about training which can be drawn upon for work on important Army problems.

Armed Forces to Taste-Test Natick Irradiated Bacon

The intent to procure for the Armed Forces 30,000 pounds of canned irradiated bacon, one of the irradiated foods being developed at the U.S. Army Natick Laboratories, was announced recently by the Defense Subsistence Supply Agency, Chicago, Ill.

As the first procurement from commercial sources, the bacon preserved by ionizing radiation will be tested at Army and Air Force installations for acceptability; also, to give the military more definitive information on the economic factors of the process.

In the process, smoked, cured bacon is sliced, wrapped in parchment paper, sealed in metal cans, and irradiated at a dose of 4.5 to 5.6 million rad per can. The radiation inactivates the food spoilage microorganisms, just as heat does in conventional canning, but without cooking.

Cobalt 60, and cesium 137 gamma rays, or X-rays from electron sources not exceeding five million electron volts may be used in processing.

Irradiated bacon has been stored for over two years at room temperatures with little loss in quality. For the military, there is a significant logistical advantage through the reduction or elimination of refrigerated storage requirements for irradiated food products.

The Army's 12-year research and development program in food irradiation has shown that foods preserved in this manner are safe for human consumption. Based on these findings, the U.S. Food and Drug Administration has granted clearances for the use of radiation in the processing of bacon (sterilization), wheat and wheat products (disinfestation), and white potatoes (inhibition of sprouting).

FORMER GOVERNOR of Greenland and permanent Undersecretary of State for Greenland Eske Brun (second from right) examines ice core from deep beneath Greenland Icecap while touring U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, N.H. Looking on are Col Philip G. Krueger, CRREL CO (right) and (l. to r.) Marcelis Parsons, Jr.; W. K. Boyd, CRREL technical director; R. F. Poland and Mrs. Brun.

Kudos

Triple cause for celebration—the rank of brigadier general, an Oak Leaf Cluster to a Legion of Merit, and assignment as deputy commanding general of the Army's Strategic Communications Command (STRATCOM)—came recently to Brig Gen John E. Kelsey.

Brig Gen John E. Kelsey

The Oak Leaf Cluster was conferred in recognition of his exemplary performance as commanding officer of the Army Joint Support Command, Fort Ritchie, Md.

General Kelsey's new stars were pinned on shoulders which had received the gold bars of a second lieutenant in the Signal Corps in 1938, when he graduated from the U.S. Military Academy. He is also a graduate of the Naval War College, the Army's Command Management School, and holds a degree in electronic engineering from Massachusetts Institute of Technology.

General Kelsey's duty stations have included Korea, Switzerland, Brazil and France. In the latter nations he served as assistant chief of staff, Communications, Allied Land Forces Central Europe. His stateside assignments include the Signal Engineering Laboratories, Fort Monmouth, N.J.; deputy chief, Research and Development Division, Office of the Chief Signal Officer; and Research and Development Project Manager in the Technical Operations Division of the Advanced Research Projects Agency.

Brig Gen Howard P. Persons, Jr., received the Legion of Merit with First Oak Leaf Cluster in ceremonies at the U.S. Army Missile Command, Redstone Arsenal, Ala., where he served as deputy commanding general for Air Defense Systems.

General Persons' new assignment is with the Air Defense Command, Colorado Springs, Colo. His exceptionally meritorious service while at the Arsenal, 1962-65, earned him the award. His citation points out that his management of complex missile programs, from research to deployment, was an "unparalleled contribution" to the Army mission.

Col David B. Emmons, who retired recently, was presented the Legion of Merit for inspiring leadership, professional skill and managerial ability. With 28 years of active service and nine years of inactive duty in the Army Reserve, he spent the last three years as adjutant general and director of the Personnel Directorate at Fort Huachuca, Ariz.

His campaign service includes the Northern Solomons, Rendova and Okinawa during World War II and five Korean Campaigns. He has also been assigned to posts in Japan and Turkey.

Col Harry W. Elkins was awarded the Legion of Merit for his outstanding performance of command duties in Alaska, Turkey, Fort Bragg, N.C., and at the U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz.

Col Elkins, a U.S. Military Academy graduate, was assigned to those posts between 1956 and the present. His most recent assignment was Fort Huachuca, where he served as commanding officer of the Combat Developments Command Communications and Electronics Agency (CDCCEA) and the Electronic Research and Development Activity (ERDAA).

USAEPG CO Maj Gen Benjamin H. Pochyla presents Legion of Merit to Col H. W. Elkins, former ERDAA CO.

Col Thurston T. Paul, Jr., was recently awarded the Army Commendation Medal with Third Oak Leaf Cluster in a ceremony performed by Maj Gen Lloyd E. Fellenz, commanding general, U.S. Army Japan.

As commanding officer of the U.S. Army Logistical Center, Japan (USALCJ), he was honored for his meritorious service from October 1964 to June 1965. Col Paul is returning to the U.S. for an assignment with the Office of the Deputy Chief of Staff for Logistics, Washington, D.C.

R. W. Brewer, an employee in the Development Fabrication Division of the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., earned two cash awards totaling $280 under the civilian Incentive Awards Program. He recommended that automatic water regulating valves be installed in the Environmental Testing Laboratory to replace manually operated ones. The idea is expected to save $5,250 in the first year. His second suggestion was to improve access to the roof of the Environmental Test Building.

Two executives of the Missile Command, U.S. Army Materiel Command, at Redstone Arsenal, Ala., recently received the Secretary of the Army Exceptional Civilian Service Award, the highest offered to Army civilians.

The recipients, John L. McDaniel and Frank W. James, are with the Missile Command Directorate of Research and Development. McDaniel is technical director and James is director of the Propulsion Laboratory.

The award, consisting of a plaque, a gold medal and a lapel rosette, is given only for extremely significant contributions to Army programs, and has been approved for only 12 employees Army-wide this past fiscal year.

Maj Gen John G. Zierdt, CG of the Missile Command, made the presentation on behalf of the Secretary of the Army. Accompanying citation lauded their work in administration and direction, as well as personnel research, which produced liquid and solid propellants and other advanced components of missile systems.

Missile Command executives John McDaniel (left) and Frank James pose with Maj Gen John G. Zierdt after receiving Secretary of the Army Exceptional Civilian Service Awards.

Army Medical Expert Honored With Legion of Merit

"His resourcefulness, intelligence, and vast knowledge of surgical infections and antibiotics enabled him to make numerous contributions of great significance to the Army's manpower.

"His sound judgment and keen perception were also of great value in initiating research projects in the study of surgical conditions peculiar to the military service and in the success of these projects which increased knowledge for the treatment of wounds, trauma and shock. . . ."

That citation, accompanying presentation of the Army's Legion of Merit, was but part of the tribute accorded Col Edwin J. Pulaski, director of the Division of Basic Surgical Research at Walter Reed Army Institute of Research, Washington, D.C., when he retired recently after 21 years in the Army.

Internationally known for his research on the treatment of burns as well as for his investigations in surgical techniques, Col Pulaski also is credited in medical records as the organizer, in 1949, of the Surgical Division, Army Research and Graduate School, which became Walter Reed Army Institute of Research about 10 years ago.

The "vast knowledge of surgical infections and antibiotics" recognized in his Legion of Merit will now serve him in his civilian medical research career as director of Clinical Research for the Baxter Laboratories, Inc., Morton Grove, Ill.

Col Pulaski's military career began in 1944 when he entered the Army Medical Corps shortly after earning a degree in surgical science from the Columbia Universtiy College of Physicians and Surgeons.

Other qualifications at that time included BA (1933) and MD (1937) degrees from the University of Pennsylvania; internship at Jefferson Medical College Hospital, Philadelphia, Pa.; residency in surgery at Frankford Hospital in that same city; and experience as a Research Fellow at Columbia-Presbyterian Hospital, New York City, 1940-43.

LEGION OF MERIT recipient Col Edwin J. Pulaski is flanked by son Tom, daughter Eileen and Col William D. Tigertt (left), commandant of WRAIR, during recent ceremonies honoring the noted surgeon upon retirement after 21 years in Army.

His first Army assignment was Haloran Army Hospital, Staten Island, N.Y. There the heavy influx of infected wounds from the battlefields challenged Col Pulaski to develop treatments later adopted as standards of military surgery and treatment of wounds and trauma. Wounded and burned patients remained his principal interest throughout his career.

Col Pulaski is credited with many contributions to the range of advances in the treatment of infection, from the use of zinc oxide (Meleney's Mud) through penicillin to the latest wonder drugs, such as streptomycin, tetracyclines and polymyxin.

The record shows he has written two books on surgical infections and their management and has authored nearly 200 articles for professional journals, plus chapters in other books. In the short space of two years, 1946-48, he authored or coauthored 28 articles on experimentation and treatment of wounds with streptomycin.

He introduced the exposure method of burn treatment in 1950 while assigned to Brooke Army Medical Center, Fort Sam Houston, Tex. The method views the major problem of burns as a special kind of wound infection. Not fully merit-acclaimed by surgeons for several years, the method, once accepted, impacted effectively in the surgical world.

Col Pulaski held many key positions before his most recent assignment at WRAIR as director of Basic Surgical Research. Between July 1957 and June 1965, he served as chief, General Surgical Service, Letterman Army Hospital, San Francisco, Calif., and chief, Department of Surgery, Walson Army Hospital, Fort Dix, N.J.

Missile Command Reports Firings of 2 MAW Models

Successful firing of two versions of the Army's new medium anti-tank weapon (MAW), both designed for use against tanks and other armored vehicles, was reported recently by the U.S. Army Missile Command, Redstone Arsenal, Ala.

One version, known as the directional-control, medium antitank weapon (DC-MAW), is being developed in-house by the Research and Development Directorate at the Missile Command. The other MAW concept being developed by McDonnell Aircraft Corp. uses fine connecting wires between the launcher and missile.

Both versions can be used by infantrymen at the platoon level either defensively or as an assault weapon and can be carried and shoulder-fired by one soldier.

DC-MAW features a self-contained guidance system that permits the missile to fly swiftly along the line-of-sight established by the gunner.

The Army will select one of the two versions for further development atfer examination of test results. Project manager for the two MAW concepts is Lt Col John H. Boyes at the Missile Command.

USARO Geographer Heads Tropic Test Center Unit

Dr. Guy N. Parmenter, who helped organize the U.S. Army Tropic Test Center research mission in the Panama Canal Zone, is the new chief of its Research Division.

Assigned until recently to the Army Research Office staff, he was an earth sciences specialist and adviser on all aspects of tropical environments. For many years he was a supervisory intelligence research specialist in the Washington, D.C., area and the Intelligence Division of the European Command.

In World War II he served as a fighter squadron instrument specialist. After the war he completed his studies and joined the faculty of the University of Kentucky, Lexington, Ky. Later he was a teacher at the George Washington University and at the Army Strategic Intelligence School, both in Washington, D.C.

Dr. Parmenter was graduated in 1942 from Nebraska Wesleyan University. He received a master's degree in 1947 from Clark University, Worcester, Mass., and a Ph.D. in geography from Clark in 1956. Recognized as an authority on physical geography, he is a member of the American Geographical Society and Association of American Geographers.

Nondestructive Testing Activities in Army Materiel Command

By Eugene Roffman

Eugene Roffman is chief of the Engineering Laboratory Branch, MEIE Division, R&D Directorate, Frankford Arsenal. He delivered a keynote address at the Third International Conference on Nondestructive Testing, held in Tokyo in 1960. In 1961, he was elected as National Director, Society for Nondestructive Testing. Now serving as the U.S. Army representative on Commission V, International Institute of Welding, he is also a member of the Tripartite Technical Cooperation Program Panel P4, Test and Evaluation of Materials, and is chairman of the Sub-Group on Nondestructive Testing and Evaluation Methods, Technical Working Group of the Materiel Command Materials Advisory Group.

Eugene Roffman

Nondestructive testing has, for many years, provided a reliable method for evaluation of Army materials in laboratories, during various stages of production, and by maintenancemen in field depots.

Although history records evidence of nondestructive testing by various simple methods, it was not until 1924 that it emerged as a new and valuable production tool. X-ray studies conducted by Dr. H. H. Lester of Watertown Arsenal led to development of industrial radiography.

Since 1924, more than 30 methods and techniques have been developed to evaluate and inspect critical materials with a high degree of confidence. Many have proven invaluable for testing existing Army materials.

With the advent of recently developed materials, however, it has become necessary to improve on the nondestructive testing technology in order to obtain optimum results. Many recently developed nonmetallic materials such as plastics, elastomers, composites, gases and liquids are difficult to evaluate using present testing techniques.

Recognizing the need for new and improved test methods, scientists, engineers, metallurgists and technicians are working in close coordination with quality assurance personnel in various Army installations throughout the world to solve nondestructive testing problems.

Under the guidance of David E. Driscoll, technical and industrial coordinator, Army Materials Research Agency (AMRA), and leader of the MAG Technical Working Group, Test and Evaluation Methods, subcommittees on nondestructive, mechanical and chemical testing were established.

The purpose of these committees is to review proposed project requests, make recommendations to the leader, and to assist in the preparation of a 5-year plan covering both the Army Materiel Command (AMC) Materials Research Program in Test and Evaluation and the Materials Testing Technology Program.

These plans are forwarded to AMC through the chief of the Chemistry and Materials Branch, who is also chairman of the MAG. The plans constitute a major input in determining the annual program that the Army undertakes in the field of nondestructive testing.

The subcommittee on nondestructive testing is composed of Eugene Roffman, Frankford Arsenal, chairman; Otto Gericke, AMRA; Charles H. Martens, Redstone Arsenal; Stanley J. Shurtleff, U.S. Army Natick Laboratories; Joseph Dudzinski, U.S. Army Tank Automotive Center; Arthur Zavarella, Springfield Armory; and Edward Hebenstreet, Watervliet Arsenal.

The 5-year plan developed by the subcommittee on nondestructive testing is concerned with the design, development, application and continual refinement of materials testing techniques for Army requirements. The plan provides for the investigation of new methods and techniques proved feasible in research studies and for the improvement of existing methods and techniques that may be required as an acceptance test in Federal specifications.

The Test and Evaluation Methods portion of the plan is concerned with exploratory development directed towards a better understanding of the phenomena associated with nondestructive testing of materials. The plan incorporates those areas of effort that are prerequisite to an effective utilization of the data in subsequent industrial programs.

Typical examples of areas of emphasis in the exploratory development program include ultrasound imaging, microwave testing, and penetrating radiation, optical inspection, electromagnetic testing and the Broad field of ultrasonics.

Looking ahead to the potential offered by each of these areas, it is believed that further advances in the ultrasonic field will provide video displays of the internal structure of materials. The display will be seen on a television screen using an ultrasound image converter tube and associated electronic equipment.

Preliminary results with this technique have successfully shown imperfections in materials which cannot be discerned using radiographic techniques. Since the internal structure of materials is displayed on a TV screen, a skilled operator is not required to interpret pulse indications normally associated with ultrasonic tests.

Comparatively a newcomer to the field of nondestructive testing, the microwave method shows promise in the testing of plastics, rubber, ceramics, resins, nonmetallic solids, gases and liquids. Microwave tests will be developed for dimensional measurements, flaw detection and monitoring properties, composition, structure, state of cure, and moisture content of materials.

An expanded effort is planned in the penetrating radiation field during the next five years to improve upon the existing technology; it will be directed toward improving the definition of radiographic images. Methods of beam scanning will be developed to continuously monitor and view the internal structure of materials.

X-ray diffraction efforts will be expanded to examined nondestructively the crystallographic structure of materials. These and many other improvements will permit penetrating radiation tests to be used for the evaluation of materials now difficult to accomplish with present methods.

Electromagnetic methods will be developed to define more accurately the physical and mechanical characteristics of ferrous and nonferrous materials. Many shortcomings in eddy current testing will be eliminated through a thorough study of probe design requirements and the use of phase discrimination techniques for the identification of metallurgical variables.

In the optical inspection field, investigations will be made with fiber optics, filtered light, and ultraviolet

light to improve upon a wide variety of internal surfaces such as bores, deep holes, recesses and other areas normally inaccessible to the eye.

The Materials Testing Technology portion of the 5-year plan is devoted to the utilization of information derived from exploratory development programs and other studies for application to the design of practical systems and equipment.

Important objectives of this program are improved reliability, standardization, simplicity, speed and economy of nondestructively testing materials and hardware in current Army production and procurement programs.

Equipment developed from this program will materially benefit Army inspection agencies and contractors to assure quality of Army materials in compliance with established military requirements.

Considerable research and exploratory development have been accomplished in providing new concepts in nondestructive testing. Knowledge gained in various studies must be used to advance technology and specialized equipment must be refined to achieve workable, general-purpose practices for routine examination of a wide variety of materials and critical components.

Image converters for ultrasonics and X-ray inspection will lessen the need for highly skilled operators as well as reduce inspection time. Methods will be developed to determine the physical and mechanical properties of metals and nonmetals, both in static and dynamic loading.

A further goal is to provide reliability and quality assurance personnel with simplified, economical nondestructive test equipment and methods for in-process production testing design to meet Army requirements. Areas of emphasis in the Materials Testing Technology Program include electromagnetic testing, infrared, microwave, multiple procedures, and penetrating radiation.

In the field of electromagnetic testing, work will continue to determine the correlation between electromagnetic phenomena, known physical properties, structure of materials, and components. Electromagnetic probe design criteria will be developed to determine the effect of parameters on sensitivity and resolution.

Harmonic analysis techniques for the evaluation of ferromagnetic material must be established, and multifrequency techniques investigated to provide maximum information concerning flaw dimensions. To determine criteria for establishment of acceptable measurements, interacting electromagnetic effects of case hardness will continue to be examined.

Another newcomer to the field of nondestructive testing is the infrared method. This will be used to determine physical and mechanical properties of materials which cannot be effectively examined by other nondestructive methods. Infrared inspection methods are to be investigated and test systems developed for composite structures.

Supporting members of dynamic components, such as rocket cases, engine support struts, helicopter blades, etc., undergo a gradual deterioration when subjected to normal usage. Deterioration is accelerated when abnormal conditions are encountered, such as severe static or shock loading.

To ascertain the state of deterioration, studies are necessary to determine appropriate nondestructive testing techniques that can recognize and identify these physical changes without removing the member from its structure.

The penetrating radiation activity will be concerned with the adaptation of new techniques for inspection of Army equipment, and the qualification of equipment, personnel and procedures. Automatic scanning methods will be studied and radiographs of various materials will be recorded and correlated with known conditions in order to establish trace standards. Automatic recording accept-reject levels will be studied, developed and evaluated.

In the field of ultrasonics, efforts will be made to reduce to practice, flexible ultrasonic systems and procedures to provide more definitive information on flaw interpretations and evaluation. It will eliminate the many problems associated with pulse-echo interpretations and will provide acoustic analysis techniques required for dynamic testing.

Finally, the Nondestructive Testing Information Center at the Army Materials Research Agency will continue to carry out its mission assignments in the field of nondestructive testing.

Dissemination of information throughout the Department of the Army will continue via newsletters, letters of inquiry and the following series of AMRA report guides which were recently published: MS 64-10, *Autoradiographic and Microradiographic;* 64-11, *Gamma Radiograhic;* 64-12, *Liquid Penetrant;* 64-13, *Fluoroscopy and Remote Viewing Techniques;* 64-14, *Thermal Testing.*

Additional guides covering other fields such as Electromagnetic and Magnetic Particle are planned for publication in the near future. Supplements to these guides will be processed as additional information is received.

References: 1. The Economic Impact of Nondestructive Testing, E. Roffman, 1962

2. Army Materials Research and Industrial Plan, FY66

CRREL Leader Retires After 30 Years Civil Service

More than 30 years of Federal career service ended recently for Dr. Robert W. Gerdel, but he will continue as a consultant with the U.S. Army Cold Regions Research and Engineering Laboratories.

Until he retired, Dr. Gerdel was chief of the Environmental Research Branch of the Laboratories. He joined USA CRREL in 1961 after serving since 1950 with the Snow, Ice and Permafrost Research Establishment (SIPRE) at Wilmette, Ill. SIPRE was one of the predecessor organizations combined in USA CRREL.

Dr. Gerdel began his Civil Service career with the Soil Conservation Service in 1934. From 1943 to 1950 he was a research physicist on hydrology with the U.S. Weather Bureau, including service as director of the Weather Bureau-University of Nevada Snow Laboratory and of the Central Sierra Snow Laboratory maintained by the Bureau and the Army Corps of Engineers.

One of the two Army scientists elected a Fellow of the Institute of Environmental Sciences, he is also a Fellow in the American Society of Civil Engineers. He is affiliated with the American Geophysical Union, American Meteorological Society, Western Snow Conference, which he helped found, Eastern Snow Conference and the International Society for Terrain Vehicles Systems, of which he is a founder-member.

Dr. Robert W. Gerdel

Report Shows DoD Softening Shutdown Effects

Department of Defense efforts to soften the economic impact of military base closures or reductions are outlined in a full-color publication, "The Challenge of Change," issued July 10 by the Office of the Secretary of Defense.

In a foreward, Secretary of Defense Robert S. McNamara points out that since 1961 the Defense Department has closed or substantially reduced activities at over 700 installations, with an ultimate savings to taxpayers of more than $1 billion each year. He further observes that valuable resources which would otherwise remain idle have been freed for more productive purposes—thus property which was tax-consuming becomes tax-producing.

The publication describes the 2-pronged DoD program to prevent economic detriment to Defense employees through job guarantees and to the community affected through the new Office of Economic Adjustment.

DoD policy guarantees a new job opportunity to each displaced employee, reimburses him for costs of moving to a new job, and protects his income during the transition period.

The effort is assisted by a Centarlized Referral Activity established in Dayton, Ohio, Mar. 1, 1965. There vacancies are matched by automated methods againts skills of displaced employees. The report emphasized that in no case is an employee separated without a job opportunity.

In the Community Action Program, the Department of Defense helps communities to organize for economic growth. The DoD provides advice and technical assistance in the development and application of economic recovery programs, and establishes liaison between community leaders and Federal agencies.

The Defense Office of Economic Adjustment workers with any community which has been affected economically by the curtailment of a Defense activity whenever it is requested to do so and continues its work as long as assistance is desired. Since its establishment, the office has worked with 71 cities in 34 states.

The full resources of the Federal Government have been mobilized to assist the Office of Economic Adjustment, the DoD publication points out. Among agencies involved in the program are: the Departments of Health, Education and Welfare, Labor, Commerce and Interior and the Federal Aviation Agency, Housing and Home Finance Agency and the Small Business Administration.

Rotoprop System Tried Successfully in Flight

Successful flight testing of a thrust-producing system termed a Rotoprop, a combination tail rotor-propeller similar to that proposed for the S-66 high-speed compound helicopter being designed for the Army Advanced Aerial Fire Support System (AAFSS), was reported in July.

Lee S. Johnson, president of Sikorsky Division, United Aircraft Corp., announced the system as a "major technical advanced in the propulsion and control of vertical takeoff and landing aircraft." The Rotoprop used in the initial flight tests was a standard helicopter tail rotor adapted to prove the Rotoprop principle.

In helicopter flight, the Rotoprop provides side thrust to counter main rotor torque and to give directional control. In high-speed flight, it provides forward thrust by turning 90 degrees aft and serving as a propeller, while directional control is supplied by a conventional rudder.

The Sikorsky test pilots described the test flight transition from the tail rotor to the pusher propeller as "very smooth—no problem at all." Sikorsky engineers say the Rotoprop, in addition to the advantage of simplicity of design and efficient operation, offers significant weight and cost reduction.

The Rotoprop is represented as conserving power at both high and low speeds to provide improved agility, acceleration and deceleration—all essential to the AAFSS mission. Sikorsky is one of two companies participating in the project definition phase of the Army program.

DoD Agency Fuzes Tri-Service Contract Audit Duties

The new Defense Contract Audit Agency, Department of Defense, began operations July 1 under provisions of DoD Directive 5105.36, signed by Secretary of Defense Robert S. McNamara.

Contract audit work formerly carried on by separate groups in the Army, Navy and Air Force is concentrated in the new Agency.

Secretary McNamara announced establishment of the Agency last Dec. 12 to increase uniformity, consistency, simplification and savings in auditing Defense contracts. The Agency will be responsible for audit of contracts performed by more than 6,000 business enterprises, universities and other institutions. It is now the only agency with which Defense contractors will deal concerning Defense contract audit matters.

Management of the Agency will be centered in the Agency's headquarters at Cameron Station, Alexandria, Va. Seven regional offices will be located at Atlanta, Boston, Chicago, Los Angeles, New York, Philadelphia and San Francisco. More than 200 branch and resident offices will be located throughout the United States and overseas.

The Agency will have approximately 3,500 employees consisting mostly of professional accountants and auditors transferred along with audit functions from the Military Departments. More than 300 staff members are certified public accountants.

William B. Petty is director and Edward T. Cook is deputy director of the Agency.

Army Consolidates Facilities At Fort Clayton Test Center

The U.S. Army Tropic Test Center, Fort Clayton, Canal Zone, has consolidated some of its operations in five buildings recently acquired from the former Canal Zone Corrosion Laboratory of the Naval Research Laboratory at Miraflores.

Three buildings near the Miraflores locks will be modified into semipermanent biological and instrumentation laboratories. Two buildings at Galeta Point will be used by the Center until completion of a current project there.

Col Pedro R. FlorCruz, commanding officer at the Tropic Test Center, pointed out that the new facilities will increase the Center's test, evaluation and research capabilities and will permit better support of visiting scientific teams and attached units.

The Tropic Test Center, operational since 1962, is one of the Army's three environmental test centers. The others are the Arctic Test Center, Alaska; Yuma Proving Ground, Ariz.

ROTC Revitalization Program

One thousand carefully selected high school and college students recently received the first scholarships authorized by the Reserve Officer Training Corps Vitalization Act of 1964. The Act authorizes a maximum of 5,500 of these scholarships by the 1970-71 school year.

When the Army Research and Development Newsmagazin *was in its infancy, in the March 1961 edition, a "Letters to the Editor" column was introduced. Contributions did not permit continuance of this feature, but now that the irreplaceable talent of Dr. R. G. H. Siu's wise and witty T-Thoughts column has been lost (not permanently, we fervently hope), the letters-to-the-editor idea is being revised as a perhaps milder "cup of tea." Contributions on pertinent matters are welcomed.*

* * *

Col Robert J. Hoagland, commander of the U.S. Army Medical Research Laboratory, Fort Knox, Ky., offers the following:

Dear Sir:

In the May 1965 issue of *Army R&D Newsmagazine*, under the heading "Nagging Women Suggested as Psychological Weapon," there appeared a humorous comment contain-in the following: "My suggestion is to use this [i.e. harassment] against the enemy by recording a particularly obnoxious nagger in the enemy's language." Recordings were to be dropped behind enemy lines and "suitable messages could be blared out loudly at them."

The suggestion for military use—of this old matrimonial weapon—is not new. About 2300 years ago the writer of Ecclesiasticus, (Chapter 26, verse 27) wrote: "A loud crying woman and scold shall be sought out to drive away the enemies."

Perhaps tacticians should consider Biblical authorities before proposing "original" ideas.

P.S. This contribution could be headed "Nothing new under the sun."

Dr. Bernard W. Langer, Jr., assigned to the U.S. Army SEATO Medical Research Laboratory in Bangkok, Thailand, joins the Angstrom argument with:

Dear Sir:

I am writing concerning the letter appearing in the May 1965 issue of the *Army R&D Newsmagazine* on page 25.

May I please take the liberty of clarifying the letter which was supposed to simplify.

As there are 100,000,000 Angstroms to the centimeter and 2.54 centimeters to the inch, it figures that the original author was right in his approximation of an Angstrom being one 250 millionths of an inch and that the simplifying correction was wrong.

The writer of the letter was led astray by an error in multiplaction, namely 6,328 x 1/250,000,000 is 6,328/250,000,000 inches not 1,582 million Angstroms. By these means then it is calculated that the wavelength of the Laser beam is about 0.000025 inches.

I would like to paraphrase the moral stated in the letter "Simplicity without accuracy is chaos."

Authoritative information that settles the controversy regarding the length of the Angstrom comes from the veteran chairman (since 1956) of the U.S. Army Mathematics Steering Committee, Dr. I. R. Hershner, chief of the Physical Sciences Division, U.S. Army Research Office, who writes:

Your letter to the editor, printed in the May issue of the R&D Newsmagazine, is in error; and the article on page 3 of the March 1965 issue of the Newsmagazine is correct. Specifically, the following applies:

1 Angstrom = 10^{-8} centimeters
= $(1/2.54) \times 10^{-8}$ inches
= (1/250,000,000) inches
= (one 250 millionths inches.

WSMR Complex Serves as Rocket Network Model

The launching complex first built at White Sands (N. Mex.) Missile Range provided the pattern for an international rocket-firing network planned at a recent international meeting of space scientists in Buenos Aires, Argentina.

Willis Webb, chief scientist of the U.S. Army Electronic Research and Development Activity at White Sands, presented plans for the launching stations in the global network based on his experience in building meteorological rocket-firing bases.

The National Academy of Sciences of the United States designated Mr. Webb as a member of the American scientific team taking part in the Sixth Anual Space Science Symposium. He is a member of the Academy's Space Science Board.

In a technical paper titled "Global Circulation of the Stratosphere and Mesosphere," he detailed problems solved at White Sands in firing low-cost rockets into the upper atmosphere in sufficient quantities to gather meaningful information.

The Army built the first small meteorological rocket-firing stations at White Sands in 1958. Since then, the Army organization has furnished guidance, hardware, and trained crews to establish a launching network spaning the northern hemisphere from Ascension Island in the Atlantic to Eniwetok in the Pacific.

The master plan backed by the National Academy of Sciences presented at the international meeting includes many rocket-firing stations in the southern hemisphere. Little information has been gathered about the high atmosphere in this area.

The current Meteorological Rocket Network uses inexpensive rockets less than seven feet long that blast as high as 50 miles to radio back data from tiny transmitters.

Col Bane Retires at WSMR

Col John C. Bane, until recently deputy commander at White Sands (N. Mex.) Missile Range (WSMR), has concluded 26 years of Army service but plans to continue in defense activities with private industry.

Joining WSMR in 1961, he was chief of staff for one year and deputy commander for three years. A West Point graduate in 1939, he earned an MS degree in electrical engineering from the University of Pennsylvania in 1949. He has attended the Command and General Staff College and the Armed Forces Staff College.

Scientific Calendar

Structural Inorganic Chemistry Conference, sponsored by Chemical Institute of Canada, Halifax, Nova Scotia, Sept. 1-3.

Tri-Service Symposium for Signal Analysis, Identification and Display as Related to Electronic Warfare, sponsored by AMC, USN, USAF and DoD, N.Y.C., Sept. 8-10.

Conference on Radiation Effects, sponsored by MSA and IME, Ashville, N.C., Sept. 8-10.

International Conference on Industrial Electronics and Control Instrumentation, Philadelphia, Pa., Sept. 8-10.

13th Annual Industrial Electronics and Control Instrumentation Conference, Sept. 9-11.

Fall Meeting of Ceramic-Metal Systems, sponsored by the American Ceramic Society, Sept. 12-15.

150th National Meeting of the American Chemical Society, Atlantic City, N.J., Sept. 12-17.

13th Annual Joint Engineering Management Conference, sponsored by IEEE and ASME, N.Y.C., Sept. 13-14.

Symposium on Structural Adhesives Bonding, sponsored by AMC, Hoboken, N.J., Sept. 14-16.

National Power Conference, sponsored by IEEE and ASME, Albany, N.Y., Sept. 19-22.

Petroleum Mechanical Engineering Conference, sponsored by ASME, Houston, Tex., Sept. 19-22.

Joint ASTIM-TAPPI Committee on Petroleum Wax, sponsored by ASTIM, Cincinnati, Ohio, Sept. 21-22.

13th Canadian High Polymer Forum, Ottawa, Ontario, Canada, Sept. 22-24.

Conference on Military Electronics, sponsored by IEEE, Washington, D.C., Sept. 22-24.

1965 Semiannual Convention of the American Society of Photogrammetry, sponsored by AFSC and ASP, Wright-Patterson AFB, Ohio, Sept. 22-24.

Fall Meeting of American Ceramic Society, Greensboro, N.C., Sept. 22-25.

Fluid Amplification Controls Pass Missile Flight Tests

Fluid amplification control of a missile in a "highly successful" flight test at Redstone Arsenal, Ala., was reported this past month by the Harry Diamond Laboratories of the U.S. Army Materiel Command.

The hot-gas fluid amplifier attitude control valve system was mounted in a TIM (Test Instrumentation Missile), a modified Little John missile airframe propelled by an 8,000-pound-thrust Zuni rocket motor.

Provided by the U.S. Army Missile Command's Guidance and Control Laboratory at Redstone Arsenal, the missile was 176 inches long, 12 inches in diameter, carried a 156-pound payload, and was flown for 20 seconds. The control system was applied during the first 10 seconds of the flight.

As part of the Harry Diamond Laboratories program to develop fluid control systems, the test was conducted to verify theoretical performance of the hot-gas valve control under actual flight conditions. Ever since the principle of fluid amplification controls was invented by the Washington, D.C., Laboratories late in 1960, possible use in missile systems has been foreseen.

In the test flight, the reactive thrust from the fluid amplifier directed the TIM along an undisturbed trajectory for the first one and one-half seconds after burnout of the booster motor. The vehicle was then steered into a tight o.5g turn by a pre-programed low-power fluid-control signal.

After a one-second damping period, during which the amplifier was cycled at a rate of 20 cps. to reduce the net output thrust to zero, the TIM was steered back to a course parallel to its original trajectory.

The stainless steel valve in the control system weighed 4½ pounds. The system consisted of a 4-output axisymetric fluid amplifier, a solid-propellant gas generator, four solenoid actuators, and a nitrogen pressure bottle.

Exhaust gases from the generator were deflected to one of four equally spaced lateral thruster nozzles by the application of a low-pressure nitrogen digital control signal.

An on-board flight programer, in conjunction with a vertical reference gyro, energized the solenoids in a sequence independent of the missile roll rate, allowing them to fire in their quadrant.

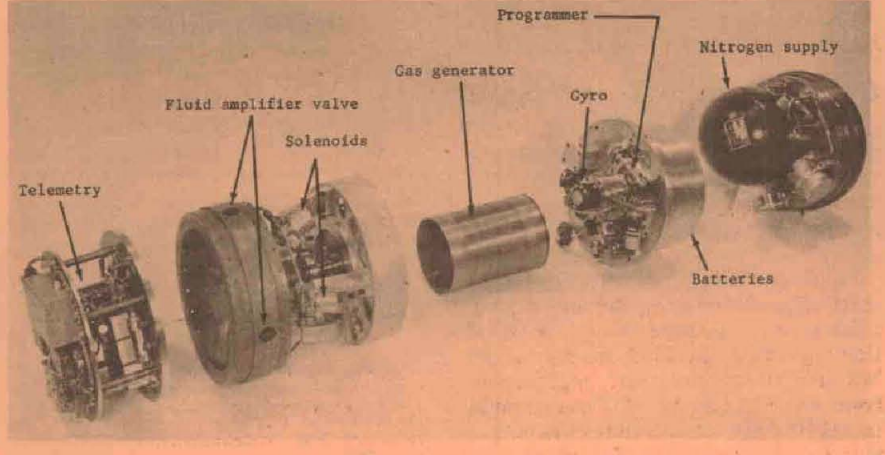
The hot-gas valve operates on the principle that the flow in an ever-expanded supersonic stream can be made to separate from a bounding wall if an adverse pressure gradient can be set at the separation point.

In the test system, the adverse gradient is established by a minute flow (approximately equal to nine percent of the power nozzle flow by weight) through the control orifice. The power nozzle flow then establishes itself in the opposing aerodynamic flow channels and exhausts through the thruster nozle.

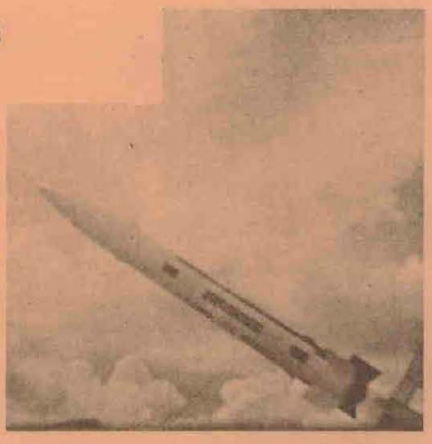
Preliminary verification of the valve control concept was established by use of high-pressue air as the flowing medium on a full-scale test model at the Naval Ordnance Wind Tunnel facility in White Oak, Mo.

Based on results of the cold-flow tests, a full-scale hot-gas model was designed and evaluated by the Army's Solid Rocket Propellant Laboratories at Picatinny Arsenal, Dover, N.J.

The gas generator used in the static tests and in the flight model employed a low flame temperature (2500° F.) double-base SMU-101 propellant, producing a rated thrust established at 45 lbf. at 800 psig.



Hot-Gas Fluid Amplifier Attitude Control Valve System



Test Instrumentation Missile

Upon completion of the static hot-gas tests, the valve was packaged in the instrumentation compartment of the TIM for a final checkout of the complete system under simulated missile roll conditions. The fluid amplifier was programmed to oscillate for 1.5 seconds, fire 3 seconds to the left, oscillate 1.5 seconds and first to the right for 3 more seconds.

Human Factors Society Ponders Man-Machine Compatibility Need

The breadth of man's communicative techniques, from smoke signals to conversing with computers and satellite telephoning was discussed at the Second Annual Metropolitan Human Factors Symposium held recently at New York University, the Bronx.

The Human Factors Society, organized in 1957, now lists 1,375 members, 10 percent of whom form the New York chapter. These psychologists, physiologists, engineers, physicians and others are interested in designing and evaluating military and civilian equipment systems and in analyzing the resultant man-machine relationships.

Features of the program included an address by Harold Weasner of the Human Factors Section of the Army's Picatinny Arsenal, Dover, N.J., and a tour of the Systems Science Laboratory at New York University where new ways of talking into machines are designed and tested.

Contract Awarded for Polymers

The Thiokol Chemical Corp. will evaluate high-energy carboxy terminated polymers under a $94,963 contract recently awarded by the Army Missile Comand, Redstone Ala.