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Memorandum Assigns Roles Of Agencies in Structuring Management STI Network

Responsibilities for building a management Army Research, Development Test and Evaluation Information System (ARDIS) are fixed by Army Chief of Staff Memorandum 67-62, dated Feb. 13.

The memorandum requires that the Chief of Research and Development will develop a management information system for RDTE activities in conjunction with the Comptroller of the Army, the commanding general of the Army Materiel Command, and other development agencies.

The designated development agencies concerned with ARDIS are the Office of The Surgeon General, Office of the Chief of Engineers, U.S. Army Combat Developments Command, U.S. Army Security Agency, and U.S. Army Research Office.

Specifically stated is: "The system must be sufficient to cover all aspects of RDTE program management at all command levels to support the planning, programing, budgeting, funding, accounting and reporting, and execution of the Army RDTE effort."

ARDIS will include the RDTE portion of the Resource Management System for which monitorship has been

(Continued on page 19)

Army Nominates 8 Civilians, 7 in R&D For Presidential, Defense Top Awards

Victor Lindner

Success in the role of "the man behind the gun" at the Army's Picatinny Arsenal, Dover, N.J., has won Victor Lindner a nomination for the President's Distinguished Civilian Service Award (DCSA).

Seven other Army employes, six involved in research and development, were nominated in mid-February for the Department of Defense Distinguished Civilian Service Award by Secretary of the Army Stanley R. Resor.

Nominees are: Billy M. Horton, technical director of the Army's Harry Diamond Laboratories, Washington, D.C.; Wendell E. Johnson, chief, Engineering Division, Directorate of Civil Works, Office of the Chief of Engineers, HQ Department of the Army; Charles W. Flaherty, special projects officer for General Frank S.

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Featured in This Issue . . .

Burton Selected to Direct Army Research at Durham

Nine years after he served on the committee set up by the first Chief of Research and Development to establish the U.S. Army Research Office in Washington, D.C., Lt Col Donovan Finley Burton has been selected to command the Army Research Office-Durham, N.C., effective July 11. He is listed for promotion to colonel.

Graduated from the United States Military Academy at West Point, N.Y., with an MS degree in 1947, he earned an

(Continued on page 4)

Lt Col D. F. Burton

Fifth National JSHS Scheduled at West Point

More than 235 selected participants in the Fifth National Junior Science and Humanities Symposium, Apr. 20-22, at the U.S. Military Academy and United Nations Headquarters in New York City will, for the first time, hear a woman make the major address on the importance of the humanities in science.

Dr. Margaret Mead

Dr. Margaret Mead, internationally known anthropologist, has stated that she will discuss "Science and the Humanities: An Anthropologist's Views." Dr. Mead is Curator of Ethnology, American Museum of Natural History, New York City, and adjunct professor of anthropology at Columbia University in New York City.

Each year the National JSHS has drawn as guest speakers many of the foremost academic leaders of the nation. Distinguished speakers of international professional stature are the rule rather than the exception. Acceptances from several noted leaders still are awaited, but indications are that the 1967 meeting will uphold tradition.

Dr. Edward Teller, world-renowned nuclear scientist and a man who was keenly interested in development of

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Army R&D Newsmagazine

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PROJECT TREND
Environmental Research in Thailand

By Paul A. Blackford

Project *TREND*, a comprehensive research effort by the Department of Defense designed to collect quantitative data on natural factors affecting the soldier, materiel and operations in two types of tropical forest environment, is beginning in Thailand.

TREND is derived from TRopical ENvironment Data and the project of collecting it is centered initially at a research station in the dry evergreen forest about 100 miles northeast of Bangkok. After two years of continuous observations at this site, a similar two-year program is planned at a second station to be located in a tropical rainforest region of Thailand.

The concept for this type of study originated in the Environmental Sciences Division of the U.S. Army Research Office (USARO), Office of the Chief of Research and Development, Department of the Army.

In response to numerous requests for data on the humid tropic environment, the Data Base Project of the Tropic Test Center, Fort Clayton, Panama Canal Zone, was established in 1964.

The Earth Sciences Division of the U.S. Army Natick (Mass.) Laboratories (NLABS) was invited in 1965 by the Advanced Research Projects Agency (ARPA) to plan and submit a proposal for a comparable study of the physical environment of Thailand.

The Project TREND proposal, drafted by the Earth Sciences Division, U.S. Army Natick Laboratories, and the ARPA project manager for Environmental Sciences, was accepted and funded by ARPA in July 1966.

This project is based on the belief that making very detailed measurements of environmental parameters is necessary to obtain a more complete understanding of the precise physical conditions existing within a given environment. The TREND plan calls for simultaneous acquisition of data in various earth science disciplines at different points, vertically and horizontally, and in various time frames (diurnally, monthly, seasonally, and annually) in an outdoor laboratory carefully selected as representative of the particular environment studied. This is considered particularly valuable to determine interrelationships of different environmental phenomena.

Comprehensive data are needed to improve materiel testing, evaluation, and operations planning. In addition, it should facilitate advances toward understanding interrelationships of the various phenomena, by determining the extent and significance of the different microenvironments known to occur with small variations in place and time.

An important secondary objective is the development of Thai capabilities to carry out research in the environmental sciences and related fields. TREND will employ Thai nationals as much as possible to conduct the research and process the data. Considerable on-the-job and some Stateside training is planned for the Thai scientists and technicians.

After completion of the planned two years of intensive observations at each research station, it is proposed that the facilities will be turned over to the Thai government for operation.

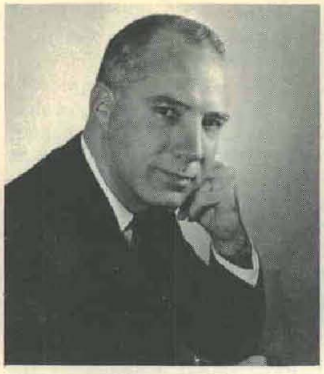
Priority is given to research programs in the fields of meteorology, vegetation, soils and hydrology. Microbiological and macrofaunal studies also have been planned. In addition, the Applied Scientific Research Corporation, a Thai government organization serving as the prime contractor, will carry out a number of related ecological studies at their own expense.

Meteorological investigations will ascertain conditions below, within, and above the forest canopy, and in an adjacent clearing, through instrumentation installed at about 15 levels on paired, walk-up towers 150 feet tall.

The micrometeorological program is designed to determine vertical differ-

(Continued on page 24)

PAUL A. BLACKFORD is coordinator for Project TREND. A tropical geographer in the Earth Sciences Division, he joined the U.S. Army Natick (Mass.) Laboratories in August 1966. His experience includes three years teaching geography and earth science at the University of Hawaii and Wisconsin State University, six years resource development and management in the Fiji Islands, two years on expeditions throughout other South Pacific Islands, and five years with consulting engineers-planners in Hawaii. He received a BS degree from the University of Southern California, an MA degree from the University of Hawaii, and has continued graduate work in water resources at Utah State and Wisconsin Universities.



Billy M. Horton

Dorothe K. Matlack

Irene K. Fischer

Wendell E. Johnson

Army Nominates 8 Civilians for Top DoD Awards

(Continued from page 1)

Besson Jr., CG, U.S. Army Materiel Command; and

Dr. William C. Manion, chief, Cardiovascular Branch, Armed Forces Institute of Pathology, Washington, D.C.; Dr. Joseph H. Kanner, special assistant, Pictorial and Audio Division, Tactical Systems Directorate, Office of the Chief of Communications-Electronics, HQ Department of the Army; Mrs. Irene K. Fischer, Army Map Service, Corps of Engineers, HQ Department of the Army; and Mrs. Dorothe K. Matlack, Office of the Assistant Chief of Staff for Intelligence, HQ Department of the Army.

VICTOR LINDNER received the Department of Defense Distinguished Civilian Service Award in 1965 for his achievements as deputy director, Ammunition Engineering Directorate at Picatinny Arsenal. He was also a Department of the Army nominee for one of the 1966 Rockefeller Public Service Awards, and in 1964 was presented with the Army Exceptional Civilian Service Award.

In an era when innovations in atomic warfare have held the limelight of scientific interest, Lindner has achieved recognition for "his contributions of profound importance in implementing national policy to increase the total nonnuclear military strength of the United States. . . .

"As deputy director, Ammunition Engineering Directorate, Picatinny Arsenal, he has been the primary instrument in the issuance of a completely new spectrum of highly effective and unique munitions systems which have strengthened the combat capabilities of all the Services. These contributions were in both the research and development and production engineering spheres."

Lindner has served as the principal consultant to the Picatinny commanding officer as pertains to the science and art of weapons development. He is credited by his military superiors with providing the leadership that has enabled his organization to be "fundamentally instrumental in developing and sending to South Vietnam a large variety of new and highly effective munitions. . . ."

"In response to the accelerated demand for Picatinny Arsenal services growing out of the Vietnam conflict, five new major laboratories have been provisionally created within the past year in his directorate. An assessment of his performance states:

"During this period, he has in an exceptionally outstanding manner applied his considerable talents and technical leadership to organizing this greatly increased directorate into a highly productive group. As a result, such major requirements for the Services as bombs, bomb fuzes, 2.75 rocket ammunitions, flechette ammunition and others have been met. . . ."

Listed among the notable achievements of the Ammunition Engineering Directorate in responding to the Vietnam requirements (exclusive of those having a security classification) are flechette ammunitions of a variety of types, munitions for the 90mm and 106mm recoilless weapon systems and the 105mm howitzer. The XM64 system has provided "an effective and simple technique for destruction of tunnels."

A variety of new rounds for the 40mm system was provided, and a new SM37 linear mine was developed in less than three months. The SM47 Mine Dispersing Aircraft System was completed and issued in quantity within one year to the Army and the Air Force.

Lindner has served in his present capacity since 1962. The 50-year-old scientist-engineer was given Outstanding Performance Ratings in 1958 and 1959 and Sustained Superior Performance Ratings in 1961 and 1962.

Graduated cum laude with a BS degree in engineering from City College of New York, he received an MA from Columbia University and an MS from Newark (N.J.) College of Engineering.

BILLY M. HORTON's nomination for the DoD Distinguished Civilian Service Award adds to the long list of honors that have been accorded him since he teamed with Raymond W. Warren and Dr. Romald E. Bowles in inventing fluid amplification controls. They received the John Scott Award in 1966, thereby joining a select society of such immortals as Edison, Marconi, Madam Curie and others whose discoveries have been of vast importance.

Horton holds the basic patent for a fluid amplifier, the basic building block from which has evolved a family of sensors, control and logic devices, active and passive components driven by gases or liquids and having no moving mechanical parts. He is the holder of nine patents in this field and six applications for his other inventions have been filed.

Promotion to technical director of the Harry Diamond Laboratories in 1962

(Continued on page 4)

Charles W. Flaherty

Dr. William Manion

Dr. Joseph Kanner

Army Nominates 8 Civilians for Top Awards

(Continued from page 3)

recognized Horton for nearly 10 years of progressively notable achievements. He was a member of the original staff when the Diamond Ordnance Fuze Laboratories (renamed in 1962) were founded in 1953 with a substantial nucleus of personnel from the U.S. National Bureau of Standards.

Graduated from the University of Texas with a BA degree in 1941, Horton earned an MS degree from the University of Maryland in 1949. He completed the National Bureau of Standards graduate school in 1959, specializing in signal and system analysis, and took courses in fundamentals of continuous medium from the University of California in 1960. The 48-year-old scientist attended the Civil Service Commission Executive Leadership Institute in 1963.

Horton was presented with an Army Research and Development Achievement Award in 1961, the Arnold O. Beckman Award of the Instrument Society of America in 1960, and the Department of the Army Decoration for Exceptional Civilian Service and $3,000 in cash in 1965.

CHARLES W. FLAHERTY has at least one distinction believed unsurpassed in federal Civil Service annals. During 25 years service he has never received less than an Outstanding Peformance Rating, and has been cited four times for Superior Performance.

"Self-made man graduated from the school of hard knocks" is a description that appears particularly fitting for Flaherty at age 47. He entered the U.S. Navy in 1942 as a marine sheet metal mechanic, became a shipbuilding inspector in 1951, and transferred to the U.S. Army Transportation Corps in 1952.

After serving in the Army as a marine surveyor, he progressively served as an equipment specialist, supervisory equipment specialist, equipment adviser and technical adviser, prior to becoming a special projects officer for General Besson, with duty in Norfolk, Va.

Flaherty's nomination for a DoD Distinguished Civilian Service Award is based upon his effectiveness in expediting the deployment of combat equipment to U.S. Forces in Vietnam. The recommendation states, in part:

"His efforts and accomplishments were invaluable in insuring the expeditious and thorough completion of the reconfiguration of the LARC Vs, and of insuring their safe shipment and safe discharge from the U.S. Navy Ship *Comet* at various destinations. The offloadings were accomplished under the most hazardous conditions."

WENDELL E. JOHNSON is chief of the Engineering Division, Directorate of Civil Works, Office of the Chief of Engineers, HQ Department of the Army. His experience with the Corps of Engineers dates back to duty as an engineering officer in World War II.

Johnson's nomination for the DoD DCSA credits his leadership in water resources development, a field in which he has gained international renown. The recommendation states, in part:

"He provides technical consulting services for studies of the Atlantic-Pacific Interoceanic Canal Study Commission in connection with a scheduled feasibility report to the President on a sea-level canal across the Isthmus of Panama.

"Mr. Johnson's recognized position as an outstanding engineer has led top leaders of engineering organizations to seek his advice and counsel on many unusual and difficult problems. He acted as consultant to the State Department in connection with the preservation of the Abu Simbel Temples in Nubia, Egypt, from inundation by the reservoir behind the Aswan Dam."

Currently chairman of the U.S. Section of the Columbia River Treaty Permanent Engineering Board, Johnson also is vice chairman of the U.S. Committee on Large Dams, and is a member of the International Committee on Irrigation and Drainage. He has served as a member of the Board of Consultants to the Prairie Farm Rehabilitation Administration of Canada.

In 1956, he was one of 10 recipients of the annual Career Service Awards of the National Civil Service League, and also was awarded the Department of the Army Decoration for Exceptional Civilian Service. He has won Outstanding Performance Ratings continuously each year since 1961.

Graduated from the University of Minnesota in 1931 with a BS degree in civil engineeeing, Johnson is a member of long standing in the American Society of Professional Engineers. He was chief of the Engineering Division of the Corps of Engineers Omaha District and later the Mississippi River Division until moved up to major projects. He has served with the Corps of Engineers since 1933.

Some highlights of his Corps of Engineers assignments include officer in charge of engineering design and construction of the Third Lock Project of the Panama Canal, design and construction assistance on the John Martin and Conchas Dams, as well as channelization of the Upper Mississippi River, and highway construction projects. He has supervised engineering of all Corps of Engineers water resource work since 1961.

DR. WILLIAM C. MANION has served since 1963 as chief of the Cardiovascular Branch, U.S. Armed Forces Institute of Pathology, is the winner of numerous honors, and at age 51 has achieved international recognition in his field. He was recently awarded the Department of the Army Decoration for Exceptional Civilian Service. (See December 1966 edition of this publication.)

A brief summary of his recommendation for the DCSA follows:

"Due to his personal efforts, the Armed Forces Institute of Pathology now contains a museum of 4,000 congenital hearts, the most extensive collection of its kind in the world, all of which Dr. Manion has methodically examined and recorded for study and research.

"Each year the heart museum is host to numerous residents, surgeons, cardiologists and other specialists who study under Dr. Manion's direction. He renders opinions and diagnoses and acts as consultant on cases submitted by pathologists of the Armed Forces, Veterans Administration, Public Health Service and other federal and civilian institutions."

Graduated in 1939 from Catholic University, Washington, D.C., he received an MD degree from Georgetown University School of Medicine in 1943, and has done postgraduate work at George Washington Univ. School of Medicine.

Among his honors are the American Medical Certificate of Merit (1957), American Society of Clinical Pathologists (ASCP) Gold Award (1959),

Burton Selected to Head Army Research at Durham

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MS degree in physics in 1954 from Penn State University. For the past two years he has been a graduate student at Columbia University in the Professional Industrial Engineering Department.

Since July 1963, Col Burton has been assigned to the United States Military Academy, first as an instructor and more recently as associate professor in the Department of Ordnance. From 1961 to 1963, he was with the Southern Area Advisory Team at HQ Military Assistance Advisory Group, Taiwan, and with MAAG in China.

Following a 1956-59 tour with the Office of the Chief of Research and Development, Combat Materiel Division, he became a student officer at the U.S. Army Ordnance School, Aberdeen (Md.) Proving Ground. He stayed there to serve as special assistant to the chief, Career Training Department, then became special assistant to the director for ROTC Plans, and was promoted to assistant director.

During a 1954-56 tour at Picatinny Arsenal, Dover, N.J., he held a variety of staff officer assignments.

Col Burton attended high school in Potomac, Ill., where his parents still reside. Among his decorations are the Purple Heart, Bronze Star, Combat Infantry Unit Citation, World War II Victory Medal, Korean Service Medal, United Nations Medal and Army General Staff Medallion.

American Medal Association Silver Hektoen Medal (1964), ASCP Silver Award (1965), Veterans Administration Outstanding Service Award (1964), and Department of the Army Meritorious Civilian Service Award (1965).

DR. JOSEPH H. KANNER has come a long way professionally since he was discharged from the Army in 1946 after five years service in World War II as an enlisted man.

As special assistant, Pictorial and Audio Division, Tactical Systems Directorate, Office of the Chief of Communications-Electronics, he is recognized as an Armed Forces authority in the field of educational television.

The recommendation for a DoD DCSA states that "His contributions, reflecting both original research as well as field application, have provided the Armed Forces with the information and techniques necessary to employ successfully television as a teaching, training and information medium. . . . In 1959 he prepared the first military manual on teaching by television, which is employed by the Armed Forces. He is the author of 16 published works. . . ."

Dr. Kanner was an aviation psychologist with the Human Resources Research Laboratories, U.S. Air Force, Washington, D.C., from 1951 to 1953 until promoted to senior research scientist. Then he served from 1954 until 1962 as chief, Audio Visual Applications Office, Army Pictorial Division, Office of the Chief Signal Officer, Department of the Army.

In 1958, he received the Army Meritorious Civilian Service Award, followed by the Army Decoration for Exceptional Civilian Service in 1959.

Dr. Kanner is a member of the American Psychological Association, the Eastern Psychological Society, Sigma Xi honorary society, National Educational Association, National Association of Educational Broadcasters, and the Council on Medical Education.

MRS. IRENE FISCHER's nomination for a DoD DSCA is solidly based in a distinguished career since she was graduated with honors from the University of Vienna in Austria in 1931, and did graduate work at the Vienna Institute of Technology and Pedagogical Institute.

Since she emigrated to the U.S. in 1939, she has studied machine drafting at Boston Technical Institute (1942), topology at the University of Virginia (1949-50), and celestial mechanics at Georgetown University, Washington, D.C. (1957). She also was enrolled in the U.S. Department of Agriculture Graduate School in 1953-54.

Austria's conquest by the Nazis prompted Dr. and Mrs. Fischer to flee to the U.S., and from 1941 to 1945 she taught mathematics in several schools. She also constructed geometric drawings for 3-dimensional visual teaching aids at Massachusetts Institute of Technology.

In 1952, after seven years devoted to her two children, she became a GS-7 mathematician with the Army Map Service and has progressed steadily to her present position as chief of the Geoid Branch. Her professional honors are numerous, including the Army Meritorious Civilian Service Award in 1957 and in 1966, the Army Map Service nomination for Federal Career Woman's Award in 1965, the Army Research and Development Achievement Award in 1966, and the Army Decoration for Exceptional Civilian Service in 1966.

Mrs. Fischer has held various elective and appointive offices with international professional groups, has presented 21 technical papers at national and international meetings, and is the author of 39 technical reports or articles published in professional journals.

Mrs. Fischer's nomination for the DoD DCSA credits her for "superior leadership which resulted in major contributions to the international geodetic community . . . (and for) development at Army Map Service of sound plans to meet DoD requirements in the geodetic area. . . .

"The Mercury Data developed by her was used in the Mercury and Gemini Projects, and continues to be used in Project Apollo. The reference figure is known as the *Fischer Ellipsoid*. Patrick Air Force Base has adopted the Mercury Datum for the National Eastern and Western Ranges, as has the Navy for Loran-A and -C and the Omega System.

"The increasing demand currently imposed by the above and other government agencies, as well as private industry, for Mrs. Fischer's work justified the publication of a new Department of the Army Manual, 'Latitude Functions Fischer 1960 Ellipsoid.' "

MRS. DOROTHE K. MATLACK began her Civil Service career in 1948 as a CAF-3 following the death of her husband, Col Jesse Brooke Matlack, U.S. Army. Currently she is a GS-14 branch chief and Intelligence Operations Specialist, in charge of 15 to 20 field grade officers and civilian employes in the Office of the Assistant Chief of Staff for Intelligence, HQ Department of the Army, Washington, D.C.

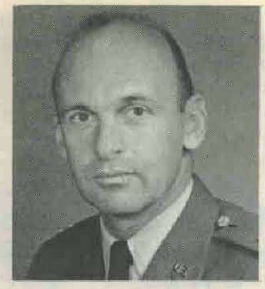
Her nomination for the DoD DCSA is based on "consistently exceptional contributions to the national security," and she is recognized as an expert on the Communist Bloc countries. The recommendation states, in part:

"In 1962 and 1966, she organized and directed the debriefings of particularly sensitive Soviet sources who provided information vitally affecting Defense security. Her efforts are also reflected in current intelligence successes in Vietnam . . . thousands of classified intelligence reports filling gaps in national intelligence surveys and adding to the currency of national intelligence estimates. . . . "

Argentine Officer Visits Federal STI Installations

ARGENTINE ARMY Maj Horacio O. Canovas, who will have a key role in the organization and establishment of the first in-house laboratory research and development capability of the Argentine Army, is shown at the conclusion of a 7-week visit to federal installations in the Washington, D.C., area. His itinerary of briefings was arranged by Dr. John C. Hayes, Scientific and Technical Information Division, U.S. Army Research Office. It included the Defense Documentation Center, Scientific Information Exchange of the Smithsonian Institution, National Library of Medicine, National Bureau of Standards, U.S. Department of Agriculture, Washington International Center, and several U.S. Government contract agencies. Maj Canovas completed a 9-month executive course in management at Stanford University during his U.S. visit. Pictured (left to right) Dr. Hayes, Maj Canovas, Deputy and Scientific Director of Army Research Dr. Richard A. Weiss and Col Thomas N. Chavis, Assistant Director of Army Research.

Lt Col A. W. Blankenship



Lt Col S. A. Jackson

Maj E. D. Richards

Maj H. L. Rutledge

Maj R. W. Spotts

Donald R. Leighton

6 New Personnel Join OCRD Staff

Five staff officers and a civilian employe are recent additions to the Office of the Chief of Research and Development (OCRD). They are Lt Col Alan W. Blankenship, Lt Col Saul A. Jackson, Maj Everett D. Richards, Maj Howard L. Rutledge, Maj Rodney W. Spotts and Donald R. Leighton.

LT COL BLANKENSHIP, staff officer in the Technical Information Liaison Office, comes to OCRD from Germany. He commanded the 20th Battalion of the 83d Artillery Battalion in Buedingen and was executive and war plans staff officer with the G-3 Division, Central Army Group in Seckenheim.

In 1963 he attended the Command and General Staff College, following duty with the Nike-Hercules program. He received a BS degree in commerce from the Citadel (1949) and returned several years later to teach military science. He also has completed the Artillery Officers' Basic and Advanced courses, and holds the Army Commendation Medal with two Oak Leaf Clusters.

LT COL JACKSON came to the International Office, OCRD, from HQ I Field Force Vietnam Artillery, where he was S-3 and executive officer. He first went to Vietnam as a battalion commander in the 25th Infantry Division, after a tour in Hawaii with the Plans Division, HQ Commander-in-Chief, U.S. Army Pacific.

Col Jackson has also served with the Combined Arms Combat Development Agency, Fort Leavenworth, Kans., and taught at the Command and General Staff College.

He holds a BS degree from the U.S. Military Academy (1944) and has been awarded the Legion of Merit, Bronze Star with Oak Leaf Cluster, Air Medal with four Oak Leaf Clusters, the Joint Service Commendation Ribbon, Army Commendation Ribbon, Purple Heart.

MAJ RICHARDS is assigned as a staff officer with the Communications-Electronics Division, OCRD. He is a 1952 graduate of the U.S. Military Academy, a 1966 graduate of the Command and General Staff College, and holds an MS degree in physics from University of Virginia (1959).

Major assignments include service with the Electronics System Division, J-6; Office, Joint Chiefs of Staff (1964-66); Army Test Board, Fort Rucker, Ala. (1963-64); 23d Special Warfare Aviation Detachment, Vietnam (1962-63); and Combat Surveillance Department, Fort Huachuca, Ariz. (1959-62).

He holds the Distinguished Flying Cross, Second Oak Leaf Cluster to the Air Medal, and the Joint Service Commendation Medal.

MAJ RUTLEDGE, R&D coordinator in the Nike-X System Office, OCRD, formerly held that title in the Nike-X project manager's office of the Army Materiel Command. Prior to that he was with the 2d Logistical Command, Fort Lee, Va., after a tour in Vietnam.

Three of his assignments with the U.S. Army Missile Command included project officer on the Honest John Missile, production and procurement officer, and R&D coordinator for the Directorate of Missile Intelligence.

Maj Rutledge has a BS degree in education from Middle Tennessee State College (1954), and has attended the Ordnance Officer Career Course, Field Artillery Maintenance Officer Course, and Special Weapons Officer Course. He holds the Bronze Star Medal and the Army Commendation Ribbon.

MAJ SPOTTS, staff officer in the Plans Division, came from Vietnam, where he served with the 1st Cavalry Division. Prior assignments were with the 11th Air Assault Division, Fort Benning, Ga., and with the Joint U.S. Military Advisory Group in Thailand.

Recipient of a BS degree in agriculture from Ohio State University in 1953, Maj Spotts attended the associate course at the Command and General Staff College. He holds the Army Commendation Medal with two Oak Leaf Clusters Air Medal, Bronze Star.

DONALD LEIGHTON joined the Department of the Army as a management intern in 1966. He is now a technical information specialist in the Scientific and Technical Information Division, Army Research Office.

After receiving a BS degree in chemistry from Hunter College in 1959, he worked as a research chemist with the Roosevelt Hospital in New York City, a programer with the Philco Corp., and a management analyst with the New York City Department of Welfare.

ATAC Speeds XM759 Program for USMC

In a "crash" program response to a request from the U.S. Marine Corps for greatly enhanced mobility in the swamps and rice paddies of Southeast Asia, the U.S. Army is accelerating engineering and production of the XM-759 Marginal Terrain Vehicle (MTV).

An $8.6 million contract awarded by the U.S. Army Tank-Automotive Command, Warren, Mich., provides for advanced production engineering, production and engineering support — normally accomplished under three separate contracts. Work will be done by the Pacific Car & Foundry Co., Renton, Wash.

The contract calls for delivery of 200 MTV's beginning in about a year and ending by Dec. 31, 1968. The advanced production engineering phase of the contract is to be done by February 1968

ATAC was given the job of developing the XM759, which is specifically designed for Southeast Asia requirements, through an agreement between the Marine Corps and the U.S. Army Materiel Command, of which ATAC is a field command. Seven pilot models of the 1½-ton vehicle are being built in the ATAC shops at Detroit Arsenal.

The XM759 carries 3,000 pounds of cargo or a fully equipped Marine squad of 14. Operated by a 2-man crew, it has a gross weight of 11,500 pounds. A top speed of seven miles an hour over inland waters, and a top land speed of 35 miles an hour are expected.

Quarles Heads TARC; 5 New Members Named

Assistant Secretary of the Army (R&D) Dr. Russell D. O'Neal appointed a new chairman and five new members of The Army Research Council (TARC), effective Mar. 1, in the third annual realignment of the research planning group of senior scientists.

U.S. Army Corps of Engineers Chief Scientific Adviser Dr. Gilford G. Quarles was named to succeed Dr. Richard A. Weiss, Deputy and Scientific Director of Army Research, as TARC chairman. Dr. Quarles has served on TARC continuously since it was established in January 1964.

New members of the 11-man council are Dr. Andrew Assur, chief scientist, Cold Regions Research and Engineering Laboratory; Dr. E. Kenneth Karcher Jr., Social Science Research Division, U.S. Army Research Office (USARO), Office, Chief of R&D; and

Dr. Peter D. Lenn, Office of the Deputy for Research and Laboratories, U.S. Army Materiel Command; Dr. Ernest N. Petrick, chief scientist, Army Tank-Automotive Command; Dr. Robert E. Weigle, technical director, Benet Research and Engineering Laboratories, Watervliet (N.Y.) Arsenal.

TARC appointments are for 2-year terms. Holdover members are Col William D. Tigertt, director, Walter Reed Army Institute of Research, Washington, D.C.; Col Tyron E. Huber, chief, Life Sciences Division, USARO; Dr. Maurice Apstein, associate technical director, Harry Diamond Laboratories; Dr. Hoyt Lemons, chief, Geophysical Sciences Branch, USARO; Dr. John D. Weisz, director, Human Engineering Laboratories, Aberdeen (Md.) Proving Ground.

Col Tigertt and Col Huber are original TARC appointees. Dr. Lemons and Dr. Weisz were appointed June 1, 1965, when the Council was expanded from its original strength of 9 to 11 members. Dr. J. V. R. Kaufman, chief scientist, Army Munitions Command, concluded service as an original member.

TARC was established by former ASA (R&D) Willis M. Hawkins to advise him and the Chief of Research and Development concerning in-depth analysis of in-house laboratory research efforts and program planning.

Army Materiel Command Deputy Director of Developments Dr. Ralph G. H. Siu served as the first chairman.

An updated version of the first report on 6.1 basic research (budgetary category), with emphasis on 6.2 exploratory development in support of two or more end items of equipment, was published under the leadership of Dr. Weiss in September 1966.

Director of Army Research Col Charles D. Y. Ostrom Jr., is coordinator of TARC activities and serves with Dr. K. C. Emerson, Special Assistant for Research to the ASA (R&D), in representing the Army on the Defense Committee on Research.

TARC members also represent the Army in their scientific disciplines on the Joint Discussion Forums for the Office of the Director of Defense Research and Engineering, as follows:

Physical and Mathematical Sciences, Dr. Peter Lenn and Dr. Robert Weigle; *Engineering Sciences,* Dr. Ernest Petrick and Dr. Maurice Apstein; *Environmental Sciences,* Dr. Hoyt Lemons and Dr. Andrew Assur; *Life Sciences,* Col Tyron Huber and Col William Tigertt; *Social and Psychological Sciences,* Dr. E. Kenneth Karcher Jr. and Dr. John D. Weisz.

TARC's new chairman, Dr. Quarles, has served since 1961 as Corps of Engineers Chief Scientific Adviser. Previously he was director of long-range planning on defense projects for the Bendix Corp., and he also has served as chief scientist of the former U.S. Army Ordnance Missile Command at Redstone (Ala.) Arsenal.

Dr. Gilford Quarles

Dr. Robert Weigle

Dr. E. K. Karcher, Jr.

Dr. Andrew Assur

Dr. Ernest Petrick

Dr. Peter Lenn

Dr. Quarles earned BS, MS and PhD degrees from the University of Virginia in the period 1930-34, diversifying studies in electrical engineering, general engineering, mathematics and physics with emphasis on the latter.

During the next 10 years, he served progressively as an acting, assistant and associate professor of physics at Mercer University, the University of Alabama and Furman University in 1934 as a research associate. From 1947-52, he was a project engineer, assistant director and then director of the Ordnance Research Laboratories, Pennsylvania State University.

DR. ROBERT WEIGLE joined the professional staff at Watervliet (N.Y.) Arsenal in 1959 as chief of research. In April 1962, he was promoted to chief scientist and technical director of the Benet Research and Engineering Laboratories.

Dr. Weigle received a BCE degree in 1951, MS in 1957 and PhD in 1959, all from Rensselaer Polytechnic Institute, Troy, N.Y. In 1963 he was one of two U.S. representatives who attended the NATO Arms Conference in Paris. Since 1963 he has served as a member of the Army Mathematics Steering Committee.

DR. PETER LENN is serving as acting chief, Physical Sciences B, Office of the Deputy for Research and Laboratories (DRL), U.S. Army Materiel Command, and is a recent addition to the staff of DRL Dr. Jay Tol Thomas.

Dr. Lenn was senior scientist with Electro-Optical Systems, Inc., from 1964 until he accepted his present position. For two years, he was a staff member at Northrop Space Laboratories. He was an instructor in mechanical engineering from 1962 to 1965 while doing graduate work in the University of Southern California Extension Division. His specialty fields are thermodynamics, aerodynamics, plasma accelerators, and analystical and experimental investigations.

DR. ANDREW ASSUR is a 1966 recipient of the Department of the Army's Exceptional Civilian Service Award Internationally recognized for his research, he has solutions to problems of logistic operations in cold regions through research on snow, ice and permafrost conditions.

Graduated from the Civil Engineering School in Rezeken, Latvia, Dr. Assur received a PhD degree from Hamburg University in Germany in 1950. He began his U.S. Civil Service career as , translator with the Army Corps of Engineers Snow, Ice and Permafrost Research Establishment in 1954.

DR. ERNEST PETRICK became chief scientist at Army Mobility Command HQ, Warren, Mich., in 1965 after serving five years as chief of research and engineering with Kelsey-Hayes Co., Romulus, Mich. Backed by more than 20 years of academic and industrial research and engineering experience, he was graduated in 1943 from Carnegie Institute of Technology.

After serving three years in the Navy during World War II, he was on the staff at Purdue University until 1953. While studying for MS and PhD degrees, he supervised the Gas Turbine Laboratory of the Jet Propulsion Center. In 1953 he joined Curtiss-Wright Corp. and later became chief, Advanced Propulsion Systems at Quehanna, Pa., where his group participated in early development of high-energy rocket propellants and ion engines.

DR. E. KENNETH KARCHER, JR. joined the staff of the U.S. Army Research Office in 1961 as a social psychologist and project coordinator in the Human Factors Division. For 14 years previous, he had served in the Personnel Research Branch of The Adjutant General's Office and was chief of the Behavioral Evolution Research Laboratory when he transferred to USARO.

Dr. Karcher also served as chief of the Combat Systems Research Laboratory during his long association with the Personnel Research Branch. He earned a BS degree from Lincoln Memorial University in mathematics and psychology (1946), MS from the University of New Mexico (1947) and PhD from Western Reserve University (1954).

Fifth National JSHS Scheduled at West Point

(Continued from page 1)

the Army's JSHS program, spoke at the first National JSHS in 1963. Nobel Prize physicist Dr. Polykarp Kusch was featured in 1964. In 1965 the late Dr. Robert Oppenheimer gave the principal address. Dr. Henry Morganau of Yale University and Dean Harry L. Levy of City College (N.Y.C.) shared leading roles in 1966.

Among other academic leaders who had accepted invitations to speak at the 1967 symposium at press time are Dr. Paul R. Elliott, assistant professor of zoology, University of Florida, and Dr. Frederick C. Steward, professor of botany, Cornell University.

Dr. Elliott will speak on "The Enlightened Animal World." A 1955 graduate of Phillips University, he received MA and PhD degrees from the University of Michigan. From 1960 to 1963, when he assumed his present position, he studied biochemistry at Johns Hopkins University, Baltimore, Md., on a National Institutes of Health Fellowship.

Dr. Steward had not announced the topic of his presentation at press time. He has been on the faculty at Cornell University since 1950 and in 1963 was the winner of the Stephen Hales Award from the American Society of Plant Physiologists. After receiving BS, PhD and DSc degrees in England, he came to the U.S. in 1945 and taught at the University of Rochester. He is a Fellow of the American Academy of Arts and Sciences and a member of the Royal Society, London, England.

Maj Gen Donald V. Bennett, superintendent of the U.S. Military Academy, and a top official representative of the Office of the Chief of Research and Development (OCRD), sponsor of the National JSHS, will welcome the conferees at the opening session Apr. 20. Lt Col Ralph A. Starner of OCRD, chief of the Communications Branch, Communications-Electronics Division, will preside at the banquet.

Apr. 22 at 7:30 a.m. participants will board buses for New York City where they will be addressed by a top official of the United Nations and taken on a guided tour of UN HQ.

High school students selected to participate in the National JSHS are representative of the top junior scientists screened from entries in the 23 regional JSHS sponsored throughout the past year by the Army in cooperation with industrial and academic institutions on an equal joint support basis. Arkansas will be represented as a new region for the first time.

In each region, six students, the JSHS director, a representative of the Department of Education, and a teacher who has made a notable contribution to the JSHS program are selected to attend the national symposium.

In addition about 25 students and 15 teachers will be representative of outstanding participants of the Youth Science Congress Program sponsored by the Office of Education, U.S. Department of Health, Education and Welfare. Like the JSHS students, they have been carefully screened for notable contributions to the program.

DR. MARGARET MEAD has a well-established position as a gifted public speaker in addition to her exceptional professional qualifications. Graduated from Barnard College in 1923 with a BA degree, she earned an MA in 1924 and PhD in 1929 from Columbia University, and has been recognized with honorary degrees from 16 academic institutions.

Since 1926, the year she finished a "Study of the Adolescent Girl in Samoa" as a National Research Council Fellow in the Biological Sciences, Dr. Mead has been associated with the Curator

R&D Managers to Exchange Views

Government, industrial and academic leaders will exchange views at the 12th annual Institute on Management Technology and Optimization of R&D, Apr. 24-27, at the Twin Bridges Marriott Motel, Washington, D.C.

The American University Center for Technology and Administration (CTA) is sponsoring the broad-range discussion of major R&D problems with respect to improvement of planning and management techniques.

The program has been planned for decision-making executives in the R&D process, directors of R&D laboratories, technology managers, program managers, and planning and operating staff.

Chief of Research and Development Lt Gen A. W. Betts and Army Materiel Command Chief Scientist Dr. Craig M. Crenshaw are key speakers.

CTA's Director of Institutes and Special Programs, Ralph I. Cole, will open the conference. General Betts is the luncheon speaker Apr. 24.

An afternoon session on Planning of Phenomena-Oriented Research in a Mission-Oriented Organization will feature Dr. William J. Price, executive director, Air Force Office of Scientific Research; Dr. Howard W. Vollmer, Stanford Research Institute; Gilbert Hollingsworth, Boeing Scientific Laboratory; Prof. Donald Telz, University of Michigan; and Dr. L. C. Van Atta, National Aeronautics and Space Administration Electronics Center.

The tentative program follows:

Apr. 25 — *Session III: The Mechanisms of Planning.* Technological Forecasting, Dr. Everett T. Welmers, assistant for technical operation, Manned Systems Division, Aerospace Corp.; Structuring R&D Planning to Optimize Effectiveness, R. F. Robinson, manager, Systems Analysis Department, Bendix Systems Division; Relation Between Technological System Requirements and the Availability of Research Results, Chester Hasert, AF Scientific Advisory Board.

The luncheon speaker will be Paul W. Howerton, director, Client Services, EBS Management Consultants, Inc., and adjunct professor at American University.

Apr. 25 — *Session IV: Characteristics of the Administration Control Process.* Project Organization — Where are the Pitfalls?, E. D. Jernigan, manager, Federal Systems Department, Industrial Nucleonics Corp.; Value of R&D Results — How Do You Measure?, J. Rabinow, president, Rabinow Electronics, Inc.; The Reporting Process — A Burden or a Help?, Dr. William W. Eaton, industrial consultant; and Synthesis and Identification of the Research and Development Choices, Irving R. Mirman, Assistant Deputy Chief of Staff for Science and Technology, Air Force Systems Command, Andrews AFB, Md.

Apt. 26 — *Session V: Decision Making and Its Process.* Are the Usual Management Decision-Making Processes Applicable to Effective R&D Program Direction?, Dr. Sam Rothman, acting director, Exploratory Developments Division, HQ Naval Material Command; Can Decision-Making Models Be Formulated for the R&D Process?, George W. Whittington, editor, *R/D Magazine;* and the Role of Systems Analysis in Planning and Decision-Making, Dr. C. M. Schoman Jr., Advanced Planning and Analysis, Naval Ordnance Lab.

The luncheon speaker will be Eldon E. Sweezy, executive director, Management Counsel, Bethesda, Md.

Apr. 26 — *Session VI: The Electronic Computers' Interface with Management.* Remote Computer Searching of Technical Information, Philip K. Reily, director of marketing, Chemical Abstracts Service; and R&D Management Information Systems, Dr. Craig M. Crenshaw.

Apr. 27 — *Session VII: Trends in R&D Resources and Management.* People — A Vital Resource, Dr. Charles W. Fotis, assistant for Civilian Training and Career Development Policy, Office of the Assistant Secretary of Defense, Manpower; Factors and Relationships Involved in the Management of Men, Money and Physical Plant, Edward M. Glass, assistant director (Laboratory Management), Office of the Director of Defense Research and Engineering.

Frank I. Adams, marketing manager, Department of Defense, RCA Service Co., will be the luncheon speaker.

Apr. 27 — *Session VIII: Research and Development Contracts.* Regarding Contractual Arrangements, Robert McMillan, Melpar, Inc.

of Ethnology at the American Museum of Natural History in N.Y.C. She started as an assistant and from 1942 to 1964 was an associate curator.

As a Social Science Research Fellow, she made a "Study of Young People in the Admiralty Islands" in 1928-29. For the past 30 years she has been increasingly in demand as a guest lecturer on child psychology and youth problems, and from 1957 has been a visiting professor of anthropology, Department of Psychiatry at the University of Cincinnati. She also has been since 1959 a visiting professor at the Menninger Foundation, Topeka, Kans.

Guest lecturer invitations have taken her to France (UNESCO Workshop for International Understanding), England (World Federation for Mental Health International Seminar), Australia (New Education Fellowship Jubilee Celebration), Austria (Harvard Seminar on American Civilization), and many major universities in the U.S.

In 1965 Dr. Mead was selected by the Nationwide Women Editors as "One of the Outstanding Women of the Twentieth Century." In 1940 she was presented with a National Achievement Award and in 1949 the Associated Press named her the "Outstanding Woman of the Year in the Field of Science."

The list of additional honors accorded Dr. Mead is long and highly impressive, including the "Spirit of Achievement Award" presented by the Women's Division of the Albert Einstein College of Medicine of Yeshiva University of Japan in 1960, and the "Leadership for Freedom Award" of the Women's Scholarship Association of Roosevelt University in 1963.

During her expeditions to foreign lands to study young people primarily but also adults, Dr. Mead has learned to use seven primitive languages. Four of her expeditions have been to the Admiralty Islands (1929, 1931-33, 1964, 1965), to Bali (1936-38 and 1957-58), Iatmul in 1938 and Montserrat in 1966.

Dr. Mead is a Fellow of the American Anthropological Association (president in 1960), American Association of University Women, American Ethnological Society, American Society of Clinical Hypnosis (charter), American Orthopsychiatric Association, Royal Society for the Encouragement of Arts, Manufactures and Commerce, the American Association for the Advancement of Science, and the Committee on Science and Promotion of Human Welfare, of which she is now chairman. She is also vice president of the New York Academy of Sciences, and chairman of the Parents Without Partners Committee of Science and Medicine.

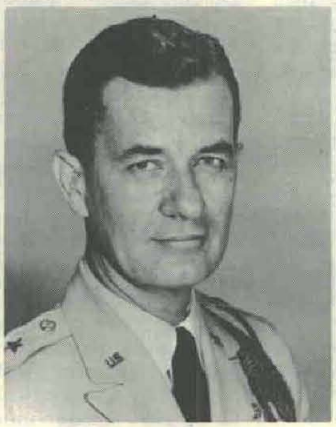
Dr. Mead finds time to serve as editor or coeditor of numerous books. She has authored or coauthored many books and magazine articles, including eight monographs, and has been responsible for preparation of numerous films on her travels and studies.

Norton Named AVCOM CG When Schiltz Goes to AMC

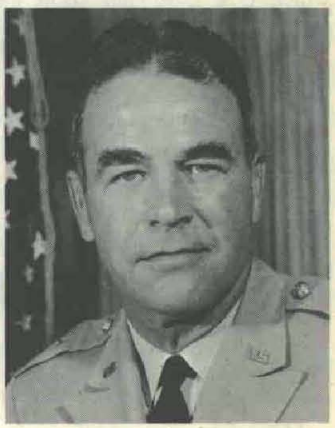
Maj Gen John Norton will end a 2-year assignment in Vietnam, where he is CG of the 1st Cavalry Division (Air Mobile), to become CG of the U.S. Army Aviation Materiel Command (AVCOM), St. Louis, Mo., May 1.

Brig Gen Howard F. Schiltz, AVCOM commander since April 1964, will report June 1 to HQ U.S. Army Materiel Command (AMC), Washington, D.C.

General Norton's successor in Vietnam had not been announced at press time. Assigned to Vietnam as commander of the U.S. Army Support Command when he reported in April 1965, he became assistant deputy CG of the U.S. Army in Vietnam in January 1966 and took command of the 1st Cavalty Division in May.



Maj Gen John Norton



Brig Gen H. F. Schiltz

Prior to the vietnam assignment, General Norton was assistant commandant of the U.S. Army Infantry School, Fort Benning, Ga., for two years. From September 1962 until May 1963, he was chief of the Aviation Division, HQ U.S. Continental Army Command, Fort Monroe, Va. He had served there two years on high-level boards, including the Howze Board which developed advanced concepts for air-mobile operations and assault doctrine.

During a 3-year tour in the Office of the Chief of Research and Development, HQ Department of the Army, Washington, D.C., he was chief of the Aircraft and Electronics Division and later chief of the Air Mobility Division. In October 1957, he was appointed by the President to serve as military aide to Prince Philip during the British royal family's Washington visit.

General Norton graduated from the National War College in 1959 and was assigned as commander of the 2d Battle Group, 4th Cavalry of the 1st Cavalry Division in Korea. He is a graduate of the United States Military Academy (1941), the Command and General Staff College, Armed Forces Staff College, and the U.S. Army Aviation School.

During World War II, he completed courses at the Infantry School, including the parachute course at the Airborne School, and served in North Africa with the 82d Airborne Division as a battalion executive, battalion commander and Division G-3.

Upon return to the United States, he was assigned to Fort Bragg, N.C., and served in various positions with the 82d Airborne Div., becoming chief of staff in 1947.

In 1948 he transferred to Washington, D.C., as a staff officer with the Strategic Plans Group of the General Staff. Later he served as deputy chief of staff for Plans, Office of the Chief of Staff, HQ Department of the Army. Then he served nearly three years as military assistant and executive officer to the Secretary of the Army.

General Norton holds numerous foreign decorations and U.S. service medals. His U.S. honors include the Legion of Merit, Bronze Star Medal with two Oak Leaf Clusters, Army Commendation Medal with OLC, Presidential Unit Citation, Combat Infantryman Badge, Army Aviation Badge, and Master Parachutist with four Bronze Stars.

GENERAL SCHILTZ, an ROTC graduate of Iowa State College, was commissioned a second lieutenant (USAR) in the U.S. Army Corps of Engineers in 1934 and went on active duty in 1941. In 1946 he was commissioned in the Regular Army and assigned to the Transportation Corps at Fort Eustis, Va.

Other assignments have included: HQ Far East Command, 1948-1951; Office of the Assistant Army Chief of Staff, G-1, 1952-1953; assistant secretary, Army General Staff, 1954-1956; CO, 28th Transportation Group, 1956-1958; deputy transportation officer, European Communications Zone, 1958-1959; executive in the Office, Chief of Transportation and in the Transportation Division, Office of the Joint Chiefs of Staff, J-4, 1959-1962.

He also has served as transportation officer for the United Nations Command and the Eighth Army in Korea. Before assignment as CG, AVCOM, General Schiltz was Army project manager of the Mohawk Aerial Surveillance System in Washington.

Report Summarizes 1966 Space Activities

America's "brilliant progress" in aeronautics and space activities during 1966 is documented in President Lyndon B. Johnson's recent annual report to the 90th Congress, summarizing participation by 14 agencies.

Prepared under supervision of the National Aeronautics and Space Council headed by Vice President Hubert H. Humphrey, the report states in an introduction signed by the President:

"Our national investment in space has stimulated the invention and manufacture of a flood of new products. Our new knowledge has made us more secure as a Nation and more effective as leaders in the search for peace. This knowledge is hastening the ultimate solution of social and economic problems that combined to obstruct peace."

Detailed in the report are the success of the GEMINI-manned missions on which U.S. astronauts spent more than 1,900 hours in orbit, and the significant achievements of the Lunar Orbiters, the APOLLO-SATURN moon program and the Manned Orbiting Laboratory.

The President's introduction also states:

"In December the United Nations, following this country's lead, reached agreement on the Outer Space Treaty. At that time I said it had 'historic significance for the new age of space exploration.' It bars weapons of mass destruction from space. It restricts military activities on celestial bodies. It guarantees access to all areas by all nations."

In addition to summarizing activities of the National Aeronautics and Space Council, the report devotes a chapter each to participation of the Department of Defense, Atomic Energy Commission, Department of State, National Science Foundation, Department of Commerce, National Academy of Sciences-National Research Council, Federal Communications Commission, Smithsonian Astrophysical Observatory, Federal Aviation Agency, U.S. Information Agency, and the Arms Control and Disarmament Agency.

Defense Communications Satellite Program (DCSP). The Army is cooperating with the other services and the Defense Communications Agency in the three efforts which comprise the DCSP: SYNCOM, the Initial Defense Communications Satellite Program (IDSCP), and the Operational Defense Satellite Communications System.

Army responsibility for developing the ground terminals and conducting the technical test program is being carried out by recommending terminal sites and constructing the facilities for IDCSP.

During 1966 ground terminals were established for worldwide communication on the east and west coasts of the United States and in Germany, Hawaii, the Philippines and Vietnam.

Development of a smaller, lighter ground terminal, transportable in a single aircraft, continued throughout 1966 with testing beginning in November.

Tactical Communications Satellites. As a participant in the Tri-Service Steering Group managing a joint research and development program for tactical communications satellites, the Army has the primary responsibility for development of ground equipment.

During 1966, terminals were installed in combat vehicles for the 1967 tests. Development of an actual operational tactical satellite communications system will depend on the results of this 1967-68 experimental program.

Geodetic Satellite. The U.S. Army Corps of Engineers has extended a continuous geodetic network from Japan to Hawaii, using the Sequential Collation of Range (SECOR) Satellite System.

Three SECOR satellites, VI, VII AND VIII, with a newly developed high-altitude performance capability, were successfully orbited in 1966. The SECOR transponder in VII is functioning favorably, and greater distance between stations is expected soon. A SECOR transponder is also carried on NASA's Explorer XXIX.

Operations will begin shortly on a 30-station globe-circling network designed to link all major geodetic datums, provide a new determination of the earth's equatorial radius, and provide scale to the PAGEOS satellite triangulation network.

Helicopters. The Army initiated design of the AH-56A Advanced Aerial Fire Support System helicopter and has

U.S. Army Mapping Mekong River Basin

Photogrammetric mapping of the Mekong River Basin in Southeast Asia will be done under a U.S. Army Map Service (AMS) contract as part of U.S. support of the international PaMong Survey Project.

Acting for the U.S. Agency for International Development (AID), Department of State, the Army Corps of Engineers Map Service has contracted with Aero Service, a division of Litton Industries. Basic data will be provided to determine the economic feasibility of constructing the proposed PaMong multipurpose dam on the Mekong in Laos.

The U.S. is assisting the United Nations — Mekong Committee project to study the economic and technical feasibility of vitalizing the basin with a dam which would provide power, irrigation of farm lands, flood control and river navigation. Cambodia, Laos, Thailand and Vietnam are represented.

The U.S. Bureau of Reclamation of the Department of Interior is administering U.S. participation. A preliminary study on the 8-year program was completed in June 1965 and an advanced reconnaissance study is in process.

In a Participating Agency Service Agreement between AID and the U.S. Army Corps of Engineers, the AMS is responsible for a technical study of mapping and aerial photographic requirements and for a detailed plan covering essential elements of work by AMS and Aero Service.

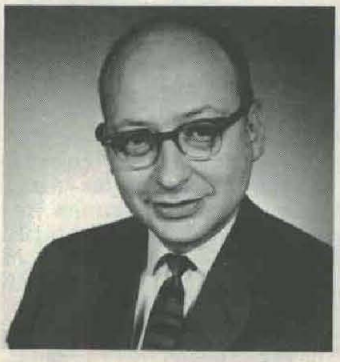
The contractor will provide basic horizontal and vertical survey control for 6,209 square miles, supplemental horizontal and vertical survey control for photogrammetric mapping of 3,006 square miles, aerial photography of 7,905 square miles and 455 photogrammetrically compiled map sheets at a scale of one to 10,000.

ARPA Names Dr. Franken Deputy Director

Dr. Peter Franken, professor and researcher at the University of Michigan, has been appointed Deputy Director of the Advanced Research Projects Agency (ARPA).

Dr. Robert Frosch vacated the position when he recently was appointed Assistant Secretary of the Navy for Research and Development.

With the University of Michigan since 1956, Dr. Franken was a member of a research group which made some of the original studies and experiments with the laser leading to its possible development as an instrument of communications.



Dr. Peter Franken

Dr. Franken's laser research is recognized in his selection to receive the 1967 American Physical Society award for his "important and original contributions in the field of spectroscopy, particularly to harmonic generation and rectification, cross-over spectroscopy and optical pumping."

Dr. Franken has served on the Group on Optical Masers of the Advisory Group on Electron Devices for the Office of the Director of Defense Research and Engineering and is a member of the Review Committee for the Physics Division of the Argonne National Lab.

He received a BA degree in 1948, MA degree in 1950, and PhD from Columbia U. in 1952.

contracted for 10 prototypes. The design of the aircraft will integrate armament, avionics and fire control subsystems. A weapons platform will be capable of effectively employing various combinations of point and area fire weapons in support of ground combat operations.

Pending availability of the AH-56A, the Army is procuring the AH-1G Cobra in response to an urgent operations requirement for an interim improved armed helicopter in Vietnam. The Cobra is a streamlined version of the UH-1.

The AH-1G armament includes a flexible chin turret and wing-mounted pods which are capable of employing machineguns, rockets, and grenade launchers. Flight test reports of an AH-1G prototype are highly favorable.

V/STOL. The three services successfully conducted individual operational evaluations of the XV-6A (P1127) aircraft in performing missions related to their specific interests. The British-built diverted-thrust aircraft was evaluated for flight operating procedures, transition techniques, suitability to operating environments, logistic implications, and various takeoffs and landings.

Members of the XC-142A Tri-Service Test Force at Edwards Air Force Base have operated the tilt-wing V/STOL transport aircraft from various land and ship surfaces. Cargo drop and rescue potential were investigated. The Army is preparing an operational plan for an evaluation this summer of the aircraft's ability to operate from an Army field environment.

Missile Interception. In cooperation with the Advanced Research Projects Agency, the Army is developing the technology of high-acceleration solid rockets for advanced missile interceptors requiring extremely short reaction times and the ability to perform high-G and high-Q maneuvers.

This has involved the development of high-burning rate propellants and novel means of achieving thrust vector control through external burning. The Army is also sponsoring the development of smokeless propellants for tactical field missiles.

Project HARP. This joint U.S.-Canada high-altitude research program using gun-launched instrumentation vehicles continued to develop techniques for probing the upper atmosphere. Fiberglass plastic rocket bodies have been successfully developed and tested. Rocket grains, rocket components and hardened telemetry components have withstood the 10,000-g acceleration associated with a gun launch. An improved powder ignition has produced higher muzzle velocities.

An extended 16-inch modified gun was installed at the Highwater Test Facility in Canada for horizontal test firings of rockets and guidance control systems. A similar gun was installed at the Yuma (Ariz.) Proving Ground for vertical firing of recoverable rocket components and to collect upper-atmosphere wind information.

Approximately 50 vertical firings with the 16-inch gun during 1966 gathered upper-air wind and electron-density measurements and tested the engineering design. The firings detected atmospheric winds in excess of 200 knots at 475,000 feet and marked wind changes in speed and direction over short time intervals.

Support to NASA. Army support of NASA projects includes design and construction of facilities by the Corps of Engineers; development of lunar mapping techniques and lunar control networks by the Army Map Service; and an Army Materiel Command-Corps of Engineers study of the feasibility of modifying an Army vehicle for exploration of the moon's surface.

The Army Materiel Command is conducting mobility tests on two versions of prototype lunar vehicles, and the Corps of Engineers is Assisting the National Aeronautics and Space Administration in evaluating engineering models of lunar drills (see the *Army Research and Development Newsmagazine,* October 1966, page 8).

Through its laboratories and field commands, the Army Materiel Command carried out a variety of research and development projects for NASA. These included development of freeze dried foods for space use and design of clothing for extended missions at the Natick (Mass.) Laboratories; investigation of spacecraft contamination and development of a post-operational destruction system for the NERVA engine at Picatinny Arsenal; development of a safety and ignition device for a spacecraft apogee motor, and development of fluid logic techniques at Harry Diamond Laboratories.

HumRRO Studies Role of WO Aviator

Analysis of questionnaires filled out by 2,000 Army warrant officer aviators is under way to define in detail the role of the flying specialists and review the adequacy of their training and career programing.

The George Washington University Human Resources Research Office (HumRRO), Division No. 6 (Aviation), Fort Rucker, Ala., is making the study under contract with the U.S. Army Research Office, Office, Chief of R&D.

Purporse of the study is to determine the actual and potential functions of warrant officer aviators to insure that their training prepares them for field duties. HumRRO is hoping responses will indicate how well the warrant officers feel their preflight and flight training courses met requirements.

The questionnaire was sent to all warrant officer aviators on the Army rolls. More than 80 percent completed and returned it — a high percentage, considering that some may not have received the query due to assignment changes and transient conditions.

Researchers are analyzing also the additional nonflying duties aviators are called upon to perform. Many of the new warrant officers have stated they were unaware of the extent to which they would be called upon for "additional duties," and some reported they felt unqualified to undertake them.

Survey results are expected to provide definitive information on the extent to which warrant officer aviators perform additional duties in the field and the nature of the duties. An objective is to obtain information needed to improve career programing to enhance attractiveness of the warrant officer aviator career field.

Responses to questions will indicate how warrant officers and their wives feel about such facets of military life as assignment policy, temporary duty, permanent change of station, housing conditions, on-post facilities, pay, promotion rates and others.

Findings of the questionnaire analysis will be presented in a series of briefings at the U.S. Army Aviation School at Fort Rucker, HQ of the U.S. Army Continental Army Command at Fort Monroe, Va., and top Army leaders in Washington, D.C.

Briefings will precede the publication of technical reports so that Army planners can act quickly on any indicated modifications of training, recruitment, assignment and career planning.

Agencies Probe Rankine Units Powered by Organic Materials

Use of organic materials in Rankine Cycle power generation systems was reviewed recently by representatives of six industrial laboratories, the Department of Defense, Atomic Energy Commission, National Bureau of Standards and the National Aeronautic and Space Administration.

The meeting was arranged by the Atomic Energy Commission through the Power Information Center to evaluate use of organic materials as potential substitutes for water or liquid metals as a driving vapor in a closed cycle generator.

Each of the industrial presentations was made without the other industrial laboratory representatives being privileged to listen to it.

Major effort in this field has been funded by the AEC and NASA. Army representatives were interested in the presentations because Rankine Cycle systems are potentially reliable with up to 20 per cent efficiency utilizing any kind of fuel for heating.

Dr. Sidney Magram, chief of the Energy Conversion Branch, Physical and Engineering Sciences Division U.S. Army Research Office represented the Office of the Chief of R&D.

Report to Congress Examines Use of Federal R&D Resources

Utilization of federal government in-house laboratories and R&D "plant" resources aggregating more than $8.4 billion is examined penetratingly and critically from a management standpoint in a recent report to Congress.

"A Case Study of the Utilization of Federal Laboratory Resources," was prepared by the Science Policy Research Division, Legislative Reference Service, Library of Congress. It is a summary of a study requested by the Research and Technical Programs Subcommittee of Committee on Government Operations.

The letter of transmittal states, "You will find much of this information is of a kind not previously presented to Congress." It notes that utilization of federal laboratory resources "appears to have received little attention to date." The report aims to fill a gap in management literature on R&D effort.

Initiated as a case study of federal R&D for environmental pollution control and abatement, the project involved an examination of federal policies as presented in responses to questionnaires from nine of the major departments and agencies. More than 1,000 projects in this field are conducted in "from 100 to 200 installations."

Findings and recommendations were prepared under the direction of Dr. Warren H. Donnelly, a specialist in science and technology, assisted by Dr. Lawton M. Hartman, Robert L. Thornton, Miss Sylvia M. Kesinger and Miss Nancy Gamarra.

Total federal funding obligations for research and development performance have increased by about 660 percent since FY 1955, the report states. The corresponding increase within federal laboratories has been about 260 percent. More than 300,000 scientists, engineers and technicians are employed in federal laboratories, and by 1970 the total is expected to increase to 433,000.

Questionnaires were answered by the Department of Agriculture; Department of Commerce; Department of Defense (DoD); Department of Health, Education and Welfare; Department of the Interior; the Atomic Energy Commission (AEC); National Aeronautics and Space Administration (NASA); Tennessee Valley Authority; and the Veterans' Administration.

Army facilities listed with projects in pollution are Walter Reed Army Institute of Research, Washington, D.C.; U.S. Army Medical Unit, Fort Detrick, Md.; U.S. Army Environmental Hygiene Agency, Edgewood, Md.; U.S. Army Research Institute of Environmental Medicine, Natick, Mass.; and

U.S. Army Chemical Research and Development Laboratories, Edgewood, Md.; the U.S. Army Medical Research Laboratory, Fort Knox, Ky.; U.S. Army Aeromedical Research Unit, Fort Rucker, Ala.; U.S. Army Medical Research Unit — Europe, Landstuhl, Germany; U.S. Army Dugway Proving (Utah) Ground; the U.S. Army Deseret Test Center, Fort Douglas, Utah; and White Sands (N. Mex.) Missile Range.

The Department of Defense listed 43 facilities engaged in pollution R&D, second only to the Department of the Interior. DoD projects were relatively few, however, with funding of $325,000 in FY 1966, compared with the AEC's $25,307,000.

The report examines policies, types of management information, organizational relationships, missions and

Agency Helps Minimize Radioactivity Hazard

Assistance in minimizing hazards associated with increasing use of radioactive luminous compounds in Army materiel is one of the functions of the U.S. Army Environmental Hygiene Agency, an activity of The Surgeon General at Edgewood Arsenal, Md.

Announcement of availability of this assistance was made recently by the Office of The Surgeon General to avoid costly experience and protect the health of those who may come into contact with radioactive materials.

The most economical point to eliminate personnel hazards due to radioactive self-luminous material, it was emphasized, is during the development phase of new items. Strict control must be exercised, in addition to property accountability, from procurement to ultimate disposal of dangerous materials and compounds.

Prior to the Korean War, radium was used almost exclusively as the excitation source. Increasing use is now being made of radioisotopes generated artificially through nuclear fission, accelerator or activation processes. The basic problem remains of insuring that the radioactive component does not constitute a hazard to personnel during and after its military lifetime.

Radioactive self-luminous compounds have been incorporated in a variety of items, including compasses, watches, clocks, azimuth indicators and scales, surveying instruments, personnel markers, aircraft exit markers and levels.

Development agencies desiring assistance from the U.S. Army Environmental Hygience Agency should send requests to The Surgeon General, ATTN: MEDPSP, Department of the Army, Washington, D. C., 20315.

Research Support Group to Provide Logistics Aid for Icecap Resurvey

Logistics support for U.S. researchers on the Greenland Icecap during the summer season will be the task of the U.S. Army Research Support Group, Fort Belvoir, Va., for the twelfth year.

The 140 officers and enlisted men will support scientists and engineers of the U.S. Army Map Service and the U.S. Army Cold Region Research and Engineering Laboratory. A resurvey of the icecap will seek to determine movement of its ice flow. The study is part of the Army's research in operational problems in polar regions. The men will stay at Camp Tuto, 15 miles southeast of Thule, from May 1 to June 30.

ECOM Appoints New Chief of Power Sources

One of the pioneers in Army fuel cell electric power research at Fort Belvoir, Va., Dr. Galen R. Frysinger, is the new chief of the Power Sources Division, U.S. Army Electronics Command (ECOM) at Fort Monmouth, N.J.

Assigned to the ECOM Electronic Components Laboratory, Dr. Frysinger directs about 70 scientists and engineers working on new or improved battery and power systems, including major fuel cell projects. He succeeded Arthur F. Daniel when he became chief of the recently organized Plans Analysis Office.

Graduated in 1953 from Juniata College, Huntingdon, Pa., Dr. Frysinger earned MA and PhD degrees in chemistry from Yale University. With the aid of a Fulbright scholarship and a National Science Foundation fellowship, he then studied electrochemistry for two years at Max Planck Institute in Germany.

After returning to the U.S., he taught thermodynamics and physical chemistry at the University of North Carolina, then went to work for Arthur D. Little, Inc., Cambridge, Mass.

Dr. Frysinger is interested as a hobby in proposed high-performance electrically powered automobiles being studied by private industry as a means to reduce air pollution in cities caused by internal combustion engines.

A paper he wrote recently on the subject sounds out possibilities of a vehicle powered by a combination of fuel cells and batteries.

Dr. G. R. Frysinger

their changes over a period of time, and practices. It gives the background of past governmental interest in laboratory utilization, examines development of federal laboratory utilization policy, and reviews the federal coordinative bodies involved in pollution.

The concluding chapter lists questions which "may merit further Congressional consideration." An appendix with the agency replies is included.

Two-thirds of the laboratories covered in the survey said they experienced no change in mission over a period of rapidly expanding national interest in pollution. This was explained in part by stating that the depth of analysis might change although a particular basic question might have been under examination for some time. The number of federal laboratories performing pollution research grew rapidly, with few facilities terminated.

On the topic of what criterion is used to determine whether work will be done in-house or contracted out, the report states the "common denominator of the responses appears to be that research and development is contracted if it is clear that it cannot be performed within a federal installation. Only one agency (AEC) referred to Bureau of the Budget guidelines."

Development of federal policy on utilization of research and development resources is traced from the Economy Act of 1932 to the latest general policy statement, Bureau of the Budget Circular No. A-76, issued in 1966.

The circular stated that "no executive agency will initiate a 'new start' or continue the operation of an existing 'government commercial activity' except as specifically required by law or as provided in this circular.

Guidelines are "in furtherance of the government's general policy of relying on the private enterprise system to supply its needs. National interests may sometimes justify federal in-house laboratories providing the products and services the government uses."

The government may supply its own services for military purposes, if procurement from a private source would disrupt or delay an agency program, or if a satisfactory commercial source is not available and cannot be developed in time.

Other justifying circumstances are if the product or service is available from another federal agency or if procurement from a commercial source will result in higher cost.

Cost comparison studies are required when the government must finance more than $50,000 of facilities and equipment. A "new start" should not be approved unless the cost will be at least 10 percent below the cost of using a commercial source.

Although there seems to be an accepted policy in support of a strong federal laboratory establishment, there has been no formal statement of how this establishment should be managed — particularly as federal requirements for research and development originate, change and decline, the report states, adding:

"While several parts of the Executive Office of the President have an interest in laboratory resources, there does not appear to be any single office with overall responsibility for laboratory utilization.

"Despite the capital investment and the scientific and technological capabilities represented by these laboratories, apparently there is no office that keeps fully informed concerning federal laboratory resources, their locations, characteristics, capabilities and performance, or the factors that encourage or inhibit the most effective utilization of these laboratories."

Concerning the type of information about facilities and equipment that is regularly prepared or available to management, the replies suggested that consideration of the allocation and utilization of physical resources does not occupy as important a place as that of manpower and financial resources in management decisions-making.

Inventories, usually annual and generally not indicating usage, were mentioned in 56 instances. Reports, primarily annual, on the laboratory, research progress, staffing and plans were mentioned in 52 instances. In 43, no information was regularly available about facilities and equipment; in 29, nothing was regularly prepared for management.

Problems identified in the study were not those so much those of coordination with public purpose as those related to the mechanics of management.

Listed as problem areas were separation of information sources, lack of uniformity of federal accounting systems, the role of the planning-programing-budgeting system in relation to federal laboratories, program fragmentation, policy on federal versus private laboratory work, isolation of the laboratory from the point in the management hierarchy where decisions are made, and appraisal of capability.

The report is available from House Committee on Goverment Operations.

Interagency Officials Discuss Mathematics Program

Proposed special support of postgraduate mathematicians and the holding of regional conferences on specialized topics in mathematics were discussed recently by managers of government mathematical sciences programs.

Representatives of the Army, Navy, Air Force, National Science Foundation, and National Aeronautical and Space Administration also discussed the NSF summer training programs for teachers.

The managers meet twice annually to exchange information on their contractors, grantees and proposals to eliminate unwarranted duplication of effort. They also discuss general mathematical programs of each agency and note prospective changes to determine whether the emphasis should be altered.

USABRL Engineer Wins 8th Annual Zornig Award

Eighth winner of the annual Zornig Award is Howard A. Ricci, an engineer with the U.S. Army Ballistic Research Laboratories (USABRL), Aberdeen Proving Ground, Md.

Established to honor Col H. H. Zornig, the award is presented to individuals for outstanding work in support of the laboratories' mission. Col Zornig is recognized as being largely responsible for organizing the USABRL and was director until 1941.

USABRL Technical Director Dr. Curtis W. Lampson (left) presents 1966 Zornig Award to engineer H. A. Ricci.

Dr. Curtis W. Lampson, technical director of the laboratories, presented the 1966 award to Ricci for accomplishments as assistant chief of the Instrument Development Section, Exterior Ballistic Laboratory.

Ricci received a bachelor's degree in industrial engineering from Johns Hopkins University in 1948 and has been with USABRL since then. During World War II, he served with the U.S. Army Corps of Engineers in Europe.

In collaboration with A. S. Platou, also of USABRL, he has coauthored two papers. The first "Solid State Strain Gages," was presented at the 20th Semiannual Supersonic Tunnel Association Meeting in Hollywood, Calif.

"Wind Tunnel Tests of Solid State Gages" was presented in 1964 at the 22nd meeting of the Supersonic Tunnel Association at the von Karman Institute for Fluid Dynamics in Belgium, and again a week later at the First International Congress on Instrumentation in Aerospace Simulation Facilities in Paris.

AMRA Contract Yields Major Advance in Composite Armor

Breakthrough as applied to research and development tends to be an overworked if not grossly misused word, but recent progress in improving composite steel armor appears to fit the use for which it is intended.

Under contract with the Army Materials Research Agency (AMRA), Watertown, Mass., the U.S. Steel Co. began research and development studies on lightweight heat-treatable composite steel armor in May 1966. Objective:

"To develop and produce . . . armor having a merit rating of 1.50 or greater and that can be produced in commercial quantities at moderate cost on existing equipment for protection against caliber .30 and .50 AP M2 projectiles."

In a technical paper presented recently to the American Ordnance Association at its Conference on Fabrication and Utilization of Materials for Light Armor," S. J. Manganello of U.S. Steel reported on some results of the AMRA contract to date.

The concept of composite-steel armor, he stated, involves the use of a very high-hardness, high-penetration-resistant armor as a front face that breaks up the penetrator of an armor-piercing projectile and that does not spall, even when shattered, because the front face is bonded metallurgically to a tougher, crack-arresting rear face. Composite steel thus exhibits desirable multihit protective capability.

Protective power generally increases as the hardness of homogeneous steel armor is increased to the point where it becomes brittle and is defeated due to cracking and spalling.

Composite "dual-hardness" steel armor gives a 40 to 70 percent improvement in protection against armor-piercing projectiles as compared to the "best" (as currently known) homogeneous high-hardness armor steels produced in U.S. Steel laboratories.

Under the contract, U.S. Steel has been evaluating composites bonded by roll bonding, roll and diffusion bonding, explosive cladding, explosive cladding and rolling, cast cladding and rolling, and weld overlaying and rolling. The explosive cladding experiments are conducted in a cooperative program with duPont Co.

Applicability of findings to production practices is being evaluated concurrently with laboratory development of the quality of composite steel armor the Army Materials Research Agency is seeking under the contract.

Manganello reported that "we are hopeful that the development of composites with more than two layers will enable us to employ very tough, low-carbon steels for the rear face."

Three commercial lots of composite armor as called for by the contract have been produced to date, each consisting of different combinations of low-alloy steels. They have been made by "practical production techniques," and roll-bonded, oil-quenched and tempered.

Each of the lots has exhibited good ballistic properties. Merit ratings as high as 1.7 have been obtained on production plates against caliber .30 armor-piercing projectiles. Merit ratings against caliber .50 projectiles have been lower, averaging about 1.3.

In his paper, Manganello states:

"Welding and forming studies have been undertaken concurrent with the studies to develop improved heat-treatable composite steel armor. Composite steel armor is formable before hardening. Rolled 0.3-inch-thick production place samples were normalized and tempered to a hardness of about 27 Rockwell C, then formed on a 3-point guided bend-test fixture to bend radii ranging from 1½ inches to ½ inch without cracking in the outer fibers — the high-carbon steel is on the tension surface.

"Both longitudinally and transversely oriented plate sample could be cold-formed 180° to the ½-inch radius. The same excellent formability was observed in 0.4-inch-thick plate samples that did not have the surface scale ground off. . . . We have succeeded in softening our latest production lot of composite steel armor to a hardness of about 19 Rockwell C.; this should make the composite steel armor even more cold-formable.

". . . To prove our point of weight savings, a prototype helicopter seat made by Berwick Forge and Fabricating Co. for Boeing/Vertol from heat-treatable composite steel armor was 15 percent lighter than a comparable seat made originally from ausformed composite steel armor. . . . Heat-treatable composite steel armor can serve a structural as well as a protective function."

Among fabrication advantages of heat-treated composite armor over ausformed composite armor are that it has a potential of being formed hot or cold (in the softened condition), welded in any manner (with or without preheat and postheat, and with partical — or full-penetration welds), readily cut to size with conventional cutting equipment (either hot or cold), drilled or punched, then quenched and tempered to the final desired hardnesses (if the size of welded assemblies permits such heat treatment).

Further, when heat treating is possible after welding, the ductility of composite steel armor, that may have been exhausted by cold-forming is restored. The heat-affected zone resulting from welding is eliminated, and, if the weld metal is heat-treatable, it is hardened. Extensive tests have proved that flat heat-treated composite steel armor can be produced in large plate widths and heavy thickness if desired.

Army R&D Labs Test Automatic Fuel Detector

An automatic detector embodying a flashing red light and a klaxon-type horn is being tested as a new system of timing the diversion of different types of refined fuels through military pipelines to specific storage tanks.

The U.S. Army Engineer Research and Development Laboratories at Fort Belvoir, Va., is experimenting with the prototype device to replace computation of pipeline volume and rate of flow, and continuous hand sampling.

FUEL DETECTOR, undergoing tests at the U.S. Army Engineer R&D Laboratories, Fort Belvoir, Va., may replace present methods of computing rate of flow and specific gravity of fuel pumped through military pipelines.

Installed on both incoming and outgoing lines at each bulk storage terminal, the detector signals the product change in a pipeline as it detects location of a batch interface between dissimilar hydrocarbon fuels.

It determines the gravity of incoming fuel to permit correct stream switching procedures, and of outgoing fuel for signaling to the next terminal. The alarm system indicates a product change in the pipeline which is visible and audible up to 200 feet.

Containing a stainless steel paddle mounted in an open-end steel tube, the detector head is immersed in the fuel flowing in the pipeline. The paddle is vibrated at 120 cycles per second by a drive coil. Variations in paddle vibration resulting from changes in the specific gravity and viscosity of the surrounding fuel are reflected by a signal generated in a pickup coil at the opposite end of the cylinder.

The signal is relayed through shielded cable leads to a tripod-mounted receiver which records gravity (API degrees) to actuate the alarms.

TECOM Plans Materiel Tests in Extreme Environments

ARCTIC, TROPIC, DESERT test center representatives join U.S. Army Test and Evaluation Command (USATECOM) commander at environmental test planning conference, Aberdeen Proving Ground, Md. From left are Maj Gen Leland G. Cagwin, USATECOM commander; Col Walter F. Johnston, Arctic test Center deputy CO; Lt Col Joseph Hilpert, Yuma Proving Ground representative; and Lt Col Frederick W. Yanker, Tropic Test Center deputy CO.

Plans for FY 1968 materiel testing under arctic, desert and tropic conditions were drawn by about 100 representatives of major commands in a recent 3-day conference at HQ U.S. Army Test and Evaluation Command (TECOM), Aberdeen Proving Ground, Md.

Maj Gen Leland G. Cagwin, TECOM commander, and Col John M. Gaustad, chief of the Test Analysis and Operations Office, welcomed the group.

Representatives of the 15 proving grounds, service test boards and environmental test centers operated by TECOM discussed requirements for materiel testing to prove operational reliability under extremes of environmental conditions.

Many of these conditions can be simulated for earlier phases of research and development in environmental test chambers. Service testing of materiel, however, requires operation under the actual variety of extremes in which it must function.

Arctic testing is centered at the U.S. Army Test Center, Fort Greely, Alaska, while conditions representative of the humid tropics are provided in the variety of operational extremes in the terrain and climate at the U.S. Army Tropic Test Center, Panama Canal Zone.

Desert environment at Yuma Proving Ground, Ariz., provides the conditions for an extensive program of materiel testing, oriented heavily toward engineering design and production problems.

Much of the Army's testing of airdrop equipment and techniques is done at Yuma. The weather is usually favorable to aircraft operations. Yuma, however, also provides technical resources and support for arctic environmental testing at the Arctic Test Center, as well as for desert tests of materiel.

The Arctic Test Center is 175 miles south of the Arctic Circle where winters are long, cold and marked by freezing winds and drifting snow. In this rugged environment, the operational reliability of materiel and the man-machine compatibility factors can be probed.

Extreme contrasting conditions are found at the U.S. Army Tropic Test Center where heat, salt-water high-humidity atmospheric conditions and heavy rainfall are combined with jungle and swamp areas that present difficult operational problems.

Problems encountered in the Tropic Test Center investigations involve rapid deterioration of many items of equipment; mobility and durability of vehicles in jungle bogs coupled with dense undergrowth very difficult to penetrate; and ineffectiveness of much communication equipment.

The war in Southeast Asia has served to accentuate the importance of operations at the Tropic Test Center in the Canal Zone area because of the similarity of environment. All the service test boards have an interest in tropic testing, but the major user at present is the Airborne, Electronics and Special Warfare Board.

Environmental testing has a simply stated objective: To ensure that materiel will be usable with maximum effectiveness under all conditions of combat.

TECOM Designates Gaustad Test Analysis Chief

New chief of the Test Analysis and Operations Office, U.S. Army Test and evaluation Command (TECOM), Aberdeen Proving Ground, Md., is Col John M. Gaustad, TECOM director of armor materiel testing since July 1964.

Col Gaustad was one of the staff officers of the U.S. Army Research Office during its second year of operation in 1959. He was chief of the Operations and Research Division when he departed in 1960 to attend the Army War College, from which he was graduated in 1961.

Col John M. Gustad

The new assignment makes him responsible for shaping TECOM policies, procedures and regulations for testing and evaluating military hardware. Included in his duties are the review and analysis of test reports and the planning of test programs conducted by the 15 proving grounds, service test boards and environmental test centers.

Prior to assignment to TECOM, he was commander of the 3rd Brigade, 4th Armored Division in Germany. He commanded the 67th Tank Battalion, 2d Armored Division and later served as division G-4 and G-3 in Europe (1954-1957).

Col Gaustad was graduated from the Armored Officers Advanced Course in 1949, the Air Command and Staff Course in 1951 and the Armed Forces Staff College in 1958.

Lubricants Tested at ATC, Alaska

RIFLES AND MACHINEGUNS used in testing small arms lubricants are exposed continuously to the elements by the U.S. Army Arctic Test Center at Fort Greely, Alaska. Five products are under study in the quest for a lubricant suitable for use with all small arms in temperatures ranging from minus 10°F. to minus 65°F. Weapons used in tests include M14 and M16E1 rifles and M60 and M73 machineguns.

Optics Symposium Slated Mar. 22-24

An international Symposium on Modern Optics in New York City, Mar. 22-24, arranged by Polytechnic Institute of Brooklyn under sponsorship of the Joint Services Electronics Program (JSEP), is expected to draw some 800 participants.

Scheduled to coincide with the international convention of the Institute of Electrical and Electronics Engineers (IEEE), the optics symposium is the seventeenth of the annual international conferences arranged by Polytechnic Institute of Brooklyn (PIB). All sessions will be at the Waldorf-Astoria.

Topics of more than 50 technical papers to be presented include advances in laser interferometry; holography I, II and III; coherence; acoustic interactions; nonlinear optics; lasers; electrodynamics and diffraction; information transmission and processing; and atmospherics and X-ray astronomy.

Dr. Chalmers W. Sherwin, Deputy Assistant Secretary for Science and Technology, U.S. Department of Commerce, will be the featured speaker at a Mar. 22 luncheon. His topic is "Synthetic Aperture Radar — A Case History of Hindsight Analysis," based on findings in the Department of Defense Project Hindsight study. Dr. Sherwin formerly was Deputy Director of Defense Research and Engineering for Science and Technology.

Dr. Frederick B. Llewellyn, PIB director of research and a prominent research physicist, is chairman of the symposium on optics. Professors L. Bergstein and W. K. Kahn of PIB are designated as cochairmen.

The PIB Microwave Research Institute administers the symposia series with the JSEP members: Air Force Office of Scientific Research (AFOSR); U.S. Army Research Office, Office of the Chief of Research and Development; and the Office of Naval Research (ONR).

Seminar project officer is Lt Col William Kalish of AFOSR. Lt Col J. Edward Houseworth III is the OCRD project officer of the JSEP.

The JSEP was organized to provide the U.S. Department of Defense with a hard-core research capability in the electronics and related areas of the basic research spectrum. The sophisticated research program is performed by the laboratories of 11 academic institutions.

Comprising the JSEP complex are Massachusette Institute of Technology, Harvard U., Columbia U., PIB, U. of Illinois, Stanford U., U. of California (Berkeley), U. of Southern California (Los Angeles), U. of Texas, Purdue U. and Northwestern U.

Huey Cobra Undergoing Aerial Weapons Tests

An airworthiness qualification testing of the Army's AH-1G Huey Cobra, the Army's first helicopter developed as an aerial weapons system, is under way.

Under contract with the Army Aviation Materiel Command in St. Louis, Bell Helicopter Co. pilots are putting the new craft through rocket and machinegun-pod jettison tests and armament firing tests. About 300 dummy pods of various configurations are being dropped to assure safe jettisoning of pods in an emergency. Army pilots fly Bell UH-1Bs and T-28s as chase aircraft during most of the tests.

The armament firing tests will enable engineers to measure the effects of recoil loads on the helicopter and to determine the effectiveness of the armaments system. Data also will be obtained to compute the service life of the helicopter's various components.

The Army has ordered 320 of the Huey Cobras, a product improvement of the UH-1 series, long a mainstay of Army helicopter strength in Vietnam. The AH-1G was designed on the premise that an armed helicopter should deliver the highest armament payload possible in the most effective yet least vulnerable manner.

The Huey Cobra will serve as the Army's interim armed helicopter until the Advanced Aerial Fire Support System (AAFSS) is available.

U.S., French Firms Agree on V/STOL Jet Flap Rotor Task

Development of the radical concept of the jet-flap powered rotor for use in vertical lift and short takeoff and landing aircraft, initiated in 1961 by the U.S. Army R&D Group-Europe, is expected to be enhanced by a recent agreement.

Negotiated between Giravions-Dorand Co. of Paris, France, and LTV Aerospace Corp., Dallas, Tex., the agreement calls for joint developmental effort. Originally, the jet-flap project was supported by an Army Materiel Command contract in 1964 with Giravions-Doran through the Aviation Materiel Laboratories, Fort Eustis, Va.

The contract required an analytical investigation of the jet-flap powered rotor applicable to heavy-lift helicopters. Later an experimental jet-flap rotor was ordered for wind-tunnel research. Successful tests of the rotor were made in the National Aeronautics and Space Administration wind tunnel at Moffett Field, Calif.

The unique rotor principle was originated by R. Dorand of the French firm. The LTV (Ling-Temco-Vought) Aerospace Corp. also has many years of background experience in vertical lift and short takeoff and landing craft.

Among LTV efforts have been the V-173, designed and tested between 1937-1942, the follow-on development of the XF5U-1 to 1945. LTV is working on the propulsive wing concept under an Army-Air Force contract and the U.S. tri-Service V/STOL XC-142 program.

Considered a technical breakthrough and a significant contribution to rotary-wing technology for extra-large helicopters, the jet-flap rotor is propelled by exhausting a sheet of high-pressure gas along the trailing edge of each blade.

The magnitude of the lift on the rotor blade is varied or controlled by changing the angle between the plane of the jet-sheet and the rotor blade.

Engineers believe this method of control may replace the existing blade-cycling system which becomes a problem on large helicopters. Propulsion of the rotor by gas emission eliminates the driving transmission.

Dr. Llewellyn, chairman of the Symposium of Modern Optics, has made extensive contributions to the field of communications during the past 40 years. He went to Polytechnic Institute of Brooklyn from the Institute of Science and Technology of the University of Michigan where he was deputy director.

Early work in telephone communications began with Western Electric in 1923. He joined Bell Laboratories in 1925 and retired in 1961 as assistant to the president.

He was awarded the Morris Liebman Award in 1935 by the Institute of Radio Engineers for his work in high-frequency electronics and constant-frequency oscillators. He has been published in more than 20 publications and holds 40 U.S. patents.

Dr. Llewellyn served as consultant to the Secretary of War (1944) and to the Weapons Systems Evaluation Group of the Joint Chiefs of Staff (1951). He was executive secretary of the Science Advisory Committee, Office, Defense Mobilization (1951).

He received a PhD degree in physics from Columbia University in 1928 and has been a Fellow of the IEEE since. He is a Fellow of the American Physical Society and the American Association for the Advancement of Science and a member of the Operations Research Society, Newcomen Society of North American, American Institute of Physics, and Sigma Xi and Tau Beta Pi honorary societies.

Dr. F. B. Llewellyn

High-Temperature Alloys Extruded at Room Temperature

Hydrostatic extrusion of several high-temperature, high-strength, lightweight alloys in a fully hardened state at room temperature is reported by Watervliet (N.Y.) Arsenal researchers as a significant "first" in advancing metallurgical technology.

The achievement means that these alloys — none of which could be extruded even in their partially hardened state at room temperature in earlier experiments by the Watervliet scientists — now can be formed into shapes without relying on cast structures or resorting to difficult metalwork at narrow high-temperature ranges.

Credited with the discovery, which conceivably has broad applications to military requirements, are Dr. James C. Uy, metallurgist, and Charles J. Nolan, physical science technician. They also designed the press used for the tests.

Very large increases in strength, generally around 50 percent and sometimes as much as 80 percent, were achieved in their series of experiments through work hardening and subsequent aging.

Combination of mechanical and thermal treatments for simultaneous forming and strengthening is considered of potential importance in other high-strength alloys for weapons (such as rapid-fire mortars) subjected to high temperatures, high stresses and corrosive environments.

Table 1 Some Preliminary Results (Mechanical properties at room temperature)

Alloy	Yield strength (p.s.i.)	Tensile strength (p.s.i.)	Elongation (%)	Reduction in area (%)	Hardness (Rc)
Inconel 718					
Solution treated and aged	153,400	198,500	19.5	30	40
Extruded and aged	300,000	304,800	2	5	53
Rene 41					
Solution treated and aged	133,800	193,200	7	12	37
Extruded and aged	243,000	291,000	3	11	50
Udimet 630					
Solution treated and aged	177,600	204,000	8	10	44
Extruded and aged	268,800	268,800	0	0	47
Maraging 250					
Solution treated and aged	251,000	259,500	12	60	50
Extruded and aged	295,000	300,000	18	65	50
4320					
As quenched	150,000	204,000	19	76	42
As quenched and extruded	264,000	273,000	13	46	51
4340					
As quenched	215,000	310,000	12	48	56
As quenched and extruded	355,000	364,000	9	46	57

Alloys investigated to date by the Watervliet team include three nickel-based superalloys — Inconel 718, Rene 41 and Udimet 630, a high-strength maraging 250 steel, and types 4320 and 4340 steels.

The superalloys and the maraging steel were extruded in the recent experiments at 50 percent reduction in area, both in the solution treated and in the partially and fully aged condition. Types 4320 and 4340 steels were extruded in the untempered martensite conditions, with hardness values up to 56 Rc, at reductions up to 70 and 30 percent, respectively. (See Table 1.)

Mechanical properties before and after extrusion were evaluated and compared. In addition, the effect of a subsequent individual aging treatment was investigated. In general, large increases in strength and hardness were achieved by cold deformation at a sacrifice in ductility.

Subsequent aging restored some of the ductility and could either reduce or further enhance the strength. Currently, the optimum post extrusion aging conditions for Inconel 718 are being determined. High-temperature properties of extruded superalloys are also being evaluated.

Plans of the research team for the immediate future include extension of investigations to the cast superalloys. Ultimately, it is hoped to develop equipment to form finished shapes, including hollow cylinders, under high-pressure environments; also, to develop new alloy compositions precipitation hardening after cold work.

WATERVLIET ARSENAL researchers Dr. James Uy and Charles Nolan are shown with the press of their own design in which they have successfully extruded high-strength, lightweight alloys similar to that held by Nolan.

ECOM Awards Contract For Microwave Data Study

Theory and organization of coherent microwave data processors will be studied under a $67,882 contract recently awarded by the U.S. Army Electronics Command, Fort Monmouth, N.J.

Primary aims of the study by the Syracuse (N.Y.) University Research Corp. are to identify areas in the data processing field where microwave techniques can be profitably applied. Suggested approaches to the organization of a microwave computing system are sought.

ECOM researchers are hopeful that the use of microwave technology in computers could lead to simpler and faster operations over present methods. The contract "Data Processing Using Distributed Parameter Techniques" will be investigated by the ECOM Computer Sciences Laboratory, one of the eight labs comprising the Syracuse University Research Corp.

The study is an outgrowth of recent advances in the art of radar signal processing which have resulted in the creation of new microwave devices and distributed-parameter techniques which appear promising for digital data processing applications.

Results of this investigation will provide the basis for deciding whether a full-scale feasibility study and hardware development effort are justified.

Army Researchers Find Strong Underwater Glue

Underwater bonding of a wide variety of metallic and nonmetallic materials such as steel, aluminum, glass, wood and rubber is possible with a new adhesive composition developed at the U.S. Army Medical Biomechanical Research Laboratory, Washington, D.C.

A patent application has been filed for the various compositions developed by Dr. Fred Leonard, scientific director of the laboratory, and George Brandes, organic chemist.

Termed "serendipitous outgrowths" of their research on compounds for inducing hemostasis and nonsuture-closure of wounds, the compositions may solve the long-standing problem of preparing adhesives durably effective underwater.

In tests to date, within 30 seconds after application underwater, the adhesives have achieved steel-to-steel bond strengths up to 700 p.s.i. in tension. The compositions appear to be equally effective on corroded, painted and clean surfaces.

Continued underwater exposure of glued steel surfaces for one month, at a tensile loading of 100 p.s.i., did not cause deterioration in the bond strength.

Project Action Gauges Vietnam Problems by Interviews

More than 180 hours of detailed interviews with leaders at various levels in five major combat organizations in Vietnam are being transcribed for the first combat-theater research report to help update U.S. Army Infantry counterinsurgency training.

Project Action was conducted by the Human Resources Research Office (HumRRO) of George Washington University, Washington, D.C., under contract.

Dr. T. O. Jacobs, director of HumRRO Division 4 at Fort Benning, Ga., home of the U.S. Army Infantry Training Center, and two of his staff assistants, George Magner and George R. Hoak, spent six weeks in Vietnam.

Systematically, they queried battalion commanders, platoon leaders, platoon sergeants, squad leaders and fire-team leaders in the South Vietnam delta area, on the coast and in the central highlands.

Detailed descriptions of recent operations were obtained. Recommendations from interviewees for improvements in training for future Vietnam replacements also were recorded on tape.

The itinerary was planned to enable the team to detect differences in operational techniques that might have been developed by the various commands in response to varying terrain and climactic conditions. Different tactics used by enemy forces could be detected.

Researchers used specially structured interviews for various situations and levels of command. They covered 479 subjects in 182 interviews, each lasting approximately one hour, many longer.

First-draft transcripts are expected to fill between 7,500 and 10,000 typewritten pages. An interim report is expected to be published late this spring and an analytical technical report by December.

Condensed interviews of the first report will be made available to interested Army agencies for such immediate use as illustrative material to support current instruction.

Dr. Jacobs said intensive analysis of the material is being made to identify successful new combat techniques used in Vietnam and to provide "a rich description" of combat conditions. The broad topographical coverage of combat areas, he said, permits a more detailed analysis of small-unit combat operations than has ever before been possible.

General William C. Westmoreland, commanding general of the U.S. Military Assistance Command and the U.S. Army in Vietnam, wrote recently to Dr. Meredith P. Crawford, HumRRO Director, that he believes Project Action "should be of great benefit to the U.S. Army. . . . We are looking forward to publication of results of your work. . . ."

In a presentation last January at HQ U.S. Continental Army Command (USCONARC), Fort Monroe, Va., the HumRRO team described briefly its research technique and noted some initial impressions. They included:

- The Ranger Course conducted at the U.S. Army Infantry School, Fort Benning, was praised by those interviewed as adding materially to the confidence and ability of the small-unit leader. They recommended that the course be given to all commissioned and noncommissioned officers scheduled for duty in Vietnam.
- The individual soldier who is likely to become a fire-team or squad leader during service in Vietnam should be given more concentrated trainint in several critical areas.
- The researchers "were deeply impressed by the high morale of all individuals contacted and with the competence and professionalism of all the units furnishing data."

The Project Action team scheduled interviews to obtain descriptions of recent combat operations from at least three leader levels within an organization. After general operations were discussed with a battalion commander, the team would debrief company commanders and then split up to interview leaders of smaller units.

The researchers sought data that would enable training centers to develop realistic courses geared to duplicate conditions in Vietnam. Questions included: At what distance was the enemy first sighted or heard? What methods were used in firing individual weapons? What positions were used? What were the procedures for quick response to the enemy?

Major organizations involved in the interviews included: 1st Infantry Division at Di An; 173d Airborne Brigade, Ben Hoa; 1st Brigade, 101st Airborne Division, Tuy Hoa; 1st Cavalry Division (Air Mobile), An Khe; and 3d Brigade, 25th Infantry Division, Pleiku.

Army Demonstrates Missile Mentor Command Posts

Nine operational sites joined in recent "unveiling" demonstrations of the Army's Missile Mentor command posts for coordinating Nike Hercules and Hawk surface-to-air (SAM) missiles defending major American cities.

Missile Mentor employs high-speed, general-purpose computers and electronic display consoles mounted in two vans. The demonstrations were staged in the San Francisco, Los Angeles, Chicago-Milwaukee, Washington-Baltimore, Pittsburgh, New York, Detroit, Boston and Miami Areas.

Solid-state components and circuitry of the Missile Mentor are representative of the rapid development of air defense electronics know-how over the past decade. The system will replace Missile Master systems now in use.

Officially designated the AN/TSQ-51 by the Department of the Army, the Missile Mentor evidences the savings to taxpayers achieved through research and development. Despite substantial increases in labor and material costs, a single Missile Mentor system costs about one-tenth that of Missile Master system — about $10 million 10 years ago.

Operation and maintenance costs of the Missile Mentor are less than $250,000 annually, which is about one-fourth of the older system's operating cost.

In operation, the AN/TSQ-51 vans or trailers are parked together to form an Army Air Defense Command Post. In some defenses, one or more single, van-mounted Remote Radar Integration Stations are being used to enhance the area of defense radar coverage.

The system will be operated by the Army Air Defense Command, the U.S. Army component of the North American Air Defense Command which is the multi-Service command responsible for the defense of the United States and Canada against air attack.

Edgewood Designates Col Davies Deputy CO

Col Walter J. Davies

Col Walter J. Davies is Edgewood (Md.) Arsenal's new deputy commander but also is continuing to serve temporarily as chief of the Technical Support Directorate, a position he has held since 1965.

Prior to the Edgewood assignment, he was chief of the Armor Human Research Unit at Fort Knox, Ky. From 1958 to 1962, he was assigned to the Office of the Deputy Chief of Staff for Personnel, Department of Army, Washington, D.C.

In Germany he was commander of the 826th Tank Battalion and during the Korean War was assistant chief of staff, G-2, at HQ 7th Infantry Division. From 1945 to 1950, he was at HQ of the Far East Command in Tokyo, Japan. He entered the Army in 1940 and in World War II served with armored cavalry units.

Col Davies has a BS degree from Michigan State University. He is a graduate from the Cavalry School, Fort Riley, Kans., Armor School at Fort Knox, and Command and General Staff College.

Research Probes 'Time Bomb' Disease

Melioidosis, the disease publicized in the press last month as "The Vietnam Time Bomb," is caused by a bacterium known to exist in northern Australia and Southeast Asia countries for 56 years.

A British Army medical officer, Maj Alfred Whitmore, first described the bacterium in animals in 1911 and reported the first human infection in Rangoon, Burma, in 1913. The disease has since been diagnosed in some patients several years after their departure from the endemic area.

Termed "an unusual tropical disease" that affects a "very small percentage" of persons, melioidosis is caused by the bacterium *Pseudomonas pseudomallei,* which can be cultured in soil, market fruits and vegetables, well water and surface water. The source of infection is not fully known, but is presumed to come from these sources. Researchers say to-man transmission has not been verified and probably does not occur.

U.S. Army Medical Service and U.S. Army Medical Research and Development Command units have been conducting research on the nature and distribution of the illness for several years in Malaysia and Thailand.

Observations and studies begun during World War II and carried on the U.S. Army and Navy have contributed markedly to advances in treatment and subsequent reduction in mortality rate.

Thirty-two cases among U.S. Army personnel assigned to Southeast Asia or recently returned from the area had been reported to the Office of The Surgeon General through January 1967. Eight deaths could be attributed to the disease. The French army in Indo-China from 1951 to 1954 reported 32 cases and 11 deaths.

Melioidosis can occur as an acute or chronic disease and may involve any organ of the body. The most common form is an infection of the lungs which may be confused with pulmonary tuberculosis. The bones, joints, subcutaneous tissue or other internal organs may be the site of infection.

Because of its deceptive nature, diagnosis of melioidosis is largely dependent upon an awareness of the disease, the clinical picture, blood tests for antibodies to the bacteria, and culture of the organisms from the patient.

A Department of the Army message in December 1966 to all major commands provided technical guidance on diagnosis and treatment.

Intensive study of the disease is being conducted at Valley Forge General Hospital, Phoenixville, Pa., and Fitzsimons General Hospital, Denver, Colo.

Army researchers describe *P. pseudomallei* as a hardy organism. Elimination requires multiple antibiotics and close medical care over a rather long period of time. Contraction of the disease is associated mostly with personnel having wounds or breaks in the skin through which the organism may enter.

Memo Assigns Roles for Management Info Network

(Continued from page 1)

assigned to the Comptroller of the Army. It will use standard or uniform data elements for program and financial management in a single accounting and reporting system. Stipulated is that the system will be developed and made operational step-by-step or file-by-file in accordance with a master plan.

Other provisions of the Chief of Staff Memorandum are that the system will "give equal emphasis and priority to technical, financial and planning data; provide timely data to all command levels; be responsive to specific request for data; apply data automation techniques as appropriate; and be as compatible as possible with other existing information systems."

Selected prototype sites based on accounting procedures prescribed in AR 37-112 will be used for development and testing of the Financial Management Subsystem of ARDIS. Planning for Army-wide implementation will proceed concurrently. Other subsystems will be tested and integrated as they develop.

Defined by the memorandum are the functions of a steering committee of five men chaired by Brig Gen Thurston T. Paul Jr., Director of Plans and Programs, Office of the Chief of Research and Development. Project director is Col Dale L. Vincent, Army Director of Technical Information and chief, Scientific and Technical Information Div., Army Research Office.

Other members of the steering committee are Charles R. Woodside, Office of the Assistant Secretary of the Army (R&D); Col Vincent; Col David A. Marcelle, Office of the Comptroller of the Army (OCOA); Walter W. Flynn and Clydre Begley, Army Materiel Command (AMC); and Lt Col Michael Juvenal, Army Information Data Systems Command (AIDS).

Supplementing efforts of the steering committee is a working group comprised of Col Vincent; Lt Col Carl D. Bolson, OCOA; John G. VanDerveer, David Nemore and Leander H. Hamm, AMC; Lt Henry O. Miller, OCOA; Lt Col George P. Mooney and Homer E. Hart, Office of the Chief of Research and Development; and Miss Dorothy Darrach, AIDS.

The steering committee will provide guidance to the project director, review and approve directives for staffing, supervise test and evaluation of ARDIS, participate in development of policies, and assure that coordinated response of all agencies concerned is accomplished. It also will maintain cognizance of and serve the mutual interests of other development agencies and the Continental Army Command.

The ARDIS working group will provide direction for the design, development and test of the system to the point at which an Army Regulation covering the system can be published and responsibility for implementation assigned to field RDTE agencies. It will develop concepts, directives and test internal operating procedures of the system, review and orient the efforts of the Army Materiel Command task group, and provide consultants to HQ Army Materiel Command and other RDTE agencies in installing the network.

Establishment of the Financial Management Subsystem of ARDIS is scheduled within 30 months of the date of issuance of the Chief of Staff Memorandum. That would make the subsystem operational in August 1969, by building upon current automated systems within the major commands. The complete ARDIS development is expected to require several years.

In addition to directing the working group, Col Vincent will be responsible for ARDIS studies, development of concepts, procedural guidance, monitorship of test operations, and "other assignments as determined appropriate" by Brig Gen Paul.

The OCA deputy project director will be responsible for the Resource Management System coordination and intergration of new requirements as they develop; also, for insuring that any broader information systems are properly related to ARDIS.

The Army Materiel Command is charged with supporting the ARDIS effort "to the greatest extent possible." This will require assignment of highly qualified personnnel in the functional areas of planning, programming, budgeting and accounting and reporting for RDTE programs, and management systems and data automation.

The AMC will provide at least three members to the ARDIS Working Group, one to represent the Office of the Directorate of Development, one the AMC Directorate of Management Systems and Data Automation, and one the Comptroller and Director of Programs. They also may be members of the AMC ARDIS Task Group.

The AIDSCOM will provide one full-time staff member knowledgeable in the functional areas of ADP systems analysis and computer programing, and assist in determination of the appropriate location of the Headquarters Department of the Army data bank for ARDIS, as well as the additional personnel required.

ATAC Becomes Major Command

Realignment of principal subordinate elements of the U.S. Army Materiel Command, as announced on its fourth anniversary last Aug. 1, was completed recently when the Army Tank-Automotive Center became a major command of the Army Materiel Command.

With this change, the Mobility Command (MOCOM) established in August 1962 as one of the Army Materiel Command's seven commodity commands, is phased out because each of its former elements has gained major command status.

Actually, it is a change in name only. The new Army Tank-Automotive Command takes over the facilities, equipment and personnel of the Center and of the Mobility Command Headquarters, Warren, Mich. The Aviation Materiel Command (AVCOM) and the Mobility Equipment Command (MECOM), separated from the Mobility Command effective last Aug. 1, both are located in St. Louis, Mo.

Maj Gen W. W. Lapsley, who headed the Mobility Command, now is CG of the Army Tank-Automotive Command. Brig Gen E. I. Donley is CG of MECOM and Brig Gen Howard F. Schiltz is commanding AVCOM. Other major commands of the Army Materiel Command and the commanders are:

Electronics Command, Fort Monmouth, N.J., Maj Gen William B. Latta; Missile Command (MICOM), Redstone (Ala.) Arsenal, Maj Gen John G. Zierdt; Munitions Command (MUCOM), Dover, N.J., Maj Gen Floyd A. Hansen; Test and Evaluation Command (TECOM), Maj Gen L. G. Cagwin; Weapons Command, Rock Island (Ill.) Arsenal, Brig Gen W. J. Durrenberger.

The first major move in the Army Materiel Command reorganization was effected July 1, 1966, when the Maintenance and Supply Command was merged with HQ of the AMC.

ATAC is the acronym for the Army Tank-Automotive Command, as it was for the Center. The ATAC complex at Detroit Arsenal employs more than 7,000 civilians in addition to some 155 officers and enlisted men, and has an annual payroll of $65 million.

About $2 billion is under ATAC management for FY 1967. Roughly $1.2 billion will support research, development, maintenance procedures, quality assurance control and supply of parts for Army tank-automotive vehicles, as well as vehicles for other Armed Forces. ATAC also assists in carrying out other programs totaling $800,000,000 assigned to project managers.

Project managers located with ATAC are assigned to general purpose vehicles, the M561 and XM705 vehicles, GOER vehicles, M60/M48 Series tanks, M107 and M110 Self-Propelled Artillery Vehicles and the Scout Vehicle. Field offices of project managers of the Sheridan Assault Vehicle and Combat Vehicles also are with ATAC.

ATAC provided project managers support in research and engineering, maintenance, quality assurance, supply and procurement and production. Largest of these associated activities of ATAC is assigned to the project manager of general purpose vehicles. He will spend about $560,000 in the current fiscal year.

Activated in August 1962 as part of the Army-wide reorganization, the now defunct Mobility Command "worked itself out of a job." This was accomplished by taking the nine field installations originally assigned to MOCOM and consolidating them into ATAC, AVCOM and MECOM.

Engineer Produces Prolifically as Author

"Work of love" beyond regular duties as an engineer at Picatinny Arsenal, Dover, N.J., has established William Griffel as one of the most prolific freelance technical writers employed by the U.S. Army.

With nearly 100 technical articles and a book published in the past 10 years, Griffel now is writing the second volume of a trilogy on problems in structural and design engineering.

The first, *Plate Formulas*, will be released in May by New York City publisher Frederick Unger Co., also under contract to publish *Beam Formulas* and *Shell Formulas* as soon as completed. are ready.

The first book by Griffel, based partly on the articles published in American and British engineering and design journals, is *Handbook of Formulas for Stress and Strain*, released in May 1966 by the New York publishing house.

The Polish-born Griffel migrated to Israel (then Palestine) in 1934 and to the U.S. in 1940. He studied at the College of Engineering, Lwow, Poland, and was graduated from the College of Engineering, Toulouse, France. He became a U.S. citizen in 1945, when New Jersey became his home.

Before joining Picatinny Arsenal in 1959, he was a tool designer in a Newark zipper factory, a designer of water pumps and equipment in Harrison, chief engineer for a design consulting firm in Hackensack, and a structural engineer for Bendix Corp. in Teterboro.

Griffel is a multilinguist who speaks excellent English with a broad European accent. Recognized as an authority on strength of materials, he is a member of the American Society of Mechanical Engineers (ASME). As an editor of the Society's monthly "Applied Mechanics Review," he handles the journal's scientific papers in English, Polish and French.

"Forty to 50 hours are available to everyone every week in addition to regular working hours — if you want them," he strongly believes. For years he taught engineering at night in the machine design departments at Newark College of Engineering and Fairleigh Dickinson University, Teaneck, N.J.

He operates a part-time engineering consultant firm at home in Fair Lawn, N.J., by using personnel of engineering concerns in their spare time to help him resolve problems he cannot handle.

All his material is written in longhand and transcribed by a secretary at the William Griffel Engineering Office. In 1965 and 1966, he won Picatinny Arsenal honors for "excellence in technical writing."

Inspiration for much of his writing comes from television, he says — not from the picture, which he rarely follows, but from the "disturbance" created by the medium.

"I always sit before TV with pad and pencil, but during my 'work of love' it is the only disturbance I can tolerate."

William Griffel

5 Nations Plan Report On Long-Term Mobility

Representatives of five nations performing a long-term mobility study under the NATO Defence Research Group will meet this spring or early summer to prepare the first report.

United States project officer Merrill V. Kreipke, a staff engineer in the Environmental Sciences Division, U.S. Army Research Office (USARO), Arlington, Va., said a date and place for the 5-nation "exercise" is not set.

Great Britain is executive agent for the mobility study and is responsible for preparations. Other nations participating are Canada, France and the Federal Republic of Germany.

British project leader is Fred Uffelman of the Fighting Vehicles Research and Development Establishment, Ministry of Defence (Army). He has prepared a "working paper" now being circulated for comment among other project officers to provide a basis for the forthcoming report.

Federal Agencies Review Energy R&D, National Progress

For 15 cents, anyone interested in findings and conclusions of an interdepartmental study titled "Energy R&D and National Progress" can obtain a highly informative document released through the Federal Government Office of Science and Technology.

The recently distributed 18-page document is a concise summary based on a highly significant report prepared in 1964 by an Energy Study Group under the direction of Dr. Ali Bulent Cambel. The late President Kennedy requested the study in a Feb. 15, 1963 memorandum to heads of nine federal agencies.

Copies of the original 437-page report, identically titled "Energy R&D and National Progress," also are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at a cost of $1.50 each.

Comprehensiveness and depth of the report are indicated by the list of contributors and advisory committees. Forty-six percent of the report is representative of industry, 33 percent federal government, 15 percent universities, and six percent from other sources. Eighty technical papers and 159 reviews were submitted, and 225 advisory committees functioned.

Federal agency heads who contributed to the study included the Director of the Office of Science and Technology, Chairman of the Council of Economic Advisers, Director of the Bureau of the Budget, Director of the Office of Emergency Planning, Secretary of the Interior, Secretary of Commerce, Chairman of the Atomic Energy Commission, Chairman of the Federal Power Commission and Director of the National Science Foundation.

In all, more than 500 recognized authorities in the field, both inside and outside the government, contributed to the massive task. The result is a detailed analysis of the many specialized problems associated with development of particular energy sources.

Although energy consumption in the United States has increased rapidly in the past, current requirements will be dwarfed by needs in the year 2,000 — estimated at about three times the present rate, the report states. That would raise the annual requirement by year 2,000 to 135 quadrillion British thermal units.

"From the most reliable information," according to the report, "it seems fairly clear that present foreseeable total resources will be adequate to meet total energy needs without major cost increases for the remainder of this century. . . . *The main problem is how to meet the growing need in the most effective and least costly way,* both in the immediate future and the long run.

"Secondly, *problems arise in matching energy sources for particular purposes and in assuring competitive availability.* Coal was once the principal energy source for household heating, industrial use, transportation and electrical power. Today it has been replaced widely by petroleum and natural gas in household heating and industrial uses, and by petroleum for transportation — truck, rail, ship, air and automobile.

"It (coal) also now shares the market for electric generation with natural gas, oil, nuclear fuel and waterpower. The economy should retain and expand its flexibility to choose among energy sources for particular application."

Another factor of mounting importance is the desire of Americans to minimize environmental pollution and preserve natural beauty in the course of developing and using energy resources. The Energy Study Group was concerned with the role of research and development in contributing to solution of these problems, and particularly the future role of the federal government.

"In the future," the report states, "the government will need to assist when the development is too large or risky for the private sector, when the benefits of development are too diffused, when they are required for national security and welfare, or when necessary to maintain effective competition among and between energy sources."

During the next few decades the foreseeable sources of energy are the fossil fuels such as coal, oil, shale oil, tar sands and natural gas, and the fissionable or fertile materials, uranium and thorium.

Research and development activities must, to maintain long-run adequacy of energy resources, improve knowledge of geology and exploration capability; improve processes for extraction from grades now considered marginal and submarginal; reduce transportation costs; improve efficiency in use; and develop substitutes for resources which are being depleted or are increasing in cost.

Magnitude of annual R&D expenditures on energy sources is difficult to identify accurately, the report notes, but a rough figure of $1 billion dollars by industry and government is offered as a 1963 estimate. Industry is credited with funding about $600 million. Oil and gas research accounted for about 40 percent ($376 million), nuclear energy for 32 percent ($300 million) and electricity 17 percent ($157 million).

Controlled thermonuclear fusion research accounted for $29 million or three percent, coal for $22 million or two percent, and the remaining $60 million or six percent was spent on research in thermoelectricity, thermionics, fuel cells, magnetohydrodynamics and solar energy.

Cited as a major issue in R&D planning in the report is the size and direction of the atomic energy program, "both in magnitude of government involvement and in overall national significance. . . . While private industry will probably concentrate on improving existing commercial reactors, the government should play a key role in developing more advanced reactors with better fuel utilization. Present development schedules should be maintained so as to accomplish development and final commercial application within the normally expected 15-year time period."

SATCOM Directorate Splits into 2 New Units

Separation of the U.S. Army Satellite Communications (SATCOM) Agency's Operations, Control and Evaluation Directorate (OCED) into two units was announced this past month by Col Mitchel Goldenthal, commanding officer.

A new Operations Directorate is headed by Lt Col Clarence A. Klaver, who moved up from his assignment as operations officer in the OCED. William Tobias is director of the Control and Evaluation Directorate, following service as deputy director of OCED. He formerly was Project SYNCOM test director.

The Operations Directorate will take over the conduct of systems testing on satellite communications ground facilities, including operational readiness tests, research and development, engineering, and service tests, as well as experiments and demonstrations. The Control and Evaluation Directorate will continue test planning and evaluation of results.

Lt Col C. A. Klaver

The Operations Directorate will include the SATCOM Test Operation Center from which satellite communications testing is conducted, using both conventional circuits and satellite links with all Initial Defense Communications Satellite Program surface terminals around the world. Site survey and selection also will continue under Lt Col Klaver's direction.

Selected on the list for promotion to colonel, he joined SATCOM in 1963 after a tour as Signal Adviser to I Corps. MAAG Vietnam.

Initially assigned as director of Sites and Installations, he was responsible for directing the SATCOM team which recommended and supervised satellite terminal sites across the globe.

Army Contracts Total $316,137,362

Army contracts in excess of $1 million each for research, development, testing, evaluation, and procurement listed by the Department of Defense since the February issue of this publication totaled $316,137,362.

Olin Mathieson Chemical Corp. received seven contracts and modifications totaling $25,633,454 for cartridges, activation of rocket propellant facilities, and operations and maintenance activities.

Sperry Rand Corp. was second with $24,346,914, including a modification to a previously awarded contract for ordnance items and a new contract for classified electronics equipment.

Two modifications totaling $23,043,988 went to Mason and Hanger, Silas Mason and Co., for loading, assembling, and packing ammunition and for classified items.

A $22,710,525 modification of a contract to Thiokol Chemical Corp. is for loading, assembling and packing illuminating projectiles, and operations and maintenance activities.

A total of $13,410,937 in contracts and modifications with the AVCO Corp. will provide turbine nozzles and gear assemblies for T-53 turbine engines, rotor turbine blades, air inlet vanes, deflector assemblies, and T53-L-15 engines for the OV-1 helicopter.

Contract definitizations aggregating $13,049,525 will procure AN/PRC-77 and AN/GRC-50 radio sets from the Radio Corp. of America. The U.S. Rubber Co. received a $13,957,639 modification for ordnance items, additional reactivation of facilities, and collapsible fabric water tanks.

Modifications totaling $13,957,639 with Hercules, Inc., involve propellants, explosives, and operations and maintenance activities. Two new contracts and a modification totaling $10,234,994 with the Remington Arms Co. will supply 1.62mm 5.56mm, and 7.62mm cartridges and miscellaneous small arms ammunition.

General Motors Corp. was awarded $9,641,738 in contracts to supply trucks. Defense Metal Products, Inc., received an $8,642,623 definitization for parts for 155mm projectiles.

Under an $8,580,784 modification, the National Gypsum Co. will supply classified items and operations and maintenance activities. New contracts with Ford Motor Co. for ¼-ton trucks and a modification for advance production engineering for 5-ton trucks totaled $8,184,879.

The A. O. Smith Corp. received a $7,910,789 modification for parts for demolition bombs. Emerson Electric Co. will supply armament subsystems for helicopters for $7,711,285.

Day and Zimmerman, Inc., received a $7,613,452 modification for loading, assembling, and packing of medium caliber ammunition and components.

A contract to Raytheon Co. for retrofit kits for the Hawk missile system and a modification for metal fuze parts for the 750-pound bomb totaled $5,949,046. Three contracts for $5,156,283 with the International Harvester Co. will supply buses, tractors and tractor trucks.

The Aero Service Corp. was awarded a $5,143,630 contract for aerial mapping work and Hughes Tool Co. received a $4,760,400 exercise of option for light observation helicopters and tools.

Multifuel engine assemblies for 5-ton trucks will be bought from Hercules Engines, Inc., for $4,521,000. Global Associates will provide aircraft maintenance and operation for a $4,069,037 modification. A modification and contract totaling $3,747,277 with Norris Industries, Inc., will supply 66mm rocket launchers and training projectiles.

Other modifications include Honeywell, Inc., $3,552,500 for bomb metal parts assembly; American Machine and Foundry Co., $13,233,272 for metal parts for demolition bombs; and R. G. LeTourneau, Inc., $3,154,800 for metal parts for 750-pound bombs.

Firm, fixed-price contracts are: Johnson Corp., $3,147,328 for chassis trailers for 3½-ton M353 vehicles; Bethlehem Steel Corp., $3,058,596 for tube forgings for 175mm guns; Talley Industries, Inc., $2,810,667 for hand grenades; and the Fontaine Truck Equipment Co., $2,532,948 for 25-ton semitrailers; the General Electric Co., $2,509,200 for machineguns and inspection and test equipment; and Intercontinental Manufacturing Co., $2,421,100 for metal parts for Nike-Hercules rocket motors.

Amron Corp. will provide 20mm projectiles and brass cups for 20mm M103 cartridge cases for $2,324,000. Northrop Corp. received a $2,270,448 modification for facilities to produce ordnance projectiles. Chrysler Corp. will provide cargo trucks, ambulances and engineering services in support of combat tanks for $2,237,226.

Jackes-Evans Manufacturing Co. will supply 7.62mm cartridge belt links for $2,140,610; the Mine Safety Appliance Co., field protective masks for $2,054,500; and International Telephone and Telegraph Corp., image intensifier assemblies for the Army Night-Vision Program for $2,000,000.

Stevens Manufacturing Co. received a $1,998,004 contract for 7½-ton refrigerator vans; Firestone Tire and Rubber Co., $1,988,550 modification for bus and truck tires; Federal Cartridge Corp., $1,946,670 for 5.56mm cartridges; and Superior Scaffold Co. $1,799,490 for steel water tank support towers.

A modification of $1,748,938 went to Hughes Aircraft Co. for engineering services in support of the AN/TSQ-51 Air Defense Fire Distribution System. Lockheed Aircraft Corp. will receive $1,665,105 for equipment and services for the underground nuclear testing at the Nevada Test Site. General Dynamics Corp. received a $1,607,088 definitization for radio sets and components.
components.

Other contracts include: General Tire and Rubber Co., $1,551,636 for pneumatic tires for trucks and trailers; Motorola Inc., $1,500,000 for improved airborne radar surveillance sets; Eureka Williams Co., $1,450,240 for hand grenade fuze assemblies; Philco-Ford Corp., $1,377,805 for 40mm grenade launchers.

Bell Helicopter Co. will get $1,350,000 for UH-1E helicopters for the Navy under the joint services procurement plan. LTV Aerospace Corp. gained a $1,200,000 modification for production equipment in support of the Lance Missile Program. Brunswick Corp. received a $1,167,381 order for bombs.

Other contracts include: Gibb Manufacturing and Research Corp., $1,135,350 for fuze adapters for 81mm mortar cartridges; Kellett Aircraft Corp., $1,060,000 for field photographic laboratories and components; Harvey Aluminum Sales, Inc., $1,040,464 for classified items and operation and maintenance activities; and Loadcraft, Inc., $1023,568 for trailers.

AWC Commander Names Hudson Deputy for R&E, Chief Scientist

ARMY WEAPONS COMMAND (AWC) Commander Brig Gen William J. Durrenberger welcomes Dr. Colin M. Hudson to Rock Island (Ill.) Arsenal as deputy for Research and Engineering and chief scientist. Since 1963, Dr. Hudson has been director of the Army Materiel Command Research and Development Division in Washington, D.C. He began his federal career in 1940 after receiving a 1936 BS degree from Presbyterian College, S.C. He earned a PhD in physics and mathematics from the University of Wisconsin. He has made many valuable contributions in the ordnance field and holds basic patents on piezoelectric fuses and propellants.

HDL Physicist Aids von Karman Institute Work on New Lab

U.S. Army research physicist Joseph M. Kirshner is contributing his knowledge of fluid dynamics to the establishment of a new laboratory in Belgium as a student at the von Karman Institute sponsored by NATO.

Employed as a GS-15 researcher at the Army's Harry Diamond Laboratories in Washington, D.C., Kirshner is the principal author of *Fluid Dynamics*, the first textbook on the subject published in 1966. He is one of four employes of the U.S. Army Materiel Command attending the NATO training center for fluid dynamics.

Other students representing AMC are Gilbert G. Morehouse, Aeronautical Research Laboratory, Moffett Field, Calif.; Joe C. Walters, Army Missile Command, Redstone Arsenal, Ala.; and Donald P. Neverton, Aviation Materiel Laboratories, Fort Eustis, Va. Each is a GS-13 engineer.

In a summary of activities since the Institute's training term began last fall, Kirshner reported that von Karman Institute Director Robert O. Dietz had invited him to assist Prof. Paul E. Colin in setting up a fluidics laboratory and to suggest special projects for students. He wrote that five projects are under way, some already in the data-taking stage, while others are being designed.

Reporting on the Institute's program at the request of the U.S. Army Research Office, Kirshner wrote as follows:

"On the outskirts of Brussels, near Waterloo, is situated the von Karman Institute for Fluid Dynamics. Originally called The Training Center for Experimental Aerodynamics, it was founded in 1956 by Theodore von Karman to give postgraduate students from the NATO countries the opportunity to work together learning the newest fluid dynamics techniques.

"As implied by its former name, the Institute is primarily concerned with supplementing the experimental skills of its students and is most adequately equipped with shops, computer facilities, electronic and photographic labs, turbomachinery labs and a variety of wind tunnels. New facilities are continually being added. The latest is a 'long shot' tunnel for very high-pressure high-temperature tests.

"Although the accent is on experiment, theory is by no means neglected and the courses include several series of lectures given by visiting professors from all over the world who are well-known authorities in their fields. These 'special' courses supplement the regular staff-given courses which include such topics as ground effects machines, physics of gases and unsteady aerodynamics.

"Each student specializes in one of the four major topics — low-speed aerodynamics, supersonics, hypersonics and turbomachinery — and during the year designs and runs tests on a project of his choice in one of these areas.

"The project is the most important part of the study. To make certain that necessary facilities are available to each student, attendance is limited to about 30. The student body this year, by country, is as follows: Belgium, 2; France, 3; Germany, 3; Italy, 1; Netherlands, 2; Norway, 1; United Kingdom, 3; and the United States, 14.

"There are three terms which may vary in order of presentation for students. Typically, one term would consist of Low-Speed Aerodynamics as a major with 60 hours of lectures, 60 hours lab work; Mathematical Methods of Fluid Dynamics, 30 hours; and Fluid Dynamics Facilities, 30 hours.

"During the second term, a student may take Viscous Flows with 45 hours of lectures and 75 hours lab work; Instrumentation and Electronics for Fluid Mechanical Measurements, 60 hours; Boundary Layer and Circulation Control, 30 hours; and Separated Flows, 60 hours.

"The third term is used for finishing experiments and reporting on the selected project. During this term there is usually a one-or two-day trip to some aerodynamics facility in a neighboring country."

Kirshner also wrote that most of the von Karman students are recent college graduates. He strongly recommended that anyone intending to spend a year at the Institute should take at least one course the preceding year to "get back into the groove" of studying.

(Editor's note: As a result of articles published in the *Army R&D Newsmagazine* about the von Karman Institute for Fluid Dynamics, inquires have been received regarding the procedure for admission to the Institute. The following is from the von Karman brochure:

"To be eligible for admission . . . the applicant must be a citizen of one of the NATO nations and his application must be approved by one of the delegates from his own country to AGARD (Advisory Group for Aeronautical Research and Development of NATO). Names and addresses of national delegates will be furnished when application forms are requested. These applications are then considered by a selection committee at the Institute.)

Correspondence should be directed to Dr. Robert O. Dietz, Director, the von Karman Institute for Fluid Dynamics, 72 Chaussee de Waterlooo, Rhode-Saint-Genese, Belgium.

Redstone Physicist Earns SARS Fellowship

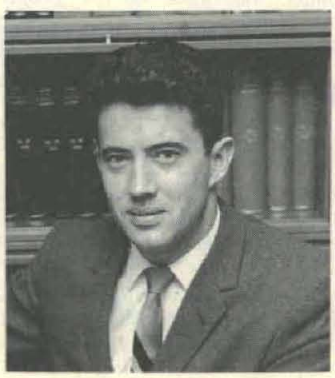
Five years of solid achievement in research since he joined the civilian professional staff at HQ Army Missile Command, Redstone (Ala.) Arsenal, have earned 30-year-old Dr. Vitalij Garber a one-year SARS Fellowship.

Secretary of the Army Research and Study Fellowships are awarded on the basis of demonstrated competence in areas of research having potentially valuable application to military requirements. The goal is to develop the talents of gifted researchers by enabling them to work under the guidance of internationally renowned scientists.

Dr. Garber began his SARS Fellowship Feb. 6 at Harvard University. His research project is "The Application of Optimization Theory to Air Defense Guidance and Control Problems."

Since 1961 he has been employed in the Advanced Systems Laboratory, Research and Development Directorate, HQ U.S. Army Missile Command. He will continue to draw his full salary and his tuition fees and other expenses related to the research will be paid by the Army.

Dr. Garber received BS and MS degrees in physics from the University of Minnesota and a PhD from the University of Alabama.



Dr. Vitalij Garber

ALTAIR Control Center Shipped to Kwajalein Atoll

Project ALTAIR, a $20 million program sponsored by the Advanced Research Projects Agency (ARPA), Office of the Director of Defense Research and Engineering, forged ahead recently with shipment of an electronic control center to Kwajalein Atoll.

ALTAIR is the acronym for ARPA Long-Range Tracking and Instrumentation Radar, a part of Project PRESS studies of the physics of vehicles reeintering the earth's atmosphere.

Installation of the control center on Roi Namur Island in the Pacific Ocean will enable operators to maneuver and monitor the 150-foot diameter radar antenna. Panels will display tracking information such as range, altitude, speed and trajectory of targets. A closed circuit TV circuit will follow the antenna as it moves in azimuth and elevation.

Work on the program is directed by the ALTAIR Office, ARPA Division of the Research and Development Directorate, HQ U.S. Army Missile Command at Redstone (Ala.) Arsenal. Sylvania Electronics Systems is developing the ALTAIR radar system under contract.

Environmental Research in Thailand

(Continued from page 2)

ences, climatic conditions associated with the different vegetation levels, and energy exchanges between the soil-air, ground-canopy and canopy-sky interfaces.

Data from observation towers will be recorded on magnetic tape to facilitate handling and speed of analysis. Mesoscale studies will be conducted in the general site area to support the tower programs and to determine the extreme conditions that can be expected in this type of forest environment.

The vegetation program will commence with an inventory transect to determine specific representative areas for intensive study. Continuing observations at these plots will relate occurrences of types and seasonal changes to other environmental parameters, especially hydrometeorological conditions, soils, and variation in the microbiological and faunal populations.

Soils investigations will describe, identify and classify the soils of the site area. Fixed sensors and portable instruments will be used to record moisture and temperatures, and to relate variations with the different environmental phenomena.

The use of a nuclear soil moisture probe is expected to yield data of much greater accuracy than that obtained in previous tropical soils programs. Primary instrumented soil-test plots will be near the towers. Auxiliary plots are planned in the site area where distinctive differences occur in vegetation, parent materials or terrain characteristics.

Hydrological observations will be taken to determine temporal variations in surface water and ground water quantity and quality, using weirs, stream gauges and wells which will be installed throughout the area.

The total water budget of several small basins will be studied in detail for correlation of hydrologic phenomena with other environmental factors.

Bioscience programs will seek data on microbiological and macrofaunal populations, their kinds, numbers, interrelationships, and effects upon military materiel and operations.

Microbiological studies will be made at the tower sites and auxiliary locations established after patterns are determined by initial surveys now under way. Occurrences in relation to height above ground and frequency with season and type of forest will be emphasized.

Observations of small mammals, fish, amphibians, reptiles and entomological subjects will determine population fluctuations and territories. Surveillance will be especially detailed on fauna which carry disease, deteriorate materiel, or otherwise hinder man's activities.

Data will be acquired by the best methods and techniques available, using automation wherever possible. Electronic instrumentation systems which will be used wherever feasible are complex. Careful attention has been given to minimizing adverse effects of the humid tropics on components through close surveillance, periodic calibration and preventive maintenance schedules.

NLABS Earth Sciences Division scientists in Thailand and at Natick will direct the program. Dr. Paul C. Dalrymple, chief of the Regional Environments Branch at Natick, is project supervisor, and Paul A. Blackford is coordinator. Frank Barnett, project manager, and George Immisch, deputy project manager, stationed in Thailand, will direct field operations. Leander Stroschein is responsible for meteorological instrumentation specification and will supervise their installation and calibration.

ARPA monitors of the project are Dr. Verne Fryklund, program manager, Environmental Sciences, Remote Area Conflict, Washington, D.C., and Dr. Leonard Wood, formerly of the U.S. Army Research Office headquarters staff, chief of the Environmental Sciences Division, Military Research and Development Center (MRDC), Bangkok.

The Applied Scientific Research Corp. of Thailand (ASRCT) will construct and operate the station and process much of the data under a cost-sharing contract. The ASRCT was founded under the office of the prime minister in 1964 as a result of a proposal following a 1960-61 survey of Thai scientific capabilities made by Frank G. Nicholls as a United Nations technical adviser.

The primary purpose of the organization is to promote national development through the application of scientific research. ASRCT is organized into a number of divisions called Institutes, such as those for Technological Research, Agricultural Research, and Nutrition and Food Sciences Research.

Project TREND will be carried out within the newly formed Institute of Environmental Research.

The ASRCT also provides a number of auxiliary scientific services to the Thai government and to scientists through subsidiary units such as the Thai National Documentation Center, Center for Thai National Reference Collections, Instrument Repair and Calibration Center, National Reference Standards Laboratories and the Center for Thai National Standard Specifications.

ASRCT laboratories and offices are housed in a modern building on an 8-acre site adjacent to Kasetsart University outside Bangkok. Project TREND headquarters, in the same building, will have radio communications with field stations.

The contractor will be working closely with personnel from the Thai Meteorology Department on the meteorology-micrometeorology programs, the Thai Forestry Department on vegetation studies, Thai Land-Development Department on soil studies, SEATO Graduate School of Engineering on the hydrology program, and the Thai National Statistical Office on the data analyses programs.

Personnel from Chulalongkorn University and Kasetsart University are expected to assist in special aspects of the studies. Many other learned humid-tropical earth scientists in Thailand will be involved as principal investigators or as advisers.

Among these are Dr. Kajit Buajitti of the Thai Meteorology Department; Dr. Frank Moorman, Food and Agriculture Organization (FAO), soils specialist, and Santhad Rojanasoonthon, both with the Thai Land-Development Department; Tem Smitinand, Thai Forestry Department; Dean Sanga Sabhasri, Kasetsart University; and Dr. Kasin Sumatapand, Chulalongkorn University.

Dr. Heinz Lettau, principal investigator on several large Department of the Army contracts and grants in the field of micrometeorology over the past decade, will work closely with Dr. Kajit Buajitti in the establishment of the micrometeorological analyses programs. Other ranking American scientists may be brought in to work with the Thais on the project.

The decision to conduct research first in the dry evergreen forest and then the rainforest was made because this order coincides with the Panama project, thus enabling earlier comparison of data. Since the rainforest site is expected to

DR. PAUL C. DALRYMPLE, chief, Regional Environments Branch, Earth Sciences Division, has been with the Natick Labs since July 1954. Past experience includes work at the Harvard University Blue Hill Observatory, the Mount Washington (N.H.) Observatory, the Woods Hole Oceanographic Institution, and the Atlantic Weather Project of the U.S. Weather Bureau. He has an AB degree from Clark University, an MA degree from Syracuse University, and a PhD degree from Boston University. He has been associated with meteorological programs in Antarctica and Greenland, and spent three months during 1966 in Thailand, doing the foundation work for Project TREND.

DR. KAJIT BUAJITTI, research meteorologist, Thai Meteorology Department (left) and H. Frank Barnett, Project TREND manager. Barnett joined the Earth Sciences Division at the Natick Labs in September 1966 after serving with the Bureau of Indian Affairs in Alaska. Field experience includes work in the Aleutian Islands, Nevada and California, and Southeast Asia. He has a BS degree from the University of Washington.

pose more problems, especially to electronic instruments, the experience gained at the dry evergreen site should help overcome these difficulties.

The main criteria for site selection were that the forest be representative of its type in Southeast Asia and relatively unaltered by man; free of direct or pronounced marine influence and atypical topography; and in a good location for logistical support and security.

Good access also was considered vital to facilitate construction work and operation of TREND's intensive 2-year research program; also, to make continued operation of the station thereafter by the Thais economically feasible.

The final choice is a compromise satisfying all of the requirements reasonably well. Finding a site was difficult because areas of uncut-over forest of this type are limited in Thailand. Such areas are more extensive in Cambodia and Viet Nam.

The site lies within Khoa Yai National Forest, on the sandstone uplands between 300 and 600 meters elevation, that forms the southwest rim of the saucer-like Korat Plateau of northeast Thailand. The immediate area is sparsely populated by an influx of agriculturists.

The new laterite-surfaced extension of Freedom Highway provides good access to Korat (Nakon Ratchasima), 37 miles to the north, and to Bangkok, about 170 miles southwest via Kabin Buri and Chachoengsao.

Access to the research area is limited and will be controlled to avoid unnecessary disturbance of the natural environment. As the Thais plan to operate this station indefinitely, the Government has been asked to set aside the area as a permanent national research reserve.

The Applied Scientific Research Corp. has been conducting preconstruction bioscience surveys of the site. Camp construction, involving 18 buildings, is expected to be completed by April, following which the mesoscale meteorological instruments will be installed, the two towers erected, and the soils and hydrology programs initiated. The complex micrometeorological system should be operational by November.

Apart from the value of the data collected in this research study, Project TREND provides avenues for assisting other scientists and organizations oriented towards the humid tropics.

Adequate support facilities will be available for use of visiting scientists who wish to conduct programs related to those of TREND.

Dr. Emory G. Simmons and Dr. Louis M. Roth of the Natick Pioneering Research Division have submitted proposals for studies in mycology and entomology to be carried out at the site as a part of the project. The NLABS Container Division plans to furnish tarp-covered pallets of instrumented food containers to determine temperatures and humidities within food packages under field conditions in support of research on deterioration and waste.

A number of other organizations, including the Smithsonian Institution, U.S. Forest Service, Army Test and Evaluation Command and the Air Force Office of Scientific Research have expressed interest in conducting research.

Requests for specific environmental data, such as surface and groundwater quality characteristics, tree height and spacing, and several climatic parameters have been received from various sources and many more are expected as the project becomes more widely known.

Individuals or units interested in obtaining specific environmental data or in submitting research proposals for work at the site are invited to contact the Project TREND Coordinator at Natick.

Proposals consistent with the various objectives of TREND will be given all consideration possible within the limits imposed by availability of funds, space and the TREND staff.

GEORGE B. IMMISCH, a tropical soil geographer with the Earth Sciences Division at the Natick Laboratories since January 1966, has had field experience in Hawaii, Japan, Korea, and Southeast Asia. He received his BA and MA degrees from the University of Hawaii and later taught at Wisconsin State University.

ERDL Sets R&D Seminar, Limits Registration to 55

Attendance at the Tenth Annual R&D Seminar July 30-Aug. 12, sponsored by the 1621st R&D Unit (Reinforced Training) at the U.S. Army Engineer Laboratories, Fort Belvoir, Va., will be limited to 55 officers and enlisted personnel.

No one who attended the 1965 or 1966 seminars, except for the sponsoring organization, is eligible to attend. Applicants must be attached to a Reserve R&D Unit or approved by the Chief of Research and Development, Department of the Army.

The 1621st R&D Unit is commanded by Lt Col Adolph Humphreys, national vice president of the Reserve Officers Association. Lt Col Alexander Levin is the seminar director.

Designed to update R&D Reserve Units personnel on some of the significant progress in Army R&D, management aspects of the program, and enable attendees to listen to many of the Army's top R&D leaders, the seminar will include a series of lectures and demonstrations at the Fort Belvoir Army Management School. Field trips will be made to various R&D facilities in the Washington, D.C., area.

Applications must be submitted by Apr. 1 on Standard Form 1058 to the Office, Chief of Research and Development (OCRD), Department of the Army, ATTN: Assistant for Reserve Affairs, Washington, D.C. 20310.

ARPA Studying Techniques For Controlling Interceptors

New control techniques for high performance interceptor vehicles are being studied in a series of tests termed Project PRESTAGE.

Advanced Research Projects Agency (ARPA) officials announced that all test objectives in one of the first firings were met recently when a combination 2-stage Nike Ajax and Tomahawk rocket boosted a payload into a high-velocity trajectory at White Sands (N. Mex.) Missile Range.

The payload housing the fast-response control system was designed and launched by Douglas Aircraft Co., under contract to the U.S. Army Missile Command, Redstone Arsenal, Ala.

The Army Missile Command manages Project PRESTAGE for ARPA, as part of the Agency's Project Defender Program — a study of ballistic missile defense systems.

MERDL Modernizing Army Field Medical Equipment

Products of the U.S. Army Medical Equipment Research and Development Laboratory (MERDL), Fort Totten, N.Y., go to the far corners of the world in meeting requirements of combat forces for field medical care.

MERDL also is concerned with methods of control of insect and animal disease carriers, such as malaria-spreading mosquitoes. Primarily, the Laboratory's mission is to conduct engineering research and design for development of new medical equipment for military field use, as well as to improve the design and utility of existing equipment.

Established originally in 1921 at Carlisle Barracks, Pa., MERDL was moved to Fort Totten in 1948. Commander Col Lee A. Grove, Army Medical Service Corps, currently has a staff of more than 50 technical and administrative personnel. Organizational elements are the Support, Engineering, and Shop Divisions.

The Shop Division consists of a number of specialty shops capable of machining, plastic fabrication and various other processes involved in producation of pilot or test models and prototypes. These facilities are described as "excellent" for meeting mission requirements.

Over the 45-year span since MERDL was founded, the continued existence of the establishment has been justified by a progression of medical equipment that has helped greatly in meeting field care requirements. One of the newest devices is the Lightweight Field X-Ray Medical Apparatus.

Developed on a basic design conceived by MERDL researchers, the field X-ray is intended to serve forward-area medical units not equipped with standard X-ray equipment, as well as to supplement the latter in other medical facilities.

Weighing 100 pounds, including packaging, the unit has been under intensive development over a period of several years. Successful use in Vietnam and other service test areas has supported a decision of the Army Medical Service to plan to standardize the item for issue.

Complementing the field x-ray is a spring-driven polaroid X-ray film processor, also developed by MERDL. Both units operate without external power sources. Together they provide a capability of taking and rapidly processing high-quality radiographs in remote and isolated areas.

Various items developed by MERDL for military field use find application to emergency requirements for civilian populations. An example is the foot-operated Jet-Injected Apparatus, designed for immunization at an injection rate of 600 (normal) up to 1,000 patients an hour.

Distributed to major medical facilities throughout the Army, the jet-injector has proved particularly valuable at induction centers and large camps. The speed with which it gets the job done has made the injector applicable to civilian needs in many disaster or epidemic areas.

Col Lee A. Grove
USA MERDL Commanding Officer

Orginally, the jet-injector was intended for immunization other than the slow conventional method of smallpox vaccination — the pricking and scratching process so well remembered by military men.

Refinements of the jet tip, however, made it suitable for smallpox control. On the Island of Tongo, smallpox is a dread disease. With the jet-injector, 70,000 Tongans were immunized rapidly, economically and effectively. Because of the efficiency of the injector, vaccine can be diluted 50 times from that used for the hand method.

The Vietnam war has pointed to the importance of the work of the MERDL Vector Control Equipment Branch, headed by Lt Col Alvin A. Therrien. Malaria and other arthropod-borne diseases have long been a threat to the health of American fighting men, and the mission of the branch is to "arm" a preventive medicine program.

Conventional methods of insecticide dispersal in Vietnam have proved difficult to use because of environmental conditions and lack of secure areas in which to operate, a MERDL representative explained.

To meet the unusual need, the Laboratory developed a liquid dispersal unit that can be mounted in a UH-1B or UH-1D helicopter in 15 minutes and removed as rapidly, thereby minimizing time lost in aircraft combat missions.

The spray rig is capable of dispersing one-half fluid ounce to three gallons an acre. The half-ounce capability is important because it makes the unit adaptable for use in applying low-volume concentrates, which are becoming more popular in insecticide dispersal programs.

Significant items of arthropod and rodent control equipment under development by MERDL include a battery-operated insect survey trap, disposable rodent bait container, electronic insect detector and many others.

Contracts with industry are an important part of MERDL operations. For certain requirements, developmental contracts with industry, calling for design and production of prototypes, are more advantageous than Army in-house laboratory effort. Likewise, in some cases production of a limited number of prototypes by industry, based on MERDL designs and operational concepts, is more economical than in-house production.

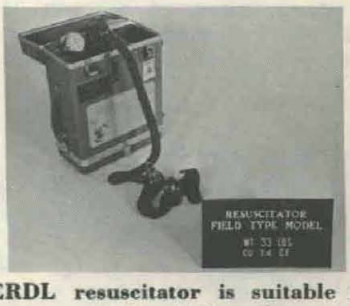
Currently, a developmental contract with General Electric Co. has established the feasibility of using plastics for fabricating certain surgical instruments. Use of plastics would substantially reduce cost, weight and reflection of light in the operating field, investigation has indicated.

Extensive testing has proved the qualities of a new material called polyphenyloxide (PPO) for use in forceps (three types), the handle of a surgical knife, scissors and an anoscope. Clinical evaluation of the six instruments is scheduled in the near future to determine if they will replace stainless steel.

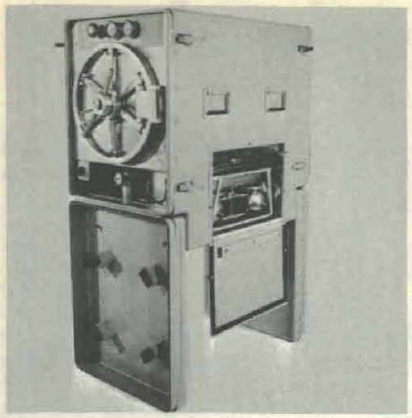
Previous efforts to develop plastic surgical instruments had experimented with fiberglass-reinforced nylon molding compounds. Although this material offered some good properties, the reinforcement had a tendency to pierce the surface and then act as wicks. As moisture was absorbed, physical properties were degraded.

Similarly, with the introduction of polycarbonate materials, new attempts were made to fabricate plastic instruments. Repeated experimentation and sterilization revealed that polycarbonates had excellent physical properties below 250°F, but that hydrolization at higher temperatures rapidly decreased rigidity of material.

Under the developmental contract



MERDL resuscitator is suitable for treatment of chemical warfare casualties as well as for general medical resuscitation in either a contaminated or uncontaminated atmosphere.



MERDL sterilizer can sterilize instruments, gowns and dressings in a field surgical facility at a great saving in weight over older models.

with General Electric Co., work is proceeding on developing a glass-filled PPO with improved mechanical properties, particularly in flexural modulus. Increased stiffness is required for other than delicate types of surgical instruments.

Improvement of standard items by redesign is achieved through continuing studies at MERDL. Medical equipment in use is examined critically to determine if a particular item is doing the job for which it was produced as efficiently as it should. A case in point is the standard field operating light.

Several shortcomings in the light now used are recognized. The task of MERDL investigators is to determine how to develop a better light — one that will have adequate stability when used as a floor model; provide a presently lacking extension arm to put the reflector directly over the operating table without requiring the lamp to be placed so close to the table that it is in the way of operating room personnel; and that will offer operation from vehicular 6- and 24-volt systems.

An experimental surgical lamp developed by MERDL appears to meet most of the requirements shown by the study. The light output is no less than 2,000-foot candles at 38 inches from the face of the 17-inch reflector, and is provided with a heat-absorbing cylinder. The positioning handle of the reflector assembly can be removed easily for sterilization. Power for the unit can be supplied from a 110-volt AC source or 24-volt DC vehicular source. Packaged, the unit weighs about 60 pounds.

The power system offers the highly desirable feature of automatic switch-over to 24-volt DC when the 110-volt AC source fails, and automatic switch-back again to the 100-volt source as soon as available.

Transfer from one power source to another is accomplished without a relay or switch. The 24-volt battery is "floated" across the rectified 24-volt from 110-volt source on continuous "trickle" charge. Thus the battery is immediately available to power the lamp when the 110-volt source fails. The rectifier pack has sufficient capacity to charge a very low battery and to energize the lamp at the same time.

Compared to many Army Medical Research and Development Command installations, MERDL is a midget in respect to personnel and facilities.

Considered properly in its relationship to providing fighting men with field medical equipment with the highest performance characteristics feasible in a combat environment, MERDL has a just claim to impressive stature in the Army scientific community.

Key words in the minds of the staff are dependability, ruggedness and lightness, as built into equipment within MERDL's mission responsibility.

Commanders Offered Aid on What Trees to Plant

Commanders of military installations concerned about problems of tree-planting beautification programs may find help in knowledge gained from New York City park authorities.

Dr. Carl Lamanna, deputy chief of the Life Sciences Division, U.S. Army Research Office, became interested in learning about what trees are best suited to big city conditions and that might be suitable for military posts.

In response to a letter of inquiry to the New York City Department of Parks, he was told that experience has proved the advantages of the Pyramidal London Plane, Globe-Head Norway Maple, Littleleaf Linden, Buisman Elm, Moraine Honeylocust, Willow Oak and Maidenhair trees. The Flowering Ash, Japanese Flowering Cherry and Lavalle Hawthorn are listed as desirable ornamental trees.

The London Plane tree *(Platanus Acerifolia pyramidalis)* has proved valuable in dust-laden, smoky downtown parts of cities where atmospheric pollution restricts use of better species. It should not be used in residential areas out of the heavy soot-fall zone, but its upsweeping branches cause no conflict with trucks and buses.

The Norway Maple *(Acer Platanoides globosum)* is termed "unexcelled for use on streets where *narrow treelawn*, shallow setback or low telephone cables would result in heavy pruning of conventional trees."

The Littleleaf Linden *(Tilia cordata)* is acclaimed by the New York City Department of Parks horticulturist as having "only good points — beautiful rich foliage, fragrant flowers, small stature and low maintenance — an asset to any city."

Advantages listed for the Buisman Elm *(Ulmus Carpinifolia buisman)* include its resistance to Dutch Elm Disease, pyramidal shape, and smooth leaves that do not readily pick up soot and gas fumes.

The Moraine Honeylocust *(Gleditsia Triacanthos moraine)* is covered by U.S. Plant Patent #836 and is a thornless, seedless variety that does not heave sidewalks. It is drought resistant, free from diseases, a rapid grower and is in great demand.

The Maidenhair tree *(Ginkgo biloba)* is a native of Asia and is used extensively as a street tree in large cities because of its wide tolerance of soil types, ease of transplanting, freedom from insect attacks, and ability to withstand city conditions. It is considered ideal for narrow streets and those bordered by tall buildings, but only the male tree should be planted because of the foul odor given off by the fruits.

The Willow Oak *(Querus phellos)* stands up well under city conditions, has dense branch structure with fine-textured foliage, grows fairly rapidly, and has a round-topped to conical shape.

Contractor Developing ILLIAC IV Computer

Engineering development of an experimental parallel-processing computer known as ILLIAC IV will be performed by the Burroughs Corp. for the Advanced Research Projects Agency (ARPA), Department of Defense.

Expected to amount to several million dollars, the contract is being negotiated by the University of Illinois, ARPA's prime contractor for parallel-processing computer research. The ILLIAC IV project is a part of the ARPA research on information processing and will be directed by Prof. Daniel Slotnick of the University.

Present computers involve the use of one control unit interacting with one arithmetic unit. The ILLIAC IV will have four control units interacting with more than 250 arithmetic units. Speed of data processing will be increased from 500 to 700 times over present computers. ILLIAC IV will be 100 times faster than any computer in development.

This large increase in computing capability is particularly important in the areas of simulation, modeling and signal processing. Examples of these uses would be the simulation of the atmosphere for weather prediction, the modeling of large economic systems and simulation of large and extremely complex military logistics problems.

The U.S. Air Force Rome (N.Y.) Air Development Center is acting as the engineering and procurement agency for the Advanced Research Projects Agency on the ILLIAC IV project.

Kudos

MERITORIOUS CIVILIAN SERVICE MEDAL. The Army's second highest award for civilian employes was presented recently to two employes of the U.S. Army Munitions Command's (MUCOM) Operations Research Group at Edgewood (Md.) Arsenal for their work on Project Mandrake Root.

Col William W. Stone Jr., Arsenal commander, presented the Meritorious Civilain Service Medal to Dr. Irvin W. Gibby, chief, Biological Systems Division, and Morton D. Shavit, chief, Physical Sciences Division. Maj Gen Floyd A. Hansen, MUCOM CG, cited them for the "exceptional skill and ability and aspiring leadership which has earned the admiration of those who have worked for you."

LEGION OF MERIT. Lt Col William J. Ayoub, retiring director, Plans and Operations Directorate, U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz., received the Legion of Merit for "exceptionally meritorious conduct in performance of outstanding service."

Lt Col Edgar A. Zaharia, senior project officer, Test Analysis Division, Test Directorate, Fort Huachuca, received the Legion of Merit for duty in Vietnam.

Lt Col Lowell K. Solt, Air Mobility Division, Office of the Chief of Research and Development (OCRD), Department of the Army, also was awarded the Legion of Metit for his contribution to the tri-Service, tripartite XV-6A aircraft (P-H27) program.

Morton D. Shavit

Dr. Gibby and Col Stone

BRONZE STAR. Maj Robert W. Leach, Special Warfare Division, OCRD, has received an Oak Leaf Cluster to the Bronze Star Medal for service in Vietnam as assistant sector adviser.

Maj James B. Walling Jr., U.S. Army Combat Developments Command Institute of Special Studies, also received a Bronze Star for service in Vietnam.

Recent Fort Huachuca recipients of the Bronze Star included Maj Charles Teeter, Capt Vander Humphries, Chief Warrant Officer Chris H. Leubner, SFC James Elliott, Sp/5 Robert L. Taylor, and MSgt Bobby M. Elliott. Taylor also received the 12th to 15th Oak Leaf Clusters to the Air Medal and Elliott received a 1st Oak Leaf Cluster. Maj Teeter and Capt Humphries also received the Air Medal.

AIR MEDAL. Fort Huachuca personnel receiving the Air Medal were Sgt Michael A. Martin, Sp/6 Roy E. Brown (14th to 16th Oak Leaf Clusters), Sp/5 Paul G. Chapa (3rd Oak Leaf Cluster).

The Senior Army Aviator's Badge was presented to Lt Col John W. Lauterbach, who recently returned from Vietnam to the OCRD Air Mobility Division.

ARMY COMMENDATION MEDAL. An Oak Leaf Cluster to the Army Commendation Medal was awarded to Lt Col Charles F. Baish Jr., now chief of the High Altitude Systems Branch, Air Defense and Missiles Division, OCRD. He was cited for service as commanding officer of the 7th Battalion, 2d Artillery, Eighth U.S. Army, in Korea.

Lt Col Albert W. Crowell received the Army Commendation Medal upon his retirement after 30 years of service. He was cited for his work in planning and supervising tests of major Army missile weapon systems while chief of the Missiles and Rockets Division, Field Artillery Materiel Testing Directorate, U.S. Army Test and Evaluation Command, Aberdeen (Md.) Proving Ground.

At Fort Belvoir, Va., the Army Commendation Medal was awarded to SFC John A. Maxwell, Operations NCO in the Department of Topography, and to SFC James E. Blumenshein, for meritorious service in Germany.

Fort Huachuca recent recipients of the Army Commendation Medal include Warrant Officer Robert L. Norris (who also received the Air Medal), Chief Warrant Officer Stanley M. Brockett, Warrant Officer Raymond J. Canfield, SMaj Salvador Rodriguez, SFC Joe J. Tippit, SSgt Robert L. Schaal, SFC James A. Dolan, Sp/5 Dalton T. Hartman, SSgt James M. Cook (1st Oak Leaf Cluster), and SSgt Dewey L. Seagroves (1st Oak Leaf Cluster). SSgt Ollie Worley received the Joint Service Commendation Medal.

At the Walter Reed Army Medical Center (WRAMC), Washington, D.C., the Army Commendation Medal was awarded to Capt Kenneth L. Wagner, MC, Department of Psychiatry and Neurol-

USARO WAC Listed as 'Outstanding Young Woman'

Recognition as an outstanding young woman has been accorded to Capt Diane Dicke, the only WAC in the U.S. Army Research Office (USARO), Office of the Chief of Research and Development.

Her name has been included in the 1966 edition of *Outstanding Young Women of America,* a listing of 6,000 women between the ages of 21 and 35 who have distinguished themselves in civic, religious, professional or political activities.

Assigned as a staff officer in the Human Factors and Operations Research Division, USARO, and acting adjutant until May 9, Capt Dicke was nominated for the honor by the Defense Advisory Committee on Women in Service.

Capt Diane Dicke

A graduate of Lindenwood College, St. Charles, Mo. (1953), she holds an MBA degree in human relations and business and industry from the University of Washington (1958).

Before entering the Army during the Berlin crisis in 1961, she was assistant dean of women at Lawrence College, Appleton, Wis., dean of women at Westminister College, Salt Lake City.

Her military career includes assignments as chief of the Reception-Processing Division, U.S. Women's Army Corps Center, Fort McClellan, Ala., and WAC selection officer, St. Louis, Mo.

Capt Dicke holds the Army Commendation Medal and is listed in *Who's Who Among American Women, Who's Who in the Mid-West,* and the *International Dictionary of Biographies.*

ogy, Walter Reed General Hospital (WRGH), for services as battalion and brigade surgeon in Korea. For service in Vietnam, 1st Lt Nickey J. McCasland, WRGH nurse, also received the award.

Other WRAMC personnel awarded the Commendation Medal are Sp/5 Charles E. Milliner, auditor in the Comptroller's Office; SFC Arthur W. Webb, NCOIC of the operating room, WRGH, who retired from the Army Medical Service Corps; and Sp/5 Glenn P. Call, Jr., Transportation Office, for service with the 1st Cavalry (Airmobile) in Vietnam.

SPECIAL ACT AWARDS. Reinhold Gerharz, Night Vision Laboratory, Fort Belvoir, Va., received three Civil Service Special Act Awards for publication of scientific articles in professional journals. The articles featured his findings as a research physicist in the Far Infrared Technical Area of the laboratory.

INCENTIVE AWARDS. Recent Edgewood (Md.) Arsenal invention award recipients included Timothy L. Fisher, Chemistry Research Laboratory, for designing an automatic pipette; Abraham Flatau, Physical Research Laboratory, for a free-spinning articulated rotor; Brennie E. Hackley Jr., Medical Research Laboratory, for his process for the reduction of Pyridine N-Oxides.

A work titled "Chemical Agents" won an incentive award for Edgewood scientists Omer O. Owens, Harold Z. Somer and 1st Lt John Krenzer of the Chemical Research Laboratory.

SSgt Larry B. Bice, an instructor in the Demolition and Mine Warfare Branch of the U.S. Army Engineer School, Fort Belvoir, received a $500 award for a suggestion he made while stationed at the U.S. Army School, Europe, in Murnau, Germany. He suggested coating the hands of galvanometers with phosphorescent paint to aid personnel performing hazardous demolition-type night missions.

In the U.S. Army Aviation Command Marvin O'Kelly, received $445 for a new method of entering overhaul publication data into the master data record. Lucille White was awarded $425 for a new procedure to expedite computer input and output actions.

Working as a team, Peggy Willingham and Earl Clower of the U.S. Army Missile Command (MICOM), Redstone (Ala.) Arsenal, have received in the past year two awards totaling $1,420 for improved computer procedures.

Sp/5 Russell Kemme, of the Maintenance Support Division, MICOM, received a $590 award for proposing a method for returning Hercules Transponder Control Groups to serviceable condition for training purposes.

Edgewood Arsenal's Bob Dugent, and employee in the Technical Support Directorate, received $300 for seven suggestions over the past year.

KENT AWARD. Harry L. Reed, chief of the systems engineering evaluation branch, Weapons Systems Laboratory, U.S. Army Ballistic Research Laboratories (BRL), Aberdeen (Md.) Proving Ground, received BRL's annual Dr. Robert H. Kent award for scientific or engineering accomplishment that reflects the highest professional achievement.

CERTIFICATE OF ACHIEVEMENT. John W. Poteet Jr., chief legal counsel at the U.S. Army Mobility Equipment Command's Engineer Research and Development Laboratories (ERDL), Fort Belvoir, Va., received a Certificate of Achievement upon his retirement from more than 25 years of military-civilian service.

CERTIFICATE OF APPRECIATION. ERDL Director of Engineering Robert W. Beal received a Certificate of Appreciation from the Society of Automotive Engineers for his outstanding service in the cooperative program.

COMMENDATION CERTIFICATES. Army Certificates of Commendation for outstanding service were presented to Dr. Joseph I. Wollman, Physical Examination Section, and Sallie M. Norcott, dietition, Walter Reed General Hospital, and to Mrs. Beulah M. Jones, secretary at the Nuclear Power Field Office, Fort Belvoir.

Salvage Expert Saves Silver From Hypo

Exhausted sodium thiosulfate solution, popularly known as hypo or "fix" in the photographic film-developing process, is yielding 300 ounces of reclamable silver a month at Aberdeen (Md.) Proving Ground.

Formerly the solution was discarded. This is but one of a series of money-making ideas conjured by Robert L. Kessler, Property Disposal Division chief, who has an impressive record of extracting savings for the U.S. government from materials generally wasted.

The silver recovered from the hypo electrolytically has a resale value of $1.29 per ounce. The unit at APG processes hypo solutions from its own photo lab, Edgewood Arsenal and the Bainbridge (Md.) Naval Training Center (BNTC).

Kessler has developed an incinerator that can reduce a ton a day of old photographic film to ash which is sent to the U.S. Naval Ordnance Plant, Forrest Park, Ill., for recovery of silver. Previously, the film was shipped at an expense of several thousand dollars annually. He received a cash award for the idea under the Army Incentive Awards Program.

A merger of the property disposal units at Edgewood, the APG and BNTC, recommended in 1965 by Kessler after a 4-month study requested by the Army Materiel Command, resulted in a saving estimated at $165,000 in 1966. The APG property disposal unit also handles similar processing for the National Guard and The Adjutant General Offices in Baltimore, Md.

In March 1966, Kessler was selected by the Department of the Army to serve with an international team of 11 specialists to assist in establishing a property disposal system in Vietnam.

When Kessler became property disposal officer at APG in 1961, he set a goal for improvement of scrap-handling methods. He also designed an improved method for separating ferrous and nonferrous metals. Within a year, he developed new techniques for using nonreportable property and increased utilization of total line items received to 83 percent.

He served as an enlisted many with the old 40th Ordnance Company at Aberdeen and after graduation from OCS in 1942 served with Ordnance units in Florida and overseas. He was separated from the Army in 1945 and joined APG as assistant property disposal officer.

Robert L. Kessler

DoD, Contract Personnel Meet In Cost-Reduction Workshops

"Working level" representatives of the U.S. Department of Defense and industrial contractors have been meeting since Feb. 14 in a series of eight cost-reduction workshops in major cities.

Coordinating the program is Commander H. L. Gurnee, U.S. Navy, assigned to the Office of the Assistant Secretary of Defense (Installations and Logistics). Assisting with panel discussions on value engineering, audit validation and reporting procedures are F. A. Romeo, Office of the Assistant Secretary of Defense (Comptroller), R. H. Kempter, Office of the Assistant Secretary of Defense (Installations and Logistics) and T.H.E. Winshurst, Defense Contract Administration Services.

Remaining workshops in the series are scheduled for Mar. 21-22 in San Francisco, Mar. 23-24 in Los Angeles, Apr. 11-12 in Chicago and Apr. 13-14 in Philadelphia.

Army Officers Participate in AEC Nuclear Weapons Design

By Maj Orbun E. Qualls, Jr.

Research on some of the nation's most sophisticated concepts in weapons design is assigned to a select group of Army officers at the renowned Lawrence Radiation Laboratory (LRL) in Livermore, Calif., under a program initiated in 1959.

Founded in 1952, Lawrence Radiation Laboratory is operated for the U.S. Atomic Energy Commission (AEC) by the University of California. Its primary mission is the design and development of nuclear explosives.

The first three Army officers assigned in 1959 were captains with advanced degrees in the physical sciences. Under an agreement between the AEC, the Laboratory and the Department of Defense, selectees for the program are assigned to the director of the Livermore Laboratory for two years. An optional one-year extension is sometimes available at the director's request.

Several U.S. Army officers presently working with LRL scientists and engineers are actively engaged in weapons design. Their function *is not* to observe, act as liaison, or get an education, although these things occur in the normal course of events. Their prime function is to participate — to take a definite part in the design of nuclear devices.

U.S. Army officers selected for research associate assignments move directly into current projects within the laboratory. The work they do depends upon their technical qualifications, but they operate on the same basis as their civilian counterparts. Officers are supervised by, and, in some cases, they supervise, laboratory employees.

Over the past years, these officers have been involved in the design of weapons such as the nuclear shell for the 155mm howitzer and the warhead for the Polaris missile. Some members of the current group are working on the warhead for the Lance missile. Others are devoting their research to new concepts for which there are no weapon applications as yet.

The job usually calls for them to travel to AEC facilities throughout the country to participate in and direct a variety of activities. Almost every day they face the technical and managerial problems that arise in the kind of scientific community they have joined.

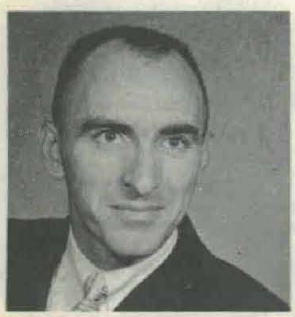
When they leave the LRL, they usually move into U.S. Army positions of responsibility for nuclear systems under operational conditions.

Army officers are in good company in this joint AEC-DoD-LRL program. Many of the country's brightest young scientists are working at LRL. The roll of past directors at the Laboratory reads like a "Who's Who in the Department of Defense."

Among these notables are Dr. Herbert York, former Director of Defense Research and Engineering; Dr. Edward Teller, world-renowned nuclear scientist; Dr. Harold Brown, the Secretary of the Air Force; and Dr. John S. Foster, Director of Defense Research and Engineering. Dr. Michael M. May is the present LRL director.

The Laboratory employs about 5,600 personnel. While the nuclear weapons program is foremost, several other AEC-sponsored projects are under study at Livermore. These include the Plowshare Program — the study of industrial applications for nuclear explosives; the Sherwood Program — research on controlled thermonuclear reactions for power generation; the Bio-Medical Program — research of the effect of radioactivity on man and the biosphere; the advanced space reactor research program; and a program of basic physics and chemistry research.

Maj Orbun F. Qualls Jr. is attending the U.S. Army Command and General Staff College at Fort Leavenworth, Kans., after serving from 1963 to 1966 at the Lawrence Radiation Laboratory.



Maj Orbun F. Qualls Jr.

Other duty tours include command and staff assignments with Infantry and Armor divisions in Europe (1955-58); staff officer with Infantry troops in the United States (1958-59); and nuclear weapons employment officer, G3, HQ 7th Infantry Division, Korea.

He received the Army Commendation Medal and an Oak Leaf Cluster for service during 1956-59 and the Joint Service Commendation Medal for his performance at the Lawrence Radiation Laboratory.

He received a BS degree from the U.S. Military Academy in 1954 and an MS degree in mechanical engineering from the University of Southern California in 1962. His military schooling includes Infantry officer, Airborne school, and jungle warfare.

Atomic Training Group Lists 75,000 Grads

More than 75,000 students have been graduated by the Atomic Weapons Training Group since its establishment in 1946 at HQ Field Command Defense Atomic Support Agency (DASA), Sandia Base, N. Mex.

Many of these — ranking from privates to generals and from seamen to admirals — now comprise a major part of the specialized staff maintaining the U.S. nuclear strike force.

Military experience in nuclear wearpons maintenance operations qualifies the core of 185 instructors in five distinct training divisions. Formal civilian college education is not a prerequisite for staff assignment, although some 50 insturctors hold baccalaureate and master's degrees. Represented on the training staff are enlisted and officer members of the Army, Navy, Air Force and Marine Corps.

Courses vary from five days for high-ranking officers in the Weapons Orientation Advanced Course to five months for enlisted students in the Army Nuclear Weapons Electronics Specialist Course.

Chief of the Training Group is Col Howard O. Golladay, who joined the DASA unit in 1966 after a 3-year tour as assistant chief of staff, G-3, HQ U.S. Army Southern European Task Force, Italy.

Primary training divisions are Army Weapons, Navy Weapons, Joint Training, National Capabilities, and Instructor Training and Evaluation. Each is responsible for training in specialized areas but emphasis is on joint training. The divisions frequently join forces to present particular phases of instruction. Visiting instructors are drawn from other DASA Field Command departments and from Sandia Corp.

A new training facility at Sandia was opened late in 1965, combining classrooms, audio-visual training aids, weapons bays and other training space that had been scattered in 28 buildings.

Col Crowe Becomes Chief Of Nuclear Surety Group

Col John H. Crowe became chief of the U.S. Army Nuclear Weapons Surety Group, Fort Belvoir, Va., upon the recent retirement of Col Silas Gassett.

The Group is in charge of monitoring the overall aspects of Army nuclear safety, from the initial concept of weapons to their delivery or retirement.

Graduated from the U.S. Naval Academy in 1939, he served in the Navy for seven years before transferring to the Army. His Army assignments have included executive officer, 1st Artillery Task Force in Germany; commanding officer, 559th FA Missile Battalion in Fort Bliss, Tex.; and acting J-3 at Alaskan Command HQ.

From June 1960 to February 1962, Col Crowe was a division chief in the Nuclear Weapons Surety Group, then went to the Weapons Systems Evaluation Group Office, Secretary of Defense. Before returning to Fort Belvior, he served a tour in Vietnam.

Dr. Abbott, Moore Named Director, Deputy for CRESS

American University has selected Dr. Preston Abbott as executive director of the Center for Research in Social Sciences (CRESS) and promoted Richard H. Moore to assistant executive director.

Until successors are appointed, Dr. Abbott will continue to serve also as director, CRESS Social Science Research Institute (SSRI) and Col Moore will remain also as director of the Cultural Information Analysis Center (CINFAC).

Dr. Theodore R. Vallance vacated the director's job last fall to join the staff of the U.S. Department of Health, Education and Welfare. Dr. William A. Lybrand, assistant director, departed CRESS in mid-1966 to engage in an American University research project.

CRESS was established at the Washington, D. C., university July 1, 1966 as successor to the Special Operations Research Office (SORO), which functioned for many years as one of the Army's major contract agencies in the social science research field.

The Center is responsible for conducting research in support of Department of the Army missions in special warfare and military assistance and for maintaining a rapid-response counterinsurgency information system.

SSRI conducts research studies of psychological operations, unconventional warfare, counterinsurgency, military assistance, civic action and related problem areas. CINFAC collects, stores, retrieves and analyzes cultural and human factors date relevant to potential and real insurgency and counterinsurgency situations in specified geographical areas.

CRESS has a full-time staff of 52 professionals and 58 administrative support personnel.

DR. ABBOTT joined CRESS in 1966 after serving a year as assistant director for review and analysis at the Human Resources Research Office (HumRRO) of George Washington University, Washington, D. C. He was director of the Human Ecology Fund research programs from 1960-1965 following service as director of research, Infantry Human Research Unit, HumRRO, Fort Benning, Ga.

From 1955-1957, he was senior research scientist and executive officer of the Training Methods Division, HumRRO, after four years as research psychologist of the Air Force Personnel and Training Research Center, Mather Air Force Base, Calif.

Dr. Abbott holds an AB degree from Bates College (Lewiston, Me.), an MA from the University of Hawaii and a PhD degree in psychology from Brown University, Providence, R.I. He is a Fellow of the American Psychological Association and Sigma XI. In the U.S. Air Corps during World War II, he was awarded the Distinguished Flying Cross, Air Medal and Purple Heart.

COL MOORE, who retired in 1963 after 30 years of military service, became director of CINFAC in 1964 after a year as CRESS liaison officer to the Department of Army.

Dr. Preston Abbott

Richard H. Moore

His tours in the Army included the position as deputy assistant to the Director of Joint Staff for Counterinsurgency and Special Activities (SACSA) of the Joint Chiefs of Staff (1960-1963); and commanding officer, 35th Artillery Group and Assistant Corps Artillery Commander VII Corps Artillery, Stuttgart, Germany (1957-1960).

He was chief of operations in the Office of Chief of Psychological Warfare, Department of the Army, Washington, D. C. (1954-1957); on the staff and faculty of the Command and General Staff College, Fort Leavenworth, Kans. (1950-1953); and executive officer to the Chief of Civil Affairs and Military Government, Eighth Army, Japan (1947-1949).

UH-1 Helicopters Test LWL Smoke Screen Unit

Twenty prototype integral smoke generators for UH-1 helicopters are scheduled for operational evaluation by Army units in Vietnam.

Developed by the U.S. Army Limited War Laboratory, the generator can produce a 4,000-meter linear smoke screen lasting two minutes in moderate winds. One of the engineering models successfully screened a recent airlift of a UH-1D by a CH-47 in Vietnam.

The device consists of a smoke-agent tank, pump, piping, and a spray nozzle attachment. The nozzle is mounted on the aircraft turbine exhause stock so that the smoke agent is directed into the hot exhaust gases and vaporized.

AFIP Lectures Open With Cancer Progress

"Progress Against Cancer" is programed as the opening presentation at the seventh annual Armed Forces Institute of Pathology (AFIP) lectures, Mar. 20-24, at Walter Reed Army Medical Center, Washington, D. C.

AFIP Director Brig Gen Joe M. Blumberg will make the presentation on recent advances in the intensive research effort being conducted in the Armed Forces in cooperation with other agencies to combat cancer. Sixty-five papers will be presented by the Institute staff during the 5-day meeting.

The AFIP lecture series is a review and compilation of progress in anatomic pathology and clinical methods as they apply to pathology.

Technical papers will deal with pitfalls in diagnosis, unusual cases, statistical data, advances in histologic techniques, and application of new toxicological methods in the daily practice of pathology. Articles published or to be published by AFIP staff members also will be reviewed.

Dr. Elson B. Helwig, chief, AFIP Department of Pathology and course director, says the lectures are designed to give practicing pathologists a concise combined period of instruction and review of the most recent developments at the Institute.

Optional programs offered this year include seminars on endocrine pathology, selected special stains as an aid to diagnosis, and on veterinary pathology.

SCIENTIFIC CALENDAR

Conference on Characterization of Macromolecular Structure, sponsored by OAR, AFOSR, AFML and NAS, Washington, D.C., Apr. 2-7.

1st Rock Island Arsenal Biomechanics Symposium, sponsored by RIA, ARO-D and Augustana College, Rock Island, Ill., Apr. 5-6.

American Meeting of The Institute of Management Sciences, Boston, Mass., Apr. 5-7.

International Conference on Nonlinear Magnetics, sponsored by IEEE, Washington, D.C., Apr. 5-7.

Meeting of the American Chemical Society, Miami Beach, Fla., Apr. 9-14.

Meeting of the American Society of Mechanical Engineers, Detroit, Mich., Apr. 10-12.

Symposium in Combinatorial Mathematics and Its Applications, sponsored by OAR, AFOSR, the University of North Carolina and the U.S.-Japan Science Cooperative Committee, Chapel Hill, N.C., Apr. 10-14.

1967 Army Conference on Numerical Analysis and Computing, sponsored by ARO-D, Madison, Wis., Apr. 12-13.

Meeting of the American Physiological Society, Chicago, Ill., Apr. 16-21.

Meeting of the Federation of American Society for Experimental Biology, Chicago, Ill., Apr. 17-21.

National Technical Meeting on Applications Related Phenomena in Titanium Alloys, sponsored by ASTM, Los Angeles, Calif., Apr. 18-19.

Conference on Polymer Structure and Mechanical Properties, sponsored by Natick Laboratories, Navy, Air Force, NASA and CLR, Natick, Mass., Apr. 19-21.

Meeting of the American Society of Mechanical Engineers, Chicago, Ill., Apr. 23-27.

21st Annual Frequency Control Symposium, sponsored by ECOM, Atlantic City, N.J., Apr. 24-26.

Meeting of the American Society for Microbiology, N.Y.C., Apr. 29-May 4.

Why the Army Civilian Employe?

General Waters Pays Tribute to Army Career Service

General John K. Waters, Commander-in-Chief, U.S. Army Pacific when he retired Sept. 1, 1966, after 39 years military service, paid a high tribute to Army civilian employes in a farewell address at Fort Shafter, Hawaii. Published in the December issue of the Army Personnel Letter, the condensed address is deemed worthy of reprint.

* * *

General John K. Waters

"In the land of the blind, the one-eyed man is king," and so there are times and places where an uninformed few are sumped when an occasional character asks: "Why do we need civilians in the Army?" Well, for both the uninformed and the characters, the answers are not vague or abstact but clear and positive:

- Civilian employes provide abilities not otherwise available.
- Civilian employes provide continuity of administration and operation.
- Civilian employes constitute a stable, trained force and as such preserve the industrial and administrative work knowledge peculiar to the military.
- Civilian employes free military personnel for primarily military duties.

There are some direct barometers of the performance of government workers. If we turn to the barometer of education, for example, there are pleasant discoveries. Federal executive employes have a higher average education than their counterparts in industry. Another reading on the barometer of actual performance in the readiness of the Civil Service to rid itself of incompetence.

Folklore has it that federal employes, particularly those with competitive status, cannot be fired or that the process is so difficult it cannot be made effective. The facts betray the myth. In the federal Civil Service, annual dismissals have averaged about 14,500 for the past several years. You and I may take comfort in the fact that the federal service is not the haven of apathy and incompetence that it is sometimes accused of being.

A continuing and urgent need of the Army is to be able to attract and retain first-rate men and women as employes. Both within and outside the Army work environment, some real dangers are present which, if not corrected, could materially damage our ability to have enough of the best people. I would like to touch upon three dangers which particularly concern me:

One pertains to military-civilian relationships. There are a few military personnel who lack an understanding of the expanding role of the civilian employe. Conversely, there are a few civilian employes who fail to understand the military tradition.

A second danger to the Army's success in maintaining a quality workforce is the public's attitude toward the role of the government worker. It is a distressing situation when government employes become the subject of ridicule or disrespect.

A third danger pertains to the comparability of pay and working conditions with those in private industry. The Army must compete with the private sector for available good men and women.

If I were asked to describe my ideal Army employe, it would be an extremely difficult task, but there are certain qualities I would surely include:

- The ideal employe is competent. He knows his job and stays abreast of the continuing changes in techniques and methodology.
- He is creative, having the spirit of innovation and the willingness to change.
- He has integrity, He puts principles above expediency and is more interested in "what is right" rather than "who is right."
- He has pride. His motivation to a large degree is self-motivation.
- He is a loyal employe, loyal to the people for whom he works, the organization in which he is assigned, and the country that he serves.
- And finally, the ideal employe has courage. He has the courage to stand up and be counted though in the minority.

In these perilous times, the challenge to the Army civilian employe has never been greater. He must understand the requirement for continuing his education to be equal to his increasingly difficult tasks. Regardless of how routine or highly responsible his job may be, he is a part of a vital mission and as such shares in the glory of the Army successes. In the spirit of the words of the late Nehru, the leader of India: "You know, we are small men and unimportant but the cause in which we work is great — and some of that greatness touches each of us."

NCO Wins 3-Year PhD Study in Japan

No one aspiring to a higher education through an Army career has better reason to put his whole heart into saying "Never had it so good" than MSgt James D. White, Fort Belvoir, Va.

Selected for a 3-year international scholarship offered by the Japan Radio-Television Education Association, MSgt White will study educational broadcasting at the International Christian University in Tokyo. His objective is a PhD degree in that field.

Because the project is considered of value to the U.S. Army, he will receive full pay and allowances for the three years of study.

MSgt White entered the Army in 1953. He studied Mandarin Chinese at the Army Language School in 1958, then served in Korea and Japan. While in Japan he enrolled in the University of Maryland's off-duty education program and earned a BA degree in 1963.

In 1965, he received a master's degree in education from the International Christian University in Tokyo. He is the first member of the military profession and the second American citizen to achieve this distinction. His master's thesis, an historical survey of the Japanese use of radio and TV in education, was the first large-scale paper written in the English language on this subject.

MSgt White served at Fort Belvoir as administrative NCO at the U.S. Army Engineer Center Brigade.

DEPARTURE ORDERS for three years study toward a PhD at the International Christian University, Tokyo, Japan, are handed a MSgt James D. White by U.S. Army Engineer Center Brigade Commander Col Benjamin R. Bush. Dr. Eric A. Eber, director of General Education Development at the Army Education Center is at right.

Bill to Raise Federal Pay

A bill pending before the House Civil Service Committee would provide full pay comparability for federal classified employees if enacted by Congress. Pay raises would range from 3 percent in grades 1 and 2 to 21 percent in top grade GS-18.

Low-Cost International Scientific Cooperation

By Dr. Frederick H. Reder
Senior Scientist Institute for Exploratory Research

Between February 1963 and August 1965, the Institute for Exploratory Research (IER), U.S. Army Electonics Command, Fort Monmouth, N.J., established a global network of 10 very low frequency (VLF) phase-and-amplitude-recording stations in the United States and eight overseas countries.

Bilateral arrangements with five universities and four Government laboratories were established with wholehearted support from the U.S. Army Materiel Command, the Office of the Chief of Research and Development, and the Office of International Scientific and Technological Affairs of the U.S. State Department.

The cooperation is based on mutual scientific interest, supply of all equipment and materiel (manufactured and purchased in the U.S.), technical guidance and special training by the IER, and operation of the equipment free of charge (with two exceptions) by our overseas partners.

The exceptions involve the payment of about $1,500 per year for services in one case because of a particularly difficult manpower situation. In the other case the payment of $7,000 in 1965 and $3,000 in 1966 was for extra expenses for equipment operation in remote areas.

The project (short title: INT-VLF) tentatively is intended to run until the summer of 1970, in order to cover the entire period of increased solar activity.

INT-VLF serves the purpose of conducting a worldwide, coordinated study of the lowest inonosphere and of VLF propagation phenomena by means of high-precision VLF phase- and amplitude tracking, and by other techniques added at some sites by mutual agreement. All stations are furnished with identical equipment and controlled by rubidium frequency standards in order to facilitate data reduction.

Of particular interest are:

- Correlation between VLF phase and amplitude anomalies with riometer, magnetometer, auroral radar and photometer, solar photometer, and solar radiometer observations;
- Geographic extent of ionospheric disturbances;
- Transequatorial propagation effects;
- Nonreciprocity of VLF propagation losses and phase velocities;
- Sunrise and sunset fading due to mode interference;
- Propagation factors of higher-order modes; and
- Improvement of antipodal signal suppression in critical areas.

A technical manual on the project is being written. The first part, containing the scientific program, organizational details and data on the utilized transmitters, propagation paths, and receiving sites, has just been completed.

Part II, describing seven computer programs for data reduction, will be completed in March 1967. Part III, on the subject of time and frequency, their measurement, and clock synchronization, is to be completed in May 1967.

Part IV, on INT-VLF equipment and VLF measurement techniques, will be completed in calendar year 1967. It should be noted that these will be the first comprehensive technical manuals on VLF measurement ever published.

The acute problems of providing special training for foreign participants and overcoming the shortage of qualified manpower at the IER for data analysis have been solved by inviting, under "Invitational Travel Orders," about two INT-VLF partners each year to IER for a period of six months each.

The invited scientist receives transportation on a U.S. air carrier and regular pen diem pay while at the IER. Applications from three countries have already been received. The first visit by a scientist from Brazil proved that the plan was a complete success.

Direct technical communication between the U.S. and overseas project leaders has been authorized to speed results and reduce administrative work.

Up to now this cooperative program has fulfilled all technical expectations. Since it operates at very low cost, because of work sharing, it avoids the gold flow problem. Because it provides participating countries additional opportunities for their skilled manpower, it generates much good will overseas.

The U.S. Army is interested in having the overseas trainees return to their homeland to apply what they have learned here in operating a station under the INT-VLF project.

The plan of training foreign scientists under invitational travel orders provides the U.S. Army with skills in technical areas which otherwise would require special hiring by the U.S. laboratories concerned with advancing VLF systems. It is believed that this method of INT-VLF can be applied to other research requiring overseas locations.

Services Seeking Nongovernmental Scientific Consultants

Retirements are thinning the ranks of the many able scientists and engineers who have served the Department of Defense as consultants since World War II, and a wide search is underway.

The Department of Defense, University of California and the Armed Forces have joined in sponsoring three seminars during the past two years to acquaint bright young talents with the technical problems for which the services of consultants are in demand.

Based upon participation in the seminars, a roster of 129 scientists and engineers and their technical achievements was compiled and distributed to major commands for consideration to meet consultant needs. Analysis showed that half the participants had not been affiliated with the government.

Dr. John S. Foster Jr., Director of Defense Research and Engineering, suggested that the military departments appoint one or more of the nongovernmental participants to each high-level ad hoc consultative panel and committee, as well as to scientific steering groups associated with in-house labs.

The Army intends to follow up with semiannual inquiries to ascertain the utilization of new consultants and the resulting benefits. Dr. Richard A. Weiss, Deputy and Scientific Director of Army Research, Office of the Chief of Research and Development, is the contact for the Army program.

Command representatives to date include Dr. Craig M. Crenshaw, chief scientist, U.S. Army Materiel Command; Col C. P. Rountree, chief, Combat Developments Division, Research and Development Directorate, HQ U.S. Army Continental Army Command; and Dr. G. G. Quarles, chief scientific adviser, Office of Chief of Engineers.

Col John Sheedy, chief, Research Division, U.S. Army Medical Research and Development Command; and Thomas J. Bartlett, chief scientist, HQ U.S. Army Air Defense Command, have been designated points of contact.

"BRIEFCASE WEATHER STATION," the AN/TMQ-22 Meterological Measuring Set, developed by the Atmospheric Sciences Laboratory, U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz. Shown above in the operating position, the set represents significant improvements over the older versions of similar equipment for measuring wind velocity and direction, temperature, dew point, barometric pressure, rainfall and snow depth.

A New Plan and Goal for Packaging Research

By Dr. E. A. Nebesky
Dr. M. S. Peterson

Packaging research at the U.S. Army Natick (Mass.) Laboratories has set forth on a long-range program with an ambitious goal — complete correlation of packaging with the military product and military supply-line operations.

A century ago the packaging of supplies for the combat soldier was the job of craftsmen, and the requirements were not much more rigorous than for civilian users.

Today, military service requirements for packaging are written in response to a revolution in the concept of warfare — a revolution that has increased enormously the Army's mobility, firepower, and capability for sustaining itself in combat.

Packages must be adapted to rapid, labor-saving methods. They must protect the contents against agents of destruction totally unknown a hundred years ago, and they must fit snugly into sharply defined systems, such as combat feeding.

The tare weight of packages today is of vital concern. Higher strength of container materials is required without any increase in weight.

Increased storage life, easier removal of contents, re-use after initial use, better patterning of loads, proper safeguarding of chemical supplies, and reduction in cost are among the many problems that can no longer be solved simply by the craftsman.

Containers must be based on greatly improved design and construction concepts, and tailored to requirements of the product, to transportation by air, land and sea vehicles, and to a wide range of environmental conditions to ensure that materials and materiel will be usable when needed, even when stored for extended periods.

The role of the container in keeping the supply stream flowing is too well recognized to be described here, but what may not be so well recognized is the need to raise packaging research and development to a level compatible with major advances in materiel.

Packaging is a science and as such is no less important than product formulation, quality control and manufacturing operations. It was with this goal in mind that a new approach to the U.S. Army Natick Laboratories' Packaging Research Program was taken and a unified network of tasks was scheduled under three coordinated projects.

The three avenues to attainment of the packaging research and development goal are Packaging Performance Evaluation, New Packaging Engineering Systems, and Applied Container Engineering Development.

Container performance data derived during actual mobility supply operations will be collected and translated into design and construction criteria. Advanced concepts, such as a universal container system, will be implemented.

Dr. Edward A. Nebesky, chief of the Container Division at the U.S. Army Natick (Mass.) Laboratories, directs Army programs for preserving, packaging and packing materials and methods for military supplies including food and clothing.

He attended the University of Massachusetts, earning BS, MS, and PhD degrees (1943, 1948, 1950), all in food science and technology. He later served there as an instructor until 1951 when he joined the Cryovac Co., Simpsonville, S.C., as product manager.

In 1956 he became associate professor and head of the Division of Food Technology, Dairy Department, at Cornell University, Ithica, N.Y. He joined the Rutgers faculty in 1959 as professor and Food Science Extension specialist and was named director of the Rutgers Graduate Packaging Center in 1963.

Dr. Martin S. Peterson, supervisory physical scientist at the U.S. Army Natick Laboratories, is a graduate of Reed College, Portland, Ore.

Appointed to a Rockefeller Fellowship at the University of Chicago in 1924, he selected American literature as his field. In 1926 he was appointed to a teaching post at the University of Nebraska, where he earned MA and PhD degrees (1929 and 1932).

During World War II, he was a publications consultant for the Quartermaster Subsistence Research and Development Laboratory, Chicago, Ill. In 1947 he entered Federal Service. From 1952-1960, he was editor of two professional journals, Food Research and Food Technology.

Dr. Peterson is the author of several published works, including a 2-volume work, Food Technology the World Over, *and articles in industrial journals.*

Applications of container engineering developments to the packaging of products individually, by category, or in combination, also will be made.

Evaluation Criteria. The successive environments to which a container is exposed on its journey to the user range from mild to harsh. The first leg of this journey from the factory shipping dock is likely to be easy, with no more than the usual amount of jolts, vibrations and abrasions sustained in the domestic transportation of supplies.

Shipment overseas by plane or boat may be a little more rough. But when a container reaches its destination, say a port in South Viet Nam, it leaves the world of well-equipped transport vehicles, smooth supply routes, ideal climatic environment, orderly handling, and enters the harsh part of its journey.

To evaluate packaging performance, data on results of the whole cycle of operations, from factory to use in the field under all types of adverse climatic and environmental conditions, must be collected and analyzed. The current Natick Laboratories effort is believed the first comprehensive, systematic, scientific approach.

Observations of packaging performance in the past have been visual, supplemented by tests after the fact. What is needed, and is well under way, is an objective evaluation system based on recording devices, placed in selected containers of a shipment, that will measure accurately the effects of physical and environmental shocks.

Once experimental data obtained over a wide range of transport methods, routes and regions have been collected and analyzed, new laboratory test methods and techniques will be divised to correlate environmental effects with predictions of container performance. By these means, a science-oriented engineering capability for designing and constructing containers can be achieved.

The term "science-oriented" applied to packaging research may be viewed a bit skeptically by the practical man, but it is by no means a pretentious desciption. A container structure that will stand up to military supply-line punishment cannot be designed without a penetrating study of many factors.

In the first place, a container has to be "optimized," that is, factors of money, materials, adequate structural strength, and a configuration suited to transport, handling, storing, and field use must be considered.

For example, take one area of concern — physical shock, where a variety of physical forces impact on a container. What can be done to neutralize or at least modify these forces? The answer can be found only in structural analysis, a complex field.

In the area of materials deterioration, the application of chemistry and microbiology is required. To attain optimal container configurations, evaluation has to be done by a mathematician or topologist, and computers will have to be employed for many performance evaluation tasks.

New Packaging Systems. The word systems is used here in a technical rather than a military sense. For example, a packaging system for irradiated foods is a *technical* system that must fit into a *military* feeding system. Packaging engineering systems are not unknown today. With advances in combat development systems, however, we must look ahead to the time when it will be possible to design and construct a "universal container system," suitable for use in the overall military supply system.

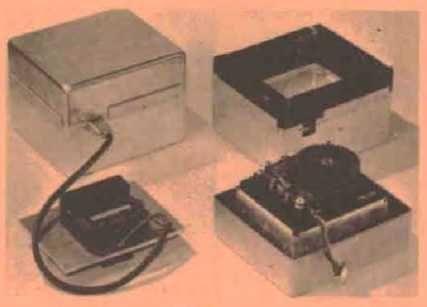
Engineering Development. The task of packaging research is to analyze all pertinent military situations and to devise systems and methods responsive to military requirements. Modern science and technology must be used by the Army in coordinated effort with industry to design and construct lightweight containers and keep constantly aware of their performance in the supply lines through systematic evaluation.

No packaging engineering system will be acceptable, however, unless it interacts smoothly with the supply system which it serves, with tactics, and with overall strategy. Cumbersome supplies have been known to bog down an army and cause its defeat. Modern packaging research can help assure that supplies are delivered where they are needed, in condition for use when required.

Applied container engineering development, the third approach to the goal of a science-oriented packaging research program, can be illustrated with the concept of the universal container system. A large volume of *performance evaluation data* must be collected and analyzed before the criteria for this advanced system can be established.

The optimal design, determined by model analysis, will involve: (1) detailing mathematically the broad intuitive assumptions concerning the model, by means of the computer; (2) studying each part of the system, separately; and (3) meshing the universal container system into the military supply system.

An example of a universal container system, no doubt farfetched in terms of today, would be a collapsible barracks, with equipment and supplies, all in one package. Nevertheless, we should be thinking in terms of the amount of work a given container can perform, how it can take over, in part, the work of another container, and how by entending this principle we can substantially reduce the burden on supply operations.



DATA COLLECTION by means of the recording instrument illustrated above will provide design criteria required for construction of containers capable of withstanding shipping shocks sustained during handling and transportation. The instruments will be concealed in standard containers and shipped with line items scheduled for worldwide distribution. Transducers in the instrument sense various environmental conditions encountered in shipment—stresses such as acceleration, stacking loads, dynamic loads, temperature, humidity and drop impact.

Some of the basic principles of a universal container system (UCS) have been vaguely outlined. Examples are: containerizing containers, standardization of container sizes and configurations, efforts to obtain an acceptable material, the development of multi-use containers, and, thinking now of military systems and how a UCS could mesh in with it, the increasing attention being given to the effect of one component of a system on all other components. In the approach to *new packaging engineering systems,* special attention will be given to these modern principles of military supply systems.

Philosophy of the Natick Laboratories Program. It should be evident from the foregoing account that the new plan being developed at the Natick Laboratories does not try to tell the Army what it should have in the way of containers nor to sell the Army on specific containers. The plan does call for an investment of scientific, engineering, and technological effort that will be responsive to current and forseeable needs.

The keystone of this planning philosophy is constant coordination of container development with military operational planning to assure that packaging research is kept abreast with progress in Army materiel.

Standard Vocabulary Defines ADPS Terms

Blank character . . . artificial intelligence . . . character recognition . . . benchmark problem . . . crosstalk . . . argument . . . noise . . . X-punch . . . Y-punch . . . flip-flop . . . postmortem

The above drama is not free-verse poetry, but a listing of a few of the terms defined in a new "United States of American Standard Vocabulary for Information Processing."

Issued by the United States of America Standards Institute (USASI), formerly the American Standards Association, the standard provides succinct difinitions of 711 terms, some of them familiar words with strikingly new meanings.

Blank character, for example, refers not to a "zero personality" type but is a "character used to produce a character space on an output medium." *Character recognition* is the "identification of graphic, phonic, or other characters by automatic means." Oh, yes, a *character* is an "elementary mark or event that is used to represent data."

A benchmark problem is not the carving of contemporary slang into the furniture, but a "problem used to evaluate the performance of computers relevant to each other."

An *argument* is an "independent variable, such as the number that identifies the location of the desired value," and a *flip-flop* is a "circuit or device containing active elements, capable of assuming either of two stable states at a given time. Synonymous with *Toggle.*"

Other computer terms: *Dump* — to copy the contents of all or part of a storage.

Dynamic Dump — a dump that is performed in execution of a program.

Cardstacker — an output device that accumulates punched cards in a deck.

Crosstalk — the unwanted energy transferred from one circuit, called the "disturbing" circuit, to another circuit, called the "disturbed" circuit.

X-punch — a punch in the second row, one row above the zero row, on a Hollerith punched card.

Y-punch — A punch in the top row, two rows above the zero row, on a Hollerith punched card.

Designed to aid communication among systems designers, users and managers, and to aid the proper interpretation of manuals, programs, specifications and patents, the vocabulary is intended also for classroom instruction.

The unabridged version is available for $3.50 from the U.S.A. Standards Institute, 10 E. 40th Street, New York, N.Y., 10016. An abridged edition of 318 words is available for 25 cents from Dept. CG, *Newsweek,* 444 Madison Ave., New York, N.Y., 10022.

Vietnam Units First to Receive New Field Anesthesia Machines

Armed Forces medical units in Southeast Asia are receiving the first shipments of a new field anesthesia machine standardized after 10 years Army-manufacturer development.

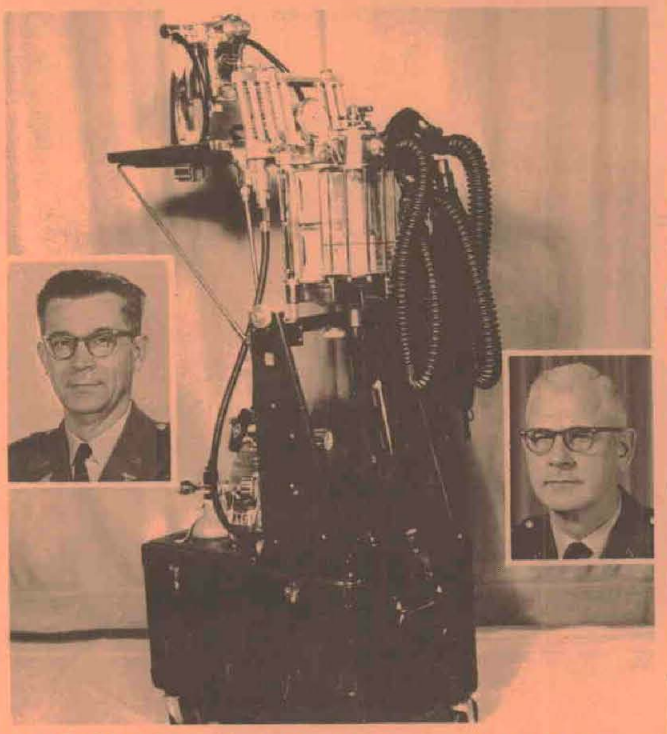
Under an $857,434 contract with Ohio Chemical and Surgical Equipment Co., the Department of Defense has ordered 723 of the machines. Delivery is slated to Vietnam, then to U.S. Army Europe ready units, and eventually to all Armed Forces medical services.

The project to develop the first innovation in field anesthesia equipment since 1930 originated with Col Harvey C. Slocum, MC, director, Department of Medicine and Surgery Medical Field Service School, Fort Sam Houston, Tex., while he was with the Walter Reed General Hospital (WRGH) staff in Washington, D.C.

Final development of the field unit was assigned in 1962 to Col John A. Jenicek, chief of WRGH Anesthesiology and Operative Service. Working with chief design engineer Wayne Hay of Ohio Chemical Co., he incorporated a third anesthetic gas capability (cyclopropane) as well as a break-in-circuit so that vaporizers for available halogenated anesthetic agents could be used for out-of-circuit vaporization.

Standardization was completed in November 1966 and seven models were sent to the 45th Surgical Hospital (MUST) in Vietnam. (MUST is the acronym for Medical Unit, Self-contained, Transportable.) The machine is one-third less in bulk and nine pounds lighter at 75 pounds than the machines it will replace throughout the world.

Clinically tested at Walter Reed and field tested in the Continental U.S. and by the U.S. Army, Europe, it has proved rugged, reliable, durable, and easily transportable. It provides a total anesthesia capability never before available to the U.S. Army for field medical use.



STANDARDIZED after a decade of research, the field anesthesia machine shown above is being procured for the Armed Forces medical services. Largely responsible for R&D Col John A. Jenicek (left insert) and Col Harvey C. Slocum.

Cyclopropane, ether, nitrous oxide, halothane or methoxyflurane can be administered singly or in combination with oxygen for a "tailored" anesthetic to meet physiological needs.

Armed Forces anesthesiologists believe the machine will serve all Armed Forces medical services as well as the emergency requirements of the U.S. Public Health Service, other federal agencies such as the U.S. Department of Health, Education and Welfare, and state Civil Defense organizations.

U.S. Air Force and Navy medical research and development officials assisted in the final steps required for standardization.

COL JENICKEK is a 1946 graduate of the University of Illinois School of Medicine at Chicago. Widely known in anesthesiological circles, he is presently in charge of the training program for anesthesiologists and nurse anesthetists at Walter Reed General Hospital. He served in the same capacity from 1957-1961 at Brooke General Hospital, Fort Sam Houston, Tex.

Col Jenicek has had a number of special appointments, such as consultant on anesthesiology to the Army Surgeon General and to the National Aeronautics and Space Administration. He was certified as a Diplomate of the American Board of Anesthesiologists in 1957 and as a Fellow of the American College of Anesthesiologists in 1958.

Biomechanics Symposium to Consider Weapons Design

Interrelationships of life sciences and engineering as potentially related to weapons design will be considered at a Biomechanics Symposium, Apr. 5-6, sponsored by the Army Weapons Command, Army Research Office-Durham (N.C.) and Augustana College at Rock Island, Ill.

Army Materiel Command Deputy for Research and Laboratories Dr. Jay Tol Thomas has accepted an invitation to make the keynote address at the opening session. His topic is: "The Army Looks at Biomechanics."

Augustana College President Dr. C. W. Sorenson and Brig Gen William J. Durrenberger, CG of the Weapons Command, are listed among principal speakers at the opening session.

Col Harry A. Snyder, CO of Rock Island Arsenal is chairman for the event. Session chairmen are Dr. G. Bugliarello, Carnegie Institute of Technology; L. M. Patrick, Wayne State University and Dr. R. Bean, Philco-Ford Corp.

Others listed as speakers include R. A. Liston, F. Pradko, R. Lee, V. Kaluza, U.S. Army Tank-Automotive Command, Warren, Mich.; L. L. Salisbury and A. B. Colman, Walter Reed Army Medical Center, Washington, D. C.; H. L. Jacobs, U.S. Army Natick (Mass.) Laboratories;

Dr. E. L. DuBrul, University of Illinois Medical Center; R. E. Beckett and K. Chang, University of Iowa; L. A. Cohen, Albert Einstein Medical Center, Philadelphia, Pa.; Dr. A. Seireg, University of Wisconsin; E. C. Kris, Sensory and Perceptual Research Laboratory, Cambridge, Mass.;

G. E. Lowtiz, TRW Systems, Redondo Beach, Calif.; Dr. R. Gesteland, Northwestern University; Dr. H. A. Baldwin, Sensory System Laboratory, Tucson, Ariz.; and P. H. Greene, University of Chicago. Summation remarks will be made by Dr. W. S. McCulloch, Massachusetts Institute of Technology.

The U.S. Army, through the Army Materiel Command, has established at Rock Island Arsenal a program to investigate the applications of biomechanical sciences and engineering to improve the effectiveness of weapons, weapon systems and countermeasures. Included in this research and development program is the stimulation of new advanced concepts for weapons.

Edgewood Scientist Selected ACS National Council Member

Dr. George M. Steinberg, an Army scientist at Edgewood (Md.) Arsenal, will represent the Maryland Section on the national council of the 105,000-member American Chemical Society.

Chief of the Biochemistry Branch of the Medical Research Labs at the Arsenal since 1955, Dr. Steinberg joined the ACS in 1941. He received a BS degree from Brooklyn College in 1940, and MS in 1943 and PhD in 1945 from Purdue University.