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ASAP Plans Fall Meet On Aviation Technology

Army Scientific Advisory Panel (ASAP) members and consultants will hold their fall meeting at the U.S. Army Aviation Materiel Laboratories, Fort Eustis, Va., Oct. 15-17.

The theme will be "Advanced Technology and Operations in Air Mobility." Noted aircraft designer Clarence L. "Kelly" Johnson, vice president for Advanced Development Projects at Lockheed Aircraft Corp., is programmed as guest speaker at the banquet.

Dr. John D. Baldeschwieler, an ASAP consultant since 1965, has accepted the invitation of Secretary of the Army Stanley R. Resor to become a panel member. Dr. Ali B. Cambel and Dr. Theodore B.

(Continued on page 4)

U.S. Scientist Heads SHAPE Tech Center

Appointed in mid-August as director of the Supreme Headquarters Allied Powers Europe (SHAPE) Technical Center (STC), Dr. Robert Kahal is the first U.S. citizen to guide the activities of scientists from 13 SHAPE countries.

The 10-year key staff member of the Institute for Defense Analyses (IDA), Washington, D.C., moved into the newly created PL-313 position at The Hague, Netherlands, following approval of his selection by SHAPE leaders and the North Atlantic Council. Previous directors have been British and Canadian citizens.

Dr. Kahal graduated from Cooper University in 1943 and continued his education at the Polytechnic Institute of Brooklyn (PIB), earning an MEE degree in 1947 and a doctorate in electrical engineering

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50 THEMIS Grants Broaden Research Base

Expansion of the nation's centers of excellence in science and technology at institutions of higher education—an objective set by President Johnson in September 1965—will begin this fall with 50 research programs in 30 states and the District of Columbia.

Secretary of Defense Robert S. McNamara announced selection of the research programs, following several months of evaluation of 480 proposals submitted by educational institutions. Congress has allocated \$20.5 million for the current academic year and the Department of Defense has requested 50 additional programs next year.

SHAPE Nuclear Head Named Army Deputy Chief of R&D

(See story on page 9)

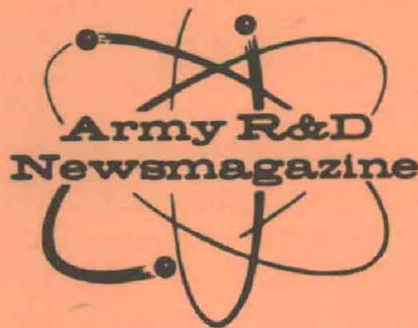


Maj Gen Robert E. Coffin

ASA (R&D) Talks From Vietnam to Hawaii by Satellite



FIRST HAWAII-BOUND CALL from U.S. Army Vietnam (USARV) via new series of communications satellites is made by Dr. Russell D. O'Neal, Assistant Secretary of the Army (R&D), to Chief of Staff Lt Gen Edgar C. Doleman, U.S. Army Pacific. Shown left to right are Lt Gen A. W. Betts, Chief of Army R&D; Brig Gen John R. Guthrie, Director of Developments, Office, Chief of Research and Development, Department of the Army; and Brig Gen Robert D. Terry, commanding general of the 1st Signal Brigade and USARV's Chief of Communications and Electronics. Secretary O'Neal recently toured Army combat and support units to evaluate equipment developed under Army R&D Contracts. (See related stories on page 6)



Vol. 8, No. 8 September 1967

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U.S. Scientist Heads SHAPE Tech Center

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in 1950. He was an associate professor of mathematics at PIB from 1946 to 1950.

Two years as an associate professor of electrical engineering at Washington University and service for one year as a consultant to the Rand Corp. preceded his appointment in 1952 as a professor at the U.S. Naval Postgraduate School, Monterey, Calif. Three years later he became a professor of electrical engineering at Syracuse University. He transferred to the Weapon System Evaluation Division of IDA in 1957.

Established in 1955 as the SHAPE Air Defense Technical Center, the STC was renamed in 1963 when its mission was broadened to include ground offense and defense. Today it employs 359 personnel, including 98 scientists and 95 technicians.

About 20 of these are from the United States. Four of the newest employees are Dudley L. Cline, a satellite communications specialist from Fort Monmouth, N.J., and W. E. Grunwald, R.C. Ward and E. L. Owen from Redstone Arsenal, Ala.

The annual STC work program is established with the assistance of a Scientific Committee of National Representatives (SCNR). Familiar with defense research and development in their own countries, these scientists and engineers function to prevent duplication between the STC and national projects.

The U.S. representative is Dr. Alexander H. Flax, Assistant Secretary of the Air Force (R & D), until recently chairman of the SCNR. He is assisted by an STC liaison officer, Lt Col Alan F. Erwin (USAF). U.S. R&D coordinator is Lt Col J. W. Bell (USAF).

The STC is divided into an administrative division and three technical divisions: Communications, Operations Research and Systems Research.

The Communications Division proposes techniques to ensure reliable communications for meeting specific operational requirements of the Allied Command. Feasibility trials of new principles are performed in the laboratories and experimental field stations located in several NATO countries.

Much of the work is directed toward achieving greater efficiency in circuit utilization, higher-speed telephone and telegraph messages, ready interconnection of long-distance cable and radio circuits and reduced delays in message handling.

These studies are coordinated in a program for planning a comprehensive automatically switched network to serve a large number of users.

The division also plans highly-survivable radio systems to provide direct links for vital traffic between selected users. Experimental buried-antenna, ionoscatter, meteor-burst and troposcatter systems have been built and are being tested.

In the Operations Research Division, scientists of many disciplines provide



Dr. Robert Kahal

objective analyses for decisions affecting military forces, their equipment and their employment in Europe. Particular emphasis is given to assessment and operation of systems.

The work of the OR Division includes the analysis of command and control functions, design of field experiments and evaluation of exercises, and the systematic exploration of performance characteristics of weapons. It also provides mathematical and computer services.

The Systems Research Division evaluates equipment and systems performance and examines and develops methods and procedures for collecting, transferring, and processing information required in the operation and control of weapon systems.

It carries out analytical studies, systems engineering, evaluation and laboratory research related to ground environment systems, detection, data handling and display techniques and systems, aircraft identification, guided weapon electronics, combat intelligence and electronic warfare.

STC technical reports and memoranda are available to U.S. Government agencies on a need-to-know basis through the Defense Documentation Center, Cameron Station, Va., 22314.

R&D Officers Please Note Address Change Instructions

Continued problems of the Office of Personnel Operations (OPO) in encouraging those assigned to the U.S. Army Atomic Energy and Research and Development Officer Special Career Programs to give notice of their change of address when transferred to a new assignment prompt this notice:

"To assure continuous and expeditious receipt of the *Army Research and Development Newsmagazine*, all persons enrolled in those programs are requested to submit changes of address to:

SPECIALIST BRANCH, OPXC
DEPARTMENT OF THE ARMY
STOP 106

WASHINGTON, D.C., 20315

"Officers who fail to give notice of change of address will not, in most instances, receive the *Newsmagazine*."

50 THEMIS Grants Expand Basic Research in Educational Institutions

(Continued from page 1)

stantial opportunity or financial support in Defense research programs.

Brochures distributed by ODDR&E in January this year outlined the scope of Project THEMIS, its objectives, criteria for preparation of research proposals, procedures to be followed, and other information.

The 50 research programs selected for the 1967-68 academic year are separated into eight general technological categories. The institutions, the research subject, and the Defense agency for which the work is being performed are as follows:

DETECTION, SURVEILLANCE, NAVIGATION AND CONTROL: Georgetown U., laser technology, Air Force; U. of Florida, solid state materials, ARPA; Iowa State U., auto navigation and control, Navy; U. of Kansas, remote sensing instrumentation, ARPA; U. of Minnesota, infrared detector and laser technology, and U. of New Mexico, radiation effects on electronics, Navy; John Carroll U., laser and ultrasonic radiation, Air Force; Ohio U., low level navigation, and Oklahoma State U., electronic description of environment, Army; Texas A&M College, optimization research, Navy; Southern Methodist U., automatic navigation, Air Force; and U. of Virginia, learning control systems, Army.

ENERGY AND POWER: U. of California, San Diego, transport phenomena in flow systems, Air Force; U. of Delaware, fluid mechanics and heat transfer, Army; Florida State U., geophysical fluid dynamics, and U. of Minnesota, gas turbine technology, Navy; U. of Missouri, fluid transport properties, Army; U. of Tennessee, dynamic sealing, Navy; and U. of Utah, chemistry of combustion, Air Force.

INFORMATION SCIENCES: Auburn U., information processing, and U. of Florida, logistics and information processing, Army; Louisiana State U., digital automata, Air Force; Dartmouth College, time shared computing systems, ARPA; Case Institute of Technology, research on R&D management, Army; and U. of Houston, information processing systems, Navy.

MILITARY VEHICLE TECHNOLOGY: Georgia Institute of Technology, low-speed aerodynamics, Army; Notre Dame U., deep-sea engineering and aerodynamics, and U. of Massachusetts, deep-sea submersibles, Navy; Mississippi State U., rotor and propeller aerodynamics, Army; and Rutgers U., separated flow, Air Force.

MATERIAL SCIENCES: Georgia Institute of Technology, interface phenomena, and Iowa State U., ceramic materials, Air Force; Stevens Institute, nonlinear physics of polymers, Navy; Stevens Institute, cryogenic science and engineering, Army; and North Carolina State

U., materials response phenomena, ARPA.

ENVIRONMENTAL SCIENCES: U. of Hawaii, astronomy research, Navy; U. of Nevada, cloud physics, Air Force; New Mexico Institute of Mining and Technology, environmental sciences, Navy; State U. of New York — Albany, modification of environment, Air Force; Oregon State U., on-line computer environmental research, and South Dakota School of Mines, modification of convective clouds, Navy; and Texas A&M U., meteorology research, Army.

MEDICAL SCIENCES: Indiana U.,

environmental hazards, Air Force; Louisiana State U., infectious communicable disease, Army; State U. of New York — Buffalo, environmental physiology, Navy; and U. of Alaska, human ecology, Army.

SOCIAL AND BEHAVIORAL SCIENCES: Arizona State U., human performance in isolation, Navy; Kansas State U., performance in altered environments, Air Force; U. of Kansas, social and behavioral sciences, ARPA; and Texas Christian U., human pattern perception, Army.

Services Join in Meet on R&D Management Systems

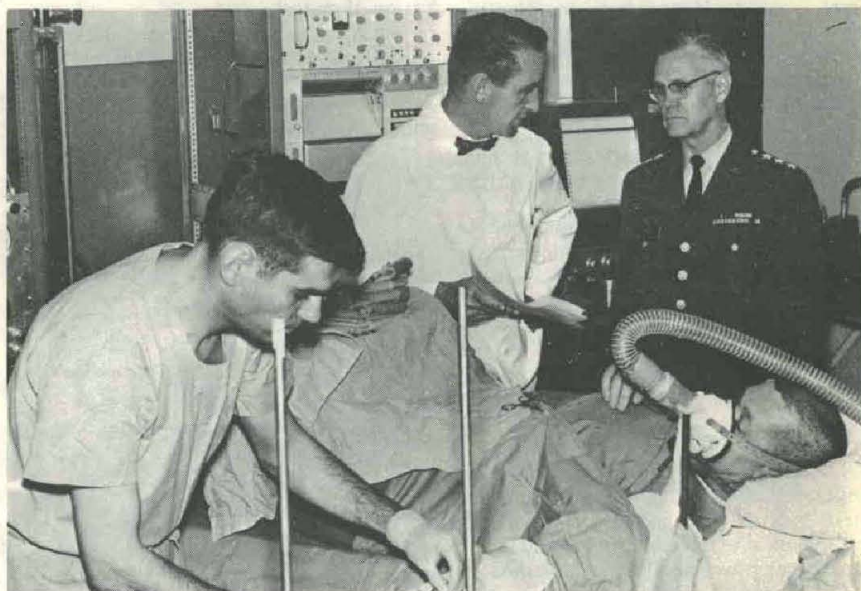
Research and Development Management Information Systems is the topic of the Third Joint Service Technical Information Meeting, Oct. 16-18, at the Rome (N.Y.) Air Development Center.

Arrangements are being completed by Inter-Service Steering Group for Technical Information Meetings through Martin H. Weik of the Army, Charles DeVore of the Navy and Alex Hoshovsky of the Air Force. The Department of the Air Force is sponsor and will conduct the meeting.

Tentative plans call for a keynote address by a Department of Defense leader in the field of management information systems and four 15-minute presentations by representatives of the Defense Documentation Center, Army, Navy and Air Force.

Three 30-minute technical papers are planned on the theme "The Outlook for the Future," dealing with conceptual and logical issues of management-oriented data systems, and progress to date in development. Three papers also are planned on "Problems and Impediments," and a full day will be devoted to three workshop sessions on this same theme.

About 150 R&D managers, technical information specialists, and systems design specialists in field organizations and at Department of Defense level are expected to attend the sessions. A visit is planned to the RADCOM Computer Laboratory at the Rome Air Development Center to observe the on-line MADAPS query system.



STUDIES OF SQUIRRELS and how to cope with the effect of hypothermia on metabolic processes of soldiers at high altitude, as may be experienced in mountain warfare, might not appear to be closely related. Results at the U.S. Army Medical Research and Nutrition Laboratory (USAMRNL), Fitzsimons General Hospital, Denver, Colo., showed how dietary changes affect squirrels and rats. Chief of Research and Development Lt Gen A. W. Betts is shown being briefed by Dr. John P. Hannon, chief, USAMRNL Physiology Division. Squirrels exhibit high tolerance to hypoxia. Scientists seek better understanding of this phenomenon.

ASAP Plans Fall Meet on Aviation Technology

(Continued from page 1)

Taylor have accepted appointments as consultants.

Dr. Baldeschwieler, an associate professor of chemistry at Stanford University, taught at Harvard University from 1960 to 1965. A specialist in molecular spectroscopy with an interest in radar systems, intelligence, and small unit tactics and weapons, he has participated on several defense and industrial advisory teams.

He received a BS degree in chemical engineering from Cornell University in 1956 and a PhD degree from the University of California, Berkeley, in 1959.

Dr. Cambel is the Walter P. Murphy Distinguished Professor at Northwestern University, where he has taught since 1953. He has been chairman of the Mechanical Engineering and Astronautical Sciences Department since 1957. He has also been a visiting professor and consultant to Purdue University and a consultant to the Office of Science and Technology, Executive Office of the President, since 1963.

He graduated from Robert College, Istanbul, Turkey, in 1942. Following study at the University of Istanbul and the Massachusetts Institute of Technology, he received an MS degree in mechanical engineering from the California Institute of Technology in 1946. In 1950 he

received a PhD degree from the State University of Iowa in mechanical engineering.

Dr. Taylor was appointed deputy director scientific of the Defense Atomic Support Agency in October 1964, and later was a consultant to the director of International Affairs of the Atomic Energy Commission. He has also worked at the Los Alamos Scientific Laboratory and the General Atomic Division of the General Dynamics Corp.

His advisory positions have included chief of the Los Alamos Study Group that advised the Air Force Space Study Committee, consultant to the Air Force Scientific Advisory Board, and member of the Arms Control and Arms Administration Panel on Outer Space.

Dr. Taylor received a BS degree in physics from the California Institute of Technology in 1945. He did graduate work at the University of California and received his PhD degree in theoretical physics from Cornell University in 1954.

In 1965 he received the Ernest Orlando Lawrence Memorial Award of the Atomic Energy Commission for his work on the design of nuclear weapons and the TRIGA research reactor.

Upon completion of their Army Scientific Advisory Panel appointments, Robert E. Hage, Dean David Halliday, Maj

Gen K. D. Nichols (USA, Ret.), and Dr. Maurice J. Zucrow were awarded certificates of appreciation by Secretary of the Army Resor.

Dr. Anthony Curreri, Dr. Jacob E. Goldman and Dr. Richard C. Raymond accepted reappointments as panel members.

Former members Dr. Herbert L. Ley, Dr. Allen E. Puckett, Dr. William C. Tinus and Dr. E. Arthur Trabant have accepted appointments as consultants.

Reappointments as consultants have been accepted by Dr. Clifford C. Furnas, Dr. Carroll B. Gambrell, Dr. Max Garbuny, Dr. Gilbert W. King, Dr. Paul W. Kruse Jr., Dr. William D. Murray, Dr. Walter J. Nungester, Dr. Bernard M. Oliver, Dr. John L. Schwab, Dr. Joseph Sternbert, Dr. John E. Vance and Dr. Ernst Weber.

13 Corporations Sponsor Welding Distortion Research

Thirteen large corporations in the U.S. and Japan are sponsoring a 3-year \$300,000 research program conducted by Battelle Memorial Institute to develop techniques for minimizing distortion in welded structures.

Involving advanced computer techniques, the program is expected to provide participating companies with new tools to estimate distortion that will occur for any given welding procedure. A minimum distortion procedure can then be selected to eliminate costly "cut and try" methods.

A scientific basis for considering the use of new materials and the fabrication of unusual structures also will be established.

Dr. Koichi Masubuchi, of Battelle's Columbus (Ohio) Laboratories, heads the team of specialists in welding and computer analysis assigned to the program. Research will be in three phases: (1) Development of formulas for determining shrinkage and distortion of simple welds; (2) development of analytical systems for determining distortion in complex weldments; (3) development of operational systems, including computer programs, to be used in predicting and controlling distortion in welded structures.

Dr. Masubuchi said that several more corporations are interested in the program and the group of sponsors is likely to be expanded.

Sponsors who are sharing equally in costs and results include Bell Aerosystems Co.; Bethlehem Steel Corp.; Chicago Bridge and Iron Co.; DeLaval Turbine, Inc.; Esso Research and Engineering Co.; General Dynamics Corp.; Hitachi Shipbuilding and Engineering Co., Ltd.; Ishikawajima-Harima Heavy Industries Co., Ltd.; Litton Industries, Inc.; Ingalls Shipbuilding Corp.; Mitsubishi Heavy Industries, Ltd.; Sun Shipbuilding and Dry Dock Co.; Tokyo Shibaura Electric Co., Ltd.; Westinghouse Air Brake Co.

Metallic 'Fingerprints' Identify Missiles

Metallic "fingerprints," providing a simple but foolproof way to identify missiles, have been devised by the National Bureau of Standards (NBS) at the request of the U.S. Arms Control and Disarmament Agency.

The project to find an aid for keeping track of arsenal inventories was headed by Dr. M. R. Meyerson, chief of the Engineering Metallurgy Section of the NBS Institute for Materials Research. He said he knew of at least one private research firm which also was asked to provide an identification method.

The method described in Dr. Meyerson's recent report makes use of the metallographically prepared microstructure of an area directly on the missile shell or on a metallic label which can be attached.

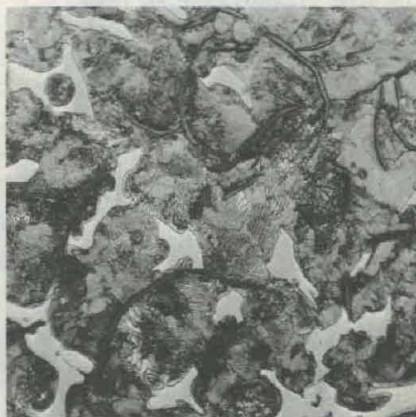
Metallic microstructure, like the human fingerprint, cannot change with time, and there is little likelihood that the inherent and unique characteristics would be the same on any two missiles, he explained.

Dr. Meyerson said that such a positive means of identification can be invaluable to the Arms Control and Disarmament Agency for checking compliance with an international disarmament or arms control agreement.

Either a high-magnification photograph or a replica of the surface area, using a cellulose tape-pressing technique, is said

to be satisfactory as a means of reidentification of materials.

Dr. Meyerson said the techniques developed in the study are relatively simple, and the required skills for applying and interpreting the identification system can be taught to technicians in a few hours.



MICROSTRUCTURE of a properly polished and etched metal sample—like the one shown above—is the basis for a simple and foolproof identification technique devised by NBS scientists. No other microstructure will display the same sizes, shapes, or interrelationships of grain boundaries and phase particles, NBS researchers state.

Changes in Top-Level Jobs Announced

Heading recent top-level Department of Defense appointments is the selection of Paul R. Ignatius to succeed Paul H. Nitze as Secretary of the Navy Sept. 1.

John T. McNaughton, who had been nominated and confirmed as successor to Mr. Nitze, was killed in an airplane crash July 19. Mr. Nitze succeeded Cyrus R. Vance as Deputy Secretary of Defense when he resigned July 1.

Thomas D. Morris, currently Assistant Secretary of Defense (Manpower), has been selected to step up to the position vacated by Mr. Ignatius as Assistant Secretary of Defense (Installations and Logistics).

President Lyndon B. Johnson also accepted "with regret" the resignation of Norman S. Paul as Under Secretary of the **Materiel Salvage Idea Saves U.S. \$2.5 Million at Edgewood**

More than \$2.5 million first-year savings to the U.S. Government through a salvage materiel idea recently earned a Special Act or Service Award of \$3,615, under the Army's Incentive Awards Program, for five civilian employees at Edgewood Arsenal, Md.

Edgewood Commander Brig Gen William W. Stone Jr., recently promoted to that rank, presented the checks and Certificates of Achievement to Angelo A. Conti and Larry T. Shaff, mechanical engineers; Donald M. Cohen, supervisor mechanical engineer; and Robert E. Krauch Jr., mechanical engineering technician.

Robert E. Lentz, formerly employed with the others in the Edgewood Air Munitions Laboratory, was transferred recently to Aberdeen (Md.) Proving Ground where he received his award.

The five engineers developed a concept for adapting existing surplus jet engine containers for further use by the U.S. Air Force. Their design modification can be accomplished for \$1,000, compared to \$4,000 per unit on a new procurement.

Engineer Labs Expand Order For 60-Kilowatt Generators

Production and delivery of 266 additional 60-kilowatt generator sets at a cost of \$2,918,322 was ordered recently by the U.S. Army Mobility Equipment Command's Engineer Research and Development Laboratories, Fort Belvoir, Va., under a contract with Studebaker Corp.

The original contract awarded in November 1966 was for 393 sets at a cost of \$4,298,308, and the modification raises the total to \$7,207,630. The new order is for 162 sets operating at 400 cycles and 104 sets operating at 60 cycles.

The military engine-generator family developed by the Engineer R&D Laboratories includes 15, 30, 45, 100 and 150-kilowatt sets, all self-contained, liquid-cooled and skid-mounted for easy portability.

Air Force. Townsend Hoopes, who has been serving as Principal Deputy Assistant Secretary of Defense (International Security Affairs), has been named to succeed Mr. Paul.

Among other recent appointments are: Harry H. Schwartz, Deputy Assistant Secretary (Near East and South Asian Affairs), Office of the Assistant Secretary of Defense (International Security Affairs); Maj Gen Wendel E. Carter, USAF, Deputy Assistant Secretary of Defense (Information), Office of the Assistant Secretary of Defense (Comptroller); and Brig Gen Richard Scott, USAF, Deputy Assistant Secretary of Defense (Atomic Energy), a newly created position.

Secretary of Navy Ignatius has been associated with the Department of Defense since 1961, when he was appointed Assistant Secretary of the Army (Installations and Logistics). He was named Under Secretary of the Army in 1964 and became Assistant Secretary of Defense (I&L) in December 1964.

Mr. Ignatius has an AB degree from the University of Southern California (1942) and a master's in business administration from Harvard University (1947), where he was an instructor until 1950. He then formed a management and consulting firm, Harbridge House, Inc., and remained

with it until 1961.

Mr. Morris, as successor to Mr. Ignatius, returns to the position he held from January 1961 to December 1964, when he joined the management consultant firm of Cresap, McCormick, and Paget. He returned to the Defense Department in 1965 as Assistant Secretary of Defense (Manpower).

In 1956-57, he served in the Office of the Secretary of Defense in various capacities, including Deputy Assistant Secretary (I&L), then returned to private employment until he became Assistant Director for Management and Organization, U.S. Bureau of the Budget, in 1960.

President Johnson, in accepting the resignation of Mr. Paul, commented on his distinguished U.S. Government career of almost 20 years, and said:

"As Under Secretary of the Air Force, you have participated with great distinction in the leadership of the Air Force's valiant activities in Southeast Asia. A grateful nation extends its thanks."

Mr. Paul came to the DoD as Assistant Secretary of Defense (Legislative Affairs) in 1961 and was named Assistant Secretary of Defense (Manpower) in 1962-65.

Mr. Hoopes has been Principal Deputy Assistant Secretary of Defense (International Security Affairs) since September 1966, following two years as Deputy Assistant Secretary of Defense for Near East, South Asia and Military Assistance Policy Review.

Army Winners on CSC Economy Roll Listed

The Roll of Economy Champions for the final month of the U.S. Civil Service Commission's 6-month experimental program was released too late for publication in the previous edition of the *Army R&D Newsmagazine*.

Army award winners and the amounts they saved are listed by the installation making the award as part of local suggestion programs, as follows:

U.S. Army Ammunition Procurement and Supply Agency, Milan, Tenn.: John E. Barham, two awards totaling \$1,910 for savings of \$120,798; Elbert L. Parker, \$790 for a \$27,593 suggestion; Paul S. Steele, \$780 for saving \$25,305; William E. Hunter, \$770 for a \$22,599 idea; and Royce J. Laster, \$545 for an \$11,730 saving.

U.S. Army Armor Center, Fort Knox, Ky.: Marilyn D. Lanham and Gloria D. Martin, \$765 for a \$22,264 suggestion; Clell R. Mears, \$775 for a \$24,484 savings; Capt William A. Schoeneberger, \$760 for a \$21,180 idea; and Dorothy J. Stinnet, \$595 for a saving \$13,696.

U.S. Army Corps of Engineers, Walla Walla, Wash.: Edward G. Wainwright, \$500 for an idea that saved \$140,000; Leonard J. Tucker, \$785 for a \$27,000 suggestion; William L. Kelly, \$750 for a saving \$20,492.

U.S. Army Aviation Materiel Command, St. Louis, Mo.: Harvey B. Miller, \$1,205 for a suggestion saving \$150,054;

Charles G. Davis, \$1,185 for a \$131,708 economy suggestion; and Robert W. Shoults Jr., \$520 for a \$10,646 idea.

HQ Fourth Army, Fort Hood, Tex.: W. L. Henson, \$775 for an idea saving \$24,362; James H. Bailey, \$755 for a \$20,455 idea; and Bernis C. Williamson, \$520 for a \$10,621 suggestion.

HQ U.S. Army Europe: George C. Edwards and Guenter Links split \$2,325 for a \$925,000 idea. U.S. Army Strategic Communications Command, Europe: Capt Richard M. Truran and CWO Kelton R. White shared \$1,000 for a suggestion saving \$169,802.

U.S. Army Test and Evaluation Command, Fort Huachuca, Ariz.: Enrique B. Hoffman, \$1,000 for a \$152,922 suggestion and Fred S. Bennett, \$250 for saving \$19,896.

Anniston (Ala.) Army Depot: William A. Rountree, \$690 for a \$17,628 idea and Sidney B. Maddox was awarded \$600 for saving \$15,774. Dr. Donald E. Westcott, U.S. Army Natick (Mass.) Laboratories, \$1,000 for a \$70,051 idea.

Other economy champions included Charles Birkland, Rock Island (Ill.) Arsenal, \$840 for a \$37,885 suggestion; Frederick N. Green, U.S. Army Electronics Command, Fort Monmouth, N.J., \$775 for saving \$25,000; and Carlos O. Segarra, U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., \$575 for an idea that saved \$12,900.

UHF Satellite LES-5 Achieves Tri-Service Tactical Link

Experimental tactical communications among U.S. Army, Navy and Air Force units were achieved by satellite for the first time with the launch of the LES-5 from Cape Kennedy, Fla.

Placed in orbit July 1, LES-5 (Lincoln Experimental Satellite) is the first all-solid-state UHF repeater satellite. It is the fifth in a series built by the Lincoln Laboratory, Massachusetts Institute of Technology.

Messages via LES-5 were exchanged among airborne aircraft, a submarine, a ship and fixed and mobile land-based terminals of the Armed Forces.

LES-5 was one of six Department of Defense (DoD) satellites launched by the Air Force with a Titan IIIC missile. Others were three functional satellites of the IDCSP (Initial Defense Communications Satellite Program), a DoD Gravity Gradient Experimental (DODGE) satellite, and one IDCSP satellite with an experimental antenna. (See article on IDCSP, page 6.)

The LES-5 experiments are an initial step in the DoD Tactical Satellite Communications Program. The objective is to meet military needs of the highly mobile, lower-echelon land, air and sea forces using small, lightweight equipment in tactical networks characterized by maximum flexibility and minimum control.

Results of the tests are expected to have a bearing on the tactical communication satellite being built for the three Military Departments by the Hughes Aircraft Co. This satellite will have both UHF and SHF (ultra-high and super-high frequency) for communications research.

The main problems with UHF are fading and multipath due to reflected waves, and radio-frequency interference. SHF can eliminate these problems, but is highly directional and requires bigger and heavier antennas.

Back-pack units that can be carried by three men and assembled for operation are being developed in both UHF and SHF frequency regions. long, 4 feet in diameter and weighs 225 pounds. Powered by two bands of solar cells, it is traveling slowly around the earth from west to east at a daily drift rate of approximately 32 degrees, taking about 11 days for a complete revolution.

At any given location, the satellite is visible to radio communicators for approximately five days per revolution. In its present 18,000-nautical-mile near-synchronous orbit, it permits extended testing when visible anywhere around the earth, between points up to 9,000 miles, thus eliminating the need for multiple satellites.

At least 27 terminals will be used in UHF communications experiments. Five were built in-house by SATCOM using modified existing equipment and vehicles. Included are two ¼-ton jeep terminals,

two ¾-ton truck terminals, and one 26-foot van terminal.

Electronics Communications Inc. built 22 terminals: 1 for the Army, 6 for the Navy and 15 for the Air Force.

With the completion of UHF tests in the Fort Monmouth area, the Army will test the terminals under varying environmental conditions at selected locations.

The first voice link over LES-5, using two terminals and the first voice network using three terminals, was established by the Army test group at SATCOM. Six Navy stations taking part in the test included USS *Iwo Jima* (LPH02), USS *Sea Leopard* (SS-483), a P3 *Orion* aircraft, and three shore installations. Aircraft

from the Air Force Systems Command and the Strategic Air Command participated in the test with Air Force ground terminals of the Rome (N.Y.) Development Center.

The *Iwo Jima* was in the Pacific and the *Sea Leopard* and the *Orion* aircraft were in the Atlantic area for the test. Sixty-word-per-minute teletypewriters were used for the exchange of communication.

The Navy terminals all have essentially the same internal components, but different antenna configurations for the aircraft submarines and surface ships.

An experimental communications satellite with a despun antenna was orbited July 1. The antenna enables the satellite

DCA Director Briefs House Subcommittee on IDCSP

First-year progress of the Initial Defense Communications Satellite Project (IDCSP), as detailed in a briefing of the House Military Operations Subcommittee, has built a sound basis for development of the desired degree of capability.

Defense Communications Agency Director Lt Gen Alfred D. Starbird was clear in that conviction as he addressed the congressional body, pointing to the 17 satellites in orbit and 9 ground stations already deployed.

General Starbird said some 30 modifications during the past year have raised reliability of the terminals to an acceptable standard. The modifications are being incorporated in production deliveries. Testing, though incomplete, indicates design of the terminals is now satisfactory.

Extensive IDCSP activity has produced "some significant achievements and some initial disappointments . . . not unexpected with an R&D project."

The original IDCSP satellites placed in orbit June 16, 1966, are "still functioning satisfactorily." Eight satellites launched Aug. 26, 1966, encountered a "payload fairing structural failure." The designed system quantity of 15 was achieved with the successful launching of eight satellites Jan. 18, 1967.

The fourth launch July 1 included three IDCSP satellites, a similar satellite with an experimental antenna, and two other satellites not part of this program. (See article on LES-5, page 6.) One IDCSP satellite did not function properly when placed in orbit.

Two fixed terminals, AN/FSC-9 with 60-foot-diameter antennas, are in operation at Fort Dix, N.J., and Camp Roberts, Calif. Seven medium-transportable 40-foot AN/MS-46 terminals are deployed in South Vietnam, Hawaii, the Philippines, Okinawa, West Germany and Ethiopia.

General Starbird said six more 40-foot terminals will be available by February 1968. Two have been allocated for the Pacific, two to the Middle East/Africa area, one to Europe and one to Alaska. He said a total of 13 small, transportable 18-foot AN/TSC-54 terminals have been procured and deliveries are expected to be completed by January 1968.

Three of these are reserved for training, service and engineering tests. Six will be located in the Pacific/Southeast Asia area, two in the Middle East/South Asia and two in continental U.S. Additional small terminals are programed "to meet contingencies and European area requirements."

Two AN/SSC-3 shipboard terminals are available for deployment by the Navy in the Pacific area, and five more shipboard 6-foot terminals are scheduled for delivery to meet fleet requirements by October.

"Though the IDCSP has been considered an R&D effort," General Starbird said, "our recent deployments, improvements and test results of the system have permitted us to achieve a certain operational capability." He said the Pacific links were designated as operational last July.

The IDCSP is a tri-Service, Department of Defense project under the direction of the Defense Communications Agency. The Army develops the ground terminals and conducts the communications technical test program, the Air Force develops and launches the satellites, and the Navy develops shipboard equipment to enable ships at sea to use the satellites for specific naval communications requirements.

General Starbird told the subcommittee that the research, development, test and evaluation of the IDCSP system will be concluded early in 1968.



Lt Gen A. D. Starbird

to beam about 75 percent of its radiated energy toward the earth, compared with 5 percent with previous military communications satellites. Gain of output over input is expected to be about 13db, in contrast to 5db gain from standard satellite antennas.

A system of magnetically controlled ferrite phase-shifters directs the principal radiation of the combined radio frequency output from the probes toward the earth. The technique was developed by Philco-Ford, with Sylvania Electronic Systems as subcontractor.

The DODGE tests are concerned with a method of stabilizing a satellite in synchronous orbit by means of gravity, and is the first demonstration of such a technique at high altitude. Stabilized passively in three axes, the satellite always is pointed toward the earth.

Navy researchers stabilize the satellite and dampen vibration from the ground by changing the distribution of the satellite mass. This is accomplished by contracting or extending any of 10 weighted booms up to 150 feet.

The satellite is designed to maintain stabilization until a change in position is desired. Two television cameras powered by solar energy reveal the satellite's attitude by taking pictures of the earth which reference the satellite to the earth.

MICOM Planning Support Of 1st Australian Satellite

When Australia becomes the fourth nation to launch an earth-orbiting atmospheric research satellite early in 1968, the U.S. Army Missile Command (MICOM), Redstone Arsenal, Ala., will provide important support.

MICOM'S Intercept Technology Branch, R&D Directorate, will serve as an agent for the U.S. Department of Defense Advanced Research Projects Agency (ARPA), Office of the Director of Defense Research and Engineering.

In addition to providing launch services, MICOM will furnish a modified Redstone ("Old Reliable") missile to boost the satellite into space.

The 85-pound satellite, called WRE SAT-1 (Weapons Research Establishment Satellite I), measures approximately 2½ feet in diameter and 5 feet in length.

Developed by the physics department of the University of Adelaide and by the Weapons Research Establishment in Australia, WRE SAT-1 will study atmospheric effects on climate and weather.

Planned experiments concern solar physical phenomena and measurement of X-ray and ultraviolet radiations in the upper atmosphere.

The satellite will orbit at 100 to 700 miles above the earth. It will be launched from the Woomera Test Range, currently the site of a series of reentry tests involving Redstone rockets conducted jointly by the U.S., Australia and Great Britain.

DoD Cites \$14 Billion Cost-Cut Saving

Cost Reduction Program savings exceeding \$14 billion in the Department of Defense in five years, including \$914 million in FY 1967, are reflected in Secretary of Defense Robert S. McNamara's annual progress report to President Lyndon Johnson.

The FY 1967 economies exceeded the goal by \$42 million. Additional savings estimated at \$590 million will result in FY 1968 and 1969 from ideas adopted in FY 1967, raising the 3-year total to \$1,504 million.

President Johnson highlighted Cost Reduction Week, July 24-28, by presenting Certificates of Merit to 11 individuals who contributed significantly to the success of the DoD program.

Two Army employees were honored at the White House ceremony. Others represented the Navy, Air Force, Marine Corps and Defense Supply Agency. Secretaries of the Military Departments, members of the Joint Chiefs of Staff and other high-ranking civilian and military officials attended.

In paying tribute to the many thousands of military and civilian personnel whose ideas and efforts have produced the multi-billion-dollar savings of the Cost Reduction Program since it was established in 1962 by Secretary McNamara, President Johnson commented in a memorandum transmitting the progress report by saying:

"I am particularly pleased with the alertness shown to the opportunities for cost reduction despite the pressure of combat operations. We are determined to provide our men with everything they need to accomplish their mission but we believe, and the report proves, that such an objective is not inconsistent with continued emphasis on the elimination of waste and inefficiency."

Secretary McNamara said that FY 67 action results which exceeded the goal of \$872 million, are now expected to exceed the goals set for each of the two following fiscal years. Last year (FY 66) the Secretary reported savings of \$4.5 billion.

He predicted that the 5-year savings since the program began are not likely to be duplicated during the succeeding five years but, he said, "There are still significant opportunities for improvement, particularly in those activities which have expanded so rapidly for the support of our military operations in Southeast Asia."

He said that the task for the year ahead (FY 68) is "to ferret out" all sources of possible unnecessary spending and inefficiency that may have "crept" into the Defense program during the past two years of rapid build-up. He believes that further savings can be achieved by action completely "consistent with a high degree of readiness."

The "pioneering effort in Defense management" (the Cost Reduction Program)

significantly raised the level of effectiveness of the entire worldwide logistics system, Secretary McNamara reported. Tangible incentives for economy and efficiency were provided to the thousands of managers throughout the department.

He said that policies and procedures have now been firmly established and the program has been "shifted" to a permanent basis.

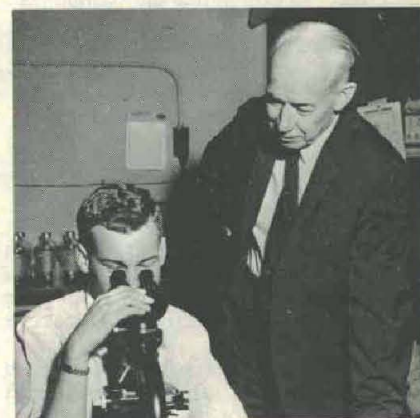
Three major premises established for the program in 1962 which still prevail are: "buying only what we need, buying at the lowest sound price and reducing operating costs."

Army employees who received citations at the White House are:

CARLO J. LETO, automotive equipment specialist at the U.S. Army Tank-Automotive Command, Warren, Mich., for saving an estimated \$2,963,807 (FYs 1967-69) by eliminating superfluous protective covers for rifles in cabs of standard vehicles and by developing a low-cost rifle bracket while improving accessibility by repositioning rifles.

RALPH J. PIZZELLO, woodworker foreman with the Supply Division of Tooele Army Depot, Utah, for "his preception and initiative" which enabled the Department of the Army to substitute plastic vents for metal in crates of automotive components, thus saving \$11,556 in FY 67.

ISF Winner Visits Edgewood



ONE OF TEN International Science Fair Winners selected by the Army, Nevin M. Summers Jr. received first-hand information through experience during his recent week-long, all expense-paid visit to Edgewood Arsenal, Md. Looking on is his host for the week, Dr. Charles Hassett, assistant to the Arsenal's chief of medical research. Summers will begin studies this fall at the Johns Hopkins University, Baltimore, Md., on a scholarship won in a Westinghouse Science Talent Search.

Cancer Institute Modifying MICOM Medical Laser

Laser equipment developed by the U.S. Army Missile Command and tested in cancer research since 1963 at Redstone (Ala.) Arsenal is being modified for increased power and better control in an installation at the National Cancer Institute (NCI), Bethesda, Md.

U.S. Public Health Service scientists,

MICOM Assigns Col Pettit To Top Nike Hercules Post

Assignment of Col Morris W. Pettit as project manager of the Nike Hercules air defense missile system was announced recently by HQ Army Missile Command, Redstone Arsenal, Ala.

Previously chief of MICOM's Control and Coordination Systems Office, Col Pettit now has responsibility for all Nike Hercules weapon system management as well as for supporting Hercules sites throughout the U.S. and several allied countries.

Prior to assignment to HQ MICOM in 1965, Col Pettit served in Europe as deputy assistant chief of staff, G-1, Seventh Army, commanded the 69th Artillery Group, and was Inspector General, U.S. Army Communications Zone. Earlier he served in the office of the Chief of Research and Development, Department of the Army, Washington, D.C.

Col Pettit was assigned to the Hart Committee for Civil and Air Defense of the Continental United States, and has participated on the Committee on Army Requirements for Scientific Support, and the Project 80 Committee on Reorganization of the Army.

Graduated from Texas A&M University with a BS degree, he earned his master's degree in mechanical engineering (guided missiles) from the University of Southern California.

Vietnam Test Scheduled For Support Jet Aircraft

Test and evaluation of a new jet aircraft designed for close air support of ground forces will be performed in Vietnam this fall by a recently activated U.S. Air Force squadron.

The A-37 lightweight twin-engined Cessna Aircraft Co. ground-attack aircraft can also be used for interdiction and limited warfare. The Military Aircraft Command (MAC) will transport the 604th Air Commando Squadron from England Air Force Base, La.

Data collection and test evaluation personnel will work under direction of the Tactical Fighter Weapons Center, Nellis AFB, Nev.

Using two J-85 engines, the A-37 can carry 4,800 pounds of conventional ordnance using eight wing pylons. It has a 7.62 minigun mounted in the nose and has a range of more than 1,400 miles with speeds up to 480 m.p.h.

headed by Dr. Alfred S. Ketcham, chief, and Dr. Robert C. Hoye, associate surgeon, NCI Surgery Branch, are "continuing investigations in experimental cancer systems, but not on humans."

Dr. Ketcham said research to date with the equipment developed by Army scientists and also with different equipment developed by Eastman Kodak Co. has produced a "great deal of new knowledge regarding possible use of lasers in treatment of cancers." Early optimism has been tempered greatly by results and further research must seek a solution to many problems, he stressed.

"We are now much more hesitant about predicting that lasers will present a reliably effective tool in treatment of cancers in humans," Dr. Ketcham said. "Our investigations will be continued, but the present indication is that lasers may find application only as a last resort, after other treatment has been ineffective."

Results of research with lasers as possible tools in the treatment of cancer came up for considerable discussion at the Gordon Conference on Lasers at Andover, N.H., June 19-23. Prevailing viewpoints stressed that current findings are inconclusive regarding the potentialities.

Experiments at Redstone Arsenal, conducted jointly by NCI and Army scientists, have proved that infrared radiation from high-energy lasers can destroy some cancer cells "under certain circumstances in laboratory animals."

Pritchard Selected Project

Dr. Edward M. Pritchard has been appointed deputy project manager of the Mallard Project, a multimillion-dollar program to develop a communications system that will serve to link field armies of Canada, Australia and the United States.

As deputy to Brig Gen Paul A. Feyereisen, U.S. manager for the international project, he will work closely with representatives of the three countries. (For details, see May issue of *Army R&D News-magazine*, p. 1).

Dr. Pritchard served a year as a consultant on management and systems pro-



Dr. Edward M. Pritchard



LASER SURGICAL TOOL is demonstrated by William B. McKnight (center) of the U.S. Army Missile Command, Redstone Arsenal, Ala. Looking on are Drs. R. C. Hoye (left) and A. S. Ketcham.

Dr. Ketcham said, however, that the research also has shown that lasers are, in their present state of development, ineffective against certain cancers.

William B. McKnight and the late James R. Dearman, Missile Command engineers, designed the laser device used for the experiments. In the modifications now underway, assistance is being provided by Grant Riggle, Biomedical Engineering and Instrumentation Branch, Division of Research, National Institutes of Health, and William Hawkins, Redstone electrical engineer.

Mallard Deputy Manager

grams for the U.S. Army Electronics Command, which is providing major support for the Mallard Project. Recently he has been a consultant to nonmilitary government agencies and industrial firms in Washington, D.C.

During World War II, he worked on the atomic bomb. After holding several post-war engineering design and supervisory positions, he was with RCA from 1953 to 1960. As chief systems engineer in the Airborne Systems Division, his accomplishments included a major role in development of the Tiro weather satellite system.

With Lockheed Electronics Co. from 1960 to 1966, he advanced from director of engineering in the Military Systems Division to vice president, a position in which he served as the division's general manager and then as chief scientist of the company.

Dr. Pritchard earned bachelor's, master's and doctoral degrees in electrical engineering and physics at Massachusetts Institute of Technology. He spent a year at MIT in post-doctoral research in electrical engineering, before attending the University of Paris and the University of Göttingen on a Swope Fellowship. In 1959, he studied advanced management methods at the Harvard Business School.

SHAPE Nuclear Head Named Army Deputy Chief R&D

Maj Gen Robert E. Coffin, promoted Aug. 1 to 2-star rank, will end more than two years service as chief, Nuclear Activities Branch, Supreme Headquarters Allied Powers, Europe (SHAPE), when he reports Sept. 15 as Deputy Chief of Research and Development under Lt Gen A. W. Betts.

General Coffin will succeed Maj Gen William C. Gribble, who departed July 17 for assignment as Deputy Assistant Chief of Staff for Force Development (DACSFOR) in the Pentagon, Washington, D.C. General Gribble had served as DCRD since April 1966.

Many familiar faces will greet General Coffin in his new assignment. He served in the infancy of the Office of the Chief of Research and Development, first as chief of the Atomic Division in 1955 and later as chief of the Missiles and Space Division.

General Coffin attended the National War College in 1958-59, then was assigned as G-3, Southern European Task Force in Verona, Italy. In January 1960,

MICOM Activates Center For Metrology, Calibration

Activation of the U.S. Army Metrology and Calibration Center at Redstone Arsenal, Ala., has been announced by the U.S. Army Missile Command.

The nucleus of the new Center is the former MICOM Metrology Center, its facilities and personnel, which had been part of the Directorate of Arsenal Support Operations. Headed by Lt Col Peter L. Horne, the Center is established at the same level as MICOM's seven major directorates.

In addition to consolidating calibration and metrology functions formerly conducted at several locations throughout the U.S., the Center is responsible for management of calibration effort at 13 locations around the world.

Personnel previously assigned to the Center have been augmented by 184 civilian and military spaces transferred as a result of the consolidation. Most of those transferred are from the former headquarters of Army Measurements and Standards at Frankford Arsenal, Pa. Others were moved from Tooele Army Depot in Utah.

Among additional responsibilities of the Center are to function as a national maintenance point; also, to provide for a national inventory control and procurement and engineering missions on the national and international level, MICOM announced.

The John M. Cone Laboratory, which houses the Army Standards Laboratory, of which the Center is a part, was completed in September 1966. Named after Maj Gen Cone (deceased), it provides one of the most completely equipped facilities in the U.S. for precise calibration and measurement of equipment.

he took command of the 1st U.S. Army Missile Command, a missile task force in Italy.

Transferred to Heidelberg, Germany, in July 1961 as chief of Plans, Operations Division, Headquarters U.S. Army, Europe, he later became assistant chief of Operations.

In June 1963, he returned to the U.S. to become assistant division commander, 2nd Infantry Division at Fort Benning, Ga.

General Coffin attended the Armed Forces Staff College (1954-55) and the Command and General Staff College (1949-50), remaining at the CGSC as an instructor until 1953.

Born in 1917 at Bellingham, Wash., he

ECOM Team Supports Operations in Vietnam

Outstanding leadership of the U.S. Army Electronics Command's first Research and Development Technical Liaison Team to support combat operations in Vietnam recently earned John J. Charlton a \$500 Special Act or Service Award under the Army Incentive Awards Program.

The citation presented to the chief of the Microwave Materials Section in the Electronic Components Laboratory stated in part:

"As a result of his efforts, the new concept of the Army Electronics Command R&D Team has become well established, its usefulness as a first-hand source of information on the combat field situation unquestioned, and it has earned the confidence and support of all elements, both in the theater of operations and in the Army Electronics Command."

Original team members who worked with Charlton were chosen for their special abilities from four of the command's technical elements.

They included Leo H. Wagner, then



PHYSICIST John J. Charlton (left) receives \$500 check and congratulatory handshake from Stanley F. Danko, deputy director, Electronics Components Lab, Electronics Command.

was graduated from Stanford University in 1939 and a year later entered active duty at Fort Lewis, Wash., as a second lieutenant with the 3rd Infantry Division.

His early assignments included service in North Africa and the European Theater of Operations (1943-45). He then was ordered to the Intelligence Division, War Department General Staff, Washington, D.C.

General Coffin took command of the 549th Airborne Field Artillery Battalion at Camp Pickett, Va., in 1948 and served in Korea during 1953-54 as commander of the 39th Field Artillery Battalion and as assistant chief of staff, G-1, 3rd Infantry Division.

He has been awarded the Legion of Merit, Bronze Star Medal (with two Oak Leaf Clusters), Army Commendation Ribbon and the French Croix de Guerre.

with the Communications-Automatic Data Processing Laboratory, now with the Mallard Project; P. W. Dubowicz, of the same laboratory; Stanley J. Zalesky, Avionics Laboratory; John W. Burt, Research and Development Directorate, and Earl Bienz, with the Combat Surveillance, Night Vision and Target Acquisition Laboratories at Fort Belvoir, Va.

Along with the work of the R&D teams and technical experts on special missions, other elements of the command, including the Materiel Readiness and Production and Procurement Directorates, provide direct support to the U.S. Army in Vietnam.

Sprint Missile Achieves First Full-Duration Flight

Nike-X missile defense development has achieved the first successful full-duration flight of the Sprint antimissile missile, launched from an underground cell at the White Sands (N. Mex.) Missile Range.

Results of the latest in the series of test firings at WSMR were announced Aug. 10 by the U.S. Army Missile Command project officials at Redstone (Ala.) Arsenal. Later tests are scheduled at the Nike-X project's Kwajalein Test Site in the mid-Pacific.

Major test objectives of the flight were met, and the missile functioned according to plan, officials announced. The Sprint is ejected from its underground cell by a gas charge, and its first stage is not ignited until the missile is in the air.

One of the two interceptor missiles in the Nike-X missile defense system, the Sprint is powered by two solid-propellant rocket engines and is guided during flight by system radars.

Western Electric Co. is the prime contractor on the Nike-X system, and Bell Telephone Laboratories is responsible for system design and development. Martin-Marietta Corp. is developing the Sprint.

Edgewood Dedicates \$3 Million Lab

Chemical research capabilities at Edgewood Arsenal, Md., were expanded substantially July 27 with the dedication of the \$3 million Amos A. Fries building, containing 53 laboratories for about 150 researchers.

Dedicated as a memorial to the late Maj Gen Amos A. Fries, a former Arsenal commander and Chief Chemical Officer of the Army, the new building contains ultramodern equipment and is scientifically designed for safety and convenience of the research staff.

U.S. Representative Clarence D. Long of Maryland gave the dedicatory address and stressed the need for public understanding of the humane aspects of chemical warfare to incapacitate temporarily rather than to kill or maim with bullets. He cited riot control as one example.

Brig Gen William W. Stone, Edgewood Arsenal commander, and Dr. Seymour Silver, director of the Arsenal's Research Laboratories, welcomed more than 300 civic and military leaders. Three daughters and a son of General Fries participated by unveiling an honorary wall plaque.

Following the ceremonies, guests were taken on a tour of the building.

Accommodations include air intakes and exhausts for each of the 53 specialized research facilities, assuring a continuous supply of outside air to each. Airborne chemicals produced in research are carried into filtering systems by 160 exhaust hoods, ranging in size from standard laboratory bench hoods to large walk-in types, before discharge to the outside.

One of the safety features is the maintenance of varying levels of air pressure. Corridor air is kept at a constant pressure, clothing change rooms at a slightly lower pressure, and laboratory working areas

ERDL Testing New Unit

As Silent Power Source

Continuing investigation of possible silent power sources at the U.S. Army Mobility Equipment Command's Engineer Research and Development Laboratories, Fort Belvoir, Va., has produced a 35-pound thermoelectric power module delivering 560 watts.

Testing of the unit was started recently and it has demonstrated that it is inaudible at a distance of 100 feet. Operating at 28 volts d.c., it has a multifuel capability, including gasoline, jet fuel or diesel fuel.

The module is 14½ inches in diameter, 25 inches high and is expected to operate at least 1,000 hours, continuously or with a minimum of 100 on-off cycles, without major maintenance. The planned end use is a combination of three modules in a skid-mounted configuration delivering 1,500 watts.

Minnesota Mining and Manufacturing Co. fabricated the unit under a contract with the Engineer R&D Laboratories in conjunction with the Air Force.

at a still lower pressure, thus confining airborne chemicals to lowest pressure areas.

Change rooms for personnel to shower and change clothes when entering or leaving the building are located between individual laboratories throughout the building. Exterior walkways at each floor level permit movement of laboratory materials between working areas without the risk of contamination of corridors.

An overnight laboratory is provided for scientists engaged in experiments requiring continuous operation. Building design and special equipment permit unattended continuation of a day's processes. The laboratory includes an automatic carbon dioxide fire extinguisher system.

Design of the building also permits two of the separate laboratories to be converted into a single 2-story laboratory by removal of floor sections to provide extra height needed to set up special apparatus.

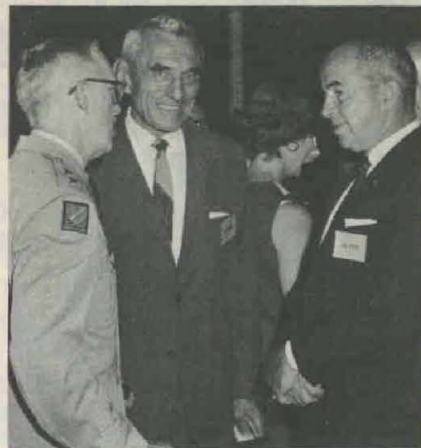
Air-conditioning, heating and exhaust systems operate independently in each of the 53 laboratories.

General Stone said the added opportunities for R&D provided by the new laboratory "enable us to attract the best professional people in the business. It helps us to speed existing projects and map future ones."

Battelle, Ohio University Plan 2-Week R&D Course

Representatives of the Army, Navy and Air Force will be among the 65 participants in the Fifth Annual Research and Development Management Program conducted jointly by the Columbus Laboratories of Battelle Memorial Institute and Ohio University. The 2-week course starts Sept. 24.

Sessions the first week are scheduled at Battelle and the second week at the Ohio University Inn in Athens. Featured speakers are Dr. Earl Planty, professor of management at the University of Illinois, who will discuss "Conventional and New Practice in Supervision of R&D Personnel," and Albert T. Shapero, University



of Texas professor of management and statistics, "Technical Manpower - The Chief Production Factor in R&D." The program includes presentations by scientists, educators, and management specialists from Harvard, Indiana, Ohio, Northwestern, New Brunswick (Canada) and Pennsylvania Universities; International Business Machines Corp.; and Peat, Marwick, Mitchell, and Co.

Among Army representatives will be Lt Col Russell D. McGovern, new chief of the Studies and Analysis Division, and James W. Sterling, Research Plans Office, U.S. Army Research Office, Office of the Chief of R&D.

Picatinny Develops Deterrent Coating for Propellants

Development of a superior deterrent coating applicable to all types of small arms propellants, including the NATO 7.62mm. weapon, was announced recently by Picatinny Arsenal, Dover, N.J.

The purpose of the coating is to retard and control the burning rate at the grain surface, thereby reducing the initial rate of gas evolution and resulting in a lower peak pressure within the gun tube.

Dr. Jean Picard, chief of propellants, Feltman Research Laboratories at Picatinny, originated the basic concept of the new coating, but developmental work is credited to Russel Trask, research chemical engineer. First-year savings of \$26,800 in production costs are claimed.

Experiments have established that propellant compositions using coating are superior in chemical stability and long-term ballistic heat stability, as well as more economical to produce. It emits less flash and smoke than the standard composition and achieves required velocity with a smaller propelling charge, the announcement stated.

Trask developed use of ethylene dimethacrylate as the coating for a single-base propellant for the NATO 7.62mm cartridge. The only propellant acceptable previously for this cartridge was a double-base ball propellant, produced by only one U.S. firm. The new coating thus broadens the procurement base.



Col F. A. Bates Jr.



Col T. N. Chavis



Col W. J. Lynch

Cols Bates, Chavis, Lynch Take New OCRD Positions

Chain reaction following promotion and reassignment of Brig Gen George Sammet moved Cols Frank A. Bates Jr., Thomas N. Chavis and William J. Lynch to new duties in the Office of the Chief of Research and Development (OCRD).

Col Bates vacated duties as deputy director, Missiles and Space, OCRD, to succeed General Sammet as executive. Assistant Director of Army Research Col Chavis, also Army Research Office commander, succeeded Col Bates. Col Lynch filled the vacancy left by Col Chavis after serving two months as Technical and Industrial Liaison Officer (TILO).

Assigned to OCRD in July 1965 after a 2-year tour as commander of the St. Louis (Mo.) Defense Command, ARADCOM, Col Bates became deputy director of the Missiles and Space Directorate in July 1966. Col Chavis had served in his dual role since April 1966. Col Lynch was deputy chief of staff, U.S. Army Hawaii (1966-67).

Col Bates served in the J-3 Division, Military Assistance Command Vietnam (MACV) from July 1962 to July 1963 following a year as a student at the Army War College, Carlisle Barracks, Pa.

For two previous years, he was assistant deputy chief, Joint Atomic Information Exchange Group, Washington, D.C., and in 1958-59 was a staff officer, Deputy Chief of Staff for Operations, in the Pentagon. He was a technical operations officer, Division of Military Applications, U.S. Atomic Energy Commission, Germantown, Md. (1957-58) after graduating from the Air Command and Staff College.

Col Bates received BS and MS degrees in mechanical engineering from the University of Michigan (1947, 48). He has been awarded the Bronze Star Medal and

Army Commendation Medal.

COL CHAVIS was assistant chief of staff (G-2), Central Army Group Europe, NATO, for a year until assigned to command the Army Research Office, and was deputy commander, 32nd Artillery Brigade, U.S. Army Europe (1963-65).

Prior to completing a 10-month course at the National War College in 1963, he was assigned to the Army Element, R&D Section, Office of the Joint Chiefs of Staff, Washington, D.C., for two years. From 1958 to 1960, he was a staff officer, Air Defense Division, OCRD.

Col Chavis was graduated from the Army Command and General Staff College in 1953 and served until January 1955 with Antiaircraft Artillery units in

OCRD Cosponsors World's Highest ES Research Facility

Environmental sciences research has achieved a new pinnacle of success, figuratively and literally, with the establishment of a facility at the 17,500-foot level of Mount Logan, Canada's highest peak.

Sponsored by the Arctic Institute of North America with partial support from the U.S. Army through the Office of the Chief of R&D and from the Army Element, Canadian Armed Forces, the small station was established this summer for field experiments of mutual interest. Non-governmental scientists may use the facility on a space-available basis.

The purpose of the station is to conduct basic environmental and physiological research at a high elevation. The facility is at the highest elevation of any research installation on the North American continent and is the highest environmental research facility in the world. Future plans call for establishment of satellite stations at higher and lower elevations on Mount Logan.

Feasibility of setting up the station at the 17,500-foot elevation was determined by a party of eight mountaineers landed by the single-engine aircraft at 10,500 feet. They reached the higher level in a 5-day climb, which served to acclimatize them to conditions for building the laboratory with precut plywood.

Research will be conducted under contract with AINA. Dr. Charles Houston, AINA medical consultant, and Wing Commander Charles Bryan of the Cana-

Korea, first as battalion commander, then executive officer of the 55th Antiaircraft Artillery Brigade. He served as deputy chief of staff for Operations, Air Defense and Guided Missile Center, Fort Bliss, from 1955-1957, then as CO, 495th Antiaircraft Artillery Missile Battalion, then to the Armed Forces Staff College, January to June 1957.

Commissioned in the Army in 1942 after studying law at San Diego (Calif.) State College, he has received the Bronze Star Medal, Army Commendation Medal (with 2 OLC), and various service medals of WWII and Korea.

COL LYNCH served in the Plans Division of OCRD in 1959-60 after a 2-year tour as commander of the 739th Nike Battalion in Boston. He was Army assistant to the director, Advanced Research Projects Agency, Office of the Director of Defense Research and Engineering (1960-61) and project manager, Remote Area Conflicts Office, ARPA, for three years until assigned to the U.S. Army Hawaii in 1964 as assistant chief of staff, G-2/G-3.

Col Lynch received a BS degree in mechanical engineering in 1941 from the Tufts College School of Engineering and an MD degree from the New York University Guggenheim School of Aeronautical Engineering in 1948. He is a graduate of the Guided Missile School, the Artillery Officers Advanced Course, and the Command and General Staff College.

dian Forces Institute for Aviation Medicine determined that research at the 17,500-foot elevation was feasible with adequate air support.

Many new opportunities for learning about living and working at high elevations to enhance military capabilities will be provided by the Mount Logan facility. Similar research is being conducted by AINA under contract with the U.S. Army Research Office-Durham (N.C.) in the vicinity of Mount Sulzer, Wrangell Mountains, Alaska.

The Alaskan area is comparable to passes in the Himalaya Mountains that are 10,000 feet higher in elevation. Soils, landforms, drainage and other terrestrial factors are each comparable, although atmospheric conditions differ.

Current research involves physiological and atmospheric operational factors.

Dr. Will F. Thompson, geographer in the Earth Sciences Division of the U.S. Army Natick Laboratories, has been doing reconnaissance work at the Mount Logan site. His bylined article, "Military Significance of Mountain Environmental Studies," appeared in the May 1967 edition page 30, of this newsmagazine.

The U.S. Army Institute of Environmental Medicine at Natick, Mass., and the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, N.H. have sent scientists to determine their interests in using the new field facility for basic research.

AMEDS to Chronicle War

Brig Gen James Weir, U.S. Army Medical Service veteran who returned recently from Vietnam, has been selected to head an Advisory Editorial Board for preparation of an AMEDS history of the war in Vietnam.

The task will be accomplished in two categories, a Clinical History plus a Tactical and Administrative History. The first category will deal extensively with the problem of the massive war wounds sustained in Vietnam, and will complement a History of Orthopedic Surgery.

Other members of the Advisory Editorial Board had not been announced as this publication went to press.

BESRL Sets Up Field Unit With TOS in Germany

Cooperation with HQ USAREUR/Seventh Army in development of an automated tactical operations system (TOS) is being facilitated by the U.S. Army Behavioral Science Research Laboratory (BESRL) through a field branch established this month in Germany.

Seymour Ringel directed the BESRL Command Systems Task in setting up the field laboratory, headed by James D. Baker, to work with the Seventh Army TOS Development Group in Heidelberg.

The TOS Development Group was formed by the Automatic Data Field Systems Command (ADFSC) and HQ U.S. Army Europe/Seventh Army. Its purpose is to develop and test a field version of a TOS involving operations and intelligence.

The automated TOS is part of the Automated Data Systems within the Army in the Field (ADSAF) for receiving,

ARO-Durham Issues 'Research in Progress' Report

U.S. Army basic research projects in mathematics, engineering, physical and environmental sciences are described in summary form in "Research in Progress 1966," distributed recently by the Army Research Office-Durham.

The 384-page document includes programs sponsored by the Office of the Chief of Research and Development, U.S. Army Materiel Command, the Advanced Research Projects Agency and the Defense Atomic Support Agency.

2 Gas Engine Generator Sets Type Classified for Procurement

Type classification of 5-kilowatt and 10-kilowatt general purpose generator sets as the newest members of the Army's growing family of generators driven by military standard gasoline engines was announced recently by the Engineer R&D Laboratories at Fort Belvoir, Va.

Type classification means that the new units are earmarked for military procurement as the need arises. Characteristics are defined as 60-cycle a.c. 120/208 volt, 3-phase, 4-wire reconnectable to 120-volt, 3-phase, 3-wire; 120-volt single phase; or 240-volt single phase. Other units in the family are the 1/2, 1 1/2, and 3-kilowatt sets.

All sets are self-contained, air-cooled, lightweight and through maximum standardization feature a high degree of parts interchangeability, plus performance and reliability superior to commercial predecessors.

The 5-kilowatt set is designed for maximum steady-state voltage deviation of plus or minus one percent, as compared to one-half percent for the 10-kilowatt unit. Power produced is of the quality needed for operation of communication and surveillance systems and missile systems. The units also may be used as a power supply for lighting, water supply equipment and engineer tool sets.

processing, storing, retrieving and displaying military data. Data flows from a network of cross-linked highly automated computerized systems, each dealing with relatively specialized functions.

The BESRL has been providing supporting research on the human component problems of the TOS for several years. Objectives of the laboratory's Command Systems Task in Washington, D.C., are to provide TOS designers and users with information concerning:

1. Objective performance measures for evaluation of system and subsystem effectiveness.
2. Effects of characteristics of the information presented - amount, density, type, coding, updating.
3. Capabilities, limitations and reliability of human performance.
4. Various modes of representing in-

Categories covered are physics, chemistry, mathematics, engineering, metallurgy and ceramics, and environmental sciences. Projects are listed by subcategory, the scope and progress of each project is summarized, and relevant reports are listed.

A 15-page introduction describes briefly the program in each category and Army interests in that field.

A 47-page subject index provides a detailed key to the material. Indexes by active military themes, proposal numbers, terminated projects, new proposals, materials oriented proposals, contract numbers, primary scientific liaison and cognizance participants, contractors and grantees, and principal investigators are also included.

Copies may be obtained from the U.S. Army Research Office-Durham, Box CM, Duke Station, Durham, N.C. 27706, ATTN: CRDARP-IP.

Col Andreoli Named Director Of Weapons Lab at Edgewood

Col Robert Andreoli reported for duty recently as director of the Weapons Development and Engineering Laboratories, Edgewood Arsenal, Md., succeeding Col George W. Connell Jr., who served two years and is now at Fort McClellan, Ala.

For the past three years, Col Andreoli has served at HQ U.S. European Command. From 1960 to June 1963, he was assigned to the Office of the Chief of Research and Development.

Col Andreoli entered the Army in 1943 after graduating from Michigan State University with a BS degree in chemistry. He completed a one-year graduate course in mechanical engineering at the University of Wisconsin and is a graduate of the Command and General Staff College, Fort Leavenworth, Kans., and the Air War College, Montgomery, Ala.

formation for assimilation and decisions.

5. Specification of effectual individual and group work methods and techniques, and allocation of functions among men and equipment.

6. Procedures for identification and assignment of appropriate personnel to critical positions.

7. Man-machine implications of alternative system configurations.

The BESRL research to date has been done in an in-house program simulating various functions of ADSAF. The new Command Systems Field Branch is directing activities toward support of the actual on-the-spot development of the TOS and its concepts. At the same time it is enriching the BESRL in-house program with additional operationally oriented concepts and problems. It will:

- Perform field validation of some of the major research findings of BESRL's laboratory experimentation.

- Develop questions which can be used to redirect and orient the laboratory toward field problems in command and control.

- Provide technical advice regarding human performance capabilities and limitations to the TOS development.

The field research activity is administered by the Army Research Office Europe, located in Frankfurt. BESRL will provide 2 1/2 man-years of professional effort to be split 50-50 between the major interests of TOS development support and BESRL program extension.



DEPICTING THE ADVANTAGES of a new invitation for bid package being developed for contractors by Rock Island (Ill.) Arsenal is Patricia Vance. Produced in a test operation, as part of development of the Technical Data Package Automated System (TEDPAS), the 35mm aperture cards she displays take up one-third cubic foot of space compared to 17.5 cubic feet for the full documents shown, weigh 16 pounds as compared to 600 pounds, and could be mailed for \$16 as against \$80. Even-ual reproduction will be facilitated by aperture card equipment, now being acquired, to expose, develop and punch as high as 2,000 cards an hour.

Army Engineer Gets High German Decoration

One of the Federal Republic of Germany's highest decorations, the Officers Cross of the Order of Merit, was presented recently to an American engineer with the US/FRG Main Battle Tank (MBT) program.

Eugene W. Trapp, chief of the project's U.S. Element, Joint Engineering Agency (JEA) and a 20-year veteran of the federal service, was honored for leadership and guidance which have contributed materially to the progress of the MBT development program.

Authorized by the President of the FRG, the decoration was presented by Dr.

Army Dentist Receives Award For Denture Processing Method

A \$400 incentive award for development of a new technique in processing denture bases was presented recently to Lt Col Walter L. Shepard, DC, executive officer of the U.S. Army Regional Dental Activity, Walter Reed Army Medical Center, Washington, D.C.

The new "fluid resin method" is considered to be more accurate, cleaner, and less time-consuming than previously used methods. In the two years the dental activity has been using the process, it is credited with saving an average of \$4,600 per year.

A gelatinous hydrocolloid mold is made in a Bakelite flask and filled with a liquid resin which cures at room temperature in 35 minutes. The old process involved making a plaster-of-Paris mold in a heavy bronze flask and curing an acrylic resin denture at 165°F. for eight hours.

The new method has saved 40 to 50 minutes working time and reduced personnel requirements 50 percent in the facility's acrylic processing section.

Col Shepard has been executive officer of the facility since 1963.

Project SPARTA Reentry Study Launches Fourth Test Missile

Project SPARTA (Special Antimissile Research Tests in Australia), a 3-nation study of missile reentry phenomena, has progressed through the fourth of several planned launches, the U.S. Missile Command reports.

A modified Redstone missile was fired in July down the Woomera Test Range. At the top of its trajectory, the velocity package of upper stages of several rocket motors hurled the sensor-observed vehicle back into the earth's atmosphere at ICBM (Intercontinental Ballistic Missile) velocities.

The Missile Command manages SPARTA for the Department of Defense Advanced Research Projects Agency (ARPA). The project, part of an overall ARPA study of ballistic missile defense concepts, is a cooperative effort of the U.S., Great Britain and Australia.

Georg von Pirch, German Counsel General in Detroit.

An employee of the Engineering Division of the Army Tank-Automotive Center from 1950-63, he was named director of design and deputy chief of the Interim Joint Engineering Agency in August 1963.

Until September 1964 he was responsible for initiating the organizational framework and establishing the fully bilateral JEA. In addition, he and his German counterpart were responsible for directing the evaluation and selection of several tank concepts, including armament systems, fire-control systems, suspension and power-train components.

Until June 1966 he was the deputy chief of the U.S. Element, JEA, and continued in his role of director of design. In July 1966, the JEA was relocated to the General Motors Technical Center in Warren, Mich., where design, development and fabrication of pilot vehicles continued. He assumed his present duties in June 1967.

He holds a BS degree in mechanical engineering from the Lawrence Institute of Technology (1950).

New AMC Center Performs Materials, Mechanics Research

The Army Materials Research Agency, which operated in 15 buildings on 35 acres of the old Watertown Arsenal since 1962, has been discontinued. All of its assigned functions and more than 800 employees have been transferred to the

Kreager, Wiley Assigned To Key Posts at Huachuca

Assignment of two deputy commanders at Fort Huachuca, Ariz., was announced recently, following closely the transfer of command of the post from the U.S. Army Electronic Proving Ground (USAEPG) to the CG of the Army Strategic Communications Command.

Col Raymond F. Kreager became deputy commander of the post after serving since August 1966 as director of the Personnel Directorate. Col James A. Wiley took over as deputy commander of the USAEPG following completion of a tour of duty as commander of the U.S. Army Arctic Test Center at Fort Greely, Alaska.

Col Kreager is backed by 28 years military service, including several assignments as a gunnery instructor and a tour as professor of military science at the Sam Houston State College, Huntsville, Tex. He also was an ROTC instructor at Ohio State University and an instructor at the Naval Amphibious Base, Coronado, Cal.

Col Wiley entered military service after graduating in 1942 with a BS degree from Ohio University, where he majored in chemistry and zoology. During World War II, he served in the South Pacific and has since had duty in Japan, Europe, Korea and at various U.S. installations.



GERMAN COUNSEL GENERAL in Detroit, Dr. Georg von Pirch, presents Officer's Cross of the Order of Merit to Eugene W. Trapp, chief of the U.S. Element, Joint Engineering Agency (JEA), associated with U.S./Federal Republic of Germany program to develop a new Main Battle Tank for the early 1970s. Witnessing the presentation is Trapp's German counterpart, Col Archibald MacLean, chief of German Element, Joint Engineering Agency.

new Research Center, which will operate at the same location under the former AMRA commander, Col Dimitri Kellogg.

The AMMRC is already one of the largest, if not the largest, Army installation in the Greater Boston area. Since its functions now include mechanics and electronics work, as well as the basic and applied research in metals, ceramics and other materials for weapons and equipment, continuing expansion of employment at the new Center seems certain.

The AMMRC will also serve as caretaker for the adjacent buildings which formerly housed the Watertown Arsenal, until final disposition of the property.

Thornley Succeeds Neubauer At STRATCOM-CONUS Command

Command of the U.S. Army Strategic Communications Command of the Continental United States (STRATCOM-CONUS) was assumed recently by Lt Col James F. Thornley, deputy CO, until Col William C. Neubauer retired.

Before coming to STRATCOM-CONUS, Lt Col Thornley was chief of the Plans and Engineering Division, Signal Section, HQ Eighth U.S. Army, in Korea. He holds a BS degree from the University of Maryland and attended the Command and General Staff College.

STRATCOM-CONUS controls single-side-band high-frequency radio systems to major countries overseas, as well as leased facilities reaching Europe, Latin America and Hawaii. It provides communications in support of the White House, State Department, Pentagon and key government agencies.

Army RDT&E Contracts Exceed \$1 Billion

Contracts totaling \$1,035,929,270 for research, development, test and evaluation and procurement of material — each valued in excess of \$1 million — have been awarded by the Army since the previous edition of the *Army R&D Newsmagazine*. The cutoff date for this compilation is July 26.

Six contracts with the Kaiser Jeep Corp., totaling \$65,767,479, will purchase trucks and ambulances. The General Motors Corp. received nine contracts totaling \$61,330,680 for armored reconnaissance/airborne assault vehicles (\$28,725,157), 155mm self-propelled howitzers (\$19,212,760), projectile parts, engineering services, radio transmitters and receivers, diesel engines and vehicle transmissions.

The Bell Aerospace Corp. was awarded contracts totaling \$56,730,313 for UH-1 helicopter blades (\$31,410,889), helicopter instrument trainers, and UH-1D and OH-13S helicopters.

Hercules, Inc., will provide propellants for \$46,920,976. Four contracts totaling \$37,293,047 were awarded to the Remington Arms Co., Inc., for small arms ammunition.

The Raytheon Co. won nine contracts totaling \$35,634,574 for support and maintenance equipment and modification kits for the Hawk missile system, advanced development of the SAM-D, and communications equipment.

A \$25,753,440 contract modification with the Federal Cartridge Corp. will purchase small arms ammunition. The U.S. Procurement Center, Frankfurt, awarded two definitive contracts totaling \$23,843,710 to the Federal Republic of Germany, Bundesamt fuer Wehrtechnik und Beschaffung, Koblenz, for 20mm ammunition.

National Presto Industries, Inc. received two contracts totaling \$23,435,582 for metal parts for 105mm projectiles. Contracts totaling \$22,966,542 with the Chrysler Motor Corp. will purchase cargo trucks, ambulances, tanks, combat engineer vehicles, chassis for M60A1 tanks, cupola modification and adapter vision-ring kits.

For \$22,771,268, the General Electric Co. will supply XM163 weapons systems (\$13,639,900), high-power acquisition radar and rotary joints for the Nike-Hercules system, machineguns, and test equipment and ancillary items for the attitude-heading reference sets.

Machlett Laboratories received an initial increment of \$1,657,306 to a \$7,364,556 contract for miniaturized AN/PVS-3, and a \$5,398,043 initial increment to a \$14,373,519 contract for 25mm image-intensifier assemblies.

Five contracts with the Olin Mathieson Chemical Corp. will procure propellants, cartridge tracers and clipped cartridges for a total of \$21,669,591.

The Sperry Rand Corp. will furnish ammunition, gyromagnetic compass sets, automatic flight control systems and electromechanic rotary actuators, and design of an exploratory development model electronic scanning pencil-beam antenna, for a total of \$17,100,675.

Contracts totaling \$16,926,875 will obtain from the Chamberlain Manufacturing Corp. metal parts for projectiles and repairs in support of several projectile programs.

The White Motor Co. will furnish 2½-ton trucks for \$19,467,767. Consolidated Diesel Electric Co. will supply 10-ton trucks for \$19,115,838. Hoffman Electronics Corp. received a \$3,500,000 increment to a \$17,065,536 contract for airborne radio sets.

The FMC Corp. received a \$12,237,400 contract for M113 armored personnel carriers, mortar carriers, command-post carriers, control test items and repair parts, and modifications totaling \$3,258,045 for metal parts for projectiles and engineering activities supporting production of M113A1, M106A1, M125A1, M177A1, XM741 and all Vulcan air defense vehicles.

Two contracts with Case Master Body, Inc., will obtain ¾-ton cargo trailers and 2-wheel water-tank trailers for \$15,385,260. The Hughes Tool Co. will provide TH55A primary trainer helicopters and related data, and rotary wing blades for OH-6A helicopters for \$15,352,952. Continental Motors Corp. will supply truck engines on six contracts totaling \$14,994,975.

International Telephone and Telegraph Corp. received contracts totaling

\$15,479,574 for radio sets and tactical antenna systems. Johnson Corp. will provide 1½-ton cargo trailers for \$13,158,694. Atlantic Research Corp. will receive \$12,490,000 for munitions items. Two contracts with Honeywell, Inc., will provide research and development and electronics equipment for \$11,500,000.

Mason and Hanger, Silas Mason and Co., received modifications totaling \$11,305,549 for loading, assembling and packing bombs, ammunition and aerial mines, and for facilities for manufacturing M106 shells.

Thiokol Chemical Corp. will provide rocket motors, tear gas and ammunition for \$11,191,332. Strick Corp. will furnish 12-ton semitrailers for \$11,634,148. Hanson Machinery Co. was awarded an initial increment of \$4,336,866 to a \$10,514,777 contract for 5-ton cranes.

Day and Zimmerman, Inc., received a \$9,623,759 modification for miscellaneous explosive items. Ford Motor Co. will provide ¼-ton trucks and engineering services for M151A1 and M718 trucks for \$9,345,771. Holston Defense Corp., Division of Eastman Kodak Co., received a \$9,129,266 modification for explosives.

Norris Industries, Inc., was awarded modifications totaling \$9,031,998 for 152mm projectiles, 105mm cartridge cases and rocket launchers.

The Collins Radio Co. won contracts totaling \$8,206,897 for radio sets, direction finder sets and repair part kits. An \$8,155,781 contract with the Stromberg Carlson Corp. will provide nine tandem switching centers to be installed in Southeast Asia.



A NEW STABILIZED OPTICAL SIGHT equipped with a laser rangefinder and night-vision capabilities was unveiled recently for integration with all helicopter armament in the UH-1 series. Expected to be operational in the field soon, the sight allows the operator to track a target under all aircraft maneuvers and has been called a 100 percent improvement over what is in use. Among those present for the unveiling at Frankford Arsenal, Pa., was Howard P. Gates Jr., Office, Assistant Secretary of the Army (R&D), seated at the controls. Others, from left, are: Robert Pfeilsticker, project chief; Lt Col Lowell K. Solt, Office, Chief of R&D (OCD); Gordon Sigman, project engineer; and Lt Col David C. Money, OCD.

Contracts totaling \$8,101,500 will obtain from the Fairchild Camera and Instrument Corp. artillery fuzes, still picture cameras and test sets. AVCO Corp. will supply aircraft engine assemblies, turbine nozzles and particle separators for \$7,922,093. U.S. Rubber Co. received modifications totaling \$7,639,816 for explosives.

Harvey Aluminum Sales, Inc., received a \$7,628,915 modification for ammunition. Mack Trucks, Inc., gained contracts totaling \$7,577,998 for spare diesel engines and transmission and axle assemblies for 5- and 10-ton trucks. Western Electric Co. received contracts totaling \$6,581,979 to overhaul three Nike Hercules systems and for additional Nike-X planning.

Pace Corp. won a \$6,251,653 contract for ground and parachute illuminating signals. Texas Instruments, Inc., will supply artillery fuzes for \$6,100,600.

Northrop Corp. received contracts totaling \$6,052,655 for projectiles, Hawk launchers, and target missile flight services for Project Charging Sparrow. Page Communications Engineers, Inc., received modifications totaling \$5,950,000 for maintenance and operation services for Integrated Wide-Band Communications Systems in South Vietnam and a classified project in Southeast Asia.

Aerojet General Corp. was awarded contracts totaling \$5,842,224 for rockets, rocket motors, bomb dispensers, and forward-looking infrared airborne target-acquisition and fire-control systems. Page Aircraft Maintenance, Inc., received a \$5,871,378 modification for fixed- and rotary-wing aircraft maintenance.

Dow Chemical Co. won a \$5,775,000 contract for MX-18 extruded aluminum airplane mat material. Philco-Ford Corp. will provide grenade launchers and services for the Integrated Wide-Band Communications System in Thailand for \$5,558,335.

Contracts totaling \$4,838,632 will procure 90mm projectiles and canister assemblies from Whirlpool Corp. R.G. LeTourneau, Inc., will provide metal parts for 750-pound bombs on a \$4,807,600 modification.

Canadian Commercial Corp. received contracts totaling \$4,599,954 for TNT and test facilities and support kits for radio sets. Colt's Inc., received a \$4,500,000 contract for license to use technical data and patents pertaining to 5.56mm M16, M16A1, XM177 and XM177E2 rifles.

American Machine and Foundry Corp. received a \$4,345,085 modification for metal parts for 750-pound bombs. Good-year Tire and Rubber Co. will receive \$4,161,065 for pneumatic tires. HRB Singer, Inc., won a \$4,055,880 contract for radio transmitters, infrared detecting sets and maintenance floats to support the AN/AAS-14.

Ross Aviation, Inc., was awarded a \$4,032,847 contract for conducting fixed-

wing, primary and instrument training, and rotary-wing basic instrument flight training.

VARO, Inc., received contracts totaling \$3,973,722 for xenon searchlights, night-vision weapons, and metasopes, or image-forming receivers. Cummins Engine Co., Inc., gained a \$3,890,621 modification for diesel engines with accessories for 10-ton trucks.

Elliott Machine Works was issued a \$1,712,910 first-year increment to a \$3,836,110 contract for trailer-mounted lubricating and servicing units. Global Associates won a \$3,759,386 modification for logistics support at the Kwajalein Test Site.

The URS Corp. will continue development of an ADP system for \$3,721,082. Boyertown Auto Body Works, Inc., won a \$3,318,958 contract for 6-ton semitrailers and Allison Steel Manufacturing Co. will supply saddle assemblies for \$3,270,072.

Memcor, Inc., will supply radio receivers and transmitters for \$3,123,108. Radio Corp. of America received a \$3,000,000 modification for repair parts.

Gichner Mobile Systems, Inc., was awarded contracts totaling \$2,967,124 for airborne transporters and for portable electric tool outfits. United Aircraft Corp. will supply detachable pods for the CH-54A for \$2,923,844. Studebaker Corp. received a \$2,918,322 modification for generator sets.

General Time Corp. will supply XM711 fuzes for \$2,916,179. Electrical power will be provided at Radford (Va.) Army Ammunition Plant on a \$2,900,000 modification with the Appalachian Power Co. Magnavox Co. will supply M18 direction computer guns for \$2,879,609.

Servo Corp. of America won a \$2,811,793 contract for receiving sets. Metal parts for fuzes will be supplied by the Columbus Mil Par Manufacturing Co. for \$2,810,467. E. I. du Pont de Nemours and Co. will furnish TNT for \$2,726,076.

Stevens Manufacturing Co. will provide 1½-ton cargo trailers for \$2,722,766 and Maremont Corp. will furnish barrel assemblies for 7.62mm machineguns for \$2,580,252.

Bulova Watch Co. received modifications totaling \$2,512,525 for rocket fuzes and fuze parts. A \$2,500,000 modification with McDonnell Co. is for engineering development and test of an antipersonnel companion round for the Dragon, an antitank weapon system.

Continental Aviation and Engineering Corp. was awarded \$2,339,400 for production and inspection engineering of truck engines and International Harvester Co. will supply trucks for \$2,313,871. The SCM Corp. will furnish teletypewriter sets for \$2,301,268.

A \$2,300,000 contract will procure electronic equipment from Minnesota Mining and Manufacturing Co. Hughes Aircraft Co. received a \$2,139,167 definitization for radio sets, receiver-transmitters and

spare parts, and a \$142,041 increment to a \$1,432,980 contract for replacement tubes for the Nike Hercules system.

Mine Safety Appliance Co. was awarded a \$2,241,700 modification for field protective masks, Caterpillar Tractor Co. will supply tractors for \$2,183,606, and Hawthorne Aviation will furnish aircraft maintenance services and related test support of the U.S. Army Aviation Test Board on a \$2,175,201 modification.

Lockheed Electronics Co. won a \$2,160,000 contract for radar sets. Chicago Aerial Industries, Inc., was awarded a \$2,156,000 contract for cameras, components and equipment. National Union Electric Corp. will supply bomb fuzes on a \$2,008,515 modification.

Hol-Gar Manufacturing Co. received a \$1,967,366 contract for 1.5 kw generator sets, Bermite Powder Co. won a \$1,914,655 contract for fuzes, and Southern Airways Co. will supply metal parts for projectiles on a \$1,912,553 modification.

VIZ Manufacturing Co. was issued a \$1,868,465 contract for radiosonde sets, Ingraham Co. will supply metal parts assembly of M125A1 boosters for \$1,812,774, and General Dynamics Corp. will provide engineering services for the Red-eye missile for \$1,784,064.

Engelhard Hanovia, Inc., won a \$1,782,144 contract for lamp assemblies for xenon searchlights and Hi-Voltage Engineering Corp. will erect shielding for tandem Van de Graaff accelerators for \$1,782,000.

Other contracts and modifications are: Bethlehem Steel Corp., \$1,779,649 for tube forgings for 175mm guns; Rand Corp., \$1,717,850 for a classified study; Booz-Allen Applied Research, \$1,710,527 for continuation of studies by the Combined Arms Research Office; and Donaldson Co., Inc., \$1,628,531 for exploratory and advanced development services to establish modularized collective protection for vehicles, vans and shelters; R. T. Communications, Inc., \$1,600,000 for transportable radio sets; Varian Associates, \$1,592,120 for electron tubes for radar sets; and

Hayes International Corp., \$1,588,000 for metal parts for rockets; ACF Industries, Inc., \$1,587,134 for fuzes; Stewart and Stevenson Services, Inc., \$1,552,610 for 45 kw. multipurpose generator sets; Gibraltar Manufacturing Co., \$1,537,315 for sprocket tank drives; and

Zenith Radio Corp., \$1,530,206 for metal parts for rocket fuzes; Allis Chalmers Manufacturing Co., \$1,528,113 for generator sets and spare parts; Capital Radio Engineering Institute, \$1,500,000 for classified services; EG&G, Inc., \$1,500,000 for equipment and services in connection with underground nuclear testing at the Nevada Test Site; and

Sylvania Electronics Products, \$1,500,000 for electronics equipment; Automatic Electric Co., \$1,494,750 for telephone equipment; Arvin Industries, Inc., \$1,469,

(Continued on page 16)

Redeye Value Engineering Saves \$4.9 Million

Value Engineering (VE) of the U.S. Army's Redeye shoulder-fired air defense missile has produced estimated savings of \$4,931,100, making the system a front-runner in the Department of Defense VE competition.

Savings on the Redeye are detailed by Col G. D. Mobbs, director for VE, Office of the Assistant Secretary of Defense (Installations and Logistics), in a bylined article in the Department of Defense *Cost Reduction Journal* issued in mid-August.

Based on reviews made by VE teams, a VE Program requirement clause was included in the FY 1964 Redeye R&D contract. VECPs (Value Engineering Change Proposals) by the close of FY 1967 had raised the total savings to \$4,931,000 (subject to final audit).

Under the VE Program, the Army agrees to share savings with the contractor, which provided General Dynamics with the incentive to propose VE changes on the Redeye. Col Mobbs describes the savings as follows:

"Slightly over half of the \$5 million in estimated VECp savings on the Redeye is on the instant contract with the remainder on follow-on contracts. In two current production contracts the Army's share of savings is 70 and 60 percent on the instant contract and 80 and 75 percent, respectively, on follow-on procurement. It is estimated that General Dynamics' (Pomona) share of these savings may be \$1.5 million.

"An example of a VECp that is achieving a significant saving involves the device that provides Redeye impulse ignition at launch. Substantial unit cost reductions were obtained through the simplification of design, the reduction in the number of parts, the use of powdered metal parts and by the relaxation of tolerances. Total savings for the instant contract and follow-on procurement should be well over \$300,000.

"Another noteworthy example is the battery-gas unit in which total instant contract and follow-on savings are estimated to exceed \$700,000. This item stores and releases the coolant for the IR detector. Reductions were achieved through the use of a simplified bottle design and a modified off-the-shelf release mechanism.

"A third item concerns the infrared transparent dome on the nose of the Redeye missile. The use of a lower cost, but entirely satisfactory material, permitted an estimated total cost reduction for current and follow-on contracts in excess of \$1 million.

"These examples, plus 11 other approved VECp's, provide the savings which are expected to reach \$5 million. All of these changes have been given technical approval by the Army and are being incorporated in the Redeye weapon.

"Standard value engineering incentive clauses have also been developed for use

in outside procurement. In fiscal year 1967, Redeye production program incentive provisions will be employed with at least 15 major suppliers.

"As you might expect from the exemplary results achieved, Army personnel on the Redeye program have been consistent supporters of value engineering. In addition to introducing value engineering contract provisions early in the program, Army personnel participated regularly in value engineering training seminars conducted by the contractor. Together, the Army and the contractor established a climate in which value engineering could thrive.

"Value engineering began in the Pomona Division of General Dynamics in 1958. Its possible application to the Redeye program was discussed with an Army representative as early as 1959. A formal value control program with coordinators assigned in each major department was established in January 1960. By September 1963, all cost reduction program elements were placed under a single Director of Cost and Value Control. The responsibilities of the department coordinators were expanded to en-

Fiscal Year Closing RDT&E Contracts Top \$1 Billion

(Continued from page 15)

945 for direction finder sets; Photo-Sonics, Inc., \$1,443,830 for versatile tracking mounts with binocular scopes; Cessna Aircraft Co., \$1,433,795 for bomblet dispensers; and

Bell and Howell Co., \$1,422,900 for time-fuze metal parts for 60mm projectiles; Ravenna Arsenal, Inc., \$1,410,674 to convert 90mm high-explosive cartridges to antitank cartridges; Rulon Co., \$1,384,075 for plunger-body assemblies and firing-pin assemblies for M48 fuzes; and

Craig Systems Corp., \$1,364,406 for shelters for electrical equipment; IBM Corp., \$1,358,102 for ADP equipment; Ampex Corp., \$1,357,430 for educational TV technical terminal facilities, programs and control tests for 12 U.S. CONARC Training Centers; and

Applied Devices Corp., \$1,304,412 for surveying instruments; Northrop Carolina, Inc., \$1,302,000 for chemicals; Southwest Truck Body Co., Inc., \$1,298,150 for semitrailers and chassis; Systems Development Corp., \$1,293,997 for a systems training program for the Army Air Defense Missile Mentor and for Birdie Air Defense Control and Coordination Systems; Stelma, Inc., \$1,275,001 for an automated technical control system; and

Massachusetts Institute of Technology, \$1,275,000 for one year of basic and applied research in general physics, plasma dynamics, communications sciences, and engineering; R. C. Can Co., \$1,263,209 for fibre containers for ammunition; and

Bowen-McLaughlin-York, \$1,260,007

compass all elements of the cost reduction program. The Pomona Division's cost and value control program is fully formalized and authenticated by management in widely distributed internal directives.

"Both the Army and General Dynamics intend to place continuing heavy emphasis on cost effectiveness in the Redeye weapon system. Value engineering activity, including further mutually advantageous use of incentive clauses, will continue to be a key element in the overall cost reduction effort for Redeye.

"In fiscal year 1966, 979 VECp's submitted by defense contractors were approved with estimated savings of \$36 million. Of the 979 approved VECp's, 125 were high dollar (estimated savings of \$50,000 or more before sharing). These were submitted by 28 defense contractors. The Army Redeye program and the Pomona Division of General Dynamics were frontrunners. If the results were as good on the total fiscal year 1966 DoD program authorization for centrally procured systems and equipment as on the Redeye, the value engineering cost reduction from contractor-initiated VECp's in fiscal year 1966 would have been about 25 times greater than the \$36 million reported."

for guided missile loaders and transporters; and Prestolite Co., Division of Eltra Corp., \$1,202,132 for 12-volt storage batteries; and Ryan Aeronautical Co., \$1,185,861 for engineering flight services for the MQM-34D target guided missile; Muncie Gear Works, \$1,164,810 for fin and nozzle assemblies for rockets; and

John R. Hollingsworth Co., a \$1,148,343 first increment to a \$1,979,708 contract for 7½-kw. generator sets; Wilkenon Manufacturing Co., \$1,140,750 for fin assemblies for projectiles; Rodgers Hydraulic, Inc., \$1,139,000 for hydraulic presses; and

Page Airways, Inc., \$1,136,299 for services and materials for maintenance of military aircraft; Westinghouse Electric Corp., \$1,120,193 for 30-kw. generator sets; Battelle Memorial Institute, \$1,102,900 for a classified project; Ford-Werke AG, Koln, Germany, \$1,099,764 for vehicles and equipment (work will be done at Kent, Ohio); and

Uniroyal, \$1,097,540 for petroleum tanks; Stanford Research Institute, \$1,092,000 for a classified project; Missouri Research Labs, Inc., \$1,082,909 for automobile shelters; GO Corp., \$1,077,785 for track assemblies for M113 armored personnel carriers; and

Mansfield Tire and Rubber Co., \$1,072,362 for tires for ¼-ton trucks; Christie Electric Corp., \$1,068,454 for a transformer to provide power for portable radios; Firestone Tire and Rubber Co., \$1,066,130 for petroleum tanks; Atlas Chemical Co., Inc., \$1,034,852 for TNT; and Federal Laboratories, Inc., \$1,012,680 for hand grenades.

Army Establishes Economy Champion Program

An Army Roll of Economy Champions Program, based on the same guidelines used for the Civil Service Commission ECP conducted from January through June, is established by TAG Letter dated Aug. 4, 1967.

Requiring major command implementing instructions by Aug. 15, it states:

"In the interest of giving added impetus to Incentive Awards activities aimed at encouraging widespread efforts by all Army personnel, civilian and military, to find ways of doing their jobs more efficiently at less cost, a program designated as the Army Role of Economy Champions is established."

Significant contributions toward achieving the goal of a "Better Product and Service at Reduced Cost" will be recognized by major commanders and major subordinate commanders with award of Department of the Army Certificates of Achievement.

The continuing program will be conducted on a fiscal year basis. Not later than July 31 each year, major and subordinate commanders will nominate a candidate for the title of Army Economy Champion of the Year. Nominees will be selected from those receiving recognition

during the year as Economy Champions. The winner will be honored at a ceremony in the Pentagon, Washington, D.C.

The Army ECP will differ from the policy followed for the Civil Service Commission in ECP in that there will be no monthly consolidation of nominees at Department of the Army level. The CSC program called for the issuance of a monthly list of award winners. In the Army program, each major or subordinate command will determine how often the list will be issued.

Selections at major or subordinate command level will be based on adopted suggestions or special achievements which are beyond normal job requirements, have been put into effect during the competitive year, and result in first-year measurable benefits having a value of

\$10,000 or more.

Contributions to economy may be individual or group achievements, and be recognized by cash awards.

To assure that appropriate recognition is given, contributions submitted through the Cost Reduction, Management Improvement, Zero Defects, and Work Simplification Programs will be reviewed.

AVCOM Announces Appointment

John Malerich has been named chief of the Command and Project Management Office at the U.S. Army Aviation Materiel Command (AVCOM), St. Louis, Mo. His assignment follows appointments as chief of the Procurement Division and chief of the Cost Analysis Division (Procurement and Production) since 1962. Malerich joined AVCOM as a member of the resident staff and became a supervisory auditor for the Army Audit Agency.

Human Factors R&D Conference Slated Oct. 25-27

Participants in the 13th Annual Army Human Factors Research and Development Conference at Fort Monmouth, N.J., Oct. 25-27, will center discussion on the theme of "Enhancement of Human Performance for Military Operations."

The conference is sponsored by Chief of Research and Development Lt Gen A. W. Betts through the Behavioral Sciences Division, U.S. Army Research Office. The purpose is to provide for the exchange of information on human factors R&D requirements, accomplishments and future plans among Army agencies, industrial organizations and educational institutions.

Assistant Secretary of Defense (Installations and Logistics) Thomas D. Morris is scheduled for the principal address at the banquet Oct. 25. General James Woolnough, CG of the U.S. Continental Army Command, will give the keynote address Oct. 26. A session on "Improvement of Human Performance in Overseas Operations" will follow his presentation.

Dr. Lynn E. Baker of the Behavioral Sciences Division, chief psychologist of the U.S. Army, will speak at the opening session Oct. 25 on "Army Operational Requirements for Human Factors Research and Development."

Panel discussions will deal with "Army Requirements, Plans and Policies," "Current R&D on Bulk Manpower Management Requirements," "Information Processing and Target Acquisition," and "Systems Performance Criteria."

16 Patents May Invite Challenge for Honors

Two patents on inventions granted recently might prompt Dr. Helmut L. Brueckmann of the U.S. Army Electronics Command, Fort Monmouth, N.J., to open up a new contest for honors in the *Army R&D Newsmagazine* by laying claim to being "the man with the mostest" by way of ingenuity.

The patents raised Dr. Brueckmann's total of inventions to 16 — and would anyone want to challenge that for top honors? A few months ago, a continuing contest was started merely by an item in this publication about a young lady claiming to be the youngest PhD in the Army.

Dr. Brueckmann's latest inventions are a multidirectional antenna system designed primarily for long-range, high-frequency radio, and a ferrite-filled coaxial-stub antenna tuner intended principally for portable and vehicular high-frequency and very-high-frequency radio.

Thirteen of his patents have been granted in the United States, and the other three in his native Germany before he joined the Fort Monmouth staff. Most of his patents are in the field of antennas.

Who wants to file his claim to having the most patents of anyone directly identified with Army R&D activities? Since the Army places a high value on innovation and ingenuity in solving problems, a contest for the honor of having the most inventions should be interesting, along with a brief account in each case of their application to Army needs.



THE WILLIAM J. KROEGER LIBRARY was dedicated at Frankford Arsenal in the memory of the coinventor of the Army's recoilless rifle and former chief scientist of the 151-year-old installation at Philadelphia, Pa. Maj Gen Frank G. White (left) CG of the U.S. Army Munitions Command unveiled the bronze plaque July 27, commemorating the occasion. With General White are the inventor's widow; C. Walton Musser, coinventor of the rifle; and Col Paul A. Nilsson, Frankford Arsenal commanding officer. During his government career, Dr. Kroeger distinguished himself through exceptional contributions to national defense. He held 18 patents and published 35 technical papers. In establishing what he called the "scientific rationale" for interior ballistics of the recoilless rifle, he was directly responsible for development of the 57mm, 75mm and 105mm model.

Army Engineers Develop Hydraulic Modeling as Precise Science

By EUGENE P. FORTSON JR., Chief, Hydraulics Division
U.S. Army Waterways Experiment Station, Vicksburg, Miss.

NOTE: This article is the second of a series that started in the July-August edition on the Army Corps of Engineers' extensive R&D activities.

Over a period of more than 40 years, the U.S. Army Corps of Engineers has developed hydraulic modeling to a demanding precision science that produces results of tremendous value in the Corps' Civil Works Program — involving sound engineering of dams, flood control levees, rivers and harbors construction projects, soil-erosion control, etc. — and also has important applications to many military needs.

The technique of hydraulic modeling is used at a number of Corps of Engineers installations, but the principal agency for engineering research and experiment in hydraulics and hydrodynamics is the U.S. Army Waterways Experiment Station at Vicksburg, Miss., where the Corps maintains the largest hydraulics laboratory in the world.

The small-scale hydraulic model has a rational mathematical basis in the laws of similitude, derived from Newton's Second Law of Motion of the familiar form: $F=MA$. These laws of similitude establish the scales of time and motion for the geometric scale selected for the model.

Proved methods are used for aspects of the model system which cannot be scaled directly. For example, scales sufficiently small to bring streams down to reasonable widths in the laboratory are too small to give usable depths. In its middle reaches, the Delaware River is a mile wide and 40 feet deep. A model of the river at a scale of 1:1000 would be 5 feet wide and ½ inches deep — much too thin a sheet of water to represent a hydraulic system.

The technique used here is to select a larger vertical scale, say 1:100, given a laboratory stream to distorted scale but of usable depth. Sand in nature becomes dust when scaled down, but dust will not model a sand bar. The answer lies in selecting a granular material that is lighter than sand, such as coal or plastics. Finally, before testing, all aspects of models of natural systems are carefully compared to their prototypes by means of extensive field measurements.

Hydraulics problems in waterways and harbors embrace some four specialized fields: (a) development of regulative measures for inland waterways for flood control, navigation and other purposes; (b) investigation of hydraulic, shoaling, salinity, pollution and other problems in estuaries; (c) study of wave-action problems and remedial measures in harbors; and (d) investigation of the performance of hydraulic structures to determine the adequacy of designs and develop required



MISSISSIPPI BASIN MODEL (showing Missouri River downstream from Sioux City, Iowa) is constructed to a scale of 1:100 vertical and 1:2000 horizontal. This section of the model assisted in the flood fight of the Missouri River in 1952 by predicting where the levees would be overtopped and where they would prove adequate. The model is electrically operated from control houses shown in rear.

improvements.

Modeling procedures are varied to meet the particular requirements in each specialized field.

Inland Waterways Problems. Inland waterways model investigations are used for the resolution of several types of hydraulic and sedimentation problems encountered in the regulation of inland rivers for navigation, flood control and other purposes.

Examples of the types of problems investigated in such models are:

- Determination of optimum locations of river lock-and-dam structures, the best arrangements and designs of appurtenant elements of such structures, and necessary adjacent riverbank realignments to eliminate navigation hazards in the lock approaches and ensure good navigability of the structures.

- Development of effective economic designs of high-velocity and other channels to safely carry floodflows through congested urban areas.

- Determination of the effectiveness of a wide variety of flood-control measures in the channels and backwater areas of the Mississippi River and its tributaries.

- Devising and testing plans for the development or improvement of rivers for navigation, utilizing various types of open-river regulation works such as dike systems, channel realignments, cutoffs, dredging, bank revetments, etc.

- Many similar or related problems.

Problems concerned with flood-control plans involving great lengths of streams and vast backwater areas are studied in fixed-bed (concrete) models with high-scale distortion (vertical scale considerably larger than horizontal scale). Such models are concerned primarily with flood heights and total

discharges rather than velocity distributions in stream cross sections. Models of this type are used extensively in connection with the planning of flood-control measures on the Mississippi River and its major tributaries.

Movable-bed models requiring a low degree of scale distortion are used extensively for developing and testing river-regulation plans for improving navigation channels in rivers with erodible beds. Such models are usually concerned with plans for increasing or maintaining navigable channel depths by means of spur dikes, training walls, or other structures, and for minimizing costs of channel maintenance dredging.

Models in this general category also are used to study the fundamentals of regulation of alluvial rivers, involving principles of channel meandering, bank-revetment practices, channel stabilization and related factors.

Navigation model studies are used extensively to ensure good navigability of lock-and-dam structures on inland rivers. An interesting and practical feature of the lock-and-dam model studies is the use of self-propelled, radio-controlled, model towboats with tows for testing the navigability of the locks and approaches.

Representatives of the major navigation interests concerned visit these models, "navigate" the locks, and are invited to suggest and try out any desired design modifications in order to satisfy themselves of the adequacy of the planned layouts and designs.

Models of this type normally are constructed without any linear scale distortion, to assure a high degree of similitude with their prototypes. Studies usually are concerned with the composition and positioning of the lock-and-dam compon-

ents, dimensions and locations of approach walls and navigable passes, navigation hazards in the approaches, methods of correcting adverse currents and velocities, effects of various gate operations, effects of lock filing and emptying, powerhouse releases and surges, arrangements of submergible gates for passage of ice and debris, development of stage duration curves, effects of structures on flood heights, and effects of cofferdam stages on navigation during the construction phase.

Problems in Tidal Estuaries. Estuary models are used to investigate many types of problems in tidal rivers, canals, harbors and coastal areas. Problems most frequently encountered are:

- Reduction of maintenance dredging cost in navigation channels and docking areas by reducing shoaling or by improving dredging methods and techniques.

- Developing new harbor areas, or increasing the dimensions of the channels of existing harbors.

- Protection and maintenance of offshore entrance channels.

- Control of salt water intrusion; determination of the diffusion and flushing patterns of industrial and sanitary wastes and other types of water pollutants; and protection of coastal areas from hurricane surges.

Several types of models are used to predetermine the effectiveness of various proposed schemes for regulating and improving conditions in estuaries, and to devise such modifications as are necessary to their proper functioning before field construction is undertaken.

Often it is necessary to reproduce to scale in tidal models such interrelated hydraulic or sedimentation phenomena as

tides and tidal currents, wave action, littoral currents, movement and deposition of channel shoaling material, movement and deposition of beach sands, and intrusion and mixing of salt water.

The tides of nature are reproduced in the models with close precision by means of an electromechanical device developed at the Experiment Station. Models used to study means of preventing shoaling in offshore and entrance tidal channels require reproduction of the effects of tides, waves and littoral currents upon the transportation and deposition of the ocean sands and silts.

Models used in these studies are constructed with movable beds, and are permitted only a low degree of scale distortion. This type of model has application in planning for the development or maintenance of offshore entrance channels by employment of jetties, groins or other means.

Model studies of plans for preventing shoaling of channels within tidal streams, or for reducing dredging costs by provision of sediment traps or similar schemes, are concerned with the combined actions of tidal currents, river currents, and density currents upon the transportation and deposition of silt in the navigation channels.

Studies are conducted in fixed-bed models with a medium degree of scale distortion. Models are provided with means of reproducing tidal action, river discharges, density effects, and movement and deposition of silt. These models are used in devising channel-maintenance plans, involving such measures as training walls, dikes, bulkheads, dredge-spoil areas, channel realignments, sediment traps, and many other specialized im-

provement schemes.

Wave-Action Problems. Wave-action model studies usually are concerned with either or both of two types of problems: design of the overall layout of a harbor to determine the best locations and dimensions of wave-control structures to provide the required protection within the harbor and its approaches; and structural design of the breakwaters, wave absorbers, and other structures to provide stability to withstand the forces imposed by wave action.

The first type involves such problems as determination of proper types and alignments of breakwaters; locations of required piers, spending beaches, and wave absorbers within the harbor; locations, shapes and widths of navigation openings; and effects of proposed dredge cuts and fills on wave action.

Structure-stability models are used to develop design curves showing wave pressures created on vertical and inclined impervious breakwaters; stability of cribs and caissons; and the required size and density of stone, degree of slope, crown elevation, and cross-sectional shape of rubble-mound breakwaters.

Harbor wave-action models usually are permitted no linear-scale distortion. However, some distortion is permissible in cases where the waves in nature are either deep-water waves or waves of translation.

In general, problems involving short-period wind waves can seldom be studied accurately by use of distorted-scale models. In the case of long-period waves, scale distortion, if not too severe, will not affect the accuracy of model results.

No scale distortion is allowable in breakwater-stability models, because it is necessary to reproduce the dynamic characteristics of the waves as well as the resisting forces of the breakwater materials.

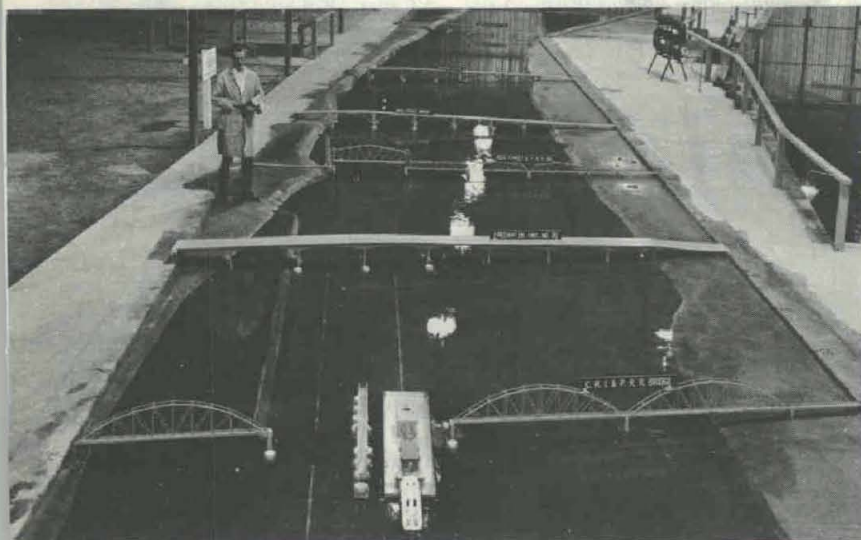
Harbor wave-action models usually are constructed of concrete, and linear scales vary from about 1:75 to 1:150 (model:prototype), depending primarily on depths of water and dimensions of waves seaward of the harbor. Breakwater-stability models are constructed in wave flumes, using scales varying from about 1:25 to 1:60.

Several wave-action studies at the Waterways Experiment Station have been concerned with problems connected with military operations. A model study of the Naval Operating Base at Terminal Island, Calif., considered the problem of alignment of a breakwater needed during World War II to protect Navy vessels, docked for repairs, from wave and surge action.

Similarly, a model study was used in the development and design of portable triangular and cellular caisson breakwaters to be used to protect landing craft from wave action during the initial phases of the invasion of France.

Other studies have been concerned with

(Continued on page 20)



BARGES ARE TOWED upstream through swinging span of Rock Island Railroad Bridge on hydraulic model of three miles of the Arkansas River at Little Rock. The model is scaled at 1:100. Purpose of the investigations at the Waterways Experiment Station is to develop a navigation channel through the area where six bridges cross the river, and where velocities are high during super discharges. The tow and barges, also built to scale, are used to test navigation conditions.

Engineers Develop Hydraulic Modeling as Science

(Continued from page 19)

the design of various wartime harbors for military operations, a recent one being of a harbor in Vietnam.

Problems with Hydraulic Structures. Model studies are widely used to investigate the hydraulic performance of such structures as dams, spillways, stilling basins, outlet works, sluices, control gates, high-pressure valves, gates, locks, pumping plants, sewer systems, surge tanks, dry docks and many others, to arrive at designs which will provide optimum performance at minimum cost.

Most of these studies are concerned with specific structures or problems. Some investigations are made of typical structures or systems to evolve principles for general application.

Models of structures generally are permitted no linear-scale distortion, owing to the facts that free fall of water is usually involved and that true geometric shapes of the structures must be maintained in order that resulting flow distributions and other hydraulic phenomena will have direct application to the full-scale structures.

Since the smoothness of the model surfaces significantly affects hydraulic performance, and since smoothness must increase as the model linear scale decreases, the absolute smoothness to which a model surface can be finished frequently fixes the lower limit of the linear scale. In the case of conduit flow, a reduction in the conduit length, from that called for by geometric scaling, is frequently made to insure accurate reproduction of the hydraulic grade line in critical areas.

In the interest of economy, two or more models of different scales often are used to check the hydraulic performance of a large dam and its appurtenant structures. Large-scale models of limited critical portions of such a structure are required for determining local effects of design details. Overall performance of the structure can be evaluated with a model of much smaller scale.

Engineers engaged in hydraulic engineering investigations frequently are consulted by government agencies and indus-

try on problems involving navigation and flood control in inland waterways and estuaries, alleviation of pollution in waterways, protection of harbors from wave action, and design and performance of hydraulic structures.

RAC Briefing Draws DoD, Army Dignitaries

Assistant Secretary of the Army (R&D) Dr. Russell D. O'Neal headed some 30 high military and civilian officials attending their semiannual progress briefing by the Research Analysis Corp., McLean, Va.

Dr. Philip H. Lowry, head of the RAC Combat Analysis Department, and Lawrence J. Dondero, Military Gaming Department head, gave presentations on nine major subjects in the RAC work program for Army research. Another briefing is scheduled Sept. 26 for staff officers of the R&D offices and agencies.

RAC is a nonprofit organization under contract with the Department of the Army for operations research. It was established in 1961.

Others attending the briefing included:

Lt Gen Austin W. Betts, Chief of Research and Development; Lt Gen William B. Bunker, deputy CG, Army Materiel Command (AMC); Lt Gen F. J. Chesarek, Assistant Vice Chief of Staff; Lt Gen Arthur S. Collins Jr., Assistant Chief of Staff for Force Development; Lt Gen Harry W. O. Kinnard, CG, Army Combat Developments Command; and

Dr. K. C. Emerson, Assistant for Research, Office of ASA (R&D); Dr. Wilbur B. Payne, chief, Office of Operations Research, Office of the Under Secretary of the Army; Dr. Jay Tol Thomas, Deputy for Research and Laboratories, AMC; Leonard W. Hoelscher, Deputy Comptroller of the Army; Maj Gen William P. Yarborough, Assistant Chief of Staff for Intelligence; and

Dr. J. C. Honig, special assistant, Office of Director of Studies, Office of the Assistant Vice Chief of Staff; Col Charles D. Y. Ostrom Jr., Director of Army Research; Dr. Richard A. Weiss,

Hydraulic modeling, as used by the Corps of Engineers, U.S. Army, has a definite bearing in determining that the design of a structure or an improvement plan in a river or harbor is engineered soundly prior to actual construction and expenditure of public funds.

Deputy and Scientific Director of Army Research; Richard J. Trainor, Acting Director, Weapons Systems Analysis, Office of the Assistant Vice Chief of Staff; and

Slavko N. Bjelajac, Office of the Deputy Chief of Staff for Military Operations (ODCSOPS); Col Ernest D. Bryson, Personnel Research Division, Office of the Deputy Chief of Staff for Personnel; Col W. Evans-Smith, Assistant Director of International and Civil Affairs, ODCSOPS; Col Edward L. Ramsey, Deputy Director for Plans, ODCSOPS; and

Col R. W. Strunk, Chief, Logistics Personnel Training Group, Office of the Deputy Chief of Staff for Logistics; Col Bates C. Burnell, Acting Director of Special Studies, Office of the Assistant Vice Chief of Staff; Col Henry C. Schrader, Force Planning Analysis Directorate, Office of the Chief of Staff; and

Col Charles E. Preble Jr., Senior Military Adviser, U.S. Army Research and Development Operations Research Advisory Group (USARDOGRAG), Office of the Chief of Research and Development (OCRD); Lt Col Russell D. McGovern, chief, Studies and Analysis Division, OCRD; Lt Col Joe G. Mears, Systems and Analysis Division, OCRD; Lt Col Harold Keesbaugh, U.S. Army Combat Developments Command; and

Lt Col William S. Vargovick, Studies and Analyses Division, OCRD; Lt Col Nathan C. Sibley, Studies and Analyses Division, OCRD; Maj W. E. Davis, Studies and Analyses Division, OCRD; Maj Paul P. Winkel Jr., Executive Officer, USARDOGRAG, OCRD; Maj John H. Barbazette, AMC; and Capt Bernard J. Hamilton, AMC.

USAEPG Technical Director Accepts AEC Position

Chief Scientist Dr. Lawrence E. Killian, who doubles as technical director of the U.S. Army Electronic Proving Ground (USAEPG), Fort Huachuca, Ariz., has resigned to accept a new position.

Dr. Killian has served at the USAEPG since May 1965 and was detailed in his present position until formally appointed in September 1966. His new job is with

the U.S. Atomic Energy Commission (AEC) in Washington, D.C., as deputy assistant controller for Information Systems.

Graduated from Baylor University with a BS degree in physics and mathematics, Dr. Killian earned his master's from Indiana University in 1948 and PhD degree from Washington University, St. Louis, Mo., in the same field in 1955.

His Civil Service career began in 1958 with the U.S. Defense Atomic Support Agency, Washington, D.C. In 1959, he started a 6-year tenure as chief of the Quality Assurance Agency, AEC, Albuquerque, N. Mex., until he transferred to Fort Huachuca.



Following graduation from Texas A&M College with a BS degree in civil engineering in 1932, Eugene P. Fortson Jr., began his career at the Waterways Experiment Station, Vicksburg, Miss. He was chief of the Hydraulics Division from 1945 to 1950 and again from 1952 to the present time. He served with the U.S. Army Corps of Engineers in the Middle East during World War II (1940-45) and in Korea (1950-52). He is a member of numerous professional societies.

Library Lists Latest R&D-Oriented Volumes

Recent acquisitions in the Army Library at the Pentagon, Washington, D.C., include the following publications of interest to the R&D community.

Aircraft Detection, Range Estimation and Auditory Tracking Tests in a Desert Environment, Edward W. Frederickson (HumRRO), U 15 .C34a 68-3.

Air Force Scientific Research Bibliography, vol. 4, U.S. Library of Congress, Z 7401 .U582 v. 4.

Amount of Assignment Information and Expected Performance of Military Personnel, Richard C. Sorenson (BESRL), UB 173 .A25 v. 1152.

Analysis of Interpreter-Computer Reporting Techniques, An, Robert T. Root (BESRL), U 408.3 .U582 v. 170.

Annotated Bibliography of CRESS Publications, American University Center for Research in Social Systems, Z 6724 G7 A513

Armed Forces of African States, The, David Wood, JX 1974 .L84 no. 27.

Art of Counter-Revolutionary War: The Strategy of Counter-Insurgency, John J. McCuen, U 240 .M13.

Aviation Subject Headings and Classification Guide, Virginia W. Earnshaw, Z 695.1 .A2 E12.

Communication and Change in the Developing Countries, Daniel Lerner and Wilbur Schramm (eds.) HM 101 .L61.

Comparing Nations: The Use of Quantitative Data in Cross-National Research, Richard Merritt (ed.), H 62 .M57.

Computational Linguistics: Bibliography, 1966, David G. Hayes (Rand), Q 180 .A1 R18 no. 5345.

Decision Making with Updated Graphic vs Alpha-Numeric Information, Frank

L. Vicino and Seymour Ringel (BESRL), U 408.3 .U582 v. 178.

Development and Evaluation of a Catalog Technique for Measuring Image Quality, Robert W. Brainard (BESRL), UB 173 .A25 v. 1150

Digital Computer Simulation: The Allocation of Computer Time in Comparing Simulation Experiments, George S. Fishman (Rand), Q 180 .A1 R18 no. 5288.

Directions in Research, Battelle Memorial Institute, Q 183 .B33.

Jungle Vision III: Seasonal Variations in Personnel Detectability in a Semideciduous Tropical Forest, D. A. Dobbins (U.S. Army Tropic Test Center), U 167.5 J8 D63 v. 7.

Language and Machines: Computers in Translation and Linguistics, National Research Council, P 308 .N271.

Libraries and the Organization of Knowledge, Jesse H. Shera, Z 665 .S55.

Manpower Planning: Operational Research and Personnel Research, W. N. Jessop (ed) UA 17.5 .A2 J58.

Manpower Rotation Policy Models, Richard C. Sorenson and Pauline T. Olson, (BESRL), U 408.3 .U582 v. 172.

Mathematical Analysis and Digital Simulation of the Respiratory Control System, Fred S. Grodine (Rand), Q 180 .A1 R18 no. 5244.

1967 Government Contracts Guide, Commerce Clearing House, KC 85 .C73 G699 1967.

Operations Report: Lessons Learned, 3-67, Engineer Notes 2, Dept. of the Army, Office of the Adjutant General, U 163 .06 3-67.

Patents, Research and Management: A Guide for Inventors and Executives, How-

ard I. Forman (ed), KC 220 .F72 P19 1961

Perspectives in Defense Management, U.S. Industrial College of the Armed Forces, UA 23 .A292 1967 May.

Planet: Planned Logistics Analysis and Evaluation Technique, B. J. Voosen (Rand), Q 180 .A1 R18 no. 4950. *Relative Effectiveness of Different Viewing Devices for Photo Interpretation*, Boyd L. Mathers (BESRL), U 408.3 .U582 v. 179.

Simple Scheme for Formalizing Data Retrieval Requests, Fred M. Tonge, (Rand), Q 180 .A1 R18 no. 5150.

Small-Scale Power Generation: A Study for Pioneer Electrification Work, United Nations, Dept. of Economic and Social Affairs, TK 1005 .U58.

Sources of Information on Atomic Energy, L. J. Anthony, Z 5160 .A62.

Soviet Party-Military Relations: Contained Conflict, Roman Kolkowicz (Rand), Q 180 .A1 R16 no. 3371.

Space Research: Directions for the Future: Report of a Study by the Space Sciences Board, National Academy of Sciences — National Research Council, Q8 500 .S73.

Techniques for Low Altitude Navigation: Direction Estimation from Tactical Maps, T. Harrison Gray (HumRRO), U 15 G34a 67-4.

SCIENTIFIC CALENDAR

2d Ground Identification of Satellites Symposium, sponsored by ARPA, Bedford, Mass., Oct. 2-4.
IEEE-IGA Group Annual Meeting, Pittsburgh, Pa., Oct. 2-5.

32d Physicists Conference, Berlin, Germany, Oct. 2-7.
Allerton Conference on Circuit and System Theory, sponsored by IEEE, Monticello, Ill., Oct. 4-6.

Joint Engineering Management Conference, sponsored by IEEE, Vancouver, B.C., Canada, Oct. 9-10.
Systems Science and Cybernetics Conference, sponsored by IEEE, Cleveland, Ohio, Oct. 9-11.

4th Congress on Material Testing, Budapest, Hungary, Oct. 11-14.

11th Annual Organic Chemistry Conference, sponsored by NLBS and NAS-NRC, Natick, Mass., Oct. 12-13.
Meeting of the Electrochemical Society, Chicago, Ill., Oct. 15-20.

Biomedical Problems of Living and Performing at High Terrestrial Altitudes, sponsored by USARIEM, Natick, Mass., Oct. 16-17.

Aerospace and Electronics Systems Convention, sponsored by IEEE, Washington, D.C., Oct. 16-18.

URSI-IEEE Fall Meeting, Ann Arbor, Mich., Oct. 16-18.
2d Materials Research Symposium, Molecular Dynamics and Structure of Solids, sponsored by NBS, Gaithersburg, Md., Oct. 16-19.

International Antenna and Propagation Symposium, sponsored by IEEE and Group on Antennas and Propagation, Ann Arbor, Mich., Oct. 18-20.

International Electron Devices Meeting, sponsored by IEEE, Washington, D.C., Oct. 18-20.

Symposium on Switching and Automatic Theory, sponsored by IEEE and University of Texas, Austin, Tex., Oct. 18-20.

National Electronics Conference, sponsored by IEEE, Chicago, Ill., Oct. 23-25.

17th Canadian Chemical Engineering Conference, sponsored by the Chemical Institute of Canada, Niagara Falls, Ontario, Canada, Oct. 23-25.

Fall Military-Industry Conference of the R&D Associates, Inc., Natick, Mass., Oct. 24-25.

Symposium on Shock and Vibration Technology, sponsored by NRL, Orlando, Fla., Oct. 24-26.

20th Military Operations Research Symposium, sponsored by ONR, Washington, D.C., Oct. 24-26.

Army Human Factors Research and Development Conference, sponsored by ARO, OCRD, Fort Monmouth, N.J., Oct. 25-27.

Interscience Conference on Antimicrobial Agents and Chemotherapy, Chicago, Ill., Oct. 25-27.

Symposium on Unconventional Photographic Systems, sponsored by the Society of Photographic Scientists and Engineers, Washington, D.C., Oct. 26-28.

37th Annual International Meeting of the Society of Exploration Geophysicists, Oklahoma City, Okla., Oct. 29-Nov. 2.

'Father' of Student Science Fairs Dies of Heart Attack

Internationally recognized father of student science fairs Joseph H. Kraus, 69, stricken by a heart attack in Washington, D.C., died Aug. 2 in a hospital in his hometown, Flushing, N.Y.

Since Kraus encouraged Science Service of Washington to sponsor science fairs in 1941, the program has grown to more than a million students participating in state and regional fairs held throughout the world. More than 420 finalists selected this year displayed projects at the 18th International Science Fair in San Francisco in May.

Science Service is a nonprofit organization which has the cooperation of most of the nation's scientific and technical societies, educational institutions, industry, the U.S. Department of Defense and the Army, Navy and Air Force and other government agencies in sponsoring the International Science Fair.

A native New Yorker, Kraus chose scientific journalism over the career in medicine he originally planned. He was editor of *Science and Invention*, *Science and Mechanics*, *Mechanics and Handicraft*, *Practical Microscopy*, *Foto-Craft* and *Science Observer*.

Kraus served on the task force of the President's Committee on Scientists and Engineers, 1957-59, and is listed in *American Men of Science*. He commuted regularly between Washington and New York conducting adult education classes at New York University. He was a member of the Association of Science Writers and the Science Teachers Association.



Joseph H. Kraus



Col Earl K. Buchan



Col Joe B. Lamb



Col George R. O'Neal



Lt Col R. D. McGovern

27 New OCRD Personnel Include 5 Division Chiefs

Twenty-seven new personnel have been assigned recently to the Office of the Chief of Research and Development, Department of the Army, including chiefs of the Air Mobility, Combat Materiel, Communications-Electronics, Studies and Analyses, and Resources and Requirements Divisions.

COL EARL K. BUCHAN became chief of the Air Mobility Division after completing studies at the Navy War College (NWC). He was G-3, 1st Air Cavalry Division, Vietnam (1965-66), following a year as commander of the 229th Assault Helicopter Battalion, Fort Benning, Ga.

Col Buchan served in Germany as commander of the 2/34 Mechanized Infantry Battalion (1963-64), and commandant, Seventh Army Aviation Training Center (1962-63). Stationed at Fort Campbell, Ky. (1959-62), he served successively as commanding officer of the 101st Aviation Company and Provisional Battalion and of the Fort Campbell Army Airfield.

He has a bachelor's degree in general education for the University of Omaha, an MS degree in international affairs from George Washington University, and has graduated from the Command and General Staff College (CGSC) and the Armed Forces Staff College.

COL JOE B. LAMB is chief of the Combat Materiel Division and until recently was commanding officer of the 4th Training Brigade, Fort Jackson, S.C. He was senior adviser to a Vietnamese airborne brigade (1963-64), and served on the staff of the CGSC (1959-62).

Col Lamb has an MS degree in business

administration from the George Washington University, has completed the management program for executives at the University of Pittsburgh, and has attended the CGSC and the Industrial College of the Armed Forces (ICAF).

COL GEORGE R. O'NEAL, chief of the Communications-Electronics Division, succeeded Lt Col Harry A. Buzzert, who is now with the Nike-X System Office.

Col O'Neal was deputy signal officer, U.S. Army Vietnam (1966-67) and in 1965-66 was project manager, European Troop-Army with the U.S. Army Strategic Communications Command (STRATCOM), Washington, D.C.

He was commanding officer of the 11th Signal Group, STRATCOM (1963-65), and transportation officer J-4 with the Commander-in-Chief, Pacific (1960-63).

A 1942 graduate of the U.S. Military Academy (USMA), Col O'Neal has an MS degree in electrical engineering from the University of Illinois and has attended the CGSC and the ICAF.

LT COL RUSSELL D. MCGOVERN, chief of the Studies and Analyses Division, U.S. Army Research Office (USARO), was executive to the Director of Army Research (1963-64), following two years in the former Human Factors and Operations Research Division, USARO.

He was battalion commander, 1st Cavalry, 2nd Division, Korea (1964-65) and was then assigned to the USMA (1965-66) where he organized and directed the Office of Research.

Lt Col McGovern has a BS degree from the USMA, and an MS degree in

psychology from the University of Miami. He graduated this year from the National War College and has attended the CGSC.

LT COL DAVID H. THOMAS, chief of the Resources and Requirements Division, Nike-X System Office, was last assigned as commanding officer, 5th Training (Missile) Battalion, U.S. Army Training Center, Field Artillery, Fort Sill, Okla., 1966-67. He was assistant senior standardization representative to Canada, 1963-66, and staff officer to the deputy chief of staff for programs, HQ North American Air Defense Command, Ent Air Force Base, Colo., 1954-63. He has also served in Vietnam.

Graduated from the USMA in 1945, he received an MS degree in electrical engineering from the Georgia Institute of Technology in 1954. He has completed the associate course at the CGSC.

LT COL KENNETH G. HERRING was assigned as OCRD assistant executive for Administration after receiving an MS degree in industrial management from the University of Tennessee in June.

Formerly aide to the commanding general, Fourth Army, Fort Sam Houston, Tex., he has served as executive of the 1st Battalion, 11th Infantry, 5th Division, Fort Carson, Colo.; company commanding officer, U.S. Army Arctic Test Center, Fort Churchill, Canada; and company commanding officer, 501st Airborne Battle Group, 82nd Division, Fort Bragg, N.C.

Lt Col Herring earned a BS degree in engineering from the USMA and has attended the CGSC.

LT COL JERRY A. BERRIER graduated recently from the CGSC and is



Lt Col D. H. Thomas



Lt Col K. G. Herring



Lt Col J. A. Berrier



Lt Col J. F. Bleecker



Lt. Col E. J. Denz

assigned to the Nuclear Branch of the Nuclear, Chemical and Biological Division, OCRD. He served tours in Germany as chief, Special Weapons Branch, HQ Advanced Weapons Support Command (1965-66) and as commanding officer, U.S. Army Special Depot, Siegelbach (1963-65).

He was Pershing project officer at White Sands (N. Mex) Missile Range (1962-63), following duty as director of the Warheads and Special Weapons Laboratory, also at White Sands.

Lt Col Berrier has a BS degree in nuclear engineering from North Carolina State University (1952) and an MS degree in engineering science from Purdue University (1956).

LT COL JAMES F. BLEECKER is assigned to the High Altitudes Systems Branch, Missiles and Space Directorate. He recently received an MS degree in mechanical engineering after two years study at the University of Southern California.

He attended the CGSC (1964-65), following a year in Vietnam as a J-1 staff officer with the Military Advisory Command. He taught military science at the Virginia Military Institute (1960-63), upon completion of the Advanced Artillery Course.

LT COL ERNEST J. DENZ recently completed a year of study at the U.S. Army War College and is assigned as chief, Mid-Range Plans Branch, Plans Division.

From 1964-66, he was project manager and assistant chief of the Nuclear Power Division, Office of the Chief of Engineers, following duty as battalion commander, 554th and 62nd Engineer Construction Battalions, Fort Leonard Wood, Mo.

He received an MS degree in civil engineering from the Massachusetts Institute of Technology in 1952 and has attended the CGSC.

LT COL JESSE B. DOSS, new chief of the Range Branch, Nike-X and Space Division, graduated from the CGSC in June.

He served as project officer, Weapons Test Division, Defense Atomic Support Agency (1964-66) and as manager of Technical Projects and the Engineering and construction officer on Project Long Shot from September 1964 to November 1965.



Lt Col J. B. Doss



Lt Col G. H. Gardes



Lt Col W. J. Harrison

In Germany, he served from 1962 to 1964 as advanced weapons officer, G-3, HQ 3rd Infantry Division, Wurtburg; S-3, HQ 1st Rocket Howitzer Battalion, 9th Artillery; and assistant S-3, HQ 3rd Infantry Division Artillery, Kitzingen. He was assigned to the Missile Division, U.S. Army Artillery Board, and stationed in Fort Bliss, Tex., from 1959 to 1961 as project officer for the Honest John missile system.

Lt Col Doss earned a BS degree in geological engineering from the University of Oklahoma and an MS degree in aeronautical engineering from the University of Michigan.

LT COL GEORGE H. GARDES is a staff officer in the Test and Evaluation Branch, Management and Evaluation Division. In Vietnam for the past year, he served successively as a logistics staff officer, Plans Division, J-4 Section at HQ MACV, inspector general at HQ 1st Infantry Division, and commander of Task Force Dixie North.

In Europe, he was executive officer of the 1st Battalion, 4th Infantry Division (1965-66) and logistics staff officer, Plans Division, G-4 section, HQ Seventh Army (1964-65).

Graduated from the USMA in 1951, he earned a master's degree in nuclear engineering from the University of Virginia in 1960. He completed the CGSC course in 1964.

LT COL WILLIAM J. HARRISON is a staff officer in the Communications Branch of the Communications-Electronics Division and recently completed three years of advanced education.

He attended the Command and Staff Course at the Naval War College (1964-

65) and received an MS degree in international affairs from George Washington University in 1965. This year he received an MS degree in electrical engineering from the Georgia Institute of Technology. He earned a BS degree from the USMA in 1952.

In 1963-64, he served as executive officer, G-1, with HQ U.S. Army Pacific, following a tour of duty as assistant executive to the Chief of Staff, Commander-in-Chief Pacific (1961-63).

LT COL LOUIS W. HASKELL JR. is assigned to the Long Range Plans Branch, Plans Division, following a year in Vietnam as an artillery battalion commander and group executive officer.

Recent assignments have included staff officer, Directorate of Communications and Electronics, NORAD, Colorado Springs, Colo., and project officer, Sergeant missile, Department of Materiel, U.S. Army Artillery and Missile School, Fort Sill, Okla.

He is a 1948 graduate of the USMA and has completed the CGSC course.

LT COL CHARLES G. OLENTINE was commanding officer of the 8th Engineer Battalion, 1st Air Cavalry Division in Vietnam this past year and is assigned to the Nike-X System Office.

Previous assignments have included: staff of officer, Office of the Chief of Engineers (1964-66); staff officer, Central Army Group, Germany (1962-64); and S-3, 10th Engineering Battalion, 3d Infantry Division, Germany (1961-62).

A 1949 graduate of the USMA, he received an MS degree in civil engineering from the Massachusetts Institute of Technology in 1955, completed the Ad-

(Continued on page 24)



Lt Col L. W. Haskell Jr.



Lt Col C. G. Olentine



Lt Col J. T. Tambe



Lt Col Vito Stipo



Maj P. C. Bunevitch



Maj W. E. Davis



Maj J. E. King



Maj G. B. Lowery



Maj J. H. Richards Jr.



Maj E. E. Roderick

27 New OCRD Personnel Include 5 Division Chiefs

(Continued from page 13)

vanced Engineer Officer Course in 1956, and was graduated from the CGSC in 1961.

LT COL VITO D. STIPO graduated from the CGSC in June and has been assigned to the Programs Branch, Programs and Budget Division.

He was chief of the Construction, Repairs and Utilities Branch of the Engineering Division, U.S. Army Southern Europe Task Group (USASETAG), Verona, Italy (1964-66), following a year as chief of the Plans and Operations Branch, USASETAG.

Stationed at Fort Belvoir, Va., in 1961-63, he was an engineer officer with the 79th Engineer Construction Group until he became the commander of the 73rd Engineer Company in 1962. He has also been resident engineer and assistant area engineer, U.S. Army Engineer District, Greenland.

Lt Col Stipo received a BS degree in civil engineering from Pennsylvania Military College in 1952 and an MS degree in civil engineering from Iowa State University in 1957.

LT COL JOSEPH T. TAMBE, staff officer in the Human Factors Branch, Behavioral Sciences Division, USARO, returned recently from Vietnam. There he held successive assignments as chief, Plans Branch, Plans Division; assistant chief of staff, Security Plans and Operations, HQ 1st Logistics Command; and commanding officer, 266th Supply and Service Battalion.

He served in 1965-66 as S-1, Seventh Army Special Troops, U.S. Army Europe (USAREUR); as executive officer, 3rd

Supply and Transport Battalion, 3rd Infantry Division, USAREUR; and as a psychologist with the U.S. Army Natick (Mass.) Laboratories (1961-64).

He received AB and MA degrees in psychology from Ohio State University.

MAJ PETER C. BUNEVICH was assigned to the Studies and Analyses Division, USARO, following a year's graduate study of defense policy and economics at the Institute for Defense Analysis and the University of Maryland.

Graduated from the USMA in 1954, Maj Bunevich served as S-3 with the 39th Signal Battalion, in Boeblingen, Germany (1956-57), and returned to Germany with the Radio Section, Engineering Agency, U.S. Army STRATCOM-E, Heidelberg (1964-66).

Other assignments include radio officer, Signal Section, XVIII Airborne Corps, Fort Bragg, N.C. (1963-64); Eighth U.S. Army Signal Long Lines Battalion, Korea (1961-62); and a signal officer at the McGregor Guided Missile Range, El Paso, Tex. (1959-61).

MAJ WILLYS E. DAVIS was assigned to the Studies and Analyses Division, USARO, following his graduation from the CGSC. He was S-3, 1st Battalion, 5th Cavalry, 1st Air Cavalry Division, Vietnam (1965-66) and commander of Company A, 2nd Aviation Battalion, 2nd Infantry Division, Fort Benning (1963-65).

Maj Davis received a BS degree in business administration from North Georgia College in 1953.

MAJ JACK E. KING was assigned as a staff officer, Test and Evaluation Branch,

Management and Evaluation Division, shortly after receiving an MA degree in business administration from Tulane University.

Prior to two years of study at Tulane, he served as chief, Hawk, Mauler Multi-Systems Test Equipment Branch, Training Research Division, Redstone Arsenal, Ala. He has served as executive officer, Hawk Firing Battery, 7th Battalion, 2nd Artillery, at Fort Bliss, Tex., and in Korea; and commander, 159th Ordnance Detachment, Direct Support Hawk, Redstone Arsenal, Ala., and Fort Bliss.

He has a BS degree in mechanical engineering from Purdue University (1958) and has completed several advanced guided missiles and nuclear weapons courses in military schools.

MAJ GEORGE B. LOWERY was chief of the South Vietnam Imagery Interpretation Section, Combined Intelligence Center, Vietnam, until assigned to the Behavioral Sciences Research Laboratories as an intelligence systems research analyst.

In 1965 he was chief of the Current Intelligence Indications Center, XVIII Airborne Corps, following duty as assistant J-2 operations officer the the U.S. Forces, Dominican Republic.

Assignments in recent years include chief, Imagery Interpretation Section, 218th Military Intelligence Detachment, Fort Bragg, N.C.; assistant operations officer, U.S. Army Transportation Terminal Command, Arctic; and port operations officer, Greenland.

He holds a BBA degree in economics from the University of Georgia (1954), was an assistant professor of military science at John Carroll University (1959-61), and has completed several advanced



Maj H. F. Stone



Maj B. L. Walker



Capt R. Von Freymann



Frederick S. Jones



Michael N. Zabych

courses at military schools.

MAJ JOHN H. RICHARDS JR., assigned to the Management and Evaluation Division, recently completed the CGSC.

In June 1966, he returned from Vietnam where he served with the III Corps Advort Group as adviser to the 25th ARVN Infantry Division.

Maj Richards has been an instructor at the U.S. Army Ordnance Center and School, Aberdeen (Md.) Proving Ground, and assistant S-3 and battery commander with the 2nd Howitzer Battalion, 12th Artillery, U.S. Army Europe.

He holds a BS degree in petroleum geology from Mississippi State Univ.

MAJ EDWARD E. RODERICK's assignment as staff officer in the Electronics Branch, Communications-Electronics Division, followed soon after his graduation from the CGSC. In 1965-66, he was in Vietnam as deputy G-5 adviser, I Corps Advisory Group, and deputy sector adviser, MACV.

Assignment as S-3, 1st Battalion, 81st Armor, 1st Armored Division, Fort Hood, Tex., followed a 3-year assignment as assistant professor in the Department of Electricity at the USMA. He was graduated from the USMA in 1954 and in 1961 received an MS degree in communications and electronics from Purdue University.

MAJ BILLY L. WALKER, is assigned to the Nike-X System Office and recently completed the Ordnance Career Course at Aberdeen Proving Ground.

In 1965, he received an MS degree in engineering from Purdue University and he has a BS degree in chemical engineering from New Mexico State University.

Assignments have included budget officer, Ordnance Advisory Division, J-4, Military Advisory Corps Vietnam; field artillery missile project officer at the U.S. Army Ordnance Guided Missile School; and platoon leader with the Redstone Missile Ordnance Company, Germany.

MAJ HOWARD F. STONE was assigned to the Air Movement Branch, Air Mobility Division, soon after he was graduated from the Armed Forces Staff College. He is a 1955 graduate of the U.S. Military Academy.

In 1965-66, he was S-3, 5th Special Forces Group in Vietnam, following a year as an infantry instructor at the U.S. Military Academy, from which he was graduated in 1955 with a BS Degree. He has completed the CGSC course, the Infantry Career Course, and the Ranger Airborne and Aviation Course.

CAPT RONALD VON FREYMAN, a 1964 graduate of the USMA, has been assigned as adjutant of the U.S. Army Behavioral Science Research Laboratory. He replaced Capt Dwight B. Carlile, who requested relief from active duty.

Capt von Freymann's last tour of duty was with the 2nd Battalion, 9th Artillery, 25th Infantry Division, Vietnam. He served successively as finance officer, assistant executive officer, executive offi-

cer, adjutant and assistant S-3.

FREDERICK S. JONES is a new contract specialist in the Contracts and Grants Branch, Research Programs Office, USARO. A member of the Fleet Marine Reserves after 20 years active duty, he has worked since 1958 as a civilian in the contract field in various military offices and private industry.

His most recent position was with the Washington Procurement Division of the Electronics Command. From 1963 to 1966, he was an industrial property officer with the Defense Contract Administration Services and the Air Force, following five years with Melpar, Inc., as an engineering assistant, Field Service Div.

In recent years he has completed numerous courses in government contracting procedures.

MICHAEL N. ZABYCH, a new value engineer in the Management Branch of

the Management and Evaluation Division, is assistant to the HQ Department of the Army specialist for the Army Value Engineering Program.

Since entering the Civil Service in 1962 he has held positions as depot operations industrial engineer, value engineering operations supervisor and civil engineer at the Defense Construction Supply Center, Columbus, Ohio, and value engineer with the HQ U.S. Army Materiel Command. Positions with private industry included plant engineer with the Western Electric Co. and test engineer with ACF Industries.

He received a BS degree in civil engineering from Pennsylvania State University in 1957, did graduate engineering work at Western Electric and took management training at Capitol University, Columbus, Ohio.

AUSA Slates Features of 13th Annual Meeting, Oct. 9-11

Climaxing the 13th Annual Meeting of the United States Army (AUSA), Oct. 9-11, in Washington, D.C., will be the presentation of the George Catlett Marshall Medal to Secretary of State Dean Rusk for outstanding public service.

Secretary of the Army Stanley R. Resor will open the 3-day conference with the keynote address Oct. 9 at 10:30 a.m. at the Sheraton-Park Hotel in Washington, D.C. About 6,000 members are expected to attend.

Army Chief of Staff General Harold K. Johnson is programed to address the Annual Luncheon Oct. 10, and General Frank S. Besson Jr., commanding general of the U.S. Army Materiel Command, will speak Oct. 11 at the Sustaining Members' Luncheon. Army Chief of Research and Development Lt Gen A.W. Betts will give a major address.

Program topics will include "R&D Support of the U.S. Army in Vietnam," "Automation and the Army," "The Army's Role in Latin America," "Military Communications," and "Mechanized and Armor Combat Operations in Vietnam."

Brig Gen Hughes Takes Command of WRGH

Command of Walter Reed General Hospital, Washington, D.C. was turned over Aug. 1 to Brig Gen Frederic J. Hughes by Maj Gen Philip W. Mallory, CG of Walter Reed Army Medical Center, who had served in both capacities since April 28, 1967.

General Hughes has been commander of the William Beaumont General Hospital, El Paso, Tex., since February 1966. From June 1961 to May 1962, he was chief medical consultant in the Directorate of Professional Service, Office of The Surgeon General and became director until assignment to the Texas hospital.

Other assignments include chief of the

Department of Medicine at Letterman General Hospital, San Francisco, Calif.; chief of the Cardio-vascular Disease Service and assistant chief, Department of Medicine, Tripler Army Hospital, Honolulu, Hawaii.

He earned a BA degree from Cornell University in 1935 and an MD degree from Cornell's Medical College in New York City in 1938. After internship and residency training at the New York Hospital, General Hughes was appointed a first lieutenant in the Army Reserve Medical Corps and went on active duty July 1, 1941. In June 1943 he was appointed to the Medical Corps, RA.

He is coauthor of several publications on the treatment of pulmonary tuberculosis and has been published in *Military Medicine* on "Hormonal Therapy of Cancer" and "Symposium: Postgraduate Educational Needs and Trends in the Federal Medical Services."

General Hughes is a Diplomate of the National Board of Medical Examiners, and a member of the American Medical Association, the American Heart Association, American Federation for Clinical Research and is a Fellow of the American College of Physicians. He is a member of the Association of Military Surgeons of the U.S. and received the AMS Founder's Medal.



Brig Gen Frederic J. Hughes

8 of 32 on 2-Star List Have Served in R&D



Brig Gen J. R. Deane Jr.



Brig Gen D. H. Cowles



Brig Gen H. F. Schiltz



Brig Gen W. A. Becker

Eight of the 32 Army general officers confirmed for temporary promotion to the grade of major general by the U.S. Senate Aug. 18 have a background in research and development. They are:

John R. Deane Jr., Donald H. Cowles, Howard F. Schiltz, William A. Becker, Paul A. Feyereisen, Charles T. Horner Jr., Roger M. Lilly and John C. Dalrymple.

The Senate also confirmed for permanent appointment to brigadier general in the Regular Army 28 officers of the Army of the United States (AUS) serving on active duty as major general or brigadier general. Included are five R&D officers: Maj Gens William C. Gribble Jr., George P. Seneff Jr. and John Norton, and Brig Gens Schiltz and Horner.

BRIG GEN JOHN R. DEANE JR. has been CG of the 173rd Airborne Brigade, U.S. Army Vietnam, since December 1966. From July 1962 to June 1965, he was military assistant, Office of the Deputy Director of Defense Research and Engineering (ODDR&E), and executive assistant to the Assistant Secretary of Defense (Deputy Director of Defense Research and Engineering).

Earlier assignments in Vietnam included assistant division commander, 1st Infantry Division, and chief of staff, HQ Field Force I. From 1955 to 1958, he was chief, Programs and Budget Division, Office of the Chief of Research and Development, Washington, D.C.

General Deane is a graduate of the United States Military Academy (USMA), and has an MBA degree from George Washington University. He has attended the Command and General Staff College, the Armed Forces Staff College, the National War College and the Harvard School of Business Administration.

His many decorations include the Silver Star, Bronze Star, Legion of Merit and Joint Service Commendation Medal.

BRIG GEN DONALD H. COWLES is Military Assistant to the Assistant Secretary of Defense (Public Affairs), Office of the Assistant Secretary of Defense. From

January 1954 to August 1957, he served as G3 in the Office of the Deputy Chief of Staff for Operations (General Staff, Research and Development, Doctrine and Combat Developments Division).

More recent assignments include: assistant to the Special Assistant for Strategic Mobility, Office Joint Chiefs of Staff, U.S. Army Element, Washington, D.C.; director, Coordination and Analysis, Office of the Army Chief of Staff; assistant chief of staff, U.S. Continental Army Command; and chief, Manpower Control Branch, U.S. Army Europe.

General Cowles received a BS degree from the University of Massachusetts in 1939, an MF degree in 1941 from Yale University, and entered active military service in March 1942. He has attended the Command and General Staff College and the Army War College.

His military decorations include: the Silver Star and the Bronze Star with two Oak Leaf Clusters.

BRIG GEN HOWARD F. SCHILTZ became special assistant to the deputy commanding general, U.S. Army Materiel Command, Washington, D.C., in June 1967.

Formerly CG, U.S. Army Aviation Materiel Command (St. Louis, Mo.), General Schiltz has also served as project manager, Mohawk, U.S. Army Materiel Command, Office of the Project Managers, Washington, D.C.; special assistant to project manager, Mohawk, USAMC; and transportation officer (Army), with additional duty as transportation officer, United Nations Command, United States Forces Korea, HQ Eighth U.S. Army Korea.

Graduated from Iowa State College with a BS degree, he has attended the Command and General Staff College and the Army War College.

His decorations include the Legion of Merit and Bronze Star Medal.

BRIG GEN WILLIAM A. BECKER has served since April 1967 as deputy to Dr. Jay Tol Thomas, Deputy for Research and Laboratories, HQ U.S. Army Materiel Command, Washington, D.C.

Previously assigned to Vietnam, he was assistant commander, 1st Cavalry Division Artillery (Airmobile); commanding officer, 11th Air Assault Division Artillery, redesignated 1st Cavalry Division Artillery (Airmobile); and commander, U.S. Army 1st Field Artillery, Missile Brigade.

Assigned to Yugoslavia as U.S. Army Attache from 1959 to 1961, he then served three months as executive of the 2nd Infantry Division at Fort Benning, Ga., before going to the Artillery and Missile School, Fort Sill, Okla., for a 3-year tour. He served successively as deputy and director of the Office of Combat Developments and Doctrine, then organized and commanded the Artillery Agency, and finished as commander of the 1st Field Artillery Brigade. He returned to Fort Benning in 1964 as commander of the 11th Air Assault Division Artillery.

After graduating from Texas A&M University in 1941, with an ROTC commission as a second lieutenant, he entered on active duty. He has attended the Command and General Staff College and the Army War College.

His military decorations include the Distinguished Service Medal, the Legion of Merit with Oak Leaf Cluster, the Bronze Star with "V" device and Oak Leaf Cluster, the Air Medal with 10 Oak Leaf Clusters, the Venezuela Army Cross, and the Republic of Vietnam Cross of Gallantry with Palm, with Silver Star and Bronze Star.

BRIG GEN PAUL A. FEYEREISEN is assigned as the first U.S. program manager of the Mallard Project, a multi-million-dollar, five-to-seven year effort to develop a comprehensive communication system for field armies of the U.S., Canada and Australia. He was previously deputy CG for Plans and Programs, U.S. Army Electronics Command, Fort Monmouth, N.J.

Other service has included, deputy and then acting chief of staff, HQ U.S. Army Materiel Command, Washington, D.C.; member of the Planning Group for the organization of the Army Materiel Com-

mand, Washington, D.C.; and director, Systems Development Directorate, HQ U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz. He also served as a member of the Hoelscher Committee on the reorganization of the Army in 1962.

General Feyereisen attended the University of Minnesota and received a BS degree from Sophia University, Tokyo, Japan, and an MA degree from Harvard University. He has attended the Command and General Staff College and the National War College.

His decorations include the Legion of Merit with Oak Leaf Cluster and the Army Commendation Medal.

BRIG GEN CHARLES T. HORNER JR. is assistant division commander, HQ 5th Infantry Division, Fort Carson, Colo. From January 1952 to August 1953, he served in the Office of the Assistant Chief of Staff, G4, Planning Branch, Research and Development Division, General Staff, Washington, D.C.

Other recent major assignments have included: CG, 2d Logistical Command, and later CG of the FASCOM, Fort Lee, Va.; chief of the Combat Developments Office and then commander of the 1st Infantry Brigade, Fort Benning, Ga.; and executive officer, Programs Division, Supreme Headquarters Allied Powers Europe (SHAPE).

General Horner attended the United States Military Academy in 1936 and graduated with a BS degree in mechanical engineering from the University of Pennsylvania in 1940, when he entered military service. He has attended the Command and General Staff College, the Armed Forces Staff College, the Army War College and the University of Pittsburgh.

General Horner's decorations include the Distinguished Service Cross, the Silver Star with Oak Leaf Cluster, the Bronze Star with three Oak Leaf Clusters and "V" device and the British Distinguished Service Order.

BRIG GEN ROGER M. LILLY has served as CG of the U.S. Army Automatic Data Field Systems Command, Fort Belvoir, Va., since April 1965. Since he was assigned from 1947 to 1950 with the Research and Development Group of the

Department of the Army General Staff, he has had a succession of RDT&E or related assignments, except for time spent on advanced schooling.

Graduated from the U.S. Military Academy in 1939, he earned an MS degree in mechanical engineering from the University of Michigan in 1952, then served three years with the Army Artillery Board at Fort Bragg, N.C., and Fort Sill, Okla.

Following graduation from the Armed Forces Staff College in 1955, he commanded the Army Task Group (JTG 7.2) of Joint Task Force Seven at Eniwetok Atoll, Marshall Islands, and then served three years with the Combat Development Department of the U.S. Army Artillery and Missile School at Fort Sill.

From 1960 to 1963, he was in Europe as commander, 212th Artillery Group and then as deputy Artillery commander, HQ Seventh Army. After serving as deputy chief of staff, Atomic Weapons Training, Field Command, Defense Atomic Support Agency, he became deputy commander until assigned as CG, I Corps (Group) Artillery.

He has attended the Command and General Staff College, the Armed Forces Staff College and the National War College. His decorations include the Bronze Star with "V" device, Joint Service Commendation Medal and Army Commendation Medal.

BRIG GEN JOHN C. DALRYMPLE has been assigned to the Office of the Deputy Chief of Staff for Logistics as director of installations since August 1966. From December 1955 to June 1958, he was chief, Plans Division, Office of the Chief of Research and Development, Department of the Army.

His OCRD assignment was followed by about a year of duty as executive officer, Office of the Secretary of the Army. Prior to his present assignment, he was director, Military Construction, Office of the Chief of Engineers. From July 1962 to June 1965, he was division engineer, North Atlantic Division.

Other assignments included: district engineer, U.S. Army Engineers, Little Rock, Ark.; senior engineer adviser, ROK

Army, Korea; executive officer and assistant executive officer, Office of the Secretary of the Army.

General Dalrymple earned a BS degree in electrical engineering from Rose Polytechnic Institute and an MS degree in civil engineering from Iowa State College. He has attended the Command and General Staff College, the Armed Forces Staff College and the National War College.

Awarded the Silver Star Medal for leading the 82nd Engineers into Normandy, France, General Dalrymple has twice earned the Bronze Star Medal. He later directed the 1117th Engineer Combat Group in its crossing of the Rhine, for which he was awarded the Legion of Merit.

MAJ GEN GRIBBLE was assigned in July as Deputy Assistant Chief of Staff for Force Development after serving from April 1966 as Deputy Chief of Research and Development, Department of the Army.

Prior to the OCRD assignment he was director of R&D, U.S. Army Materiel Command, for more than a year and a half after serving successively as chief of the AMC Development Division and deputy director of R&D.

Graduate of the U.S. Military Academy in 1941, he was assigned to the Army Corps of Engineers. From 1961-1963, he served as chief of the Army Nuclear Power Program and later as deputy director of Military Construction in the OCE, Washington, D.C.

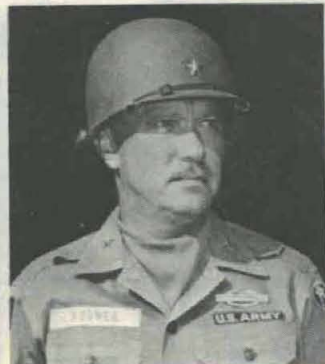
From 1953 to 1956, he was deputy assistant director, Reactor Development Division, U.S. Atomic Energy Commission. In 1957 he was presented the Legion of Merit for developing the technical specifications for design, construction and test operation of the Army's first nuclear power plant at Fort Belvoir, Va.

General Gribble received a master's degree in physical science from the University of Chicago in 1948. He is a graduate of the Oak Ridge (Tenn.) School of Reactor Technology, the Command and General Staff College and the National War College. In 1962 he completed the Modern Engineering

(Continued on page 28)



Brig Gen P. A. Feyereisen



Brig Gen C. T. Horner Jr.



Brig Gen R. M. Lilly



Brig Gen J. C. Dalrymple

8 of 32 on 2-Star Promotion List Have Served in R&D

(Continued from page 27)

Course at the University of California, Los Angeles.

MAJ GEN SENEFF has served in Vietnam since February 1966 as CG of the U.S. Army Aviation Brigade and also as Army Vietnam Aviation Officer. In 1965-66, he was Director of Army Aviation, Office of the Assistant Chief of Staff for Force Development.

General Seneff was chief, Air Mobility Division, Office of the Chief of Research and Development, Department of the Army from July 1957 to July 1959, following a year as an OCRD staff officer.

After graduating from the National War College in June 1960, he served more than three years as the Army Member of the U.S. Delegation to NATO, Paris, France. He then served two years as commander of the 11th Air Assault Aviation Group, Fort Benning, Ga.

General Seneff attended the University of Illinois in 1934-35 and then enlisted as a private in the U.S. Army. A year later he was selected to attend the U.S. Military Academy, from which he was graduated in 1941. During World War II, he served in the European Theater of Operations with the 14th Armored Division. He qualified as an Army aviator in fixed- and rotary-wing aircraft in 1956.

Among his many decorations are the Legion of Merit and Bronze Star Medal, both with first Oak Leaf Cluster, Army Commendation Medal and French Croix de Guerre.

MAJ GEN JOHN NORTON became CG of the U.S. Army Aviation Materiel Command, St. Louis, Mo., in May 1967 after a 2-year tour in Vietnam.

Assigned to Vietnam as commander of the U.S. Army Support Command, he was

promoted to assistant deputy CG of the U.S. Army in Vietnam in January 1966 and took command of the 1st Cavalry Division in May 1966.

General Norton was assigned to the Office of the Chief of Research and Development, Department of the Army, from 1955 to 1957, serving as chief of the Airborne, Aviation and Electronics Division and later as chief of the Air Mobility Division. He was a member of the Howze Board which developed advanced concepts for airborne operations and assault doctrine.

Graduated from the U.S. Military Academy in 1941, he completed courses at the Infantry School prior to assignment to

HQ CDC Announces

Changes in key assignments at HQ U.S. Army Combat Developments Command, Fort Belvoir, Va., have given Lt Gen Harry W. O. Kinnard a substantially new staff since he assumed command July 1.

Maj Gen Julian J. Ewell remains as deputy commander and chief of staff. Brig Gen Roy L. Atteberry Jr. is director of doctrine, Col Patrick B. Watson is director of plans and Col Nicholas Dunlap is a holdover as director of organization. Brig Gen Roger M. Lilly continues as CG of the Automatic Data Field Systems Command.

Other holdover staff members are Col Charles W. Adcock, inspector general; Col Robert H. Stumpf, who will retire this month and be succeeded by Lt Col R. P. McDermott; Command Chaplain Lt Col Ray M. Rowland; and Lt Col Frederick B. Jenkins, information officer.

Among the newcomers are Col Edward B. Kitchens Jr., director of materiel, who succeeded Col Thomas O. Blakeney upon

Africa with the 82nd Airborne Division. He became the Division's chief of staff in 1947, and in 1948 was assigned to the Strategic Plans Group of the General Staff, Department of the Army, Washington, D.C.

In the early 1950s, he was military assistant and executive officer to the then Secretary of the Army Frank Pace Jr. Later he qualified as a fixed- and rotary-wing pilot at the Army Aviation School. He has completed requirements of the Command and General Staff College, Armed Forces Staff College and the National War College.

His decorations include the Legion of Merit, Bronze Star Medal with two Oak Leaf Clusters, Army Commendation Medal with OLC, Presidential Unit Citation and numerous foreign medals.

Major Reassignments

his reassignment to head the ROTC program at the University of Louisiana; Col Charles B. Hazeltine Jr., director of evaluation, who took over from Col Ben Harvey Jr., now with the Eighth U.S. Army in Korea; and Col William S. Barrett, deputy director of plans.

Col Kitchens was assigned to the Office of the Chief of Research and Development, Department of the Army, from 1963 to 1966, serving in the Plans Division before he was transferred to the Air Mobility Division, in which he served one year as chief. Col Hazeltine served four years with the U.S. Army Research Office, the last two as assistant director, and left in June 1964 for a 3-year tour as deputy commander of the Berlin (Germany) Brigade.

The new Combat Developments Command deputy chief of staff for developments is Col Ernest W. Chapman, who succeeded Col Harold E. Marr Jr. upon his retirement July 31. Col Chapman was commander at the Engineer Agency at Fort Belvoir. Col Homer G. Snodgrass Jr. became deputy chief of staff for administration when Col James F. Pearsall retired June 30. Col Robert G. Todd succeeded Col Snodgrass as director of personnel.

Col Charles T. Caprino's assignment as comptroller followed retirement of Col William N. Sloan Jr. and the retirement of Lt Col Henry B. Cabell made Lt Col Robert M. Lathrop the new judge advocate.

In other USACDC personnel changes, Col James T. Avery Jr. was assigned as commanding officer of the new Institute of Special Studies when Col Norman Farrell was reassigned as commander of the new Institute of Land Combat. Both units are at Fort Belvoir.

Col Jim D. Keirse, commander of the Combat Support Group at Fort Belvoir, succeeded Col Glenn H. Gardner, who has left for assignment to Thailand.

Edgewood Building Environmental Testing Laboratory

Improved capability for expanding Army requirements in quality assurance (QA) chemical testing will be provided in a \$3.2 million laboratory being constructed at Edgewood Arsenal, Md. Completion is slated by January 1969.

Ground-breaking ceremonies were conducted recently, with Col William W. Stone, Edgewood commander (shown at right of photo), participating along with Lt Col Orlando Ortiz-Moreno (turning over spade of dirt), director of quality assurance at Edgewood, and Wesley J. Thomas, QA director, Army Munitions Command.

The laboratory will have 10 controlled environmental rooms for conducting safe chemical tests in simulated winter, tropical and desert climates. With 28,500 square feet of floor space in a one-story structure, it will provide about double the space of the nearly 50-year-old building it will replace.



Blumberg Appointed CG Medical R&D Command

Maj Gen Joe M. Blumberg, MC, has succeeded Brig Gen Colin F. Vorder Bruegge, MC, as commanding general of the U.S. Army Medical Research and Development Command, Office of The Surgeon General, Washington, D.C.

Capt Bruce H. Smith (MC, USN) follows Maj Gen Blumberg as commander of the Armed Forces Institute of Pathology (AFIP). His position as AFIP deputy director has been filled by Col James L. Hansen, former assistant chief of AFIP's Department of Pathology.

Col Claude K. Leeper (MC, USAF) retains his position as AFIP deputy director representing the Air Force.

Maj Gen Blumberg, who holds BS and MD degrees from Emory University, served at AFIP as deputy director from 1957 to 1963 and as director for the next four years. From 1954 to 1957, he was commanding officer of the 406th Medical General Laboratory in Japan. He has also been chief pathologist of Walter Reed General Hospital and chief of its Laboratory Service.

Capt Smith, deputy director of AFIP since 1963, began his naval career in 1940 with his internship at the U.S. Naval Hospital, St. Albans, N.Y. Major assignments have included director of laboratories at the U.S. Naval Hospital,

ECOM Lab Calls for Papers On Atmospheric Toxicity

Army researchers are invited to propose papers for presentation at an unclassified conference on diffusion of toxic materials in the atmosphere in Las Cruces, N. Mex., May 7-8, 1968.

Sponsor of the meeting is the White Sands Office of the Atmospheric Sciences Laboratory of the U.S. Army Electronics Command, Fort Monmouth, N.J., and New Mexico State University is the host.

Suggested topics, limited to 20 minutes for each paper, include special problems associated with diffusion of toxic fuels; toxic fuel diffusion prediction results; meteorological data collection systems and techniques; data handling and processing techniques, and mathematical and empirical prediction models. However, the scope of presentations will not be thus limited.

Interested authors are asked to submit one copy of their abstract by Nov 1 to the Atmospheric Sciences Office, Atmospheric Sciences Laboratory, U.S. Army Electronics Command, Attention: AMSEL-BL-WS-M, White Sands Missile Range, N. Mex. 88002.

Proceedings will be published and distributed to all interested scientists. Questions concerning the conference should be addressed to the conference chairman, J. D. Horn of the Atmospheric Sciences Office.



Maj Gen Joe M. Blumberg

Philadelphia, and chief of Laboratory Service, U.S. Naval Hospital, Mare Island, Calif., and sea duty during WWII.

During his service career, Capt Smith has also been a teaching Fellow at Harvard University and assistant and visiting professor of pathology at Temple University. He holds BA and MD degrees from Syracuse University.

Brig Gen Vorder Bruegge has been named commanding general of the Ninth Army Hospital in Germany. First assigned to the Medical Research and Development Command (MRDC) in 1959 as chief of the Research Division, he was promoted to deputy commander of the MRDC that same year and served until 1965, when he became commander.

From 1948 to 1950, he was assistant director of AFIP and then was deputy commander of the U.S. Army Medical Unit at Fort Detrick, Md., 1956-59. The next five years he served as special assistant to the director for organization and planning, and as technical adviser and Institute representative to the group planning the new AFIP building.

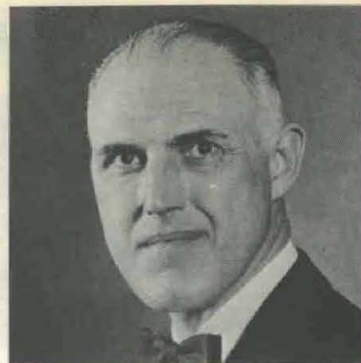
Holder of an MD degree from the University of Tennessee, he has also

ECOM Fabricates Prototypes Of Telescope Radio Antennas

In response to some of the special radio problems encountered in Vietnam, the U.S. Army Electronics Command has designed and fabricated final prototypes of telescoping whip-type radio antennas for the back-pack AN/PRC25 transmitter-receiver.

Samples of the antenna are being field tested by troops in Vietnam in a "quick reaction project" headed by Elliot Berman, chief of the Antenna Branch in the Communications and Automatic Data Processing Laboratory, directed by Col George M. Snead Jr.

The telescoping feature of the new design is of special value for use by patrols. Radio operators can retract the antenna until they are ready to use their sets and thereby lessen the chances of being sighted by enemy forces. The new antenna is intended to combine the functions of the two nonretractable types.



Capt Bruce H. Smith

attended the Industrial College of the Armed Forces.

Col Hansen served concurrently as assistant chief of the Department of Pathology at AFIP and as chief of Pathology and Laboratory Sciences Consultant, Office of The Surgeon General of the Army, since his return in 1965 from Thailand, where he was director, U.S. Army-SEATO Medical Research Laboratory in Bangkok.

From 1956-62, he was assistant chief of Pathology Services, Brooke General Hospital, Fort Sam Houston, Tex., following duty as CO of the 406th Medical General Laboratory and CO of the Far East Medical Research Unit. Col Hansen received an MD degree from Duke University in 1944, two years before he was commissioned as an Army officer.

Computer Conference Solicits Information Processing Papers

Original papers on "any aspect of the computer or information processing field in breadth or depth, from hardware to software and theory to practice" are being solicited for the 1968 Spring Joint Computer Conference.

The American Federation of Information Processing Societies is holding the meet Apr. 30 to May 2 in Atlantic City.

The AFIPS Technical Program Committee has suggested as possible topics: computer utilities, time sharing, man-machine interface, computers and communications, computers and control, and design automation. Survey, tutorial and interdisciplinary papers are acceptable.

Five copies of drafts, not exceeding 6,000 words, and 100-150-word abstracts must be submitted by October 30. Each page must contain the name of the senior author and be sequentially numbered.

The title page must include the full name of the author and co-authors, with their affiliation, city and state. The senior author should list his mailing address and phone number.

Drafts should be mailed to Prof. T. R. Bashkow, Technical Program Committee Chairman, 1968 SJCC, Department of Electrical Engineering, 1312 S.W. Mudd, Columbia University, New York, N.Y.

Army Picks 19 R&D Colonels for Promotion



Brig Gen G. W. Dickerson



Brig Gen G. Sammet Jr.



Brig Gen W. B. Fulton



Brig Gen W. W. Stone

Nineteen of 72 officers confirmed recently by the U.S. Senate for promotion to brigadier general (AUS) are actively engaged in research and development or have had R&D assignments. Included are three assigned to the Office of the Chief of R&D when they were nominated.

In the latter category, Col George Sammet Jr., then assigned as OCRD executive, was the first to receive his star. Director of Army Research Charles D. Y. Ostrom Jr. and Director of Developments Col Thomas W. Mellen are listed for promotion later this year. It is anticipated that all selectees will be promoted by June 30, 1968.

George W. Dickerson headed the list of 14 colonels, including four with R&D backgrounds, who were promoted in August. Erwin M. Graham Jr. leads the list of R&D colonels expected to be promoted in September.

Other R&D selectees are Brig Gen William B. Fulton, Brig Gen William W. Stone, Brig Gen Robert M. Tarbox, Brig Gen Wilson R. Reed, Col Oscar E. Davis, Col James G. Shanahan, Col Howard W. Cooksey, Col Donald D. Blackburn, Col John W. Barnes, Col Vincent H. Ellis, Col Richard A. Edwards Jr., Col Henry C. Schrader, Col Thomas K. Trigg and Col Edwin L. Powell Jr.

BRIG GEN G. W. DICKERSON became comptroller for the U.S. Continental Army Command Aug. 21 at Fort Monroe, Va., succeeding Maj Gen Wil-

liam McG. Lynn. General Dickerson has been director, Department of Strategy, Army War College, since July 1966.

From June 1959 to May 1961, he was chief, Plans Division, Office of the Chief of Research and Development (OCRD), Department of the Army.

Assigned to the U.S. Army Element, Allied Forces Southern Europe, from May 1963 to June 1966, he was chief of the Training Branch, Organization and Training Division, and later secretary for the staff. From May 1961 to 1963, he was Army member of the Joint Advanced Study Group, later a member of the General Purpose Forces Branch, and then chairman of the Joint Chiefs of Staff Special Studies Group, Washington, D.C.

General Dickerson has a BS degree from Virginia Polytechnic Institute, an MS degree from Ohio University, an MBA degree from George Washington University, and is a graduate of the Industrial College of the Armed Forces, Armed Forces Staff College, and Command and General Staff College.

He holds the Silver Star, Bronze Star Medal with two OLCs, Joint Service Commendation Medal, Army Commendation Medal and the Combat Infantryman Badge.

BRIG GEN GEORGE SAMMET JR., executive, Office of the Chief of Research and Development since August 1966, on Sept. 1 became deputy for operations, Development Directorate, U.S. Army Materiel Command, succeeding Maj Gen

Richard H. Free.

General Sammet was assigned to OCRD as deputy director of the Missiles and Space Division in September 1964. He was a staff officer, International Division and Programs and Budget Office, and later assistant chief, Combat Materiel Division, OCRD, from July 1959 to August 1962.

Following graduation from the National War College in 1963, he was commander, 4th U.S. Army Missile Command in Korea.

He holds a BS degree in agriculture from the University of Illinois (1940), an MA degree in international affairs from George Washington University (1964), and is a graduate of the Command and General Staff College and Armed Forces Staff College.

Among his decorations are the Bronze Star Medal, Air Medal and Army Commendation Medal.

BRIG GEN W. B. FULTON has been assigned to HQ 9th Infantry Division after serving since March 1966 as commander of the 2nd Infantry Brigade, 9th Infantry Division, U.S. Army Vietnam.

Assigned to OCRD from April 1957 to July 1960, he was chief of the Surface-to-Surface Missile Section and later a staff officer in the Nuclear Weapons Branch, Atomic Division.

After two years as general staff secretary, I Corps, U.S. Army Pacific, he served from 1962 to 1966 at the War College.

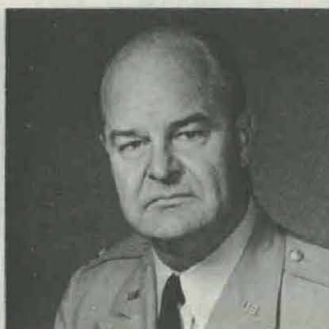
General Fulton has a BA degree from



Brig Gen E. M. Graham



Brig Gen R. M. Tarbox



Brig Gen W. R. Reed



Col C. D. Y. Ostrom



Col O. E. Davis



Col H. H. Cooksey



Col D. D. Blackburn



Col J. W. Barnes



Col V. H. Ellis

the University of California and is a graduate of the Air War College, Maxwell Air Force Base, Ala.

Medals he is entitled to wear include the Distinguished Service Cross, Legion of Merit (with OLC), Bronze Star Medal, Army Commendation Medal and Combat Infantryman Badge.

BRIG GEN W. W. STONE, CO of Edgewood Arsenal, Md., since October 1966, will continue this assignment as commanding general. He was the executive to the first Director of Army Research, 1958-1959.

Prior to the Edgewood assignment, General Stone served from September 1965 as director, Research, Development and Engineering, U.S. Army Munitions Command, Dover, N.J. He earlier served as commander of Dugway (Utah) Proving Ground. After attending the Army War College, he was chemical adviser to the First Republic of Korea Army from 1960 to August 1961.

He holds bachelor's and master's degrees in physics from the California Institute of Technology and was commissioned in the Army Air Corps following graduation in 1941.

His decorations include the Legion of Merit and the Army Commendation Medal with four OLCs.

BRIG GEN E. M. GRAHAM JR., career Ordnance officer since 1941 and associated with guided missiles since 1951, was assigned Aug. 21 as commander, U.S. Army Ordnance Center and School, Aberdeen (Md.) Proving Ground.

He was commandant of the U.S. Army Missile and Munitions Center and School, which he helped establish in 1952 at Redstone Arsenal, Ala., from July 1965 to August 1967.

Duty as chief of the Missile Branch, R&D Directorate of the U.S. Army Materiel Command in 1962 followed a tour as CO, 74th Ordnance Battalion, later assistant chief of staff, Logistics, 7th Logistical Command, Korea.

Other assignments include chief, Control Office of the Army Ordnance Missile Command, Redstone Arsenal, and CO of the Ordnance Procurement Centers in Paris, France, and Oslo, Norway.

He has a BS degree from Mississippi State College (1938), MS and a doctoral degree in electrical engineering from MIT, and is a graduate of the Naval War College, Command and General Staff College and Armed Forces Staff College.

He holds the Bronze Star Medal, Army Commendation Medal (with OLC) and foreign decorations.

BRIG GEN R. M. TARBOX, deputy chief of staff V Corps and later assigned to HQ U.S. Army Europe since July 1965, was chief of the International Division, OCRD, January 1957 to July 1957.

The first of this month he became Division Engineer, North Central Division, Chicago, succeeding Brig Gen Roy T. Dodge when he retired.

He was director of staff and faculty of the U.S. Military Academy from June 1962 until he became deputy commandant in June 1964. From August 1959 to May 1962, he was assistant chief and assistant director of Civil Works for Southwestern Division, Office of the Chief of Engineers, and was CO, 36th Engineer Group, U.S. Army Pacific, in Korea, June 1958 to August 1959.

After graduating from the U.S. Military Academy, he received an MS degree in civil engineering from the University of

California. He is a graduate of the Army War College, Engineer School and the Command and General Staff College.

His awards include the Legion of Merit, Bronze Star Medal and the Army Commendation Medal.

BRIG GEN W. R. REED, Deputy Secretary of the General Staff (White House liaison officer), Office of the Chief of Staff, since January, has held several major positions in OCRD. He was promoted Oct. 1 and his new assignment had not been announced at press time.

He was assistant director of developments with the Office of the Chief of Research and Development, Department of the Army, from June 1965 until he was assigned to the Requirements and Developments Division, J-5, Joint Staff and the Joint Chiefs of Staff, in December 1965.

From June 1960 to October 1962, his OCRD assignments included staff officer, Plans Branch, and later deputy chief, Programs and Analysis Division. He was chairman of the Planning Group for Reorganization of the Army in 1962 and was later chief of the Policy Division.

Assigned to the Office of the Director of Coordination and Analysis, Office of the Chief of Staff, from October 1962 until June 1964, he then served a year as commander of the 1st Cavalry Division Artillery, 1st Cavalry Division, U.S. Army Pacific in Korea.

A 1941 graduate of the U.S. Military Academy, Col Reed has completed the Artillery Advanced Course, Command and General Staff College and the Army War College. He earned an MA degree in international relations from Georgetown University in 1952.

Among his decorations are the Bronze

(Continued on page 32)



Col R. A. Edwards



Col H. C. Schrader



Col T. W. Mellen



Col T. K. Trigg



Col E. L. Powell Jr.

Army Designates 19 R&D Colonels for Promotion

(Continued from page 31)

Star, Army Commendation Medal with Oak Leaf Cluster, Croix de Guerre with Silver Star and the George Washington Gold Medal of the Freedom Foundation (1958, 1965).

COL C. D. Y. OSTROM JR., Director of Army Research since February 1967, served previously for 3½ years in a multiple role as commander of the U.S. Army Ballistic Research Laboratories, the Human Engineering Laboratories, and the Coating and Chemical Laboratory, Aberdeen Proving Ground, Md. From 1960 to 1963, he commanded the U.S. Army R&D Group, Frankfurt, Germany.

Backed by 25 years service in the Army Ordnance Corps, Col Ostrom has a BS degree from the University of California, an engineering degree from Harvard University and an MS in mechanical engineering from Massachusetts Institute of Technology. He was graduated from the Command and General Staff College in 1955 and the Industrial College of the Armed Forces in 1960.

During World War II, he served as an ammunition officer with the Ninth U.S. Army in the United Kingdom, France, the Netherlands and Germany. From July 1948 to June 1950, he was executive officer of BRL's Ballistic Measurements Laboratory at Aberdeen Proving Ground.

Following a tour of duty as ammunition officer with the Eighth U.S. Army during the Korean War, he was assigned to Picatinny Arsenal, Dover, N.J., as executive officer, R&D Division (Samuel Feltman Laboratories) from June 1952 to July 1954. Later he became chief, Research Branch, R&D Division, Office of the Chief of Ordnance, Washington, D.C.

COL O. E. DAVIS has served as deputy CO, 1st Brigade, 101st Airborne Division, U.S. Army Vietnam, since March. He was assigned to OCRD from 1962 to 1964 as chief, Support Aircraft Aerial Development Branch, and for a short time as acting chief, Air Mobility Division.

From August 1966 to February 1967, he was chief liaison officer with the Republic of Korea Army and later senior liaison officer to Field Forces in Korea and Vietnam with the U.S. Army Pacific. From June 1964 to August 1966, he was CO, 101st Support Command, 101st Airborne Division, Fort Campbell, Ky.

Col Davis has a BS degree from the University of Arizona, has graduated from the Command and General Staff College, Armed Forces Staff College and the Air War College.

He holds the Legion of Merit, Bronze Star Medal with "V" device and two OLCs, and the Army Commendation Medal with OLC.

COL J. G. SHANAHAN returned recently from duty in Vietnam where he served as deputy chief of staff, HQ I Field Force, deputy commander and then com-

mander of the 3rd Brigade, 25th Infantry Division.

From April 1957 to February 1958, he was chief of the Review and Analysis Branch, Programs and Budget Division, Office of the Chief of Research and Development, Washington, D. C. Assigned to the Office of the Joint Chiefs of Staff in Washington from June 1963 to June 1966, he was a member of the Strategic Operations Division, J-3, Joint Staff.

Graduated with an AB degree from Niagara University, he is also a graduate of the Infantry School, Command and General Staff College, Armed Forces Staff College and the National War College.

He holds the Silver Star, Legion of Merit, Bronze Star Medal (with three OLCs), Army Commendation Medal (with OLC) and the Combat Infantryman Badge.

COL H. W. COOKSEY has been assigned to JI-U.S. STRIKE Command, MacDill AFB, Fla., following a tour as commander of the 1st Brigade, 2nd Infantry Division, U.S. Army Pacific. He was assigned to OCRD from July 1963 to July 1966, serving successively as chief of the Combat Arms Branch, chief of the Combat Materiel Division and executive officer.

His earlier OCRD assignment in 1957 was as special projects officer in the

Technical Liaison Office, OCRD, with additional duty as personal assistant to the CRD.

In 1961-1962, he had two Battle Group assignments with the 6th Infantry in Berlin. He served from 1954 to 1956 in the Development Division of the Office of the Assistant Chief of Staff, G-4, and then with DCS Logistics. He was assigned to the Armed Forces Staff College in 1958.

Col Cooksey has a BS degree from Virginia Polytechnic Institute and has completed courses at the Command and General Staff College and the National War College. He holds the Bronze Star Medal with two OLCs and the Army Commendation Medal with two OLCs.

COL D. D. BLACKBURN, assistant deputy director of the U.S. Army Element of the Communications Planning Group, Defense Communications Agency, since October 1966, served in OCRD from June 1961 to May 1964.

After attending the National War College, he served in OCRD as deputy director of developments, Special Warfare, and later chief, Special Warfare Office.

Other recent assignments include planning officer, Division B, International Planning Staff of the NATO Military Committee, Washington, D.C.; commander, Special Operations Group, U.S. Military Assistance Command Vietnam; and director of Special Warfare, Office of the Deputy Chief of Staff for Military Opera-

Zakel Succeeds FlorCruz as Head of Tropic Test Center

Col John Zakel Jr. has assumed command of the U.S. Army Tropic Test Center at Fort Clayton, Canal Zone, as successor to Col Pedro R. FlorCruz, reassigned to the U.S. Army Materiel Command, Washington, D.C.

Col Zakel's previous assignment was as chief of the Weapons Division, Materiel Directorate, U.S. Army Combat Developments Command, Fort Belvoir, Va. He entered the Army in April 1942 and took part in the Ardennes, Central Europe and Rhineland campaigns.



Col John Zakel Jr.

Col Zakel was in Europe for three years as assistant operations officer, Office of Deputy Director for Intelligence, U.S. Forces in Austria, and returned to the Army Field Forces Board Number 2 in 1951 as a test officer for general and special-purpose vehicles.

From 1955 to 1957, he served as executive officer 67th Tank Battalion, 2nd Armored Division; then as battalion commander; and finally as G-4 of the Division. He was then assigned as research and development coordinator for armored vehicles and equipment, U.S. Continental Army Command, Fort Monroe, Va.

Assigned to Vietnam in 1961, he served in II Corps (Pleiku) for six months and completed his tour as a member of the Joint Operations Evaluation Group. Upon his return to the United States, he was assigned to the U.S. Army Combat Development Command Armor Agency, Fort Knox, as chief of the Materiel Division.

Col Zakel received a BA degree in business administration from George Washington University and has attended the Armor Officers Advanced Course, the Command and General Staff College and the U.S. Army Language School. His awards include the Legion of Merit, Bronze Star and Purple Heart.

tions, Department of the Army.

He has a BS degree from the University of Florida, and is a graduate of the Armed Forces Staff College.

His decorations include the Silver Star, Legion of Merit with two OLCs, Bronze Star Medal, Army Commendation Medal, Air Medal and the Combat Infantryman Badge.

COL J. W. BARNES has served since August 1966 as a staff officer in the Office of Operational Test and Evaluation, Directorate of Defense Research and Engineering (U.S. Army Element), Secretary of Defense.

While assigned to OCRD from January 1959 to June 1952, he was a staff officer, then chief of the Programs Branch, and later assistant chief of the International Division. He attended the Naval War College in 1962-63.

From June 1964 to July 1966, he was chief, Test Analysis and Operations Office, U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Md., following a tour as commander of the 3rd Brigade, 7th Infantry Division, U.S. Army Pacific (1963-64).

He is a graduate of the U.S. Military Academy, Naval War College, Armed Forces Staff College, the Armored and Engineer Schools (Advanced Courses) and the Command and General Staff College.

He holds the Legion of Merit, Soldier's Medal, Bronze Star Medal and Army Commendation Medal with OLC.

COL V. H. ELLIS has commanded the Harry Diamond Laboratories, Washington, D.C., since May and has served all but one year since 1959 in R&D assignments. He has been an Army Ordnance officer 25 years.

From June 1964 to April 1967, he was assigned to the U.S. Army Materiel Command, Washington, D.C., serving as chief of the Infantry Weapons Branch, then as chief of the Weapons Branch in the Development Division, Director of R&D. In 1962-63, he was an AMC project manager staff officer.

For three years previous, he was assigned to the Office of the Chief of Ordnance in Washington, serving as assistant to the chief, Artillery and Vehicle Systems Branch and later as chief of the Artillery Section. From 1957 to 1959, he was a special assistant to the senior Ordnance officer and later a maintenance adviser to the Turkish Ordnance Department, Joint U.S. Military Mission for Aid to Turkey.

He has a BS degree from Kansas State University, an MS degree from Cornell University, and has attended the Command and General Staff College and the Air War College.

COL R. A. EDWARDS JR. has been assigned since June as deputy director, Enlisted Personnel Directorate, Office of Personnel Operations, Department of the Army, Washington, D.C., after a year as executive officer.

In 1965-66, he was commander of the 4th U.S. Army Missile Command, U.S. Army Pacific, following graduation from the National War College.

Assigned to the U.S. Army Combat Developments Command, Fort Belvoir, Va., from June 1962 to November 1963, he was deputy director, Materiel Requirements Directorate, then chief of plans in the directorate, and later executive officer with additional duties as acting deputy director, Materiel, and chief, Plans and Programs Division, Materiel.

While with the U.S. Continental Army Command HQ at Fort Monroe, Va., he served as chief of the Communications and Electronics Branch, Combat Developments Section, following duty as a staff and action officer.

He has a BA degree from Virginia Military Institute, is a graduate of the Command General Staff College, and has been awarded the Bronze Star Medal, Legion of Merit (with OLC) and Army Commendation Medal.

COL H. C. SCHRADER has been chief of the Systems Analysis Group, Force Planning and Analysis, Office of the Chief of Staff, since July 1966.

He has served as chief of the Mobility Branch and later deputy chief of the Development Division R&D Directorate of the Army Materiel Command from 1964 to 1966.

Deputy chief of the Army Nuclear Power Program, Fort Belvoir, Va., from January 1959 to July 1961, he then served as district engineer, Pacific Ocean Division, Okinawa, from June 1962 to August 1964.

He has BS and MS degrees in civil engineering from the University of Illinois and an MBA degree from George Washington University. A graduate of the Command and General Staff School and College, and the Industrial College of the Armed Forces, his awards include the Legion of Merit with two OLCs and the Army Commendation Medal with OLC.

COL T. W. MELLEN. Director of Developments, OCRD, since Aug. 24th, served as deputy director since May. He was previously chief of staff, 25th Infantry Division, Vietnam, following duty as commander 3rd Brigade, 25th Infantry Division, Hawaii.

This is Col Mellen's second tour with OCRD. Following 30 months with the Programs and Budget Division, he became chief of the Programs and Analysis Division in March 1960. Six months later he left to attend the U.S. Army War College, Carlisle Barracks, Pa.

Other assignments include staff officer, HQ U.S. Army Pacific; commanding officer, 2nd Battle Group, 4th Cavalry, Korea; and operations officer, I Corps Korea.

Col Mellen studied forestry at the College of San Mateo, Calif., and is a graduate of the Command and General Staff College. He holds the Silver Star with two Oak Leaf Clusters, the Legion of

Merit, the Bronze Star Medal with OLC, the Distinguished Service Medal, and the Army Commendation Medal with OLC and the Combat Infantryman Badge.

COL T. K. TRIGG, deputy assistant chief of staff for Communications-Electronics Division, Supreme Headquarters Allied Powers, Europe, since July 1966, has an R&D background from 1956.

Prior to assignment to SHAPE, he was chief of the Plans and Policy Division, J-6, Joint Staff of the Joint Chiefs of Staff. From May 1963 to January 1964, he was deputy commander, U.S. Army Electronics Research and Development Laboratories, Fort Monmouth, N.J., and from June 1961-May 1963 he was director.

He was Signal Officer, I Corps, U.S. Army Pacific in Korea from May 1959 to May 1960 and was chief of the Plans, Programs and Operations Office, R&D Division, Office of the Chief Signal Officer, from December 1956 to March 1959.

He has a BS degree from Mississippi State College and is a graduate of the Command and General Staff College and the Industrial College of the Armed Forces. His awards include the Joint Service Commendation Medal and the Army Commendation Medal with OLC.

COL E. L. POWELL JR., deputy director of Army Aviation, Office of the Assistant Chief of Staff for Force Development since June 1966, has served in the Office of the Chief of Research and Development, and the Office, Deputy Director of Defense Research and Engineering.

He was military assistant with the NATO General Scientific Affairs at HQ SHAPE from June 1965 to May 1966, following two years at Fort Benning, Ga. as a liaison and test officer.

From February 1962 to September 1963, he was military assistant with Combat Systems, ODDR&E, and from July 1961 to February 1962 was chief of Plans and Requirements Branch, Air Mobility Division, OCRD.

He is a U.S. Military Academy graduate and has an MS degree in civil engineering from the University of California. He has graduated from the Command and General Staff School, Army Aviation School, and Air War College.

His awards include the Silver Star, Bronze Star Medal and the Army Commendation Medal.

30-Year Climb Gains ACHA Status

Thirty years after he started military service as an enlisted man, Col Frank K. Lawford, executive officer at Walter Reed Army Medical Center, achieved membership status in the American College of Hospital Administrators, Aug. 20.

Prior to his assignment to WRAMC in September 1966, Col Lawford was chief of Administrative Service, Brooke General Hospital, Fort Sam Houston, Tex., and from 1959 to 1962 was stationed with medical units in Germany.



ORDER OF THE WHITE ELEPHANT. Col James L. Hansen, MC, deputy director, Armed Forces Institute of Pathology, was presented the Order of the White Elephant, Third Class, with the rank of commander, for his services in Thailand where he directed the U.S. Medical Component of the SEATO Laboratory.

Bestowed by the King of Thailand, the award was presented by Maj Gen Pung Phintuyothin, director general of the SEATO Medical Research Project. The accompanying citation noted that the "distinguished services of Col Hansen have truly been of remarkable medical value, and his sense of humanity has been apparent to all the Thai people..."

Col Hansen was also commended for his leadership and cooperation in promoting the basic medical sciences.

JOINT SERVICE COMMENDATION MEDAL. The JSCM was presented to Brig Gen Curtis W. Chapman Jr., newly assigned commander of the 20th Engineer Brigade, U.S. Army Vietnam, for his service as chief of the Theaters Branch, Chairman, Joint Chiefs of Staff, Special Studies Group, Washington D.C., from August 1966 to July 1967. His prior

assignment was executive to the Chief of Engineers.

EXCEPTIONAL CIVILIAN SERVICE. Dr. Lorenz E. Zimmerman, chief of the Ophthalmic Pathology Branch, Armed Forces Institute of Pathology (AFIP), Washington, D.C., recently received the Exceptional Civilian Service Award from the Department of the Army.

He was cited for "professional skill and teaching which influenced the field of ophthalmic pathology both on a national and international basis . . . [and] became a leading authority in this specialty."

MERITORIOUS CIVILIAN SERVICE (MCS). This award was presented to John Johnson, technical director, Image Intensification Technical Area of the Night-Vision Laboratory, Fort Belvoir, Va. He was commended for his initiative in developing the visionics program and the promotion of the concept of the Night-Vision Simulator.

Guy Bevers, chief of the Special Programs Office at Fort Huachuca, Ariz., received the MCS award for his work in setting up Zero Defects programs at Fort Huachuca and other installations. The award was presented by Col Nicholas C. Angel, commander of the U.S. Army Electronics Proving Ground.

LEGION OF MERIT (LOM) Brig Gen I. O. Drewry, Nike-X Missile Defense System project manager, received the LOM for "exceptionally meritorious service" in the Army's ballistic missile

defense program.

Cited for "outstanding dynamic management, rare leadership qualities, and profound professional competence," he was credited with cost reduction savings of more than \$23 million in the Nike-X R&D program.

Col Andrew C. Anderson received the LOM for "outstanding meritorious service," as chief, Plans and Programs Division, Directorate of Materiel, in the Combat Developments Command (CDC) from July 1964 to June 1967. He is now serving in Korea.

Col John M. Gaustad received the LOM prior to his departure from the U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Md., for a new assignment in Vietnam. He was cited for exceptional accomplishments during a 3-year tour in successive assignments as director of Armor Materiel Testing and as chief of the Test Analysis and Operations Office.

Col Arthur E. Makhholm, director of facilities at Edgewood Arsenal, Md., was awarded the LOM for his "professional knowledge, dynamic leadership, and managerial skill, which were significant factors in instituting a major program of materially increased maintenance and support. . . ."

Upon retiring from 21 years of service, Col Makhholm was cited for initiating the arsenal's first installation master plan, which received DA recognition for the arsenal as a model post for engineer management.

Col A. W. Reed, former Redeye missile project manager, received the LOM upon his retirement from active military duty at the U.S. Army Missile Command, Redstone Arsenal, Ala.

Col Austin Triplett Jr. received the LOM for his service from 1965 to 1967 as director of Infantry Materiel Testing, Aberdeen Proving Ground, Md. He was cited for developing new testing methods for combat clothing and equipment, for expediting test of the XM-148 grenade launcher, and for the study of small arms service test facilities, which resulted in a program for improving testing techniques. He is now assigned to the Military Assistance Advisory Group, Norway.

Lt Col Donald R. Keebaugh received the LOM for his distinguished service, from August 1963 to May 1967, in the Electronics Division of the Materiel Directorate, U.S. Army Combat Developments Command. He received the award upon his retirement from the Army.

Lt Col Richard I. Taylor, information officer at the U.S. Army Satellite Communications (SATCOM) Agency, received the LOM for his contributions in planning, coordinating and executing the agency's information activities concerning a program of "global implications with both national and international sensitivities."

BRONZE STAR MEDAL (BSM). Lt Col Lesil S. Bomar Jr., Life Sciences

Success as Student Ends 20-Year Service Career

Scholastic achievement has ended more than 20 years military service for SFC Leo G. Miller Jr. and embarked him upon a civilian career as a computer programmer with the U.S. Government Department of Health, Education and Welfare.

Director of Army Research Col Charles D. Y. Ostrom Jr. honored SFC Miller when he retired July 31 by presenting him with the First Oak Leaf Cluster to the Army Commendation Medal. The award recognized exceptionally meritorious performance of duty from June 11, 1965, to July 31, 1967, as chief of the Supply and Transportation Branch, U.S. Army Research Office.

SFC Miller applied for the 2-year course of academic instruction in the Programers School sponsored by the Department of Health, Education and Welfare and was selected among 21 individuals from 354 applicants. When he retired he was seventh in his class and was only two months short of completion of the course.

His military career started in the U.S. Navy in June 1943, and he served as a gunners mate on sea duty in the Atlantic and the Mediterranean theaters until he was released from active duty January 1947.

From June 1947 until June 1950, he attended the University of New Hamp-

shire, graduating with a BA degree in political science. He received an ROTC commission and was placed on active duty in the Army in June 1950.

Five years service as an ROTC instructor of heavy weapons at Dartmouth College, Hanover, N.H., earned him the Army Commendation Medal in August 1962. He then served until May 1965 with the 3rd Logistical Command in France and was assigned to the U.S. Army Research Office when he was returned to the U.S.



SFC Miller and Col C. D. Y. Ostrom Jr.

Division, U.S. Army Research Office, Office of the Chief of Research and Development, received the first Oak Leaf Cluster (OLC) to the BSM for "outstanding meritorious service in connection with ground operations against a hostile force in the Republic of Vietnam, February 1966 to January 1967."

Maj Duane G. Erickson, a parasitologist at the Walter Reed Army Institute of Research (WRAIR), received the BSM for meritorious service in Vietnam while assigned to the 9th Medical Laboratory.

ARMY COMMENDATION MEDAL. The ACM was presented recently to several officers at the Walter Reed Army Medical Center (WRAMC). Lt Col Herbert J. Condit, assistant chief, Special Project Branch, Historical Unit, since August 1964, received the medal upon his retirement from 20 years of active duty.

Lt Col Gene V. Aaby, assistant chief of the Walter Reed Army Hospital (WRGH) Thoracic Surgical Service, and Lt Col Bruce Butler Jr., chief of Hand Surgery, WRGH, and assistant chief, Orthopedic Service, received the AMC for outstanding achievements. Col Butler has entered civilian medical service.

At the U.S. Army Materiel Command, Maj Paul L. English, project officer in the Missile Division, received the ACM for exhibiting "outstanding initiative and managerial ability in the supervision and direction of the Army Target Missile Program in support of expanding air defense weapon requirements."

Maj Robert B. Henry received the OLC to the ACM for his work at Fort Detrick, Md. As assistant to the chief of the Plans and Readiness Operations Office, he has been instrumental in the effective preparation of a plan for implementing a number of munitions systems. In his former assignment as chemical project leader in the Rapid Warning Office, he assisted in the planning, coordination and implementa-

tion of an in-house contract program on rapid detection of biological aerosols.

MISCELLANEOUS AWARDS. Lt Col Joseph L. Alexander received the Hoff Medal, established in 1897 for the graduate holding the highest standing in the Military Medicine and Allied Sciences Course at Walter Reed Army Institute of Research (WRAIR).

Lt Col Alexander's research dealt with the "passive, homologous, cutaneous anaphylaxis in the guinea pig, a preliminary search for a reagin-like antibody." Reagin is an antibody developed by the human body in response to allergies such as those involved in hay fever. Producing the antibody in guinea pigs provides an experimental model for further research.

Lt Col Alexander will next study renal transplantation at Harvard University on a surgical research fellowship.

Capt Robert J. Parks, who led 16 fellow medical officers in WRAIR's Global Medicine Course, was presented with the Sternberg Medal. It is named for George M. Sternberg, an Army medical officer during the Civil and Spanish-American Wars and the founder of the Army Medical School.

Capt Parks, formerly with the 3rd Special Forces Group at Fort Bragg, N.C., entered duty with the 3rd Civil Affairs Group, Panama, as a medical officer upon completion of the 19-week course.

Allan J. Wilson, a mechanical engineering technician with Aberdeen Proving Ground's Development and Proof Services (D&PS), received the D&PS annual director's award for his "outstanding technical achievement in the design of testing, methods of evaluation, and analysis of data of small arms materiel, specifically with reference to the engineering test of the Small Arms Weapons Systems."

More than 250 members and guests attended the annual banquet of the Fort Detrick (Md.) Branch of the Scientific

Research Society of America (RESA), which was highlighted by presentation of the RESA Award for Scientific Achievement to Darrel D. Gwinn and the Arthur J. Rawson Memorial Award to Eugene B. Boward. Gwinn is employed in the Medical Bacteriology Division, and Boward is with the Munitions Development Division in the Fort Detrick Laboratories.

Gwinn received the award for his paper, "Helper Phage-Dependent Transfection in *Bacillus subtilis*," in which he demonstrated that a certain bacterial virus may render bacteria susceptible to infection by nucleic acid from unrelated viruses. A continuation of the research has led to other discoveries concerning the entry of foreign nucleic acid into cells and the resulting biological activity of the acid.

Boward received his award for a study entitled "Estimates of Threat and Challenge for Biological Detection Systems Subjected to Multi-Line Attacks."

The American Society for Testing Materials (ASTM) Award of Merit was presented recently to Thomas B. Kennedy, chief of the Concrete Division of the U.S. Army Engineer Waterways Experiment station, Vicksburg, Miss., until his retirement in 1965. He was cited for "outstanding administrative and technical service to STM committees . . . and for notable leadership in research on concrete and in the development of standards on Portland cement and concrete."

MICOM Finds Goldplating Serves to Minimize Costs

"Eliminate goldplating," watchwords of the Army Value Engineering Program in research and development — meaning to minimize costs through simplified, functional design of materiel — have a reverse twist in the R&D Directorate, Army Missile Command.

Reason: Goldplating saves money when applied to requirements for many electronic circuits. Lloyd Woodham, who fabricates all printed circuits used by the Advanced Sensors Laboratory at HQ MICOM, Redstone Arsenal, Ala., works with a recently acquired goldplating machine. He says it is cheaper to use gold than cheaper metals unless circuits are mass produced.

Using a copy camera, he can tailor circuit boards to meet requirements. Gold is resistant to heat, moisture and acids, solders easily to make good electrical connections, and the goldplating equipment requires little maintenance.

Woodham uses black tape on plastic film to show the circuit as it appears in the engineer's drawing. He photographs it, reducing to the size desired, and exposes the photographic film on a sensitized copper-clad, fibre-glass material. The circuit pattern image on the copper plate is then electroplated with gold, etched with acid, and the gold is left behind as the goldplated printed circuit.

2 More Contenders Claim 'Youngest PhD' Title

Competition for honors is keen these days in almost any field one enters, but the distinction of being the "Youngest PhD in the Army" is bringing forth fresh candidates with each edition of the *Army Research and Development Newsmagazine*.

First Lt Kenyon S. Latham Jr. addressed a letter to the editor to set forth his claim to distinction — and it held up for a few days, until another young candidate stepped forth.

Assigned to the Research and Analysis Division, Gunnery Department, U.S. Army Artillery and Missile School, Fort Sill, Okla., Dr. Latham began active duty Jan. 30, 1967, after graduating from the University of Kansas in October 1966 with a PhD in organic chemistry. He was born Feb. 8, 1941.

That birthday enabled him to displace the fourth successive "Youngest PhD in the Army" titleholder, Capt Michael J. Ram, U.S. Coating and Chemical Laboratory (CCL), Aberdeen (Md.) Proving Ground, by one month, 21 days.

Then along came 1st Lt Arthur B. Krewinghaus, also of the CCL, who entered the world Nov. 21, 1941, making him nine months and 13 days younger than 1st Lt Latham. Dr. Krewinghaus was assigned to the CCL in June 1966, shortly after receiving his PhD degree at the age of 24 years, 6 months.

Can anyone beat that? If so, step forward, front and center!



1st Lt A. B. Krewinghaus

Edgewood Arsenal's 15 'Eyes' Aid Medical Research

Scientific experiments at the U.S. Army Medical Research Laboratory, Edgewood Arsenal, Md., are under the view of a man with 15 extra eyes and a videotape memory who sees to it that not even the smallest detail of laboratory work escapes observation.

The extra eyes of Lloyd E. Matter, director of the U.S. Navy Medical Television Facility assigned to Edgewood Arsenal, are television cameras used for monitoring laboratory tests and experiments and recording them on videotape.

In the five years it has been in operation at Edgewood, the facility has grown from two cameras and five monitoring screens to 15 cameras and 75 monitors. Other TV equipment includes complex recording and switching systems. The total inventory is valued at more than \$600,000.

Rapid expansion of the medical television facilities at Edgewood Arsenal underlines the value and versatility of this medium of communication. It is highly useful in many aspects of laboratory work as a complement to the usual scientific observation and data-recording techniques.

For example, a dissection in a Pathology Laboratory can be observed more easily by a small, strategically placed television camera than by a class of 20 or more viewers peering over shoulders trying to catch a glimpse of the action.

Instant Replay. Not only is the actual viewing easier and clearer when presented on a large monitor, in the comfort of the conference room, but critical portions of the operation can be studied in great detail through the instant replay or stop-action feature of videotape.

Moreover, the dissection in this case need be performed only once — no matter how many are viewing it — thus eliminating the time and effort wasted in setting up a series of separate performances for direct observation.

The instant replay feature also makes TV particularly suitable for laboratory use. Other visual recording methods require a wait for processing, and any failure or deficiency is not known until long after the completion of the test.

MICOM Selects Pottle To Manage Lance System

Col Arthur F. Pottle Jr. has been named project manager for the Lance missile at the U.S. Army Missile Command, Redstone Arsenal, Ala.

Col Pottle was stationed at Huntsville from 1954-58 as chief of the surface-to-air missile division, Army Missile and Munitions Center and School. He returned recently from duty in Vietnam as commander of the 701st Maintenance Battalion, 1st Infantry Division.

A graduate of Norwich University with a BS degree in chemistry, he holds an MBA degree in business management from the University of Chicago.



DOCTOR'S BEDSIDE COMMENTS are monitored by nurse via one of 75 TV screens at the U.S. Army Medical Research Laboratory, Edgewood Arsenal, Md. Similar hookups are used between scientists for lab-to-lab consultations.

The videotape can be played back immediately to see whether the desired effect has been obtained. If the recording is unsatisfactory, the test can be repeated.

One piece of television equipment can record X-ray pictures on videotape directly from the X-ray image intensifier. If the researcher watching his monitoring screen sees something that raises a question, he can have the tape played back instantly, eliminating any wait for X-rays.

When the videotape indicates a need for further examination, the subject is still on hand and available for another X-ray.

As an early entry in the field of research-oriented television, the Navy was prepared, in 1962, to provide the basic elements of a medical TV facility at Edgewood Arsenal. Through the Naval Unit permanently stationed there, the necessary arrangements were made, and the first programing began in the Medical Research Laboratory.

Operationally, Matter and his aides work directly with the director of the Medical Research Laboratory and with the chief scientist of the Arsenal. The TV facility tailors its work schedule to meet requirements of scientists and technicians.

Administratively, the video group is supported through the commanding officer of the Naval Unit attached to Edgewood Arsenal and on a consultative basis with the Navy's Bureau of Medicine and Surgery.

In the Field. TV's versatility is not confined to the laboratory; it also applies to the test field. A well-equipped TV van enables the group to move quickly and smoothly to remote areas for on-the-spot videotaping. Earlier this year, the Naval Unit installed some of its portable equipment in a 2½-ton truck, and the entire "package" was airlifted to Dugway Proving Ground, Utah.

The truck and equipment are readily available for loading when the call comes from the field. All essential hardware for field use is in place. The truck can be driven directly aboard a cargo-carrying aircraft and carried virtually to any destination.

Magnification. Another area where TV

proves its usefulness is in its capacity for magnification. Typical of this is the measurement of variation in pupil size. With the camera focused directly on the eye, an enlargement of the eye appears on the monitor where it is easily measured on a scale. The old method required a small measuring device to be held in front of the eye. This provided results only with great difficulty and questionable accuracy.

Split-Screen. Still another advantage is television's split-screen effect. While one camera focuses on the general subject, a second camera is aimed at a specific area of that subject or some other item of interest. The image from the second camera appears in a corner of the monitor screen, enabling the viewer to watch both areas at the same time.

For example, a clock placed in the corner of the screen allows the viewer to see how much time elapses during the various stages of a test.

Conferences by TV. In the Edgewood Arsenal laboratories, the television system allows the scientist to make use of additional expert opinion without leaving his work bench. When a scientist wishes to obtain another opinion on a subject, he switches on a camera which transmits the TV image to a monitor in another lab. Voice contact between the two labs is accomplished by adding audio to the TV hookup, or by using a telephone.

Science-Oriented. Assisted by one electronic technician and an audio-visual production officer, Matter maintains a daily schedule of televising, replay and evaluation. "Since our tapes and films are of a highly scientific nature," he points out, "the emphasis is on having one expert talk to others."

Placement of a camera for viewing an experiment, or preparation of a work bench for a demonstration, is left largely up to the scientist himself — rather than to a television production manager.

"We offer helpful comments on lighting, sound and positioning," Matter said, "but we recognize the vital importance of having the scientist use TV as a direct aid in speaking to his fellow professionals in their own idiom without production gimmicks."



TV PROVES usefulness through its capacity for magnification. With camera focused on the eye, any change is readily measured on the scale placed on the monitoring screen shown here.