



ARMY RESEARCH AND DEVELOPMENT



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Beach Takes Command Of CDC; Dick Selected As Army Chief of R&D

Rapid-fire actions in Army research and development top leadership positions in recent weeks reached a climax of changeover Aug. 20. Lt Gen Dwight E. Beach succeeded the late Gen John P. Daley as CG of the Combat Developments Command on that date, and Lt Gen William W. Dick took over 10 days later as Chief of Research and Development.

Effective Aug. 20 also, Lt Gen Charles B. Duff ended 11½ months of duty as Comptroller of the Army when he stepped into the spot vacated by General Dick as CG of the U.S. Army Air Defense Command. Simultaneously, Maj Gen Robert Hackett, Director of the Army Budget, OCA, since Aug. 1, 1962, was installed as General Duff's successor.

Another reassignment of considerable interest to the Army R&D community is that of Maj Gen Charles H. Bonesteel III, a distinguished Army Engineer who had served since April 1962 as CG of the VII Corps, U.S. Army, Europe. His new job, effective (Continued on page 4)

Army Prepares Pilot Program Geared to DoD Goals Of Career System for Project Management Offices

Department of Defense emphasis on the project manager approach to development of weapon systems is behind a new Army pilot program, "Career System for Staffing Project Management Offices."

Approved by Secretary of the Army Cyrus R. Vance, and developed under his instructions following discussion with Secretary of Defense (Manpower)

Hawkins Named ASA (R&D)



Willis M. Hawkins
(See story on page 3.)

Norman S. Paul, the program is to be implemented by Army Civilian Personnel Regulation, CP-2. The CPR is expected to be off the press in September or October, and a tentative schedule calls for program implementation on or about January 1.

In a memorandum to the Army Chief of Staff based upon his discussion of project manager policies with Secretary Paul, Mr. Vance reported: "We are agreed that personnel policies and procedures throughout the Department of Defense must provide the most efficient possible support of weapon systems management programs. . . ."

The Army program is designed to serve as a pattern for broader use in coordination with the Office of the Assistant Secretary of Defense (Manpower). Objectives include: To attract, develop and retain the highest quality manpower to meet staffing requirements of Department of the Army project management offices throughout the U.S.

Initially, however, the pilot program will be limited to the 35 (present total and subject to change) project management offices within the jurisdiction of the U.S. Army Materiel Command headed by Lt Gen Frank S. Besson, Jr. About 1,600 personnel in professional, technical, administrative and managerial positions are affected.

Because of the broad diversity of (Continued on page 6)



Lt Gen William W. Dick

Brig Gen Lotz Selected Director of Army Research

A quarter century of progressively responsible assignments in military communications, interrupted only by studies to earn M.S. and Ph.D. degrees, backs up Brig Gen Walter E. Lotz, Jr., the new Director of Army Research.

Graduated from the U.S. Military Academy in 1938 with a B.S. degree,

General Lotz earned an M.S. at the University of Illinois in 1947 and a Ph.D. at the University of Virginia in 1953. Presently he is acting CG of the U.S. Army Electronics Command, Fort Monmouth, N.J., and will report for his new assignment Oct. 3.

Similarity in the educational back- (Continued on page 6)

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

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QM R&E Field Evaluation Agency's Role

"Important as new machines and weapons are, they do not have the heart and soul and logic to keep the peace, or if necessary, to wage war. They can only increase the fighting man's capabilities in a hostile environment. No weapon or machine is any more effective than the men who operate and maintain it."—Lt Gen Dwight E. Beach, Commanding General, U.S. Combat Development Command and former Chief of Research and Development.

The condition is RED and all systems are GO! Button, button, who will push the button?

The answer, of course, is a man; a well-trained, highly effective fighting man whose food, clothing and equipment have been engineered to provide maximum protection from the hazards of a battlefield environment, and at the same time afford adequate operational effectiveness.

Today, when much of our research and development effort is directed toward the perfection of "exotic" weapons, and guided missiles are the "glamour boys" of advanced firepower, man is still an essential element whose effective performance at a critical moment may well be the key to military success on the battlefield.

Weapons systems, no matter how superior they may be, and troops, no matter how well trained, are fully effective only insofar as they can be deployed and utilized to maximum advantage under the environmental stresses of combat any place in the world where they may be needed.

Importance of the combat effectiveness of the United States soldier is nowhere more readily recognized or more strongly emphasized than at the U.S. Army Quartermaster Research and Engineering Field Evaluation Agency. An activity of the U.S. Army Test and Evaluation Command, the Agency is located at Fort Lee, Va.

To the visitor or casual passerby, the Agency Headquarters, situated among towering pine trees and surrounded by still visible Civil War entrenchments, presents a tranquil setting though it controls a global testing operation.

Housed here is a close-knit team of inquiring military and civilian scientists and technologists, dedicated to the purpose of assuring that the U.S. fighting man is supplied with palatable, nutritious food and functionally suitable clothing and equipment.

The attitude of the Agency regarding the military potential of all experimental items of food, clothing, equipment, or systems that are submitted for evaluation is aptly expressed by its motto "Nous Verrons," translated "We Shall See." Exhaustive testing of each item is a rigid responsibility.

The staff of the Agency, under the command of Col Gus H. Montgomery and the guidance of Dr. Howard W. Hembree as Scientific Director, works to assure that food, clothing and Quartermaster equipment meet requirements under the most exacting conditions of terrain, weather and combat-type environmental factors.

Established initially in 1934 as the Quartermaster Corps Board at Schuylkill Arsenal in Philadelphia, as part of the Quartermaster School, the Agency later had its title shortened to the Quartermaster Board before assuming its present name, which is more indicative of its mission.

Originally it functioned as policy committee on matters of Quartermaster administration. In the early stages of World War II it was separated organizationally from the Quartermaster School and its primary mission became the field evaluation of Quartermaster items of food, clothing and equipment.

In 1957 the FEA was assigned the additional responsibility of testing systems and concepts, such as field feeding, petroleum products dispensing, and air delivery systems. For over two decades it has been engaged continuously in conducting scientific field tests of experimental items of materiel, systems and techniques.

Reorganization of the U.S. Army made the Agency a field element of the U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, Md., on Aug. 1, 1962. Currently the mission of the FEA is to conduct, supervise or participate in engineering studies, evaluations, engineering design tests, engineering and service tests, production, product improvement and surveillance tests of Quartermaster materiel, systems and techniques.

The FEA conducts research and studies in methodology, with a view to improving validity, reliability, efficiency and techniques used in assigned testing

(Continued on page 26)

Industrial Aircraft-Missile Leader, ASAP Member Selected as ASA (R&D)

Appointment of Willis M. Hawkins as Assistant Secretary of the Army for Research and Development was announced Aug. 26 by the White House. General manager and vice president for engineering of Lockheed Aircraft Corp. when selected, he has served on the Army Scientific Advisory Panel since April 1957.

Subject to Senate confirmation as successor to Dr. Finn J. Larsen, who resigned effective July 31 to return to a top executive post with Minneapolis Honeywell Co., Mr. Hawkins is expected to report for his new duties on or about Sept. 23.

Observation of Mr. Hawkins' capabilities as a member of the ASAP, including duty on two important subpanels now engaged in top priority studies, prompted a high-ranking official of the Office of the Chief

of Research and Development to say:

"As long as we had to lose Dr. Larsen, who earned the respect and esteem of all who were privileged to be associated with him in his duties, we could not be more fortunate in the choice of the man selected to carry on."

Graduated from the University of Michigan in 1937 with a B.S. degree in aeronautical engineering, the new ASA (R&D) joined the staff of Lockheed shortly thereafter and was assigned to the Preliminary Design Office. From 1947 to 1953, he was head of that Division.

Promoted to director of engineering of the Lockheed Missiles and Space Co., he served in that capacity for four years, then took another step up the ladder as assistant general manager for operations, and in 1958 became assistant general man-

ager. In 1961, he advanced to vice president and general manager of the Space Systems Division.

Creative talents of Mr. Hawkins in research and development are attested by a number of patents on complete aircraft designs and five major patents on aircraft component designs. He also has been associated with and has contributed substantially to missile development from the time Lockheed entered the field.

In his last assignment with Lockheed, he provided weapons system management of the research, development, production and test activities necessary to the creation of a family of military satellite systems.

The U.S. Navy Distinguished Public Service Award recognized his notable achievements in 1961.

Professional affiliations include: American Rocket Society, of which he is a Fellow and a past member of the board of directors of the Southern California Branch; Institute of Aerospace Sciences (Fellow and past chairman of the Southern California Section); American Ordnance Association (member of the Missile and Space Division, vice president and member of the board of directors, San Francisco Section); Navy Polaris Steering Task Group; and Tau Beta Pi fraternity.

OCRD Staff Pays Tribute to General Beach at Party

Parties at which devoted and dedicated employees and their spouses pay farewell tribute to military leaders who have earned their right to admiration and affection are, by tradition, somewhat sentimental affairs at which normally stern and dignified men may show the trace of a tear.

When virtually 100 percent of the employees in the Office of the Chief of Research and Development and many others in closely related agencies gathered to pay farewell respects to Lt Gen and Mrs. Dwight E. Beach, ceremonies held true to Army tradition — only more so than usual, marked by a depth of affection only men with rare leadership qualities can inspire.

Tributes flowed freely from all sides, spearheaded by the comments of Col Donald D. Blackburn, Chief of the Special Warfare Division, who presided as master of ceremonies, and by Maj Gen George W. Power, Deputy CRD designated to fill in as CRD pending arrival of Lt Gen W. W. Dick Aug. 31.

Sincerity sometimes may be suspect on such occasions—the natural result of a prideful disposition to try to outdo each other in qualifying as "pretty fair country orators"—but at the party in the beautiful new Officer's Club at Cameron Station, sincerity was so obvious it was painful, the hurt of parting felt by all.

A scroll presented to General Beach, signed by OCRD directors and their executives, division chiefs, office chiefs and Executive Office per-

sonnel, provided a proper indication of esteem:

"This scroll is presented as a token of our admiration, respect and affection. With complete dedication, you guided, prodded, ordered, convinced, led and inspired us to give our best efforts in support of that lonely individual at the end of the line . . . the combat soldier on the battlefield. May we have the privilege of serving with you again."



FAREWELL PARTY presentations to Lt Gen Dwight E. Beach, whose anticipated 3-year tour as Chief of Research and Development was cut short by assignment to succeed the late Lt Gen John Daley as CG of the Combat Developments Command, included an artist's drawing to remind him of his days as CG of the 82nd Airborne Division. Deputy CRD Maj Gen George W. Power (left) made the presentation. Mrs. Beach is the delighted observer.

Beach Takes CDC Command; Dick Selected as Army R&D Chief



Maj Gen Robert Hackett



Maj Gen Charles H. Bonesteel



Lt Gen Charles B. Duff

(Continued from page 1)

Aug. 20, is Director of Special Studies, Office of the Army Chief of Staff.

Never before in the history of Army research and development have so many top-level changes occurred in so short a span of time. In roughly two months, Dr. Finn J. Larsen resigned as Assistant Secretary of the Army (R&D), following closely upon the resignation of his Deputy, Wilbur S. Hinman, Jr.

Lt Gen William J. Ely then was reassigned from Deputy CG, U.S. Army Materiel Command, to Deputy Director of Defense Research and Engineering (Administration and Management).

That resulted in Maj Gen Jean E. Engler's reassignment to fill Ely's AMC position and Maj Gen C. W. Clark being shifted from Director of Army Research to succeed Engler as CG, U.S. Army, Japan. Dr. Richard A. Weiss, Deputy and Scientific Director of Army Research, left at the same time for a 10-month course at the National War College.

GENERAL BEACH served as Deputy CRD under Lt Gen Arthur G. Trudeau for 13 months until he relieved him upon retirement from the Army on June 30, 1962. Born in Chelsea, Mich., in 1908 and graduated from the U.S. Military Academy in 1932, he gained many honors as a distinguished combat Artillery officer in World War II in the Pacific and in the Korean War.

Anyone saying of General Beach that "wild horses couldn't stop him" would have ample support for the statement. Shortly after Pearl Harbor, he organized and commanded in the Southwest Pacific the 167th Field Artillery Battalion, using wild horses

purchased in Australia. The horses later gave way to tractors and his unit took part in the campaigns from Australia through New Guinea to the Philippines and Japan.

After taking part in amphibious assaults at Aitape, Maffin Bay, Wakde and Palawan and in the follow-up phase of amphibious operations in Biak and Zamboango, as well as at Davao, he was returned to the States. Subsequent assignments have included: Artillery commander, 11th Airborne Division; Artillery commander and, later, CG of the 45th Infantry Division in Korea; Deputy Chief of Staff for Plans and Combat Operations and, later, Chief of Staff, Eighth U.S. Army, Korea.

In 1955 he became Director, Special Weapons Development, U.S. Continental Army Command, followed by service as Director of Guided Missiles and then Director of Air Defense and Special Weapons until 1959, when he was ordered to Fort Bragg, N.C., as CG of the 82nd Airborne Division.

Included in his long list of decorations are the Silver Star, Legion of Merit, Bronze Star Medal, and Air Medal with Oak Leaf Cluster.

GENERAL DICK served from July 1960 to April 1961 as Deputy Chief of Research and Development, leaving to take command of the 3rd Infantry Division, U.S. Army, Europe. He became CG of the U.S. Air Defense Command in September 1962 upon promotion to 3-star rank.

Military tradition was ingrained in General Dick by his life in various Army posts in the U.S. and overseas as the son of a colonel (deceased). Born in 1910 in Montgomery, Ala., he entered the U.S. Military Academy under a Presidential appointment and was graduated in 1931.

When the Japanese attacked Pearl Harbor, he was on duty with the 25th Infantry Division in Hawaii and he fought with it during four years in the Pacific as a battalion and division Artillery commander, executive and chief of staff.

The outbreak of the Korean War again found him in Japan with the 25th Infantry Division, and he served with it during six campaigns of that war. Subsequent assignments were with the 31st Division, Artillery in the U.S., as an Artillery commander and, later, chief of staff with the Seventh U.S. Army in Germany. Two years as deputy commander of Joint Task Force Seven preceded his first assignment to the Office of the Chief of Research and Development in 1958 as Director of Special Weapons.

General Dick's decorations include the Legion of Merit (with two Oak Leaf Clusters), Bronze Star, and presidential citations from the Republic of Korea and the Republic of the Philippines.

GENERAL DUFF takes into his new ARADCOM assignment an illustrious combat record that began at the outbreak of World War II, when he was in command of a 16-inch gun battery defending the Pearl Harbor coast. Until reassigned to Washington, D.C., in 1945, he held battalion, group and regimental command posts, served as assistant harbor defense commander at Coast Artillery installations in Hawaii and in the Mariana Islands, and as an Artillery officer with the Saipan Garrison Force.

More than eight years of assignments in the Washington, D.C., area followed his return to the U.S., including service with the War Department General Staff, as a logistical analyst with the Joint Logistic Plans Committee of the Joint Chiefs of

Staff, and in the Budget Division.

In 1953 he was assigned to Korea as executive and then commander of the 45th Division Artillery before taking command of the 55th AAA Brigade. Returned to the U.S. in 1954, he served as an instructor at the Industrial College of the Armed Forces for one year. Three years as commander of the 52nd AAA Brigade, ARADCOM, and a year as assistant chief of the Estimates and Funding Division, Office of the Director of Army Budget, preceded his assignment as Director of the Army Budget in June 1960.

Decorations General Duff is entitled to wear include the Legion of Merit, Bronze Star with Oak Leaf Cluster, V Device to Bronze Star Medal for Valor, United Nations Service Medal, and Korean Service Medal.

GENERAL HACKETT was graduated from the U.S. Military Academy in 1931 in the Field Artillery and for nine years served in the U.S. and Philippine Islands. Four years as an instructor and, later, professor in the Department of Physics at the U.S. Military Academy preceded his assignment early in 1944 to Office of the Assistant Chief of Staff, G-1, U.S. Armed Forces in the Far East. He was credited for participation in the

New Guinea, Southern Philippines and Luzon campaigns.

Except for attending the Industrial College of the Armed Forces in 1952, General Hackett served continuously from 1948 through 1957 in budgetary and comptroller assignments in the U.S. and in Germany. From 1951 to 1957, he was closely associated with financial studies related to NATO membership costs and the Federal Republic of Germany contribution toward the maintenance of the Occupying Powers and later the Allied Forces in Germany.

Two years as CG of the Division Artillery, 25th Infantry Division in Hawaii were followed by his return to the U.S. in July 1959 to head the 56th Artillery Brigade (Air Defense) and in June 1960 he took command of the First Region, U.S. Army Air Defense Command.

GENERAL BONESTEEL followed his graduation from the U.S. Military Academy in 1931 with studies at Oxford University in England, and received a B.A. degree (1934) in politics, philosophy and economics. He is also a graduate of the National War College.

In World War II he served in England, Iceland, North Africa, Sicily and France, including service as Act-

ing Chief of Plans for Field Marshal Montgomery at the time of the Normandy invasion.

Following the war he held a series of high level diplomatic assignments—as Special Assistant to Under Secretary of State Robert Lovett in work on the Marshall Plan, as Military Attache at Large with Ambassador Averell Harriman, Chief of the Marshall Plan in Europe, and in London as deputy to Ambassador Spofford with the NATO Council Deputies.

From 1953-56 he was the Department of Defense member of the Planning Board of the National Security Council, then served a tour in Korea with the 24th Infantry Division, and in March 1958 was detailed as Secretary to the General Staff, Headquarters, Department of the Army in Washington, D.C.

2396 USAR R&D Unit Begins Study on Thin Film Devices

An example of military research projects assigned to U.S. Army Reserve R&D Units is the study initiated recently by the 2396 Unit at Columbus, Ohio, on "Materials, Processes and Film Characteristics of Thin Film Passive Parts and Integrated RC Networks."

A report to the Chief of Research and Development is to be made upon completion of the work, the object of which is to enhance the military use of thin film devices in electronics.

The project, No. 213, was approved by the U.S. Army Electronics Research and Development Laboratories, Fort Monmouth, N.J. Work is being done by Capts K. W. Fisher and C. T. Huck, Army Signal Corps.

The nature of the project was explained to Lt Col Robert J. Hebert, Assistant for Reserve Affairs, Office of the Chief of Research and Development, and Lt Col W. B. Murray, who has since succeeded him, during a recent visit to the 2396 Unit.

Maj Gen Moorman Becomes Electronics Command CG

Maj Gen Frank W. Moorman, most of whose past 22 years have been in Signal Corps or staff level assignments, succeeded Brig Gen W. E. Lotz, Jr., Aug. 30 as CG of the U.S. Army Electronics Command, Fort Monmouth, N.J.

Graduated from the U.S. Military Academy in 1934, General Moorman has served since 1960 as Chief Signal Officer at SHAPE Headquarters in Paris, France, where he served from 1955 to 1958 as military attache. In between he was CG of the U.S. Army Electronics Proving Ground, Fort Huachuca, Ariz. From 1953 to 1955, he was secretary to the Army General Staff, Washington, D.C.

Other key assignments include: Command and General Staff College, Fort Leavenworth, Kans., instructor (1948-50); Army General Staff, Washington, D.C. (1950-51); secretary to the General Staff, Far East Command (1951-52); Mediterranean Theater of Operations, staff officer (1945-46); United Nations Military Staff Committee, New York City (1946-47).

During World War II, he served as a signal officer with the 82nd Infantry (later Airborne) through cam-

paigns in Sicily, Italy and Normandy, and was then appointed assistant chief of staff, G-4. Later, in that same capacity with the XVIII Corps (Airborne), he served in the European campaign until he was assigned in 1944 to the Far East Command. In 1945 he returned to the staff of the Mediterranean Theater of Operations.

General Moorman has been awarded the Legion of Merit with three Oak Leaf Clusters, the Bronze Star and the Army Commendation Ribbon.



Maj Gen Frank W. Moorman

651 ROTC Schools Placed On Newsmagazine Distribution

In cooperation with the Chief of the Office of Reserve Components, this and subsequent issues of the Army Research and Development Newsmagazine will be distributed to 651 schools that participate in the ROTC Program.

Information in the Newsmagazine, it is believed, will bring to the campuses of the Nation the nature of the scientific and intellectual challenge that exists in research and development for the modern Army, and thereby serve scientific recruitment.

Brig Gen Lotz Named Director of Army Research

(Continued from page 1)

ground and laboratory administrative experience of General Lotz and Maj Gen C. W. Clark, who had served as Director of Army Research since April 1962, was highlighted Aug. 8.

The occasion was a farewell party for General Clark, who became Commanding General of the U.S. Army, Japan, effective Aug. 23, and Dr. Richard A. Weiss, Deputy and Scientific Director of the U.S. Army Research Office for nearly five years, has taken a 10-month leave of absence to attend the National War College.

Col Charles B. Hazeltine, Jr., Assistant Director of Army Research, presided over the festivities, attended by more than 150 associates of General Clark and Dr. Weiss, and stated:

"When General Clark reported for duty, I introduced him as the only military officer with a Ph.D. in Army Research. Now that General Lotz is here, I'll admit I made an error."

From 1959 to 1962, General Lotz served at the U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz., first as Chief of Electronic Warfare, then as Director of Systems Development, and later as commanding officer of the Combat Developments Command before becoming deputy commander of USAEPG.

After obtaining his doctorate, he

Nike Zeus Leaders Take Different Responsibilities

Upon his graduation from the Industrial College of the Armed Forces at Fort McNair, Washington, D.C., Col Glenn Crane succeeded Lt Col Edward M. Dooley in mid-August as head of the Nike Zeus Pacific Field Office.

From July 1960 to July 1962, Col Crane was Nike Zeus antimissile missile system project manager at Redstone Arsenal, Ala. His reassignment to Kwajalein Island was announced by Col I. O. Drewry, who succeeded him at Redstone, with expanded control and responsibility, when the Nike Zeus project became an element of the U.S. Army Materiel Command.

Col Dooley's new assignment is chief of the project manager's staff office at Materiel Command Headquarters in Washington, D.C. One of the Nike Zeus pioneers, he has been with the project since 1957. He organized the Redstone office in 1958 and was its chief until 1960.

was assigned to the Research and Development Division, Office of the Chief Signal Officer in Washington, D.C., for two years. Graduated from the Industrial College of the Armed Forces in June 1956, he was assigned for one year as Signal Officer, Eighth U.S. Army, Korea, and in the same role for two years with the U.S. Army, Pacific, Fort Shafter, Hawaii.

During a 3-year tour (1947-50) at the Army Signal Corps Research and Development Laboratories, Fort Monmouth, he was first Chief of the Meteorological Department, then Deputy Director of Evans Laboratory.

In 1944 he was ordered to Headquarters, Ninth Air Force in England and accompanied it to France, Luxembourg, Belgium and Germany as Assistant Director of Communications. Next he served as Director of Communications of the Ninth Air Force, later redesignated the XII Tactical Air Command.

Among the numerous medals he is entitled to wear are the Legion of



Brig Gen Walter E. Lotz

Merit, Bronze Star Medal, French Croix de Guerre with one star, Belgian Croix de Guerre with palm, and the European-African-Middle East Campaign Medal with five stars. He is a Senior member of the Institute of Radio Engineers and a member of the Armed Forces Communications Association and Society of Sigma XI (national honorary research society).

Army Prepares Pilot Program Geared to DoD Goals

(Continued from page 1)

the occupational specialties involved in the AMC project offices, about 60 specialties in all, the pilot program utilizes existing DA career programs rather than a separate occupationally oriented career field. About 97 percent of the positions are in occupations covered by operational DA civilian career programs.

All Department of the Army civilian employees who meet basic qualification requirements for specific occupational series will be eligible for admission to the project management career system. Recruitment from outside the Army is an expedient that will be used only when Army rosters do not provide candidates of sufficiently high caliber.

Development and administration of the program is assigned to the Army Materiel Command. The Office of the Deputy Chief of Staff (Personnel) is responsible for coordinating the system with the overall civilian career Department of the Army planning.

Selection, placement, promotion and reassignment of personnel for project manager positions will be in accordance with the Federal Civil Service merit promotion system. An Army-wide career referral system will utilize qualification inventory records within Civilian Personnel offices, to

ensure that the most capable individuals are identified and considered for each project.

Project management assignments, despite their fluidity, are to be made as attractive as feasible to insure that as capable, well-trained personnel are phased out of one assignment their skills will be used in another.

Training and retraining programs are to be tailored to meet present and projected needs of project management offices, and with a view to correcting marginal performance. Successful performance is to be rewarded by appropriate monetary and honorary recognition, and by promotional opportunities.

Project offices involved in the program are located at U.S. Army Materiel Command Headquarters, Washington, D.C.; U.S. Army Munitions Command, Dover, N.J.; DESERET Test Center, Fort Douglas, Utah; U.S. Satellite Communications Agency, Fort Monmouth, N.J.; U.S. Army Missile Command, Redstone Arsenal, Ala.; U.S. Army Electronics Command, Fort Monmouth, N.J.; U.S. Army Mobility Command, Center Line, Mich.; U.S. Army Weapons Command, Rock Island Arsenal, Ill.; U.S. Army Electronics Proving Ground, Fort Huachuca, Ariz.; U.S. Army Engineer Research and Development Laboratories, Ft. Belvoir, Va.

STINFO Leaders Planning for R&D Engineering Data System

Activation of an R&D Engineering Data and Information System is one of the next prime objectives in development of the overall Army Scientific and Technical Information Program.

A letter of instructions for a planning meeting Sept. 5 at U.S. Army Research Office Headquarters in Arlington, Va., called for representation from four major elements of the U.S. Army Materiel Command—the Mobility, Munitions, Weapons and Missiles Commands—and Corps of Engineers.

Preliminary discussions at the meeting will be directed toward the preparation of a detailed study of the Army-wide problem of establishing a total automated Army RDT&E Engi-

neering Data and Information System. The study is to begin not later than the second quarter of FY 1964.

As envisioned by leaders of the Army Scientific and Technical Information Program (STINFO), the system would provide for automated encoding, storing, retrieving and transmitting of RDT&E engineering data and drawings in the form of a digital or computer language. The system would complement the microfilm facility at the U.S. Army Missile Command, Redstone, Ala.

Feasibility of such a system appears promising on the basis of limited application of techniques demonstrated by the Allison Division,

General Motors Corp. Experiments have used a draftsman digital language on magnetic tape to drive a 5 x 12-foot automatic plotter for preparation of a variety of engineering drawings in the turbine area.

The letter of instructions cited also "the potential for the establishment of an automated searchable file for data allied with engineering drawings." Systems for retrieval of documents have been demonstrated in information centers at Western Reserve University, the Defense Documentation Center (formerly ASTIA), Ohio State University, and the National Aeronautics and Space Administration center operated by Documentation Inc.

Other phases of the Army STINFO program are moving ahead. A briefing scheduled Sept. 17 in Washington, D.C., will acquaint an anticipated several hundred representatives of the pharmaceutical and chemical industries with plans for the Chemical Information Data System (CIDS) and use of the new Army Chemical Typewriter in a broad network.

Invitations to the briefing have been addressed to representatives of the President's Committee on Scientific Information, top scientific information officials of other Government agencies, and other leaders in research activities.

Meanwhile, plans are nearing completion for the initiation of an Army-wide survey and evaluation of existing information resources. The objective is to determine what needs to be done to standardize equipment and methodology insofar as practicable in an integrated but decentralized effort coordinated through the Army Director of Technical Information.

Maj Gen McMorrow Dies at 52; Headed Army Missile Command

Maj Gen Francis J. McMorrow, 52, who had served since May 1962 as leader of the U.S. Army Missile Command, Redstone Arsenal, Ala., died of a heart attack Aug. 24. Cautious by his physician about remaining on duty after several earlier attacks, his devotion to duty prevailed to the end.

Recent assignments in a 30-year Army career included: Deputy CG, Army Ordnance Missile Command (1961-62); director of the Procurement Office, DCSLOG, Washington, D.C. (1959-61); CG of Aberdeen Proving Ground, Md. (1957-59); executive to the Chief of Ordnance, Department of the Army (1951-54).

USARO Personnel Switch Jobs in U.S., Europe

Occupants of three key positions in physical sciences at Headquarters, U.S. Army Research Office, and at USARO-Europe, are switching assignments.

Dr. Bernard R. Stein, author of the widely read "Status Report No. 1 on Fuel Cells," a U.S. Army Research Office Publication in 1959 which set a record for total sales by the Office of Technical Services, U.S. Department of Commerce, will return to his old job as an action officer at USARO Hq.

Dr. Sidney J. Magram, Chief of the Chemistry and Materials Branch of the Physical Sciences Branch at USARO Hq. since 1958, will fill the spot being vacated by Dr. Stein in October at USARO-Europe. In his new assignment he will deal with contract agencies in an advisory and monitoring capacity on research in the physical sciences.

Lt Col Louis G. Klinker, assigned to USARO-Europe for a 3-year tour before taking his present staff duty officer job at USARO Hq., will move up to replace Dr. Magram as Chief, Chemistry and Materials Branch.

A graduate of the University of Pittsburgh with a B.S. degree (1937) and a Ph. D. in chemistry from New York University (1940), Dr. Magram has been affiliated with the Government as a physical chemist and physical science administrator for 23 years.

As Branch Chief, he was responsible for staff mentorship of all Army research projects on materials, energy conversion, fuels, lubricants, propellants and explosives. He represented the Army on many advisory and working groups for the Department of Defense, other U.S. Government agencies and agencies of other

governments.

In his new liaison capacity, Dr. Magram will maintain contact with U.S. and European scientists, universities, research institutes, professional societies and Government agencies connected with research and development.

His first 18 years of Government service was with the U.S. Army Chemical Corps on research and development of smoke screens, colored smokes, generation of toxic agents, thermit igniters and incendiaries, flame thrower igniters, production and properties for aerosols, and general chemistry measurements.

DR. STEIN received his B.S. degree in chemistry from Northeastern University, Boston, Mass., (1949), his masters at the University of Tennessee (1950) and Ph. D. from the Catholic University, Washington, D.C., (1954). His education was interrupted for two years during the Korean War.

In 1954 Dr. Stein was awarded a Fulbright Scholarship, and in 1956 an Alexander von Humboldt Stiftung Grant at the Max Planck Institute for Physikalishe Chemie.

He returned to the University of Ottawa for post-graduate studies.

COL KLINKER, a Purdue University graduate (1934), has been Deputy Chief, National Engineering Branch, Ordnance Ammunition Command; Chief, Materials Division, USARO-Europe; and Chief Engineer, the Glidden Co. (Chemical-Pigment-Metals Division), as a civilian. He has written articles for numerous metallurgical publications.

In addition, he has had seven patents approved to the Glidden Co., and three to the Johnson Bronze Co.

WRAIR Preparing to Host Ninth U.S. Army Human Factors R&D Conference

Substantially broadened areas of discussion account for the changed name of the U.S. Army Human Factors Research and Development Conference (formerly Human Factors Engineering Conference), Oct. 14-17.

The ninth annual assembly is expected to attract 250 to 300 well-known leaders of human factors research, including a large representation of industrial firms, to Walter Reed Army Institute of Research, Washington, D.C.

Attendance is by invitation only. Commercial firms and educational institutions may request an invitation through the Army R&D agency with which they have a contract, or have worked for on other projects.

Sponsored as in previous years by the Office of the Chief of Research and Development, the conference will be hosted by the U.S. Army Medical R&D Command, Office of the Surgeon General. The introductory conference in 1953 was held at the Pentagon in Washington and subsequent meetings have been held in different cities each year.

All areas of human factors research of interest to the U.S. Army are on the agenda for discussion this year for the first time, including psychophysiology, personnel management, psychological operations, unconventional warfare, special training, and human factors engineering. Army Chief Psychologist Dr. Lynn E. Baker is general chairman.

Discussions will seek to improve interchange of information on requirements, accomplishments, and future plans among Army agencies and research and development contractors on human factors problems.

Army Chief of Research and Development Lt Gen William W. Dick will give the keynote address Oct. 14, following welcoming remarks by Maj Gen A. L. Tynes, MC, Commander of Walter Reed Army Medical Center, and Col William Tigertt, commanding officer of WRAIR.

Eighteen topics will be discussed in six sessions. In the first session, the Director of the Division of Neuropsychiatry at WRAIR, Dr. McK. Rioch, will speak on the Relations Between Military Psychiatric Research and Human Factors Engineering.

During the second session William W. Dawson will discuss The Functional Aspects of Ionizing Irradiation of the Retina; Lt Col Harold L. Williams, Primary Task Factors in the Reduction of Performance Decrement; Bruce O. Bergum, The Influ-

ence of Task and Environmental Variables on the Maintenance of Vigilance Performance; Pfc James T. O'Connor, Human Factors Study of Design Configurations for the Laser Range Finder; and B. J. Dougherty, Joint Army, Navy, Airforce (JAN-AIR) Display Systems: Simulator and Flight Evaluations.

Speakers and topics at the third session are: Maj R. J. T. Joy and R. F. Goldman, Some Effects of Chemical Biological Protective Clothing on Soldier's Performance in Hot Climate; James P. Torre and Robert T. Gschwind, Rocket Gunner Stability in a Dynamic Firing Environment; and Francis M. McIntyre and John Waugh, Firing Shock Effects on Gunners in a Light-Weighted Armored Vehicle.

Session No. 4 is devoted to touring the WRAIR main laboratory facilities, the psychology laboratories at Forest Glen and prosthetics lab.

Five topics comprise the fifth session: Milton Jacobs, A Study of Word-of-Mouth Communications in

Thailand; Seymour Ringel, Charles H. Hammer and Frank L. Vicino, Information Assimilation from Command System Displays; R. E. Packer, Automatic Data Processing (ADP) Brevity Coding—Design of Compatible Info-Transfer Vocabularies Between Personnel and Processors of the Fielddata; Peter Zakanycz and Hal Buckbee, Human Factors Considerations in Army's New Multichannel Carrier System Employing pulse Code Modulation; and Maurice A. Larue, Jr., An Experimental Evaluation of the Application of Programmed Instruction and Teaching Machines to Weapon System Training.

Subjects at the concluding session are: Philip I. Sperling, Criteria for Military Social Science Research; Dr. Arthur J. Drucker and J. E. Uhlener, Criteria for Human Performance Research; Eugene A. Cogan, The Evaluation of Systems, Analytic Training Programs; and Leon T. Katchmar, Human Factors Engineering Criteria for Various Stages of Systems Research and Development.

Milburn Succeeds Doan as Deputy Surgeon General

Deputy Surgeon General of the Army is the new title of Brig Gen Conn L. Milburn, Jr., MC, who succeeded Maj Gen Howard W. Doan, MC, upon his assignment as Executive Director, Office for Dependents' Medical Care in Denver, Colo.

Formerly Director and Commandant of the Walter Reed Army Institute of Research in Washington, D.C., General Milburn later served as head of the Personnel and Training Directorate, Office, Surgeon General.

A career in Army Medical Service began with an Army internship at William Beaumont General Hospital, El Paso, Tex., following graduation from Tulane University School of Medicine with a doctor's degree in 1935. Earlier studies were at Hampden-Sydney College, Va., and Southern Methodist.

Until World War II he served in the Panama Canal Zone and various professional and staff duty positions in the United States. Subsequently he served as an operations officer and later as Deputy Group Surgeon of General Omar Bradley's Twelfth Army Group.

From 1945-48 he was a resident in Pediatrics at Brooke General Hospital, Fort Sam Houston, Tex., and a Fellow at the Babies and Children's Hospital, Cleveland, Ohio. Assignments followed as Chief of the Pedi-

atrics Services at Letterman General Hospital, San Francisco, Calif.;

Director of the Department of Professional Sciences, Medical Field Service School, Brooke Army Medical Center; Assistant Army Attache for Medical Research at the American Embassy in London, England; Surgeon, Military District of Washington; and Director of Graduate Education, Walter Reed General Hospital, Washington, D.C.

In 1956 he was awarded the degree of master of hospital administration by Baylor University, Waco, Tex., and the following year received a master's degree in public health from the Royal College of Physicians and Royal College of Surgeons, England.

General Milburn is a Fellow of the American College of Physicians, a member of the American Medical Association, a nominee of the American College of Hospital Administrators, the Association of Military Surgeons of the U.S., the Theta Chi fraternity and the Phi Chi medical fraternity. Among his decorations are the Croix de Guerre of France and Belgium, and the Couronne de Chene of Luxembourg.

He is married to the former Hebe Reynolds whose home was in Washington, D.C., when her father, the late Maj Gen Charles R. Reynolds, was the Army Surgeon General.

Dramatic Medical Event in Portugal . . .

U.S. Army Colonel, Nurse Help Give New Eyes to Girl

An operation performed by a former Chief of Ophthalmology at the Army's Walter Reed General Hospital in Washington, D.C., with the aid of nurse Claire McNair, wife of the man now in that job, has restored the sight of a 13-year-old girl in the first corneal transplant in the history of Portugal.

Interwoven in the mission of mercy story are an ancient Portuguese law, Dr. John Harry King, Jr., a retired Army colonel whose skill was used in his role as National Ophthalmology Consultant for Medico, CARE's medical arm that reaches around the world, and International Lions Club.

Dr. King is renowned as the researcher who worked with Col Joel McNair, now Chief of Ophthalmology at Walter Reed, in developing at that hospital the method of preserving corneas which has since become standard practice. Col McNair was recently awarded the "A" prefix in Ophthalmology, a coveted honor.

When the International Lions Club, which maintains cornea "banks" in many areas, brought to attention the plight of the girl in Portugal whose condition required a transplant of fresh rather than preserved corneas, Dr. King was preparing to leave for Algiers on another Medico mission.

The ancient Portuguese law precluded the possibility of obtaining fresh corneas in that country. It forbids the touching of the body of a deceased person for a set period of time, and fresh corneas have to be transplanted within 72 hours to avoid deterioration.

The Lions Club furnished the fresh corneas, Dr. King called Mrs. McNair, employed at Walter Reed as a registered nurse, and the mercy mission was soon underway. Dr. King's daughter, Suzanne Wiggle, accompanied them.

Portuguese politicians, in an attempt to arouse sentiment for repeal of the ancient law, made the team and their mission a "cause celebre."

"When we arrived at Lisbon," Mrs. McNair said, "there were reporters, newsreel cameras, the vice president of Portugal, and the mayor of Lisbon waiting for us. People stopped us and asked for our autographs."

"Dr. King had to operate under very adverse conditions. It was a small, old hospital. The temperature in the operating room must have been close to 100 degrees! They even had



Mrs. McNair, Walter Reed General Hospital nurse who assisted with corneal transplant that restored sight of 13-year-old Portuguese girl, glances over paper lauding the operation.

U.S. Army Group Participates in AGARD Meeting

U.S. Army representation at the 13th annual meeting of the Advisory Group for Aeronautical Research and Development (AGARD), NATO, at Athens, Greece, included 10 leaders in the field from Stateside agencies.

Members of 13 other NATO countries attended the 2-week conference, and five nations took part in the principal presentation on Design, Construction and Operation of Missile Ranges. The U.S. Army delegation contributed to discussion on seven major phases of the overall problem.

Considered were progress and future plans concerning the aerospace medical field, avionics, ionospheric research, flight mechanics, fluid dynamics, combustion propulsion, structure and materials. A special committee discussed technical information and documentation.

Richard Ballard attended as the U.S. Army Liaison Representative to AGARD. Assigned to the Physical Sciences Division, U.S. Army Research Office, he was accompanied by Lt Col Louis G. Klinker of the same office to represent the Office of the Chief of Research and Development.

Other U.S. Army attendees included: Col Dimitri Kellogg, now an Army Attache staff member in Bonn, Germany, but formerly assigned to the U.S. Army Research Office, Physical Sciences Division; Joseph Matulaitis, Donald Weidhuner and John Beebe, U.S. Army Materiel Com-

mand; Lester Lang and Edward Reiley, U.S. Army Electronics Command, Fort Monmouth, N.J.; James McHugh, U.S. Army Transportation Research Command, Fort Eustis, Va.; and Charles Roach, U.S. Army Research Office-Europe.

The 14th annual AGARD general assembly in 1964 is set in Portugal.

USAEPG Veteran Accepts New Job at Fort Belvoir

The deputy comptroller of the Army Electronic Proving Ground at Fort Huachuca, Ariz., moved to Fort Belvoir, Va., in mid-August to become program management officer for the Command Control Information System-1970.

Robert Murray, one of the first civil servants to arrive after Fort Huachuca was reopened, came in 1954 from a management position in the Office of the Chief Signal Officer, Washington, D.C.

The tall, slim Californian has doubled as the commanding general's personal representative on community affairs, for both Maj Gen F. F. Uhrhane and his predecessor, Brig Gen Frank W. Moorman.

The Army's second highest civilian employee award, the Meritorious Civilian Service Award, was presented to him in 1960, and he has received numerous Outstanding Sustained Superior Performance awards.



Robert M. Schwartz



Will A. Lewis



Gaetano Falabella



Dr. George W. Howard

Seven Army Engineers Attend UCLA Course for Engineering Executives

Three Army engineers in the "rising young executive" category and four whose professional records merit respect as "senior administrators" are among 22 Government and industry personnel who recently completed one of the Nation's most intensive advanced training courses.

Titled "Modern Engineering for Engineering Executives," the 6-week course was conducted by the University of California at Los Angeles. Briefly stated, its objective was "to teach participants in modern technological concepts, to explore the nature of probable future trends, and to develop a deeper understanding of the nature and forces of our changing technology."

Noted UCLA professors and distinguished guest lecturers from other educational institutions and from industry contributed to the stature of the presentations and discussions.

Based upon his participation, Col Hubert L. Nolan, newly appointed Chief of the Physical Sciences Division, U.S. Army Research Office, recommended to the Chief of Research and Development, "that the Army avail itself fully of this program to update, on a selective basis, R&D

General Officer Changes

Brig Gen Robert R. Williams, commanding general of the U.S. Army Aviation Center, Fort Rucker, Ala., was recently reassigned to Fort Benning, Ga., as Chief, Test and Evaluation Control Group.

Maj Gen John G. Shinkle, Assistant for Missile Production, Production and Logistics Division, NATO International Staff in Paris, retired from active service in August. Prior to his NATO assignment he was commanding general of White Sands (N.M.) Missile Range.

career officers and key civilian scientific executives." His report said the course provides:

- An overflow of scientific thinking and a clear picture of the structure on which modern engineering is based.
- An understanding of basic phenomena from which new devices are created and of modern mathematics as a language for abstract representation of systems and as a tool for solution of problems in modern engineering.

Initiated in 1961 and offered for the third time, the course was structured along two parallel stems. One was centered around a physical understanding of phenomena such as basic concept of modern physics, kinetic theory of matter, solid state physics, light and relativity, electrostatics, electrodynamics, plasmas, etc. The other stem dealt with mathematical understanding of conceptual models of systems, ranging from Boolean Algebra and matrices to formation and solution of partial differential equations by hybrid computers.

In Col Nolan's opinion, the course material "is roughly a synthesis of 1½ years, approximately, of graduate work in each of the disciplines."

Other Army participants included: Lt Col Spencer R. Baen, until recently Chief of the Ballistic Missile Branch, Missiles Directorate, Office of the Chief of Research and Development; Dr. George W. Howard, Technical Director, U.S. Army Engineer Research and Development Laboratories, U.S. Army Mobility Command; Will A. Lewis, Director of the Missile Systems Laboratories, U.S. Army Missile Command;

Col Charles H. Schilling, professor, Department of Military Arts and Engineering, U.S. Military Academy;

Gaetano Falabella, Jr., Chief of the Aeronautics Engineering Office, U.S. Army Natick Laboratories; and Robert M. Schwartz, Chief Engineer, U.S. Army Munitions Command.

Guest lecturers for the course included such notable men of science as Dr. Edward Teller, Professor at Large and Associate Director, Lawrence Radiation Laboratory, University of California, Berkeley; Dean Morrough P. O'Brien, Chairman of the Army Scientific Advisory Panel and Dean Emeritus of the College of Engineering, University of California, Berkeley;

Dr. Harold C. Urey, Professor at Large, Department of Chemistry, University of California, San Diego; Dr. Warren S. McCulloch, Head of the Neurophysiology Group, Research Laboratory of Electronics, Massachusetts Institute of Technology; and Dr. Richard E. Bellman of the RAND Corp., an authority in advanced mathematics techniques.

Possibly the most renowned of the Army students who completed the course is Robert Schwartz, 42, who gained national prominence in May 1961 when he received \$15,000 as his share of a \$25,000 maximum award under the Army Incentive Awards Program. Only three awards that large have been made since the Government-wide program was set up by Act of Congress in 1954.

Schwartz was cited along with Milton E. Epton and the late Irving Mayer for research and development for the Davy Crockett 280 m.m. cannon as well as the Jupiter intermediate range ballistic missile.

DR. GEORGE HOWARD has earned his right to prestige as a Federal career scientist of top stature, backed by 31 years of continuous service with the Army Corps of En-



Lt Col Spencer R. Baen

Col Hubert L. Nolan

Col Charles H. Schilling

gineers. In 1953, he received a Rockefeller Public Service Award, and spent a year studying management of research and development in the U.S., Canada and Europe. He has authored a book on R&D management and is recognized for numerous seminar presentations and professional journal articles.

WILL A. LEWIS has established his reputation at the Army Missile Command during two 3-year periods of employment at Redstone Arsenal interrupted by three years (1957-60) with the Goodyear Aircraft Corp. at Akron, Ohio. Graduated with a B.S.

degree in electrical engineering from Texas A&M in 1941, he received advanced radar and electronics training at M.I.T. and Harvard. Four years with the Army Chief of Ordnance in Washington, D.C., preceded his assignment to the Missile Command in 1954.

GAETANO FALABELLA's assigned duties make him responsible for the overall planning, organizing and directing of research and development activities under the Chief of the Air Delivery Equipment Division at the Army Natick Laboratories. He is regarded by associates as an ad-

ministrator whose abilities promise well for his future in Army R&D.

COL H. L. NOLAN, Deputy Chief of the Physical Sciences Division, U.S. Army Research Office, since September 1962, was appointed Chief in mid-August 1963. Biographical information is included in a story on page 36 announcing his selection to succeed Dr. I. R. Hershner.

COL S. R. BAEN terminated a tour of duty with the Office of the Chief of Research and Development soon after completing the UCLA course and is now assigned to G-3, Headquarters, U.S. Army Pacific. He received a B.S. degree in mechanical engineering in 1943 from Texas A&M, an M.S. in 1947 and a Ph.D. in 1950 from California Institute of Technology. He is also a graduate of the Army Command and General Staff College.

COL SCHILLING in his present assignment at the U.S. Military Academy is serving at the institution from which he was graduated in 1941. He earned an M.S. degree in chemical engineering at the University of California in 1947 and a Ph.D. from Rensselaer Polytechnic Institute in 1959, and completed a 1-year course at the Army Command and General Staff College in 1951.

20 OCRD Personnel Slated For Promotion to Colonel

Twenty lieutenant colonels assigned to the Office of the Chief of Research and Development have been recommended for promotion to the temporary rank of colonel, as announced late in August.

From the main OCRD office at the Pentagon, Washington, D.C., 10 men were selected, namely: Howard H. Cooksey, Horace J. Crouch, Jr., John D. Erickson, William L. Holcomb, John W. Irving, John F. Kuznicki, Charles A. Riegle, James H. Watts, Woodrow W. Wiltse and Charles M. Young, Jr.

U.S. Army Research Office Headquarters nominees are Thurmond D. Boaz, Jr., Charles W. Cook, John E. Craig and Raymond S. Isenson.

Assigned to the United Kingdom R&D office in London are Richard C. Miles, Arthur E. Mitchell and David E. Wright, Jr.

Named for promotion in the Army R&D Operations Research Advisory Group assigned to Research Analysis Corp., Bethesda, Md., are Herald B. Gallinger and William J. Phillips.

On the list from the U.S. Army Limited War Laboratory at Aberdeen Md., is Austin Triplett, Jr.

Dugway Installing Computer-Controlled Network

A completely automated, computer-controlled testing network will be installed at Dugway Proving Ground, Utah, the Army's chemical and biological testing site, by June 1964.

Designed to keep a continuous electronic eye on weather conditions such as wind speed, direction, temperature, gradient, relative humidity, and other weather variables, the network will have the last say on GO-NO GO conditions for tests conducted here. The heart and brain of the system will be a \$1.8 million Litton FSG-1 computer.

Tests at the Proving Ground are presently conducted on unautomated test grids over which are arrayed as many as 3,000 field samplers. With the approach of agent test clouds, the samplers must be activated by remote control in a sequence based on the movement of the clouds. Travel calculations are computed by professional meteorologists to determine that equipment timing coincides with cloud transport.

Even before a test is started, however, weather sensor instruments arrayed over 1,000 square miles of grids must be read, averaged, calculated out and compared with allowable deviations before a test can be

run. The new test network will eliminate most of this tedious procedure and simplify the rest.

Recordings from field weather sensors will be transmitted over the new network at intervals of 1/10 second, in digital form directly to the computer. Data will be analyzed in real time to determine whether actual conditions meet test criteria, and when a test should be fired.

The Litton FSG-1, which will control the whole network, is a real time computer, that is, a simultaneous recorder, analyzer and reader. Fifty times as fast and with twice the memory capacity of Dugway's present computer it will process 10,000,000 bits of information per second.

The network will include a radio telemetry system which will function as the eyes and ears of the computer, enabling it to reach out over 1,000 square miles for analysis.

The meteorological data telemetry collecting and transmitting system will be designed and installed by Daystrom Inc. of La Jolla, Calif.

Elaborate vector and plotted displays together with programed lights will enable the test officer to make decisions 40 miles away from the scene of the action.

Maj Gen Bowen Chosen for 3 Stars as CONARC CG

Nominated by President Kennedy for promotion to 3-star rank, Maj Gen John W. Bowen, 53, has been assigned to take command of the U.S. Army Continental Command, effective Oct. 7. Lt Gen Louis W. Truman, incumbent, has been selected to head the Seventh Army Corps in Germany.

General Bowen has served since 1961 as director of the Military Assistance Division, U.S. European Command in Paris. Prior to that for two years he was assistant chief of staff for Reserve Components at Department of Army Headquarters in Washington, D.C., an assignment which followed 16 months as CG of the 82nd Airborne Division.

Son of a retired Army colonel, he entered the U.S. Military Academy as an honor graduate from Georgia Military Academy and was commissioned in 1932. He is also a graduate of the National War College (1949) and returned there from 1951 to 1953 as an instructor. Other military education includes the Infantry School (1937), educational equivalent to Command and General Staff College, and the Armed Forces Staff College.

Major assignments in recent years include: assistant commander, 101st Airborne Division, May to September 1956; assistant chief of staff, J-3, Headquarters Far East Command, 1955-56; deputy chief of staff for administration, Eighth U.S. Army in Korea, 1953-54; assistant chief of staff, J-3, Headquarters Far East Command, 1955-56; Plans and Operations staff officer, Caribbean Command, 1949-51; secretary to the War

Blanchett Takes Command Of Ft. Bliss HumRRO Unit

Lt Col Leo M. Blanchett, Jr., has been assigned as military chief of the U.S. Army Air Defense Human Research Unit at Fort Bliss, Tex.

This Unit is one of five field laboratories operated jointly by USCONARC and the Human Resources Research Office of the George Washington University. Each Unit is headed by a military chief and a civilian director of research.

A 1943 graduate of West Point, he holds a master of science degree in mechanical engineering from the University of Southern California. He served in the European Theater of Operations during World War II; on Formosa in 1952-54; and again in Europe in 1960-63.

During his second European tour he was battalion commander of a Lacrosse Battalion, then served as a staff officer in the Nuclear Weapons Branch, Operations Division, Headquarters, USAREUR.

Department General Staff, Washington, D.C., 1945-48.

During World War II, he served as commander of the 26th Infantry, 1st Infantry Division in Europe, as a staff officer in the Operations Division of the War Department General Staff in Washington (later elevated to chief of the Mediterranean Division); and in the Office of the Military Aide to the President.

Decorations he is entitled to wear include the DSM and the Silver Star (each with one Oak Leaf Cluster), Legion of Merit, Bronze Star Medal, Croix de Guerre of France, Korean Military Order of Merit, Presidential Citation (Republic of Korea), Combat Infantryman's Badge, and Senior Parachutist Badge.



Maj Gen John W. Bowen

2 Springfield Employees Win 'Dual Ladder' Boosts

Under policies set forth in "Guide for Evaluation of Positions in Basic and Applied Research," a Civil Service Commission classification standard, two Springfield Armory employees have been promoted for exceptional scientific advances.

The guidelines relate to the "dual ladder concept" and they were applied to recognize Richard H. Colby of the Development Branch and Thomas P. Jones of the Support Research Branch, Research and Engineering Division.

The concept embodies a "man in job" approach to consideration for promotion to a grade higher than the position might normally justify based upon the description of assigned duties. Supervisory ability is considered as one ladder, and personal creativity and exceptional scientific contribution as another.

The rating for the unusual promotion is based in an evaluation of the candidate's exceptional performance by special committees and panels representative of top level scientific management, rather than a Civilian Personnel Office classifier's job description and subsequent reviews.

The Springfield Armory panel responsible for considering those nominated for exceptional recognition for promotion included Lt Col Stanley C. Skeiber, Chief of the Research and Engineering Division; Herman F. Hawthorne, Division Technical Director; Harry Lynch, Deputy Chief of the R&D Division for Industrial Activities; and George A. Brochu, Chief of the Armory Personnel and Training Branch.

Employed at the Armory since March 1951, Colby is a graduate of Northeastern University (B.S. degree in mechanical engineering). Holder

of 11 patents issued for his work on tank machinegun and anti-aircraft machinegun design and other small arms, with other patent applications pending, he has gained international recognition. His honors include citations from the U.S. Continental Army Command and the Marine Corps.

THOMAS JONES has worked at the Laboratory 12 years during which he has held progressively more responsible metallurgical and engineering assignments. Superiors credit him with contributing significantly to improvement of barrel steels and development of specifications for small and larger caliber weapons barrels, leading to mounting demand for his services as a consultant.

Coinventor of the "Chapmanizing" process in metallurgy, he is the author of several papers published in professional journals on techniques of determining case depth, case and core hardness, retained austenite, and other qualities of weapons materials. He has been cited for his work by the Armour Research Foundation.

Before joining the Armory staff, he was employed 22 years at Chapman Valve Co. in research metallurgy, and five years at Hampden Brass and Aluminum Co. Special educational qualifications including courses at Massachusetts Institute of Technology in physical metallurgy, Ohio State University courses in welding, and Pennsylvania State University courses on metal properties.

(Note: Procedures for considering employees for special recognition under the dual ladder evaluation system are set forth also in a Department of the Army "Guide for Evaluation of Positions in Basic and Applied Research" published in January 1961 and available at Civilian Personnel Offices.)

Army Materials Advisory Group Reports Advances, Sets Up Working Groups

Important strides toward priority objectives of the U.S. Army Materials Advisory Group (MAG), formation of which was reported in the April issue of this publication, are resulting from two recent meetings.

Guidelines for activities of Technical Working Groups (TWGs) were drawn at the first meeting, and the second was devoted primarily to the responsibilities of the policy and management element of the MAG.

MAG Deputy Chairman Norman L. Reed, Deputy Director of Plans and Programs at the U.S. Army Materials Research Agency (AMRA), stressed the importance of diligent functioning of the TWGs, saying: "They form the major operational element of the MAG and serve the Army Materiel Command (AMC) as well as AMRA."

Norman L. Klein, Chief of the Chemistry and Materials Branch, R&D Directorate, AMC Headquarters, commented: "The Technical Working Groups, in their regular operations and in special studies, will help the AMC Headquarters and AMRA tie together the program, facilities, equipment and funds."

Guidelines for TWGs include:

- Members serve . . . to communicate with materials people and designers.

Colonel Backed by Ph. D. Heads AMRA at Watertown

Backed by a Ph.D. degree in metallurgical engineering, Lt Col Joseph E. Black recently took command of the U.S. Army Materials Research Agency (AMRA) at Watertown (Mass.) Arsenal. He succeeded Col Robert B. Braid, who had commanded both AMRA and the Arsenal since AMRA was established in 1962.

After receiving an M.S. degree from New York University, following a B.S. in mechanical engineering from Cooper Institute of Technology, Lt Col Black entered the Army in 1943 and was commissioned in 1944 in the Transportation Corps. He was detailed for graduate study at Lehigh University in 1948 and received his doctorate in 1950.

Assigned to the Detroit Arsenal as Chief of the Experimental Foundry and Heat Treating Operation in September 1950, he was appointed Chief of the Laboratory Division in 1952. He completed the Ordnance Advanced Course at Aberdeen Proving Ground, Md., in 1954, and was assigned with the Materials Research Group, Office of the Chief of Ord-



Norman L. Reed

- Members shall exchange and evaluate information, discuss progress, and promote utilization of materials research results in areas of their respective competence. They shall also perform similar or allied tasks assigned, including special studies providing scientific and technical background for policy and management recommendations.

- Regularly assigned activities of TWGs will be under the staff supervision of AMRA. These activities and additional studies will be assigned and reported through Deputy Chairman, MAG (Deputy Director, AMRA,

nance, Washington, D.C.

After completing the Command and General Staff College course in 1957, he served two years as an industrial adviser to the Republic of China (Taiwan). In 1959, he returned to Aberdeen Proving Ground as Assistant Director and Executive Officer of the Ballistics Research Laboratories until his new assignment.



Lt Col Joseph E. Black

for Plans and Programs).

- Ad Hoc groups may be set up to expedite action in specialized areas, and will be dissolved on completion of the specified assignment unless direct authorization is given.

- Special groups may also be set up in areas of overlapping interest between two regularly constituted TWGs. In such cases, membership will be furnished by the TWGs concerned upon approval of the Deputy Chairman, MAG. Initially they will take action along the lines of orientation, organization, identification and assessment of tasks.

MAG members who attended the TWG meeting included: *Ceramics*, Dr. Bernard Steverding, Physical Sciences Laboratory, R&D Directorate, U.S. Army Missile Command; *Composites*, F. W. Schmiedeshoff, Research Division, Watervliet (N.Y.) Arsenal; *Design Coupling*, Heinz A. Heithecker, Structures and Mechanics Laboratory, R&D Directorate, Missile Command; *Electronics*, Louis Reiss, Electronic Parts and Materials Division, Electronics Command; *Metals*, Harold Markus, Metals Laboratory, Frankford Arsenal; *Organics*, J. D. Matlack, Plastics and Packaging Laboratory, Picatinny Arsenal; *Technology*, Dr. George R. Thomas, Clothing and Organic Materials Division, U.S. Army Natick Laboratories; and *Test and Evaluation Methods*, David E. Driscoll, Office of Technical Services, AMRA.

The next TWG meeting will be held late in September.

Col Giesen Follows Homann As Chief of Polar R&D Unit

Col Robert J. Giesen is the new commander of the U.S. Army Polar Research and Development Center at Fort Belvoir, Va., which provides administrative and logistics support to U.S. Army R&D in Greenland.

He succeeds Col G. W. Homann, who has been reassigned as district engineer, Albuquerque (N. Mex.) District of the Corps of Engineers.

The Center, which is moved to Greenland for about five months each year, operates Camp Tuto, 14 miles southwest of Thule Air Base, and Camp Century, 128 miles out on the Greenland Icecap. It is under the U.S. Army Materiel Command.

Col Giesen has served as executive officer of the PR&DC for the past year. He is a member of the American Society of Civil Engineers and Soc. of American Military Engineers.

Redstone Missile 'Firsts' Reviewed on 10th Birthday

The "old man" of the U.S. Army missile family, the historic Redstone, marked its 10th anniversary Aug. 10, at Redstone Arsenal, Ala.

Since the Redstone roared off a launching pad on a small spit of land at that time unknown and now famed throughout the world as Cape Canaveral, it has set so many "firsts" that its record has never been approached by any other missile. It is called "Old Reliable."

Development at Redstone Arsenal, now the U.S. Army Missile Command, was marked by the close cooperation of American industry and the Army. From the original Redstone idea in 1950, awarding of the first contract to Chrysler Corp. in 1952, and through final research and development firing of the missile, the team worked together.

"Know how" provided by Redstone launched America's first scientific satellite and sent the Free World's first astronaut on an historic sub-orbital flight. In 1956 it powered a Jupiter-C more than 3,000 miles down the Atlantic Missile Range on the United States' first truly long-range ballistic missile trajectory.

On the night of Jan. 31, 1958, a modified Redstone rose off the launching pad to place Explorer I on its way to outer space. Then on May 5, 1961 a Redstone Booster sent a slim, cool Navy test pilot named Alan Shepard on a sub-orbital flight 115 miles into space.



Army's first Redstone missile is shown prior to firing at Cape Canaveral in 1953. Since that time, the missile has set a long list of firsts, which includes placing the Free World's first scientific satellite into sub-orbit down the Atlantic Range.

Redstone was also:

- The first U.S. ballistic type guided missile to successfully employ an inertial guidance system, making it immune to known types of counter-measures.
- The first large U.S. ballistic type guided missile to be fired by troops.
- The missile which provided the boost when the first heat-protected

Soldier Develops Ultra-High Speed Camera Device

An ultra-high speed camera equipped with a complex synchronization system designed and built by a young soldier is proving a vital tool in research to provide the Army with better explosives techniques.

Pfc Harold R. Carey of the U.S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va., designed the synchronizer. He is a physicist in the Army's Scientific and Engineering Program for enlisted personnel.

The commercial type camera developed by Barr & Stroud, Ltd., originally for the British Atomic Energy Commission, takes photos at a rate of 8 million per second.

In contrast, the motion picture camera used by the average "shutter-bug" has a speed of 16 per second.

The camera system is being used by the Mine Warfare & Barrier Branch of the Mobility Command's Labs to photograph explosions in a 12-foot steel spherical blast chamber. Scientists study the photographs to gauge the physical forces which interact within explosives as they detonate under various conditions.

Since the detonation is over in a few millionths of a second, only a fantastically fast camera can record the process. Researchers believe these detailed photographs will aid development of new techniques for utilizing explosives, some of which may revolutionize employment in nuclear as well as conventional warfare.

The synchronization system developed by Carey includes two 5,000 volt pulsers for coordinating the lighting with the detonation of the explosive. These are timed to fire at a precise instant during the rotation of the turbine which spins an optical mirror at a rate of 5,500 revolutions per second.

The turbine is run by high-pressure nitrogen gas, and brilliant illumination is obtained by detonating an auxiliary explosive charge in a 3-foot

nose cone was fired into space and recovered.

- The first U.S. ballistic type guided missile to be deployed overseas, joining the NATO Shield Forces.

General Officer Change

Maj Gen Benjamin F. Taylor has been assigned to the Office, Comptroller of the Army, following service as director of Army Program, Office, Army Chief of Staff, Washington, D.C.

tube of argon gas. The shutter is closed by another explosive charge which shatters the glass lenses, stopping the passage of light.

Capable of providing pictures either in black and white or color, the camera will be modified to provide stereophotography. Currently used only in explosives studies, the camera with its synchronization system is expected to be adaptable to other types of high-speed photography research.

Carey was recently awarded a Certificate of Achievement for his part in designing and building the synchronization system.

The certificate stated, in part: "He assembled the necessary equipment, developed, installed and tested the intricate wiring required for remote operations, and placed the camera in operation in less than three months.

"He accomplished this extraordinary feat by efficient and energetic effort, combined with a high degree of professional competence in the fields of electronics, physics and high speed photography. His achievement contributed significantly to the research effort of the Laboratories."



Pfc Carey, checks ultra-high speed camera (8 million pictures per second) synchronized to photograph explosions at USAERDL, Fort Belvoir.

AMC Reports First-Year Operation Cost Slash of \$252 Million

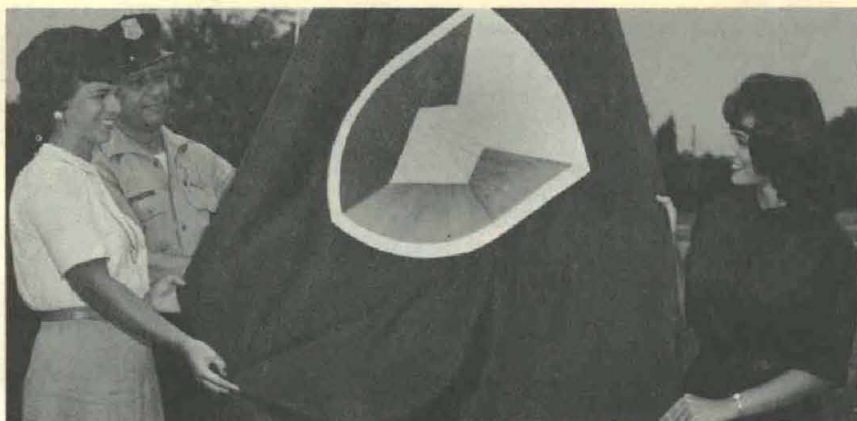
First anniversary festivities of the U.S. Army Materiel Command, which provides the Army with combat hardware, were highlighted by announcement of cost reduction type savings of \$252 million and increased effectiveness.

Under the leadership of Lt Gen Frank S. Besson, Jr., the AMC was credited with exceeding by \$25 million the \$227 million goal assigned by the Department of Defense Cost Reduction Program. Authorized civilian and military personnel strength was pared from 191,000 to 179,000 by consolidation of activities and streamlining operating procedures.

With greater emphasis directed to modern equipment and weapons for the Army, an increase from \$7.5 billion for FY 1963 to \$8 billion in expenditures during the new fiscal year is projected, the report stated.

Molding of six different organizations of the Technical Services into one directing headquarters, supervising the diverse activities of some 240 installations throughout the United States, was a major accomplishment.

Regarded as an important innovation was the introduction of a project



manager system for management of major items of military materiel, with full line authority delegated to each manager (35 at press time) to expedite development of priority or high dollar-value weapons and equipment systems.

Under this departure from tradi-

manager system for management of major items of military materiel, with full line authority delegated to each manager (35 at press time) to expedite development of priority or high dollar-value weapons and equipment systems.

Under this departure from tradi-

tional military management concepts, the AMC project managers now account for nearly 50 percent of AMC's research and development expenditures, and more than 50 percent of production outlays.

Proof of the effectiveness of the PM systems was provided when, just 11 days after the AMC became operational, a requirement was received to put armament on helicopters for use in Vietnam. Under the PM for Aircraft Weaponization, the guns and helicopters available were compatibly designed, joined on production lines, tested at proving grounds, and shipped to combat forces—with no disruption to other supply operations.

In two other critical tests of ability to react under pressure, the AMC responded successfully to the emergency buildup during the Cuban blockade and to the call for accelerated logistical support operations in Southeast Asia. More than 30 AMC depots for supplies of the Army and the Defense Supply Agency operated on a 24-hour, 7-days-a-week basis in the Cuban crisis.

Army Math Report Prepared

A detailed report on the *Transactions of the Eighth Conference of Army Mathematicians* is now available to Army personnel.

The 450-page report, sponsored by the Army Mathematics Steering Committee (AMSC), representing the Office of the Chief of Research and Development, can be acquired from the U.S. Army Research Office-Durham, Box CM, Duke Station, Durham, N.C.

Ceramics Research Holds Protective Armor Promise

Under an investigative contract awarded by the Army Natick Laboratories, U.S. Army Materiel Command, Rutgers University researchers are studying glass and crystalline ceramics for armor to protect men and vehicles.

Results of initial studies reported by Ernest L. Kastenbein opened the prospect of application of ceramics technology to weaponry needs for materials capable of withstanding severe stress under many conditions.

The report that led to an Army contract pointed out that ceramics offer possibilities of excellent armor materials because they can absorb considerable amounts of energy in a short period of time.

"Although most persons think of them as very brittle, many ceramics are actually exceptionally hard and durable," Kastenbein said. "For example, alumina, a crystalline material, has a ranking of 9 on Moh's scale, the table used to express the hardness of materials. Diamond, the hardest substance, is only one point higher and steel is down at 5."

When used in combination with such dense elements as lead, many

ceramic materials are extremely resistant to radiation. Another advantage of glass armor is its transparency, especially significant for plane and vehicle windows.

Since completing the basic work on determining ceramic materials best suited for armor, in accordance with strength, density and elastic properties, Kastenbein and his staff have been concentrating upon more detailed properties of ceramics—chiefly fracture patterns.

"Waves set up when a projectile hits a ceramic material are important factors in determining the fracture pattern," said Kastenbein. "The waves move out spherically from the point of impact at speeds of up to 40,000 feet per second . . . and reflect when they reach the back surface of the glass, building up tension and blowing out a part of it."

Included on the staff for the program are Dr. Malcolm G. McLaren, assistant professor of ceramics at Rutgers; Robert Matolka, graduate student; and John Rooda, technician.

Dr. McLaren and Matolka are concentrating on means of changing the reflection pattern to reduce the tension of the ceramic armor.

Army Announces Contracts Totaling Over \$480 Million

Contracts for research, development and procurement of military materiel and services aggregating more than \$480 million were announced recently by the Department of the Army.

Textron Bell Helicopter Co., received an \$81 million contract for UH-1 Iroquois series helicopters, its largest single order since moving to Texas 12 years ago.

A \$79 million contract for 8,393 5-ton Army trucks was awarded to Studebaker Corp., South Bend, Ind.

Eight contracts exceeding \$34 million for electronic equipment were distributed among Philco Corp. (\$12

million), General Electric Co. (\$6 million), Bendix Corp. (\$8 million), Sylvania (\$5,500,500), International Business Machines (\$2 million), and Burroughs Corp. (\$1 million).

GE also has a \$2,273,740 contract for over 300 atomic guns and a \$1,539,714 contract for flight test evaluation of the XV-5A. A \$2,045,000 award to Sylvania is for the modification of the mobile digital computer.

For 9,253 multifuel engines, the Hercules Engine Co., Canton, Ohio, was awarded a \$24 million contract.

Thompson-Ramo-Wooldridge Inc., Computer Division, Canoga Park,

Calif., received a \$23,553,667 contract for development of a command control information system for use by the field army in the 1970s.

The International Telephone and Telegraph Corp., Nutley, N.J., was awarded two contracts totaling \$21,876,788 for the manufacturing, installation, engineering management, operation and maintenance of a communications system equipment in Europe.

A \$20,704,320 contract to the Clark Equipment Co., Benton Harbor, Mich., is for 672 diesel engine tractors, and a \$15,507,850 contract to the FMC Corp., South Charleston, W. Va., is for 674 tracked carriers (XM77).

Six companies were awarded contracts totaling \$19,231,102 for work dealing with fuzes, ammunition and munitions, namely:

Minneapolis Honeywell Regulator Co., Hopkins, Minn., \$7,615,261; Westclox Division of General Time Corp., and Ingraham Co., \$3,020,919; Day & Zimmerman and Scovill Manufacturing, \$5,734,622; Elgin National Watch Co., \$1,236,000.

For continuance of work on the Mauler weapons system, General Dynamics Corp., Pomona, Calif., was awarded a \$16,103,403 contract. Allis-Chalmers Manufacturing Co., Milwaukee, Wis., was awarded two contracts totaling \$14,669,000 for 493 tractors and for conversion of the 106 mm. self-propelled rifle.

The RCA Defense Electronics Division, Camden, N.J., was awarded three contracts totaling \$13,052,275, including the major portion, \$9,143,016 for radio sets.

Four contracts totaling \$11,077,144 to Continental Motors Co., Muskegon, Mich., are for: tank engines and power pack assemblies, \$3,145,000; an air-cooled engine project, \$3,195,886; 788 multifuel engines, \$2,500,952; 677 generator sets and spare parts, \$1,251,149.

The Raytheon Co., Lexington, Mass., will receive \$6,704,799 for kits that will modify radar sets and \$2,518,068 for Hawk missile equipment.

Contracts totaling \$6,667,312 to Chrysler Corp., are for the M113 personnel carrier, the M60 tank, ¾-ton trucks, and for work on engines for the M113.

For a military integrated communication system, Collins Radio Co., Dallas, Tex., was awarded a \$5,377,975 contract. A \$6,082,341 contract was let to Page Communications Engineers, Inc., Washington, D.C., for services and materials for the Pacific area scatter system.

A \$5,787,436 contract to Hercules Powder Co. (Wilmington, Del.) is for propellants for missile systems, and two contracts to The Martin Co. to-

Army Missile Command Officer Raised to General

Stars signifying promotion to brigadier general rank were recently pinned on the shoulders of Charles W. Eifer, deputy commander for Land Combat Systems at the U.S. Army Missile Command, Redstone Arsenal, Ala.

Reassigned in April 1963 for his second tour of duty at Redstone, General Eifer has responsibilities extending over the Pershing, Sergeant, Lance, Lacrosse, Redstone, Honest John and Little John missiles and antitank/aircraft weapons.

Previous to his current assignment he was commanding officer of Frankford Arsenal, Philadelphia, Pa., and from July 1959 to August 1961 was commandant of the Ordnance Guided Missile School at Redstone.

Born Dec. 1, 1914, in Altoona, Pa., he graduated from Pennsylvania State College in 1936 with a B.S. degree in civil engineering. In 1948 he received a master's degree in electrical engineering from Massachusetts Institute of Technology, and in

1956 attended the Industrial College of the Armed Forces.

Commissioned in 1936, he served during World War II as an Ordnance officer with various echelons of the Army Ground Forces in Europe. Later he was Ordnance Officer of the Sixth Army in California.

After three years as executive and technical operations officer at White Sands (N. Mex.) Missile Range (1948-51) he became Chief of the Guided Missile Section and, later, of the Rocket Branch in the Research and Development Division, Office, Chief of Ordnance. In 1956, he became commanding officer of the 57th Ordnance Group, Seventh U.S. Army, Europe.

His decorations include the Bronze Star Medal, EAME Service Medal with three battle stars (Rhine-land, Ardennes, Central Europe), World War II Victory Medal, American Defense Medal, American Campaign Medal, German Occupational Medal, Armed Forces Reserve Medal, and the Glider Badge.



Brig Gen Howard P. Persons, Jr., DCG, Air Defense Systems, pins first star on newest Army Missile Command General Charles W. Eifer, deputy commander for Land Combat Systems. Mrs. Eifer gives a helping hand.

taling \$3,748,515 are for work on the Pershing weapons system.

Three contracts totaling \$4,558,943 to the Olin Mathieson Chemical Corp., New Haven, Conn., are for ammunition, propellant charges and missile assemblies.

Western Electric Co., New York, was awarded a \$2,251,730 contract for the Nike Hercules missile program.

General Motors Corp. received three contracts totaling \$3,921,239 for 123 earth-moving scrapers, 120 transmission assemblies for the M60 tank, and for engineering and fabrication

of eight power train units for use on the General Sheridan armored reconnaissance vehicle.

Two contracts totaling \$3,368,871 to Flare-Northern Division of Atlantic Research Corp., Saugus, Calif., and Albion Malleable Iron Co., Hillsdale, Mich., are for 81 mm. shells.

Harvey Aluminum Sales, Torrance, Calif., received a \$3,172,000 contract for loading 105 mm. artillery ammunition and demolition kits.

Additional contracts included: TEMCO, Inc., Nashville, Tenn., \$3,026,142 for ammunition; Polan In-

dustries, Huntington, W. Va., \$2,774,197 for 5,975 infrared optical periscopes for armored vehicles; Stanford Research Institute, Menlo Park, Calif., \$2,732,116 for continued scientific studies for the Army Combat Development Command Experiment Center; Belock Instrument Co., College Point, N.Y., \$2,698,925 for modification of 25 Hawk training devices;

Universal Moulded Fiber Glass Corp., Bristol, Va., \$2,434,110 for containers to be used in firing and shipping the M44 rocket; Emerson Electric Co., St. Louis, Mo., \$2,322,440 for 120 armament systems for mounting on helicopters; Remington Arms Co., Inc., Bridgeport, Conn., \$1,595,120 for 7.62 mm. cartridges; Airesearch Manufacturing Co., Phoenix, Ariz., \$1,772,162 for development of transportable medical units to treat combat casualties; Norris-Thermador Corp., Los Angeles, \$1,712,176 for 226,000 cartridge cases;

Hughes Aircraft, Fullerton, Calif., \$1,709,828 for transportable missile equipment; Beech Aircraft Corp., Wichita, Kans., \$1,610,000 for 115 missile targets; Technical Service Corp., Philadelphia, Pa., \$1,013,600 for preparation of technical manuals; International Diesel Electric Co., Sloatsburg, N.Y., \$1,538,955 for generator sets; Union Carbide Consumer Products Co., N.Y., \$1,534,510 for 861,000 radio batteries.

Dumont Laboratories Division of the Fairchild Camera and Instrument Corp., Clifton, N.J., \$1,518,712 for airborne camera and other photographic equipment; Frank G. Hough Co., Libertyville, Ill., \$1,495,268 for 94 scoop-type loaders; Goodyear Tire and Rubber Co., Akron, Ohio, \$1,438,954 for rubber shoes assemblies for use on M48 tank track; Stevens Manufacturing Co., Edensburg, Pa., \$1,320,420 for 236 refrigerator vans.

Gibbs Manufacturing and Research Corp., Janesville, Wis., \$1,305,920 for fuzes; John R. Hollingsworth Co., Phoenixville, Pa., \$1,867,980 for 370 diesel generators; Charles Pfizer Co., Inc., N.Y., \$1,240,000 for chemical research; Mason and Hanger Co., N.Y., \$1,168,852 for the loading of missile and artillery warheads and projectiles.

Massachusetts Institute of Technology (MIT), Cambridge, Mass., \$1,167,000 for research in the field of electronics, physics, molecular physics and communications; Spencer Safford Co., Augusta, Kans., \$1,103,890 for semi-trailer vans; Courter Products Division of Model Engineering and Manufacturing Corp., Boyne City, Mich., \$1,105,105 for 3,750 radio sets; Electronics Division of General Mills, St. Paul, Minn., \$1,100,000 for development of a series of protection kits to convert combat field structures into troop shelters.

Kaiser Jeep Co., Toledo, Ohio, \$1,078,881 for 622 ¼-ton utility trucks; and FMC Corp., San Jose, Calif., \$1,000,000 for repair parts for the M113 armored personnel carrier.

OCRD Policy Division Chief Retires for Industry Offer

Another man who stamped his image strongly by achievements during three years with the Office of the Chief of Research and Development has ended 21 years in the Army to accept a top executive position in industry. Several other OCRD personnel have been attracted to industry in recent weeks.

Col Wilford D. Gower, 45, chief of the Policy Division, which is concerned with management of the Army's \$1.3 billion annual research, development, testing and evaluation program, will become executive assistant to the comptroller of Rocketdyne Division, North American Aviation, Inc., Oct. 1.

In June 1963, he completed course requirements for a Ph. D. in business administration at American University, Washington, D.C. He has an M.B.A. degree from Syracuse University (1956) and a B.S. in chemistry and mathematics from Western Kentucky State College (1940).

Col Gower has served as an instructor in high school mathematics and science, as assistant instructor of chemistry at Western Kentucky SC, and as assistant professor of military science and tactics at St. Thomas Military Academy. He is known as a logician with effective persuasive powers, with strong convictions, and a driving determination.

In October 1962, he succeeded Col Wilson R. Reed as chief of the Policy Division after having served as deputy chief. He is credited by associates with a substantial contribution to planning and implementation of the Army-wide Value Engineering Program, which resulted in an estimated \$22 million FY 1963 saving.

As the Army General Staff representative, he handled the Department of the Army study on the Bell Report recommending sweeping changes in management policies pertaining to Army and other Department of Defense in-house laboratories. His Di-

vision also coordinated OCRD actions pertaining to research and development realignments growing out of the reorganization of the Army in 1962.

Another significant study with which Col Gower has been deeply involved is the requirement for greatly improved collection and dissemination of data and information needed by top management for decisions. Currently a pilot test phase on AUTOPROBE is being conducted with a view to Army-wide integrated effort, closely allied to the great emphasis on scientific and technical information.

Still in the trial stage of implementation as another major area of effort in which Col Gower's influence has been felt strongly is the Army adoption of research and development procurement practices based on cost-plus-incentive-fee contracts, as opposed to cost-plus-fixed-fee contracts.

Associated with Army R&D or comptroller activities for more than 10 years, he was director of the test department on U.S. Continental Army Command Board No. 3 at Fort Benning, Ga., from 1952 to 1955. Four years at Fort Lewis, Wash., as comptroller preceded an assignment to Korea as plans and operations staff officer at Eighth U.S. Army Headquarters.



Col Wilford D. Gower



Col John L. Dibble



Col Oscar E. Davis



Lt Col James J. Cobb



Lt Col C. C. Sargent



Lt Col J. S. Howland

Rotation Effects Large Turnover of OCRD Staff Officers

Staff officer reassignments within the Office of the Chief of Research and Developments effected an unusually heavy turnover in recent weeks. Newcomers include:

COL DIBBLE (John L.), the new Chief of the Air Mobility Division, received his B.S. degree from the U.S. Military Academy in 1940. He has graduated from the Command and General Staff College (1953), the Army War College (1957-58), Airborne School (1955), and the Aviator's Course (1962-63).

Assignments have included command of the 705th and 776th Tank Destroyer Battalions, European Theater of Operations (1945); instructor, Artillery School (1946-49); Chief, Organization Branch, Logistics Division, Headquarters EUCOM (1949-52); Chief, Artillery Assignment Branch, Career Management (1953-55); Chief, Foreign Military Training Branch, ODCSOPS (1955-57); General War, Cold War and Area-wide Planning Officer, J-5, CINPAC (1958-61); assistant commander of the XVIII Airborne Corps Artillery (1961); Exercise Planning and Analysis Branch, J-3, STRIKE Command (1961-62).

COL DAVIS (Oscar E.), Acting Chief of the Air Mobility Division, received his B.S. degree in adminis-

tration from the University of Arizona in 1941. He graduated in 1957 from the Armed Forces Staff College, Norfolk, Va., and Air War College, Maxwell AFB, Ala., in 1961.

Most of his assignments have been in overseas commands. He was Chief of troop movement of U.S. Army Europe in 1957-58, with the J-3 Division in Lebanon in 1959 and with the Special Forces in Germany in 1960.

LT COL COBB (James J.), a new member of the Atomic Office, served in Korea with the 7th Division in 1961-62, and was assigned to the Tactical Department, U.S. Military Academy from 1958-61. Graduated from the Academy in 1943, he served two years with the 14th Armored Division in Europe during World War II. In 1948 he was graduated from the University of Michigan with an M.S.E.

LT COL SARGENT (Chester C.), an action officer in the Mid-Range Plans Branch, Plans Division, earned an M.S.E. degree from the University of Michigan in 1954, nine years after graduating from the U.S. Military Academy. In 1940-41 he attended the University of South Carolina. Recently he served a tour in Vietnam with MAAG after three years with the U.S. Army Combat Developments Experimentation Center. He is a Command and General Staff College

graduate.

LT COL HOWLAND (John S.) is the new Chief of the Programs Branch, Programs and Budget Division, a post for which he is qualified as both an engineer and a scientist. After attending Notre Dame, he was graduated from the U.S. Military Academy in 1944 with a degree in military engineering. His other alma mater is Vanderbilt University, where he received masters and doctorate degrees in psychology. In recent years he has served as a battalion commander in the 1st and 2nd Armored Divisions.

LT COL YOUNG (Charles M., Jr.), assigned recently to the Plans Division, came to his new post from duty as commanding officer of the 1st Howitzer Battalion, 78th Artillery, 2nd Armored Division, Fort Hood, Tex. In 1960-61 he was Chief of the Artillery Policy and Plans Branch, Hq EUSA. Graduated from Virginia Military Institute in 1942 with a B.S. degree in civil engineering, he earned his M.A. in international affairs at George Washington University in 1963. He is a graduate of the Command and General Staff College and the U.S. Army War College.

LT COL GILL (Bryan E., Jr.) is a new member of the military advisory group to the Research Analysis Corp.,



Lt Col T. E. Fitzpatrick



Lt Col J. E. Craig



Maj D. E. Rosenblum



Maj R. D. Lambourne



Maj W. E. Nickel



Lt Col C. M. Young



Lt Col Bryan E. Gill



Lt Col H. J. Crouch



Lt Col H. H. Cooksey



Lt Col A. B. Shattuck

which conducts most of the Army's operations research as a nonprofit contract agency. Until recently he was an operations officer in Korea. Educational qualifications include a mechanical engineering degree from Clemson (S.C.) College in 1943 and a B.G.E. degree in general education from the University of Omaha in 1962. He is also a graduate of the Command and General Staff College.

LT COL CROUCH (Horace J., Jr.) assumed new duties recently in the Review Branch, Review and Analysis Office. He entered the Army after graduating from Clemson A&M College in 1941, and has since completed numerous advanced training courses, including the Armored School, Airborne and Air Mobility Course, Command and General Staff College, and Armed Forces Staff College. He was chief adviser for construction and maintenance to the Chief of Engineers, Republic of Korea Army from 1959-62.

LT COL COOKSEY (Howard H.), the new Assistant Chief of the Combat Materiel Division, earned his B.S. degree in business administration from Virginia Polytechnical Institute. His military schooling includes the Command and General Staff College, Armed Forces Staff College and the National War College.

He served with OCRD from 1954-58, between assignments in Korea and Germany. In 1961-62 he was deputy commander, 2nd Battle Group, 6th Infantry in Berlin. His war record shows the Bronze Star with two oak leaf clusters, a Commendation Ribbon with two oak leaf clusters and the Purple Heart.

LT COL SHATTUCK (Amos B.), staff officer with Communications Electronics Division, received his B.S. degree from the U.S. Military Academy (1946) and a masters degree in electrical engineering from the University of Illinois (1951). A graduate of the Command and General

Staff College, he also has completed the Army Parachute, Signal, Aviation and Helicopter Schools.

Major assignments include the 11th Airborne Division, the CONARC Board No. 1, U.S. Military Academy, 8th U.S. Army and, for the seven months preceding his assignment to OCRD, the Test and Evaluation Command, Aberdeen Proving Ground, Md.

LT COL FITZPATRICK (Thomas E.), assigned to the Zeus Office, is a 1945 graduate of the United States Military Academy and has an M.S. degree in mechanical engineering from the University of Southern California. Recently he was a battalion commander, 21st Artillery, 25th Infantry Division, and from 1956-59 was Chief of the Weapons Division, Combat Developments, Ft. Bliss, Tex.

LT COL CRAIG (John E.), staff officer in the Environmental Sciences Division, graduated from the U.S. Military Academy in 1942 with a degree in military engineering, the Basic and Advanced Artillery Schools (1942), and the Command and General Staff College (1957).

He has served as Field Artillery battery commander (1942-46) and battalion commander (1957-59), Field Artillery S-3 (1953-54), Artillery Plans Officer of the 7th Army (1954-56), Field Artillery gunnery instructor (1951-53), Adviser to U.S. Military Training Mission to Saudi Arabia (1959-60), and Chief, Personnel Division, J-1, U.S. Army STRIKE Command (1961-63).

MAJ ROSENBLUM (Donald E.) is a new staff member in the Special Warfare Office, an assignment for which his qualifications include service in Korea (1952-53), instructor at the Infantry School (1955-56), company commander with the 82nd Airborne Division (1957-59), company commander in the 2nd Battle Group, 6th Infantry in Berlin (1960-61).

Educational training includes a B.S. degree in business administration from The Citadel (1951), Advanced Infantry Officer's Course (1956), and the Command and General Staff College (1962).

MAJ LAMBOURNE (Robert D.) joined the U.S. Army Research Office, Office of the Chief of Research and Development, with assignment to the Physical Sciences Division, after completing a course at the Command and General Staff College. Prior to that he was assigned to Fort Sill, Okla., for three years after completing the advanced Artillery officer course. He has a B.S. degree in mechanical engineering from the University of Utah (1948) and a masters degree from Georgia Institute of Technology.

MAJ NICKEL (Wallace E.), assigned as a staff officer in the Policy Division, came to his new post after completing the regular course at the Armed Forces Staff College. He also completed the Industrial College of the Armed Forces correspondence course in 1962, and the Command and General Staff College in 1961. He was graduated from the U.S. Military Academy in 1947 and won an M.S. degree in mechanical engineering from the University of Southern California in 1955. At the U.S. Army Air Defense School he served as an instructor in missile systems.

MAJ MONIHAN (David M.), staff officer in the Research Plans Office, U.S. Army Research Office, received his B.S. degree from the U.S. Military Academy (1950). He is also a graduate of the Command and General Staff College, the Air Ground School, and the Infantry School.

From 1959-1962 he served as an assistant professor and, later, full professor of military science (ROTC) in Kansas City, Mo. He has been awarded the Senior Parachutist Badge and the Army Commendation Medal with one oak leaf cluster.

Oak Ridge Reserve Unit Conducts Nuclear Seminar

U.S. Atomic Energy Commission representatives joined with key scientists of the Oak Ridge (Tenn.) National Laboratory in technical presentations at the third annual Army Nuclear Science Seminary, Aug. 11-24.

Sponsored by the Office of the Chief of Research and Development in conjunction with the Third U.S. Army and the XII U.S. Army Corps, the conference was conducted by the 3252 Reserve R&D Unit at Oak Ridge.

Sixty-seven Army, Navy and Air Force Reservists from all parts of the United States participated. Guest lectures by many top authorities in the atomic energy field and tours of facilities in the Oak Ridge area served to update Reservists on the latest technological developments.

In the foreword to the seminar program, Lt Gen Dwight E. Beach, Chief of Research and Development, stated in part:

"I wish to call to your attention, as you begin this period of study one very sobering fact. Time was when a man's life could be rather definitely divided into three periods—preparation, production and retirement.

"A person finished his education, applied what he had learned in his productive years, and then, at least to a degree, enjoyed the fruits of his labors. This way of life has passed.

"Scientific knowledge has been rising exponentially and our day finds us on an extremely steep part of the curve. We cannot *complete* our training; life just is not that way any more. We must continually revise and alter our concepts and our education is never-ending. This is why you are here today. . . ."

Welcoming remarks were made also by C. E. Larson, vice president of the Union Carbide Nuclear Co., and S. R. Sapirie, manager of Oak Ridge Operations of the Atomic Energy Commission.

Col Allan G. Pixton, Director of Developments, Office of the Chief of Research and Development, gave a

3 USAERDL Military Personnel Honored by Awards

Maj Edward R. Hindman, Sr., Capt Henry A. Stearns and Staff Sgt (E-6) Charles Leo Downey were honored recently at the U. S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va. Col J. H. Kerkering, commanding officer, presented awards.

Maj Hindman was awarded the Army Commendation Medal for "exceptionally meritorious service" as military consultant to the Chief of the Electrical Department. Certificates of Achievement recognized Capt Stearns, special assistant to the Chief

major address originally scheduled for Director of Army Research Maj Gen C. W. Clark, reassigned as CG of the U.S. Army, Japan, Aug. 23.

Other leading speakers included Col H. M. Roth (USA, Ret.), now with the Atomic Energy Commission, W. J. Larkin of the AEC, Col W. C. Burlin as Chief of the Army Nuclear Power Program, and P. E. Aebersold of the Office of Isotope Development at AEC Headquarters in Washington.

Col W. Y. Gissel, commander of the 3252 USAR R&D Unit, conducted a tour of the Atomic Energy Museum and Nathan Hall, Director, led a tour of the AEC Research Laboratories. Other facilities visited included the AEC Agricultural Laboratory and the Experimental Gas Cooled Reactor.

of the R&D Procurement Office, and S/Sgt Downey for his "exceptional abilities, devotion and leadership" as a construction machinery supervisor.

Maj Hindman's citation stated, in part: "He achieved extraordinary success in obtaining and providing essential military guidance for particularly urgent and critical new programs of equipment development in the fields of night vision and anti-guerrilla warfare during the transition phase of Army reorganization and its attendant personnel changes."

Maj Hindman enlisted in the Army during World War II and was graduated from the U. S. Military Academy in 1949. After receiving a master's degree from Princeton University, he completed the engineer officers basic and advanced courses at Fort Belvoir, Va. He served 19 months in Korea, 1950-52, participating in seven campaigns. Prior to this assignment with the Laboratories in 1961, he served as special assistant and assistant area engineer in Topeka, Kans.

Capt Stearns' certificate commended his work in "assisting the chief in expediting the multimillion-dollar procurement mission of the Laboratories. . . . His ingenuity in eliminating desirable but nonessential procedures and devising a simple but comprehensive graphical progress report contributed immeasurably to accomplishment of the mission within the resources available." He entered the Army in 1958 and served in Germany prior to his assignment to the Laboratories in 1961. A graduate of Rensselaer Polytechnic Institute, he received a B. S. degree in civil engineering in 1957 and a master's in management engineering in 1958.



Maj Gen Alden K. Sibley, CG, U.S. Army Mobility Command, turns the first shovel of earth at ground-breaking ceremonies for \$1.7 million night vision research facility at the Engineer Research and Development Laboratories, Fort Belvoir, Va. The Thomas Concrete Construction Co., Inc., a Rockville, Md., firm, received the contract. (See June-July issue for details of the facility). Onlookers are (l. to r.) Dr. Robert S. Wiseman, chief, USAERDL Warfare Vision Branch; O. P. Cleaver, chief, Electrical Department; Wade Ferguson, Fairfax Chamber of Commerce.

AMSC Report Stresses Mathematics in Modern Army

Is mathematics being sufficiently exploited to solve Army problems?

"No!" is the indication in the annual report of the Army Mathematics Steering Committee. Increased effort is necessary, the report contends, to make known ways in which mathematics can aid personnel whose duties require advanced knowledge.

Even senior research administrators are considered among those who could capitalize more effectively on capabilities of the Mathematics Research Center, U.S. Army, established in 1956 on the University of Wisconsin campus.

The AMSC report recognizes that "senior research administrators would find it difficult to attend a conference on the utility of the mathematical sciences." It recommends that a period at the next Army Commanders and Technical Directors Conference be devoted to that purpose.

Headed by Dr. I. R. Hersner, Jr., Chief of the Physical Sciences Division, U.S. Army Research Office, the AMSC functions in an advisory capacity and is responsible for program guidance to the MRC. Dr. Rudolph E. Langer, a noted mathematician, heads the Center.

The AMSC report recognizes a need to continue and expand activities to improve the mathematical and statistical competence of Army personnel in a "wide variety of activities in which use of mathematical models is or will be potentially of importance." Application is particularly important in the research and develop-

QM R&E Center Redesignated As Army Natick Laboratories

The U.S. Army Natick Laboratories is the new designation of the Quartermaster Research and Engineering Center, Natick, Mass.

The Department of the Army announced the new name is an outgrowth of the establishment of the U.S. Army Materiel Command in August 1962 when numerous functions of the Army's technical services, including the Quartermaster Corps, were consolidated. The Natick installation is a field agency of the Army Materiel Command.

The redesignation affects only the name of the scientific installation and does not alter its mission, operation and responsibilities.

Brig Gen Merrill L. Tribe heads the Natick Laboratories and Dr. Dale H. Sieling is Scientific Director.

ment and logistics fields.

In the programing of an increased number of seminars, symposia, conferences and special orientation lectures to encourage research and advanced study by American mathematicians, the report calls for more attention to "Function Analytic approaches to solutions of problems on Non-Linear Integral and Differential Equations." American efforts in that area, the report says, clearly "lag behind those of the Soviets."

Another recommendation is that a complete roster of all mathematical scientists in the Army be prepared, and that it include "critical information" on areas of specialization, background, experience and other relevant facts. This list will be used to

USAERDL Testing Air Conditioner for Mauler

A special 26,000 B.t.u./hour air conditioner for use in the Mauler mobile missile system is being tested by the U.S. Army Mobility Command, Engineer Research and Development Laboratories, Fort Belvoir, Va.

Designed to meet the stringent space and weight limitations of the vehicle mounted missile, the unit is about half the size and weight of comparable standard units. It weighs approximately 150 pounds, and is 45 inches long, 32 inches high and 11 inches deep.

Although it has a thin configuration, the unit incorporates its own CBR (chemical, biological and radiological) filter. Its condenser fan ventilates the missile turbine-generator compartment.

Two prototypes are being evaluated. One unit uses Refrigerant-12

notify mathematicians about MRC activities open to them.

During the past year seminars or symposia have been conducted on such topics as "The Planning and Analysis of Scientific Experiments," "The Numerical Solution of Partial Differential Equations," "Stochastic Models in Biology and Medicine," and "Non-Linear Integral Equations and Application."

An Army-wide Mathematics Conference was held in June 1962 at the MRC, the "Eighth Conference on Design of Experiments" at Walter Reed Army Institute of Research in October, and the first meeting of the U.S. Army Research Office Working Group on Computers at Durham, N.C., Oct. 31-Nov. 1.

The next meeting of the AMSC is scheduled in November (date undecided) at Fort Detrick, Md.

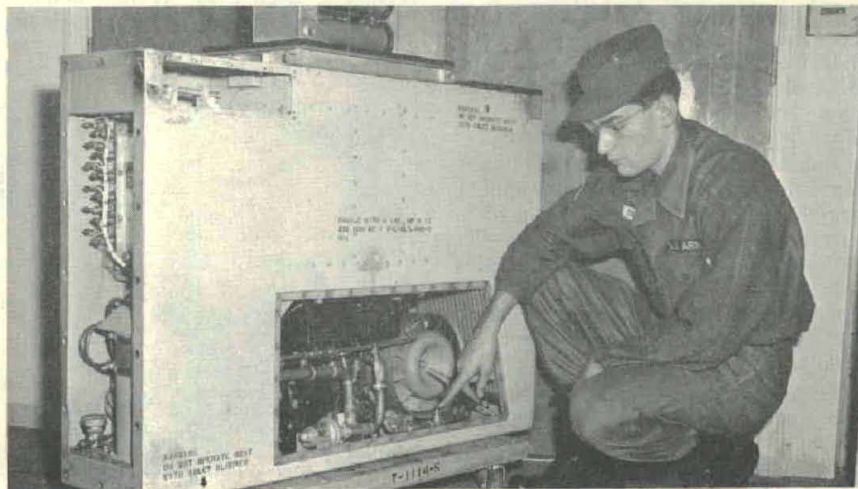
and the other Refrigerant-113.

The units were built by the AiResearch Division, Garrett Corp., Los Angeles, Calif., and by Stratost Division, Fairchild-Stratos Corp., Bay Shore, Long Island, N.Y.

In addition to air conditioning, the Laboratories are technical supervisors for the development of the gas-turbine generator and land navigation system for the missile.

The high precision, lightweight generator family under development ranges from 15 to 150 kw. capacity. Three 45 kw. sets are under test with the Sergeant missile system at Redstone Arsenal, Ala. Each weighs 975 pounds as compared to 4,300 pounds for the same capacity diesel unit.

The U.S. Army Mobility Command, Center Line, Mich., is a major sub-command of Army Materiel Command.



26,000 B.t.u./hr. air conditioner is tested at USAERDL, Fort Belvoir, Va.

Noted Astronomer Discusses Mass Migration to Moon

Mass migration to the moon could be an unqualified success, Dr. I. M. Levitt told 300 student officers of the U.S. Army Ordnance Center and School in an address at Aberdeen Proving Ground, Md.

In discussing "The Moon — Target for Tomorrow," the Director of Astronomy and Seismology at Fels Planetarium of the Franklin Institute, Philadelphia, termed landing on the moon "almost secondary to establishing a way of life upon arrival."

Travel to the moon "straight up and back" is the most feasible manner, he said, giving short shrift to the approximate quarter of a million miles which separate earth men and their goal of settling the planet.

"Using rockets that can travel a mile a second," he explained, "with five to eight engines and with the thrust and pull of the powerful rockets themselves, time will eventually gain victory over space."

Earthbound emigrants to the moon will encounter little or no difficulty through their separate or collective migrations, he said. While atmosphere would be the greatest single problem encountered, oxygen, water and energy could be created by synthetic means.

Water could be drawn from solid rock through intense heat and other forms of radiation, he suggested. Use also might be made of the great pools of water already stored below the moon's surface and ice fields from which such reservoirs are fed.

"Algae—the green moss which forms on pools—will perhaps be the first food eaten by potential moon inhabitants," he continued. "I've already eaten algae cookies, and while the color is not appetizing, I found them nourishing and sustaining." He indicated that rabbits and poultry, Brussels sprouts, carrots and potatoes would one day be as common table fare on the moon as on earth.

Habitation, the astronomer said, could be a type of quonset hut or egg-shaped plastic building, domed to entrap the required atmosphere. He outlined plans for oil-drilling, service stations, nuclear reactors and air-locked conveyances to be utilized on the coming real estate venture beyond the earth.

Recreation halls, swimming pools, golf and tennis courts, beauty salons and unique types of cosmetics for the ladies were also envisioned by Dr. Levitt. He saw no psychological or physiological problems for men and

women who might take up residence, or even be born on the moon.

The scientist also implied that because of the warmer climate in the moon area, heart trouble will be lessened because people will learn to slow down physically in keeping with the climate. His conclusion was that

a longer life span was indicated for future citizens of the moon.

"When do you think your concept will begin to take shape?" a student officer asked.

"By 1967," the astronomer replied, "we will have one man up there and back, and even during your own and my generation much of this will have become reality."

AMC Independent Labs Discuss Integrated Effort

An integrated attack on mutual problems was considered by more than 40 top scientific and military leaders of the U.S. Army Materiel Command at the third quarterly meeting of eight independent laboratories, Aug. 14-16.

Joint hosts for the discussions at Aberdeen Proving Ground, Md., were the U.S. Army Ballistic Research Laboratories (BRL), the U.S. Army Human Engineering Laboratories (HEL), and the U.S. Army Coating and Chemical Laboratory (C&CL).

Participants came from the Army Natick Laboratories, Natick, Mass.; Cold Regions Research and Engineering Laboratory, N.H.; Harry Diamond Laboratories, Washington, D.C.; Materials Research Agency, Watertown Arsenal, Mass.; Nuclear Defense Lab., Edgewood Arsenal, Md.

Because of their close association with the Army Materiel Command independent laboratories, the Foreign Science Technology Center, Arlington, Va., and the U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss., were invited to send representatives. Col Gilbert M. Payne from the FSTC and J. P. Tiffany from WES attended.

Brig Gen John G. Zierdt, acting director, Research and Development Directorate, headed an 11-man delegation from Materiel Command Headquarters and gave a briefing on AMC's future objectives and tasks.

Dr. Curtis Y. Lampson, BRL technical director, explained that BRL research encompasses nearly all aspects of a weapon system. Emphasis is on interdependence of effort in target acquisition (guidance and control), propulsion, flight physics, terminal effects, and weapon system evaluation. Investigations deal with rocket accuracy, micrometeorology, hypervelocity impact, high-altitude effects, and techniques of explosives.

Current research programs in human engineering were reviewed by Dr. John D. Weisz, HEL technical director, including personnel factors related to the Mobile High-Power Reactor 1A, the Medium Antitank Weapon (MAW) and the Special Purpose Individual Weapon (SPIW).

Dr. Charles F. Pickett, C&CL technical director, explained research in progress, including the new "exotic" finishes and a recent development in automotive brake fluids and coolants that serve equally well in tropic and arctic environments.

Col John A. Ord, acting chief of the Research Division, Research and Development Directorate, AMC, presided as chairman of discussions that served "to discuss common problems and to examine how each laboratory contributes to the AMC R&D output."

Tours of research facilities at Aberdeen included BRL, HEL and C&CL, such as the blast sphere, geodetic survey station, shock tube, wind tunnel and the laser experiment area.



Brig Gen J. G. Zierdt (left), Col William L. Nungesser, CRREL, and Dr. Curtis Y. Lampson, pause for a chat during tour of Spesutie Island.

Husband, Wife Contributing to Research Progress At Natick Labs on Deterioration of Army Supplies

Scientific exploratory talents of Dr. Gabriel R. Mandels and his wife Mary, also a Ph. D. and a recent Research Director's Award winner, are contributing notably to research progress at the U.S. Army Natick (Mass.) Laboratories.

The Mandels' research takes them into the microscopic world of molds, fungi, enzymes and bacteria in studies of their relationship to foods, military equipment and supplies for an Army which must operate efficiently on a global basis.

Importance of this field of activity is supported by statistics offered by the Prevention of Deterioration Center (PDC) of the National Academy of Sciences-National Research Council, Washington, D.C. The PDC Director stated in 1961 (see July 1961 issue of this publication, page 16) that, "A few years ago a conservative estimate of losses due to deterioration set the total annual figure at \$12 billion," much of it attributable to fungi effects.

Associate Director for Life Sciences in the Pioneering Research Division, Dr. Gabriel R. Mandels is a physiologist long identified with research on the activity of fungi. He is now studying the physiology of fungus spores.

With more than 10,000 living strains maintained in the fungus collection at Natick, an amount which is being added to annually, he has a fertile field in which to work. His activities trace a wide pattern of life sciences programs such as microbiology, mycology, bacteriology, biochemistry, entomology, insecticides

and rodenticides, radiation biology, germination studies of bacterial spores, and cellulolytic studies.

Although not assigned to the same laboratory as her husband, the research investigations by Dr. Mary Mandels are closely related. A microbiologist with the Food Division, she is exploring the use of cellulase in the conversion of waste cellulosic materials to sugar. Another project is directed toward increasing the digestibility and utilization of foods.

One of her tasks at Natick's Radiation Laboratory involves testing for possible changes in foods which have been preservation processed by ionizing radiation.

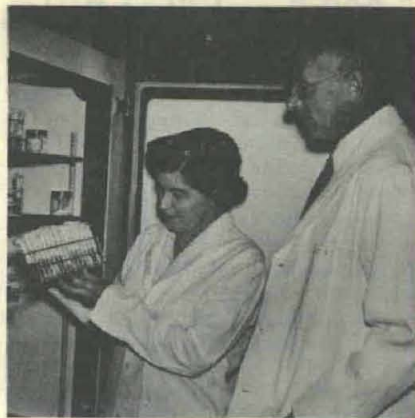
The Natick's Research Directors Award recognized her discovery of natural enzyme inhibitors in plants. The citation stated, in part:

"Her notable research work in the difficult field of enzymes will aid in hastening the day when adequate control of microbiological deterioration of materials will be achieved."

During her research on how fungi cause deterioration, she discovered powerful natural inhibitors of enzymes after extensive investigation and evaluation of extracts of over 600 plants.

Using cellulase, which is the enzyme responsible for the degradation of all cellulosic materials (cotton, wood, paper and many others), she found the most powerful inhibitor in the persimmon fruit. Work is continuing on the identification and isolation of natural inhibitors.

Accomplishments credited to her in-



HUSBAND-WIFE RESEARCHERS, Drs. Gabriel R. and Mary H. Mandels, look over some of the 10,000 fungi strains at the U.S. Army Natick Labs.

cluded investigation of previously unknown enzymes in fungi, coauthoring 18 scientific papers, and cooperating with other laboratories on such research as: isolation of lignin from wood (Forest Products Laboratory, U.S. Department of Agriculture, Madison, Wis.); fungi-causing diseases in humans (Camp Detrick, Md.); and the nature and action of beta-glucanases (Prairie Laboratory, Saskatoon, Canada).

A native of Rutland, Va., she was a part-time research and teaching assistant at Cornell University while studying for a Ph. D. in microbiology which she received there in 1947.

Dr. Gabriel Mandels is a native of Schenectady, N.Y. He received his B.S. and Ph. D. degrees at Cornell University in plant physiology, biochemistry and cytology.

During World War II, he served in the U.S. Army Chemical Warfare Service and later was in photo intelligence as chief of the damage assessment section of the 21st Bomber Command in the Pacific.

From 1946 to 1957 he served as a physiologist for the Quartermaster Corps in Philadelphia and, later, as Chief of the Biology Branch in the Pioneering Research Division at Natick. In 1957 he became Director of the Central Research Laboratory of the United Fruit Co. in Norwood, Mass., and in 1962 returned to the Natick Laboratories.

Author of numerous articles in scientific journals on fungi in investigations, he is a member of the American Association for the Advancement of Science, the American Society of Plant Physiologists, the American Society of Microbiology, the Botanical Society of America, and the American Chemical Society.

QMREC Geographer Joins Indian Ocean Expedition

Army geographer Jack V. Chambers will take a research role in the 4-year, 20-nation International Indian Ocean Expedition cosponsored by UNESCO and the International Council of Scientific Unions.

Scheduled to continue through 1964, the expedition employs a network of island stations, ships and aircraft to study the interaction between the earth, sea and upper atmosphere of the world's third largest and least known ocean.

Chambers, a specialist in the wet-tropical research at the Natick (Mass.) Quartermaster Research and Engineering Center, will participate in aircraft flights over the ocean dur-

ing India's rain (monsoon) season.

The plane, a modified C-54 funded by the National Science Foundation and the Office of Naval Research, will crisscross the Indian Ocean taking meteorological measurements within the 20,000-foot layer above the sea.

Data obtained will be used by Woods Hole (Mass.) Oceanographic Institute marine meteorologists for computation of the heat budget of the Indian Ocean. (For other International Indian Ocean Expedition activities, see *News magazine*, September 1962.)

Among the 20 nations participating in the expedition are the United States, Great Britain, Australia, France, Japan and the U.S.S.R.

5,000-Pound Blast Probes Mystery of Sky Ducts

A blast of 5,000 pounds of high explosives touched off at White Sands (N. Mex.) Missile Range in mid-August probed an upper atmosphere mystery dating back to the 1901 funeral of Queen Victoria.

Ceremonial cannon fired at the funeral were heard 90 miles away, but the sound was not detected at much closer intervening points. The "zone of silence" has made scientists wonder since then. They suspected that the cannon boom carried through "sky ducts" or sound tunnels without deflecting to earth.

The WSMR blast verified that theory. The sound of the explosion traveled 200 miles through the atmospheric duct before it bounced back to earth at Albuquerque, N. Mex. It traveled one mile every five seconds to reach the recording microphones 20 minutes later.

Since the formula used to determine atmospheric temperatures is based on a computer calculation of speed of sound, standard atmosphere variable profiles, wind speeds, and recorded intervals and azimuths of blast propagation, the latest findings are of considerable interest.

The recording station was manned by scientists of the U.S. Army Elec-

tronics Research and Development Activity who have been charting temperatures and wind speeds of the high sky for the use of space vehicle designers.

Medical R&D Command Puts Taylor in Deputy Post

The U.S. Army Medical Research and Development Command, OTSG, recently announced appointment of Lt Col Richard R. Taylor, MC, as deputy commander. He succeeds Col Colin F. Vorder Bruegge, MC, whose new station is the Industrial College of the Armed Forces, Washington.

Col Taylor has been with the Command since September 1959, first as Chief of the Biophysics and Astronautics Research Branch, and later as Chief of the Research Division and Chief of the Program Planning Office.

From 1947-1953 he served at Army-Navy Hospital, Hot Springs, Ark., and at Letterman General Hospital, San Francisco, Calif., then was assigned to Korea as commanding officer of the 7th Medical Battalion, 7th Infantry Division. Later, he served at Fitzsimons General Hospital, then as deputy commanding officer of the U.S. Army Missile Research and Nutrition Laboratory, and

The 5,000-pound explosive charge was detonated by Don Slade and personnel of the Warheads Branch of the Army Missile Test and Evaluation organization. Data was collected by Marvin Diamond, senior scientist of the Environmental Department of the Electronics R&D Activity.

as assistant clinical professor of medicine at the University of Colorado School of Medicine at Denver.

Graduated from the University of Chicago (B.S. degree in 1944 and M.D. in 1946), he has completed the Basic Medical Officers Course, Fort Sam Houston, Tex. (1947); Company Grade Medical Officers Course, Walter Reed Army Institute of Research (1951); Management of Mass Casualties Course, Brooke Army Medical Center (1957); and Command and General Staff College (Associate Course), Fort Leavenworth, Kans.

Control Experts Discuss Problems at Redstone

More than 30 of the Army's top inertial guidance and navigation specialists convened recently at Redstone Arsenal, Ala., to discuss present and future work on gyroscopes, accelerometers, and navigation and guidance computers.

The meeting was the first for the newly formed Army Technical Panel on Inertial Guidance, scheduled to meet quarterly to coordinate all Army research and development work on inertial systems and components.

Work now being done separately by several Army commands and agencies totals more than \$40 million per year for R&D of missile guidance systems, aircraft and land navigation systems, surveying instruments, fuzing systems, and various control and stabilization systems.

Host for the meeting was the Army Inertial Guidance and Control Laboratory, Directorate of Research and Development, U.S. Army Missile Command. William V. Gudaitis is deputy director of the Laboratory and chairman of the technical panel, consisting of representatives from all Army commands and agencies involved in the design and development of systems using inertial components.

Col C. W. Eifer, deputy commander, Land Combat Systems, U.S. Army Missile Command, welcomed the group and was followed by John L. McDaniel, technical director of the Directorate of Research and Development, who discussed objectives.

Commanders Cite Watervliet Arsenal Scientist

Presentation of a 1963 Army R&D Achievement award to Dr. Fritz K. Sautter at Watervliet (N.Y.) Arsenal in August included reading of commendatory letters from two commanding generals and the Arsenal commander.

Lt Gen Frank S. Besson, Jr., of the U.S. Army Materiel Command and Maj Gen Nelson M. Lynde of the Army Weapons Command joined with Col Keith T. O'Keefe, Arsenal leader, in citing Dr. Sautter's achievement. The award recognized his development of the technique and mechanism which contributed to electro-deposition of dispersion-hardened alloys.

As chief of the Electro-Vacuum Deposition Laboratory, Dr. Sautter is working toward development of a process to replace chrome plating as a means of protecting interior surfaces of gun tubes.

Born in Stuttgart, West Germany, he is a graduate of the Institute of Technology, Stuttgart, where he also earned his doctorate degree in natural science. He is the author of several papers on electroplating and allied subjects which have been published in this country and in West Germany.

Before joining the Arsenal research staff in 1959, he was employed as a scientific assistant at the Research Institute for Precious Metals, Schwaebisch Gmünd; as electroplating section chief of the DEGUSSA & firm, Hannau; and by the Firm Riedel, Biefeld, as an electroplating research specialist.



Col W. W. Foster presents 1963 Army R&D Achievement Award to Dr. Fritz K. Sautter for his contributions to the technique of electro-deposition of dispersion-hardened alloys.

ASAP Studies Modernizing of WSMR Instrumentation

A detailed study of plans for modernization of White Sands (N. Mex.) Missile Range instrumentation was completed in mid-August by a special instrumentation group of the Army Scientific Advisory Panel during a 3-day visit to the Range.

Dr. Charles C. Lauritsen, professor of physics at California Institute of Technology, headed the group. Other members included Dr. Henrik W. Bode, vice president of Bell Telephone Laboratories, Inc., Whippany, N. Mex.; Wilbur S. Hinman, Jr., who resigned recently as Deputy Assistant Secretary of the Army for Research and Development; and Dr. Edward C. Stevenson, associate director for research at the Laboratories for the Engineering Sciences, University of Virginia.

Other participants in the study are Dr. Craig M. Crenshaw, chief scientist, U.S. Army Materiel Command; Dr. W. W. Carter, chief scientist, U.S. Army Missile Command; A. W. Rogers, chief engineer, U.S. Army Electronics Command; Col Benjamin S. Goodwin, special assistant to the commanding general of the Army Test and Evaluation Command.

Accompanying the group were Maj J. E. McCleary, Office of Chief of Army Research and Development and Lee E. Davidson, electronic engineer of the Logistics Directorate, Test and

Evaluation Command.

Maj Gen J. Frederick Thorlin, White Sands commander, welcomed the group and gave a briefing on facilities and operations. Briefings also were given by WSMR staff personnel and contractor employees.

Subjects studied were the range's technical development plan, range scheduling, missile flight safety, major test programs of all Department of Defense range users, optical systems, electronic tracking systems, meteorological support and workload.



Maj Gen J. Frederick Thorlin, CG, WSMR, and Dr. Charles C. Lauritsen, professor of physics at the California Institute of Technology, pause for a chat during recent 3-day conference of ASAP instrumentation group.

AVSCOM Signs Dr. Goldsmith as Engineer Adviser

Dr. Lester M. Goldsmith has been retained as a special consulting engineer by the Army Aviation and Surface Materiel Command (AVSCOM), St. Louis, Mo.

Brig Gen David B. Parker, AVSCOM commander, and Maj Gen Alden K. Sibley, who heads the Army Mobility Command, Center Line, Mich., will utilize Dr. Goldsmith.

AVSCOM, an element of MOCOM, is the logistical agency for the Army's global aviation, surface, amphibious, rail and marine programs, of about \$500 million annually.

A graduate of Drexel Institute and retired vice president and general manager in charge of engineering for Atlantic Refining, Dr. Goldsmith has served many years as an adviser to the Army on numerous production, maintenance and operational problems concerned with surface equipment. He was a consultant to the Chief of Transportation during the development of a new family of amphibious vehicles in 5, 15 and 60-ton

cargo capacities.

The smallest of the three, the LARC-V, is in production as the replacement of the famed DUKW, or amphibious truck, of World War II. He also contributed to the development of a beach discharge lighter, landing craft retrievers and the Army's Overland Train.



Dr. Lester M. Goldsmith receives congratulations from Col H. Hauschultz, deputy commander of AVSCOM, after being sworn in as a special consulting engineer to the Command.

SCIENTIFIC CALENDAR

International Symposium on Physical Chemistry of Biogenic Macromolecules, sponsored by the German Academy of Sciences and the Institute for Microbiology and Experimental Therapy, Jena, Germany, Sept. 18-21.

International Conference to Study the Industrial Application of Radioisotopes, Zurich, Switzerland, Sept. 19-20.

Symposium on Rockets and Space Flight, Hamburg, Germany, Sept. 20-22.

Aeroelastic and Dynamic Modeling Techniques, sponsored by the Aeronautical Systems Division and the Aerospace Industries Assn., Wright-Patterson Air Force Base, Ohio, Sept. 23-25.

International Conference on Productivity, Profits and Human Progress through Industrial Engineering, N.Y.C., Sept. 23-25.

1st International Telemetering Conference, London, England, Sept. 23-27.

Conference on the Role of Atomic Electrons in Nuclear Transformations, Warsaw, Poland, Sept. 24-28.

Symposium on the Educational Aspects of Space Research and Communications, Paris, France, Sept. 25.

High-Altitude Plastic Balloons, sponsored by the AF Cambridge Research Laboratory, Boston, Mass., Sept. 25-27.

15th International Plastics Congress, Turin, Italy, Sept. 26-28.

International Colloquium on Medical Psychology, Tours, France, Sept. 27-28.

International Conference on Spectroscopy, sponsored by the Society for Applied Spectroscopy, Belgrade, Yugoslavia, Sept. 30-Oct. 4.

5th International Congress on Electroheat, Weisbaden, Germany, Sept. 30-Oct. 5.

4th Electric Initiator Symposium, sponsored by USAMC, Philadelphia, Oct. 1-2.

Colloquium on Electronic Calculating Machines and their Use, sponsored by the Otto von Guericke Technical University, Mathematical Institute, Magdeburg, Germany, Oct. 2.

Extraordinary Administrative Conference on Problems of Radiocommunication in the Universe, Geneva, Switzerland, Oct. 7.

Conference of the Communication of Research Results to Industry, Stockholm, Sweden, Oct. 7-9.

International Aerosol Congress, Brighton, England, Oct. 7-12.

10th Annual Air Force Science and Engineering Symposium, sponsored by the AF Systems Command and the OAR, Colorado Springs, Colo., Oct. 8-10.

International Conference on Electromagnetic Relays, Sendai, Japan, Oct. 8-11.

Symposium on Methods and Results of Cytophotometry and Interference Microscopy, Glessen, Germany, Oct. 9-13.

9th Annual Army Human Factors Research and Development Conference, sponsored by OCRD, Wash., D.C., Oct. 14-17.

13th Annual Symposium on USAF Antenna Research and Development Program, Monticello, Ill., Oct. 15-18.

Calorimetry Conference, Bartlesville, Okla., Oct. 16-18.

16th Gaseous Electronics Conference, sponsored by the USARO-D, Pittsburgh, Pa., Oct. 16-18.

1963 Symposium on Unconventional Inertial Sensors, sponsored by Republic Aviation Corp., Bureau of Naval Weapons and AFSC, Farmingdale, N.Y., Oct. 18-19.

Pan American Congress on Neurology, Lima, Peru, Oct. 20-25.

Symposium on Residual Porosity in Powder Metallurgy, London, England, Oct. 21-22.

12th Military Operations Research Symposium, Washington, D.C., Oct. 22-24.

Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington, D.C., Oct. 28-30.

International Symposium on Plasma Phenomena and Measurements, sponsored by AFOSR, IRE, AEC and NASA, San Diego, Calif., Oct. 28-Nov. 1.

QM R&E Field Evaluation Agency's Role

(Continued from page 2)

and evaluation activities. It also provides logistical support and technical and administrative services and advice to U.S. Army Materiel Command elements, and assists other Government agencies.

Included in the Agency's organization structure are an operations division, two administrative and support divisions, three test divisions and a division concerned with methodology.

The three testing divisions are food and container, clothing and equipment, and mechanical engineering. Specially designed and constructed accelerated test courses and facilities are located at Fort Lee. The Agency also uses terrain and environments throughout the Free World as a field testing laboratory.

Teams of FEA civilian and military specialists may be found conducting tests with the Marines on Vieques Island off Puerto Rico; with the Infantry in Greenland, Alaska or Ft. Bragg, N.C., or Ft. Benning, Ga.

Located in close proximity to Agency headquarters at Fort Lee are the specially designed test areas—the mechanical engineering test area, fuel and lubricants area, the fabric exposure site, and eight accelerated wear courses.

The FEA accelerated testing program seeks to compress an anticipated service life of materials or equipment into a much shorter period by repetition of use under conditions approximating normal or by subjecting the test item to stresses far exceeding normal—to arrive at a design decision as rapidly as feasible in the interest of shortened lead time. Data collected complement, rather than duplicate, data obtained in the laboratory where testing is conducted during the design phase of an item of materiel.

For example, in the area of textiles, abrasion resistance and tensile strength characteristics are evaluated individually in the laboratory. Several characteristics, such as abrasion resistance, snag resistance, wear pattern and water repellency, can be evaluated simultaneously on the Agency's wear courses.

Tests determine the environmental suitability of each item of materiel under all conditions to which it is likely to be subjected. Scientifically controlled conditions prevail and tests are conducted by personnel trained in engineering or scientific fields.

Human engineering factors are given prime consideration and, when appropriate, are included in field tests conducted by the Agency. The adequacy of the Agency's field tests is important, but equally important is the handling of the test results. Inadequate performance is analyzed, difficulties are determined, and remedies devised.

The procedure is twofold, involving operator performance and item performance. The major factors for the human operator are: safety, comfort, speed and efficiency of operation. Ease of maintenance and servicing are related factors. The major factors involving equipment are speed, accuracy, quality and reliability of performance under actual operating conditions.

Engineering design tests, engineering tests and service tests are conducted. The purpose of an engineering design test is to collect data, to confirm preliminary concepts and calculations, and to determine the capability of components of equipment items or systems for which the designer intended. In the case of highly complex systems consisting of a number of major integrated components, the test may be expanded to include a complete system.

The objective of an engineering test is to determine the technical performance and safety characteristic of an item. Included are associated tools and test equipment as described in qualitative material requirements (QMR), and technical characteristics.

This determination includes the measurement of the inherent structural, electrical or other physical and chemical properties, and may utilize data previously generated in engineer design tests. Controlled conditions eliminate human errors in judgment, so far as possible. Test data is used in further development and determination of the technical and maintenance suitability of the item or system for service test.

The objective of a service test is to determine to what degree the item or system being field tested, together with its associated tools and equipment, performs the mission as described in qualitative material requirements, and the suitability of the item or system and its maintenance package for use by the military, including compatibility of the machine and its operator.

Other tests conducted by the Agency are various combinations of

engineering, service and engineering design tests. Items of food, clothing and equipment that lack some essential performance requirement are either modified as a result of findings or completely redesigned.

Field testing then is the vital link between the prototype and the production item; it provides the "follow-through" after laboratory tests. Only in the field can any realistic degree of simulation of the military use environment be attained.

Field Evaluation Agency engineers and technologists are concerned with testing of items and equipment during developmental stages and tests of final prototypes. In contrast to the limited number of prototype items used in engineering tests, many items may be involved in service tests—again pointing up the value of engineering tests in eliminating waste manhours and equipment in premature service testing, and development of end items at the lowest possible cost to the Armed Forces.

A methods research program is vigorously implemented to evaluate and constantly improve the Agency's test capabilities in light of advances in the design of food, clothing and equipment. This program seeks to keep the Agency test methods abreast of and in many cases in the forefront of the art and science of field testing.

The Methods Engineering Division is pioneering in the study of the complex interactions relevant to the individual soldier, his battlefield environment and his protective clothing and equipment. The basic purpose is to define operationally those critical combat tasks that are sensitive to the effects of protective clothing and equipment.

The Field Evaluation Agency with its highly qualified technical and scientific staff and specialized facilities, together with its flexibility and versatility of operations, is uniquely suited for its assigned task—ever mindful of its responsibility to the American soldier and his combat effectiveness, any time, anywhere.

General Officer Changes

Maj Gen Bruce Palmer, Jr., has been assigned to the Office of the Deputy Chief of Staff for Military Operations, Department of the Army, Washington, D.C., following service as Eighth Army Chief of Staff.

Brig Gen William McG. Lynn, Jr., has been assigned to the Alaskan Command, Elmendorf Air Force Base, Anchorage, Alaska. Previously he was Artillery commander, Fourth Infantry Division, Fort Lewis, Wash.

If You Start to Choke Up . . . Run!

Army Advice Applies to 'Doctored' Fumigation Gases

The advice may appear needless but—if you're in an Army building and your eyes begin to smart and well up with tears, get out, fast!

The tears will be caused by chloropicrin (tear gas), which is harmless but which may indicate a dangerous concentration of toxic gas.

Military use of tear gas as a safety device to indicate the presence of toxic gases was implemented and authorized with publication of Federal Specification, "Insecticide, Methyl Bromide, 0-1-00556."

Methyl bromide is used by the Army in its fumigation program to kill insects and rodents and is lethal when drawn into the body by means of the respiratory system.

Serious danger may develop due to accidental undetected leaking or escape of this colorless, odorless gas near people without gas masks.

A suggestion that the military use a tear gas additive in the extremely dangerous methyl bromide was the brainchild of Robert G. Hahl. It earned him the largest cash award for a suggestion ever made to an employee of the U.S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va.

The U.S. Army Materiel Command, through its Mobility Command, authorized \$500 less an initial award of \$50 given when the suggestion was first approved and implemented by the Office of the Chief of Engineers and the Army Chemical Corps.

The Materiel Command stated:

"Subject suggestion from an accident prevention standpoint indicates that implementation involves a relatively important improvement in one of the Army's major programs (fumigation for control of pests and rodents).

Further, that this change in the



Robert G. Hahl is congratulated by Col. J. H. Kerkering after receiving largest cash award ever made to an employee of ERDL for a suggestion.

composition of methyl bromide to include two percent chloropicrin involved considerable ingenuity, initiative and originality on the part of the suggestor.

"The extent of application is general in that it effects a very large number of activities and personnel in the Department of the Army."

No Government specification or supply bulletin previously authorized procurement of methyl bromide containing chloropicrin. Chloropicrin also can be used in other toxic or liquified gases, in use by the military forces for purposes other than chemical warfare, to indicate dangerous concentrations in the atmosphere.

Col. J. H. Kerkering, commander of the Laboratories, presented the award and a Department of the Army certificate to Hahl.

A 1939 graduate of the University of Michigan with a B.S. degree in mechanical engineering, Hahl has worked 21 years at USAERDL.

Aberdeen Ballistic Research Labs Install Computer

A new IBM 1401 automatic data processing system computer has been installed in the Ballistic Research Laboratories Computing Laboratory, Aberdeen Proving Ground, Md.

This "small" computer provides an efficient means for preparing data and recording results for the "large" high-speed digital computers BRL-ESC and ORDVAC.

Consisting of a processing unit, a card-read punch, a high-speed printer, and a magnetic tape unit, the system accepts data and information

from conventional paper cards or magnetic tape. Results are in the form of paper cards, magnetic tape or hard copy printed results.

The reader unit accepts data from paper cards at the rate of 64,000 characters per minute. The magnetic tape unit accepts and edits data at a rate varying from 15,000 to 60,000 characters per second. The printer spews out results at 600 lines (70,000 characters) per minute.

The system relieves BRLESC and ORDVAC from the time-consuming



Eleven employees at Fort Belvoir, Va., were recognized recently for Government career service ranging from 10 to 30 years. Length-of-service awards were presented by Col. W. H. Van Atta, director of the U.S. Army Engineer, Geodesy, Intelligence and Mapping Agency (GIMRADA), and by Col. Robert S. Burlin, director of the U.S. Army Engineer Reactors Group (USAERG).

GIMRADA employees Walter P. Scales and Theodore W. Tiedeken received 30-year pins; George M. Illemszky, Frank L. Treadwell and Robert G. Livingston, 20-year pins; and Mrs. Frances A. Hagen and Mrs. Arline S. Dilliard, 10-year pins.

Two USAERG 20-year pins were presented to Winfred M. Crim, Jr., and Leo J. Misenheimer; 10-year service pins were given to Homer D. Musselman and Mrs. Helen Riggles.

Mrs. Marcia Bowker and Randall D. Esten were presented with Outstanding Performance certificates by GIMRADA.

At the U.S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va., 24 civilian employees received awards presented by Col. J. H. Kerkering, commanding.

Sustained Superior Performance certificates and cash awards were presented to Richard R. Rogowski, \$250; Jack Hildreth, \$250; Kenneth W. Davis, \$200; Ray Wood, \$200; Arthur L. Limerick, \$150; Mrs. Liselotte J. Dean, \$100; Mrs. Pauline E. Manning, \$100; J. C. Young, \$100; Sidney Levine, \$50; and Richard Bliss, \$25.

Mrs. Louise Baugh was honored for the second time with an Outstanding rating plus a \$200 Sustained Superior Performance award. Joseph R. Sholtis was given a similar award.

Outstanding ratings recognized the work of Charles F. Cashell, Mrs. Anita Collier, Dr. Georg H. Hass, Horace W. Risteen, Turner G. Timberlake, Walter H. Spinks, James E. Griffin, John A. Christians, William L. Walter, Jr., Mrs. Patricia M. Ledbetter, Alvin J. Tolbert and Thomas H. Bern.

It was the sixth such award for Cashell and the eighth for Dr. Hass.

their use primarily on computations, for which they are most efficient. details of editing vast amounts of input and output data, permitting

9 CRREL Scientists Give Papers at IUGG Seminar

Nine scientists of the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, N.H., presented technical papers at the 13th General Assembly of the International Union of Geodesy and Geophysics.

Sixty-one countries sent delegates to the IUGG meeting at Berkeley, Calif., Aug. 19-31. Participation of the United States was sponsored through the American Geophysical Union under direction of the U.S. National Academy of Sciences.

The CRREL group was headed by James Bender, Chief of the Research Division. Chairman of the U.S. Commission on Snow and Ice, American Geophysical Union, and of the International Committee on Ground Ice, International Union of Geodesy and Geophysics, he is also a member of the Panel on Glaciology, Committee on Polar Research, National Academy of Sciences.

The CRREL delegation included

Swedish Geodesist Joins GIMRADA for 6 Months

An internationally known geodesist from Sweden is augmenting the research staff of the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA) for six months as a resident scientist.

Col W. H. Van Atta, GIMRADA Director, said Prof. Arne E. Bjerhammar of Stockholm will be on leave from the Royal Institute of Technology as head of the Department of Geodesy. He will work at the Fort Belvoir, Va., installation on research and studies of the figure of the earth, serving also as a consultant and lecturer on geodesy.

Prof. Bjerhammar previously served as a guest lecturer at 25 American universities under the sponsorship of the American Society of Civil Engineers and the National Science Foundation. In 1957 he was a visiting scientist for six months with the National Research Council in Ottawa, Canada.

He has served as chairman of various committees of the International Association of Geodesy, and has authored approximately 60 papers published in journals devoted to mathematics, photogrammetry and geodesy.

Established in August 1960, GIMRADA is the principal field agency of the U.S. Army Corps of Engineers for research and development in geodesy, intelligence and mapping.

Dr. Andrew Assur, Scientific Adviser to the Technical Director; Anthony Gow, Chester Langway, Stephen Mock, Dr. Wilford Weeks, Dr. Yin-Chao Yen, Dr. Motoi Kumain and Dr. Hohannes Weertman, all employed in the Research Division.

Papers presented by the CRREL scientists covered many of the major areas of research effort in the polar regions, including deep-core drilling, internal structure of the Ross Ice

Shelf at Little America V in Antarctica, the growth and structure of sea ice, isothermal flow, surface movement surveys, and the profile and heat balance of an ice sheet fringed by mountain ranges.

The IUGG is one of the General Unions constituting the International Council of Scientific Unions (ICSU), and its mission is to promote study of problems relating to earth physics, including oceans and atmosphere.

Reserve Unit Sponsors Biological Defense Seminar

Understanding of tri-service capabilities, limitations and problems was enhanced by Army, Navy and Air Force participation in the Second Research Reserve Seminar on Biological Defense.

Held Aug. 11-24 at the U.S. Army Biological Laboratories, Fort Detrick, Md., the seminar attracted 61 Reserve officers (20 Army, 34 Navy, 6 Air Force, 1 Marine) from all parts of the country.

Chief of Naval Research Rear Adm Leonidas D. Coates presented the opening address. He pointed out that research on how to detect and combat infectious disease caused by enemy contamination of the air is producing valuable knowledge of how to control normal infection processes.

"The data we are amassing," he said, "does not have to await the emergency of the biological attack to be useful. It can and is being employed in improving the resistance of man, his livestock and food crops to infections of epidemic spread."

The admiral told Reservists they were fortunate to have the opportunity to visit laboratory facilities unique in their focus on problems of chemical, biological and radiological

defense techniques.

Participants visited the Fort Detrick Simulant Production Plant, the Animal Farm, Medical Bacteriology Division, Crops Division, Aerobiological Facilities and Test Chambers, Physical Defense Division, and the new Bio-Math Building. One day was devoted to a tour of Edgewood (Md.) Arsenal which included a field demonstration.

Brig Gen Fred J. Delmore, Edgewood Arsenal commander, discussed significant advances made in the chemical and biological sciences since the first seminar was held. He stressed the importance of stepping up the research and development program in order to reduce time required from initial concept to delivery of equipment to troops.

Other leading speakers included Dr. Riley D. Housewright, scientific director, and Col Carl S. Casto, commander of the Bio Labs; Col Dan Crozier, commander of the U.S. Army Medical Unit; and Cmdr Leon P. Eisman of the U.S. Navy Unit attached to Fort Detrick.

The program was under the direction of Naval Reserve Research Company 5-3 at Fort Detrick.



Rear Adm Leonidas D. Coates, Chief of Naval Research (left center) and Brig Gen Fred J. Delmore, CG, Edgewood Arsenal, stop to inspect UNIVAC II at Fort Detrick Bio-Math Building. Conducting the tour, during Second Research Reserve Seminar on Biological Defense, are Col Carl S. Casto, CO, U.S. Army Biological Labs (left), and Gerald T. Eccles, Bio-Math Division.

Israeli Colonel Discusses Desert Mobility Problems Related to 1-Year Study at ATAC Locomotion Lab

Lt Col Aharon D. Sela, Chief, Technical Vehicle Branch, Headquarters, Ordnance Corps, Israeli Army, discussed some of the vehicle mobility problems of interest to his group, during a recent visit to the U.S. Army Research Office-Durham, N.C.

On leave of absence from his regular post for one year, Lt Col Sela will spend this period at the Land Locomotion Laboratory (LLL), U.S. Army Tank and Automotive Command, Center Line, Mich.

There he will study shear stresses along the contact area between a rigid wheel and soft soils, with relation to normal stresses distribution. Theoretical considerations and calculations have been worked upon in some detail by Lt Col Sela at his home laboratory.

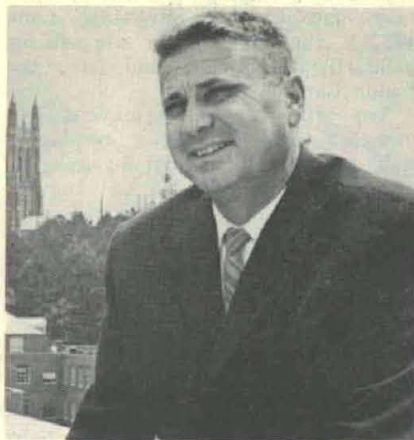
The U.S. Army Research Office-Durham (AROD) has a planning interest in fundamental research in the environmental sciences, and was instrumental in obtaining Lt Col Sela's participation in the work at LLL. AROD aided in planning the First International Conference on the Mechanics of Soil-Vehicle Systems held at Turin and Saint Vincent, Italy, in June 1961.

At that conference, which was jointly sponsored by AROD, LLL, and the General Inspectorate of Motorization of the Italian Army, with general assistance from the European Research Office, U.S. Army, Frankfurt, Germany, the Israeli representatives reported on important work in the subject field.

One sequel of the Turin conference was the formation of the International Society for Terrain-Vehicle Systems which was organized in January 1962. James J. Murray, Director of the AROD Engineering Sciences Division, serves as General Secretary.

Underlying the Israeli Army's intense interest in the vehicle mobility field are two aspects. First, the problems of trafficability in sand are not yet solved. Second, the problems of vehicle passage along the undulating contour of the desert are not fully understood.

Lt Col Sela pointed out that under the influence of the prevailing wind, the sand in the desert is left in a kind of sawtooth wave formation. On the windward side the sand lies in a long sloping grade upward, to a short and steep cut-off slope to leeward. A vehicle descending the sharp slope ac-



Lt Col Aharon D. Sela

quires kinetic energy that is used up as it ascends the next slope.

The phenomenon is not fully understood, however, and the lack of knowledge inhibits attainment of maximum trafficability. As a general proposition, it appears that the first vehicle across a sand surface has the best situation from a mobility standpoint. The second vehicle has the worst situation. Mobility of following vehicles increases.

The terrain of Israel is 30 percent desert, with considerable areas of dry soils, plus some deep mud from sporadic rainstorms. The portion of Israel adjoining Egypt is primarily desert. On the eastern boundary of Israel, where the Dead Sea separates Israel from Jordan, there are areas 1,300 feet below sea level, with 20 percent humidity quite frequent.

Performance of men and vehicles in both areas involves very special influences of an environmental character, Lt Col Sela pointed out. Most of the research done by his office is realistically carried out in the field. Many of the vehicles used are of American design, such as the Sherman tank, jeeps, personnel carriers and military trucks.

Lt Col Sela stressed two objectives as having primary importance for scientists working in the vehicle mobility (terradyamics) field. It is necessary to advance the state-of-the-art to a point that will permit design of vehicles for predetermined conditions, just as is done in the case of a bridge or a building. Secondly, it is essential to uncover new principles that will support design of vehicles with increased mobility.



By Ralph G. H. Siu

STORMING THE BARRICADES. A kindly fellow, with a cynical bent, insisted the other day that there is considerable resemblance between some executives and the hero of the story told by A. Lawrence Lowell about the 1848 upheaval in Paris.

A man saw his friend marching after a crowd heading for the barricades. Knowing that the troops behind the barricades were well-seasoned and well-armed, and that the mob would certainly be slaughtered, the man urged his friend to leave.

The friend said he could not do so. When pressed for the reason, he explained, "I must follow them. I am their leader."

GREAT SPEECHES. Ghost-writers may be interested in Montaigne's remark about most of the speeches of great men:

I did not understand his meaning; his discourse was so obscured by solemnity, grandeur and majesty.

SWIFT ARROWS. There must have been hard-driving executives fifteen hundred years ago, when the old proverb was coined: For a swift arrow, pull hard on the string.

THE MANTIS. Empire-builders should pay heed to the ancient warning: When the mantis hunts the locust, he is unaware of the shrike hunting him.

SALES. "It is easier to make goods than to get men to sell them," says Cottingham. "The head of the house ought to be a salesman. The head of the country ought to be a salesman, with his eyes on the markets of the world at home and abroad; for successful selling means successful leadership. . . . The great factor in selling is the human factor, and not the things we sell. The things must be right, of course; but it's people who buy and use the things, and therefore it's people whom we must interest and deal with in getting rid of things. Too many businessmen are paying too much attention to the things they make and not enough attention to the people who make them, the people who sell them, and the people who use them. It's not things that make life; it's people. It's not things that make business, it's people."

\$3 Million Utah Project Becomes WSMR Test Site

Confined to the mountain-ringed desert of south-central New Mexico since establishment in 1945, White Sands Missile Range (WSMR) will become a 2-state operation this month with the completion of a \$3 million project at Green River, Utah.

Topped by a 500-foot-tall meteorological tower, the new facilities will support the overland portion of the Air Force's extensive ABRES/Ath-

ena program—a study of missile re-entry phenomena.

Presently employing about 40 military and civilian personnel from WSMR, the Green River site utilizes primarily facilities leased from the Union Carbide Co.

Approximately 400 permanent Government and contractor employees will participate in the 2-year program. Personnel will be regular

Battelle, Ohio University Slate Management Parley

Battelle Memorial Institute and Ohio University at Athens have joined forces to present a Research and Research Management Program termed the "first of its kind in the U.S." at the Institute in Columbus, Ohio, Oct. 6-19.

To intrigue prospective participants, an announcement of the program fired the question: If you were assigned a half million dollars to organize a research project, where would you begin?

The problem with which nationally known guest instructors and speakers will deal is explained by Maximillian N. Brinkman, Director of the Management Development Program at Ohio University and coordinator of the joint project:

"Research has grown so rapidly it sometimes becomes impossible to control. Men who are primarily research scientists suddenly inherit great re-

sponsibilities of management. Our program will assist these men in balancing the economic and scientific factors involved in the research projects they supervise."

Scientists and engineers throughout the U.S. engaged in research and development are invited to take part in the program. Top instructors from Battelle and Ohio University will conduct courses on human relations and communications as well as on the philosophy of administration and techniques of research, dealing primarily with the physical and behavioral sciences.

Donald C. Power, Chairman of the Board and Chief Executive Officer of the General Telephone and Electronics Corp., will be among the speakers. Noted administrators who will take part are Dean Paul L. Noble of Ohio University and Dr. Frank C. Croxton, Director of Education at Battelle.

Col Steele Takes Command of Kirk Hospital at APG

Col Lowell R. Steele, MC, assumed command Aug. 19 of Kirk Army Hospital, Aberdeen Proving Ground, Md. He replaces Col William T. Lane, MC, who plans to retire Nov. 1.

Col Steele was chief of surgical service at Brooke General Hospital, Fort Sam Houston, until reassigned.

Commissioned in the Army Medical Corps when he received his doctor of medicine degree from Indiana University in 1941, he served his internship at Brooke General, went to Europe in World War II with the 67th Medical Group, and became inspector for the 814th Hospital Center in Paris in 1945.

Beginning in 1947, he served in Okinawa as chief of surgery with the 37th Station Hospital before moving to the Army's Letterman General Hospital in San Francisco where he spent three years as a resident in surgery. He has since served two tours at Fort Knox, Ky., and with

the 130th Station Hospital in Heidelberg, Germany.

Certified by the American Board of Surgery, he is a Fellow of the American College of Surgeons and holds membership in the American Medical Association and the Association of Military Surgeons.



Col Lowell R. Steele

WSMR and Atlantic Research Corp. (Air Force contractor) employees.

Operationally, the site will include a radar and control center built around two powerful and accurate FPS-16 missile tracking radars used to insure the safety of the tests. A hazardous storage area isolated from the other buildings will house propellant components of test rockets before each launch.

The launch complex itself will include four firing pads, the blockhouse from which the tests will be operated, and the tower.

In order not to overload the housing facilities of the small southeastern Utah city, the missile range is constructing a park and service area for approximately 60 trailers to be used as living quarters and administrative and mess facilities.

Dr. Carr Writes for Book Honoring Russian Scientist

Dr. C. Jelleff Carr of the U.S. Army Research headquarters staff in Arlington, Va., is listed as one of 29 authors in a recently published memorial volume to Prof. V. V. Zakusov, U.S.S.R. Academy of Medical Sciences.

Renowned as a neuropharmacologist, Prof. Zakusov is honored in the volume by 29 review papers in pharmacology. Included are a bibliography of his publications and titles of theses published by his students.

Dr. Carr, Chief of the Life Sciences Division Scientific Analysis Branch at USARO, describes in his chapter, titled "Unsolved Problems in Psychopharmacology," the need for more specific drugs for psychiatric cases.

Korean Army Chief Cites RAC Officer for Service

The commanding general of the Republic of Korea Army has cited an officer assigned to the U.S. Army R&D Operations Advisory Group to the Research Analysis Corp., Bethesda, Md., for meritorious service in 1962-1963.

Lt Col Bryan E. Gill, Jr., received the commendation of Lt Gen Jung Nai Huik for his contributions to the development of the VI ROK Corps while serving as G-3 Operations officer.

The citation stated, in part: "... you have been of great value in bringing forth the higher state of combat readiness of the Corps. I am certain that your devotion to duty and cooperative spirit have won great admiration of all whom you have come in contact with. . . ."

Electronics R&D Laboratory 'Supermarkets' Aid Supply Needs

The U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, N.J., has found that the way to promote better use of scientific, engineering and office supplies is to make them easy to get.

The Laboratory operates one of the world's most unusual chains of "supermarkets." Machinists, stenographers, scientists and engineers can take what they need from the shelves—anything from a new kind of transistor to a box of paper clips, some 7,500 items, none of them edible.

The seven supermarkets distribute more than a \$1 million worth of supplies annually. Known as Consumer Supply Points, they are operated by the Laboratory's Logistics Division, headed by Lt Col William J. Lawlor, with Wallace Greenwood as civilian chief. Richard F. Dorer, head of the Consumer Supply Branch, is in direct charge of the stores.

The three outlets at the Hexagon Building headquarters of the Laboratory and the one at its Evans Area in Wall Township, which handle electronic, photographic and office supplies, are supervised by Thomas L. Norris. Three outlets which distribute shop materials—stock metal, chemicals, plastics—are supervised by David Lambertson.

Although the chief stock in trade consists of components used in designing electronic equipment for the Armed Forces, some key features of the supply system have their counterparts in progressive retail chains, such as speedy procurement of goods



Lt Col William J. Lawlor, Chief, Logistics Division, looks over stock with Wallace Greenwood, the division's civilian head, while engineer John J. Hand does some "on-the-job-shopping" in self-service supply store.

directly from a central distributor.

Time-consuming practices such as filling out property-issue forms in quadruplicate and scanning through hefty catalogues filled with rows of numbers are eliminated. Since supplies are readily available, employees rarely take more than they need. Under the old order-and-wait system, hoarding was sometimes resorted to as a hedge against job interruption caused by slow delivery on items that might run out before a new supply could be obtained.

The simplicity of the supermarket system for the customer rests upon precise stock control, achieved with the aid of electronic accounting machines and punch cards. Each type of item has a preprinted data processing card on which are entered nomenclature, stock numbers, unit value, and information only logistics employees need to know.

When the supply of items carried on the shelves begins to run low, attendants mark the quantities wanted and the stock numbers on the proper cards and send them to the Property Control Branch. There the orders from all the consumer points are totaled on accounting machines. Consolidated orders go to the Central Supply Office, the "jobber" for all Fort Monmouth agencies.

Orders are handled at Central Supply on a "fill or kill" basis, and the records show that upwards of 90 percent of the orders are filled immediately. Consumer demand is the guide in selecting the items regularly stocked. Outdated and rarely used items are minimized and the focus is on "live merchandise." Rapid advances in the electronic art enable logistics officials to make informed decisions on the outdated items that should be dropped and the new ones that should be stocked.

Col Lawlor, Mr. Greenwood and their assistants work closely with the Laboratory's Electronic Components Department and with two committees. One of these advises on electronic items and the other on the shop materials used in fabricating models of new electronic equipment, and for "housekeeping" purposes.

One of the methods considered highly important for keeping stock up to date is individual suggestion. If engineers, scientists and shop men do not find what they are looking for at the self-service stores, they obtain suggestion slips and request that the items be carried regularly. Requests

are forwarded to the electronic or shop committee for review.

If the demand for a rare item is not great enough to merit stocking it, it is obtained directly from the manufacturer.

Although the user can take even the more expensive components directly from the shelves, a rigid accounting is kept of all electronic items by the use of "charge plates" issued to Laboratory task groups. Common office supplies are exempt from the itemized charge accounts.

"When all of the factors are weighed, self-service very clearly saves time and money in distribution of supplies," Mr. Greenwood said. "But, perhaps more importantly, it saves waiting time for engineers and others who might otherwise be held up on an urgent project while waiting to receive essential items."

USAEPG Scientist Joins IBM Control Center Staff

Dr. Robert E. Frese resigned recently as Chief Scientist at the U.S. Army Electronics Proving Ground, Fort Huachuca, Ariz., to join the staff of the Command Control Center of the International Business Machine Corp. His successor had not been named at press time.

In March 1959 he came to Fort Huachuca as Deputy for Scientific Affairs to the Director of the Combat Development Directorate, then was promoted to Deputy Director of that Directorate and of the Systems Development Directorate. In April 1962 he was promoted to Chief Scientist, and was awarded the Army Meritorious Civilian Service Award.

During his tour at Fort Huachuca he supervised the technical development of the SD-2 surveillance drone system; the overall development of an automatic data processing system for use by a field army; basic research in micro-meteorology; the Electromagnetic Environmental Test Facility; and a varied complexity of Army electronics communication research, development and testing.

A native New Yorker, he was awarded a B.S. degree in electrical engineering and mathematics (1951) and a Ph. D. (1959) from the University of Michigan.

He is a member of the board of directors of Consumers Union of the U.S., Inc., publisher of "Consumer Reports," and of the Institute of Electrical and Electronics Engineers.

Picatinny Arsenal Safety Design Program Stirring Interest

Results of a "Safety Design Criteria Program" at Picatinny Arsenal, Dover, N.J., directed toward minimizing loss of life and property damage from accidental explosion, are arousing interest of Defense agencies.

The program deals with protective facilities for the manufacture and storage of explosive material. It recently received the endorsement of the Defense Atomic Support Agency, National Aeronautics and Space Administration, Air Force and the Navy.

Under the supervision of the Ammunition Engineering Directorate's Process Engineering Laboratory, the project is in charge of Leon W. Saffian, chief of the High Explosives and Loading Section.

Credited with significant contributions to success of efforts to date are Richard M. Rindner, a chemical engi-

neer, Charles E. McKnight, Stanley Wachtell, Arthur Schwartz and Irving Weisman of the Process Engineering Laboratory.

When work several years ago indicated that safety design technology lagged far behind process engineering technology in the field of explosives, Saffian and Rindner attacked the problem. Papers they presented at seminars sponsored by the Armed Services Explosives Safety Board (ASESB) stimulated support.

In 1959 their work was officially recognized by establishment of an ASESB Barricade Work Group, with Saffian as the Army representative. Subsequent success of research and development activities led to the designation of Picatinny Arsenal as the technical manager for the next phase of Safety Design Criteria Program.

That will involve an estimated million-dollar test program to prove out analytical study results developed by the Process Engineering Laboratory.

In addition to frequent presentations on their work at conferences and symposia, Saffian and Rindner have been receiving invitations to lecture to groups in industry research.

Winners of a number of commendations from superiors at the Arsenal, including the 1962 technical writing award for the best Directorate paper, they also have been called as consultants to military installations and firms under contract to the Government.

Further results of the program, it is envisioned, may influence the construction of missile sites, munitions plans and other military facilities where explosive materials are used.

'Gay Deceivers' Play Key Role in Missile Testing

Gay deceivers is an apt term for the Army's most colorful missiles. They try hard to act like what they really aren't—full-scale missiles and airplanes.

Some of them saunter along at a poky 200 miles per hour. Others flit through the blue at twice the speed of sound. They even play follow-the-leader in a darting, diving game of aerial acrobatics.

The chances are you will never see one unless you should blunder over a missile firing range. Even then, the

aviator who wanders too close to a firing area will hear from an aerial policeman long before he has a chance to see them.

The small "birds" are the target guided missiles developed and supplied to Army missilemen by the Army Missile Command at Redstone Arsenal, Ala.

Primarily, they are used for two purposes—as "clay pigeons" for the Army's missile sharpshooters, and as "live" targets to test the ability of Army missile systems to pick up, track—and most important—hit high-performance aircraft and missiles.

Target missiles can simulate both airplanes and missiles. One of the smallest is the propeller driven RCAT. Many World War II anti-aircraft gunners trained on this 12-foot-long craft that resembles an overgrown model airplane.

The parade uniform for most Army missiles is a glossy black and white. Target missiles generally wear bright red or fluorescent orange as working clothes—for visibility.

Color doesn't mean a great deal to radars that track the target missiles. But it's like using a black golf ball in a snowstorm for the recovery people who hunt them down and bring them in after their flight is over. Missile range country is usually so rugged that some people aver crows won't fly over it.

The missiles are lowered to earth by parachute and are recovered after each flight, unless their mission is to provide a target for missilemen using

armed missiles. Then, the explosion of a well-aimed warhead or an occasional direct hit is enough to turn one into cast iron confetti.

Recovering the targets saves money. The Firebee, a swept-wing target with a turbojet engine, averages 10 flights before the dents become too big to knock out. One staunch Firebee has flown 27 missions and at last report was still ready to go, needing only a snort of JP-4 fuel.

Even if they were not recoverable, the target missiles would be cheaper than drone airplanes with "black box" pilots. Cheaper still, they can pull tow targets.

The target missiles are radio controlled. They can maneuver like a jet and even fly in formation. For formation flying, the Firebee is equipped with a special radio transmitter that keeps two other slave Firebees trailing along behind it on an electronic leash. This air show stunt was designed to give missilemen the illusion that they are under attack by aircraft or missiles.

Most of the Army's target missiles are ground launched—literally hurled into the air by a JATO bottle strapped underneath. But some, such as the 10-foot RP-76, can be carried two at a time under the wing of an F-89 jet airplane.

Once in flight a target can last for varying periods before its fuel runs out—or it runs into a warhead. The RP-76 can rocket around for 10 minutes; the RCAT's 4-cylinder engine will keep it aloft for an hour; and the Firebee will sprint along at near the speed of sound for an hour.



TARGET MISSILES in various stages of development are displayed by Jere Ducote, Chief of the Target Guided Missiles Branch of the Army Missile Command's Directorate of Research and Development. Ducote holds a Firebee. The propeller-driven target at right is a Cardinal, and the large model nudging Ducote's shoulder is the Redhead/Roadrunner.

Quadripartite Mobility Group Report Due Off Press

Proceedings of the Fourth Meeting of the Quadripartite Standing Working Group on Ground Mobility in London, England, will be published in two volumes, the first of which is expected off the press this month.

Australia joined for the first time with Great Britain, Canada and United States scientists and engineers in discussing how to coordinate efforts and standardize techniques in ground mobility research.

New Film Shows Interest Of Army in Fuel Cell Power

Army interest in development of fuel cells as an unconventional power source of great potential is shown in a new 30-minute film, "The Search for Fuel Cell Power," scheduled for distribution about Oct. 1.

More than 70 copies of the 16-mm. color film will be made available by Army Signal Corps film libraries throughout the United States. Cost of preparation of the film was shared by the U.S. Army Materiel Command and the U.S. Army Research Office.

Leo Lieb of the AMC Pictorial Section directed production of the film. Ernst Cohn, coauthor of *Status Report No. 2 on Fuel Cells* while on the U.S. Army Research Office staff, and now employed by NASA, was technical adviser.

Purpose of the film is to stimulate industrial and private research and development of fuel cell power to meet Army requirements. Army interest is focused on fuel cells as a completely silent, highly mobile and virtually nondetectable power source for remote combat areas.

From a military logistics viewpoint, fuel cells offer the prospect of ultimately producing twice as much power with half as much fuel as conventional power sources.

'Pygmy' to Vie With Industrial Aircraft 'Giants'

With a potential order of 275 Army helicopters involved, based at least partially on the outcome, a "pygmy" in the aircraft business will compete with three "giants" in evaluation tests early in September.

Maj Gen Alden K. Sibley, leader of the U.S. Army Mobility Command, has invited the R. J. Enstrom Corp., of Menominee, Mich., to send its 3-place F-28 helicopter to Fort Rucker, Ala., for 20 days of competition keyed to Army requirements.

Major aircraft firms entered in the test program are Bell Helicopter Co., Fort Worth, Tex., Hiller Aircraft Co.,

Dr. Leonard S. Wilson, Chief of the Environmental Sciences Division, U.S. Army Research Office, led the 5-man U.S. delegation, including Merrill V. Kreipke of his staff, Robert R. Philippe of the U.S. Army Materiel Command, Dr. William J. Turnbull, U.S. Army Engineer Waterways Experiment Station and Ronald A. Liston, AMC Land Locomotion Lab.

David Cardwell, Director of Research, Fighting Vehicles R&D Establishment, United Kingdom, presided as chairman. Discussion centered on terrain evaluation, air cushion tech-

Army Education Program Recording Continued Gains

Sustained stimulus provided by the Army to raise the educational level of personnel yielded 743 college degrees for officers and enlisted personnel during the past year.

An announcement of results of the Army education program on Aug. 21 cited also that 41,840 soldiers had qualified for high school diplomas by taking General Educational Development Tests.

The Army education program is conducted through 305 education centers at Army installations throughout the world by some 300 civilians employed as career administrators. The objective is to encourage personnel to keep abreast of rapid technological developments in modern warfare and to increase their military proficiency.

In FY 1963 a total of 657,178 course completions were registered, as compared to 587,321 in FY 1962 and 488,399 in FY 1961. Military Occupational Specialty related courses showed a gain of more than 33,000 over FY 1962.

Course completions numbered 337,967 for high school preparation, 244,983 MOS related, 6,215 high school, and 68,013 for college credits.

Palo Alto, Calif., and Hughes Tool Co., Aircraft Div., Culver City, Calif.

The Army Mobility Command, headquartered at Center Line, Mich., just outside of Detroit, is responsible for research, development, procurement and supply management of all mobility materiel. Involved is an annual expenditure of about \$7.5 billion, formerly controlled by four of the Army Technical Services.

General Sibley explained that the invitation to the Enstrom Corp. was in line with a command policy of encouraging qualified local industrial firms to compete for contracts.

niques, and the relative merits of track and wheel-type vehicles.

In an address of welcome, Maj Gen W. M. Hutton, Director-General of Fighting Vehicles, British War Office, stressed the increasing importance of ground mobility research with respect to both vehicle design and ways of adjusting to varying terrain conditions.

Delegates witnessed "impressive demonstrations" at a number of ground mobility research installations. One of the field trips was arranged by Dr. P. H. T. Beckett, Department of Agriculture, University of Oxford, a recognized authority on soils research.

Ries Named to Serve AMC With Air Assault Division

After a tour of duty as Chief of Staff of the Army Aviation and Surface Materiel Command (AVSCOM), at St. Louis, Mo., Col Arthur W. Ries reported in August to the Air Mobility Tests at Fort Benning, Ga.

Col Ries is serving as personal representative of Lt Gen Frank S. Besson, Jr., commander of the Army Materiel Command, Washington, D.C., in providing direct logistical support to the 11th Air Assault Division.

The Division is based on one of the concepts developed by the Howze Board, a group of general officers headed by Lt Gen Hamilton Howze. The Board was formed as a result of directions from Secretary of Defense Robert S. McNamara to the Army to study the entire air mobility question.

Emphasis on air mobility is stressed in Army thinking and planning, with some 6,000 aircraft presently in Army service.

Col Ries majored in aeronautical engineering at the University of Washington, Seattle, and is a graduate of the Industrial College of the Armed Forces, Washington, D.C.

Since World War II he has served in numerous top level staff positions, including special assistant assignments with the Army's Chief of Transportation Office in Washington, and in the office of the Deputy Chief of Staff for Logistics. He is a member of the General Staff Corps and has served as Army representative on the Joint Logistics Plan Committee, a function of the Joint Staff.

During the first 15 months of the Korean conflict, Col Ries was movement control officer in Eighth Army Headquarters, heading the entire water, rail, highway and air logistic effort in Korea. His honors include the Legion of Merit and Air Medal.

ATAC Aims at Reducing Weight of Combat Vehicles

Materials research at the U.S. Army Tank-Automotive Command is progressing toward a goal of making turret bearing ring assemblies of self-propelled artillery vehicles much lighter for high-speed mobility, air-transport and parachute drop needs.

Investigations are directed toward reducing the weight of combat vehicles without limiting their military usefulness, and recent tests of substitutes for steel in turret bearing ring assemblies yielded good results.

Aluminum and polycarbonate are among materials most promising to ATAC engineers at present in their effort to produce lightweight bearing rings as strong and durable as steel.

For example, the turret ring assembly for M52 vehicles weighs 667 pounds and consists of three indi-

vidual race rings and 144 steel balls. The 80-inch diameter rings are made of high-alloy-hardened steel. SAE 52100 steel also is used for the 1¼-inch diameter balls, heat treated to bearing hardness.

Stress findings revealed that rings made of 7075-T6 aluminum could withstand the firing and riding loads but, since aluminum races cannot be hardened to the equivalent of steel balls, steel inserts were used.

An air-hardening tool was selected to avoid distortion and to provide a hardness of RC 62. Three steel inserts rough machined from a 27-inch long, ¾-inch square bar were soaked for one hour at 1800° F., die-formed to the proper curvature, and air cooled. Then they were tempered at 400° F. to RC 62, cemented to the

aluminum ring with an epoxy resin, and machine finished.

Simultaneously with the rings program, ATAC engineers evaluated polycarbonate as a substitute material for the steel balls. The substitute balls stood up to loading of 4,500 pounds each, single impact testing with a force of 56 ft.-lb., and single impact testing with a force of 190 ft.-lb. on balls conditioned at -90° F.

Important in the search for weight reduction in vehicles through use of lightweight materials, polycarbonate balls offer an 80 percent decrease as compared to steel balls.

Firing tests using the new materials in the complete ring assembly consisted of 60 rounds each at elevations of zero, 45 and 60 degrees using a standard charge, and two rounds at each elevation using a 115 percent charge.

Inspection after disassembly revealed that all components came through the tests in good condition. Road tests of vehicles with the gun in both locked and unlocked positions proved equally successful. Results prompted initiation of a program to build aluminum race rings without steel inserts. Work is advancing.

Army Medic Authors Book On Subject of Diabetes

Manual of Diabetes for the House Officer, is the title of a new book by Maj William T. Nunes, MC, Assistant Chief, Metabolic Division, U.S. Army Medical Research and Nutrition Laboratory.

Published by Charles C. Thomas, Publisher, Springfield, Ill., it contains eight chapters dealing with the diagnosis and treatment of various aspects of diabetes mellitus, plus a section consisting of 25 multiple choice questions covering text material. The book is designed to present utilitarian information and is intended to benefit, primarily, the student, the house physician, and the general practitioner.

Most of the material in the text is taken from lectures and seminars given by the author to interns and residents of the Department of Medicine of Fitzsimons General Hospital.

Maj Nunes graduated from the University of Tennessee School of Medicine, served his residency in internal medicine at Tripler General Hospital and attended the Military Medicine and Allied Sciences Course at Walter Reed Army Institute of Research. He has served as Assistant Chief of the Metabolic Division of USAMR&NL since July 1960.

Pfc Sets Up Paper Products Plant for Research

Research on wider use of paper and paper products by the military is the function of a new facility at the U.S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va.

Designed and set up by "soldier-scientist" Pfc. R. Gregory Meese, 24, the paper-making facility is enabling the Labs Materials Branch to broaden investigations of the use of paper. The Branch has developed the paper sandbag, which in tests has proved equal and, in some areas superior, to the bags manufactured from imported jute burlap.

Believed to be the only one in the Army, the new facility features equipment used in research by the

pulp and paper industry. It includes a mixing machine, paper forming machine, press, and drying racks.

Assigned to the Laboratories in May 1962 under the Army's S&E (Scientific & Engineering) Program, Pfc Meese was employed by the Scott Paper Co. prior to entering military service in March 1962. A native of Benton Harbor, Mich., he received his B.S. degree in chemical engineering from Michigan College of Mining and Technology, Houghton.

While in college, he was a member of the Blue Key national fraternity and was listed in "Who's Who in American Colleges and Universities." Prior to entering military service, he authored a paper on "My Vote," which was a \$200 prize winner in the 1962 Bolton Award Essay Contest open to all persons engaged in the pulp and paper industry in the United States and Canada.

Supervisor Sid Levine, Chief of the Chemistry Section, is high in his praise of the work Meese is doing which he said "has been invaluable in helping establish the facility."

The promise of paper as an engineering material is unlimited, he said. Some military applications stand out, such as strapping material to replace steel in some instances, camouflage nets and embellishments, sleeping bags and radiation shelters.

Pfc Meese said he is gratified that his military assignment gives him a job in which he has had experience and broadens his knowledge in the field he intends to follow after completing his military obligation.



Pfc R. Gregory Meese pours slurry (water and pulp) into paper forming vessel at new paper-making facility at the USAERDL, Fort Belvoir, Va.

Frankford Arsenal Applies PAD Knowledge to Flight Problems

By Robert F. LeVino

Using know-how accumulated in over 17 years of developing Propellant Actuated Devices (PAD) for emergency pilot escape systems, Frankford Arsenal personnel recently completed work on two significant projects. One is applicable to all fixed-wing aircraft and has both the pilot and the aircraft in mind. The other is a joint Arsenal-Air Force experimental effort utilizing the nose section of an aircraft as a pilot escape vehicle.

Fixed-Wing Aircraft Study. A high percentage of all fatal aircraft accidents occur during the takeoff or landing phases of the flight profile. In most cases, the sudden loss of lift (known as stalling) is the critical factor. Stalling takes place when the orderly stream of air flowing over the airfoils becomes turbulent and separates from the upper surface of the wing contour.

This phenomenon, potentially present in every takeoff or landing, usually results in the loss of aircraft control as one wing rises or falls before the other. The means for fail-safe recovery from this often catastrophic situation have long been sought. To date, varied applications employing aerodynamic means are used to restore loss of lift.

Frankford Arsenal personnel conceived the idea of applying propellant energy as the primary power source for restoration of lift at stall. Working under a research grant sponsored by the U.S. Army Research Office-Durham, N.C., they have now concluded that an important and almost completely unknown segment



Charles J. Litz



Agnew E. Larson

of aerodynamics may have been discovered in smoke tunnel tests conducted at Princeton University. Thus, the safety of fixed-winged aircraft in the future may be vastly increased.

Through use of propellant energy, safely stored and ready in such PAD devices as gas generators, it is hoped that the recognized limitations of present means of lift restoration will be overcome in a novel manner: propellant gas would be transmitted through internal ducting to wing or control surface profile apertures at appropriate locations for instant automatic restoration of lift.

Charles J. Litz, Jr., is Project Engineer and Agnew E. Larsen is Chief Investigator. Personnel and facilities of the Aeronautical Engineering Department, Princeton University, have assisted in the study.

Air Force Escape Capsule. An Arsenal rocket is the prime mover in tests now being made of an escape capsule designed to break away from a disabled high-altitude aircraft and

to return the pilot safely to earth.

Weighing only 220 pounds and less than three feet long, this powerful little rocket has a peak thrust of 49,000 pounds, twice that of a jet engine. With a capability of defying the tremendous air-stream pressures found in ultra-sonic flight, it can eject a 2,400-pound capsule at speeds over 1,000 miles per hour.

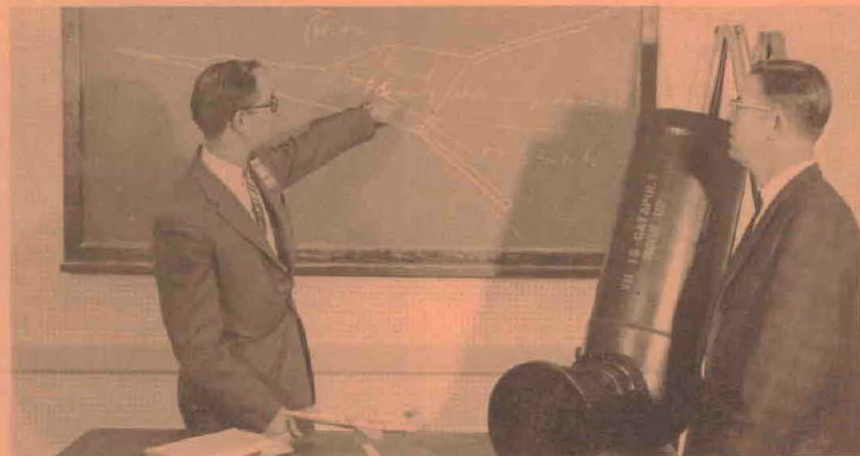
The experimental escape capsule is approximately eight feet long and four feet wide, and would be the actual nose section of an aircraft. It would enable a pilot to fly without a cumbersome pressure suit or other protective personal equipment. Moreover, it would protect him from exposure to high "G" forces and crushing pressures during high-speed ejection, shield him from freezing cold, and shelter him on land or water.

Upon ejection, explosive nuts separate the capsule from the rear section of the aircraft and the capsule is rocketed at a 35-degree angle.

The rocket burns for only one-half second. Complete ejection takes approximately six-tenths of a second. In that short time, the manned capsule is hurled one-tenth of a mile above the rear section. The rocket is capable of action throughout a speed range of zero to approximately Mach 4, and from sea level to 100,000 feet altitude.

A nylon 72-foot diameter parachute, automatically deployed as the separated capsule descends to 15,000 feet, lowers the capsule at about 28 feet per second, a speed similar to that of a man landing in a conventional parachute.

The rocket, called the Catapult, Aircraft Capsule Ejection, XM15, is under the technical guidance of Arsenal engineer Hugh MacDonal, Jr., Project Engineer.



Frankford Arsenal project engineer Hugh D. MacDonal discusses thrust factors of Catapult, Aircraft Capsule Ejection, XM15, with author Robert F. LeVino. Mock-up of experimental catapult rocket is shown at right.

Natick Preparing Parley on Food Science Aid to Military

Contributions of food science to military needs will be discussed by some 500 industrial, educational and military leaders in food processing, Nov. 19-21, at the U.S. Army Natick (Mass.) Laboratories.

Sponsored jointly by the National Research Council, Research and Development Associates, Inc., and the Army Natick Laboratories, the conference will cover nonconventional foods, radiation and freeze dehydration preservation methods, creation of structure and flavor, and the physiology and psychology of acceptability of new food products.

Hershner Relieves Weiss as USARO Deputy Director

Dr. Ivan R. Hershner has been assigned as Deputy and Scientific Director, U.S. Army Research Office, Office of the Chief of Research and Development, during a 10-month leave of absence of Dr. R. A. Weiss.

Succeeding Dr. Hershner as Chief of the Physical Sciences Division is Col Hubert L. Nolan, who served as Deputy Chief since September, 1962.

Chief of the Physical Sciences Division since 1959, Dr. Hershner is regarded as "one of the founding fathers" of the U.S. Army Research Office, having participated in planning its establishment.

For seven years he has been a member and since 1960 has headed the Army Mathematics Steering Committee, which advises and provides guidance to the Mathematics Research Center, U.S. Army, at the University of Wisconsin.

Dr. Hershner earned a B.S. degree in mathematics and physics (1938) and an M.A. in mathematics (1940) from the University of Nebraska and an M.A. (1941) and a Ph.D. in mathematics (1947) from Harvard Univ.

Prior to joining the Office of the Chief of Research and Development as a mathematical adviser in 1956, he was an instructor in mathematics at the University of Chicago (1947-48), assistant professor in mathematics, University of North Carolina (1948-51), and professor and chairman, Department of Mathematics, University of Vermont (1953-56). In 1962 he was Chief of the Research Division Planning Group for the activation of the U.S. Army Materiel Command.

During World War II, Dr. Hershner served with the 607th Tank Destroyer Battalion and the 502nd Para-

Top executives of the food industry are listed among major speakers who will report on industry's capability in military preparedness situations.

Dr. S. M. Siegel of the Research Institute, Union Carbide Corp., will discuss "Martian Biology" at the conference banquet Nov. 20. He has done extensive research on plants and organisms believed to exist on Mars.

F. Warren Tauber, manager of the Food and Packaging Development Section, Visking Co., is programmed for an address on coordination of basic and applied food science research toward military objectives.



Dr. I. R. Hershner

chute Infantry Regiment, 101st Airborne Division. He was awarded the Purple Heart and Bronze Star.

He later served as action officer with the Research Branch, Research and Development Division, Office, Assistant Chief of Staff, G-4.

COL NOLAN, prior to his assignments with OCRD, served from 1959-62 as Chief of the Plans and Operations Division, U.S. Army Combat Surveillance Agency, Wash., D.C.

A graduate of the Command and General Staff College, he was assigned with U.S. Army, Pacific, in Hawaii (1958-59) and with U.S. Army, Far East, in Japan (1956-58).

During World War II, he was assigned to the U.S. Air Force in China with the 14th Air Force (Flying Tigers) as Ordnance Officer, 68th Composite Wing. From 1946-49 he was stationed in Panama as Base Consolidated Property Officer.

Col Nolan received a B.S. degree in mechanical engineering from Georgia Tech and M.S. from Purdue in 1952.

Other industrial leaders listed on the program include:

Dr. Harrell DeGraff, president, American Meat Institute, whose subject is "Animal Products"; Dr. J. J. Thompson, vice president, Kellogg Co., "Cereals and Baked Products"; Dr. Philip Bates, research director, Carnation Co., "Dairy, Fats and Oil Products";

Dr. Karl Kreiger, Campbell Soup Co., "Fruits and Vegetable Products"; Dr. C. W. Cook, president, General Foods, Inc., "General Products"; and Angus J. Ray, publisher of *Packaging Engineering*, "Packaging."

Noted educators scheduled for presentations include: Dr. John Ordal, University of Illinois, "Factors Affecting Spore Resistance to Environment"; Dr. Harold O. Halverson, University of Wisconsin, "Biochemical Changes Accompanying Sporulation"; Dr. Nicholas Grecz, chairman of the Center of Physical Microbiology, Illinois Institute of Technology, "Radiation Destruction of Microorganisms."

"The New Look at Freeze Drying" is the title of a presentation programmed for Dr. John Nair, a chemical engineering consultant in the food field, and Dr. Edward S. Josephson, Director of the U.S. Army Radiation Laboratory at Natick, will discuss "Radiation Preservation."

Dr. Werner Stock, known for his work in new product development with the Union Carbide Corp., will give a presentation on "Food Fabrication" and Dr. Ralph Schilly, I.E. duPont deNemours, will report on "What's Ahead in Packaging, Techniques and Materials."

Challenges for the future will be the theme of the final session, to be featured by a presentation by a representative of the National Aeronautics and Space Administration, Life Sciences Division, on "New Stress Concepts." Scheduled also are:

Dr. Dean Foster, Virginia Military Institute, "Physiology and Psychology of Taste and Acceptability"; Dr. Paul LeChance, Air Force Systems Command, "Nonconventional Foods"; Dr. Herbert A. Hollender, Natick Laboratories Food Division, "Miniaturization of Foods"; Dr. Jack Durst, Pillsbury Mills, "Creation of Food Structure"; and Dr. Robert Swaine, Arthur D. Little Co., "Creation of Food Flavor."

Brig Gen Merrill L. Tribe, Natick Laboratories commander, will be the host for the conference and will give the welcoming address.