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J. S. Army Research Office Schedules Move to New Location in June

R&D Commands Shape Up As Generals Get New Jobs

Definite answers to many of the questions and conjectures regarding reorganization of Army research and development are being filed at a rapidly accelerating pace. Strong sinews are growing around the skeletal plan announced by Secretary of the Army Elvis J. Stahr, jr., Jan. 16.

Within a period of a few days in mid-April it was announced that:

• Lt Gen Arthur G. Trudeau, Chief of Research and Development since April 1, 1958, is retiring, effective June 30, and will be succeeded by Maj Gen Dwight E. Beach, Deputy CRD since May 1961. General Beach has been nominated for 3-star rank.

• Maj Gen William J. Ely, Director of Army Research since March 1959, has been assigned as Deputy Commanding General of the new Materiel and Development Logistic Command, under Lt Gen Frank S. Besson, Jr. The new Director of Army Research designate is Brig Gen Chester W. Clark, who stepped up from service as Chief, Research and Development Division, Office of the Chief of Ordnance.

(Continued on page 3)

Lt Gen A. G. Trudeau
Will retire June 30

Maj Gen D. E. Beach
To get 3 stars as CRD
(Please turn to page 28)

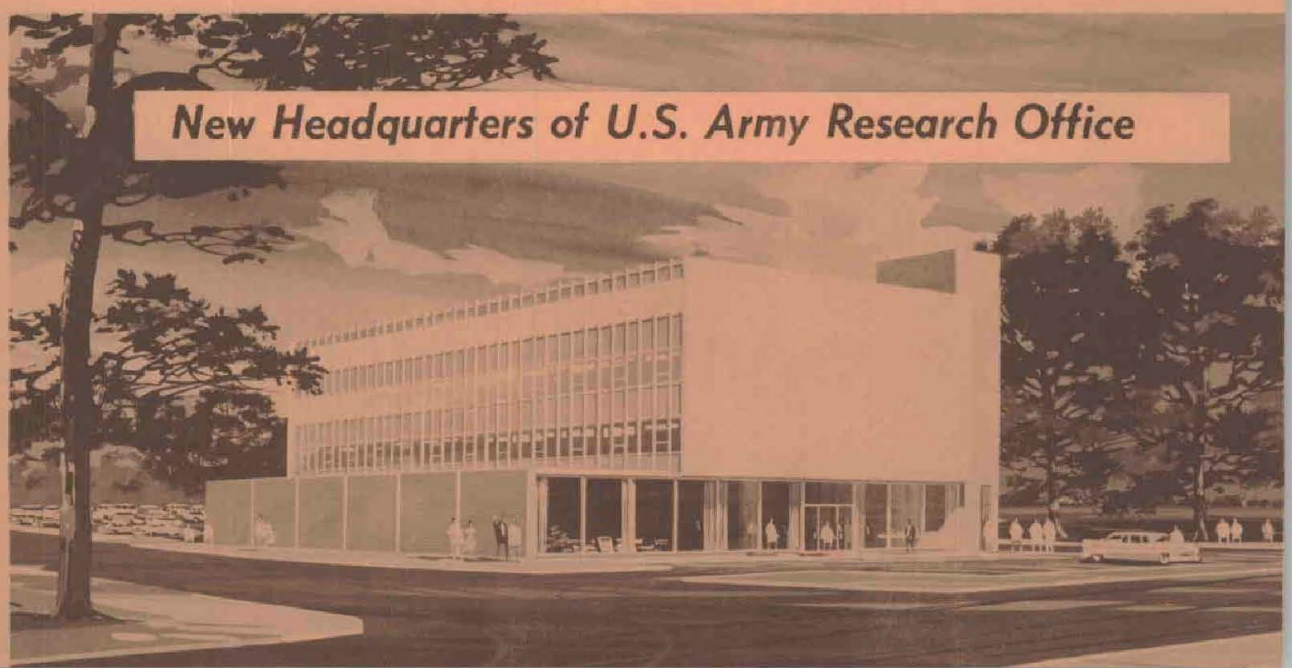
Relocation of the U.S. Army Research Office in a new building outside a military reservation, to meet requirements of expanding relations with the general scientific community and substantial growth in functions and responsibilities since it was established four years ago, is scheduled to be completed early in June.

Operating as a directorate of the Office of the Chief of Research and Development, the U.S. Army Research Office controls the planning and coordination of research at a current rate of $165 million annually. USARO also has similar responsibility for medical and meteorological portions of the development program.

The move will be made from Arlington Hall Station, Va., to the newly constructed Highland Building on Columbia Pike under terms of a 5-year lease. Arlington Hall Station accommodates Army agencies which require rigid security control of visitors, a factor which has hindered USARO relations with the scientific community not requiring special security.

When the forerunner of the U.S. Army Research Office, a small research detachment operating at Fort Belvoir, Va., as an element of the Office of the Chief of Research and

(Continued on page 18)



New Headquarters of U.S. Army Research Office

Army R&D Newsmagazine

Vol. 3, No. 5 MAY 1962

Editor . . . . . Clarence T. Smith
Ass't Editor . . . . George J. Makuta

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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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Theme of the Month: Body Armor

By Marion B. Sulzberger, M. D., Technical Director of Research
U.S. Army Medical Research and Development Command

There is now available a sufficient supply of full body armor satisfying the following specifications: To be negligible in cost; individually tailored to fit; extremely light, elastic, flexible and perfectly comfortable under most climatic conditions, *durable for life;* corrosion, rust and mildew proof; self-heating, self-cooling; self-thickening in response to repeated trauma and self-repairing in response to acute trauma; self-drying, self-humidifying, self-cleansing and self-sterilizing; practically impermeable to water, to grease and to most harmful chemicals; and equipped with thousands of slender antennae and telemetering systems to warn of approaching danger. For these specifications quite accurately describe the human skin—provided it is healthy and is not subjected to unphysiological and excessive attacks.

The human skin is so light that many people "prefer" it to any other covering; with its arterio-venous shunts, it conserves or dissipates body heat as required. Through the evaporation of sweat, it cools on demand—not only itself but the entire individual—and without these thermostatic mechanisms of the skin we would be poikilothermic with our temperatures shooting up and down with that of our environment.

The healthy skin is antibacterial—shedding its surface horny layers with their bacteria, fungi and viruses; producing fatty acids which kill most germs; washing off some and killing off others by desiccation. Even when some disease germs penetrate the skin's barrier zone, the dermal tissues wall them in and throw them out in a few days (as with the core of a boil or the pus of a skin abscess) and thus prevent sepsis and internal infection. In addition, the skin plays a role in producing and in recording immunization to disease, as in small pox, diphtheria, scarlet fever, etc.

In its mobilization against repeated pressure and friction, the skin increases its thickness. Moreover, it rapidly builds up horny and pigmented filters against penetration by damaging ultraviolet rays. It is almost entirely impermeable to most noxious chemicals; any traces which manage to breach its barrier zone are generally so minute as to be harmless.

When damaged, the skin repairs itself by "invisible mending" if the cut is narrow and superficial and by scar formation if the cut is deeper or broader. The skin's surface is kept pliable by a most remarkable emulsion of fats, water and emulgents, coming from the sebaceous glands, the sweat glands and the keratin. Through its hairs, and its tactile, temperature and pain receptors the skin records the approach of threatening forces and telemeters the warnings so that the body's defenses can be mobilized.

Like every good outpost, the skin will, when needed, sacrifice itself to ward off the attack on the main body—as it does when it dilutes and throws off poisons in blisters, or dilutes them in hives, or throws out disease germs in its abcesses and ulcers.

The surfaces of the human skin, digestive and respiratory tracts are in fact the main boundaries between man's external environment and his own tissues—and of these, the skin is the most exposed. It is, therefore, not astonishing that men subjected to the onslaughts of the myriads of potentially damaging exposures of military pursuits in the far-flung reaches of the world should suffer an almost immediate dangerously high incidence of disabling skin diseases. In 1959 (the last year for which completed figures are available) diseases of the skin and cellular tissues had an incidence of 26.85 per year 1000 average strength of the Army. In World War II, over 4,000,000 man-days were lost because of skin diseases in the Army.

The Army's Medical Research and Development Command is intensifying its programs to insure maximal medical fitness of our combat forces.

Among these programs, research in skin diseases is expected to be greatly increased, for the following reasons:

- The total present effort in dermatologic research, both civilian and military, is disproportionately small in view of the tremendous amount of military ineffectiveness produced by diseases of the skin.
- It can be predicted that in future operations the amount of ineffectiveness from skin troubles will mount geometrically because of the rigors of ground military operations in hostile climates, and in the hostile infectious and chemical environments which the skin armor must ward off.
- *Increased research and development in skin disease problems is imperative, not only because of their impact but also because to neglect them would be to fail in a field of promise. With increased dermatologic efforts in our clinics and hospitals, in field trials and in laboratories, there is every reason to hope for better means of using the advances of modern physics, biochemistry, pharmacology, immunology, plastic and fabric technology to improve and reinforce our soldiers' natural protective armor against the onslaughts of heat, cold, moisture, infectious diseases, insects, poisons, rays and trauma.*

R&D Commands Shaping Up as Generals Get New Assignments

(Continued from page 1)

• Lt Gen John H. Hinrichs, Chief of Ordnance since April 1958, will retire from the Army, effective May 31, instead of accepting assignment (announced last month) as Commanding General of the new Supply and Maintenance Command of the MDLC.

• Maj Gen Alden K. Sibley, since October 1961 the Deputy Chief of Engineers for Military Operations, OCE, will head the new Mobility Command.

• Maj Gen Marshall Stubbs, Chief Chemical Officer since October 1958, will become Director of Chemical-Biological-Radiological Warfare in the Office of the Deputy Chief of Staff for Military Operations.

• Maj Gen August Schomburg was nominated for 3-star rank and assigned as Commanding General of the Supply and Maintenance Command, MDLC. His successor as Commanding General of the Army Ordnance Missile Command, Redstone Arsenal, Ala., is Maj Gen Francis J. McMorrow, who has served as Deputy CG.

• Maj Gen William K. Ghormley will take over temporarily as CG of the Weapons Command, MDLC, until he retires in October. General Ghormley, now commanding the U.S. Army Ordnance Special Weapons-Ammunitions Command, is scheduled to be replaced by Maj Gen Floyd A. Hansen, presently Director for Supply Operations, ODCSLOG, when he vacates his new MDLC assignment.

• Maj Gen Nelson M. Lynde is assigned as Commanding General of the Weapons Command, MDLC. He was Chief of the Field Service Division, Office of the Chief of Ordnance.

• Maj Gen Stuart S. Hoff is assigned as CG of the Electronics Command, MDLC, after having served as Chief of Research and Development, Office of the Chief Signal Officer.

• Brig Gen William F. Ryan has been moved up from Director of Plans and Management, Office of the Chief of Research and Development, to head the Test and Evaluation Agency.

The effective date for assumption of the duties involved in the command changes here reported had not been announced as this publication went to press at the end of April.

A memorandum dated April 13 from Lt Gen David W. Traub, Project Director for the Army reorganization, advised Secretary of Defense Robert S. McNamara on progress of transition effected by the Planning Council.

The memorandum, copies of which were sent to Secretary of the Army Elvis J. Stahr, jr., and Chief of Staff General George H. Decker, listed some of the major accomplishments as:

• A rearrangement of the substructure of the Materiel Development and Logistic Command (MDLC) to include the establishment of five development and production commands: a Missile Command, a Weapons Command, a Mobility Command, a Munitions Command, and an Electronics Command. This change also includes placing the Quartermaster Research Engineering Laboratories directly under the Research and Development Staff Officer, MDLC staff.

• The resolution of the problem of transfer of responsibility for current doctrine and organization from the U.S. Continental Army Command (USCONARC) to the Combat Developments Command (CDC).

• The completion of the Site Selection Study which recommended that: USCONARC be located at Fort Monroe, Va., with overflow at Fort Eustis; CDC be located at Fort Belvoir; and MDLC be located in the Federal Office Building No. 5 upon its completion [scheduled in 1964 or 1965, and to be located opposite the new Agricultural Department building on the Tenth Street Mall in Washington, D.C.]. The interim location of MDLC Headquarters is still undecided. The Chief of Staff, based on recommendations of the Planning Council and the Army General Staff, has recommended to the Secretary of the Army that MDLC Headquarters be located in Building T-7 for the interim period.

• Initiation and completion of several studies in depth of specific functional areas requiring carefully coordinated and integrated plans, to include intelligence relationships with the Defense Intelligence Agency and relationship between elements of Department of the Army and the Defense Supply Agency.

General Traub's report stated, in part, that:

"If the plan is to proceed on schedule with an orderly transition, there are numerous complex problems which remain to be solved in the coming weeks and months. . . . I have every confidence that all details will be satisfactorily worked out and that the Army can assume its new posture expeditiously without unduly disrupting its operations or impairing its combat readiness. These considerations are of paramount concern. . . ."

Among other recent decisions of the Army Reorganization Planning Council as related to the Materiel and Development Logistic Command are:

• Instead of a Weapons and Mobility Command as originally planned, the Weapons Command will be retained, with headquarters at Rock Island, Ill. A Mobility Command will be formed, with headquarters in Detroit, Mich., using the present Ordnance Tank-Automotive Command as a nucleus for the new organization.

• The original plan for a General Equipment Command, which would have incorporated the Quartermaster Research and Engineering Command Laboratory at Natick, Mass., has been abandoned in favor of having the laboratory report to the R&D staff officer on the MDLC staff. The Mobility Command will take over remaining responsibilities that were intended for the General Equipment Command.

Important to employees of the Ordnance Tank-Automotive Command in Detroit, and the Weapons Command at Rock Island, was the announcement that the contemplated changes will not involve any transfer of work missions or reduction in personnel.

Meanwhile, Under Secretary of the Army Stephen Ailes is reported to have told the House Manpower Subcommittee at a mid-April hearing that approximately 15,700 jobs will be transferred to the Defense Supply Agency and other overall agencies by June 30.

Under questioning, Secretary Ailes is reported to have told the committee that some layoffs will be involved and that "the Army can't guarantee that no employee will be adversely affected by reorganization. But we can guarantee that we'll do everything possible to assure minimum disruption of careers of civilians and their rights will be fully honored. . . ."

Featured In This Issue . . .

QMFCI Breaks Ground for 3.8 Million Construction Program

Architect's Sketch of New Facilities at Natick

Construction of a $3.8 million facility at Natick, Mass., to house the Quartermaster Food and Container Institute by the end of 1963, started with an Apr. 19 ground-breaking ceremony.

Architect's plans call for a research laboratory designed and equipped to cope with a huge and growing problem—that of improving preparation, preservation, storage, and shipping to many parts of the world, the nearly half-billion dollars worth of food used each year by the Armed Forces. The FY 1961 grocery bill was $487,143,000.

Included in the modern food research and development center will be accommodations for some 200 civilian scientists, technologists and supporting personnel, a library, and pilot processing facilities. Army planners estimate it will save $1 million annually as compared to the present QMFCI in Chicago.

When Senator Leverett Saltonstall turned the first spadeful of dirt at the ground-breaking ceremony, his action climaxed an intensive effort initiated by the Army in 1959. Congress approved the plan to consolidate the QMFCI with Headquarters of the QM Research and Engineering Command at Natick by authorizing funds in January 1962.

Established in July 1936 as the Subsistence Research Laboratory, located in Chicago, the QMFCI added development to its name in 1944. By July 1945, it had gained major stature as an important World War II activity. Its staff had grown to 285 and it was dealing with hundreds of food and packaging concerns, university research groups, and other governmental activities. In October 1953, the laboratory was placed under the newly established QM laboratories at Natick and placed under control of the QM R&E Command.

The Institute has a stated mission of executing an R&D program for:

- Basic research in food nutrition, stability and acceptance.
- Designing, improving, developing and evaluating military rations and food products for the Armed Forces.
- Designing, developing and evaluating containers for food, clothing, equipment and supplies.
- Preserving food by means of ionizing energy and establishing wholesomeness of foods so processed.
- Standardizing foods, containers and rations.
- Providing technical services and engineering support to other elements of the Department of the Army and Department of Defense as required.

Senator Leverett Saltonstall was the star performer at ground-breaking ceremonies of new QMFCI facilities at Natick, Mass. Onlookers (l to r) are Dr. Ralph G. H. Siu, Technical Director, Office, Quartermaster General; Dr. Allan Abrams, National Academy of Sciences-National Research Council; Brig Gen Merrill Tribe, CG, Quartermaster Research & Engineering Command.

QM R&E Command Arranging 'Industry Day' May 17-18 Sponsored by Defense Supply Association, QMFCI

Government and industrial research and management personnel will participate in "Industry Day" open house at the Quartermaster Research and Engineering Command, Natick, Mass., May 17-18.

The biennial program is sponsored by the Defense Supply Association and the Research and Development Associates, Food and Container Institute of Chicago, Ill. Cooperating in this year's display is the U.S. Army Research Institute of Environmental Medicine, activated at the QM R&E Center in 1961.

Leaders in industry, research and education will be taken on guided tours and shown, in some 40 demonstrations and exhibits, the newest results of research and development in the area of Quartermaster supplies.

Maj Gen William J. Ely, Deputy Commanding General, Materiel Development and Logistic Command, and Dr. Roger H. Lueck, Vice President for Research, American Can Co., are among dignitaries scheduled for major addresses.

Brig Gen Merrill L. Tribe, Commanding General, QM R&E Command, Carl E. Cummings, President of the Defense Supply Association, and Clif Evers, Chairman of the Board of Directors, Research and Development Associates, QMFCI, will participate in the official welcome.

"Science and Engineering at Work" is the theme of a presentation to be given by Dr. Dale H. Sieling, Scientific Director, QM R&E Command.

"Interrelationship of Industrial and Military Research in Industrial Mobilization" will be discussed in seminars on R&D phases of textiles and clothing, military materials handling equipment, and food.

In keeping with the inter-departmental roles of the Defense Supply Association and the Research and Development Associates of the Food and Container Institute, representatives of the Navy and Air Force have been invited to participate.

Presentations will be made on "Textiles and Clothing for Space" by Donald Huxley, Chief of the Clothing Branch, and Jack Ross, Fibrous Materials Branch, Wright-Patterson Air Force Base. Thomas Seery, Bureau of Supplies and Accounts, U.S. Navy, will discuss "Textiles and Clothing for Surface Ships and Submarines."

Industry Backs DOD, Armed Forces in Drive to Ease Work on Tech Manuals

Industry is cooperating in a joint program with the Department of Defense and the Military Services to reduce the number of specifications and standards for preparation of technical manuals for military equipment.

Objective of the program is to establish a family of approximately 40 related specifications that would supersede approximately 280 existing specifications and documents.

There are 43 specifications in the present system that deal with format, typography, style and art. Nine others control negatives and printing.

The need for uniformity has been stressed by a military working group first appointed by the Assistant Secretary of Defense (Installations and Logistics) Feb. 8, 1960.

The Standardization Division of the Defense Supply Agency is sponsoring the program. Recently an Ad Hoc Industry Advisory Committee was established to advise the Department of Defense.

Industry representatives have endorsed the program and will support the drafting of new specifications. Concurrent emphasis is being placed on the development of manuals as communications tools which will more effectively translate technical data for the military user.

The Advisory Committee will be requested to furnish advice and comments on segments of the program as they are developed jointly with the Military Departments.

Members of the Committee include: James Campbell, Jr., Western Electric Co.; H. E. Brown, Air Transport Association; Will Eisner, American Visuals; Otto Janssen, Garrett Corp.; Howard H. Kennedy, Convair Division of General Dynamics Corp.; W. C. Ragsdale, Chrysler Corp.; C. A. Taylor, Clark Equipment Co.; Peter A. Smith, Lublin, McCoughy & Associates.

The Military Working Group consists of Frank O. White, Robert G. Hupp and Frank E. Powell, Army; Harry Kamien and Al Bayer, Navy; Col R. D. Stevens and John Anderson, Air Force; Murray Evans, Marine Corps; R. J. Dintaman, Office of the Assistant Secretary of Defense (I&L); E. B. Harwood, Defense Research Engineering; John Lawlor, Defense Supply Agency, Chairman.

Renowned Woman Mycologist Resigning Natick Post

Dorothy I. Fennell, nationally known mycologist of the Quartermaster Research and Engineering Command, Natick, Mass., will soon join the staff of the bacteriology department of the University of Wisconsin as a research associate.

Since 1955 Miss Fennell has been working with the Quartermaster Culture Collection of more than 10,000 fungi strains maintained to investigate the nature of microbial deterioration of military equipment and supplies. From April of 1961 to April of this year, she was on leave of absence as a staff mycologist at the Central Voor Schimmelculture, Baarn, the Netherlands.

Dorothy I. Fennell

During World War II she was employed at the Department of Agriculture, Northern Utilization Laboratory in Peoria, Ill., (now the Northern Utilization Research and Development Division). There she was a member of a team of researchers who worked toward developing a penicillin strain which was more adaptable to large-scale production than that first discovered by Dr. Alexander Flemming.

Hundreds of molds were investigated and a strain isolated by Miss Fennell proved the starting point for submerged production in large tanks which eventually gave more than 200 times more penicillin than earlier methods. The new mold produced tons of antibiotic which helped save thousands of lives.

New Technical Director Advanced as DOFL Progressed

Progressive notable achievement since he joined the Diamond Ordnance Fuze Laboratories when they were established in 1953 in Washington, D.C., has carried Billy M. Horton to top rank as the new Technical Director.

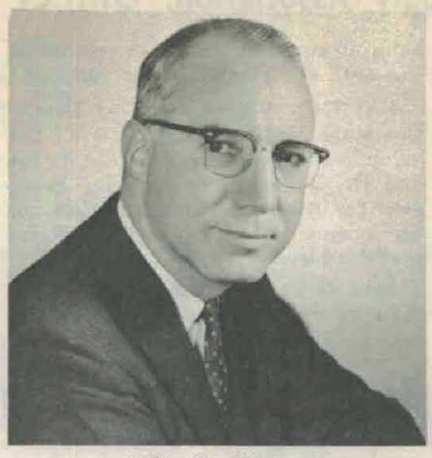
Like his predecessor, Wilbur S. Hinman, Jr., who resigned to become Deputy Assistant Secretary of the Army (R&D) in October 1961, Mr. Horton is a Federal Civil Service career scientist.

Recognized and honored for outstanding research and development of original concepts, Mr. Horton is known mainly for his work on a 3-man team which developed the principles of fluid amplification controls.

In August 1961, at which time he was Physical Sciences Administrator, Mr. Horton was honored with two DOFL colleagues on the fluid amplification controls projects. Along with Dr. R. E. Bowles and Raymond W. Warren, he was presented an Army Research and Development Achievement Award. Mr. Horton developed the discovery on which the basic patent was granted, then teamed with them on other patents.

Fluid amplification controls have attracted worldwide attention for their great potential in industrial applications. Currently, this type of control, which operates without moving parts on the principle of fluid dynamics, is the key to DOFL research on an experimental heart pump. (See November issue, page 6.)

Among other honors, Mr. Horton received the Arnold O. Beckman Award in 1960. This highest award of the Instrument Society of America also was based on his achievements in fluid amplification.



Billy M. Horton

Within three months after joining the staff of the National Bureau of Standards in Washington in 1951, Mr. Horton conceived a method of measuring range, using random noise as the modulating function, and built a successful system to show the principle.

When DOFL was founded Mr. Horton became Chief of the Surface Target Fuze Branch. The Branch later was responsible for proximity fuze development in the various phases of the Redstone, Jupiter, Little John, Corporal and Sergeant missile systems. For the past several years Mr. Horton has supervised research on sophisticated weapon systems.

While employed as a physicist at the Naval Research Laboratories in Washington, D.C., from 1946 to 1951, Mr. Horton developed and confirmed experimentally a new statistical theory. He also made measurements relating to gamma ray and neutron detectors, providing a means of absolute calibration for nuclear testing at Eniwetok in the Pacific.

Born in Bartlett, Tex., Dec. 27, 1918, Mr. Horton earned his way through the University of Texas, graduating in 1941 with a B.A. degree in Physics. He completed radar officer training at Harvard University and Massachusetts Institute of Technology in 1942-1943, and received his M.A. degree in Physics (1949) from the University of Maryland.

Serving as a radar officer with the U.S. Army Signal Corps in Normandy, France, Mr. Horton devised wave traps from scrap material to reduce mutual interference between radar and other communications equipment. He holds the rank of lieutenant colonel in the Active Reserve, has taught classes in electronics and related subjects at the University of Maryland, and is known for his church and community activities.

DOFL Scientist Gets Laboratory Promotion

Promotion of Harvey M. Nilson to Chief of Development, Laboratory 2, has been announced by the Army's Diamond Ordnance Fuze Laboratories, Washington, D.C. The position is one of DOFL's senior assignments.

Mr. Nilson received a B.S. degree in Electrical Engineering in 1943, from Trinity College, Hartford, Conn., and was elected to membership in Phi Beta Kappa Honor Society.

Prior to entering Government service in 1955, he served as Chief Electronic Engineer for the Allen D. Cardwell Manufacturing Corp., and as Vice President and Chief Engineer and, later, as Acting President, Barth Engineering and Manufacturing Co.

Harvey M. Nilson

Germfree Studies Reveal Significant Results for Treatment of Intestines

Research findings of importance to future study of human intestinal disorders were reported to a staff seminar at Walter Reed Army Institute of Research (WRAIR) by Capt Gerald D. Abrams, Assistant Chief, Department of Experimental Pathology.

The studies revealed that the rate at which the lining of the small intestine reproduces itself is sharply influenced by varying the bacterial content of the intestine.

The "normal state" of the intestinal lining is one of mild inflammation. Bacteria normally present, although considered harmless, exert a profound influence on the structure of the intestinal lining.

Availability of germfree animals at WRAIR enabled Capt Abrams to compare such animals, having completely sterile intestinal tracts, with ordinary healthy animals and with animals harboring actual intestinal infections. (For an extensive report on the WRAIR Germfree Research Laboratory, see December 1960 and January 1961 issues.)

Altering the bacterial content of the intestinal canal changed the rate at which the intestinal lining was replaced. The same principles of response hold true in the human intestine, Capt Abrams said.

Dr. Samuel B. Formal, Chief of WRAIR's Department of Immunology, led the discussion following Capt Abrams' presentation.

AROD Hosts First Army-wide Operations Research Symposium

More than 100 operations research leaders representative of the seven Technical Services and a number of the leading educational institutions in the Nation participated in the first Army-wide Operations Research Symposium, Mar. 27-28-29.

Held on the campus of Duke University, the Symposium was sponsored by the U.S. Army Research Office, Durham, N.C., with the Research Analysis Corp., a major Army contractor for operations research studies, playing a prominent role. The meeting served to:

- Emphasize the role that operations research has played and can play in the solution of military problems, and in the improvement of military operations.
- Present the latest technical developments in operations research.
- Provide for reports and discussion on various operations research studies being conducted by the Army.

In stressing the timeliness of the Symposium as related to problems of Army reorganization, Director of Army Research Maj Gen W. J. Ely cited possibilities of application of operations research to requirements of the new Combat Developments Command, the Materiel Development and Logistic Command, and the Army General Staff. He referred to use of operations research techniques in the Korean conflict, and predicted that rapidly expanding technology would increase the value of OR skills.

Among general officers who participated in the Symposium were Lt Gen John P. Daley, Commanding General designate, Combat Developments Command; Brig Gen J. F. Thorlin, Commanding General, Ordnance Tank-Automotive Command; Brig Gen John H. Weber, Commanding General, Aberdeen Proving Ground; and Brig Gen C. E. Rust, Chief, Personnel and Training Division, Office, Chief of Ordnance.

One of the contentions advanced at the Symposium was that, although the Army had been one of the pioneers in operations research, in recent years American industry has taken the lead in making OR studies a "large, respected . . . and highly technical profession."

Diverse views were expressed as to the part the Army should take in expanding its operation research effort. A contractor surprised the group by stating that Army OR studies should be concentrated at in-house facilities; an Army spokesman gave a strong endorsement to the effective OR studies being conducted for the Army under contracts.

Distinguished educational leaders who discussed the growing role of operations research in national planning in nearly every phase of economic, industrial and military activity included:

Dr. Herbert P. Galliher, Massachusetts Institute of Technology; Dr. Merrill Flood, Dr. Robert M. Thrall and Dean H. Wilson, University of Michigan; Dr. George W. Brown, University of California at Los Angeles; Dr. John W. Tukey and Dr. Harold W. Kuhn, Princeton University; Dr. Paul M. Gross, Duke University, President of the American Association for the Advancement of Science; Dr. George Nicholson, Jr., University of North Carolina; and Prof. G. H. Symonds, Case Institute of Technology.

Chairmen of the Symposium sessions included Dr. John J. Gergen, Duke University; Col George F. Leist, Office of the Chief of Ordnance; Col John F. Freund, Office of the Deputy Chief of Staff for Military Operations; Col George W. Taylor, Commanding Officer, U.S. Army Research Office—Durham;

Dr. W. M. Whyburn, University of North Carolina; John H. Neblett, U.S. Army Transportation Research Command; Morton D. Shavit, U.S. Army Chemical Center; Dr. G. C. Quarles, Chief Scientist, Office of the Chief of Engineers; Col George E. Larsen, Office of the Deputy Chief of Staff for Logistics; Maj Edward J. Gradoville, Office of the Quartermaster General;

Harold Silverstein, Office of the Chief Signal Officer, Lt Col Leslie G. Callahan, Jr., U.S. Army Research Office—Durham; Col Andrew J. Colyer, Office of The Surgeon General; Sol Ruddel, Office of the Comptroller of the Army; Col Alfred W. DeQuoy, U.S. Army Strategy and Tactics Analysis Group; and Andrew G. Favret, Office of the Assistant Chief of Staff for Intelligence.

An executive summary of the Symposium is being prepared for early distribution, to be followed by publication of formal proceedings by the U.S. Army Research Office—Durham.

Although no formal resolutions were adopted, sentiment expressed following the successful sessions was favorable to AROD sponsorship of similar symposia on an annual basis.

Maj Gen W. J. Ely (left), Deputy CG, Materiel Development & Logistic Command, Dr. Herbert P. Galliher, Associate Director of Research, Operations Research Center, MIT, and Brig Gen J. F. Thorlin, CG, OTAC, during coffee break at AROD parley.

British Commonwealth Group Making R&D Tour

Members of the British Commonwealth Advisory Committee on Defense Science are visiting selected U.S. Armed Forces research and development installations as guests of the Department of Defense on a tour that will end May 18.

Sir Solly Zuckerman, Scientific Advisor to the Minister of Defence, United Kingdom, heads the 15-member group. It is comprised of scientific advisers or high-ranking members of their staffs from Australia, Canada, India, Nigeria and Pakistan.

Arrangements for the tour were assigned by the Department of Defense to the U.S. Air Force, and a USAF officer is escorting the group.

Upon arriving in Washington, D.C., May 2, the delegation was welcomed by the Department of Defense prior to a 90-minute briefing on the concept, organization and highlights of R&D for the Army, Navy and Air Force.

After being entertained at a Department of Defense luncheon, attended by dignitaries of the State Department, DOD, and military R&D leaders, the visitors met with officials of the National Aeronautics and Space Administration. Visits then were made to the Goddard Space Flight Center and the Walter Reed Army Institute of Research.

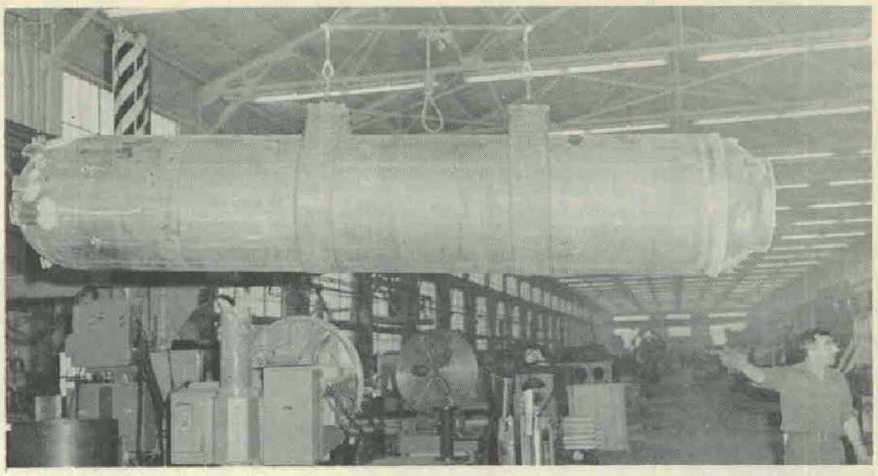
Other highlights of the tour will include visits to the Strategic Air Command at Eglin Air Force Base, the Fort Bliss Guided Weapons School, Holloman Air Force Base, White Sands Missile Range, Navy facilities in the Los Angeles area, University of California at Berkley, Quartermaster Research and Engineering Center, and the Air Force Cambridge Research Laboratory.

Watertown Arsenal Skilled Craftsmen Match Automation on Missile Cases

In the advancing age of automation, well-trained personnel are proving they can perform as well as, or better than, machines in the processing and production of missile motor cases at Watertown Arsenal. The recent completion of a production run of 45 Sergeant motor cases at the Arsenal supports that statement.

In contrast to elaborate procedures for machining, welding, hydroexpansion, stress relieving, remachining and welding used by some manufacturers in production of missile cases, Watertown Arsenal machined the parts and welded them together with the barest minimum of tooling.

This was achieved by controlled welding to prevent distortion and careful alignment of parts by skilled ironworkers.



Completed Sergeant missile case hoisted in preparation for heat treatment at Watertown Arsenal. Note dye penetrant lines used for checkout.

Ironworkers weld mounting pads to the forward dome of a Sergeant missile motor case at Watertown Arsenal.

Because of the training of welders in the causes of defects and distortion in welding, and concurrent effort of engineers and welders during production of the cases, only one or two minor repairs were required on most cases. Several cases required no repair and every case passed pressure test requirements.

Automatic and semiautomatic welding processes, as well as tape controlled machines, are being used at the Watertown Arsenal. However, many visitors who have seen other elaborate, automated welding facilities used for Sergeant motor case production have expressed amazement at the simplicity of the procedure at the Arsenal.

At least one industrial producer of motor cases has adopted the Arsenal's simplified processing.

AR 700-47 Outlines Policy On Value Analysis Program

Procedures to implement the Department of the Army policy with respect to the Army Value Analysis Program as applied to Army materiel are set forth in AR 700-47, dated Mar. 2, 1962.

The regulation defines value analysis as "the broad term used to identify all actions which discern and eliminate unnecessary cost in the requirement, design, development, and procurement of Army materiel without sacrificing essential quality, reliability, maintainability, performance, or mission accomplishment."

Responsibility for supervision and coordination of Department of Army value analysis activities is assigned by AR 700-47 to the Deputy Chief of Staff for Logistics and the Chief of Research and Development in their respective areas of interest.

Flame-Spray Coating Process Report Set at Madrid

Watertown Arsenal's research and development on ceramics for application to missile, rocket and advanced weapons systems will receive international attention at the Third International Metal Spraying Conference to be held May 21-25 in Madrid, Spain.

"Flame-sprayed metallic and ceramic coatings for Ordnance applications" is the theme of a technical paper to be presented by Milton Levy. It was prepared by Mr. Levy and Albert P. Levitt, Chief, High Temperature Materials Branch, Watertown Arsenal, Watertown, Mass.

As reported in a feature article on page 8 in the April 1961 issue of the *Newsmagazine*, ceramics are destined to play a vital role in meeting military requirements for materials capable of dependable performance under extremely high temperatures.

In the case of missiles and rockets, materials experts at Watertown report that advances in propellant technology and in systems design have outstripped materials development. Consequently, at the present time and in the foreseeable future, lack of suitable materials to resist the extremely high temperatures encountered in such systems is the primary barrier to their continued development.

Major problem areas are in the propulsion system and on the nose cone and leading edges of aerodynamic control surfaces. Since these components encounter temperatures well above the melting point of steel, over 5,000° F., they must be cooled or constructed of materials which are more refractory than steel.

In Watertown Arsenal's continued research on ceramics, primary refractory substances have been combined with each other and metals by the "flame-spray" process to produce bonded ceramics and cermets. The application of these coatings to metal parts protects the structural material from the erosive action and chemical attack of combustion gases, the fuel, and high temperatures.

The flame-spray process involves the utilization of a mixture of oxygen and acetylene to melt a powder or rod on the surface being coated. Research and development at Watertown Arsenal indicate that the porous nature of flame-sprayed ceramic coatings gives them a mechanical flexibility several orders of magnitude greater than solid body structures of the same materials.

WSMR Nominates Pioneer Missileman for Annual R&D Achievement Award

Guenther Hintze, White Sands Missile Range pioneer missileman and former German V-2 rocket expert, has been nominated by WSMR for one of the Army's 1962 Research and Development Achievement Awards.

Presented annually to Federal Government civilian employees, the awards give recognition to noteworthy scientific and engineering achievements. Two WSMR employees, William A. McCool, Ordnance Mission, and George K. Roberts, Signal Missile Support Agency, received honors last year.

WSMR officials cited Hintze for "making significant contributions to missile science by constantly promoting and effecting more thorough and meaningful testing and analysis during both the research and development and engineering evaluation of a variety of missile systems, ranging from the German V-2 to the current Nike-Zeus."

Presently Chief of Ordnance Mission's Flight Simulation Laboratory at WSMR, Hintze has been engaged in missile work for more than 20 years. He was picked from the enlisted ranks of the German Army to work on development of the V-2 missile at Peenemuende, Germany.

When World War II ended, he was among more than 100 missile scientists who came to America under contract to the U.S. Government to continue work in the guided missile field at WSMR. He went to Redstone Arsenal, Ala., with Wernher Von Braun's group in 1950 and returned to WSMR in March 1952.

He was born in Breslau, Germany, in 1906. Graduated with an M.S. degree in electrical engineering from Breslau College, he is a member of the American Ordnance Association and the Association for Computing Machinery.

Guenther Hintze

USAERDL Employees Earn Work Performance Awards

Work performance awards were presented recently to eight employees of the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. Col J. H. Kerkering, Director, made the presentations.

Employees receiving both Outstanding and Sustained Superior Performance certificates, the latter including cash awards, were Mrs. Mary Jean Baker, $150; Samuel W. Simmons, $200; Arthur C. Tiemann, $250; and Charles R. Wortman, $200.

Sustained Superior Performance awards were presented to Ralph Botos, John W. Hamrick and William R. Clarke. Each received $250. Mrs. Ruby K. Heflin, recipient of this award in 1957 and 1961, was again cited for outstanding work.

O. P. CLEAVER, Chief of the Electrical Department, U.S. Army Engineer Research and Development Laboratories received his tenth Outstanding rating certificate. He holds more awards than any other employee of the Laboratories, including several Sustained Superior Performance certificates.

A 1928 graduate of Georgia Institute of Technology, he obtained his M.S. degree in Electrical Engineering at Yale University. He has been with the Laboratories, in a military and civilian capacity, since 1942.

Sylvia Sets Scientific Standard as 'Beautiful Brain'

White Sands Missile Range, N. Mex., not only employs some of the top engineers in the Nation but now has one of the prettiest.

Sylvia Welker, 24, an electrical engineer graduate from Virginia Polytechnic Institute, is "queen" at Vulnerability Research and Development Branch of Missile Electronic Warfare Division, Signal Missile Support Agency.

As formidable as it sounds, the assignment holds no awe for the brown-haired, green-eyed young mother who could easily be a fashion model. With confidence and acumen, she works side by side with male counterparts. Activities are concerned with research and development on the vulnerability of guided missile systems to electronic countermeasures.

As much at home in the electronic-equipped laboratory as in her own kitchen, the attractive engineer is proof that brains and beauty are compatible, and that similarly educated women can work as effectively as men in scientific fields.

Mrs. Sylvia Welker

In her day-to-day work, Mrs. Welker assists with various test and evaluation programs, and helps install, calibrate, modify and operate equipment used for tests in the lab and field vans. Also, she helps analyze experimental field data, develop improved methods for obtaining necessary field data for particular projects, aids project engineers in evaluating test results and in determining requirements for additional data.

In addition to her full-time work assignment and caring for her 14-month-old daughter, Mrs. Welker is working toward her master's degree in electrical engineering at New Mexico State University and studying Russian language in night classes.

In college, she was a member of Eta Kappa Nu, Phi Kappa Phi and Tau Beta Pi national honorary engineering societies. She is a member of the American Institute of Electrical Engineers.

The dynamic young lady launched her engineering career at the desert missile range last September. Her parents, Lt Col and Mrs. V. E. Woodward, were stationed at WSMR until leaving last March for a new assignment in Teheran, Iran. Col Woodward was chief of WSMR's Integrated Range Mission. Mrs. Welker decided that she would like to work in the missile field, and WSMR, which employs a number of female engineers, seemed the ideal place.

Army's Work on Lasers Reported at International Symposium

Far ranging interest of the U.S. Army in immediate and potential application of lasers to military requirements was indicated at the first international Laser Symposium held recently at the Hague, Netherlands.

Sponsored by the SHAPE Air Defence Technical Centre at the Hague and by the North Atlantic Treaty Organization, the symposium attracted 140 participants, 34 of whom were from the United States. Other nations taking part included the United Kingdom, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands and Norway.

Indicative of recognition accorded the U.S. Army's progress in laser research was the presentation of two invited papers and 25 contributed papers. Prof. C. H. Townes, who early introduced the idea of the laser while engaged in research at Columbia University, and Dr. R. B. Watson, U.S. Army Research Office, Office of the Chief of Research and Development, were the invited speakers.

Prof. Townes' work is supported by a Joint Service Contract at the Massachusetts Institute of Technology, Cambridge, Mass., where he also is MIT Provost. He gave a comprehensive report on the state-of-the-art of laser research, and reviewed possible applications of laser beams (light amplification by stimulated emission of radiation).

Since all Army research on lasers is monitored through the U.S. Army Research Office, where he is assigned to the Physical Sciences Division, Dr. Watson outlined the overall Army program, some of the major objectives, problems of application, and the notable advances made to date. Army activities, it was explained, are directed toward a better understanding of the optical maser, with emphasis on theories and principles.

Two of the contributed papers were presented by Dr. Morris Katzman, U.S. Army Signal Research and Development Laboratory, Fort Monmouth, N.J., where a number of the most significant recent advances have been made in laser research. In a paper coauthored by Olaf Leifson, also of USASRDL, Dr. Katzman reported the successful coupling between two laser sources in a common resonator structure.

The second USASRDL paper, coauthored by Emerson Frost, discussed possibilities of optical radar systems using a laser source. It concluded that a radar using a laser is capable of increased angular accuracy and increased ability to measure target velocity, compared to present radars.

Other presentations at the symposium served to establish that the United States has a considerable lead among Free World nations in development of lasers. Whereas several hundred laser research activities are being conducted in the U.S., only about 25 are reported for the other nations, with France and the United Kingdom making the major effort.

Information on various phases of U.S. laser research was given in papers by Dr. Alan T. Waterman, Jr., Stanford University; Dr. James P. Wittke, RCA Laboratories; David Sarnoff Research Center; Dr. George W. Clark, Space Technology Laboratories, Redondo Beach, Calif.; Dr. Gordon J. Lasher, IBM Corp.; Dr. George F. Smith and Dr. M. L. Stitch, Hughes Aircraft Co.

Among Europeans who presented papers were Dr. J. H. Sanders, Clarendon Laboratory, University of Oxford; Dr. Otto Deutschbein and Guy Mayer, France; Dr. Ing. Frank Frungel, Germany; Dr. D. W. Goodwin, Royal Radar Establishment, England.

U.S. Army representatives at the symposium, in addition to Dr. Watson and Dr. Katzman, were headed by Brig Gen Chester W. Clark, Chief of Research and Development, Ordnance Corps, who soon after his return was designated the new Director of Army Research. Other members were Dr. M. E. Chwalow, Frankford Arsenal, Philadelphia, Pa.; Lt Col L. G. Callahan, U.S. Army Research Office-Durham; Joseph Kaufman, Office of the Chief of Ordnance; and Stanley Segal, U.S. Army Engineers Research and Development Laboratories, Fort Belvoir, Va.

Expanded basic and applied re-

Dr. Charles Townes Gains Recognition From NAS

Dr. Charles H. Townes, pioneer in maser and laser research, was honored along with Nobel Prize-winning chemist Harold C. Urey in Washington, D.C., Apr. 23 at the National Academy of Sciences annual meeting.

Prof. Townes was presented the John J. Carty Medal for noteworthy scientific achievement, in recognition of his work which opened the tremendously significant field of laser and maser development.

Dr. Urey received the J. Lawrence Smith Medal, in recognition of his investigations on meteorites. He won the Nobel Prize in 1934 for the discovery of heavy hydrogen and heavy water.

The National Academy of Sciences, at the same meeting, elected physicist Dr. Frederick Seitz, a professor at the University of Illinois, to succeed Dr. Detlev W. Bronk as president, a post Dr. Bronk had held since 1950.

Army Teams With USC&GS on New Arctic Station

An agreement between the U.S. Coast and Geodetic Survey (USC&GS) and the U.S. Army has cleared the way for establishment of the Free World's first seismographic station on an Arctic icecap.

The station will be located at the Army's "City Under Snow" Far North research base at Camp Century, Greenland, and is expected to be operational by early fall. It will be similar to the seismographic station at the Army's Camp Tuto, 138 miles from Camp Century.

Establishment of the new station at nuclear-powered Camp Century, 6,300 feet above sea level, is in line with a plan for a worldwide network of some 125 standardized seismographic stations recommended by the National Academy of Sciences—National Research Council.

Equipment for the station will be provided and installed by the USC&GS and it will be operated by a Signal Corps crew engaged in meteorological research at Camp Century. The Army Polar Research and Development Center will provide logistical support.

The USC&GS believes the Camp Century station will prove of particular importance on the basis of findings from icecap stations in the Antarctic. Location will permit effective detection of low levels of seismic intensity, as is true in the Antarctic at the Byrd and South Pole stations.

Operation of the Camp Century station will involve daily changes of six photographic records. The records will be developed and a daily unsophisticated analysis of them will be transmitted to Washington, D.C.

Arrangements for the establishment of the station were negotiated between the Polar Branch, Earth Sciences Division, U.S. Army Research Office and the Sisemology Branch, U.S. Coast and Geodetic Survey.

search on lasers is being conducted by the U.S. Army through its in-house laboratories and through contracts and grants with educational institutions, nonprofit research organizations and industrial firms.

Dr. Watson said the basic research is concerned with a fuller understanding of the behavior of the materials used in laser sources, and with development of new materials. Under study are the means for efficient energizing of the laser material, and the interactions of the very intense laser beams with various materials, including the nonlinear effects.

Encompassed within the applied research program are a wide variety of detailed tasks directed toward specific military problems and development of specific military devices. Activities are resulting in application to many areas, including communications, surveillance and target detection, tracking, guidance and seeking of missiles, data processing, range findings, night vision, surveying, mapping and geodesy, and metallurgy.

Four major achievements claimed for Army research in lasers are:

- A pulse from a laser source has been produced in a controlled fashion to produce three megawatts power lasting for a tenth of a microsecond, at the U.S. Army Signal Research and Development Laboratory.

- A range-finder using a laser source has been proved feasible and will allow development of a lightweight, high-accuracy, long-range optical range finder. Work is continuing at USASRDL and at Frankford Arsenal.

- An important study in propagation of coherent light beams through the atmosphere has shown the expected effects of scattering and change of direction due to atmospherics. By confining the light beam in a tube in which atmospheric difficulties are minimized, a scheme of phase correction at intervals along the tube has been developed which will allow long-distance transmission with negligible attenuation. This work has been carried on at the Diamond Ordnance Fuze Laboratories, Washington, D.C., and at USASRDL.

- A laser source using neodymium-doped glass has been developed by the American Optical Co., aided through a grant awarded by the U.S. Army Research Office. In a concurrent effort, a similar development was made at the Laboratory of Insulation Research at the Massachusetts Institute of Technology, supported by a Joint Service Contract.

Laser beam generation involves application of the principles of quantum mechanics, of optics and of electromagnetic theory. A laser beam operates at frequencies of a million kilomegacycles in comparison to radar at 300 kilomegacycles, and to television and radio at much lower frequencies. Laser beams may be continuous wave at milliwatt power levels or pulsed for a brief fraction of a second at megawatt power levels.

LARC-15 Performs Successfully in Pre-Production Tests in Pacific Ocean

The Army's new diesel-powered all-aluminum amphibian LARC-15 has completed successful land mobility and heavy surf tests in the Pacific Ocean at Coronado, Calif., and is expected to go into production this year.

Middleweight of the Army's family of amphibious craft, the LARC-15 (Lighter, Amphibious, Resupply, Cargo) can transfer 15 tons of cargo from shipside, through the surf zone and past the beach line to a transfer point as far as six miles.

The new amphibian is 45 feet long, 12 feet 6 inches wide, and 13 feet 4 inches high, and is fitted with a bow ramp for rapid loading and unloading of vehicular cargo. Equipped with 24 x 29, 16-ply low-pressure tires, and with 4-wheel drive, it has excellent maneuverability.

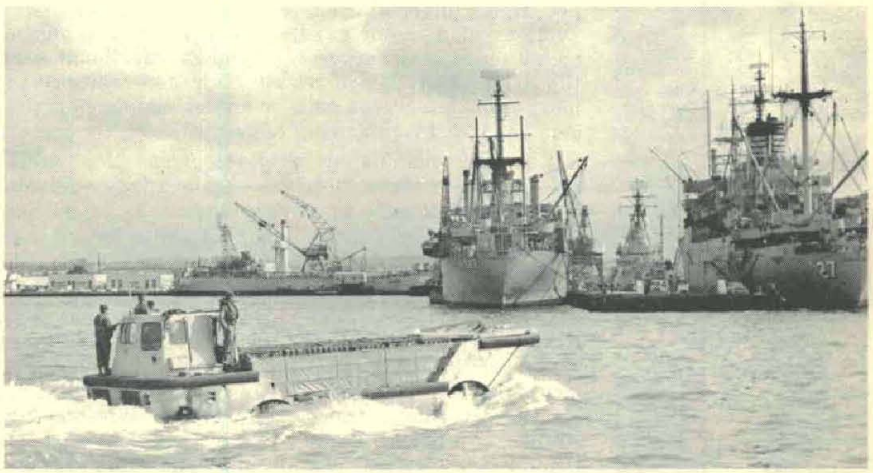
In the water, the craft is driven by a single propeller installed in a hull tunnel. Fully loaded, it is capable of speeds of ten miles an hour in water and more than twice that speed on land.

Developed by the U.S. Army Transportation Research Command, Fort Eustis, Va., under contract with the Ingersoll-Kalamazoo Division of Borg-Warner, Kalamazoo, Mich., the first LARC-15 was delivered in April 1960. The prototype has undergone a number of modifications during engineer and service testing. The latest was substitution of two commercially developed 300-hp. lightweight diesel engines for the gasoline engines. They are expected to reduce operational hazards, simplify maintenance and provide an increase in power.

Together with the recent development of its "little brother," the 5-ton LARC-5 which went into production in June 1961, and the larger 60-ton BARC in production for some years, the LARC-15 is considered a significant advance in the design of military amphibians. Its water speed is about twice that of the World War II DUKW and it carries six times as much cargo.

The LARC-15 is designed to fulfill the needs of a beach or port commander who must be able to move thousands of tons of supplies from ships at sea to supply dumps just behind the frontlines. With its non-swampable characteristics, deep-sea capabilities, and the ability to negotiate rough beach and terrain, the LARC-15 will be able to transfer 27.5 percent of the equipment of an infantry division from ship to shore, a recent study showed.

An interesting sidelight to the LARC story is the loan of two LARC-5s and one 15-ton vehicle to the National Aeronautics and Space Administration (NASA), Cape Canaveral, Fla., for use in recovering nose cone capsules for Project Mercury. The LARCs at Canaveral are also supporting Air Force missile shots.



LARC-15 demonstrates capability for offshore loading or unloading operations in final pre-production tests conducted recently in Pacific Ocean.

Karl H. Steinbach

Emil York

Sidney F. Williams

Dr. C. S. Barnhart

John L. McDonald

USAERDL Nominees for May 15 Awards

Six scientists and engineers and seven supervisors have been nominated for Director's Technological Achievement and Leadership Medals at the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. Candidates will be honored at an awards banquet May 15, at which winners will be announced.

Technological Achievement Medal nominees are: Dr. Clyde S. Barnhart, Sr., Military Dept.; Robert S. Brantly, Engineering Dept.; John L. McDonald, Civil Dept.; Karl H. Steinbach, Electrical Dept.; Sidney F. Williams, Mechanical Dept.; and Emil J. York, Technical Service Dept.

Dr. Barnhart was nominated for his development of two new lightweight, nozzleless, centrifugal insecticide sprayers. Constructed of plastic material for easy handling of corrosive insecticide formulations, the sprayers eliminate the often troublesome pump and permit the use of clogging type wettable powder.

Brantly was nominated for his work in developing evaluation systems for precise determination of the performance of various electrical and mechanical equipment under actual and simulated field conditions. Application of the systems resulted in selection of control components and development of new arrangements of power supplies to the Nike-Hercules missile launching pads that with stand acoustic intensity and vibratory excitation during firing.

McDonald was nominated for achievements in the field of air conditioning for the Pershing and Sergeant Missile Systems. Changes made on the Pershing resulted in savings in development time. He also made a preliminary design and established schedules that resulted in development of a miniature size air conditioner for the Sergeant missile system.

Steinbach was nominated for development of techniques that resulted in development of mine detection devices capable of operating over rough terrain, accommodating a wide range of searchhead heights, and reliability recognizing targets.

Williams' nomination is for three new designs, including a motor grader, a fire truck and a 10-ton crane center section, for the rubber-tired Universal Engineer Tractor (UET). He used salvaged portions of a motor grader and a fire truck, fabricated necessary components to incorporate them as functional center sections of the UET, and demonstrated their feasibility in relation to the powered axle concept as a means of simplifying the logistical burden imposed by procuring a multitude of commercial items.

York was nominated for development of a paint for Nike-Hercules missiles which provides a camouflage equivalent to standard olive drab, but reflects a high percentage of incident solar energy and thus prevents heat damage to interior electronic equipment.

Nominated on the basis of their achievements either as Branch or Section Chiefs, the Leadership Medal nominees are: Alfred A. Chabert, Facilities Planning and Maintenance Branch, Administrative Dept.; William R. Clarke, Technical Photographic Branch, Technical Service Dept.; Chauncey W. Karstens, Petroleum Equipment Branch, Civil Dept.; Arthur J. Rutherford, Evaluation Branch, Mechanical Dept.; and Dr. Robert S. Wiseman, Warfare Vision Branch, Electrical Dept. Bernard F. Rinehart is Chief of the Demolitions Section, Demolitions and Fortifications Branch, and L. L. Osteen, Jr., is Chief of the Technical Surveillance Section, Mechanical Engineering Branch.

Robert S. Brantly

Bernard F. Rinehart

L. L. Osteen, Jr.

Arthur Rutherford

Robert S. Wiseman

Alfred A. Chabert

Chauncey Karstens

William R. Clarke

New Chief of Transportation Started Army Career in Corps of Engineers

Maj Gen Rush B. Lincoln, Jr., the new Chief of Transportation, started his Army career in June 1932 as a United States Military Academy graduate assigned to the Corps of Engineers.

Groomed for his new assignment by service as Deputy Chief from Aug. 1, 1958, until promoted on Mar. 29, 1962, General Lincoln is following in the military tradition of his father, Maj Gen Rush B. Lincoln, Sr., USAF (Ret.).

Lt Gen Frank S. Besson, Jr., who relinquished the office of Chief of Transportation to become the Commanding General of the new Materiel Development and Logistic Command, was sworn in by Chief of Staff General George H. Decker on Apr. 3.

World War II service gave General Lincoln his first Transportation Corps assignments in the OCT and in the Middle East, North Africa, Europe and Pacific Theater of Operations.

Maj Gen R. B. Lincoln, Jr.

He took part in conferences of the combined chiefs of staff at Quebec, Cairo, Malta and Yalta. After V-J Day he served as Chief of Transportation, Army Forces Western Pacific.

Following service from 1947 to 1949 as Assistant Commandant of the Transportation School, Fort Eustis, Va., and Special Assistant to the Chief of Transportation, General Lincoln was assigned to the Logistics Division of SHAPE in Paris until he returned to the U.S. to take command of the Hampton Roads Port of Embarkation, Norfolk, Va. In 1954 he began a 4-year tour as CG of the Transportation Training Command at Fort Eustis.

Graduated from the Massachusetts Institute of Technology with an M.S. degree in Civil Engineering early in his career, General Lincoln has also graduated from the Engineer School, Armed Forces Staff College and the National War College. From 1938 to 1942 he served as instructor in the U.S. Military Academy Department of Military Art and Engineering.

The General was awarded the Legion of Merit with Oak Leaf Cluster for outstanding performance.

Transportation R&D Director Raised to General

Director of Research and Development, Office of the Army Chief of Transportation, David B. Parker was promoted to Brigadier General early in April.

General Parker has been responsible for Army aviation research and development for the past 3½ years and has headed Transportation Corps effort aimed at improving military rail, marine, and amphibious equipment, including modernizing highway and cargo handling operations.

The son of a Army officer, General Parker won a Presidential appointment to the U.S. Military Academy at West Point, from which he was graduated third in his class of 1937. Subsequently, he earned his master's degree in civil engineering from the Massachuetts Institute of Technology.

Brig Gen David B. Parker

Formerly Chief of the Weapons Division of the Office of Special Weapons Development for the Continental Army Command, he specialized for a number of years on atomic weapons and their tactical employment and effects. He has written and lectured a great deal on this subject before both military and civilian audiences.

A veteran of six World War II campaigns in the Pacific Theater as an Engineer Battalion and Group Commander, General Parker was assigned in 1946 as Chief of the Military Operations Division of General Leslie Grove's famed Manhattan Engineer District, the organization which developed the atomic bomb.

In 1948, he was assigned to the Army General Staff and served as Assistant to the Deputy Assistant Chief of Staff for Atomic Energy until 1952 when he was transferred to Supreme Headquarters Allied Powers, Europe as Army Atomic Planner in the Office of the Air Deputy.

General Parker authored the Manhattan District Report on the Atomic Bombings of Hiroshima and Nagasaki and was an editor of the Joint Department of Defense—Atomic Energy Commission publication, **The Effects of Atomic Weapons.**

He is a senior Army aviator, qualified to fly both single and multi-engine aircraft.

Army Nurses Given Advice On Research Opportunities

Medical research opportunities for nurses can be enhanced greatly by including scientific subjects, mathematics or statistical methods in their education, Army Nurse Corps leaders have been advised.

Deputy Director of the Army Medical Research and Development Command Col C. F. Vorder Bruegge discussed the research opportunities in an address to the Chief Nurses Conferences at the Army Surgeon General's Office.

Assembled in Washington, D.C., for the 3-day conference in mid-April were chief nurses from all parts of the continental United States, Hawaii and Europe. Col Bruegge told them:

"There are several roles for nurses in medical research. For example, some nurses are acting as principal investigators on problems related to improvement in nursing practices. Others serve as important members of multidisciplined teams assembled to study complex medical problems of military medical importance."

To illustrate his theme, that medical research is increasing the Army's capability to maintain higher health standards in all parts of the world where Army troops may be assigned, Col Bruegge showed films of research in tropical areas research. In such areas, he said, medical researchers are investigating diseases of military importance which are virtually unknown to civilian medical practice in the U.S.

Army's New Chemical Typewriter Viewed as Major Advance

An invention termed the "Chemical Typewriter," developed by a 6-man team at the Walter Reed Army Institute of Research, is being acclaimed as a revolutionary breakthrough solution to the problem of handling chemical information.

Procurement orders for the new machine are being placed by the Armed Services Technical Information Agency (ASTIA) and the Office of the Chief Chemical Officer, Department of the Army. Second and third generation models are expected to find widespread use throughout the chemical and drug industry and by private research institutions.

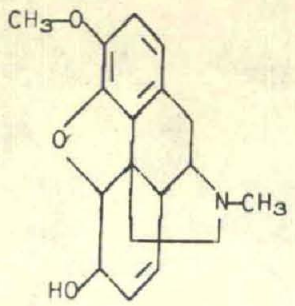
Dr. David Jacobus, Chief of the WRAIR Department of Radio Biology, headed the team which developed a basic concept of a chemical typewriter advanced by Alfred Feldman. Dr. Jacobus said the machine is a "very powerful tool which will have widespread application to the general problem of handling chemical information."

As the man who invented it, Feldman reported on the capability and method of operation of the machine on Mar. 22 to the American Chemical Society Conference in Washington, D.C. Formerly an assistant editor of the *Chemical Abstracts* in the steroid section at WRAIR, Mr. Feldman now is in charge of the coding and literature sections.

Although the general solution to the chemical information processing problem was advanced approximately three years ago, research and development of the chemical typewriter required less than two years.

Exacting requirements of the new machine called for original designing. It was possible, however, to incorporate modifications of existing machines such as the Friden Flexiwriter or the Synchrotape typewriter developed by Remington Rand Corp. William Moberle of the latter firm served for a time as a member of the WRAIR developmental team.

Typist punches computer tape coding on unique keyboard of new machine.

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C 1 1 1 1 1 C 1 C
1             2   2
C 1 N 1 C     2   C
1   1         2   1
1   C         2   1
1   1         2   1
1   C         2   1
1   1         2   1
C 1 C 1 1 1 C   1
1   1           1   1
C   C 1 0 1 C 2 C 1 0 1 C
2   1
C 1 C 1 0
```

Typed pictures of the most advanced methods of encoding a chemical formula are shown above. Left, is the picture produced on the Army's new "Chemical Typewriter," which automatically encodes the formula on computer tape. The Monsanto Chemical Corp. method (right) encodes formula on punched cards.

Developmental team for new typewriter at WRAIR (left to right) Inventor Alfred Feldman, Lt Col Michael P. Dacquisto, MC, Lt Col Donald Holland, Sp/5 Harold Manceau, James Doolittle, David Jacobus, M.D., Jerry Kugler.

Other members of the team included Lt Col Donald Holland, now assigned to the Armed Forces Radiobiological Institute, Jerry Kugler and Specialist 5 Harold Manceau. Col Holland did most of the intricate wiring, Kugler machined various components, and Manceau wrote the computer program for rearrangement of the typed chemical structures.

The chemical typewriter, Dr. Jacobus said, "puts a complete chemical picture into a computer and achieves a very basic and general solution to chemical information handling."

In the background of the chemical typewriter idea is the statement made by Calvin Mooers in 1950 that a chemical structure would be completely encoded if each atom and bond were assigned a unique number, and the interconnection between atoms and bonds were indicated.

The principle of the new typewriter is that it automatically assigns these unique numbers when the chemical structure is typed, by automatically recording the position of the paper at the time a key is depressed.

As a result, the typed output contains the following information:

- The key symbol indicating the atom or bond involved.
- X and Y coordinates of the paper position representative of the unique number, e.g., line 10, space 26.

Consequently, the typist may roll the platten backwards as necessary in the typing of chemical structures. Because all encoding is automatic, verification of the tape output is accomplished by inspecting the conventional structure diagram as shown in the above illustration. Thus, if the picture is correct, so is the code. The output as the result of a search is in the same easy to read format.

One of the advantages of the machine is that the typist does not need to type the complete structure. Portions of structures that recur frequently can be encoded by means of the tape recorder. The code punched

in this fashion is the same as that obtained by hitting the keys. When the recurring portion has typed itself, the typist completes her work.

In coded form, the chemical structure is fed into the computer where it is recorded in its most fundamental form, atom by atom. As long as chemical structures are used, the compounds so represented will not have to be re-encoded.

As this publication went to press, detailed specifications were being prepared for the machines to be manufactured for the Armed Services Technical Information Agency and the Office of the Chief Chemical Officer. Bids are expected before June 30.

WRAIR Conducts Course To Update Staff Officers

Some 40 Army Medical Corps officers whose recent career development was principally in staff and command positions were brought up to date on current professional military medical advances during a 2-week course late in April at Walter Reed Army Institute of Research, Washington, D.C.

Lt Col Paul E. Teschan, Assistant Commandant of the Institute of Research, directed the "Military Medicine Refresher" course. Students included senior colonels and lieutenant colonels in key staff and command positions throughout the continental United States.

Medical research in progress was reported and discussed by a military and civilian faculty drawn principally from Walter Reed Army Institute of Research. Other lecturers were from Walter Reed General Hospital; Army Chemical Center, Md.; Army Medical Research Unit, Fort Detrick, Md.; Brooke Army Medical Center, Fort Sam Houston, Tex.; Army Medical Research and Development Command, Office of The Army Surgeon General; Albert Einstein College of Medicine, N.Y.; Yale University School of Medicine, New Haven, Conn., and the National Institute of Mental Health.

Presentations were made on a comprehensive study of medical problems that may be encountered by the military almost anywhere in the world. Included were discussions of research on tropical health hazards, exotic diseases, bacteriological warfare, wound healing, vascular surgery, shock, resuscitation, radiation and fallout, preventive psychiatry, burns, and blood supply.

Picatinny Arsenal Backs Student Science Symposium Representative of 60 High Schools in New Jersey

Students and teachers representing 60 North Jersey high schools participated in the Second Student Science Symposium, May 3-4, at Picatinny Arsenal, Dover, N.J.

Col R. R. Klanderman, Commanding Officer of the Arsenal, welcomed more than 275 of the high school representatives. Eight science students presented original research papers, and the symposium was conducted along the lines of a professional scientific meeting.

The attendees toured the Arsenal's supersonic wind tunnel, packaging laboratories, plastic research facilities, pyrotechnics area, Betatron, missile warhead laboratories, instrumentation and computer operations. They also witnessed the test firing of an artillery shell.

Led by Picatinny personnel, the students participated in a discussion of the field of science and engineering. Teachers met separately for a seminar on future trends and problems facing the teaching profession in the sciences.

Deputy Director of the Arsenal's Ammunition Group Victor Lindler discussed some of the research and engineering work currently being conducted at the Arsenal.

Awards for the best student research papers were presented by Maj Gen W. K. Ghormley, Commanding General of the Ordnance Special Weapons-Ammunition Command.

Closing remarks were delivered by Donald R. Beeman, Deputy Director of the Special Weapons Group.

Cooperating in this venture, which is designed to encourage promising youngsters to follow scientific careers, were Stevens Institute of Technology, Drew University, Newark College of Engineering, Rutgers University, Fairleigh Dickinson University, Blair Academy, Princeton University, the Paterson Diocese and the U.S. Army Research Office.

Students Translate Million Alien Place Names

Foreign students enrolled at the University of Southern California recently translated their 1,000,000th place name on foreign maps.

The work completed and in progress is covered by contracts between USC's Engineering Center and the Army Map Service, Washington, D.C. Six contracts have been completed, according to Prof. L. Robert Schruben, associate professor of general engineering, who is in charge of the project.

In three years USC foreign students have worked on translating or tranliterating foreign names or ideographs into English for maps of various areas in Western Europe, the Pacific, Africa, the Middle East, and Eastern Europe. Asia is the subject of two current contracts.

Selection of USC for the map work —it is presently the only American college or university doing this work for the Government—was made because of the university's large and variegated foreign student enrollment. More than 80 nations are represented among 1,250 USC students.

To date, map contracts with the university have totaled $300,000. Of this, about 60 percent has gone to the student translators, and the remainder to the university for administration, supervision, office facilities, supplies and equipment.

In some instances, student translators ink in the translations of map overlays. In others they make the translations on detail lists and indicate the position of the names on the overlay by numbers. Application of the names is then done in Washington after checking and corrections, before maps are reproduced.

Army Veterinarian Slated To Give Waterfoods Paper At International Meeting

"Hygienic Measures To Be Taken for the Supervision of Fish and Waterfoods" is the title of a paper scheduled for presentation by an Army veterinarian to the International Association of Veterinary Hygienists in Nice, France, on May 30.

The paper is scheduled for translation and publication in various foreign languages.

Author Lt Col Mulford C. Lockwood, Denmark Division, U.S. Army Veterinary Detachment in Copenhagen, emphasizes that because fish and waterfoods represent the most perishable of foods, stringent methods must be taken to curtail the disease disseminating potential.

Although the waters in which fish grow often may be a source of contamination, the paper stresses that most health hazards develop from man and his processing methods. Correct methods are carefully delineated.

Mathematicians Design 'Ye Olde Confidence Game' To Test Players Statistical Analysis Abilities

Many people, perhaps with justification, feel they have an intuitive knack for drawing correct conclusions from experimental data without the aid of formal statistical tests.

Individuals now can measure this ability with a game called "Ye Olde Confidence Game," designed for use with groups ranging from 10 to 100. The game's name is derived from the concept of confidence interval, which plays such an important role in statistical methodology.

Ye Olde Game was invented by two statisticians: Dr. Theodore W. Horner of Booz-Allen Applied Research, Inc., Bethesda, Md., and Dr. Walter D. Foster of the Biomathematics Division, U.S. Army Biological Laboratories, Fort Detrick, Md.

Since they invented the game, Drs. Foster and Horner have played it with about 250 biological scientists, mathematicians, statisticians and students. The results have been surprisingly consistent and have consistently helped assay the inventor's point about the value of statistics.

In playing the game, each participant receives a different set of 18 problems. Each problem consists of two columns with 10 observations in each column. The first column is identified as treatment A, the second as treatment B. The mean of each column also is given.

Each player must examine his 18 problems and draw a conclusion about the presence or absence of real treatment differences for each.

The player's conclusions then are compared with the true conclusions known from the way the samples were drawn. In addition, the inventors applied a statistical F test to each problem after it originally was drawn.

The F test is a statistical method which offers an analysis of variance of normally distributed measurement data. The construction of the F test, which takes into consideration the background variation of the experimental procedure, guarantees a rate of correct answers during analysis.

It is with respect to this rate of correct answers that the game compares the F test to the intuitive judgment of a large number of experimentalists in a simulated situation. The climax of the game comes with the comparison of the percentage of correct answers achieved by the entire group of players with the percentage of correct answers achieved by the F test.

The F test, like an individual player, may indicate an erroneous conclusion for any particular problem. But in the long run, the average percentage error commited by the F test can be specified in advance.

For example, the predicted rate of correct F test answers for the 2,628 problems originally drawn for the game was 90.8, and 90.9 was recorded.

For all players who have participated in the game to date, the rate of correct answers has been between 75 and 80 percent.

Generally, the players have tended to conclude that real treatment differences exist when, in fact, they do not. And, surprisingly, there has been virtually no difference in the rate of correct answers achieved by statisticians, other scientists, and students.

But the inventors of the game are not out to prove the superiority of statistics. "We hope the game will give the players a better understanding of statistics," they stated. "Like the electronic computer, neither the F test nor any other statistical methods ever will supplant the investigator. But they can be very useful tools in his analysis of results."

Ye Olde Confidence Game is a simple one to administer and score. A set of data sheets and an instruction booklet can be obtained on loan for interested groups by writing to Dr. Foster.

Former Ordnance Chief Retires

Lt Gen Emerson L. Cummings retired on Mar. 31, closing a long and notable military career. Chief of Ordnance in 1953 at the age of 51, he was the youngest general to hold the job since WW II. In 1958 he received the Distinguished Service Medal, the Army's highest peacetime award. Last summer he replaced Lt Gen William H. Arnold as Fifth Army commander.

WSMR Uses Canine 'Missile Snifters' for Scented Small Section Searches

Dingo is a White Sands Missile Range dog with a nose for missiles.

The 5-year-old Weimaraner daily courses swiftly through the mesquite of the New Mexico desert test center, seeking widely scattered small parts of missiles that crash to earth after tests.

Dingo's highly trained sniffer takes him to valuable parts that human searchers cannot find. This rare ability makes Dingo one of the most valued workers, for White Sands is the only United States range where small missile parts can be recovered after flight. Scientists need the parts for study to improve missile systems. Reasons for failure as well as for success must be analyzed.

Dingo and his dog buddy, Count, have been in training more than a year. Their "research findings" indicate a bright job future for them. Dingo recently recovered a part only three inches square and an inch thick. It was the section vital in radioing information during flight and engineers wanted to know what had happened to it.

There's a trick to it, of course. The tiny parts of the missile are sprayed with a distilled solution of shark liver oil before flight. The solution is Chanel No. 5 to a dog. Especially to Dingo, who was trained by Wilson Davis to regard this scent as a whiff of heaven. Davis is the expert who has pioneered in training dogs for many uses in the Army.

Dingo and Count were brought to White Sands from Davis' Maryland training kennels by John and Cynthia Guzevich. They live in nearby Las Cruces, N. Mex., and bring the two dogs to White Sands daily, working under subcontract operation for the Range Instrumentation Development Division here.

Bill Richards, project engineer for instrumentation recovery developments, commented:

"Dingo and Count are just two of the many things we are trying to make missile recovery easier and more effective. I will say that they are about the least expensive pieces of instrumentation we have tried."

Mrs. Guzevich added: "Each dog gets paid one pound of ground round steak and one can of dog food per day."

They haven't asked for a raise yet.

Department of the Army radio reporter Don Cosgrove gets an interview (so we were told) with Dingo, Weirmaraner hound with keen nose for missiles (scented with shark oil).

AOMC Computers Simulate Missile Performance To Aid Scientists in Designing Future Systems

Army scientists at Redstone Arsenal, Ala., don't need crystal balls to see missiles of the future—they have electronic machines that do a much better job.

Analog and digital computers in the Advanced Systems Lab of the Army Ordnance Missile Command are used to simulate the construction and flight testing of missiles that are still gleams in the scientific eye.

The "building blocks" of this futuristic work are the electronic plugs that go in various combinations on the computer patchboard. They can simulate hundreds of possible missile designs and performance before any actual hardware is produced.

The result is a technically feasible system before research and development efforts begin. Dollars are saved because "bugs" that would make a system unreliable never have a chance to get into the works.

The Advanced Systems Lab also conducts general feasibility studies furnished to other Government agencies and project offices. A report on hybrid propulsion systems using a liquid oxidizer and a solid fuel is a prime example of this type of work.

Lab personnel have done feasibility studies in the past on such Army developed missiles as the Jupiter, Pershing, Sergeant and Little John.

But these vanguard scientists never see the final product of their preresearch and development work. They are already doing spadework on another future missile system.

Research engineer Maurice Hallum shows electron tube component of digital computers used by Army Ordnance Missile Command scientists in designing future missile systems.

U.S. Army Research Office Loses Key Employees to Federal Agencies

Stepping stones to progress are being provided by the U.S. Army Research Office in some ways that do not particularly please officials dealing with the problem of retaining top quality scientific personnel.

Following a trail that has been broadened by a substantial number of key personnel during the past two years, two more highly esteemed employees stepped up late in April to considerably higher salaried jobs with other Federal Government agencies.

Hilbert E. Friend, Chief of the Research Contracts and Grants Branch, accepted a similar position with the National Science Foundation. Ernst Cohn, co-author of ARO Status Report No. 2 on Fuel Cells, and a man of growing reputation in the field of unconventional power sources, transferred to the National Aeronautics and Space Administration.

Known as one of the "old-timers" of the U.S. Army Research Office, Mr. Friend joined the staff only a few months after the agency was established at Arlington Hall Station, Va., effective Mar. 24, 1958. Graduated with a B.S. degree from West Virginia University (1950), he did graduate work at Marshall College, Huntington, W. Va., and studied contractual law at George Washington University, Washington, D.C.

During his ARO service, Mr. Friend has headed a program that has been growing at a phenomenal rate, and that has brought him into contact with educational institutions and nonprofit research enterprises throughout the country. The Army currently is spending about $165 million a year on research, about 70 percent of it under contracts and grants.

ERNST COHN joined the Army Research Office staff in July 1960, filling the vacancy left by Dr. Bernard R. Stein, who resigned to accept a more responsible position with the U.S. Army Research Office in Europe. Born in Mainz, Germany, in 1920, Mr. Cohn entered the U.S. in 1936. He returned to Germany to head an Army translation team at the Nuremberg war crimes trials, 1944-46.

From 1936 to 1938, he studied at Shady Side Academy, Pittsburgh, Pa., then attended the University of Pittsburgh, graduating in 1942 with a B.S. degree in chemistry and in 1952 with an M.S. in physical chemistry.

Employed in Pittsburgh as a chemist at the Bureau of Mines, Department of the Interior, from 1942-44, he returned there after the Nuremberg trials and remained until 1953, when he moved to Washington, D.C.

Mr. Cohn has pursued research on synthetic liquid fuels, metal carbides, catalysis, spark ignition of gases, and flame photometry.

Formerly an abstractor for *Chemical Abstracts*, he is a member of the Cum Laude Society, Phi Lambda Upsilon, Sigma Pi Sigma, American Chemical Society, Society of Technical Writers and Publishers, and Toastmasters International. He is listed in the *American Men of Science* (9th and 10th editions).

Hilbert E. Friend

Ernst M. Cohn

Brig Gen C. W. Clark
Director, Army Research

Maj Gen W. J. Ely
Deputy CG of new MDLC

Dr. Richard A. Weiss
Deputy & Scientific Director

Dr. Paul A. Siple
Scientific Adviser

U.S. Army Research Office Monitors Widespread Program

(Continued from page 1)
Development, was moved to Arlington Hall in 1958, it was recognized as a temporary transitional move.

The new headquarters will be approximately two miles closer to The Pentagon, hub of all Armed Services staff agencies in the Nation's capital. Problems of liaison with other directorates of the Office of the Chief of Research and Development, and other Pentagon agencies with which USARO maintains close working relationships, are expected to be eased considerably by the move.

Simultaneous with the relocation of USARO, the OCRD Manpower and Personnel Division will be moved to the Highland Building. An advantage cited by an M&P official is that "it will consolidate all OCRD manpower and personnel elements in a research and development environment." Elements presently are separated in The Pentagon and in Building T-7 at Gravelly Point.

Activated at Arlington Hall Station, effective Mar. 24, 1958, USARO has grown in functions and responsibilities until the staff is cramped within one-third the office space needed. The new headquarters will meet space requirements approved by the Federal Government General Services Administration.

Because of the shortage of space, USARO's Human Factors Research Division was shifted from Arlington Hall to Building T-7, located several miles away, in December 1960. Offices of the Director of Army Research, Maj Gen W. J. Ely, have been located in The Pentagon.

USARO consists of seven headquarters divisions, namely: Earth Sciences, Life Sciences, Physical Sciences, Research Planning, Research Programs, Research Support, and Human Factors Research. Linked to USARO are the Senior Scientists Advisory Group, which serves the Director of Army Research, and the U.S. Army R&D Operations Research Advisory Group.

Effective Jan. 16, 1961, the Ordnance Research Office at Durham, N.C., was redesignated the U.S. Army Research Office, Durham (AROD). Other USARO elements include the European Research Office at Frankfurt, Germany, the Far Eastern Research Office near Tokyo, Japan, and a new U.S. Army Research Office—Panama activated this month in the Canal Zone. Negotiations are proceeding for establishment of a branch office in Latin America.

USARO operates with a professional staff of scientists, engineers and scientific administrators particularly skilled in analysis, evaluation and programing of research projects. Carefully selected over a period of approximately three years, to assure the highest caliber of talent obtainable, the staff currently is comprised of 86 civilians, 42 officers (most of them exceptionally qualified as scientists or engineers) and 4 enlisted men.

The Army research program currently includes more than 3,000 tasks, most of which may be separated into numerous sub-task projects. The program is conducted at 78 Army in-house installations (laboratories and arsenals), 231 educational institutions under grants or contracts, 138 nonprofit research organizations, 316 profit-making firms, and in conjunction with 22 Government agencies.

Basic research grants to nonprofit-making institutions such as universities, colleges, hospitals and foundations are controlled through the U.S. Army Research Office, though the award usually is made by one of the Army's seven Technical Services. Similarly, USARO administers contracts awarded to profit and nonprofit-making organizations, including Army-sponsored activities.

Among major sponsored activities are the Human Resources Research Office of George Washington University (HumRRO), the Special Operations Research Office of the American University (SORO), and the Research Analysis Corp. (RAC), all located in Washington, D.C. RAC was activated Sept. 1, 1961, as the successor to the Operations Research Office of Johns Hopkins University.

Among the newer divisions of USARO are Research Planning, headed by Col Charles B. Hazeltine, and Research Programs under Col Richard H. Oliver. In general, Re-

Col Vester M. Schultz
Assistant Director

Lt Col C. H. Curtis
Executive Officer

Col Jack M. Duncan
RAC Military Adviser

Col G. W. Taylor
mmanding Officer, AROD

Col C. D. Ostrom Jr.
CO, European Research O.

Col C. S. Gersoni
CO, Far East Research O.

Col Tyron E. Huber
Chief, Life Sciences

Col C. B. Hazeltine, Jr.
Chief, Research Planning

search Planning is concerned with planning, coordination and supervision of the Army's Operations Research Program, the Long-Range Technological Forecasts, and research plans in support of the Long-Range R&D Plan.

The Research Programs Division is responsible for overall programing and budgeting for the Army research activities, including supervision and monitorship. It provides the recorder for the U.S. Army Research Office Programs Review Board and coordinates the Army Research Directorate presentations at budget and program reviews conducted by higher headquarters, the Office of the Secretary of Defense and Bureau of the Budget.

Under Col Tyron E. Huber, the Life Sciences Division is responsible for primary Army General Staff supervision of research in the life sciences, including biological and medical sciences, biochemistry and biophysics, and the development of medical materiel.

The Life Sciences Division provides representation for the Department of the Army and the Chief of Research and Development to numerous high-level groups, including: Department of Defense-National Aeronautics and Space Administration Coordinating Committee for the Life Sciences; Biomedical Panel, Weapons Effects Board, Defense Atomic Support Agency; Prevention of Deterioration Center, National Research Council-National Academy of Sciences; Army Medical Service; Army Medical Service Technical Committee; & Armed Forces Pest Control Board.

The Physical Sciences Division headed by Dr. I. R. Hershner is responsible for the supervision, planning and monitorship of the Army's basic and applied research programs in the disciplines of physics, chemistry, electronics, mathematics, materials and engineering sciences. It provides the chairmen of the Army Mathematics Steering Committee and the Army Fuel Cell Working Group.

Dr. Leonard S. Wilson is Chief of the Earth Sciences Division which exercises supervision, planning and monitorship of basic and applied research in the geophysical sciences, including the meterological portion of the development program. It is responsible for formulation and coordination of long-range R&D programs for polar, arctic, tropical and desert areas, including testing and evaluation to insure completeness and balance of effort in these areas.

The Human Factors Research Division is headed by Col George E. Bayerle. It monitors, supervises, coordinates and gives impetus to the entire human factors program within the Department of the Army. Late in 1961 the Personnel Research Branch, Office of The Adjutant General, was redesignated the U.S. Army Personnel Research Office and put in command of Lt Col Earl W. Rolf, who had been a member of Col Bayerle's staff for two years.

Functions of the HFR Division include human factors engineering in the interest of man-machine compatibility for simplicity of operation and maintenance, personnel research to utilize military personnel most effectively, development of training devices and weapons simulators, and studies to achieve scientific personnel training.

Under the leadership of Col Robert W. Studer, the Research Support Division has responsibility for programs which support the Army research effort. Its functions include dissemination of scientific information, administration of contract and grant procedures, supervising foreign research activities, and coordinating the sponsorship of scientific meetings within the Army and in cooperation with other Government agencies or elements in the general scientific community. The Division developed plans for and is responsible for publication of the *Army Research and Development Newsmagazine.*

Among other activities of the Research Support Division is the preparation of the Army Research Task Summary (ARTS), an annual report on the status of all Army research tasks normally consisting of eight thick volumes of highly condensed information. It also prepares the unclassified summary volume of the Army R&D Problems Guide, which usually lists more than 1,000 project areas in which the Army is seeking the help of industry and other research groups outside the Army.

The Research Support Division also plans and arranges for the biennial Army Science Conference, the semi-annual meetings of Army Key Scientists, the Junior Science and Humanities Symposia Program, and cooperates with the Science Service in

(Continued on page 21)

Col R. H. Oliver
f, Research Programs

Dr. L. S. Wilson
Chief, Earth Sciences

Dr. I. R. Hershner
Chief, Physical Sciences

Col G. J. Bayerle, Jr.
Ch., Human Factors Research

Col R. W. Studer
Chief, Research Support

Director of Army Research Goes to MDLC as Deputy CG; Clark Takes Over

When Maj Gen William J. Ely said farewell to his U.S. Army Research Office staff and introduced Brig Gen Chester W. Clark as the new Director of Army Research, on Apr. 25, he displayed the characteristic humor that has helped to earn the warm esteem of associates at all levels.

In effect, General Ely suspected his staff of "getting rid of him by doing such a good job" that he was assigned as Deputy Commander, Materiel Development and Logistic Command, under Lt Gen Frank S. Besson, Jr.

Sentiments of the staff were sounded by Dr. Richard A. Weiss, Deputy and Scientific Director, when he credited General Ely for providing the broad knowledge, analytical ability, ideas and leadership that have stimulated personnel to exceptional effort.

Records show that since General Ely assumed command in March 1959, research programs monitored and coordinated by the U.S. Army Research Office have almost doubled in scope. Meanwhile, encouraging strides have been made in minimizing duplication of effort among coordinating agencies, and in more effective short- and long-range planning.

As Director of Army Research, General Ely was backed by almost continuous assignments in the engineering field, following his graduation from the United States Military Academy in 1933 and assignment to the Corps of Engineers. During World War II he served in Australia, New Guinea, the Philippine Islands and Japan.

Earlier assignments had given him experience on important civil works and military construction projects. He has a master of science degree in civil engineering from Cornell University, and attended Carnegie Institute of Technology for one year before entering the Military Academy.

BRIG GEN CLARK brings to his new duties broad training and experience as a teacher, scientist and research director. Until reassigned he had served since Jan. 5, 1959, as Assistant Chief of Ordnance for Research and Development. From October 1955 to June 1958, he was Chief of the Guided Missile Systems Branch, and then was promoted to Chief of the Research and Development Division, OCO.

As Assistant Director, Ballistic Research Laboratories, Aberdeen Proving Ground, Md., General Clark served from 1947 until he became Director of Research and Development, Picatinny Arsenal, Dover, N.J., where he was stationed until 1954. He was next assigned as Deputy G-4, Eighth U.S. Army in Korea until 1955.

Graduated from the University of California with a B.S. degree in chemistry in 1927 and a masters in chemistry and physics in 1929, General Clark obtained a Ph. D. degree in physics from the University of Leyden in the Netherlands.

For six years he taught mathematics and chemistry at the University of California and San Francisco City College. Following World War II, he was on the staff of the Johns Hopkins University, engaged in cyrogenics research (low-temperature physics). He also has served as a consultant and physicist at the Naval Research Laboratory, Washington, D.C., here he helped to initiate the low-temperature research program.

General Clark entered the Army as a Reserve 2nd Lieutenant in 1927 and became a Colonel in the Regular Army in August 1953.

Secretary of Army Stahr Announces Personnel Changes

Secretary of the Army Elvis J. Stahr, jr., recently announced personnel actions involving general officers in R&D positions.

Brig Gen Robert G. MacDonnell was appointed Director of Civil Works in the Office, Chief of Engineers, effective in April. Previously he was the Director of Military Supply OCE.

President Kennedy has nominated Brig Gen Ellsworth I. Davis, Engineer, U.S. Army, Europe, to head the Mississippi River Commission, in which position he also would serve as Division Engineer, Lower Mississippi Valley Division, U.S. Army Corps of Engineers, Vicksburg, Miss.

Subject to Senate confirmation, General Davis will assume his new duties July 1, 1962. He will succeed Maj Gen Thomas A. Lane, who is retiring from active service.

General MacDonnell and General Davis have been confirmed by the Senate for rank of Major General.

Maj Gen Keith R. Barney, Deputy Chief of Engineers for Construction, retired Mar. 31 after more than 35 years of service. Maj Gen William F. Cassidy, previously assigned to the Office, Chief of Engineers, has succeded General Barney.

Engineers Develop Sprayer Using Rotating Dispenser

A new type rotary sprayer for outdoor use against adult mosquitoes, flies, and gnats is being tested by the U.S. Army Engineer Research and Development Laboratories.

The simple, lightweight, relatively quiet nozzleless sprayer is powered by the 24-volt electrical system of the ¼-ton military vehicle on which it is mounted. The sprayer head is a bowl set on edge, with the rim constricted. Plastic tubes connect with the inside of the bowl into which insecticide liquid is sprayed by a fuel 24-volt automotive pump at a rate of about 16.5 gallons an hour.

Dr. Clyde S. Barnhart of the Sanitary Sciences Branch of the Laboratories developed the system.

Army's Nozzleless Rotary Sprayer

LOGEX 62 Tests Officers of 21 Service Schools

Theories and military procedures learned in classrooms regarding the highly flexible and responsive administrative support system required for modern ground warfare are being tested realistically in LOGEX 62.

The interservice logistical command post exercise in progress (Apr. 29-May 12) at Fort Lee, Va., involves more than 6,000 participants of the Army, including Reserves, Air Force, Navy and the Department of State. It emphasizes the intra-Army and interservice teamwork imperative in a theater of operations, including coordination with the diplomatic services.

Student officers of 21 participating service schools and agencies are receiving combat-simulated training in maintaining continuous logistical and administrative support against an enemy capable of employing nuclear, chemical and biological weapons.

The exercise employs as its tactical framework a hypothetical war between Allied Forces and an enemy in a Western Europe theater of operations. LOGEX 62 is under the direction of Lt Gen Ridgely Gaither, Commanding General, Second U.S. Army, Fort George G. Meade, Md.

Army Awards Contracts Totaling $80 Million For Military Materiel

Contracts totaling more than $80 million for procurement of materiel and services were announced recently by the Department of the Army.

Two contracts aggregating $16,764,654 went to Minneapolis-Honeywell Regulator Co., Hopkins, Minn., for ammunition.

Other contracts for ammunition included: $5,469,991 to Sperry Rand, New York City; $3,998,160 to Chamberlain Corp., Waterloo, Iowa; $2,977,309 to AVCO's Electronics and Ordnance Division, Richmond, Ind.; $1,660,000 to Olin Mathieson Corp., New Haven Conn.; $1,045,000 to Remington Arms Co., Inc., Bridgeport, Conn.; and $1,177,828 to the Iowa Ordnance Plant, Burlington.

General Cable Corp., Washington, D.C., received a $7,911,800 contract for 66,000 specialized telephone cable assemblies. A $4,263,255 contract was awarded to Hayes International Corp., Birmingham, Ala., for Pershing missile trainers.

Two contracts totaling $4,137,496 let to Chrysler Corp., Detroit, Mich., call for production of 2,832 engines for M113 armored personnel carriers and 471 dump trucks.

A $3,782,080 contract award to Western Electric Co., New York City, is for repair parts for improved radar equipment for the Nike Hercules missile system.

Morrison-Knudson & Paul Hardeman, Southgate, Calif., received a $3,673,000 contract for site development at the Spacecraft Center, Houston, Tex.

Army Chief of Staff General George H. Decker pins insignia of 3-star rank on Frank S. Besson, Jr., Commanding General of the new Materiel Development and Logistic Command as Mrs. Besson gladly gives him a helping hand.

Martin Co., Orlando, Fla., received two contracts totaling $3,250,000 for component parts for 26 sets of Pershing missile trainers and 7 Pershing guidance and control systems maintenance and proficiency testers.

A $1,921,000 contract let to Pacific General Construction Co., Inc., calls for construction of three Nike Hercules Hipar systems at Fort Richardson, Alaska.

For production of 401 semitrailers of the 12-ton, 4-wheel type, Great Dane Trailers, Inc., Savannah, Ga., received a $1,803,967 contract. Electrospace Corp., Glen Cove, N.Y., was awarded a $1,757,202 contract for 818 field-type telephone switchboards.

Raytheon Co., Lexington, Mass., received a $1,718,056 contract for field maintenance test equipment on the Hawk missile system. For production of 1245 sedans Ford Motor Co., Detroit, Mich., was awarded a $1,717,527 contract.

A $1,598,210 contract let to General Motors Corp., Detroit, Mich., is for production of 355 turbo-charged compression ignition engines. Norris Thermador Corp., Los Angeles, Calif., received a $1,540,800 contract for manufacture of 105 mm. cartridge cases.

A $1,537,494 award went to RCA, Moorestown, N.J., for design and fabrication of radar materiel. Ingraham Co., Bristol, Conn., received a $1,507,050 contract for components of artillery fuzes. Bendix Corp., Baltimore, Md., was awarded a $1,500,000 classified contract.

Additional contracts included: United Aircraft Corp., Hamilton Standard Division, $1,484,282 for propeller assemblies for Caribou aircraft; Lennox Industries, Inc., Columbus, Ohio, $2,211,440 for 800 fuel tank modification kits for the M-48A1 tank conversion program; Curtiss-Wright Corp., Woodridge, N.J., $1,165,861 for rocket motor cases for the Pershing missile; Tech Material Corp., Mamaroneck, N.Y., $1,146,225 for 39 radio transmitters; Burton Manufacturing Co., Northbridge, Calif., $1,038,948 for manufacture of 2,161 transistorized mine detectors; Pan American World Airways Inc., New York City, $1,000,000 to provide facilities for development and testing of advanced surveillance systems.

Army Research Office Mission Stands Pat in Growth

(Continued from page 19)

the annual National Science Fair-International for outstanding high school science students.

Key executives assisting the Director of Army Research include Dr. Richard A. Weiss, Deputy and Scientific Director; Dr. Paul A. Siple, Scientific Adviser and one of the most widely renowned polar experts in the United States; and Col Vester M. Schultz, Assistant Director.

Over the period of the four years since it was established, the U.S. Army Research Office has greatly broadened its working relationship with other Army and Governmental agencies, industry, educational institutions and the outside scientific community. Though its workload and responsibilities have expanded at a phenomenal rate, USARO's Statement of Mission remains unchanged:

MISSION: To plan and direct the research program of the Army to insure a maximum utilization of the available scientific talent and to insure a dynamic program responsive to the future requirements of the Army.

- To foster within the laboratories and arsenals of the Army the best possible atmosphere for the prosecution of research.
- To provide the civilian scientific community with a point of contact or entry into the Army research community.
- To encourage and promote scientific training and education and to further scientific activity in areas of possible interest to the Army.

RAC Finds Solutions to Army Operations Research Problems

In a battle between opposing tank forces, how much advantage goes to the force that fires first?

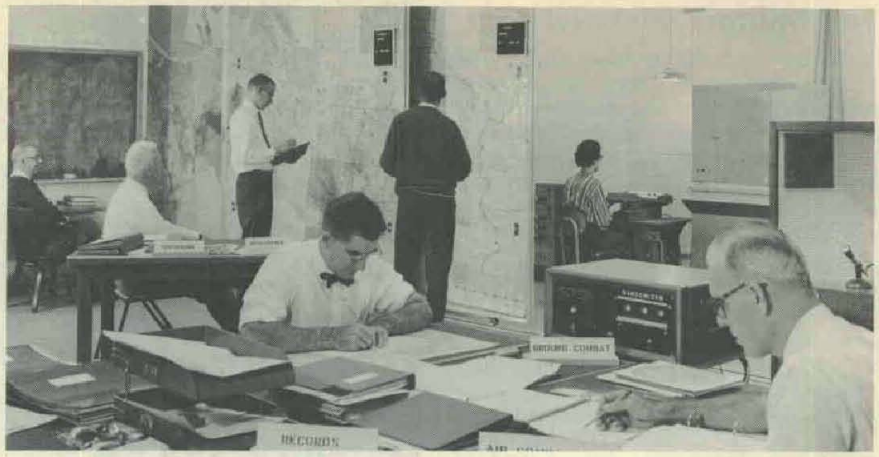
What will be the nature of the future battlefield?

What should be the composition of the Army of 1970?

The task of the Research Analysis Corporation (RAC) is to apply advanced scientific thinking to military questions and problems like these. Now RAC has expanded its divisional organization to permit broader and more effective contributions to the Army's peacetime and wartime capabilities.

RAC is a private, nonprofit corporation headquartered in suburban Washington, D.C., and reporting to the Chief of Research and Development. The corporation is responsible for the principal part of the Army's operations research and system analysis. RAC's basic objective is to backstop Army planners and commanders by providing them with the best possible scientific and analytical advice—ideas, findings, recommendations, solutions—pertinent to major Army decisions.

The President of RAC is Frank A. Parker, Jr., former Assistant Director of Defense Research and Engineering and a man who has devoted much of his professional career to problems of national defense. A pioneer in rocket and missile development, he has also been active in such diverse problem areas as sea combat, antisubmarine warfare, fleet air defense, amphibious and land combat, mobility, logistics, guerilla, counter-guerilla, tactical warfare and tactical warfare systems.



"Theatrespiel" technique of war gaming is employed at RAC to help solve major Army problems by simulating situations likely to be faced in war.

The Research Analysis Corporation signed a contract with the Department of the Army in September 1961, retaining as its nucleus the staff of its predecessor organization, the Operations Research Office (ORO) of The Johns Hopkins University. Scientists and supporting staff members now total 420, with the expectation that this figure may double by 1966.

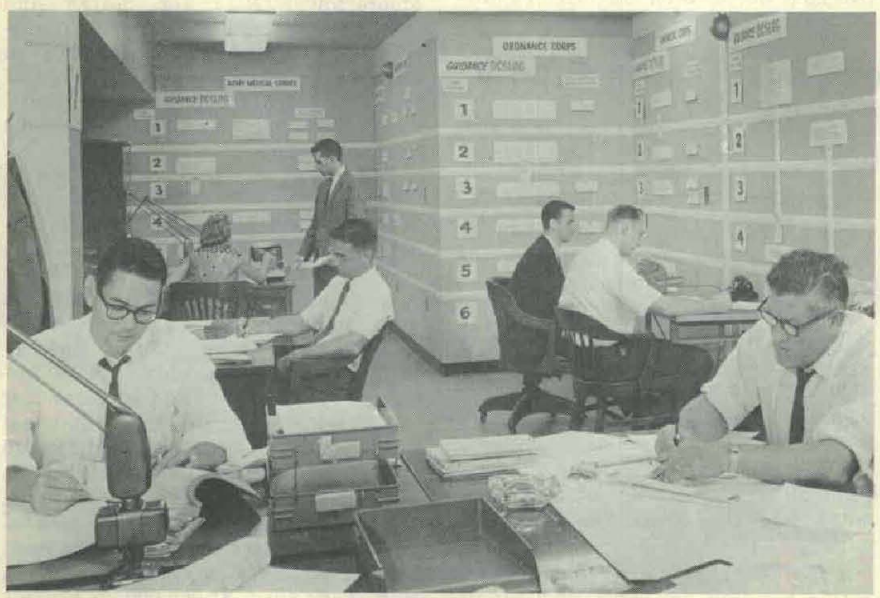
RAC's continuing expansion has resulted in the realignment of the technical directorate into two areas of research, Combat Systems and Logistic and Management Systems, and an increase in research divisions from seven to nine.

Combat Systems is composed of the Weapons Systems Division, Information and Control Division, Conflict Analysis Division, Combat Developments Division, Methodological Research Division, Computing Laboratory, and Electronics Laboratory. Logistic and Management Systems consists of the Operational Logistics Division, Support Systems Division, Logistic Simulation Division, and Economics and Costing Division.

Principal fields in which RAC works are apparent from the division nomenclature. In all, ORO/RAC has performed analysis and research in more than 100 project areas, literally from A (air defense, airlift, armor, etc.) to Z (zone defenses).

RAC's research approach is multidisciplinary for the most part. To tackle a given problem, for example, may require employing a so-called "mixed team" comprising a physicist, mechanical engineer, political scientist, mathematician, economist, and historian. Thirty-one distinct disciplines are represented in RAC's professional staff, ranging from agriculture to meteorology and heaviest in mathematics, electrical engineering, economics, and physics.

Some techniques used at RAC have names that may sound somewhat exotic to the stranger to operations research. Among them are decision theory, linear and dynamic programing, information and communication theory, learning theory, operational simulation (Monte Carlo gaming), symbolic logic, queuing theory, stochastic processes, probability theory, and value theory.



View of part of the Research Analysis Corporation's Experiment and Development Center for advanced scientific studies of strategic planning.

RAC's purpose may be stated simply — helping bolster the Army's strategic, tactical and management capabilities. How well has RAC succeeded? Because so much of RAC's present research is aimed at the future—1965-1970 and beyond—its ultimate effectiveness must await a future verdict. But the history of ORO and RAC, the part that can be mentioned, indicates continued successes for the operations research approach to defense problems.

For example, ORO/RAC research was responsible for the Army's decision to create tactical nuclear weapons, at a time when only the strategic value of nuclear arms was recognized. Present Army doctrine in the areas of nuclear weapon yields and delivery systems, number of warheads to produce, and defense against similar weapons is based to a large extent on the organization's research.

In the general field of missiles, analyses by RAC staff members have been used as guides for current programs involving both surface-to-air and surface-to-surface missiles. RAC's contributions in other fields—guerrilla and limited warfare, psychological warfare, intelligence and many more—have been acclaimed as equally significant.

Often, teams of analysts on the spot in trouble zones have been able to interpret operational needs faster and more effectively than would have been the case in a conventional research environment. Korea provided a good test for this field research. There, operations analysts studied factors of combat stress, helped increase the effectiveness of artillery fire and improve tank force tactics, recommended the use of heavy bombers (B-29s) for tactical support—a startling but effective concept — and studied, analyzed, and reported recommendations in numerous other combat situations.

The value of military operations research as a practical aid to the decision-maker is increasing day by day. As utilized at the Research Analysis Corporation, operations research is helping the Army make decisions today for 1970 and beyond—decisions that demand precise and exhaustive research to assure validity, in view of the global stakes involved.

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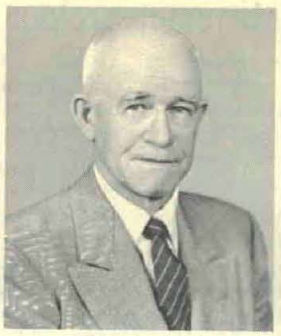
President
Research Analysis Corp.



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Helicopter Designed for Army Establishes Claim for 3 New World Records

Three new world records for open class helicopters, all established in the YHU-1D Iroquois within the period Apr. 13-20, have been claimed by pilots of the U.S. Army Aviation Board, Fort Rucker, Ala. To become official, the marks must be certified by the Federation Aeronautique Internationale in Paris.

Lt Col Leland F. Wilhelm, Dunbar, Neb., Chief of the Aviation Branch, U.S. Army Aviation Board, clipped 29.9 seconds off the official record set by the U.S. Air Force in October, 1961, when he flew to a height of 3,000 meters in 2 minutes, 14.6 seconds. The Air Force time was 2:44.3.

Capt Boyce B. Buckner, Pike View, Ky., took the YHU-1D to 6,000 meters in 5 minutes, 51 seconds, lowering by 51.3 seconds the official record set by the U.S. Air Force last October. The Air Force time was 6:42.3.

Capt William F. Gurley, Washington, D.C., shattered a record established almost two years ago by a Russian pilot when he flew the YHU-1D over a closed circuit course at Fort Worth, Tex., at 133.9 miles per hour. The Soviet record was 88 m.p.h.

Linked to the Army's 10-year aircraft development program announced in the *Army Research and Development Newsmagazine* in August 1961, the YHU-1D Iroquois is the first turbine-powered production helicopter designed specifically to meet Army requirements. Similar models played an important part in significant mapping and radio depth sounding projects in the Antarctic, reported in the March, 1962, issue of this publication.

The YHU-1D was built by the Bell Helicopter Co., Fort Worth, Tex., and the power plant by the Lycoming Division of AVCO.

White Sands Missile Range Honors Long-Term Employees

Over 500 years of Government service were represented at a recent length-of-service awards ceremony at White Sands Missile Range, N. Mex. Maj Gen John G. Shinkle, WSMR Commanding General, made presentations to 25 employees.

Sixto D. Molina, Procurement Office, and Floyd W. Thompson, Post Engineers, each received a certificate for 30 years of service. Twenty-three other WSMR personnel received 20-year certificates. Similar ceremonies for 10-year service awards to 82 employees were held at other offices.

Wide Range of Problems Discussed by Scientists Attending Fourth Micrometeorological Parley

Wide-ranging discussions regarding atmospheric turbulence, energy balance, surface and subsurface phenomena marked the recent 3-day Fourth Annual Micrometeorological Conference at Fort Huachuca, Ariz.

More than 60 meteorologists from colleges and universities, Government agencies and military installations participated. Represented were such widely separated research centers as the University of Washington, Seattle; the Agricultural Research Service (ARS), U.S. Department of Agriculture, Watkinsville, Ga.; the U.S. Salinity Laboratory, Riverside, Calif; and Massachusetts Institute of Technology, New Bedford, Mass., attended the conference.

Military installations and agencies represented at the conference included: Army Combat Surveillance Agency, Washington; Army Artillery and Missile School, Fort Sill, Okla.; Dugway Proving Ground, Utah; Hq, 2nd Weather Group, Langley AFB; Army Missile Support Agency, White Sands, N. Mex.; Army Ordnance Missile Command, Redstone, Ala.; and the Climatic Center, U.S. Air Force, Wash.

Deputy Commander of the USAEPG Col Walter E. Lotz, Jr., and Chief Scientist J. G. Reid, Jr., opened the conference with welcoming remarks. W. D. Ohmstede of the Meteorology Department described the present status of the USAEPG micrometeorological research program.

Dr. H. H. Lettau of the University of Wisconsin spoke at the opening session. "Turbulence" was the theme of papers presented by Dr. J. A. Businger, University of Washington; Dr. H. E. Cramer, MIT; and E. J. Plate, Colorado State University, who discussed results of CSU wind tunnel research.

Henry Thompson, Technical Director of the White Sands Missile Range, N. Mex., spoke at the conference dinner. Illustrated with slides and film his subject was "The Meteorological Rocket Network and Its Applications."

Participating in a session devoted to "Energy Balance-Partitioning of the Sun's Energy at the Earth's Surface" were Capt J. H. Yepsen, Chairman; Dr. W. Covey and Dr. E. R. Lemon of the ARS, Department of Agriculture, Ithaca, N.Y.; Mr. C. R. Stearns, University of Wisconsin; Dr. F. A. Brooks, University of California; Dr. C. H. M. Van Baval, U.S. Water Conservation Laboratory, Tempe, Ariz.; Dr. W. R. Gardner, ARS Salinity Laboratory, Riverside, Calif.; and Dr. D. R. Neilson, University of California.

Other participants at the session on "Surface and Subsurface Phenomena as They Pertain to Micrometeorology" included: Dr. R. R. Binnie, Chairman; Dr. W. Carey, Utah State University; Dr. D. M. Anderson, University of Arizona; Dr. A. R. Bertrand, ARS, Watkinsville, Ga.; and J. F. Appleby, USAEPG.

Closing remarks of the conference were made by Maj K. F. Hampton, Acting Chief of the Meteorology Department at the Proving Ground.

Clarence E. Erickson, Chief, Micrometeorology Div., USAEPG; Lt Col L. A. Schuknecht, Hq, 2nd Weather Group, Langley AFB; and Maj K. R. Hampton, Acting Chief, Meteorology Dept., USAEPG, discuss agenda.

AOMC Nominates 9 Scientists for R&D Award

Nine Army Ordnance Missile Command scientists have been nominated for the Army-wide 1962 Research and Development Achievement Awards. AOMC scientists won eight awards out of ten nominations last year, the first time the awards were given.

Individual nominees are William F. Otto, Senior Electronic Engineer, and Kenneth C. Evans, Electronic Engineer, in the Electromagnetics Laboratory; and John L. Tidd, Deputy Project Manager for Redstone-Corporal-Jupiter missile systems.

A 6-man team nominated for a group award is headed by Dr. Walter W. Whatron of AOMC's Research Laboratory. Other members are Joseph Connaughton, Barry D. Allan, Edgar F. Croomes, Harvard Eng, and John R. Cain.

The team has been recognized for its contributions to the area of high-energy prepackagable liquid propellants, proving the potential of a new system based on nitrogen fluorine compounds.

Otto was chosen for his work on an infared command unit project for automatic control of existing anti-tank weapons.

Evans developed a unique means of converting electrical and mechanical energy to pneumatic energy. The device provides close control over high pressure power jets for missile guidance.

Tidd directed a flight-test program on the Army's Redstone missile that resulted in improved performance in the missile system.

The AOMC nominating committee was composed of top managers in the R&D program at Redstone, headed by Dr. William Carter, AOMC Chief Scientist. A review committee in the Office of the Chief of Ordnance will screen nominations from all Ordnance activities and final selection for R&D Achievement Awards will be made by a committee representing the Chief of Research and Development.

The AOMC selections recognize contributions that established the scientific basis for subsequent technical improvement of military importance, materially improved the Army's technical capability or contributed materially to the national welfare.

Fort Bragg Conducts Course To Prepare MATA Officers

A Military Assistance Training Adviser (MATA) course is now in operation at the Army's Special Warfare School at Fort Bragg, N.C.

The MATA training consists of a 4-week course in intensive instruction. It will provide selected officers and noncommissioned officers with a working knowledge of the duties of military assistance training advisers in counterinsurgency operations.

U.S. Army counterinsurgency forces include civil affairs, psychological warfare, engineer, medical, light aviation, signal, as well as special forces and other combat arms.

They are capable of operating in disturbed areas, when invited by the host government, to provide training and operational advice and assistance to indigenous military forces engaged in maintaining or restoring security.

Ordnance Corps Reviews Foreign Weapons Progress

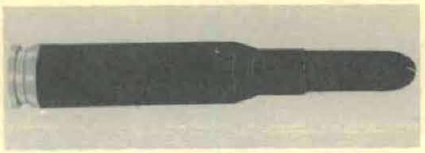
(This article is the third of a series on advanced research and new conventional foreign weapons. The first featured the Italian 105 mm. Mountain Howitzer, the second the West German Delta AA Sight.)

Initial development of plastic ammunition was undertaken by the Bakelittfabrikken A/s of Oslo, Norway, and production of calibers ranging from .32 ACP through 20 millimeters is now underway at the Dynamit Aktiengesellschaft, Nuremberg, Germany.

Approximately the same length as a ball round, the cartridge consists of a polyethylene plastic case, a charge of propellant, and a metal base (brass or zinc) holding a Boxer-type primer. An X-shaped groove is formed in the rounded end of the case to weaken that section so that it will rupture when the cartridge is fired, thus preventing fragmentation that might injure nearby persons.

Experimental propellants used to date include a square-cut (flake), double-base compound stabilized with ethyl centralite, and a cylindrical single-base compound stabilized with diphenylamine.

Plastic blank cartridges are currently being used by France, West Germany, Iran, and Finland, and have been tested in the United States.



Plastic blank cartridge being produced in West Germany munitions factory.

Air Cavalry Concept Gets Impetus From Limited War

Increasing attention on conventional war preparedness has accelerated the air cavalry concept in preparation since 1954. The first troop of air cavalry is expected to be combat ready by the end of summer. Consisting of 147 men and 27 observation and transport helicopters, it is being organized at the Fort Knox, Ky., armored center.

Fulfilling the traditional role of the cavalry, the helicopter troops will scout ahead of moving columns, reconnoiter the flanks, seek out targets for artillery and rockets and spring raids behind enemy lines.

Considered suitable for both nuclear war battlefields and guerilla wars, the air cavalry troops will be tactical units. Their helicopters are armed with machineguns and antitank guided missiles.

Ultimately, the Army hopes to integrate an air cavalry unit with each of its 16 regular divisions. The second troop will be formed at the infantry center, Fort Benning, Ga., and two more will be attached to the new regular Army divisions now being trained at Fort Carson, Colo., and Fort Hood, Tex.

Today the approximately 5,600 Army aircraft are about equally divided between fixed wing aircraft and helicopters. It is anticipated that by 1970 the proportion in 8,000 aircraft will be 7 to 1 in favor of helicopters.

Military, Industry Planning Symposium on Reliability

The Seventh Military-Industry Missile and Space Reliability Symposium will be held June 18-21 at the U.S. Naval Air Station, North Island, San Diego, Calif.

The classified and restricted symposium is sponsored by the Office of the Director of Defense Research and Engineering in cooperation with the Army, Navy, Air Force and industry.

The Bureau of Naval Weapons, Department of the Navy, will serve as host this year. Invitations are being processed by the Department of the Navy.

Chiefs of organizations responsible for implementation of R&D Directive 705-1, "Reliability of Equipment," who do not receive an invitation by Apr. 30, and who desire to send personnel may contact OCRD, Department of the Army, (Mr. Meiselman, Pentagon, Oxford 5-6525).

Engineers Testing Machine For Field Data Reduction

A machine that converts standard paper tape computer code to field data code used in compiling mapping data is being tested by U.S. Army Engineers.

The unit features standard Teletype paper tape readers and punches and a standard keyboard. It was designed to facilitate data reduction by direct conversion between the Army Fieldata and standard commercial coding systems.

Off-the-shelf components were tied together through a unique logic control matrix designed by IBM Corp. under contract with the U.S. Army Engineer Goedesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.

SCIENTIFIC CALENDAR

Research Conference on Optical Glass, Army Research Office, Durham, N.C., May 16-18.

International Conference on Large Electric Systems, Paris, France, May 16-26.

10th Annual Meeting of the Radiation Research Society, Colorado Springs, Colo., May 20-23.

8th Aerospace Instrumentation Symposium, sponsored by the Instrument Society of America, Washington, D.C., May 21-23.

Symposium on the Thermodynamics of Materials used in Nuclear Technology, Vienna, Austria, May 21-25.

8th International Congress on Ceramics, Copenhagen, Denmark, May 21-26.

Conference on Self-Organizing Systems, sponsored by the Armour Research Foundation and ONR, Chicago, May 22-24.

National Microwave Theory and Techniques Symposium, sponsored by the Professional Group on Microwave Theory & Techniques, Boulder, Colo., May 22-24.

7th Symposium on Hydrogen Thyratrons & Modulators, Fort Monmouth, N.J., May 22-24.

16th Annual Power Source Conference, Atlantic City, N.J., May 22-24.

International Colloquim on Forming & Testing of Sheet Metal, Dusseldorf, Germany, May 23-24.

National Conference on Telemetering, sponsored by IRE, AIEE and the Institute of Aeronautical Sciences, Washington, D.C., May 23-25.

IRE Conference on Space Communications, sponsored by IRE, Seattle, Wash., May 24-26.

Physics & Chemistry of Ceramics, University Park, Pa., May 28-30.

2nd International Symposium on Fluorine Chemistry, Estes Park, Colo., June (date undetermined).

7th Nuclear Congress N.Y.C., June 4-7.

Ultrasound in Biology & Medicine, Monticello, Ill., June 4-8.

Fuels Symposium, sponsored by ASME, New Brunswick, N.J., June 5-7.

2nd Colloqium on Microwave Communication, Budapest, June 5-8.

8th Conference of Army Mathematicians, Madison, Wis., June 6-7.

8th Annual Radar Symposium on New Techniques, Devices and Applications, Ann Arbor, Mich., June 6-8.

12th Symposium on International Society of Neurovegetative Research, Marseilles, France, June 11.

International Symposium of Organic Chemistry, sponsored by the International Union of Pure & Applied Chemistry, Brussels, Belgium, June 11-14.

Summer Instrument-Automation Conference & Exhibit, sponsored by the Instrument Society of America, Seattle, Wash., June 11-14.

Cloudcroft 1962 Summer Scientific Seminar on Topics in Geophysics, sponsored by AFOSR and the University of New Mexico, Clouderoft, N. Mex., June 11-21.

International Conference in Chemical Physics in the Onsager Reciprocal Relations, Providence, R.I., June 12-14.

International Symposium on the Organic Chemistry of Natural Products, Brussels, Belgium, June 12-15.

4th International Symposium on Gas Chromatography, Hamburg, Germany, June 13-16.

Conference on Standards & Electronic Measurements, sponsored by IRE, AIEE and the National Bureau of Standards, Boulder, Colo., June 14-16.

4th U.S. Congress on Theoretical & Applied Mechanics, Berkeley, Calif., June 18-21.

International Conference on Applied Spectroscopy, College Park, Md., June 18-22.

6th International Congress on Combustion Engines, Copenhagen, Denmark, June 18-22.

International Symposium on Continuous Culture of Microorganisms, Prague, Czechoslovakia, June 18-23.

1st Biannual Polymer Symposium, sponsored by the American Chemical Society, East Lansing, Mich., June 20-22.

Long Term Climatic Variations, sponsored by AFCRL and NRC, Aspen, Colo., June 20-24.

Generals Involved in Organization of MDLC Sub-Commands

Abbreviated biographical sketches of Commanding Generals who have been assigned to head the major subordinate commands of the Materiel Development and Logistic Command are presented below, except that Maj Gen W. J. Ely, Deputy CG of the MDLC, is covered on page 20.

Maj Gen Marshall Stubbs
Director, CBR Warfare

Maj Gen Nelson Lynde
CG, Weapons Command

Maj Gen Stuart Hoff
CG, Electronics Command

MAJ GEN GHORMLEY: As CG designate of the Munitions Command, has training and experience for the job in both the Quartermaster Corps and the Ordnance Corps. He has served since July 1959, as CG of the Ordnance Special Weapons-Ammunition Command, Picatinny Arsenal, Dover, N.J., and prior to that was CG of the Ordnance Weapons Command at Rock Island Arsenal, Ill.

After a 2-year tour as Commanding Officer of the Philadelphia Ordnance District, he served from 1952 to 1954 in Washington, D.C., in the Office of the Chief of Ordnance, Chief of the Automotive Branch, then Chief of the Industrial Operations Branch, and later Deputy Chief of the Industrial Division. From 1954 to 1957 he was Assistant Staff Director and Staff Director, Purchasing and Contracting Policy Division, Office of the Assistant Secretary of Defense.

Born in Hutchinson, Kans., Sept. 29, 1905, General Ghormley was graduated from the United States Military Academy in 1929. He was assigned to the Quartermaster Corps, with which he served early in World War II. Transferred in 1942 to the Office of the Chief of Ordnance, Detroit, later known as the Ordnance Tank-Automotive Center, he served there until he was assigned to England in 1944.

For the next three years General Ghormley served in England, France and Germany. Upon his return to the States he was assigned to the Logistics Division, National Guard Bureau, Washington, D.C., and in 1950 was graduated from the Industrial College of the Armed Forces.

MAJ GEN LYNDE: Nelson M. Lynde, Jr., assigned as CG of the Weapons Command, has served since May 1959, as Assistant Chief of Ordnance in charge of the Field Service Division of the Ordnance Corps. From September 1955 to 1959 he was CG of the Ordnance Tank-Automotive Command.

Graduated from the United States Military Academy in 1929, he served until World War II in a variety of Ordnance Corps assignments. In July 1942, he was assigned to the II Armored Corps and during the next five years served in Africa, Sicily and Europe. Then came 14 months of duty at the Armored Center, Fort Knox, Ky., followed by three years with the Army Field Forces at Fort Monroe, Va.

Following a year of duty at Red River Arsenal, Tex., he was assigned to Japan for one year, during which he was promoted to Brigadier General. Major General rank came in March 1959 while he was CG of the Ordnance Tank-Automotive Command.

MAJ GEN HOFF: Stuart S. Hoff has achieved a position of military importance as the CG designate of the Electronics Command without going through the preparatory training of the United States Military Academy. He was graduated in 1929 from Texas A&M College with a B.S. degree in civil engineering and a commission in the Infantry Reserve.

Nearly every summer for the next 11 years, while engaged in the construction business in southwest Texas, he took active duty training. In September 1940, he was ordered to extended active duty in the grade of captain and in 1946 was integrated into the Regular Army.

Continuous Signal Officer assignments from 1942 to 1950 were interrupted briefly while he attended the Army War College at Fort Leavenworth, Kans., and in 1951 he was assigned to Washington, D.C., in the Office of the Assistant Chief of Staff. From November 1952 until July 1955, he was assigned to the Office of the Secretary of the Army. Then came a year of duty as Deputy Signal Officer, Headquarters Eighth Army Far East Command, followed by 15 months as Commandant, U.S. Army Signal School, Fort Monmouth, N.J. After serving from October 1957 to July 1958, as Chief of the Combat Developments and Operations Division, OSigO, he was assigned for a year as Signal Officer at Seoul, Korea.

MAJ GEN STUBBS: Chief Chemical Officer Marshall Stubbs will take into his new assignment as Director of Chemical-Biological-Radiological Warfare, Office of the Deputy Chief of Staff for Military Operations, 28 years of service with the Chemical Warfare Service and its successor, the Army Chemical Corps.

For the first five years after graduation from the United States Military Academy in 1929, he served in the Infantry. Prior to World War II, he attended the Massachusetts Institute of Technology and obtained a master of science degree in chemical engineering practice.

From April 1943 until May 1947, General Stubbs served in Europe as a Chemical Officer, Assistant Chief of Staff G-4, ETO, Chief of the Communications Zone Section of the European Theater General Board, and as a Planning and Control Officer.

Reassigned to the Army Chemical Center, Md., in 1948, he served first as Chief of the Special Projects Office, followed by duty as Commanding Officer of the Chemical Corps Engineer Agency and attendance at the National War College. From 1952 to 1954 he was Chief of the Research and Development Division, ACC.

Assigned as Commanding Officer of the Chemical Corps Materiel Command in Baltimore, Md., he served as CG of the Command from 1954 until 1957. Then came a year as CG, 1st Logistical Command at Fort Bragg, N.C., and in September 1958, he became Chief Chemical Officer with the rank of Major General.

MAJ GEN SIBLEY: Alden K. Sibley, who has been named CG of the Mobility Command, was born in Tuscaloosa, Ala., Jan. 3, 1911, and was graduated from the United States Military Academy in 1933 with a Corps of Engineers commission.

Selected as a Rhodes Scholar, he attended Magdelen College, Oxford

University, England, and completed courses for three degrees in theoretical and nuclear physics. In 1935 he conducted a scientific expedition around the world to measure and study cosmic rays.

General Sibley served as a White House aide to President Franklin D. Roosevelt for a year following his graduation from the Engineer School at Fort Belvoir, Va., in 1937. For the next three years he was executive officer during construction of the Conchas Dam in New Mexico, chief of construction inspection for the John Martin Dam in Colorado, and Executive Officer of the St. Lawrence Seaway and Power Project.

From 1941 until October 1945, he had important assignments in Egypt, Africa and England, winning award of the Legion of Merit and the Order of the British Empire. He commanded the Tripoli Base Command in North Africa during the mounting of the Eastern Task Force for the invasion of Sicily.

Maj Gen A. Schomburg
CG, Supply & Maintenance

Maj Gen F. McMorrow
Takes over as CG, AOMC

Maj Gen Alden Sibley
CG, Mobility Command

In early 1944 he was assigned to Supreme Headquarters, Allied Expeditionary Force (SHAEF), in London, and participated in planning the Normandy Invasion. By order of General Eisenhower, he assisted in establishment of the SHAEF Forward Headquarters in France, then served as Chief of Staff of the SHAEF Mission to France for nearly two years until the end of the war. He was awarded the Bronze Star Medal, French Legion of Honor and the Croix de Guerre with Palm.

General Sibley has served since 1945 in numerous top planning and policy assignments as a member of the War Department General Staff, as Chief of the Logistics Plans Branch at SHAPE in Paris (1952-55), and as Chief of Staff for U.S. delegations for negotiations with the Federal Republic of Germany and the Philippine Government. Since 1957 he has been Division Engineer, U.S. Army Engineer Division, New England.

MAJ GEN SCHOMBURG: Reassigned from duty since Feb. 1, 1960, as CG of the U.S. Army Ordnance Missile Command, August Schomburg will give to his new responsibilities as CG of the Supply and Maintenance Command a quarter century of experience in the Ordnance Corps.

The first six years of General Schomburg's military career following graduation from the United States Military Academy in 1931 were spent as an Infantry Officer. Transferred to Ordnance in 1937, he attended the Massachusetts Institute of Technology and received his M.S. degree in mechanical engineering.

After attending the Ordnance School at Aberdeen Proving Ground, Md., he remained there to serve successively as Adjutant, Chief of the Small Arms Section of the R&D Center, Executive Officer of the Proving Center, and Commanding Officer of the Ordnance Winter Proving Center in Canada.

Early in 1944 he was called to the War Department General Staff and assigned to G-3 until February 1946. After three years in Ottawa, Canada, as Assistant Military Attache, U.S. Embassy, and Liaison Officer with the Canadian Army, he was assigned to Watertown Arsenal as Director of Research, Development and Engineering until July 1952.

Graduated in June 1953, from the Industrial College of the Armed Forces, Fort McNair, Washington, D.C., he was assigned as Chief, Procurement Branch, G-4, Logistics, for the United States Army in Europe.

General Schomburg became Chief, Research and Development Division, Office of the Chief of Ordnance, Washington, D.C., Apr. 27, 1956, and was promoted to Deputy Chief of Ordnance May 2, 1958, serving in that capacity until he became CG, AOMC.

Born in Denver, Colo., July 3, 1908, General Schomburg was graduated from Denver High School in 1926 and attended the Colorado School of Mines for one year before entering the United States Military Academy.

MAJ GEN HANSEN: When Maj Gen Ghormley retires from active duty in October, Floyd A. Hansen will succeed him as CG of the Supply and Maintenance Command, MDLC. Since June 1959, he has been assigned as Director of Supply Operations, Office, Deputy Chief of Staff for Logistics.

General Hansen started his career in the 10th Field Artillery after graduating from the United States Military Academy in 1932. He was put on special duty with the 11th Ordnance Company two years later to begin 28 years of service as an Ordnance officer. In September 1940, he was officially transferred to the Corps, a year after graduating from the Massachusetts Institute of Technology with an M.S. degree.

Special training at Picatinny Arsenal and Aberdeen Proving Ground, where he was graduated from the Ordnance School, prepared him for assignment to Picatinny as an Ordnance officer. He later became head of the plant engineering group, and assisted in designing and equipping the many large ammunition loading plants required in World War II.

During the war he took part in the Normandy Invasion and subsequent operations through France, Belgium and Germany, then moved with the First Army to the Philippines to serve under General MacArthur.

(Continued on page 29)

Maj Gen Floyd Hansen
To succeed Gen Ghormley

Maj Gen W. K. Ghormley
CG, Munitions Command

Brig Gen William Ryan
Test & Evaluation Agency

Lt Gen Trudeau Announces Retirement June 30, Closing 38 Years in Army

Lt Gen Arthur G. Trudeau will retire June 30, ending more than four years of hard-driving service as Army Chief of Research and Development and closing a distinguished military career spanning 38 years.

In speaking to Army research and development personnel at scientific gatherings and in visits to Army in-house laboratories and arsenals, the General has liked to refer to them as "exceptionally dedicated to their task" —a quality they likewise have recognized and respected in him.

General Trudeau will have his final opportunity as Chief of Research and Development to pay his respects to the military scientific community when he speaks at the biennial Army Science Conference, June 20-22. The conference will be held at the United States Military Academy, West Point, N.Y., where he graduated in 1924.

Tirelessly energetic in his efforts to build the Army research and development establishment to serve the Nation's defenses, at home and overseas, "to broaden the base of scientific research for potential payoff," the General has had the satisfaction of seeing the Army R&D program grow substantially under his leadership.

Each year the Army budget approved by Congress for research, development, testing and evaluation (RDT&E) has reflected the expansion of activities. Comparative figures are: 1958, $747.7 million; 1959, $963.3 million; 1960, $1.012 billion; 1961, $1.122 billion; 1962, $1.176 billion.

General Trudeau has been a strong advocate of increasing the quality as well as the quantity of basic and applied research to exploit the pool of scientific knowledge and technological capabilities of all Free World nations as "vital in the continuing fight against communism."

During his regime, the number of basic research tasks in the U.S. and abroad has gained steadily. The Army now has more than 3,000 research tasks in progress in the U.S., 13 European nations, the Far East, and is expanding interests in Panama and Latin America.

In World War II, after being assigned in 1942 as Chief of Staff of the Engineer Amphibian Command, he was sent to the Pacific at the request of General MacArthur to assist in planning amphibious operations.

Reassigned to the U.S. in 1943, he organized and commanded the 4th Engineer Amphibian Brigade. Except for special missions to Italy, North Africa and Great Britain in 1944, he served in Washington until 1945 as Director of Military Training, Army Service Forces.

In the Korean War he was in Japan as Assistant Commander and later as Commander of the 1st Cavalry Division before going to Korea as CG of the 7th Infantry Division.

After the armistice he returned to Washington as Assistant Chief of Staff for Intelligence for two years, then went back to Japan as Deputy Chief of Staff, Far East and United Nations Command. Promoted to Lieutenant General in 1956, he was sent to Korea as Commanding General, I Corps (Group) until April, 1958.

Other highlights of General Trudeau's career include a tour in West Germany from 1948 to 1950 as Commanding General of the 1st Constabulary Brigade, Deputy Commandant of the reactivated Army War College (1950-52), and Special Assistant Administrator for General Hugh Johnson, Works Progress Administration.

During his military career, General Trudeau was graduated from the Engineer School, Command and General Staff School, and the Army War College. He earned his M.S. degree in civil engineering from the University of California at Berkeley. The degree of Doctor of Laws, Honoris Causa has been conferred upon him by Seattle University, the University of Michigan and Middlebury College, and that of Doctor of Engineering by Manhattan College.

Among his decorations are the Distinguished Service Medal with Oak Leaf Cluster, the Silver Star with Oak Leaf Cluster, the Legion of Merit, the Bronze Star, the Air Medal, and the Army Commendation Ribbon. His foreign decorations include the award of Cordon of Ethiopia (Honor Star Order), Commander of the Order of Leopold II (Belgium), Grand Officer of the Order of Boyaca (Republic of Columbia), the Order of the Rising Sun, 3rd Class (Japan), the Distinguished Military Service Medal (Taeguk) with Silver Star (Korea), and Knight Commander of the Order of the Sword (Sweden).

General Trudeau will mark his 60th birthday less than a week after his retirement. He was born in Middlebury, Vermont, July 5, 1902.

Maj Gen Beach Groomed for CRD by Duty as Deputy

Nominated for 3-star rank and assigned as Army Chief of Research and Development, effective July 1, Maj Gen Dwight E. Beach has proved his capabilities while serving as Deputy CRD since May 1961.

Army career management officials might be tempted to cite General Beach as a sterling example of how Army training, educational opportunities and progressive assignments prepare talented men for top leadership positions.

With respect to his new responsibilities, General Beach gained valuable experience as Director of the Office, Special Weapons Development, U.S. Continental Army Command. Then came three years as Director of Guided Missiles, Office of the Deputy Chief of Staff for Military Operations at Army Headquarters in Washington, D. C.

The 54-year-old general started his Army career following graduation from the United States Military Academy in 1932. Prior to World War II he served with various horse-drawn field artillery units. Assigned to the Southwest Pacific following Pearl Harbor, he organized and commanded the 167th Field Artillery Battalion, using wild horses purchased in Australia.

The 167th FA Bn later converted to tractors and General Beach participated with it in the 41st Infantry Division's fighting in campaigns in New Guinea, the Philippines and Japan. He also took part in four amphibious assaults at Aitape, Maffin Bay, Wakde and Palawan, and in the follow-up phase of amphibious operations in Biak and Zamboango.

Since World War II, General Beach has commanded the artillery of the 11th Airborne Division, the artillery of the 45th Infantry Division in Korea, and served as Artillery Officer and Deputy Chief of Staff for Plans and Combat Operations, Eighth United States Army in Korea. In November 1954, he was assigned as Chief of Staff, Eighth Army in Korea.

Before joining General Trudeau's staff in 1958, General Beach served 22 months as commander of the 82nd Airborne Division, Fort Bragg, N.C.

Born in Chelsea, Mich., July 20, 1908, the General attended the University of Michigan for two years prior to enrolling in the United States Military Academy. He has served as an instructor at the USMA and various schools from which he has graduated, including the Command and General Staff College, Army War College, and the Field Artillery School. He also has completed courses at the Armed Forces Staff College, the Amphibious Training School, and the Infantry School (airborne course).

SC Establishes Strategic Communications Command

Two U.S. Army Signal Corps agencies have been consolidated to create a new U.S. Army Strategic Communications Command (USASCC).

Maj Gen R. T. Nelson, Chief Signal Officer, announced Apr. 23 that activities of the U.S. Army Communications Agency (USACA) and the U.S. Army Signal Engineering Agency (USASEA) are now being performed by the newly created command under his jurisdiction.

Commanding officer of USASCC is Col Walter A. Kneyse, Chief of the Communications Agency since April 1959. His deputy will be the former commanding officer of the Signal Engineering Agency, Col Bruce W. Caron, who also will be the new command's communications systems director.

Col Kneyse stated that both military and civilian personnel of the two previous agencies would be integrated into the Strategic Communications Command.

"No reduction-in-force actions will be taken," he said. "Consolidation of the U.S. Army Communications Agency and the U.S. Army Signal Engineering Agency, to form the U.S. Army Strategic Communications Command, is required in order to support more fully the Defense Communications Agency, Department of Defense. It is expected that increased efficiency, better utilization of personnel and greater economy of operations will result from this consolidation."

OTAC to Get New Headquarters

The Army Corps of Engineers recently awarded a $4,046,024 contract to Missiles Sites, Inc., Wheaton, Md., for construction of an Ordnance Tank Automotive Command headquarters building at Detroit Arsenal, Center Line, Mich.

Scheduled for completion in July 1963, the structure will provide 250,000 square feet of space in a 2-story building. It will include facilities to accommodate 600 people and electronic data processing equipment.

Picatinny Opens New Lab For Explosives Research

Dedication of a new explosives research building at Picatinny Arsenal, Dover, N.J., Apr. 27, provided Brig Gen Chester W. Clark an occasion to make his first principal address as the new Director of Army Research.

Named in honor of Dr. George C. Hale, the late chemist who distinguished himself by more than 25 years of service as one of the top technical leaders at Picatinny, the new building houses facilities that will facilitate explosives research.

Mrs. Hale was a guest of honor at the ceremony, during which she unveiled a memorial plaque eulogizing her late husband. Clarence J. Bain, a chemist who worked with Dr. Hale for many years and was his close personal friend, paid tribute to him in a dedicatory address.

The ceremony attracted military and civilian scientists from many parts of the United States who had worked with Dr. Hale during his quarter century of service.

Generals Assigned to Materiel Development & Logistic Command Elements

(Continued from page 27)

In October 1947, he was assigned to the Office, Chief of Ordnance, in Washington, D.C., where he later became head of the Inspection Division. His next assignment was in Venezuela with the United States Army Mission from May 1950 to June 1951, followed by duty as Chief, Inspection Division, and then as Procurement Officer, Ordnance Ammunition Center, Joliet, Ill.

After completing a year of study at the National War College, Washington, D.C., in 1954 he was named Assistant Chief of Ordnance for Program Coordination. In November 1955, he was designated Chief, Field Service Division, OCO, and served in that capacity until June 1, 1959.

General Hansen was born in Sumas, Wash., Oct. 22, 1908.

MAJ GEN McMORROW: Francis J. McMorrow prepared himself for his new assignment as CG of the U.S. Army Ordnance Missile Command, Redstone Arsenal, Ala., by serving as Deputy CG since July 17, 1961. Born in New York City, Aug. 27, 1910, he attended Manhattan College for one year before entering the United States Military Academy, graduating in 1933.

Before his assignment to Redstone, General McMorrow had served from July 1957 to May 1959, as Assistant Chief of Ordnance, Washington, D.C., and as Director of Procurement, Office, Deputy Chief of Staff for Logistics from 1959 to July 1961. In the first six months of 1957 he was CG of the Ordnance Training Command, Aberdeen Proving Ground, Md.

During World War II he served in the Pacific Theater as an Ordnance Staff Officer with the Army-Air Force Materiel Command, and as Chief, Ordnance Special Staff Section, Headquarters, 7th Air Force, and Headquarters, Far East Air Forces. After the armistice, he served with the Department of State Foreign Liquidation Commission in the Far East.

Late in 1946, General McMorrow was assigned as Chief of the Research and Development Department, Springfield Armory, and soon after he was put in charge of all manufacturing operations. From July 1951 to February 1954, he was Executive to the Chief, Industrial Division, and later Executive to the Chief of Ordnance, Washington, D.C. In 1955-56 he was assigned to G-4, Headquarters, U.S. Army in Europe.

BRIG GEN RYAN: Assigned as Director of Plans and Management, Office of the Chief of Research and Development, since May 1961, William F. Ryan will be CG of the U.S. Army Test and Evaluation Agency when it is reactivated in the MDLC.

Thirty-eight years of military service are back of the 54-year-old General, born Apr. 6, 1908, in Brooklyn, N.Y., and graduated from the United States Military Academy with the Class of 1933. His military career began with enlistment in the New York National Guard in 1924.

A veteran of combat service in both the European and Korean Wars, General Ryan was assigned to the Development Division, Office of the Chief of Research and Development, when he returned from the latter conflict in August 1954.

In 1956 he became Deputy CG and later CG of the U.S. Army Element, Armed Forces Special Weapons Project, Sandia Base, Albuquerque, N. Mex., and in 1957 assumed command of the Fourth Armored Division Artillery, Fort Hood, Tex.

The General was assigned to Korea after attendance at the Command and General Staff College, a tour with G-4, Department of the Army, and duty at the Air War College, Maxwell AFB, Ala., as a student and then as a faculty member. In Korea he was Executive Officer, IX Corps Artillery, and later Assistant Chief of Staff, G-3, Eighth Army.

Prior to World War II, General Ryan as a battery officer, as aide to the CG of an Infantry Brigade, and as a member of the staff and faculty at the United States Military Academy. In May 1943, he assumed command of the 402nd Field Artillery Battalion, 42nd Division, and fought with it through Wurzburg, Schweinfurt, Nurnberg and Munich, Germany.

U. S. Army Nuclear Power Program Serves Remote Area Needs

By Edward V. Duggan
Nuclear Power Division, OCE

Operation of three new nuclear power plants activated within a 16-day period this spring emphasizes growing U.S. military interest in the peaceful uses of atomic energy. The Navy and Air Force each acquired a first reactor plant while the Army added its third operational facility.

The new reactor plants are situated at widely separated geographic locations. The SM-1A will serve as the central heat and electrical power supply at Fort Greely, an Army post located 90 air-miles southeast of Fairbanks. On Warren Peak in northeastern Wyoming, the PM-1 provides the same utilities for Sundance Air Force Station. With the installation of the PM-3A at the U.S. Naval Air Facility, McMurdo Sound, Antarctica, nuclear-powered heat and light are serving the year-round occupancy by research teams of the icebound South Polar continent.

Significantly, none of the new power plants is experimental. In each case, the decision to employ reactor-generated electricity and heat was based upon proved logistic advantages and the increasingly competitive economic position of nuclear power.

Significant also is the interservice cooperation evident in the establishment of the plants by the Army Nuclear Power Program. This is a joint effort conducted since 1954 by the Army Corps of Engineers (acting as agent for the Department of Defense) and the U.S. Atomic Energy Commission.

Headed by Col William C. Gribble, Jr., Corps of Engineers, the Program includes military personnel of the Army, Navy and Air Force and civilian employees of both the AEC and the Department of Defense.

Research and development effort in the program covers non-weapons utilization of nuclear energy: nuclear power plants adaptable to heating and electricity requirements of all three military services, and nuclear propulsion systems for land vehicles.

The first plant established through the Army Nuclear Power Program, the SM-1 at Fort Belvoir, Va., has been in operation since April 1957. It was the first nuclear power plant in the world to supply power to an electrical system. The plant was designed to produce a net electrical output of 1,855 kilowatts per hour, the normal requirement of a city of 4,000.

As a prototype pressurized water reactor, however, the SM-1 has been of greater value used as a research and development facility by all three military services. Its design technology and operational experience have contributed to the development of all subsequent military nuclear power plants in operation.

The SM-1 is employed also in providing on-the-job training for student operators. Qualified military personnel of the Army, the Air Force and the Navy undergo an intensive one-year course given in classrooms adjacent to the plant.

Instruction in nuclear, electrical, and mechanical engineering is given with physics, chemistry, mathematics, health physics and plant information. Following completion of the course, the operators are assigned on an inter-service basis to the various nuclear power plants and research reactors now in operation by military units. Through 1961, more than 200 operators have graduated from the Fort Belvoir school.

Designed to permit operation for just over one year (15 megawatt years), the first SM-1 nuclear fuel core yielded 18 megawatt years of actual power production. Core I was in use from the initial SM-1 start-up in April, 1957, until April, 1961. This capability for long, sustained operation offers distinct logistic and operational benefits to military users, benefits which are magnified a hundredfold when nuclear power is utilized in remote areas.

Ability to operate for more than a year on a single loading of nuclear fuel permits an immensely reduced supply effort to sustain operation of a reactor plant. For such a facility as the SM-1A in Alaska, a nuclear fuel core could be transported in a single cargo aircraft.

Comparable fuel oil equivalent, 60,000 barrels, is the approximate capacity of a large tanker. If necessary, the nuclear fuel core could be

Noted WRAMC Cardiologist Promoted to PL–313

Dr. Donald E. Gregg, Chief of the Department of Cardiorespiratory Diseases, Walter Reed Army Medical Center, and a world renowned leader in his field, recently was promoted to PL-313 status. Quite incidentally, about the same time he was presented with the Department of the Army Certificate of Achievement.

Among other honors accorded him in recent years are the Exceptional Civilian Service Award (1959), Meritorious Civilian Service Award (1960), Department of Defense Distinguished Civilian Service Award (1961) and a nomination for the Presidential Award (1961).

A Phi Beta Kappa graduate of Colgate Universtiy, where he received his B.S. degree in chemistry (1924), Dr. Gregg holds M.S. and Ph. D. degrees in physiology and an M.D. degree (1929, 1930 and 1946, respectively) from the University of Rochester.

Prior to joining the WRAMC staff in 1950, Dr. Gregg taught in the Physiology Department of Western Reserve Medical School (1928-1946). From 1946 to 1950 he was Chief Research Physician in the Medical Research Laboratory, Fort Knox, Ky.

Dr. Gregg is the author or co-author of more than 90 published articles and reviews and four books. He has made more than 50 presentations before American and International societies and congresses. In demand as a scientific lecturer since joining WRAMC, he has made 25 talks in the United States and seven nations in Europe and Latin America.

He is a member of 12 scholastic and professional societies and is the Associate Editor of *Circulation Research* and Consulting Editor of the *Journal of Clinical Investigation, American Heart Journal* and *American Journal of Cardiology*.

Dr. Donald E. Gregg

airborne directly to Fort Greely, eliminating transportation inland from a seaport. Extensive storage space, both at dockside and at the operational site, becomes unnecessary. Manpower savings are readily apparent.

Water transport of fuel oil can be accomplished in the case of many arctic and antarctic locations only on a once-yearly basis because of ice-locked harbors. Air supply of fuel oil is both costly and cumbersome. The advantages of nuclear power at such locations extend beyond logistics to include operational benefits and economic savings.

The Army's second established nuclear power plant, the PM-2A, pioneered the technology of portable reactor plants. Such plants are designed primarily to overcome the disadvantages of constructing and supplying diesel plants in hostile climatic environments.

Fabricated in air-transportable units in the United States, the plant was assembled and tested prior to shipment to its present location at Camp Century, Greenland. On-site construction, as a result, was a matter of re-assembly. The PM-2A reactor was brought to initial criticality 78 days after the delivery of the first packaged unit.

Factors such as these determined the initial research and development of portable nuclear power plants. In addition to being air-transportable, the plants in this category can be moved on standard trailers, ships, barges and sleds. They offer an additional advantage as well through their capability for relocation. When the PM-2A, is no longer required in Greenland, it can be dismantled and re-erected for service at a new site.

The PM-3A, a second example of the suitability of portable nuclear power plants for operation in remote environments, is located on Ross Island in Antarctica. It was prepackaged in the United States in air-transportable units. In 1960, Congress determined that the utilization of nuclear power would reduce both the costs and hazards of maintaining U.S. stations at the bottom of the world. The PM-3A is the first of three such plants contemplated.

Construction time at the McMurdo Sound location was limited by weather conditions to the brief Antarctic "summer," late December through early March. Through prepackaging and testing before shipment, assembly of the PM-3A was completed well within time limits. The plant was unloaded at McMurdo Sound Naval Air Facility Dec. 17, 1961. Initial start-up was effected on Mar. 3.

Like its Greenland predecessor, the PM-3A produces 1,500 kw. of electrical power; but, unlike the subsurface PM-2A, the Antarctic power plant is housed on a plateau 300 feet above the base. Buildings were test-erected in the United States to insure completion of the plant during the 1961-62 "summer."

The second portable nuclear power plant to begin operation this year actually sustained its initial controlled chain reaction six days ahead of the McMurdo Sound plant. Designated the PM-1, the new plant was air-transported to its mountain top site in the fall of 1961. Erected by its present operating crew, the PM-1 boasts considerable improvement in packaging over the 27-unit PM-2A and the 18-unit PM-3A. The PM-1 will supply Sundance Air Force Station with 1,000 kw. of electricity and 7,000,000 Btu per hour of space heat.

Officials anticipate that experience gained through operation of the PM-1 will form a basis for future Air Force utilization of nuclear power plants. Nuclear energy is expected to provide the service with a capability not readily attainable through use of other power sources.

Unlike the PM-1 and the PM-3A, the new Fort Greely nuclear power plant is a permanent facility constructed entirely on-site. The SM-1A carries the SM-1 design into field use. It will provide the Alaska post with 1,640 kw. of electricity and 46,000,000 Btu per hour of steam space heat.

In addition to its practical service as a station heat and power supply, the SM-1A will be a valuable source of information relative to permanent nuclear power applications in frigid climates. Operating costs, crew size requirements, and training needs also will undergo extensive study.

The five nuclear power plants currently in use at U.S. military bases are representative of Army Nuclear Power Program adaptations to permanent and semi-permanent power needs. A third plant category further utilizes nuclear power to meet mobile requirements.

A trailer-mounted facility, the ML-1, is presently in a final stage of construction. The ML-1, a low-power plant, will provide electricity for Army field operations. Design of a 10,000 kw. barge plant, designated the MH-1A, is well advanced. It will supply greater power needs at locations along navigable waterways.

The U.S. military role in Atomic Age research and development often is considered only in terms of ballistic missiles, bombs and nuclear-powered submarines. Yet the same massive energy that levelled Hiroshima and hurled men upward into the challenges of outer space has been adapted through U.S. military interest to meet the utilitarian needs of everyday life. Heat, light and power will continue to be military requirements even in the Atomic Age.

Provocative Ponderables

"I would like to emphasize at this point that, in selecting a weapon system to accomplish a particular military task, we are dealing not with absolutes but with comparatives. We must always take into account not only the planned capabilities of the proposed weapon system but also its full cost in comparison to the cost and effectiveness of other weapon systems which can do the same job, perhaps in somewhat different ways. . . ."—Secretary of Defense Robert S. McNamare *(from a statement to the press Mar. 15, 1962).*

* * *

Science could lead to our damnation rather than our salvation if we neglected the kind of well-rounded education which nurtures the ability to think, to understand and evaluate history, to discriminate properly among the good, the mediocre, and the bad; to form valid opinions based upon substantial facts, high principles, clear reasoning, and sound judgment—in short, to develop the true wisdom required for leadership in this turbulent, changing world." *—Secretary of the Army Elvis J. Stahr, jr.*

* * *

"To me, the implications of solid-state advances are truly fascinating. Today, if an electronic computer—using conventional vacuum tubes—were to be built with the memory capacity of the average trained human brain, it would require a housing which would reach 40 stories high, and completely cover the campus of New York University. It would also require all the water from the Hudson River to cool the operating elements. On the other hand, solid-state devices promise to give us computers—of mere cabinet or room size—that will approach the wonderfully intricate capacities of the human brain."—Lt Gen Arthur G. Trudeau, Army Chief of Research and Development (from a speech made Mar. 6, 1962).

Watertown Metallic Process Coats Training Devices

Functional, lightweight, training devices used to orient field troops in the operation and maintenance of new materiel have recently been developed at Watertown Arsenal.

Supporting research activity has applied a new metal finishing process which provides additional physical properties to the device without increase in design complexity and associated cost, the Watertown Arsenal Research and Development Division announced.

Performance requirements for training devices stipulate that the mechanism must be lightweight, functional, durable and incorporate a method which will provide easy identification of component parts. The Watertown process meets these requirements and provides a hard anodic coating to the relatively soft (aluminum alloy) base metal capable of being dyed to any desired color. Brilliant hues of orange, red, blue, green, gold and black can be applied to readily distinguish components of the assembled mechanism.

Prototype training devices of the new M73 and M85 Tank Machineguns developed and fabricated at Watertown Arsenal have been furnished the Naval Training Devices Center. These mechanisms incorporate unique characteristics previously unobtainable.

The new hard anodic coating process with its dye absorbing capacity eliminates the need for costly inserts and wear strips normally associated with aluminum fabrication. The color can be applied for a permanent finish.

DA Publication 20-61 Reviews Communist China

To fill the increasing need for information about Communist China, the Department of the Army recently published a bibliographic survey entitled *Communist China: Ruthless Enemy Or Paper Tiger?* (DA Pam 20-61).

The publication aims to clarify and answer the conflicting questions concerning the Chinese Communists' military and political power, such as: Is China a serious military threat to the freedom of all Asia? Will poverty, famine and floods and an unmanageable population growth cause the downfall of Communism in China?

Aimed at a wide audience, the text includes both basic and advanced materials. With respect to objectivity, the editors have included materials obviously friendly to Chinese Communists. China's potential in atomic power and her relations with Russia are discussed.

The appendixes contain maps, charts and other useful data such as a Russian language bibliography on the Chinese Communist Army and a Korean War bibliography.

EXPERTS FROM 10 NATIONS were among 150 leading scientists participating in a Symposium on Reversible Photochemical Processes sponsored by U.S. Army Research Office-Durham (AROD) at Duke University. (Left to right) Dr. Ernst Fischer, Weizmann Institute of Science, Rehovoth, Israel; Dr. W. Berends, Technological University, Delft, Netherlands; Dr. George M. Wyman, AROD; Dr. Theodor Forster, Technische Hochschule, Stuttgart, Germany.

Picatinny Employee Picks Up $100 for Pick-up Suggestion

Christopher J. Cassidy of Picatinny Arsenal, Dover, N.J., was recently granted a $100 suggestion award for a faster method for picking up tiny ammunition components by using a small vacuum gun instead of a pair of tweezers.

The commendation from Col R. R. Klanderman, Picatinny's Commanding Officer, read in part: "This suggestion is considered to be a major change in method and procedure involving considerable ingenuity and originality on the part of the contributor."

An engineering student who alternates studies at Northeastern University, Boston, Mass., with work periods at Picatinny Arsenal, Mr. Cassidy is currently working in the solid rocket propellant section.

Christopher J. Cassidy

QM Research Director Attends Harvard Management Program

Dr. George R. Thomas, Associate Chief and Research Director, Clothing and Organic Materials Division, Quartermaster R&E Command, has been selected for the Advanced Management Program at Harvard University.

Adjudged by the Harvard Admissions Committee as a valuable member of the Command's executive team, with "real potential for growth and advancement," Dr. Thomas is attending the 13-week course which began Feb. 18.

Author of many publications and a member of several professional societies, Dr. Thomas received his B.S. degree in Chemistry at Bowdoin in 1941 and his Ph.D. degree from Northwestern University in 1948. Prior to joining the Command in 1954, he taught at Boston University.

Fight for Freedom Takes Many Forms

Fugitive From Hungarian Revolt Now QM Biochemist

Fighting for freedom can take many forms and two of the most satisfying methods are the pride of Julius Kerkay, a biochemist with the Army Research Institute of Environmental Medicine, Quartermaster Research and Engineering Command, Natick, Mass.

Not too many years ago, but still almost farther back than he cares to remember in association with that tragedy, Julius Kerkay was a Freedom Fighter in the Hungarian Revolution against Communist oppression. Forced to escape by way of the Austrian border, he came to the U.S. in 1957 and enlisted in the Army.

March 1962 will linger more pleasantly in his memories. In less than 30 days he became a naturalized citizen, received the Army's Good Conduct Medal, was separated from the Service, and became a civilian scientist at the same laboratory in which he had worked as an enlisted man.

Graduated from the Chemical Engineering University in Veszprem, Hungary, in 1956, shortly before he joined the students and workers demanding the ouster of Erno Gero, Hungarian Communist party chief, and the withdrawal of Soviet troops, Julius Kerkay has carried a sense of mission to his present job.

In his opinion as a new American citizen, free to speak his mind, he believes the fight for freedom can be won, in a very large way, in American laboratories to assure scientific and technological superiority over the potential enemy.

Julius Kerkay gets Good Conduct Medal.

'The Poles,' New LIFE Book, Credits Army's Role

"The editors of this book are particularly indebted to Carl R. Eklund, Chief, Polar Branch, U.S. Army Research Office. . . ." Thus begins the list of acknowledgements for assistance in preparing *The Poles*, latest addition to the growing list of distinguished Nature Library books compiled by the editors of LIFE magazine.

Sharing similar credit with Dr. Eklund in the acknowledgements list are Eilif Dahl, Agricultural College of Norway, and William S. Osborn, Associate Director, Institute of Arctic and Alpine Research, University of Colorado. Among others listed are Robert E. Frost and W. R. Floyd, U.S. Army Cold Regions Research and Engineering Laboratory, and Dr. Paul A. Siple, Scientific Adviser, U.S. Army Research Office.

The Poles carries an introduction by Dr. Albert P. Crary, Chief Scientist, Office of Antarctic Programs, National Science Foundation, and a leader in U.S. International Geophysical Year polar research.

Authored by Willy Ley, a noted science writer, *The Poles* goes back to Willem Barents (1560-1597) in tracing the history of "The Slow Conquest of the North." Barents and his party spent the winter of 1596 in the Arctic when their ship became icebound in seeking a Northeast Passage from the North Atlantic through the Arctic Ocean to the Pacific.

One of the most beautiful pictures in a notable collection of scenes from the Arctic and the Antarctic is a color photograph of the U.S. Army's 1,100-foot tunnel deep under the ice layer 18 miles from Thule, Greenland. The tunnel is being used to measure the ice flow within the icecap.

Pictured also are the U.S. Army's operations in deep core drilling (some 1,300 feet below the ice surface) to uncover secrets of ice formation. Mentioned is the U.S. Army's Nuclear Power Program, which is scheduled to give the Antarctic four plants for heat and light by 1965.

Chapters of particular interest to U.S. Army polar exploration scientists are chapter titled "The Coming Boom in the Arctic," "The Great Antarctic Laboratory," and "The Big Push South." The latter is a report on efforts of some 10,000 men of a dozen nations who worked to solve many of the mysteries of Antarctica during the IGY.

DISCONTINUOUS INTERFERENCE. A discussion, not too long ago, by a distinguished university scholar casting reservations on the desirability of freedom from lay interference for his fellow academicians is encouraging food for thought. The Sherardian Professor of Botany at Oxford University, Dr. C. D. Darlington, wrote:

"I conclude that though freedom from political interference and corruption seems to demand self-determination, when this has been gained we still want freedom from incompetence and stagnation. And in the long run this is not compatible with self-determination. We have to go back to interference; but it is a limited and discontinuous interference, and it is interference by organizations and authorities which it has been our responsibility to educate. There must always be the means of interaction between the scholar or scientist and the layman if the community is to keep sound. Each must interfere with the other. How is this to be done?

"It demands two things; education of the public in regard to learning and education of the learned world in regard to the public. Both these are duties of the universities. At the present time the universities nowhere in the world give their students any notion of the state of human knowledge as a whole and as it is today. There used to be a subject taught in the university, called philosophy, which attempted to do something like this. The attempt has for some time been abandoned on account of the vast amount of dead knowledge, technical lumber and sounding of jargon with which most branches of learning, arts as well as sciences, have cluttered up their academic curricula.

"Why not, once again, attempt to teach the art of science of knowing? Because, undoubtedly, to attempt it we must first persuade the arts and the sciences that each may safely dilute its own doctrinal wine with the water of unbelief. That will be a feat of persuasion only to be undertaken by an outside force, by yet another encroachment on our freedom of determination."

U.S. Army Limited-War Symposium Draws Experts From DOD, Federal Agencies, Top Institutions

Discussion on "The U.S. Army's Limited-War Mission and Social Science Research" at a symposium in Washington, D.C., Mar. 27-28-29, attracted 27 General and Flag-rank officers of the Army, Navy and Air Force, along with 300 scientists and high-ranking Government officials.

Sponsored by the Chief of Research and Development, Department of the Army, the symposium was hosted by the American University, home of the Special Operations Research Office (SORO). Under contract, SORO conducts many of the Army's strategic and special warfare studies.

A large portion of the gathering was comprised of leading officials of the U.S. Department of State, Department of Defense, leading educational institutes, and social science or special warfare research groups.

Secretary of the Army Elvis J. Stahr, jr., was the principal speaker at the symposium banquet, and Vice Chief of Staff General Clyde D. Eddleman made the keynote address. Dr. Roger Hilsman, Jr., Director of Intelligence and Research, Department of State, gave an invited address on "Recent Trends in Department of State Policy-Oriented Research."

Other leading speakers included:

- Chief of Research and Development Lt Gen Arthur G. Trudeau, welcoming address on "Limited-War: Challenge to the Military Establishment."
- Rear Adm John M. Lee, Director of Policy Planning Staff, Office Deputy Assistant Secretary of Defense (Planning and NSC), whose subject was "Roles and Missions for Limited War."
- Brig Gen Richard G. Stilwell, Commandant of Cadets, United States Military Academy, who gave an invited address on "An Overview of Army Progress: Current and Projected."
- Maj Gen William J. Ely, then Director of Army Research and now Deputy Commanding General designate, Materiel and Development Logistic Command, who made closing remarks.

Assistant Secretary of the Army (R&D) Dr. Finn J. Larsen, Director R. Young of the Russel Sage Foundation, Prof. Hurst R. Anderson of American University, Deputy Undersecretary of the Army (International Affairs) Howard E. Haugerud and Dr. Keith A. Brueckner, Institute for Defense Analysis, were among notables who attended.

Session chairmen included Dr. Lynn E. Baker, Chief Army Psychologist, Human Factors Research Division, U.S. Army Research Office, OCRD; Dr. Paul M. A. Linebarger, School of Advanced International Studies, The Johns Hopkins University; Dr. W. Phillips Davison, Council on Foreign Relations; Dr. Ithel de Sola Pool, Center for International Studies, Massachusetts Institute of Technology; Dr. Klaus Knorr, Center of International Studies, Princeton University; and Dr. Samuel H. King, Coordinator, Human Factors Research Programs, Human Factors Research Division, USARO.

Fourteen papers were presented, namely:

- "An Army View of Limited-War of the Future," Lt Col George W. Casey, Long Range Analysis Group, Office Deputy Chief of Staff for Military Operations, Department of the Army.
- "The New Dimensions of Special Warfare," Col William H. Kinard, Jr., Director, Special Warfare, same office at Lt Col Casey, above.
- "Waging Remote Area Warfare," Lt Col John T. Little, Special Warfare Center, Fort Bragg, N.C.
- "Civic Actions in Developing Nations," Col Robert H. Slover, Deputy Chief, Plans and Doctrine Division, Office of the Chief of Civil Affairs, Department of the Army.
- "Mainstreams of Research," Dr. Irwin Altman, Chief, Psychological Operations Research, Special Operations Research Office, American U.
- "Military-Political Structure and Process," Dr. Lucian W. Pye, Center for International Studies, Massachusetts Institute of Technology.
- "Images, Ideology and Identity," Dr. Frederick T. C. Yu, School of Journalism, Montana State University.
- "Gaining and Keeping Good Working Relationships," Dr. Harley O. Preston, Director, Washington Office, American Institute for Research.
- "Sources of Turbulence in New Nations," Dr. G. J. Pauker, Rand Corp.
- "Political Factors: Modernization and Related Problems," Prof. Fred Greene, Department of Political Science, Williams College.
- "National Resources in the Social Sciences," Dr. Henry W. Riecken, Assitant Director for Social Sciences, National Science Foundation.
- "Some Social Science Research Activities in the USIA," Dr. Leo P. Crespi, Chief, Survey Research Division, United States Information Agency.
- "Selected DOD Programs in Social Science Research," Dr. Carroll L. Shartle, Office of Science, Director of Defense Research and Engineering.
- "Army Social Science, Programs and Plans," Dr. E. Kenneth Karcher, Jr., Behavioral and Social Science Branch, Human Factors Division, USARO.

"Reflections and Perspectives: Field Experiences and Non-Materiel Research Requirements" was the subject of a round-table discussion involving Dr. Paul M. A. Linebarger, Lt Col John T. Little, Brig Gen (USA, Ret.) S. L. A. Marshall, and Brig Gen (USA, Ret.) Russel W. Volckmann.

Two working groups are preparing symposium recommendations to the Chief of Research and Development for Army action on program planning and Government-wide coordination of social science research.

ARMY LIMITED-WAR SYMPOSIUM participants included (left to right) Col Donald D. Blackburn, Deputy Director for Special Warfare, and Maj Gen George W. Power, Director of Developments, Office, Chief of Research and Development; Secretary of the Army Elvis J. Stahr, jr.; Brig Gen (USA, Ret.) Russel W. Volckmann and Chief of Research and Development Lt Gen Trudeau.

U.S. Army Nuclear Power Program Activates 3 New Plants

Encouraging progress in converting awesome power for destruction to peaceful purposes is attested in a recent report to the White House on the joint Atomic Energy Commission-U.S. Army Nuclear Power Program. The report informed President Kennedy that:

"Within a recent 16-day period (February 25 to March 13), the joint AEC/Army Nuclear Power Program started up three new atomic power plants at sites in Alaska, Antarctica and Wyoming.

"The air transportable *PM-1* plant was built to provide power and heat for the Air Force's mountain top radar warning station at Sundance, Wyoming.

"The *PM-3A* was built for the Navy to provide electricity for the Antarctic research base at McMurdo Sound. (The PM-3A plant was completed in record time in spite of being one of the most complex projects ever undertaken in Antarctica.)

"The *SM-1A* plant was built for the Army to supply electricity and heat at the remote Sub-Arctic installation at Fort Greely, Alaska.

"Plants built under the joint AEC/Army Nuclear Power Program now extend from the North to the South Polar regions. (The PM-2A near the North Pole began operations in 1961.)"

Since the U.S. Army's first nuclear power plant was put into operation at Fort Belvoir, Va., in 1957, joint research and development by the Atomic Energy Commission, the Armed Forces, and industry have produced major advances in design. The state-of-the-art now permits construction of plants to meet a wide variety of requirements.

Illustrative of this diversity of design is the range of difference among the plants in operation. The plant at Camp Century, Greenland, the U.S. Army's "City Under Snow" research establishment, 800 miles from the North Pole, is designed to furnish 1,560 kw. of power and heat. The SM-1A which became critical Mar. 13 at Fort Greely, Alaska, has a capacity of 4,000 kw.—2,000 for heating base installations and 2,000 for electric power. The new plant at Sundance, Wyo., produces 1,000 kw. of power and 7,000 Btu/hr for heating.

Another broad avenue of progress is the speed with which nuclear power plants may be transported to remote sites, by air in modules, and placed in operation. The U.S. Navy, several nuclear power officials concede, can be deservedly proud of its feat of offloading the PM-3A in Antarctica from ship on Dec. 17, hauling it up a steep incline to a 300-foot-high prominence above McMurdo Sound, and putting it in operation on Mar 3.

The Navy feat was a record in nuclear power plant construction—actually only one day less than required for the Camp Century plant. Both feats were accomplished under difficult terrain and environmental conditions. Actually, one week of the total Century installation time was used to haul the plant by tractor train 138 miles over the Greenland Icecap.

The capabilities of the Air Force nuclear power plant atop a mountain at Sundance, Wyo., are described in detail in a brochure prepared by Martin-Marietta, the nuclear division of the Martin Co. Military services concerned with the problem of logistics related to fuel for power plants in remote or difficult areas of access have the reason for their interest in nuclear electricity and heat explained in one paragraph of that brochure:

"The plant is designed for a service life of 20 years. Continuous full-power operation for two years is possible with a single fuel load weighing less than 1,500 pounds and smaller than a standard drum of diesel oil. *Two million gallons of fuel oil would have to be burned to release the electric enery obtainable from a single PM-1 core.*"

Importance of that aspect of nuclear power is emphasized by operation of the plant at Camp Century. There a single nuclear core will last for approximately two years, eliminating the need for hauling an estimated 1,680,000 gallons of fuel oil 138 miles by tractor train through treacherous terrain and weather. Similarly, the core in the Alaska plant is considered the equivalent of 3,300,000 gallons of fuel oil.

An official at the Fort Belvoir, Va., nuclear power plant put it this way:

"It is estimated that uranium equal in size to a golf ball has the energy capacity of 6,000 barrels (252,000 gal-

Serving as an agent of the Department of Defense, working in cooperation with the U.S. Atomic Energy Commission, the U.S. Army Engineer Reactor Group headed by Col William C. Gribble is responsible for a broad and growing program of nuclear power plant research, development and construction. In charge of the Nuclear Power Field Office, USAERG, is Lt Col Robert B. Burlin. The administrative headquarters is in the Office of the Chief of Engineers.

An Army Reactor Branch is located at the Atomic Energy Commission Headquarters at Germantown, Md., where Col Gribble wears another of his many "hats" as Assistant Director for Army Reactors, Division of Reactor Development, Atomic Energy Commission. His Deputy is Mr. Melvin Rosen, whose duties include a close working relationship with the Army's Idaho Nuclear Power Field Office at the AEC National Reactor Test Station.

Installation of a new ML-1 prototype plant at the Idaho Test Station is scheduled for completion by midsummer. The experimental reactor unit has been in operation for the past year and the power conversion unit will be shipped this month.

This trailer-mounted, gas (N_2) cooled, closed-cycle-turbine prototype plant has been under test since April 1961. Weighing 38 tons, it will be transportable in five modules on land by vehicle, by rail, sea or air. It is designed for full operation within 12

(Continued on back cover)

Limited-War Symposium Revives USAFIPNL Saga

Memories of World War II and the Korean War were recalled by many of the participants in "The U.S. Army's Limited-War Mission and Social Sciences Research Symposium." Few, however, could revive a more dramatic story than that experienced by Brig Gen (USA, Ret.) Russel W. Volckmann and Col D. D. Blackburn.

When General MacArthur was forced to abandon the epic defense of the Island of Bataan, Volckmann (then a major) and Blackburn (a captain) were among the few who escaped to the mountains of northern Luzon. There they organized USAFIPNL (U.S. Army Forces in Philippines, Northern Luzon).

Consisting of five regiments under the overall command of Maj Volckmann, with Capt Blackburn in charge of one regiment, the USAFIPNL continued guerrilla warfare activities against the Japanese until the armistice. They learned about guerrilla warfare by fighting foes who were masters at it.

When World War II ended, the USAFIPNL became a part of the Regular Army of the Philippines, constituting one division. And when the Korean War developed, one of the battalions in it was comprised largely of veterans of the USAFIPNL.

Upon its return to the Philippines this battalion was to write another heroic chapter by playing a key role in suppressing the Huks, the dissident Communist forces in the Philippines.

Army's Joint Effort Nuclear Power Program Takes Long Stride as 3 Plants Go 'Critical' in 16 Days

(Continued from page 35)

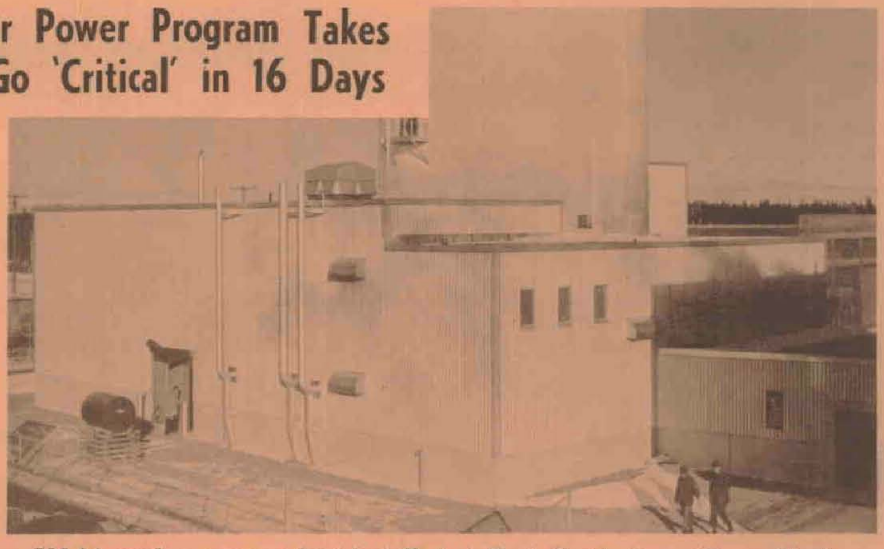
hours after arrival on site, and can be displaced 24 hours after shutdown.

Meanwhile, the Philadelphia district office says it is approximately two-thirds finished with the design of an MH-1A pressurized water reactor which will be mounted in the hull of a towed barge (actually a Liberty ship taken out of "mothball" storage).

A comprehensive and concise summary on the "Army Nuclear Power Program, a Joint Program of the Atomic Energy Commission and the Department of Defense," is prepared periodically. It presents a statement of objectives and reviews the status of all projects. The Army, it explains, "acts as sole responsible agency for the Military Services in the development of nuclear power system for applications other than those for naval vessel or air and space vehicle propulsion."

The summary states that the Army Nuclear Power Program is accomplished through four major subprograms:

- *Military Gas-Cooled Reactor Systems (Mobile):* the development of a mobile, low-power reactor and power conversion system to provide direct support to military field operations. Emphasis on the application of nuclear power to electrical power requirements at mobile military field installations.
- *Military Compact Reactor Systems (Mobile):* the development of extremely compact, lightweight, mobile nuclear power plants for use by the Department of Defense for a variety of military field applications. Emphasis on application of nuclear power to the needs of highly mobile installations. Nuclear propulsion equipment for logistic and combat vehicles will be investigated, including "energy depot" concepts.
- *Small Plants for Permanent or Semi-Permanent Military Installations:* development of a series of military nuclear power portability and reliability while minimizing capital and operating costs. Initial construction in remote regions where inherent logistic advantages of nuclear power can best be exploited.
- *Large Plants for Major Military Installations:* development of plants in the 1,000-40,000 KWe range, with emphasis on production of overall low-cost, reliable power and/or heat while capitalizing on low nuclear operating costs and minimized logistic efforts.



SM-1A nuclear power plant installed at Fort Greely in northern Alaska.

PM-3A installed in record time by Army-Navy team at antarctic station.

PM-1 plant installed to serve Air Force radar station at Sundance, Wyo.