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WRAIR Dedicates New Wing, Biomedical Research Reactor

Walter Reed Army Institute of Research, Washington, D.C., commemorated one of the epochal advances in its 69-year history as one of the world's great medical research centers on Sept. 12. The occasion was the dedication of a new wing to the headquarters building and a 50,000-watt nuclear reactor designed for important new biological research.

In line with the recently announced U.S. Army Medical Services 5-year research program, intended to establish a medical capability for U.S. forces to fight under all environmental conditions, the 5-story wing provides about 80,000 feet of floor space

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Army Initiating Program Based on Bell Report

Recommendations in the Bell Report, a penetrating study of Government R&D contracting procedures and in-house laboratory capabilities, prepared at the request of President Kennedy, are getting high priority treatment by Army R&D top management.

Announcement that the Army has initiated a program of action conforming to Bell Report recommendations came as August drew to a close. It followed by about 30 days a letter by Chief of Research and Development Lt Gen Dwight E. Beach to the Chiefs of all Army in-house laboratories.

General Beach urged greatly increased effort of Army in-house laboratory personnel on the "pursuit of excellence." (See August 1962 issue, page 36.)

Policies supporting that letter are prescribed in a forthcoming Army Regulation 705-55, subject: Management of U.S. Army Research, Development, Testing and Evaluation Laboratories or Activities. At press time, the regulation was in the final stages of staffing prior to publication.

Emphasized in the regulation is the importance of top quality management at the laboratory level to utilize properly, highly motivate, and retain the most competent scientists, engineers and technicians obtainable.

One of the most difficult bottlenecks to solution of this problem of retaining superior personnel thoroughly trained in Army R&D methodology gave a prospect of opening up late in August. Congress appeared almost certain to approve a modified version of President Kennedy's plan to raise salaries of Government scientific and engineering personnel to a level more commensu-

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Featured In This Issue . . .

Beach Emphasizes Urgency Of Limited War Lab Work

Maximum effort to place the U.S. Army's newly established Limited War Laboratory on a fully operational basis at the earliest practicable date was directed late in August by Lt Gen Dwight E. Beach.

In a discussion with Col S. C. Holmes, Commanding Officer of the LWL, the Chief of Research and Development emphasized that no time lag is to be condoned beyond what is absolutely necessary for recruitment of essential personnel. The staff is to consist of six officers and about

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WRAIR Building Wings Named for Deceased Research Leaders *(See page 3)*

Army R&D Newsmagazine

Vol. 3, No. 9 September 1962

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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: Army Medical Research

By Lt Gen Dwight E. Beach, Chief of Research and Development

On Sept. 12, 1962, it will be my pleasure to participate in the dedication ceremonies for the new wing of the Walter Reed Army Institute of Research (WRAIR). The work of the research staff of the U.S. Army Medical Service all too often does not receive the attention and publicity it richly deserves. This dedication ceremony serves as a convenient vehicle to remind all of us of the problems as well as the accomplishments of Army medical research.

The great bulk of Army R&D is devoted to the development of those items we have come to call "hardware"—new cannon, new fighting vehicles, new logistical carriers. But the best-equipped Army in the world can become simply an impotent list of names if the men who serve and use these items are physically and mentally incapable of being present for duty.

As this Nation's worldwide commitments have increased, the job of Army medical research has expanded manyfold. No small part of this expanded mission has been the task of finding vaccines for, or means to control, the myriad number of exotic diseases indigenous to those areas where the American soldier is now or in the future may be stationed, be it Southeast Asia, Africa, or South America.

Today, with our increased assistance role to the underdeveloped areas and newly emerging nations, the problem of protecting our men from these exotic diseases is receiving urgent attention. We expect that the added facilities in the new WRAIR wing will increase our capability here by 25 percent.

Similarly, by means of the Army's first biomedical nuclear reactor in the new wing of WRAIR, Army medical scientists and technicians will provide us with the answers to many of the unknowns in the problems of man versus nuclear weapon radiation.

The United States Army stands today as a worldwide bulwark of freedom, prepared to fight with the most modern weapons and equipment under any condition of warfare, from conventional to nuclear, from a Special Forces team to Vietnam to full field armies. But we should never forget that but for the work of the civilian and military research staffs who contribute to the Army Medical Service, this readiness could be reduced to impotency.

Idiophylaxis: A Biological Armor for the Soldier

Prepared by Walter Reed Army Institute of Research

Many of the protective devices designed for the modern soldier are based on the concepts of cover and concealment. Whether defensive armor be the knight's steel mail or today's missile-resistant vest, the fighting man is still susceptible to the onslaught of enemies he cannot see, hear, feel or touch. The attack comes from the stresses and anxieties of a strange environment, unusual climate, peculiar forms of energies, strange foods or disease.

Just as vaccines can assist in protecting against the harmful effects of viruses and other disease-producing germs, so can the body be stimulated to develop its own protection against other potential hazards. This form of self-protection is called "idiophylaxis" by the U.S. Army Medical Service.

The protective coloration of certain animals is a form of in-built natural protection. The blotchy skin of the frog and the changing hues of the chameleon as it blends in with its environment provide some immunity from detection by enemies.

The pupillary reflex in man is another form of protection. When one exits from a dark theater into bright light, the pupil of one's eye—in the center of the iris—contracts to form a smaller opening. As a consequence, the amount of light that strikes the sensitive cells in the retina is sharply reduced. Conversely, as one moves into the dark from a well-lighted place, the pupil dilates and more light is permitted to enter the eye, thus giving better vision under dark conditions.

Examples like these show that biological organisms have natural mechanisms for defending themselves. Idiophylaxis is that form of natural protection which can be bestowed by medical means.

The middle ear muscles can be activated in a similar manner to protect the sensitive cells of the inner ear from too much sound energy. As high-intensity sound enters the ear, the muscles which move the little bones of the inner ear contract in such a way as to damp the ear drum. As a consequence, sound waves coming in are attenuated and the amount of sound to the sensitive cells in the inner ear is reduced. The action is called the "acoustic reflex."

A device to activate the acoustic reflex just before a soldier's gun goes off is now under study at the U.S. Army Medical Research Laboratory at

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WRAIR Research Expansion Geared to Remote Area Warfare Requirements

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—most of it to be used for new laboratories. In addition, it has two subterranean levels for the reactor, and a penthouse.

Claimed to be the largest of its kind ever installed in an environment such as Walter Reed Army Institute of Research, the reactor is a "solution type." Its fuel comes from enriched uranium dissolved in seven gallons of water. Short-lived radioisotopes are produced for diagnosis, treatment and research purposes. The reactor will not be used to generate electricity.

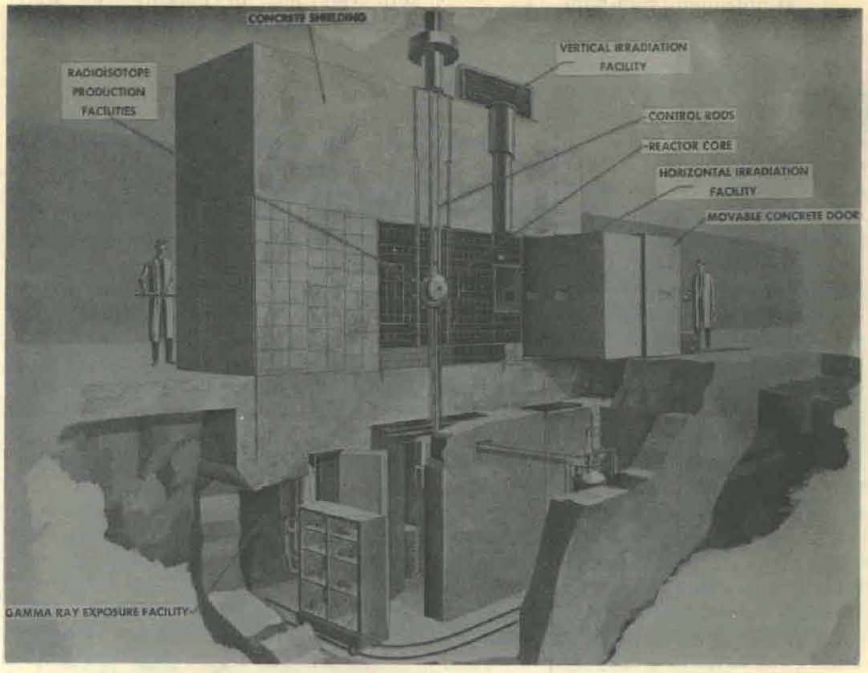
As the principal speaker at the dedication ceremony, Army Chief of Research and Development Lt Gen Dwight E. Beach paid tribute to five distinguished deceased leaders in Army medical research whose memory was honored. Effective Sept. 12, the new West Wing was named Siler Pavilion; the South Wing, Craig Pavilion; the Central Wing, Sternberg Pavilion; the North Wing, Vedder Pavilion; and the Forest Glen (Md.) Section, Kelser Section.

Army Surgeon General Lt Gen Leonard D. Heaton, MC, who was Commanding General of the Walter Reed Army Medical Center when the expansion program was initiated, was scheduled to speak but was called to England on an urgent mission. Remarks also were made by Brig Gen Henry S. Murphy, MC, Acting CG of the Center and CG of Walter Reed General Hospital, and Col Glenn L. Milburn, Jr., WRAIR Director and Commandant.

The invocation was given by Maj Gen Frank A. Tobey, U.S. Army, Chief of Chaplains, and the benediction by Col Maury Hundley, Jr., Chaplain, Walter Reed Army Medical Center.

With the activation of the nuclear reactor (the "critical" data had not been announced as this publication went to press), WRAIR will chalk up another on its list of "firsts" in medical research facilities. The Army Medical School, the forerunner of WRAIR, adapted the little-known X-ray to military medical uses in 1900, seven years after it was founded.

The first million-volt X-ray machine was acquired by WRAIR's sister-component, Walter Reed General Hospital, in 1946. Three years later the hospital established a radioisotope clinic, under WRAIR jurisdiction, for diagnosis and treatment of patients by use of such elements as iodine, phosphorous and gold. It was the first clinic of its kind in either military or civilian medical use.



Several facilities for exposing living organisms (as large as a rabbit) to nuclear reactions are shown in drawing of 50,000-watt nuclear reactor designed for Walter Reed Army Institute of Research, Washington, D.C.

Another significant advance came in 1958 when a Human Body Counting Facility was installed at WRAIR. However, it was only the second of its kind in the world. Combined with other low-level counting equipment, it gave WRAIR a valuable tool in the worldwide study of radioactive fallout and isotope metabolism, making possible the measurement of natural and attained radioactivity in the whole body.

The solution-type reactor produces neutrons and gamma rays to permit studies of their effects on living tissues, and the development of suitable methods of diagnosis and therapy. Two irradiation columns, one vertical and one horizontal, permit exposure of large objects to streams of neutrons. Several other exposure tubes are located near the core. A unique feature is an area below the reactor where experiments may be conducted with a high intensity source of gamma rays essentially free of neutrons.

Designed and built by Atomics International, which has installed similar type reactors in the U.S., Japan, Denmark, West Germany and Italy, the WRAIR reactor is completely self-contained. No harmful particles, fumes or smoke are exhausted into the air or public disposal systems.

SILER PAVILION. Named after Col Joseph Franklin Siler (1875-1960), who demonstrated the exact mechanism of transmission of dengue fever by the *Aedes aegypti* mosquito; provided, through research, a more efficient and reliable typhoid vaccine in 1939; produced new knowledge of hookworm disease in recruits; reported new knowledge of pellagra from studies extending to southern United States, Jamaica, Trinidad and Barbados; contributed many scientific articles to world's medical literature.

CRAIG PAVILION. Named after Col Charles Franklin Craig (1872-1950), who pioneered in research and produced new knowledge in military bacteriology, preventive and tropical medicine, including malaria, dengue fever, amebiasis, filariasis, yaws, tsutsugamushi fever; proved (with Ashburn) that dengue fever is caused by a filterable virus and transmitted by the *Aedes aegypti* mosquito; discovered and reported the first case of brucellosis in the United States; discovered and described *Plasmodium ovale;* discovered cause of relapse in malaria; demonstrated that injection of Treponema pertenue provoked yaws in monkeys; devised the complement-fixation test for amebiasis; contributed several hundred scientific articles and some 10 textbooks.

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Army Adopting Bell Report Recommendations on In-House Labs, Contracts

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rate with private industry salaries.

More complex and knotty problems are involved in implementing the Bell Report recommendations with respect to contract and grant procedures. Incentive-type as opposed to cost-plus-type contracts are gaining momentum, in line with the report as strongly supported by the Government. Army R&D leaders concede, however, that the ultimate objective is still far distant.

Contracting should continue with all types of research and development agencies, i.e., profit, nonprofit and other types of enterprises, the Bell Report stated. More penetrating attention was directed toward the need for improved management to maintain ethical standards.

Searching scrutiny of Congress, in line with the Bell Report findings and recommendations, has been directed in recent months to pros and cons of the grants system to promote basic research in nonprofit institutions. Prevailing sentiment appears to support substantial strengthening of the Government's in-house laboratory capabilities.

Similarly, the report stresses the need for improved in-house capabilities of planning, supervising, coordinating, controlling and evaluating all phases of the Government's research and development program. Constant attention is recommended to improve Government-industry R&D partnership relations in making the R&D dollar return the maximum in defense systems.

Pointing up this need for Government-industry R&D partnership in the management of the Nation's defense resources, the report cites, is the tremendous growth in the overall R&D effort. Government R&D expenditures have increased from $1.1 billion in 1950 to an anticipated $12.4 billion during the current fiscal year. Industrial R&D effort likewise has grown and will reach almost $7.5 billion this fiscal year, raising the overall total to approximately $20 billion.

Complementing the need for more effective program management is the requirement for more use of feasibility studies and of a definition phase prior to the intiation of full development of major projects — to minimize wasteful expenditures involved in cancellation of projects due to technical or other difficulties.

The Bell Report recognized that good technical specifications are basic to positive direction and control of the contractor's efforts, and essential to incentive contractual arrangements.

Management actions in recent months affecting the Army R&D community have included the improvement of management controls to facilitate the process of decision-making, and review of the PL-313 program. A special briefing on Bell Report follow-up actions was given at a recent staff meeting of the Office of the Chief of Research and Development.

The Bell Report was prepared by a committee headed by David E. Bell, Director of the Bureau of the Budget, and consisting of: Robert S. McNamara, Secretary of Defense; Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission; James E. Webb, Administrator, National Aeronautics and Space Administration; Dr. Alan T. Waterman, Director, National Science Foundation; Dr. Jerome B. Wiesner, Special Assistant to the President for Science and Technology; and John W. Macy, Jr., Chairman, U.S. Civil Service Commission.

Missile B Program Enters Final Definitive Phase

Missile B design proposals are to be submitted Oct. 22 to the U.S. Army Missile Command, Huntsville, Ala., in accordance with two contracts signed Aug. 20 for program definition studies.

Eight firms submitted preliminary definition proposals in mid-July. After analysis and evaluation by the Department of the Army, findings and recommendations were forwarded on July 31 to the Director of Defense Research and Engineering.

Successful bidders are Chrysler Corp., Detroit, Mich., for $494,156 and Chance-Vought Division, Ling-Tempco-Vought, Dallas, Tex., for $465,225. Both contracts are on a cost plus fixed fee basis with a cost ceiling of $500,000 for each.

Provided this phase of Missile B studies shows adequate promise, the Army plans to select one of the corporations as a prime contractor.

Program definition is a popular new DOD term applied to defining potential problem areas with cost to commit the system to development.

Missile B, the Department of the Army has stated, is planned as a simple, rugged and reliable weapons system for general fire support of a Division. Intended to complement conventional artillery in combat divisions by providing nuclear and non-nuclear supporting fire, Missile B is expected eventually to replace Honest John and Lacrosse weapon systems.

Once development contracts are awarded, they will be under the technical supervision of the Army Missile Command.

Missile B is one of several Army missile programs selected for specialized management by the U.S. Army Materiel Command, of which the Missile Command is a major element.

Lest Efforts Go Far Astray, Address Articles This Way

Numerous articles submitted for publication in the *Army Research and Development Newsmagazine* are being unduly delayed and at times lost because they are misaddressed.

Example: Army R&D News Magazine, Technical Liaison Officer, Dept. of Army, Washington 25.

Attention is invited to the basic requirement that all information submitted for publication in the Newsmagazine should be cleared through the installation Public Information or Technical Liaison Office, to insure compliance with propriety and security requirements.

It is emphasized that normally all contributions should be forwarded through established command channels. This is in the interest of proper major command coordination and clearance through ACSI when deemed necessary by competent authority.

When, in the interest of meeting Newsmagazine deadline requirements, material is addressed directly to the editor, a clear indication should be given as to the degree of clearance it has received so that any further action necessary can be taken.

Since a few installation PIOs have indicated they still do not know its correct mailing address, though the Newsmagazine is nearing the close of its second year of publication, contributions should be sent to:

U.S. Army Research Office,
Office, Chief of Research & Development
ATTN: Research Support Division, Editor
Army Research & Development Newsmagazine
Department of the Army
Washington 25, D. C.

USAERDL Man 'Outstanding'

An outstanding rating certificate was presented recently to Ernest A. Lenzner in recognition of his work as an administrative assistant to the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. He has been employed at the Laboratories since 1956.

Army Limited War Laboratory Spurs Recruitment for 'Creative' R&D Talent

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70 civilian scientists, engineers and supporting personnel.

Backed by General Beach's strong assurance of support in every way possible to resolve the problems of increasing the current capability of the Laboratory as soon as possible, Col Holmes and Technical Director Edward Kaprelian are going all-out to fill staff vacancies.

In keeping with the objective of making the Laboratory a "quick response" organization to answer urgent demands from field troops, the staff will be "weighted heavily" with engineering talent known for creative ability.

Small, unsophisticated items will be the urgent projects on the LWL work benches—projects which can be completed in months rather than years. The LWL already has initiated a number of tasks to meet urgent requirements. The large, complex weapons system projects will be the responsibility of the U.S. Army Materiel Command.

The LWL operational concept calls for teams of scientists, engineers and skilled craftsmen closely integrating their efforts to produce desired weapon or equipment items in the minimum time. The team concept is intended to make possible speedy changes or adjustments when an approach is found to be impracticable. Military personnel will provide the combat-user experience factor to insure a field-usable item.

Where necessary or advisable, the Laboratory will enlist the assistance of the larger specialized staffs and labs of the U.S. Army Materiel Command and the widespread capabilities of industry.

Lt Gen Dwight E. Beach, Chief of Army Research and Development (seated), Col D. D. Blackburn, Chief, Special Warfare Office, OCRD, and Col Sterling Holmes, CO, U.S. Army Limited War Laboratory, examine its manning chart.

"We have a real need for this laboratory," General Beach said, "and I am most anxious for it to become firmly established at Aberdeen Proving Ground and to start work on the many projects we have lined up."

Among currently urgent items are lightweight reliable radios with ranges compatible with Special Forces operations. Other areas in which LWL personnel will be active are devices to detect guerrilla ambushes, improved aerial delivery of Special Forces personnel and equipment, psychological warfare equipment particularly suitable for counterinsurgency teams operating in remote areas, and special weapons and demolition devices.

General Beach told Col Holmes the LWL is a "vital element for meeting the Army's growing RDT&E requirements relating to limited war, low-intensity actions, and counterinsurgency operations."

AMEDS Commit to Posterity Names of 5 Medical Research 'Immortals'

(Continued from page 3)

STERNBERG PAVILION. Named after Surgeon General George Miller Sternberg (1838-1915), who founded the U.S. Army Medical School (WRAIR) in 1893; produced, through research, new knowledge in bacteriology and preventive medicine of infectious diseases, including yellow fever, anthrax, smallpox, malaria, tuberculosis, gonorrhea, cholera, pneumonia and typhoid fever; recognized in the U.S. as "the father of bacteriology" and author of the first bacteriology textbook; demonstrated the tuberculosis bacillus for the first time in the U.S. after it had been discovered by Robert Koch in Germany; discovered the causative agent of pneumococcal pneumonia; suggested, two years before Metchnikoff, that white blood cells attacked and destroyed disease germs; invented automatic heat-regulating devices; advanced knowledge of disinfectants through prolonged and extensive research; formed and instructed the Walter Reed Yellow Fever Commission in Cuba; contributed more than 135 scientific articles to medical literature.

VEDDER PAVILION. Named after Col Edward Bright Vedder (1878-1952), who served more than 10 years at WRAIR as Director of the Laboratories, Commandant and Assistant Professor of Chemistry; prepared oral typhoid vaccine in 1904 and with 11 others received the vaccine for research studies; discovered that eating husks of rice grains prevented beriberi and introduced the use of half-polished rice to prevent the disease; demonstrated that emetine was the active principle in ipecac as specific effective treatment for amebiasis; studied clinical scurvy, which led to discovery of ascorbic acid; made significant contributions in study of sprue, leprosy and syphilis; experimented with Dr. Simon Flexner on dysentery bacillus; aided in development of poison gas agents in chemical warfare; demonstrated usefulness of chlorine gas in treatment of certain respiratory infections; contributed many scientific articles, five textbooks.

KELSER SECTION. Named after Brig Gen Raymond Alexander Kelser (1892-1952), who developed a new efficient vaccine for rinderpest immunization and served as Chief of the Veterinary Corps from 1939-1946; devised and produced the chloroform-treated vaccine for single-injection rabies immunization of dogs; produced new knowledge in infectious diseases of animals transmissible to man, including anthrax, rabies, and equine encephalomyelitis; authored a Manual of Veterinary Bacteriology and many articles.

Success of Army Micromodule Program Backs Expansion Plan

Plans for substantial expansion of the U.S. Army Micromodule Program were announced at a joint Army-Radio Corporation of America press conference, Aug. 28, in New York City.

In his detailed progress report, Chief Signal Officer Maj Gen Earle F. Cook noted that the Army anticipates committing $8 million for equipment and systems in fiscal year 1963, about twice the 1962 funding. Up to 1962, $18 million had been invested in the program.

Under existing plans, production should reach 250,000 micromodules per year in March 1963, a million a year in June 1964 and 3 to 5 million in 1965.

The micromodule concept grew out of the military demand for more complex and capable electronic equipment that was not concurrently heavier and larger. Since World War II the advances in electronics had resulted in a proliferation of divergent component shapes, sizes and functions.

In General Cook's words, "An imperative need developed for both a revolution and a consolidation that would shape the present capabilities of the electronic art into more coherent form, and at the same time give us the flexibility to absorb new advance techniques as they occur."

This called for weight reduction in components, sub-assemblies and equipment; increased ruggedness to withstand the harsh conditions of operating environments; compatibility with existing circuitry and microelectronic techniques in development; and a design which could take advantage of the automated production methods.

The micromodule consists of a stack of thin, uniformly shaped, wafer-like components connected by wires and encapsulated. It is possible now to achieve a density of 600,000 parts per cubic foot with micromodules, in contrast to 100,000 parts per cubic foot in advanced conventional circuitry.

RCA officials say testing has proved the micromodule circuit six times as reliable as conventional military electronic circuits and 60 times as reliable as equipment employing tubes. Already designed are 500 kinds of transistor-type circuits, 120 for communications and control functions. More than 85 digital circuits for computer-type application have been demonstrated successfully. The micromodule program was started in 1958 with award of an Army contract to RCA.

General Cook showed a new field radio based on the concept. Its receiver can be clipped to the rim of any standard combat helmet and a pocket-size transmitter is held in the speaker's hand. Slated for delivery to the Army in November is the MICROPAC computer, a general data processor with switching speeds in the nanosecond range.

Other micromodularized equipment contracted for includes 350 backborne walkie-talkie radio sets, 400 intermediate frequency amplifiers and a mobile computer to be delivered in 14 months.

Items selected for research and development include an airborne, high-frequency, single-sideband radio, a "flash ranging set" to detect gun flashes, an electronic teletypewriter, a hand-held surveillance radar, tactical digital communications systems and a production version of MICROPAC.

CDC Announces Assignments

The U.S. Army Combat Developments Command, Fort Belvoir, Va., has announced the following assignments:

Col M. A. Edwards to be Chief of Control Branch, War Games and Evaluation Division, Operations Research and Experimentation Directorate.

Col J. C. Honea, Jr., to be Chief of the Combat Developments Programs Branch, Programs Division.

President Names Wheeler to Succeed Decker as Chief of Staff October 1

President John F. Kennedy has named General Earle G. Wheeler to succeed General George H. Decker as Chief of Staff, U.S. Army, upon the latter's retirement Oct. 1.

A graduate of the U.S. Military Academy in 1932, General Wheeler was promoted to 4-star rank and assigned as Deputy Commander-in-Chief, U.S. European Command, France this past March, following a 2-year assignment as Director, Joint Staff, Washington, D.C.

Upon graduating from the National War College in 1950, he served successively as a member, Joint Intelligence Group, Office of the Joint Chiefs of Staff; CO, 351st Infantry, Trieste; Deputy Commanding General, TRUST, Trieste; Assistant Chief of Staff for Plans and Operations, Allied Forces, Southern Europe, Naples, Italy.

Other major assignments include: Director of Plans, Office of the Deputy Chief of Staff for Military Operations, Washington, D.C.; Assistant Deputy Chief of Staff for Military Operations and CG, 2nd Armored Division, Fort Hood, Tex.

General Decker's retirement will close a career of more than 38 years, climaxed in 1960 with the appointment to the top military post in the Army. Having received a B.S. degree in economics from Lafayette College in Pennsylvania, General Decker is one of few men to achieve Chief of Staff distinction without training at U.S. Military Academy.

Since World War II, when he was Chief of Staff of the Sixth Army in the Southwest Pacific, he has held numerous key Army positions, including three years as Comptroller of the Army, two years as Commander-in-Chief of the United Nations Command, and Commander, United States Forces in Korea.

General Earle G. Wheeler

General George H. Decker

Picatinny Arsenal Finishes $600,000 Plastics-Adhesives Lab

Completion of a new $600,000 Plastics and Adhesives Research Laboratory at Picatinny Arsenal, Dover, N.J., in mid-August gave the U.S. Army the largest facility of this type within the Department of Defense.

Substantially increasing the Army's materials research capability, the 53-man laboratory is staffed and equipped for all phases of plastics and adhesives research, from basic and supporting research to application in military hardware. It consists of four sections, namely:

- *Basic Research Section*, responsible for increasing knowledge about the chemical structure of plastics and adhesives, and physical application.
- *Materials Research Section*, engaged mainly in evaluating commercially developed plastics and adhesives under widely varying environments with an eye toward eventual use by the Army.
- *Plastics Application Section*, utilizes new knowledge in design of plastic components for Army Ordnance items. Research activities of this section provide greatly needed plastics design information.
- *Standardization Section*, prepares the technical portions of specifications describing the properties and qualities required for certain items.

The laboratory has test equipment which can stretch, squeeze, twist, batter and vibrate the plastics under examination. Hot and cold chambers achieve temperatures ranging from —65° to 2400° F. Other devices spray, wrap or form plastics as desired.

The overall defense effort in plastics and adhesives is expected to benefit from the close relationship the laboratory will maintain with the Department of Defense Plastics Technical Evaluation Center (PLASTEC), also located at Picatinny.

PLASTEC serves as a centralized source of information for plastics research activities of the Army, Navy, Air Force and Marine Corps, including contractors.

Army Lists Shillelagh Missile Development Firms

Industrial firms which have contributed to the development of the new Shillelagh surface-to-surface guided missile were announced late in August by the Department of the Army and the Ford Motor Co.

Ford's Aeronutronic Division, Newport Beach, Calif., prime contractor for Shillelagh, has enlisted the aid of large and small subcontractors and suppliers in widely spread parts of the United States to help develop the lethal new weapon.

Firms in Bloomington, Ill., MacGregor, Tex., Kokomo, Ind., Whitehall, Mich., Bedford, Mass., Sunnyvale, Calif., and Fairbanks, Alaska, are among the 95 organizations that have contributed to the Shillelagh development. More than $7.5 million for subcontracts has been awarded.

Major Shillelagh subcontracts were awarded to nine U.S. companies: Amoco Chemicals Corp., Seymour, Ind., propellants; Borg-Warner Corp., Santa Ana, Calif., miniature tape recorders; Clary Dynamics, San Gabriel, Calif., gyroscopes; Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y., wind tunnel testing; Eureka-Williams Corp., Division of National Union Electric Corp., Bloomington, Ill., batteries; Hamilton-Standard Division, United Aircraft Corp., Broadbrook, Conn., power supplies; Norris-Thermador Corp., Los Angeles, Calif., rocket motor cases; Raytheon Co., Santa Barbara, Calif., electronic components; Whittaker Gyro, Division of Telecomputing Corp., Van Nuys, Calif., gyroscopes.

The Army Missile Command at Redstone Arsenal, Ala., supervises development of the missile and the Army Mobility Command at Detroit, Mich., is responsible for system development. The Los Angeles Ordnance District, Pasadena, Calif., supervises the contract.

Bengston Succeeds Taylor As ARO-D Commander

Col Nils M. Bengtson has been named Deputy Commanding Officer of the U.S. Army Research Office-Durham, N.C., and designated to succeed Col George W. Taylor as CO upon his retirement Oct. 1.

The U.S. Army Research Office-Durham is the headquarters for the planning and conduct of the basic scientific research program in mathematics and the physical sciences sponsored by the Department of the Army at universities, colleges, research institutes, and industrial laboratories throughout the U.S.

Col Bengtson is a native of Springfield, Mass., and a 1940 graduate of the United States Military Academy. In 1948 he received the M.S. degree at the Massachusetts Institute of Technology, and in 1962 completed requirements for the master of business administration degree at George Washington University. He is a graduate of the U.S. Army Command and General Staff College (1945) and the Industrial College of the Armed Forces (1962).

In 1957 he was selected as a member of the Research and Development Specialization Program of the Army, which involves specially qualified officers concentrating on the research and development aspects of Army activity.

After graduating from the Infantry School in 1941, he was assigned to Hawaii and was at Pearl Harbor when the Japanese attacked on Dec. 7, 1941. During the final year of the war he served in Europe with the 89th Infantry, the "Rolling W Division," which trained at Camp Butner and departed from Durham.

Col Bengtson since World War II has had a succession of assignments related to the Army research and development program, with emphasis on the guided missile programs. He served as the United States Representative for Ordnance in the United Kingdom from 1952 to 1955, as liaison officer between the Army and the Navy on the Polaris Missile Project, and later in various top positions at the Army Ballistic Missile Agency and the Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala. He came to the U.S. Army Research Office-Durham following 10 months at the Industrial College of the Armed Forces, Washington, D.C.

Col Nils M. Bengtson

Army Contracts Exceed $100 Million

Contract awards totaling more than $100 million for research, development and procurement of military materiel were announced recently by the Department of the Army.

Two contracts aggregating $57,839,181 were let to the Cadillac Motor Corp., Cleveland, Ohio, for 1,215 armored reconnaissance carriers, self-propelled howitzers and supporting items.

Minneapolis Honeywell Regulator Co., Hopkins, Minn., received two letter contracts totaling $25 million for production of ammunition. A $2,005,293 contract awarded to Aerojet General Corp., Downey Calif., also is for ammunition.

A $2,672,227 contract went to American Motors Corp., Detroit, Mich., for 440 ¼-ton utility trucks and repair parts. A $2,337,550 contract awarded to Johnson Furnace Co., Bellevue, Ohio, calls for production of 2,277 1½-ton, 2-wheel ammunition trailers and spare parts.

For research on new detection methods and development of instruments that can detect and signal the presence of lethal and incapacitating agents, Melpar, Inc., Falls Church, Va., received a $2,661,000 contract.

General Dynamics Corp., Rochester, N.Y., received a $2,072,981 contract for 4,500 radio sets. Production of field radio sets is called for in $1,953,219 contract let to Adler Electronics, New Rochelle, N.Y. Loral Electronics Corp., New York, N.Y., received a $1,733,147 contract for coder and decoder equipment.

A $1,300,000 letter contract was awarded to Emerson Electronic Manufacturing Co., St. Louis, Mo., for 7.62 mm. quadruple machinegun turrets, sighting system and modification kits to be used on helicopters.

Highway Trailer Industries, Inc., Edgerton, Wis., received a $1,172,662 contract for 125 truck-mounted earth augers and pole setters.

Radio Station Ordered In Air-Transport Model

A powerful air-transportable miniature radio broadcasting system is being developed under an Army contract which calls for delivery within 10 months.

One of the transmitters will be a 50,000-watt standard broadcast unit, equal in power to the largest commercial radio stations in the U.S. and with a possible area coverage of 12,000 square miles. The other is a 50,000-watt short-wave transmitter with a possible range of 6,000 miles.

The system will include telescoping antenna towers, fully equipped studios with tape recorders, turntables and teletypes for news wires, diesel-powered electrical generators and a sensitive receiving station that can monitor hostile broadcasts or pick up the Voice of America, Armed Forces Radio Service or other U.S. broadcasts for re-transmission.

Flown by Army helicopters, the complete broadcasting system can be assembled and activated within a few hours. Each helicopter will carry one "Heli-hut," the name given to functional pieces of equipment which are designed to be self-contained for airlift purposes.

A typical hut may be about 12 feet long, 6 feet wide and 6 feet high. It can weigh up to 4,000 pounds and still be flown by an H-37 helicopter on a 100 nautical mile radius mission without refueling.

Gates Radio Co., Quincy, Ill., is building the system for $1,196,000 under contract with the U. S. Army Electronics Command.

7 Army Papers Set for 1963 SAE Meet

Seven of nine technical papers proposed by Army R&D scientists have been accepted for presentation at the 1963 Society of Automotive Engineers Congress and Exposition.

Scheduled Jan. 14-18 at Detroit, Mich., the congress will center on the theme of "Advances in Armed Forces Technology." Sessions will provide the Department of Defense agencies with an opportunity to exchange ideas and information on needs and problems of producing self-propelled equipment for land, sea and air.

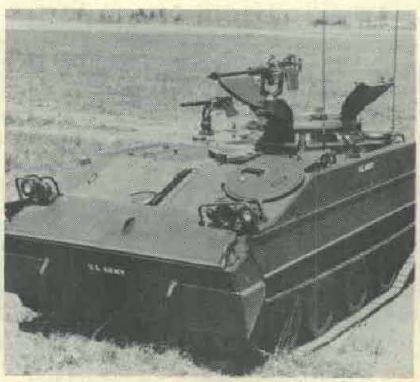
Papers will be presented by scientists and engineers of the Department of Defense, industry and research and development organizations. An exposition of military equipment is planned.

Army R&D authors and the titles of their papers are: Dr. Leonard S. Wilson, Chief, Environmental Sciences Division, U.S. Army Research Office, "Environmental Factors in Army Mobile Equipment Design and Use"; D. Quillian and U. T. Meckel, under Army contract with Southwest Research Institute, San Antonio, Tex., "Determination of Combustion Characteristics of JP-4 Type Fuels"; D. Quillian et. al., "Low Temperature Pumpability of Combustion Ignition Engine Fuels"; James Murray, U.S. Army Research Office, Durham, N.C., "International Cooperation in Mobility Research";

J. P. Jones, R&D Directorate, Ordnance Tank Automotive Command, Detroit, Mich., "Developing a Materials Research Plan Based on Analysis of Army Long Range Tank-Automotive and Applied Equipment Forecasts"; Bernard Goldberg, Ordnance Materials Research Office, Watertown Arsenal, Watertown, Mass., "Composite Materials, Their Potential to Army Mobility and Fire Power"; and P. G. Carbonaro, Watertown Arsenal, Watertown, Mass., "Steel Castings, Their Future in Tank-Automotive and Related Equipment."

T-114 Personnel Carriers Go Into Production

Production models of the T-114 personnel carrier are rolling off the assembly line at the U.S. Army Cleveland, Ohio, Ordnance Plant, culminating three years of intensive research and development in Army tracked vehicles.



T-114 Armored Personnel Carrier

A lightweight, air-droppable, amphibious, aluminum-armored vehicle, the T-114 will be used for command and reconnaissance missions. Designed to incorporate the latest communications equipment, it is capable of operation over any type of terrain and under all seasonal conditions. The full-tracked vehicle carries a crew of three, with room for a fourth man. It is armed with a .50 caliber machinegun mounted on the cuppola pintle and a 7.62 mm. machinegun located in the observer's hatch.

Under the recent reorganization of the Army, the Weapons Command, Detroit, Mich., supervises the Cleveland Ordnance Plant. Both are major subordinate elements of the U.S. Army Materiel Command.

USACDC Leaders Hold Their First Major Planning Conference

Top tactical experts of the U.S. Army Combat Developments Command, including commanders of all major subordinate elements, held their first important planning conference Aug. 22-23 at USACDC Headquarters, Fort Belvoir, Va.

Paramount questions considered:

- How should the Army be organized?
- How should the Army be equipped?
- How should the Army fight?

Timely answers to these problem areas, constantly adjusted to meet changing requirements posed by the enemy threat, are now the Army-wide responsibility of the USACDC, as inherited from the U.S. Continental Army Command, Technical Services and other Army agencies in the Army-wide reorganization.

Placed on an operational basis July 1, the new command is charged with developing organizational and operational doctrine, materiel objectives and qualitative requirements, war games and field experiments, and cost studies.

The conference at Fort Belvoir enabled commanders of the six subordinate headquarters of the USACDC and its 19 field agencies to present matters of particular interest to their commands. Twenty-four USACDC liaison officers stationed with Government agencies and other branches of the service throughout the United States participated.

Lt Gen John P. Daley, Commanding General of the newly established U.S. Army Combat Developments Command, welcomes three subordinate commanders to the first USACDC Commanders' conference held recently at Fort Belvoir, Va. Left to right, Col H. D. Thomte, CO, U.S. Army Combat Service Support Group, Fort Lee, Va.; Brig Gen J. D. Sutherland, CG, Combat Developments Experimentation Center, Fort Ord, Calif.; General Daley; and Col A. L. Sanford, CG, Office Special Weapons Development, Fort Bliss, Tex.

Staff elements of the USACDC include: Plans Division, Combat Arms Division, Combat Support Division, Organization and Doctrine Division, and Research and Analysis Division.

General Daley, in his closing remarks, paid tribute to the high quality of personnel assigned to the USACDC and stressed the urgency of giving the Army the best possible combat developments program "with a minimum of resources."

17 Students Complete Missile Command Junior Fellowship Awards Program

An experiment in education that gained nationwide attention ended Aug. 30 at the U.S. Army Missile Command, Huntsville, Ala., as an "unqualified success."

Seventeen Tennessee Valley students, 11 boys and 6 girls, holders of the first AFCEA Junior Fellowship Awards, were honored at "graduation exercises" at Redstone Arsenal. The awards were sponsored by the Redstone-Tennessee Valley Chapter, Armed Forces Communications and Electronics Association.

As the brainchild of Lt Col Earl J. Dotson, president of the chapter and Chief of the Signal Office, U.S. Army Missile Command, the awards were devised to give high school graduates an opportunity to apply their academic interest in physical sciences to on-the-job training under guidance of career professionals in their area of stated interest.

Interest in the program has been shown from organizations wanting to adopt it in California, New York, Michigan, Florida and other areas.

The award winners represented four city and six county school systems within a 60-mile radius of Redstone Arsenal, and were among 39 nominees selected by school officials on the basis of one nominee for every 100 students.

Intention of the program is to encourage high school seniors with an interest in any of the physical sciences to consider careers in the technical and scientific fields. A long-range goal is improvement of public school science education.

The students were employed on a level approximately equal to a GS-2, with opportunity to earn $878 during the 13-week period in addition to getting valuable experience. Each student was assigned to a regular employee for professional guidance.

A picture of the overall operation at Redstone Arsenal, including industry members of the missile and space team, was given Aug. 27 when each student guided the others through the areas in which he or she had worked.

Feeling of the students toward their experiences is summed up by Charlotte Ann Lee of Normal, Ala., who wrote Col Dotson:

". . . The work in the Propulsion Laboratory (Army Missile Command) is most interesting and very educational. . . . Even though I am gaining . . . worthwhile knowledge through my work here, I also feel that I am being of some service to the Laboratory. . . . All of the people with whom I work appear to be genuinely interested in helping me gain a broader knowledge of science."

Local industries, merchants and professional people have been so impressed with this year's program that many are offering aid. Tentative plans call for 50 awards next summer. Work on the 1963 Youth Fellowship Award program will commence as soon as the school systems settle down from start-of-classes activities.

Participating sponsors of this year's Fellowship Award have been the Army Missile Command, Marshall Space Flight Center, Thiokol Chemical Corp., RCA Service Co., Brown Engineering Co. and SPACO, Inc.

Operation SWAMP FOX II Seeks Improved Tropical Mobility

Operation SWAMP FOX II, aimed at improving military transportation and communications capabilities in the tropics, began early this month in the Chepo region of the Republic of Panama. Effective Aug. 15, the operation was made a responsibility of the U.S. Army Materiel Command.

Linked to the U.S. Army's continuing environmental mobility research program, as directed by the Office of the Chief of Research and Development, the exercise is the third in a series of Army tropical research expeditions. TROPICAL WET was conducted in November-December 1960 and SWAMP FOX I in 1961 from September through November.

Results of the previous studies to determine capabilities of Army vehicles to traverse deep swamps and dense jungles will be enhanced by SWAMP FOX II testing of appproximately 30 different type wheel and track vehicles under measured terrain conditions.

Unlike the previous studies, which involved traverse from a point of departure through tortuous terrain for vehicles to a designated destination 115 miles away, SWAMP FOX II is being conducted from a base camp. Studies are being made within a 50-mile radius.

Approximately 135 military and civilian personnel comprise the expedition. It is headed by Lt Col Merle R. Dawson, who gained renown for his polar research during the International Geophysical Year and on other Antarctic expeditions. A pool of 55 engineers and scientists from various Army agencies, formerly representative of most of the Technical Services and now assigned to the U.S. Army Materiel Command, furnishes technical support.

M29C Cargo Carrier, M113 Personnel Carrier, and Dodge Power Wagon at Chepo, Panama, prior to field testing during SWAMP FOX I.

Under the supervision of Alexander Tedesco, AMC Headquarters staff, with Dr. Robert Anstey as Deputy Chief, the 55-man scientific group is organized into various teams: survey, hydrographic, human factors engineering, communications, medical acquisition, and food and clothing.

The 12-man survey team made an advance trip to the expedition area late in August to select test locations and record environmental terrain characteristics that would be encountered. Three courses with greatly varying environmental terrain conditions were selected for the vehicle tests. Each vehicle will be tested over the areas, including tropical grassland, jungle-covered hills, rivers and swamp crossings.

Army off-road equipment to be further evaluated during SWAMP FOX II operations includes the Nodwell Tracked Carrier, M116 Cargo Carrier, M113 Armored Personnel Carrier, the Weasel, and the Dodge Power Wagon. These vehicles (four tracked, one wheeled) were among those that completed the 115-mile trek through the tropical rain forest from Chepo to Santa Fe during SWAMP FOX I.

Other vehicles to be evaluated include the M60 Tank, the M274 Mule, the GOER, Gamma Goat, and Army trucks of varying capacities.

The test and hydrographic teams will record soil and vehicle measurements, and all make environmental observations necessary to characterize immobilization points. The soils laboratory will conduct analysis of samples collected by the teams.

Prior to departing for Panama, the soils group was trained at the U.S. Army Waterways Experiment Station, Vicksburg, Miss., in the Corps of Engineers soil procedures.

The medical team will examine expedition members to determine incidence of previous skin disease, present skin condition and medical baseline data for the purpose of evaluating the natural history of dermatologic disease in the tropics among unacclimatized personnel.

The human factors engineering team will collect and record data from a survey of selected vehicles, covering measurements of heat stresses, total thermal balance, and performance decrements.

Members of SWAMP FOX II operations underwent a special 2½-day course of instruction and training at the Jungle Warfare Training Center at Fort Sherman, Canal Zone, before undertaking the construction of the base camp and starting on the research project.

Other objectives of SWAMP FOX II include:

- Development of a system to allow aircraft to locate quickly and accurately surface elements under the dense jungle canopy.
- Development of a portable shop van to improve maintenance capabili-

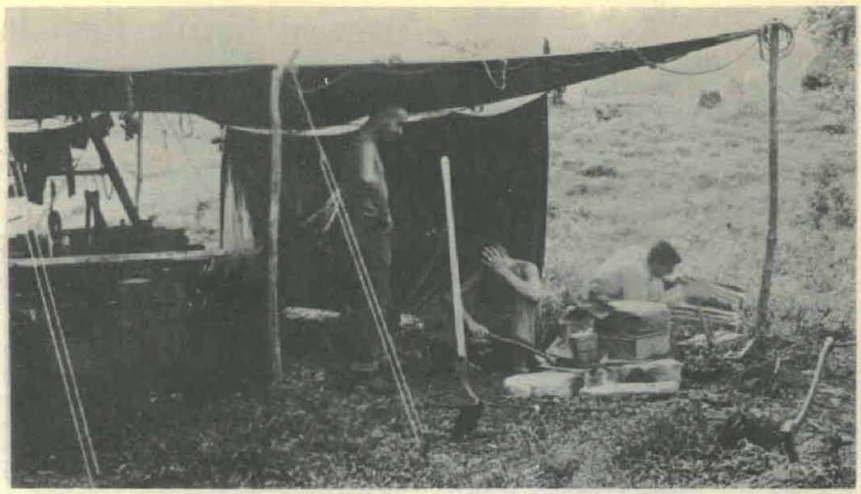
Power Wagon equipped with Terra Tires, only wheeled vehicle to complete 115-mile course during SWAMP FOX I, is loaded aboard LCM at Santa Fe.

ties of field units operating in the dense jungles.

- Research maintenance, supply and human engineering problems unique to tropical operations.
- Test air-to-surface and surface-to-surface communications.
- Investigate essential equipment to be included in a pioneer set for use in tropical operations conducted without engineer support.

A report on the environmental/mobility/terrain aspects of SWAMP FOX II will be prepared by the scientific party and submitted to the Chief, Research and Development by Jan. 15, 1963.

A "Report on Environmental Operation — SWAMP FOX I" (July 1962) is available to authorized sources from the U.S. Army Transportation Board, Fort Eustis, Va.



Botanists process field samples at Canita River Camp during SWAMP FOX I.

U. S. Army Materiel Command Sponsors 2nd Environmental Symposium

Invited Army, industry and academic leaders in environmental research and development are expected to gather about 150 strong at the Second Environmental Symposium (Ordnance), Sept. 18-20.

Scheduled at the Southwest Research Institute, San Antonio, Tex., under sponsorship of the Directorate of Research and Development, U.S. Army Materiel Command, the symposium will consider weapons and ground support equipment with respect to prevailing military doctrine and future requirements.

Maj Gen Thomas H. Lipscomb, Deputy Commanding General for Materiel Requirements, U.S. Army Combat Developments Command, has accepted an invitation to make the keynote address. The banquet speaker is M. G. Bekker, General Motors Corp., Defense Systems Division, Santa Barbara, Calif.

Four major sessions will be concerned with: terrain (mobility) factors, induced factors, upper atmospheric factions, and environmental test methods and procedures. A panel discussion of synergistic effects will be chaired by David Askin, R&D Group, Frankford Arsenal, Philadelphia, Pa. Members will be noted industrial and educational leaders.

"Rational of Human Factors versus Man-Machine Systems to Meet Environmental Stresses" is the subject of one of the principal presentations, to be made by Dr. John D. Weisz of the U.S. Army Human Engineering Laboratory, Aberdeen Proving Ground, Md.

Other speakers on the agenda include:

- Dr. C. J. Wessel, Director of the Prevention of Deterioration Center, National Academy of Sciences-National Research Council, Washington, D.C., who will discuss "Matrix Approach to Information on Environmental Problems."
- R. W. Johnson, Automotive Laboratory, Aberdeen Proving Ground, Md., whose subject is "Problems in Determining Induced Environmental Criteria for the Army."
- Hugh L. Donnelly, Applied Physics Laboratory, Johns Hopkins University, "Acoustical Environment Encountered in High Speed Flight and Its Effect on Missile Systems, Sub-Assemblies and Components."
- Ronald A. Liston, U.S. Army Tank-Automotive Command, Detroit, Mich., "State-of-Art Review of Terrain Design Criteria for Army Materiel."
- W. C. Christopher, Yuma (Ariz.) Test Station, "Army Arctic and Desert Test Activities."
- K. Putkovich, U.S. Army Diamond Ordnance Fuze Laboratories, Washington, D.C., "Use of Averages in Control of Vibration Testing."
- Lloyd O. Gilbert, Rock Island (Ill.) Arsenal Laboratory, "Influence of Self-Generated Environment."
- Benjamin S. Goodwin, U.S. Army Proving Ground, Aberdeen, Md., "Requirements and Means of Dissemination of Environmental Effects Data to Design Engineers."
- Dr. Leo Alpert, Environmental Sciences Division, U.S. Army Research Office, Arlington, Va., "Atmospheric Design Criteria for Army Materiel."

Other presentations will be made by a number of industrial representatives.

31st Symposium on Shock Vibration Set Oct. 1-4

A panel discussion of environmental problems of the next 10 years is scheduled as one of the highlights of the 31st Symposium on Shock Vibration and Associated Environments, Oct. 1-4, at Phoenix, Ariz.

Sponsored by the Office of the Director of Defense Research and Engineering, the conference will be hosted by Luke Air Force Base on behalf of the U.S. Air Force.

Dr. Paul A. Siple, Scientific Adviser, U.S. Army Research Office, will represent the Army in the panel discussion. Other members are: Dr. J. E. Duberg, Technical Assistant to the Associate Director, Langley Research Center, National Aeronautics and Space Administration; Dr. R. O. Burns, Scientific Adviser, Deputy Chief of Naval Operations, Development; and Dr. K. Millsaps, Chief Scientist, Headquarters, Office of Aerospace Research.

Representatives of the Armed Forces, industrial research laboratories and universities will present more than 30 papers related to the conference theme: "Application of Environmental Data to Specifications and Design Criteria."

R. D. Baily and J. W. Apgar of the Army's Aberdeen (Md.) Proving Ground are programed to discuss "Preparation and Analysis of Munson Road Test Tapes for Laboratory Vibration Tests." W. B. Brierly, Quartermaster Research and Engineering Center, Natick, Mass., is scheduled to present "The Army Quartermaster Corps Projects Covering the Analysis and Evaluation of Environmental Factors."

* * *

Symposia Combined in Future

In view of the similarity of subject material covered at the Second Environmental Symposium at San Antonio, Tex., and the 31st Symposium on Shock at Phoenix, Ariz., the two meetings will be combined and held as one in the future.

The decision to consolidate the symposia was reached at a meeting of representatives of the Office of the Secretary of Defense and the Chief of Research and Development, Department of the Army, late in August.

DOFL Director Welcomes Army Winner at NSF-I

STUDENT SCIENTIST Robert Karl Herman, 18, Lancaster, Pa., is greeted at the Army's Diamond Fuze Laboratories, Washington, D.C. by Technical Director Billy M. Horton. As one of 16 Army award winners at the 1962 National Science Fair-International, Herman received an all-expense paid, one-week visit as an honored guest and also was the luncheon guest of U.S. Senator Hugh Scott from Pennsylvania. "An Electronic Syllable Analyzer" was the theme of Herman's award-winning entry in the NSF-I.

BASIPAC Computer Put Under Test at Huachuca

BASICPAC, an important addition to the group of military computers to be tested at the U.S. Army Electronic Proving Ground, has arrived at Fort Huachuca, Ariz.

The medium-sized computer is one of the key parts of a system to provide faster and more accurate information for artillery fire support. Transported in a shelter on the bed of a 2½-ton Army truck, it will filter and evaluate the various bits of target information flowing into a division artillery fire direction center. Its 8,000-word "memory bank" maintains an up-to-the-moment list of enemy targets showing type and location.

BASIPAC sets up the best plan of fire for a given target by designating which batteries are to fire and how many volleys will be fired. It also keeps a constant check on ammunition supplies. These functions are performed in a matter of seconds and minutes, where they may now take hours.

Sergeant Missile Goes Into Tactical Test Phase

More than 100 missile-firing soldiers, support troops and official observers arrived recently at White Sands Missile Range, N. Mex., to check out the Army's Sergeant ballistic missile under near-tactical conditions.

Service tests are designed to determine that the missile can be maintained and fired by field troops. Engineering tests are carried out independently of development tests and assure that the system actually meets all Army requirements.

To cut the time and cost of missile development from the planning to the production stage, some parts of the development, engineering and service phases of testing are conducted simultaneously. In this way, the developing agency, the independent engineering evaluator and the troop users each utilize information gathered from the same test firing for their individual investigations.

The developing agent for Sergeant is the Army Missile Command at Redstone Arsenal, Ala. Initial research and development work was by the Jet Propulsion Laboratory of California Institute of Technology, with the prime contract awarded to Sperry Utah Engineering Laboratory.

The engineering evaluator for the Army Test and Evaluation Command (ATEC) is the Ordnance Mission of White Sands Missile Range. Service testing is performed by the ATEC Missile Division Artillery Board.

Designed to replace the Corporal liquid-fueled ballistic missile, now operational in the United States and with North Atlantic Treaty Organization forces in Europe, Sergeant is a solid-propellant missile 34½ feet tall and 31 inches in diameter. Its inertial guidance system makes the missile immune to enemy jamming. Its extremely mobile ground equipment represents the Army's "shoot-and-scoot" modern warfare concept.

Initiation of engineer-service tests was announced in early August after the missile had scored three consecutive direct hits on pre-selected targets at White Sands Missile Range.

In a ceremony at White Sands Missile Range, N. Mex., Mrs. J. Frederick Thorlin pins on her husband's second star upon his promotion to major general. General Thorlin became Commanding General of the Range July 1 after serving as CG of Ordnance Tank-Automotive Command (OTAC), Detroit.

A Ferry Tale: When You Fail, You Ride the Rail

Negligence has earned the editor of this publication prime consideration for a very special mode of transportation—usually reserved for black-hearted scoundrels—with the U.S. Army Transportation Corps as host.

In a moment of abstraction, the editor omitted a slight qualifying phrase from an article that appeared on page 23 of the August issue. Intended as a fitting tribute to the Transportation Corps on the occasion of its 20th anniversary, the article fell short—to use a mild understatement.

Justifiably, Transportation Corps leaders responded in righteous wrath. Only hours after the anniversary celebration, that article reported, "the Corps was phased out—engulfed within the U.S. Army Materiel Command." The TC leaders reacted, like Mark Twain is reputed to have written to an editor, the story of his death had been greatly exaggerated.

Actually, the qualifying phrase, *insofar as its materiel responsibilities are concerned*, would have corrected the phase-out report. Otherwise, the Transportation Corps, like the other Army Technical Services, remains a branch of the Army for classification of officers assigned to career fields. The Chief of Transportation, like the Chief of Engineers, Chief Signal Officer and The Surgeon General, retains Army Special Staff status.

Previous articles had explained the changed status of the Technical Services and their leaders in precise detail. In the throes of the final deadline rush, the editor was too presumptious—he neglected to restate facts pertinent to complete understanding of the degree of phase-out.

To the Chief of Transportation, Maj Gen Rush B. Lincoln, Jr., key members of his staff and the many thousands of loyal employees who will continue the proud traditions of the Corps, this conveys a most sincere apology.

Army Food Preservation Expert Wins ICAF Honors

One of the U.S. Army's foremost experts on food problems recently received three commendations for outstanding achievement while attending the Industrial College of the Armed Forces in Washington, D.C.

Dr. Edward S. Josephson, Director of the Food Radiation Research Facility at the Quartermaster Research and Engineering Command, Natick, Mass., is one of eight students in a class of 162 whose thesis was selected for outside publication.

Particularly gratifying to Dr. Josephson was a White House request for 200 copies of his thesis, titled "Food Research and Development; Freedom from Want." It deals with an R&D program designed to free the world from the threat of starvation as the population increases at an alarming rate.

Among Dr. Josephson's proposals are measures intended to increase the agricultural yield, prevent loss from spoilage and insects, produce missing food constituents in factories through synthetic or organic chemistry, and use waste organic materials. Envisioned also is the use of twigs and leaves as potential emergency food sources.

The Industrial College of the Armed Forces, from which Dr. Josephson was graduated recently after completing a 1-year resident course, prepares selected students for important policy making, command or staff assignments within the national and international security structure.

Vice Admiral Rufus E. Rose, College Commandant, described Dr. Josephson as one who ". . . has brought to it an understanding knowledge of responsibilities and problems of the Department of the Army which have helped materially to broaden the base of our studies. . . ."

Additional commendations for outstanding work came from Lt Gen Robert W. Colglazier, Jr., Deputy Chief of Staff for Logistics, acting on behalf of the Secretary of the Army, and from Col John W. Maxwell on behalf of Lt Gen Frank S. Besson, Jr., Commanding General, U.S. Army Materiel Command.

Dr. Josephson was cited by the Committee of Medical Research in 1954 for results during six years of malaria research with the National Institutes of Health, Washington, D.C. He is a graduate from Boston's Public Latin High School, Harvard College, and Massachusetts Institute of Technology, where he received his Ph. D. with distinction in 1940.

Some 40 articles published in scientific journals on subjects such as chemotherapy of malaria and amebiasis, nutritional biochemistry, endocrinology, enzymes, and related food research areas have contributed to his reputation.

Brig Gen Merrill L. Tribe, CG, Headquarters, QM R&E Command, Natick, Mass., extends congratulations to Dr. Edward S. Josephson on winning 3 commendations for outstanding work.

NSF-I Army Selectee Gets Science Career Insight on QM R&E Center Visit

A fascinating insight into the possibilities of Government career service in Army science was given to an unusually gifted high school science student in mid-August during a one-week all-expense-paid visit to the Quartermaster Research and Engineering Command, Natick, Mass.

Robert L. Williams, a 17-year-old Roanoke, Va., youth was permitted to pursue his interest in "Research Work with the Gas Chromatograph," the subject of his prize-winning exhibit at the 1962 National Science Fair-International. He was one of 16 Army winners at the NSF-I selected for visits to Army R&D labs.

Army scientists who served as judges at the NSF-I, held at the World's Fair in Seattle, Wash., were much impressed by the ingenuity and technical skill the youth demonstrated in designing and building a gas chromatograph.

The gas chromatograph is used professionally to identify chemical compounds in food with a view to improving flavor and odor. At the Quartermaster Research and Engineering Center Laboratories, Natick, Mass., Williams watched food odors extracted by vacuum, compounds separated by gas chromatography, and identified further by a mass spectrometer.

Intent on a career as a research physicist, Williams' interest in gas chromatograph research originated during his attendance at the 1961 National Science Fair-International in Kansas City, Mo., when he was taken on a tour of a chemical plant.

NSF-I winner Robert L. Williams checks oscilloscope for output of mass spectrometer, used to identify compounds separated by gas chromatography for odor and flavor analysis at Quartermaster R&E Command.

When informed that the purchase price of a gas chromatograph might range from $500 to $2,000, Williams undertook to build a machine in his basement. The result won him a trip to the NSF-I and a visit to the QMR&E Center. He plans to enroll at Virginia Polytechnic Institute.

Picatinny Leader Shifted To Missile Command Post

Col Daniel F. Shepherd, Acting Commanding Officer of Picatinny Arsenal, Dover, N.J., will be reassigned to the U.S. Army Missile Command, Huntsville, Ala., effective Sept. 15.

Maj Gen W. K. Ghormley, Commanding General of the U.S. Army Munitions Command, announced the action. Col Shepherd has served as Acting CO since July 1, 1962, while Col R. R. Klanderman was assigned temporarily to special duties on General Ghormley's staff.

Graduated from Massachusetts Institute of Technology in 1934 with a B.S. degree in mechanical engineering, Col Shepherd entered active duty in the Army in 1941. During World War II he served in Washington, D.C., North Africa, England and Continental Europe.

Balloons Form New Base For 'Building in Barrels' Concept

Balloons have been added to the Army's "Buildings in Barrels" concept, widely hailed as a dramatic development in remote area military housing.

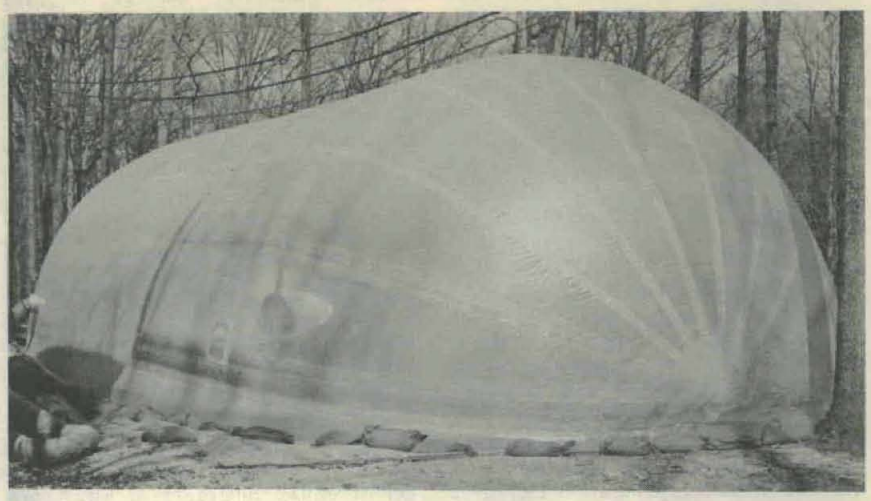
Engineers at the U.S. Army Research and Development Laboratories at Fort Belvoir, Va., are experimenting with high-speed fabrication methods by using forms constructed of air-inflated mylar-polyethylene film.

The balloon-type forms are coated with a sprayed-on laminate of fire-retardant fiberglass and resin, followed by a coating of polyurethane foam plastic and a second application of fiberglass and resin.

When the three coatings have hardened, forming a tough, durable, lightweight, heat-and-cold resistant structure, the air is let out of the form which can be reused for additional "Buildings in Barrels." Windows and doors can be cut easily where desired.

Initial construction methods of the polyurethane foam plastic shelters employed sectional forms (see May 1961 and April 1962 issues of this publication). Sections were flanged to fit smoothly and tightly together. The process released liquid foam from the barrels into the forms, where it expanded about 30 times its original volume.

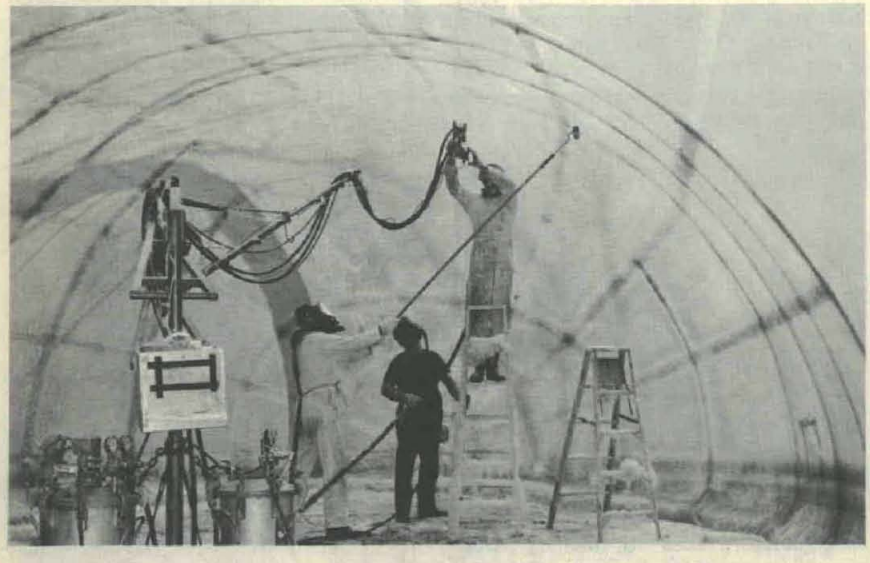
Basically, the "Buildings in Barrels" concept is geared to the Army's logistical problem of transporting construction materials to remote areas, as on the Greenland Icecap, site of the Army's Camp Tuto and Camp Century.



Air-inflated, balloon-type form constructed of mylar-polyethylene film undergoing tests as part of Army "Buildings in Barrels" program at the U.S. Army Research and Development Laboratories, Fort Belvoir, Va.

The "bonus" value of the concept, which won three of the highest awards of the Society of Plastic Industries in March of this year, is in heat-and-cold resistant qualities. It is equally suitable for buildings in the tropics or in the polar regions, on the basis of the Army's current testing program.

As the cost of the materials now being used is lowered and construction methods are perfected, Army researchers envision that the concept will find use in civilian needs.



Engineers at U.S. Army R&D Laboratories, Fort Belvoir, Va., laminate interior of air-inflated mylar-polyethylene film structure with fiberglass and resin as the first step in the construction of a plastic building.

Dr. Eklund Presents Papers At Biology Symposium in Paris, WHO Geneva Meet

A paper based on research conducted during the International Geophysical Year (IGY) was recently presented before the International Symposium on Antarctic Biology by Dr. Carl R. Eklund, U.S. Army Research Office.

The Scientific Committee for Antarctic Research sponsored the conference hosted by the French Academy of Science in Paris, France, Sept. 3-7.

Dr. Eklund was IGY chief scientist and station leader at Wilkes Station, Antarctica (1956-1958), when he pioneered bird migration and incubation studies. Now Chief of the Polar and Arctic Branch, Environmental Sciences Division, he joined the U.S. Army Research Office Staff in 1958. *(For details of this research, see January 1961 issue, p. 15.)*

On his way to Paris, Dr. Eklund stopped at Geneva, Switzerland to attend the World Health Organization Conference on Medical and Health Problems in the Arctic and Antarctic. There he discussed a paper, "Glacial Water Supply and Sewage Systems," coauthored by Richard P. Schmitt and Raul Rodriguez of the U.S. Army Engineering Research and Development Laboratories, Fort Belvoir, Va. The paper is based on studies made at the Army's polar experimental station at Camp Century, Greeland.

Star of Missile Family?

Pershing Cast in Role by Simulator Stand-in

The Pershing ballistic missile being developed by the U.S. Army Missile Command may be termed one of the stars of the Army missile program since, like motion picture stars, it has a stand-in.

Pershing's stand-in does most of the rigorous groundwork, while the Army's 4-star missile gets the applause. Pershing's double looks like the real missile. Actually, it is a trainer, with concrete in place of solid propellant to give it the same weight and balance. Soldiers thus get practical experience in handling the missile without wearing out a tactical round.

Pershing's stand-in, just like any understudy, has to know all the lines. Troops must be able to use the missile with the ground support equipment of the system, acting out checkouts and countdowns many times more than a normal missile would need to perform.

Designing the all-purpose stand-in has been the task of the Ground Support Equipment Laboratory at the Missile Command.

"Our biggest job is keeping up with changes in the script," said Willie K. Patterson, Chief of the Electrical Design Branch. "When a change is made in the Pershing missile, the same change must be made in the trainer to give the troops a realistic missile to use for practice missions. In addition, our trainer must be operating long before troops get the real thing."

The missile trainer has been proven a reliable stand-in during hundreds of successful countdowns and is expected to last at least five years with normal maintenance.

Occasionally the stand-in will try to "ham it up" by flubbing its lines. The miscues are intentional, and the prompter for the impromptu performance is a little black box called the malfunction setter assembly.

More than 50 switches are installed on the front of the box, and flipping any one of them will simulate trouble somewhere in the system. The box is used by training instructors to give missile soldiers experience in identifying and locating trouble during a countdown.

Although the missile trainer doesn't stand in for Pershing during environmental scenes such as high and low temperatures, rain, dust, salt spray and humidity, it does have to weather the same tests and be able to operate under the same conditions.

While the trainer is a duplicate of the real missile on the outside, it is sometimes an entirely different personality on the inside. Electrical circuitry to simulate actual components cuts the cost of building the trainer without losing the realistic touch.

"The Pershing trainer costs only one-third as much to build as the regular missile," said W. C. Watson, GSE Laboratory Director, "and its training value saves the cost of many Pershing missiles. Its day-to-day work will ready troops for a perfect performance with Pershing when the live missiles goes into action."

The trainer is being fabricated for the Missile Command by Hayes International Corp., Birmingham, Ala.

Willie K. Patterson flips one of the switches in the malfunction setter assembly of Pershing missile trainer. The switchbox programs error into the trainer to simulate problems future missile soldiers will have to solve.

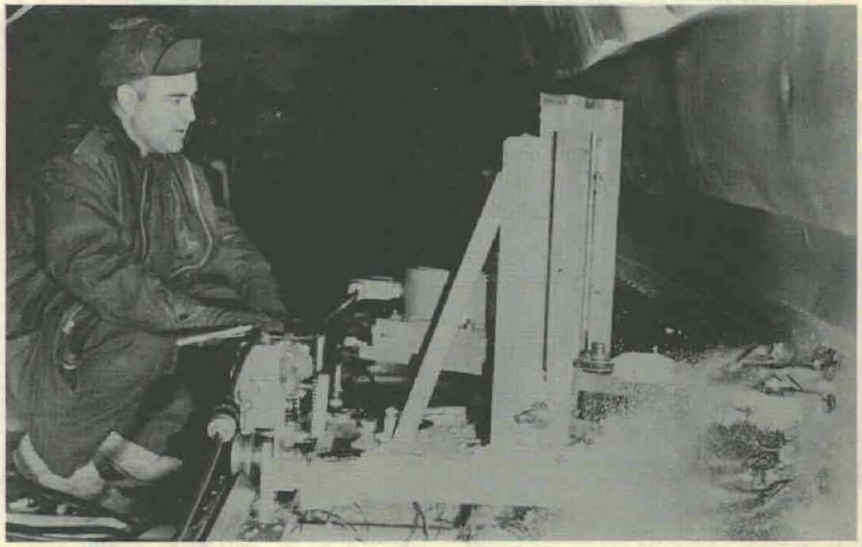
Snow Shaver Undergoing Greenland Tunnel Tests

A prototype of an electromechanical machine to prevent Arctic snow from encroaching upon the U.S. Army under-snow facilities is being tested at Camp Century on the Greenland Icecap. Shrinkage (encroachment) of the snow tunnels is due to plastic flow of the surrounding snow.

The machine being tested by the U.S. Army Engineer Research and Development Laboratories (USAERDL), Fort Belvoir, Va., consists of a trimmer head mounted on a self-propelled platform or carriage which runs on a track on tunnel ceilings.

The aluminum track is designed to guide, support, and hold down the trimmer throughout the working range. The system was designed and fabricated in USAERDL shops, using commercial components, where possible, to facilitate replacement.

A machine to crush blocks of snow removed during excavation also is being tested, along with a pneumatic conveyor system to move snow from the crusher or from the snow trimmer to the original snow surface outside of the camp.



Ice and Snow Trimmer developed by USAERDL, Fort Belvoir, Va., takes a 12-inch high, 4-inch deep cut from side of trench at Camp Century, Greenland.

4 USAERDL Employees Point Up Women in Science Career Opportunities

Mrs. Barbara O'Carroll

Four women with backgrounds in chemistry, mathematics, and physics are fashioning Federal service careers for themselves at the U.S. Army Engineer Research and Development Laboratories (USAERDL), Fort Belvoir, Va.

USAERDL is an agency of the U.S. Mobility Command, a major element of the U.S. Army Materiel Command.

The scientists-mathematicians — Mrs. Erna J. Beal, Mrs. Jean A. Berning, Mrs. Barbara M. O'Carroll and Dr. Brigitte H. Krause—are members of a predominantly all-male professional staff engaged in research for the development of equipment for troops in the field.

As a matter of record, they were employed even before President Kennedy issued Executive Order 10980 to maintain the Federal service free of discrimination against women.

Mrs. Beal is a chemist in the Materials Branch, Mrs. Berning and Mrs. O'Carroll are mathematicians in the Data Processing and Statistical Services Branch, and Dr. Krause is a physicist in Basic Research Group.

Do these career scientists-mathematicians believe that women, generally, are getting a fair break insofar as opportunities are concerned?

Dr. Krause answered: "I think, more than a man, each woman, for herself, has to disperse the employer's natural doubts in her qualifications for a responsible position. If she is able, she can get an equal deal."

Mrs. Jean Berning

Proof that the Laboratories make no such discrimination was shown when Mrs. Berning was chosen by the Technical Service Department as its 1961 nominee for the Director's Technological Achievement Medal, the first woman nominee since inauguration of the award in 1957.

Similarly, Mrs. Beal drew a prize assignment to work on Project BEARS (Bacteriological Effects, Aircraft Refueling Systems), being conducted at Kindley Air Force Base in Bermuda, thus giving her the opportunity to travel.

What prompted them to enter their particular fields?

Mrs. Beal said she was interested in science while in grade school, and her interest was furthered when she joined a science club and began working with science fairs in high school. A student trainee during the summers of 1957, '58, and '59, she became a permanent employee in 1960, after graduating with honors and a B.S. degree in chemistry from Radford (Va.) College. Her duties involve chemical analysis of and physical tests on petroleum products.

Mrs. Berning became interested in mathematics while in high school and had planned to be a mathematics teacher. After obtaining an M.A. in mathematics at Johns Hopkins, she accepted a position in scientific computing at Bausch and Lomb. Transferred to a new group which used a digital computer in scientific applications, she became "extremely interested in using this new tool to solve a wide range of technical problems."

Employed at USAERDL since 1957, Mrs. Berning works with Mrs. O'Carroll to program problems for solution by electronic digital computers. They also assist the engineers and scientists in the mathematical aspects of their work, especially the proper formulation of problems for computers.

Dr. Krause, a native of Latvia, came to the Laboratories in 1958. She said she has long had an interest in humanities and science, and that she managed to obtain her education "despite unusually difficult personal conditions." She obtained degrees corresponding to a B.S. in 1948, an M.S. in 1950 and a Ph. D. in 1954 at the University of Marburg, Lahn, Germany.

The four ladies have similar views on the question of whether married women should work.

Dr. Brigitte Krause

Mrs. Beal, whose husband, Robert, is a mechanical engineer employed at the Naval Research Laboratory, said: "I approve of married women, with professional training, working as long as it isn't detrimental to her family."

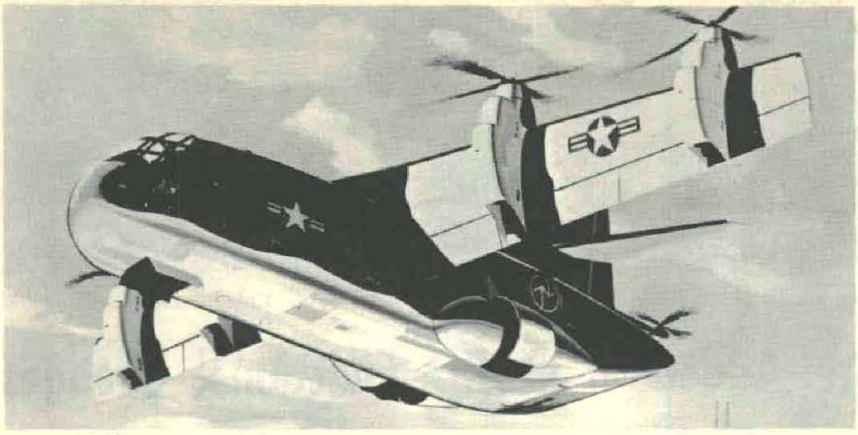
"Of course, I think that a married woman who wants to work should do so if her husband agrees," said Mrs. Berning, whose husband, Peter, also is employed at the Fort Belvoir Laboratories. "However, I think that small children need their mother at home."

Said Mrs. O'Carroll, who received her B.S. and M.S. degrees in mathematics from East Carolina College, Greenville, S.C., "It gives me quite a bit of satisfaction to know that I am able to perform the dual role of mathematician and homemaker."

Hobbies and activities of these ladies differ greatly. Mrs. Beal enjoys boating on a 23-foot sea skiff, swimming, and water skiing, Dr. Krause goes for "globe trotting," photography, literature and art. Mrs. O'Carroll prefers "reading, gardening, and cooking." Mrs. Berning said she, too, likes gardening, cooking and "trying, with little success, to train our dog, 'Braugn,' and our parrot, 'Smithy'."

Mrs. Erna J. Beal

Tri-Service VTOL Aircraft Program Builds Mockup of Experimental Tilt-Wing XC-142



Artist's concept of experimental, VTOL, Tilt-Wing XC–142.

A full-scale mockup of the XC-142, an experimental tilt-winged vertical takeoff and landing aircraft (VTOL), has been built in Grand Prairie, Tex., under the tri-service VTOL development program.

Vought-Hiller-Ryan, the joint winners of a competition held earlier this year among 30 invited contractors, will fabricate five prototypes for operational suitability testing by the Air Force, Navy and Army.

The Air Mobility Division, Director of Developments, Office of the Chief of Research and Development, has program responsibility for the Army.

The Director of Defense Research and Engineering decided in 1960 to develop a VTOL craft capable of satisfying the needs of all the services through tri-service integrated effort. (See Feb. 1961 issue, page 6.) The three services have financed the program with $7 million each in 1961 and 1962. Total cost may exceed $70 million.

Planning during the past year indicated no single craft could be developed that would fulfill all needs. Consequently, certain requirements, e.g., Navy carrier compatibility, were eliminated.

Following initial reports, the Army Aircraft Requirements Review Board acknowledged the technical feasibility of VTOL craft. However, it was noted that only testing the concept in actual aircraft would suffice to remove the question of operational value from speculation.

Results of tests with the prototype will determine the advisability of pursuing the program toward a standardized production craft.

The XC-142 is expected to meet major military goals. Cargo area is the same as in the Chinook helicopter which, together with the Caribou, is the workhorse of Army tactical transport aircraft.

Powered by four GE T64 gas turbines, the XC-142 is designed for a ferry range of 2,600 miles and a VTOL radius of 250 miles with an 8,000-pound payload. Dimensions are: overall length, 58′; height, 26′; wing span, 67′. Capable of a maximum air speed of 350 knots at sea level, its top VTOL weight is 37,500 pounds.

OCRD Arranges Exhibit At AUSA Meet Oct. 8-10

Many of the latest items of Army materiel and equipment will be displayed among exhibits at the Eighth Annual Meeting of the Association of the United States Army, Oct. 8-9-10, at the Sheraton Park Hotel, Washington, D.C.

As in previous years, the Office of the Chief of Research and Development has the responsibility for arranging the Army exhibit, and some of the items that will be displayed are still in the R&D process.

The Army exhibit will include missiles, conventional artillery, hand weapons, aircraft, a surveillance drone, new communications and electronic devices, engineer equipment, and human factors research displays.

A Special Forces demonstration team from the Special Warfare Center, Fort Bragg, N.C., will provide a highlight of the Army exhibit. The team will feature static displays of weapons, demolition, communication, jungle survival, and underwater diving equipment, and will demonstrate use of some of these items.

Provocative Ponderables

Dr. Wernher von Braun, director of NASA's Marshall Space Flight Center, Huntsville, Ala., in an interview with the General Electric forum, saw space exploration as the "moral equivalent of war." Calling the decision to put astronauts on the moon in this decade "the wisest investment America has ever made," he added these observations:

"It may well be that space flight will provide the necessary stimulus to the economy that war no longer can.

"When you look at the communications satellite system we can already see clear outlines of how dollars will flow back into the treasury as a result of tax revenues from such things as global telephone and television systems. . . .

"This is precisely the kind of stimulus the economy needs. The real payoff does not lie in mining the moon or in bringing gold back from the moon, but in enriching our science in new methods, new procedures, new knowledge, and advanced technology in general."

* * *

"In the decades ahead there will be more jobs and more improvements and innovations, bringing still more benefits to the public. These will be sparked for the most part by men and women with high degrees of technical knowledge. But the outstanding leaders, in our field as in others, will be those who possess qualities greater than "know-how." They will have depths of imagination, of foresight and of boldness."—Donald Douglas, Sr., Chairman, Douglas Aircraft Co., in the **Reader's Digest**, July, 1962.

* * *

"Anyone who believes the United States of America has no future in front of it should have his brain examined. We're at the beginning, not at the end or the middle of our history."—General of the Army Douglas MacArthur, at the White House following recent tribute by the Congress for his services to the Nation.

* * *

"The only nation that has waged war but not worshipped it, that has won the greatest power in the world but not sought it, that has wrought the greatest weapon of death but has not wished to wield it. . . . May it inspire men with dreams worthy of its action."—André Malraux, French Minister of State for Cultural Affairs, in a tribute to the U. S. A.

Col Allan G. Pixton

Brig Gen A. D. Hulse

Brig Gen Wm. T. Ryder

Col James W. Milner

Special Warfare Office Added in OCRD Functional Changes

A Special Warfare Office has been established as the major change in realignment of functions within the Office of the Chief of Research and Development attributable to Army-wide reorganization. Headed by Col Donald D. Blackburn, the SWO, like the four directorates, reports directly to the Chief of Research and Development.

Except that it has been relieved of most operational and command-like functions, the same as other general staff agencies, the Office of the Chief of Research and Development organizational structure has remained relatively intact during Army reorganization. Most of its former operational responsibilities have been transferred to the U.S. Army Materiel Command.

The Special Warfare Office has responsibility for the new U.S. Army Limited War Laboratory at Aberdeen Proving Ground, Md., and monitors all special warfare and counterinsurgency activities of the Army in the research and development area. The Office also is the point of contact for all such activities and also for the Advanced Research Project Agency's "Project Agile."

Directorate of Plans and Programs is a redesignation of the former Directorate of Plans and Management under the leadership of Col Roy B. Porter. Its former Management Analysis Division is retitled the Policy Division under the leadership of Col Wilson R. Reed, who in recent months has served as chairman of the Special OCRD working group on Army reorganization.

Further changes in the Directorate include the dissolution of the Foreign Technology Division, the Procurement and Facilities Division and the Manpower and Personnel Division.

Col D. D. Blackburn

Col Ned T. Norris

Col Lewis W. Leeney

Directorate of Special Weapons. Headed by Brig Gen William T. Ryder, with Col James W. Milner as Deputy, the Directorate lost two of its four divisions but gained two new elements. The Atomic Office and the Chemical-Biological Office formerly were designated as divisions.

The new Zeus Office and Space Office, headed respectively by Lt Col C. J. LeVan and Lt Col Nicholson Parker, have retained many special weapons functions of the Air Defense and Missiles and Space Divisions.

Director of Developments. Under the leadership of Brig Gen Allen D. Hulse, with newly arrived Col Allan G. Pixton as Deputy, the Directorate retained all of its divisions and gained two new ones in the realignment of OCRD functions. Its new units are the Air Defense and the Missiles Divisions. Retained intact are the Combat Materiel, Air Mobility, International, and Communications Electronics Divisions.

Personnel changes include the assignment of Col Ned T. Norris as Chief of the International Division, Col Lewis W. Leeney as Chief of the Air Mobility Division and Lt Col Joseph L. Gude as Chief of that Division's new Army Aircraft R&D Branch.

U.S. Army Research Office. Rather thoroughly reorganized approximately two years ago, this office remained structurally intact as an OCRD Directorate during the reorganization process. The Office's functions, likewise, have been very little affected by Army reorganization except that actions flow through different command channels.

The Research and Development Offices of the Chief of Research and Development in Alaska and in Panama have been transferred to the U.S. Army Materiel Command. Plans are progressing for the establishment of a U.S. Army R&D Office in Australia.

Biographical sketches of key personnel involved in reorganization and recent reassignments within the Office of the Chief of Research and Development follow:

• BRIG GEN HULSE, Director of Developments. Allen Douglas Hulse succeeds Maj Gen George W. Power after serving as Deputy since February 1962. Previously he had served as Chief of the Combat Materiel Di-

vision in the same Directorate.

Major posts since 1957 include Deputy Assistant Chief of Staff, Intelligence, Hq, USAREUR; and Commanding Officer, 11th Armored Cavalry Regiment, Headquarters, USAREUR.

Born in Cebu, P. I., in 1914, he was graduated from the U.S. Military Academy in 1938. During his career he has completed the courses at the Command and General Staff College, Strategic Intelligence School, Naval War College and U.S. Army Management School.

In World War II General Hulse took part in the campaigns in Normandy, Northern France, the Rhineland and Central Europe. Among his citations are the Silver Star (OLC), Bronze Star Medal (OLC), Croix de Guerre (with palm) and Purple Heart (OLC).

• BRIG GEN RYDER, Director of Special Weapons. William Thomas Ryder began his military career upon graduation from U.S. Military Academy in 1936. For the past four years he has served as Deputy Chief, PID, Hq, U.S. Army Supreme Headquarters Allied Powers, Europe. Prior to that he was Technical Liaison Officer, OCRD.

During World War II he served as Parachute Officer, 52nd Troop Carrier Wing; Regimental CO, 542 Parachute Infantry; A-3 Section, Hq, 5th Air Force; Assistant A-5, Hq, Far Eastern Air Force; and Chief of Staff, Hq, WVTF.

He participated in the campaigns in Italy, Southern Philippines, Luzon and New Guinea. His citations include the Bronze Star Medal (OLC), and the Legion of Merit (2nd OLC).

General Ryder is a graduate of the Army Parachute School, the Strategic Intelligence School, and National War College.

• COL BAKER, Chief, Atomic Office. Barton O. Baker holds a B.S. degree in mathematics and physics from the University of Illinois.

Previous positions include Ordnance Officer, U.S. Army, Hawaii; and R&D Coordinator, OSWD, Fort Bliss, Tex.

Following service in Korea, he completed the course at the Command and General Staff College. His decorations include the Legion of Merit, the Air Medal and the Army Commendation Medal.

• COL BLACKBURN, Chief, Special Warfare Office. Donald D. Blackburn served previously as Deputy Director of Developments for Special Warfare, OCRD, and prior to that was Group Commander, 77th Special Forces Group, Airborne, Fort Bragg, N.C., and Senior Adviser, Military Assistance Advisory Group, Vietnam. He taught Military Psychology and Leadership at the U.S. Military Academy from 1950 to 1952.

During World War II, Col Blackburn served as a leader of guerrillas in New Guinea, Papuan, and the Philippines. His decorations include the Silver Star, the Legion of Merit and the Presidential Unit Citation (2nd OLC).

He holds a B.S. degree from the University of Florida and has graduated from the Command and General Staff College, and National War College.

• COL HOLMES, CO, Limited War Laboratory, Aberdeen Proving Ground, Md. Sterling C. Holmes previously was Deputy to the Deputy CG for Guided Missiles, and before that, Assistant Chief of Staff for R&D at the U.S. Army Ordnance Missile Command, Redstone Arsenal, Ala. From 1955 to 1958 he served as Senior Adviser, 8th Division, Republic of Korea Army.

Col Holmes took part in the campaigns of Central Europe, the Rhineland, Normandy and Northern France. His citations include the Bronze Star with three Oak Leaf Clusters.

A native of Bushrik, N.Y., he holds a B.S. degree from North Carolina State College and an M.S. degree from the University of Southern California. He has completed the courses at the Command and General Staff College and the Naval War College.

• COL LEENEY, Chief, Air Mobility Division. A Master Army Aviator, Lewis William Leeney previously was CO, Lawson Army Aviation Command, Fort Benning, Ga. From 1957 to 1958, he served as Battle Group Commander, 2nd Battle Group, 3rd Infantry, in Korea.

In World War II, he served in Ardennes, the Rhineland, Central Europe, Normandy and Northern France as Executive Officer and then CO of the 1st Battalion, 8th Infantry. His citations include the Bronze Star Medal (OLC), the Distinguished Service Cross and the Purple Heart.

Col Leeney holds a B.S. degree from the State University of his native state, Iowa, and was graduated from the Command and General Staff College, the Air Command and Staff College and National War College.

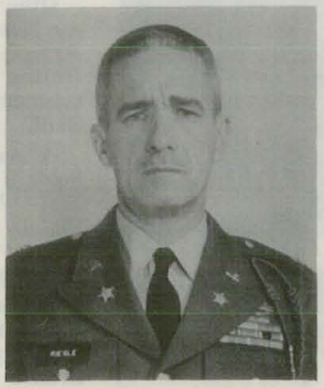
• COL MILNER, Deputy Director of Special Weapons. A native of Axtell, Tex., James Welbourne Milner was graduated from the U.S. Military Academy (1940). He earned an M.S.E. degree from the University of Michigan and has completed the courses at the Command and General Staff College and National War College.

Before his present assignment he was Group Commander, Hq, 64th Artillery Group, Camp Walters, Tex., and Deputy Chief of Staff, Hq Korean Military Assistance Group, U.S. Army, Pacific.

In World War II he participated in the Normandy, Northern France, Rhineland and Central Europe campaigns. He was awarded the Silver Star, the Bronze Star Medal, the Luxembourg Croix de Guerre and the

(Continued on page 20)

Col Barton O. Baker



Lt Col C. A. Riegle

Col W. R. Reed

Lt Col Joseph L. Gude

Biographies of New Chiefs Within OCRD Staff

(Continued from page 19)

Belgian Fourragere.

• COL NORRIS, Chief, International Division. A native of Cleveland, Ohio, Ned Taylor Norris graduated from the U.S. Military Academy in 1936.

Before joining OCRD he was CO, of the CCC, 2nd Armored Division, Fort Hood, Tex. During World War II, he was awarded the Silver Star (OLC), the Bronze Star Medal, the Croix de Guerre and the Purple Heart for combat performance in the Rhineland, Ardennes, Central Europe and Northern France. Following the war he served as Assistant Military Attache in Lebanon.

He has completed the courses at the Command and General Staff College, Strategic Intelligence School and the Imperial Defense College of England.

• COL REED, Chief, Policy Division. Formerly Chief, Management Analysis Division, Wilson Russel Reed was graduated from the U.S. Military Academy in 1941.

With OCRD since 1960, he has served as Deputy Chief, Programs and Analysis Division; Assistant Director, Plans and Management; and Chief, Planning Group for Reorganization.

During World War II he served in Central Europe and the Rhineland as Battalion S-3 with the 379th Field Artillery Battalion and as Assistant Chief of Staff, G-1, 102nd Infantry Division. Among his medals are the Bronze Star and the Croix de Guerre.

Between 1954 and 1957 he was assigned to the Office of the Secretary of Defense as the Army member of the Mutual Special Weapons Program, U.S. Mission to NATO and European Regional Organization, Paris, France.

• LT COL GUDE, Chief, Army Aircraft R&D Branch, Air Mobility Division. Joseph Lane Gude earned a B.S. degree in agronomy from the University of Maryland in 1942 and is a native of Washington, D.C.

During World War II he served with the 8th Infantry in Europe and was awarded the Silver Star (OLC), the Bronze Star Medal (2nd OLC), the Belgian Fourragere, the Presidential Unit Citation, the Air Medal (2nd OLC), and Purple Heart.

Following the war he served as Assistant Chief of Staff, G-3, 1st U.S. Army Missile Command, SETAF and with the 24th Infantry, FECOM. He has completed the courses at the Command and General Staff College and the Army War College.

• LT COL LEVAN, Chief, Zeus Office. A native of Kansas City, Mo., C. J. LeVan joined OCRD in 1959 as Staff Officer in the Air Defense Division. Previously he was an instructor in atomic warfare in the Special Weapons and Atomic Weapons Divisions at the U.S. Army Air Defense School, Fort Bliss, Tex.

During World War II he served in New Guinea and was awarded the Commendation Ribbon with three Oak Leaf Clusters. In Korea he was a battery officer, 30th AAA Battalion.

• LT COL PARKER, Chief, Space Office. A graduate of the U.S. Military Academy (1943), Nicholson Parker served since July 1961 as Assistant Chief, Missiles and Space Division. Between 1957 and 1959 he was Assistant Secretary of the General Staff, Washington, D.C.

In World War II he served in the Rhineland, Germany, and Central Europe as Assistant Operations and Training Officer, Hq 69th Division Artillery and was awarded the Commendation Ribbon.

He was graduated from the Command and General Staff College.

• COL PIXTON, Deputy Director of Developments. Allan Gardner Pixton earned a B.S. in geology at the University of Utah in 1940, and is a native of Lehi, Utah. His most recent assignments include Group CO, 26th Artillery Group, Fort Lawton, Washington, and Army Liaison Officer, USARMINO, Singapore. After completing the course at the Command and General Staff College, Fort Leavenworth, Kans., he stayed as an instructor from 1952 to 1954.

During World War II he took part in the campaigns of Normandy and Northern France. Among his citations are the Bronze Star Medal and the Croix de Guerre (with palm).

• LT COL RIEGLE, Chief, Review and Analysis Office. Prior to OCRD reorganization, Charles A. Riegle was Chief, Review and Analysis Branch, Management Analysis Division.

Other recent positions include Senior Member, Joint Observation Team, Army Affairs Division, U.S. Army, United Nations Command; and Management Office, Office of the Chief of Staff.

A native of Greenville, Ohio, he holds a B.S. in economics from Ohio State University, and a M.A. and Ph. D. degrees in Political Science and Public Administration from Syracuse University.

For service in World War II in Normandy, the Rhineland and Central Europe, he was awarded the Bronze Star Medal (OLC) and the French Fourragere.

Col Carey Heads OCRD Tech-Industrial Liaison

Col Merle L. Carey has been reassigned from Chief, Plans Branch, Research Planning Division, U.S. Army Research Office, to Chief of the Technical Industrial Liaison Office, Office Chief of Research and Development.

Appointment of Col Carey to his new post became effective upon departure of Col Russell W. Ernst for a year of study at the Industrial College of the Armed Forces, Fort McNair, Washington, D.C.

A graduate from the United States Military Academy in 1943, Col Carey served during World War II as a company commander in the 12th Armored Division. After graduating from the Armor School at Fort Knox, Ky., in 1948, he remained as an instructor in the Tactics Department until 1950. In the Korean War he commanded a battalion in the 3rd Infantry Division and served in the G-1 Section, Headquarters 8th Army.

Following graduation from the Command and General Staff College, Fort Leavenworth, Kans., he remained as an instructor in the Armor Section from 1953 to 1955. For the next three years he was assigned to the United States Military Academy as an associate professor, Department of Military Arts.

Prior to assignment to the U.S. Army Research Office in 1960, Col Carey commanded the 3rd Squadron, 14th Cavalry in Germany and served in the Operations Division, Headquarters, U.S. Army, Europe.

Col Merle L. Carey

SORO Slates Move to New Building in October

The Special Operations Research Office (SORO), funded totally under two Army contracts with the American University, will move into a new building at 5010 Wisconsin Ave. N.W., Washington, D.C., in October.

SORO Director Dr. Theodore R. Vallance announced the projected move and said that the change will keep the research organization close to the American University. SORO has been located on the campus since it was established in 1956.

Operations of SORO have mounted in importance in response to the current emphasis on special warfare and counterinsurgency activities of U.S. troops in remote areas. SORO was organized to meet the Army's requirements for research in advanced techniques of special warfare.

Acting under the direction and monitorship of the Office of the Chief of Research and Development, Department of the Army, SORO researchers apply knowledge in the behavioral and social sciences to the development of new methods of meeting special warfare problems.

SORO's research interests encompass psychological operations as well as escape and evasion, resistance, and civic action programs, in addition to the techniques of guerrilla and counterguerrilla warfare.

The close working relationship between the SORO staff and scientists at the American University will be unchanged by the relocation of SORO on 2½ floors of a 4-story building now under construction.

ASC Proceedings Slated For Limited Distribution

Proceedings of the 1962 biennial Army Science Conference held at the United States Military Academy, will be published this month.

Volume 1 contains unclassified papers whose principal authors' names start with the letters A through K. Volume 2 contains the remainder of unclassified papers. Volume 3 contains all classified papers.

About 100 copies will be distributed automatically. Most participants will receive the proceedings by submitting requests to the U.S. Army Research Office, Office of the Chief of Research and Development, Department of the Army, Washington 25, D.C. Changes of address linked to Army reorganization necessitate this policy.

The Armed Services Technical Information Agency (ASTIA) will fill requests for copies of individual papers presented at the conference, based upon a certified need-to-know in the case of classified papers.

Public sale of unclassified papers will be handled by the Office of Technical Services, Dept. of Commerce.

President Selects Paul DOD Manpower Chief

Norman S. Paul has succeeded Carlisle P. Runge, who resigned effective July 30, as Secretary of Defense (Manpower). President Kennedy nominated Mr. Paul, Assistant to the Secretary of Defense (Legislative Affairs) since January 1961.

David E. McGiffert, special assistant to Mr. Paul, became his successor.

A veteran of 14 years of Government service, Mr. Paul started in 1948 as an attorney with the Economic Cooperation Administration and served in increasingly responsible positions with the Office of the Director for Mutual Security, the Foreign Operations Administration, and the Central Intelligence Agency. He resigned in 1960 from the CIA to campaign for President Kennedy.

A native of Stamford, Conn., Mr. Paul earned a B.A. degree from Yale University (1940) and an LL.B. degree from the University of Virginia (1946). In World War II he was a Navy officer in the South Pacific.

DAVID E. McGIFFERT, born in Boston, Mass., earned B.A. and LL.B. degrees from Harvard University (1949 and 1953) and studied one year at Cambridge University as a Lionel de Jersey award winner. In 1956 he was a lecturer at the University of Wisconsin Law School. Prior to joining the Department of Defense, he was engaged in private law practice.

ARO Chiefs Return From Reorganization Planning Tasks in AMC, ODDRE

Three U.S. Army Research Office key personnel who have been on detached duty most of this year in Army reorganization implementation planning for other agencies have rejoined the staff.

Dr. I. R. Hershner, Chief of the Physical Sciences Division and "one of the founding fathers" of the U.S. Army Research Office, after serving earlier on the staff of the Chief of Research and Development, spent nearly six months with the U.S. Army Materiel Command.

As Chief of the Research Division Planning Group for the Army Materiel Command, Dr. Hershner was responsible for planning AMC Headquarters research functions and for the allocation of research activities to the subcommands.

Dr. Leonard R. Wilson, Chief of the Environmental Sciences Division of USARO, is also classed as one of the founding fathers, having transferred from the OCRD when USARO was established in March 1958. He has served in recent months as head of the Army Materiel Command group assigned responsibility for planning the establishment of an Environmental Research Branch in the AMC R&D Directorate, including an environmental research laboratory.

Maj Norman R. Rosen returned to USARO to become Chief of the Research Programs Division after a 5-month temporary tour in the Office of the Director of Defense Research and Engineering. He served as Military Assistant to the Deputy Director of DDRE for Administration and Management, Vice Admiral Charles B. Martell.

In this capacity, Maj Rosen assisted in establishing a research and engineering programing system within ODDRE, a task which involved coordination with the Comptroller, Office of the Secretary of Defense, and with the other military departments.

Maj Rosen also was project officer on the survey of sites and the negotiations which, after solution of many problems, gave the U.S. Army Research Office its new Headquarters in the Highland Building, 3045 Columbia Pike, Arlington, Va.

Dr. Leonard Wilson

Maj Norman Rosen

Dr. I. R. Hershner

Rotation, Transfers Cut Wide Swath in U.S. Army Research Office Staff

Col R. H. Oliver

Col Charles Gersoni

Col A. C. Sanders

Col Hubert L. Nolan

New faces are conspicuous in the lineup of U.S. Army Research Office personnel as a result of the heaviest normal rotation of military officers in the past three years.

Col Andrew A. Aines, who took over as Chief of the Research Support Division early in September, has the highest percentage of new personnel, including Peppino N. Vlannes as Deputy and Special Assistant.

Lt Col Charles E. Ramsburg, who served as Acting Chief of the Division for nearly two months, following departure of Col Robert W. Studer for a year of study at the Naval War College, has been assigned to Special Forces, Headquarters, U.S. Army, Europe.

Lt Col Wendell G. Van Auken has succeeded Lt Col Warren G. Langley as Chief of the Overseas Research Branch (formerly the Foreign Research Branch) of the Research Support Division. Lt Col Langley was assigned as Executive Officer, Office of the Director of Army Research. Frank H. Wright, recently retired from the Army with the rank of colonel, is a new staff assistant in the Branch.

Another member of the Research Support Division is Thomas A. Collins, assigned as a contracts specialist, Research Contracts and Grants Branch.

Physical Sciences Division. Col Hubert L. Nolan reported for duty as Deputy Chief under Dr. I. R. Hershner, following departure of Lt Col Lawrence R. Anderson to become Deputy Commander, U.S. Army Transportation Research Command (TRECOM), Fort Eustis, Va. Lt Col Raymond S. Isenson has joined the Physics and Engineering Branch as senior officer. New Chief of the Mathematics Branch is Fred Frishman, who was promoted when Dr.

Col Andrew A. Aines

Peppino N. Vlannes

Lt Col W. G. Van Auken

John A. Tierney resigned to return to the U.S. Naval Academy as a teacher.

Life Sciences Division. Dr. Eugene M. Sporn has been assigned to the Special Projects Branch as a biochemist (toxicologist), filling a position that had been vacant for several months. Col Frederick J. Haase, Chief of the Biological Sciences Branch, will depart late in October for assignment to the 819th Hospital Center, Orleans, France and will be succeeded by Lt Col Oliver H. Steed, who recently reported for duty. Maj John McWhorter left the branch temporarily to attend the Command and General Staff College, Fort Leavenworth, Kans.

Environmental Sciences. After about a year of operation under the name of the Earth Sciences Division, this division has reverted to its former title. Dr. Leonard S. Wilson is back at his old desk as Chief after nearly five months absence to serve on the Army Materiel Command planning group. The only staff addition is Lt Col Richard G. Terwilliger.

Research Planning Division. Col Bruce D. Jones recently was assigned as Chief to fill the vacancy left when Col Charles B. Hazeltine, Jr., was promoted to Assistant Director of Army Research. Lt Col Joseph P. Lydon has reported for duty in the Operations Branch as a staff officer.

Research Programs Division. Col Richard H. Oliver, who like Lt Col Charles E. Ramsburg served nearly four years with the U.S. Army Research Office, left in September for assignment as Deputy Commander, U.S. Army Post, Stuttgart, Germany. Maj Norman R. Rosen, back from five months TDY in the Office of the Director of Defense Research and Engineering, is the new Chief. Maj Joseph O. Wintersteen, Jr., is a new addition to the staff.

Other recent U.S. Army Research Office personnel changes include:

- Col Arvey C. Sanders appointed Chief of the U.S. Army Far East Research Office at Camp Zama, near Tokyo, Japan. He succeeds Col Charles S. Gersoni, newly assigned as Chief of the U.S. Army Personnel Research Office in Washington, D.C.
- Col Nils M. Bengston will take over Oct. 1 as Commanding Officer of the U.S. Army Research Office-Dur-

ham at Durham, N.C., upon the retirement of Col George W. Taylor.

• Lt Col William J. Phillips and Lt Col Glen W. Smith, Jr., have been assigned as Military Advisers to the U.S. Army R&D Operations Research Group which serves the Research Analysis Corp. (RAC), an Army contract agency.

Thumbnail biographical sketches of newly assigned U.S. Army Research Office key personnel follow:

COL AINES, Chief, Research Support Division. Andrew A. Aines, a native of Boston, Mass., served during the past year in Korea as Quartermaster, 7th Logistical Command, U.S. Army Pacific. From 1958-1959 he was a member of the Combat Developments Experimentation Center, Fort Ord, Calif., representing the Quartermaster Board. Previously he served in the Office of the Director Research and Engineering, Office Sectary of Defense.

Graduated from the University of Boston with a B.B.A. degree, Col Aines received an M.A. degree in international affairs from George Washington University. He is also a graduate of the Command and General Staff College, the Army War College and is credited with having completed a non-residence course at the Industrial College of the Armed Forces.

He has been awarded the Bronze Star, among other decorations, for his study of armored vests during combat in Korea. Col Aines also holds several patents. He is a member of the American Psychological Association and AAAS.

COL JONES, Chief, Research Planning Division. Fresh from a tour of duty as Area Engineer at Thule Air Force Base in Greenland, Bruce D. Jones was a Professor of Military Science and Technology at Colorado School of Mines, ROTC (1958-1961).

After graduating from Oregon State College with a B.S. degree in civil engineering, Col Jones obtained his masters degree at the Colorado School of Mines. He is a graduate from the Command and General Staff College.

In World War II he served with the 65th Engineer Battalion, 25th Infantry Division, and was awarded the Legion of Merit, Bronze Star and Commendation Ribbon.

COL NOLAN, Deputy Chief, Physical Sciences Division. Hubert L. Nolan was Deputy and then Chief of the Plans and Operations Division, U.S. Army Combat Surveillance Agency, Arlington, Va., from 1959-1962, following a tour in Hawaii with USARPAC. During World War II he served with the U.S. Air Force in the China-Burma-India theater.

Graduated from the Georgia School of Technology with a B.S. degree, Col Nolan received an M.S. degree in mechanical engineering from Purdue University, and is a graduate of the Command and General Staff College.

COL SANDERS, Chief, U.S. Army Research Office-Japan. Army research in the Far East is limited currently to the Life Sciences, and Arvey C. Sanders takes into his new assignement a well established reputation as an outstanding bacteriologist. He received his B.S. and M.S. degrees in bacteriology from the University of Maryland.

Among recent major assignments of Col Sanders have been two years at Walter Reed Army Institute of Research, Washington, D.C., where he was engaged mainly in the area of communicable diseases. He served in World War II as a bacteriologist and medical inspector with the 253rd, 240th and 188th Army General Hospitals.

A member of the American Public Health Association, Society of American Bacteriologists and the American Association of Professional Biologists, Col Sanders is the author of 12 publications in the *Journal of Immunology*, the *Armed Forces Medical Journal*, and the *Journal of Tropical Medicine*.

PEPPINO N. VLANNES, Deputy Chief and Special Assistant, Research Support Division, was employed from 1960-1962 as a Physical Science Administrator, Advanced Planning Division, Headquarters, U.S. Army Chemical Corps R&D Command, Washington, D.C. From 1954-1960 he was a research chemist with the Metallurgy Division, U.S. Naval Research Laboratories in Washington.

Mr. Vlannes received his B.S. degree from Centenary College, Shreveport, La., an M.S. in chemistry from Xavier University, Cincinnati, Ohio, and did graduate work at Georgetown University in Washington. Winner of a Department of the Army Achievement Award this year, he is a coinventor on three U.S. patents.

FRED FRISHMAN, Chief, Mathematics Branch, Physical Sciences Division. Before joining the U.S. Army Research Office staff in 1960, Mr. Frishman was Chief of the Applied Mathematics and Statistics Division, Naval Propellant Plant, Indian Head, Md., for six years.

During the past two years Mr. Frishman also has served as a part-time instructor in the Statistics Department, George Washington University. He is the author of numer-

(Continued on page 24)

Lt Col O. H. Steed

Lt Col J. Lydon

Maj J. Wintersteen

Dr. Eugene M. Sporn

Lt Col Terwilliger

Lt Col R. Isenson

Maj K. Borcheller

New Personnel Take Over Many U. S. Army Research Office Staff Positions

(Continued from page 23)

ous publications on statistics, mostly classified, and is a member of the Institute of Mathematical Statistics, the American Statistical Association, and Sigma Xi.

LT COL ISENSON, Staff Officer, Physical Sciences Division. Raymond S. Isenson served from 1958-1962 in the Office of the Deputy Commander for Army, Pacific Missile Range. For three years prior to that assignment he was with the Cook Research Laboratories as a staff engineer and project director in the Electronic Systems Division.

From 1952-1955 Lt Col Isenson was head test officer and leader of Board N. 4 (Light Antiaircraft Equipment), U.S. Continental Army Command. He served during World War II in the European Theater of Operations. Graduated from the University of Illinois with a B.A. degree in ceramic engineering, he received an M.S. degree in electronic engineering from the University of Pennsylvania. He is a member of the Institute of Radio Engineers.

LT COL LYDON, Staff Officer, Research Planning Division. Joseph P. Lydon served from 1960-1962 with the U.S. Military Assistance Advisory Group in Cambodia. He was Chief, Training and Evaluation Branch, Defense Atomic Support Agency, Sandia Base, N. Mex., from 1956-1960.

During World War II Lt Col Lydon served as a Company Commander, 379th Infantry, 95th Division in the battles of Metz, the Bulge and the Ruhr Valley. In the Korean War he was a Battalion Commander and Regimental S-3, 31st Infantry, Seventh Division. His decorations include the Silver Star, Bronze Star (OLC), Soldier's Medal and the Purple Heart (2nd OLC). He is a graduate from the Command and General Staff College.

EUGENE M. SPORN, Bacteriologist, Life Sciences Division. Employed by the Chemical Corps R&D Command from 1958-1962, Dr. Sporn served as Chief of the Basic Toxicology Branch, Research Division, until he was promoted to Chief of the Biological Division.

Educational qualifications of Dr. Sporn include a B.S. degree in chemistry-biology from the City College of New York, an M.S. degree from the University of Wisconsin and a Ph. D. degree in biochemistry from Georgetown University, Washington, D.C.

Author of more than a dozen publications on skin penetration, nutritional studies and psychotomimetics, Dr. Sporn is a member of the American Chemical Society, American Association for the Advancement of Science, Scientific Research Society of America, New York Academy of Sciences and Phi Sigma.

LT COL VAN AUKEN, Chief, Overseas Research Branch. Graduated from the United States Military Academy in 1943, Wendell G. Van Auken served during World War II as a Rifle Company Commander with the 42nd Division in the European Theater. He was awarded the Silver Star and the Bronze Star.

Major assignments in recent years include service with the U.S. Military Assistance Advisory Group in Vietnam (1961-1962) and Taiwan (1956-1958), and instructor at the Command and General Staff College (1958-1961).

LT COL STEED, Chief (effective in October), Biological Sciences Branch, Life Sciences Division. Assigned during the past year as Chief, Army Medical Services Career Planning, Office of The Surgeon General, Oliver H. Steed served from 1958-1961 as Commander, U.S. Army Europe Medical Service School and Commander, 8th Evacuation Hospital, Landstuhl, Germany.

From 1955-1958 Lt Col Steed was assigned to the Office of the Chief of Research and Development, Washington, D.C., following three years as an instructor at the Medical Field Service School, Fort Sam Houston, Tex. He was assigned to the 298th General Hospital in the European Theater from 1942-1945. Graduated from Purdue University with a B.S. degree in Pharmacy, he has completed courses at the Command and General Staff College and the Armed Forces Staff College.

MAJ ROSEN, Chief, Research Programs Division. Groomed for his new responsibilities by more than a year as assistant to Col R. H. Oliver, the man he succeeds, Norman R. Rosen is a U.S. Military Academy graduate (1947).

In addition to his Army engineer training, Maj Rosen has an M.S. degree in civil engineering from Massachusetts Institute of Technology, and served from 1955-1958 as a project engineer and executive with the U.S. Army Engineer District, Alaska. He was awarded the Silver Star Medal for service in Korea as a platoon leader and Assistant G-3, 10th Engineer Battalion.

MAJ WINTERSTEEN, Staff Officer, Research Programs Division. Joseph O. Wintersteen's Army experience since graduating from Pennsylvania State University with a B.A. degree in commerce and finance has been almost totally with combat troops.

From 1958-1961 he served as Company Commander, Battle Group S-3 and Budget Officer in Berlin, Germany. Prior to that he was an instructor in Airborne Operations at Fort Bennnig, Ga., for two years. In Korea he was Company Commander, 1st Battalion, Seventh Infantry, and in World War II he was assigned to the 103rd Infantry Division in the European Theater. He has been awarded the Bronze Star and Purple Heart.

FRANK H. WRIGHT, Staff Officer, Research Support Division. Retired from the Army in 1946 as a full colonel, Mr. Wright entered active duty in 1941 shortly after the attack on Pearl Harbor. He entered Reserve status in 1919 after serving with the 5th Federal Signal Battalion during many of the major battles of World War I—Chateau Thierry, Champagne Marne, Somme, Oise Aisne, St. Mihiel, Meuse Argonne. He was awarded the Legion of Merit and the Army Commendation Medal.

For eight years prior to World War II, Mr. Wright was a procurement officer with Standard Oil Co., and served four years in Saudi Arabia. His Army service has included tours in France, Germany, Panama, Korea and Japan.

THOMAS E. COLLINS, Contracts Specialist, Research Contracts and Grants Branch. Mr. Collins joined the U.S. Army Research Office staff after serving three years with the Tank-Automotive Branch, Office of the Chief of Ordnance. He was graduated from the University of Minnesota with an LL.B. degree, and served from 1954-1956 with a Nike Battery, Army Artillery.

CRDL Deputy CO Gets Promotion to Colonel

PICTURES OF PRETTY WIVES pinning insignia of promotion on their husbands' shoulders provide as legitimate justification as possible for publicizing the ladies in this staid if not stodgy publication. Getting his colonel "birds" is Allan C. Hamilton, Deputy Commander, pinned by Col James A. Hebbeler, CO of the U.S. Army Chemical R&D Laboratories and formerly Chief of what is now Life Sciences Division, Army Research Office.

Dr. Schmid Leaves Aberdeen After 12 Years to Join Staff at GIMRADA

Dr. Hellmut H. Schmid has been appointed Scientific Adviser to the Director of the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA) at Fort Belvoir, Va.

GIMRADA Director, Col W. H. Van Atta, considers the addition of Dr. Schmid to the staff a rare stroke of good fortune, since he occupies the same position of preeminence internationally in photogrammetry as the man he succeeds, Dr. R. Bertil P. Hallert.

After devoting a year to special research in photogrammetry at GIMRADA and serving also as a consultant, Dr. Hallert returned recently to his native Sweden. Dr. Schmid in 1957 and Dr. Hallert in 1961 received the Sherman Fairchild Photogrammetric Award, the highest honor conferred by the American Society of Photogrammetry.

Results of Dr. Hallert's research at GIMRADA are regarded as significant advances in techniques of topographic mapping, with possible application to other fields such as medicine (X-ray photogrammetry), engineering (ballistic photogrammetry), architecture and microscopy. He is a member of the Royal Institute of Technology in Stockholm, Sweden.

Dr. Schmid has been termed "the Werner von Braun of Photogrammetry" in respect to his outstanding accomplishments. Like Dr. von Braun, he was on temporary assignment to the German Rocket Center at Peenemunde, Germany during World War II. He was chief of a branch in charge of geodetic measurements, precision workshop measurements, and all full-scale trajectory measuring methods used for the V-2 rockets.

INTERNATIONALLY PROMINENT photogrammetrists Dr. Hellmut Schmid (left) and Dr. Bertil Hallert with Col W. H. Van Atta, GIMRADA Director.

After emigrating to the United States in 1945, Dr. Schmid was employed by the Department of Defense, working on geodetic and trajectory measurement problems in the development of guided missiles. In 1950 he transferred from the White Sands (N. Mex.) Proving Ground to the Ballistic Research Laboratories at Aberdeen (Md.) Proving Ground.

During 12 years at Aberdeen, Dr. Schmid was active in the development of a high-precision phototheodolite, featuring optimized mechanical and optical components. He also contributed to speeding the development of Ingratar and Infragon lenses and in the creation of a new Astrotar lens, as well as development of a high precision stereocomparator with automatic data output.

Dr. Schmid will continue his research activities with GIMRADA, operating on much the same basis as Dr. Hallert, who stated prior to his departure for Sweden:

"The more complicated technical developments become, the more necessary is a close cooperation between related scientific fields. . . . It has been of very great value for me to . . . discuss scientific questions with members of the GIMRADA staff. I believe that the concentration of scientists from various fields, as for instance mathematics, physics, astronomy, geodesy and photogrammetry, in an organization segment at GIMRADA is of the greatest value for the development of a basic research program. . . .

"The quality of measurements is fundamental to all scientific endeavor, but basic concepts and expressions for the quality of measurements are not always clear and well-defined. Misunderstandings, more or less serious, occur easily. . . . This is a real international problem which requires attention in all measuring sciences in all countries. . . ."

Results of Dr. Hallert's research at GIMRADA will be presented for discussion at the next International Congress for Photogrammetry to be held in 1964 in Lisbon, Portugal.

Dr. Krueger Named USAERDL Deputy Director

Col Philip C. Krueger has been named Deputy Director of the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., succeeding Col John E. Walker, reassigned to the European Command in France.

A recent graduate of the Air War College, Maxwell Air Force Base, Ala., Col Krueger served in Pakistan from 1959 to 1961 as Area Engineer and Deputy District Engineer, Trans-East District. For three years prior to that time he was an instructor at the Command and General Staff College, Fort Leavenworth, Kans.

The new USAERDL leader was assigned to the Manhattan District, Atomic Energy Commission and Armed Forces Special Weapons Project from 1946 to 1948. He was reassigned to the latter organization from 1950 to 1954 after completing studies for his master's degree at Cornell University. During WW II he served 30 months in Europe with the 40th Engineer Group.

A native of Indiana, Col Krueger received his B.S. degree and commission as a second lieutenant from the U.S. Military Academy at West Point in 1942. He also attended the Armed Forces Staff College, Norfolk, Va., in 1956.

Col Philip Krueger

Wayne A. Coleman, center, works on stress analyses, under the direction of Richard J. Clark and Capt Joseph P. Franklin in Nuclear Power Field Office, Fort Belvoir, Va.

Maureen I. Harris, with assistance from Roy P. Nebiker, Operations Support Department, calculates amounts of various isotopes produced in the Belvoir reactor.

John Page, wearing protective clothing, measures radiation levels in the Operations Support Department.

Students Learn About Army Nuclear Power Program as Summer Employees

"Members of the Nuclear Power Field Office professional staff have been pleased with results obtained under the student-hire program to date. The students are highly motivated and their performance constitutes a significant contribution to the work output of the office."

James L. Langford, assistant chief of the NPFO, made that statement in commenting on the student-hire program and, particularly, the six students employed this summer.

The students, he said, find their work interesting, challenging and rewarding in that they have the opportunity to work under the direction of civilian and military personnel who are tops in their particular nuclear power field. They also earn money for the college year ahead.

Four students, including one girl, are employed in the Operations Support Department. They are Miss Maureen I. Harris, John Campbell Bane, Jr., John Hinton Page, and Wayne A. Coleman. Charles Q. Beede is employed in the Advanced Power Conversion Development Branch, and David Kees Smith is assigned to the Training Department.

Miss Harris, a graduate of Groveton High School in Fairfax County, Va., received a 4-year full tuition scholarship to George Washington University where she will be a junior this fall. She is planning a career in chemistry.

Mr. Bane, a 1961 graduate of Mount Vernon High School, also in Fairfax County, is a student at Case Institute of Technology, Cleveland, Ohio. His studies are toward a degree in physics, with specialization in radiation physics.

Mr. Page, a 1960 graduate of Groveton High School, is studying at Davis and Elkins College, Elkins, W.Va., and plans to continue in the field of nuclear power as an engineer.

Mr. Coleman, a graduate of Edison High School in Miami, Fla., is a student in nuclear engineering at the University of Tennessee, Knoxville, Tenn., where he expects to obtain his degree in 1963.

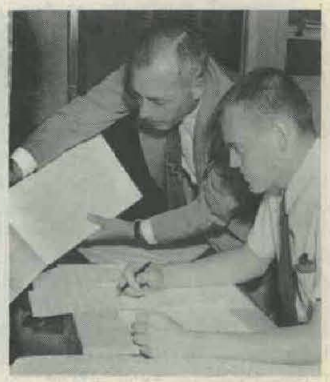
"Upon graduation", he said, "I will be commissioned as a second lieutenant in the Corps of Engineers through the ROTC program. I sincerely hope to be assigned to some phase of ANPP (Army Nuclear Power Program)."

A graduate of Montgomery-Blair High School, Silver Spring, Md., Mr. Beede attended the University of Maryland in 1957-59 and then enrolled in Brigham Young University. His interest is in nucleonics, electronics, and physics in connection with rocketry or medicine.

Mr. Smith, a graduate of Anacostia High School, Washington, D.C., is a student at the University of Maryland. A senior this fall, he said he may continue in the field of nuclear power as an electrical engineer.

David K. Smith observes wave forms on oscilloscope in a laboratory exercise under the supervision of Lt Jerry F. Welch, Chief, Instrument Training Section, NPFO.

Charles Q. Beede (right) and supervisor Joseph Kapsch check pressure gauges at gas turbine test facility of Advanced Power Conversion Development Branch.



John C. Bane (seated) and supervisor James M. Garner, Jr., study graphs on project in Operations Support Dept.

By Dr. Ralph G. H. Siu

CHINESE BASEBALL. Some sporting advice on acquiring managerial finesse in Washington may be gleaned from the following stories. To quote my old Master:

"So you're going to Washington, eh?"

"Yes sir," I replied.

"Well, son!" he warned, "you'd better be good at Chinese baseball—that's for sure!"

After I inquired about the nature of the game, he explained:

"Chinese baseball is played almost exactly like American baseball—same number of players, same balls, same bats, same scoring, and so on. The batter stands in the batter's box as usual, and the pitcher winds up as usual. However, there is one important difference. After the ball leaves the pitcher's hand, and as long as it is in the air, *anyone* can move *any* of the bases *anywhere*!"

LET'S GET ON WITH THE GAME. We have described the game of Chinese Baseball as typifying much of the Washingtonian activities. After more detailed study, however, we have concluded that another technique is equally popular among the on-the-way up eager beavers. We shall describe it in the paraphrased version about the husky football player out for the season's first practice scrimmage.

He ran up and down the field and otherwise exercised himself. Finally, he asked the coach when the scrimmage would start. He was told that the ball was not yet on the field. Whereupon the ballplayer said, "To hell with the ball, let's get on with the game!"

COMMON SENSE. The staff-study must make common sense, we are told. Otherwise, it won't pass the first assistant in the first echelon. Naturally, we are sorely tempted to dilute the difficulties, exaggerate the potentialities, delete the nuances, and in general "make good sense" out of the raw data, so that the final draft will be sure to get by the approval chain. But, then, Henry David Thoreau, advises us in *Walden:*

"Why level downward to our dullest perception always, and praise that as common sense? The commonest sense is the sense of men asleep, which they express by snoring. Sometimes we are inclined to class those who are once-and-a-half witted with the half-witted, because we appreciate only a third part of their wit."

Idiophylaxis: A Biological Armor for the Soldier

(Continued from page 2)

Fort Knox, Ky. As the trigger is pulled, an electronic timing device sets off a click in the ear of the gunner. The click causes the muscles to contract, thus pulling the ear drum more taut. About 200 milliseconds later, when the gun goes off, the ear is "protected" from the sound of the explosion.

Another form of "built-in protection" is under study at the U.S. Army Research of Environmental Medicine at Natick, Mass., where possibilities for acclimatizing the soldier to hot or cold climates have already shown great promise. Two groups of soldiers were flown to Panama and the difference under field conditions in the hot climate there were compared.

One group had been exposed to high temperatures over a period of several weeks, resulting in gradual adaptation to that environmental condition. The control group was subjected to the normal training procedures prior to overseas movement.

In practically every respect, the "acclimatized" group performed more effectively than the control group. In the non-acclimatized men there were casualties due to heat and humidity while in the heat-acclimatized men there were none. In a weight-moving task the heat-acclimatized men moved thousands of pounds more in an hour and a half than the non-acclimatized men. The heat-acclimatized men progressively improved their performance so that they moved a greater load in the last 30 minutes than in the first 30 minutes. The non-acclimatized men deteriorated in their performance.

Similar studies have been conducted in both laboratory and field for acclimatizing men to cold temperatures, and a procedure for adapting the same man simultaneously to both heat and cold has been demonstrated successfully.

Still other kinds of idiophylaxis are being studied. One possibility is insect repellents which are harmless to man and can be swallowed. By changing the man's chemistry, his skin becomes an effective repellent for approaching mosquitoes, flies, ticks, fleas and other insects. Pills are under study which would proved immunity from sunburn. Others someday may provide a measure of protection against nuclear radiation.

All of these ideas have inherent the built-in, self-protection concept. All have the possibility of being controlled through medical knowledge. They have very great promise for very large savings in Army logistics. They do not require additional weight for the soldiers to carry into combat; they do not require additional volumetric space in the ships or aircraft serving as supply lines overseas; they are part of the soldier—wherever he goes.

Dr. Polley Climbs Ladder At Chemical Laboratories

Dr. Edward H. Polley, an employee of the U.S. Army Chemical Research and Development Laboratories since 1959, was promoted recently to Chief of the Experimental Medicine and Neuropharmocology Branch. The Laboratories at the Army Chemical Center, Md., are an element of the U.S. Army Materiel Command.

Formerly an officer in the U.S. Navy and an assistant professor of anatomy at Hahnemann Medical College, Philadelphia, Pa., Dr. Polley was graduated from De Pauw University in 1947 with a B.S. degree.

After earning an M.S. degree in 1949 and a Ph. D. degree in 1951 at St. Louis University, he was granted a post-doctoral fellowship by the U.S. Public Health Service for research in neuroanatomy and neurophysiology at Washington University, St. Louis, Mo.

Dr. Edward H. Polley

Former USARO Scientist Gives View on Information Retrieval

By Ernst M. Cohn

National Aeronautics and Space Administration; Author of U.S. Army Research Office "Fuel Cells Report No. 2"

The publication "explosion," particularly in the natural sciences and technology, has made retrieval of documents an acute problem. Everyone is talking about it. Indexing, storage and retrieval of documents are receiving widespread attention. On request, non-profit and profit organizations in increasing numbers will make literature searches and often supply the output as a collection of abstracts.

This article is concerned only with systems that yield abstracts as their output. Judging from the quality of some sample abstracts, I consider them more of a hindrance than a help. Yet excellent abstracts also are available from certain sources. What causes these wide differences in quality, and what can be done to make all abstracts useful?

To arrive at an answer to these questions, we must first consider why document retrieval is a problem. Retrieval of non-specialized information by traditional methods is still adequate. The real problem arises in getting up-to-date, comprehensive, detailed data to the working-level scientist and engineer. He should have available all the technical information that could be of use to him. The technician may not be able to absorb and evaluate such information; the manager, though perhaps technically trained, normally has no need for it nor time for digesting it.

Clearly, the kind of document retrieval system that presents a challenge to our ingenuity must be based on the needs of practicing professionals, the specialists. The scientific adviser, program planner, technological forecaster, and others can obviously derive the same benefits from good abstracts as does the specialist, since his needs are more comprehensive.

Normally, the specialist is well trained and informed about the subject matter. When he prepares himself to enter a new (but usually related) field, it does not take him long to find general reference works as well as recent summaries of advances made in that field and to become conversant with it. For this purpose, he as well as the nonspecialist can still use traditional means to good advantage. The comprehensive, mechanized retrieval system that delivers abstracts as the result of a search should, therefore, not be burdened with introductory general material that the specialist takes for granted.

However, not all abstracts are, or should be, written for a modern document retrieval system. A periodic technical report, for example, may require an abstract that stays within certain space limits and is directed primarily toward management. An abstract accompanying a paper in a "popular" science or technology journal must cover a review that normally does not contain a single new fact or theory. Such abstracts are designed for generalists and therefore have no place in an elaborate, automated document retrieval system.

Incidentally, a serious shortcoming in reports to management is reflected in their abstracts, a flaw which handicaps both management and specialist: This is the tendency of the researcher to write positive reports, regardless of results. Rightly or wrongly, the report to management is used as a propaganda instrument. Rarely is it so frank as to state "we tried to do this but failed." Abstracts of reports on unsuccessful experiments can be masterpieces of misstatement without in the least falsifying any data.

From the laboratory or pilot-plant point of view, negative results are just as valuable as positive ones. Unless an abstract properly reflects and interprets such negative data, a great deal of time can be wasted on reading the report or even continuing down dead-end path experimentation.

Review papers and reports to management have their place in elaborate, mechanized document retrieval systems. Abstracts, if any, as used in such systems should be specifically written so as to serve the interests of the specialist. When the retrieval search yields only a handful of abstracts, the specialist can obtain all original sources and read them. But when the search results in an extensive collection of abstracts, they are likely to be used in selecting the most pertinent for further consultation.

That is the point at which the unnecessarily wordy abstract of a review paper is a mere time-waster. The poor abstract of a progress report

Scientist Psychoanalyzes Atoms He Makes Neurotic

Strange sounding and sometimes just plain strange jobs are commonplace in the laboratories of the Army Missile Command at Redstone, Ala. Among the men who work to improve Army missiles, Dr. Fred Findies may have the strangest job of all.

He psychoanalyzes neurotic atoms after he has made them neurotic.

A summer employee in the Army missile program, Dr. Findeis, of the University of Alabama's School of Chemistry, is picking apart an ingredient for a new high-energy rocket fuel. He does it with heat and X-rays to induce the atoms to tell him their troubles.

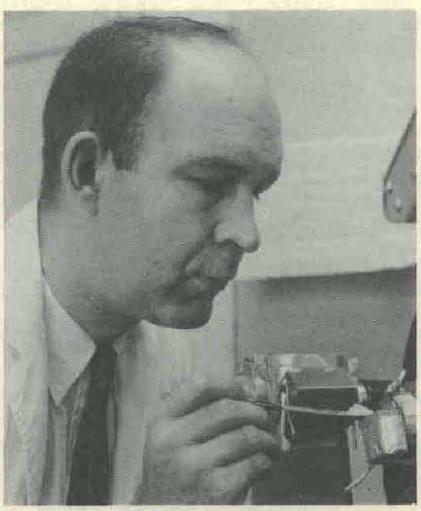
By breaking down the prospective propellant, he can watch its individual atoms. Their antics are noted by an extremely sensitive recording device, revealing their properties.

The powdery substance—its composition is classified—is being considered as an additive to boost the thrust power of the Army's biggest solid propellant rocket motors. All the major Army missiles now under development like the Nike Zeus and Pershing use fast reacting, solid fuel.

"When heated," Dr. Findeis explained, "the molecules separate into individual atoms. The atoms are then confronted with a problem. They don't know what they are until they 'see' another atom. They are really mixed up and behave neurotically."

Instead of a psychoanalyst's couch, Dr. Findeis places his "patients" in a metal sink to study reactions.

A professor of inorganic and nuclear chemistry, Dr. Findeis has been at the University of Alabama since 1961. He received his doctorate in chemistry from Purdue University, Lafayette, Ind., in 1956 following graduation from Capitol University in Columbus, Ohio, in 1952.



Dr. Fred Findeis puts high energy fuel (composed of "neurotic atoms") into X-ray machine for analysis.

or published paper may defeat the purpose of even the best retrieval system: It may lead the specialist to ignore a key paper by failing to point out the paper's relevance.

To cite an extreme but real example, I recently saw an "abstract" that was a verbatim copy of the introductory paragraph of the report. Only if the title or the author's name should excite the curiosity of a busy specialist is this report ever likely to be consulted as a result of its abstract. A poor abstract may thus lead to nonretrieval of vital information.

In other words, whereas the system is perfectly capable of retrieving the document, the human decision not to consult the paper is based on the poor quality of the abstract!

Even the best abstract can never be a substitute for the paper on which it is based. Derivations of mathematical equations, experimental details, individual data and methods for their correlation, comparison of results with those obtained by others, and complete interpretations must normally be omitted.

Because of space limitations, abstracts cannot do justice to lengthy papers or books containing major amounts of novel information. Abstracts are, after all, only guideposts to, not substitutes for, the full publication. All we can expect of them is that they point clearly and directly to useful information.

The most serious fault of poor abstracts is abstractness, i.e., lack of numbers, omission of important results, failure to state experimental or theoretical limitations. These characteristics are typical of the so-called descriptive abstract that is virtually useless to the professional who is looking for information, not for a curiosity teaser.

Conversely, therefore, *the abstract should extract a maximum of quantitative information,* use unequivocal language, and be as concise as is consistent with adequate coverage. It must tell the user whether the full paper is worth his consideration.

The abstract of a document that adds new information to a field must contain the following elements: Purpose and scope of work, all new information, all material suitable for index entries, any special applications mentioned, and author's conclusions.

That is the gist of writing an informative abstract, as stated in "Directions for Abstractors and Section Editors of Chemical Abstracts."[1] This vest-pocket booklet contains a wealth of abstracting information.

From the foregoing it is obvious that an all-purpose abstractor cannot possibly write abstracts useful for a specialist. That would be equivalent to expecting a translator of French poetry to make a translation of a French paper in quantum mechanics. Even the most talented abstractor can be familiar with only a few fields of science and technology at best.

Having done the work, the author is technically best qualified to write his own abstract.[2] But he, like any other abstractor, must be familiar with the requirements for the contents of an informative abstract and must have practice in writing and abstracting to be proficient in the art.

In a way, writing and abstracting are antithetical. Within limits, a certain amount of redundancy in writing helps the reader to understand a paper, whereas compactness is a necessary attribute of the abstract. Thus, a good writer is not *ipso facto* a good abstractor.

All that has been said here, for example, could be abstracted by quoting the displayed sentence above, if it were worth abstracting at all. It really appears to be self-evident and would not have been written, except that the obvious seems in danger of being forgotten in the quest for systems and gadgets to aid retrieval.

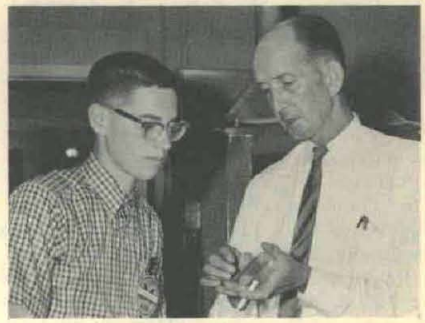
When the problem of usable abstracts is raised, it is sometimes countered by the problem of higher costs for meaningless abstracts. That is not a valid reason for having poor abstracts, of course. It would be better to supply merely a bibliography than to furnish useless abstracts that may mislead the specialist into ignoring papers, when he might have looked them up in the absence of abstracts.

The cost of training researchers to write good abstracts for their colleagues is minimal. Many professionals are willing to perform abstracting services for a professional society like the American Chemical Society, their reimbursement being little more than the cost of paper and postage.

If, in addition, we must have full-time abstractors, it will not be a luxury nor a waste of manpower to employ technical specialists for each area of science and engineering in which they are needed. If our ingenious new indexes and our expensive document storage and retrieval equipment are to be of maximum use, the chain of information must include a strong abstract link.

References. [1] Published by the Am. Chem. Soc., The Ohio State University, Columbus 10, Ohio. [2] E. Cortelyou, "The Abstract of the Technical Report," J. Chem. Ed. *32*, 532-533 (October 1955).

Crystal Gazing Into Future As Potential Army Scientist



Robert Cornell is briefed by Millard F. Timm on synthetic crystal production at U.S. Army Electronics Research Agency, Ft. Monmouth, N. J.

Crystal gazing as being practiced here by Robert Cornell, an outstanding high school science student, is not even remotely related to fortune telling—unless it can be deduced that Robert is trying to see into the future regarding his potential as a U.S. Army career scientist.

One of 16 exceptionally gifted science students selected for special awards by U.S. Army judges at the 1962 National Science Fair-International, Robert spent a week-long all-expense-paid visit at the U.S. Army Electronics Research and Development Agency, Fort Monmouth, N.J.

Deputy Commander of the Agency, Col Raymond H. Bates, and Chief Scientist Dr. Hans K. Ziegler, whose career as an Army scientist for more than 30 years has brought him international renown, were among top leaders of the Agency who explained the scope and diversity of its R&D activities.

Part of Robert's extensive briefing on Army interests in the field of electronics was an explanation by Millard F. Timm of the Agency's Solid State and Frequency Control Division on synthetic production of crystals.

Robert's prize-winning exhibit and presentation at the National Science Fair-International was on "Activating Impurities in Crystalline Minerals." His extensive knowledge of this subject, based on studies of causes of fluorescence and luminescence, won the respect of judges. His scientific interests extend to geology, chemistry, astronomy and spectroscopy.

Winner of a National Merit Scholarship, the Marion, Ind., youth is planning a career as a geochemist. His visit at Fort Monmouth impressed him favorably regarding career opportunities for young scientists in Army R&D, he stated.

Contract Provides for Study of Insects as Biological Agent Detectors

A 6-month $46,000 contract study to determine the feasibility of using insects in a detection and warning system for biological agents has been awarded by the Munitions Command of the U.S. Army Materiel Command.

Awarded to Bio-Search, Inc., of Boston, the contract was granted as part of the Chemical Corps' project for the development of rapid-warning systems for chemical and biological weapons. Dr. Alfred Kornfield of Bio-Search will report on the feasibility of the concept and recommend a research program after completing his studies.

Rapid detection and warning of biological attack must be accomplished through scientific methods because none of man's senses can detect aerosolized agents. Dr. Kornfield's work represents new approaches in the detection field.

Biological agents, if used in warfare as an aerosol or spray, would produce infection through respiratory channels. Personnel must be warned in time to don masks, seek shelter, and take other protective and decontamination measures.

An ideal detection system fulfills five basic requirements. First, it detects extremely low concentrations. Second, its response time is short. Third, it discriminates between biological agents and naturally occurring particles and other "background" interference. Fourth, it identifies various genera or species of agents. Finally, it is compact and highly reliable.

Nature has endowed living organisms with a diversity of biological "detection systems" necessary to their survival. Man's five senses are examples but are relatively insensitive. However, many other organisms have sense organs, or receptors, whose capabilities far excel man's and the most sensitive chemical and physical receptors devised by man.

Insects, in particular, have extremely sensitive receptors, especially for odors. The olfactory organs of insects are located in parts of their legs, in posterior appendages known as cerci, and in their antennae in the form of chemical receptors, or chemoreceptors. These receptors, responding to air-borne chemical particulates that are the substance of odor, transmit electrical impulses through the insect's nervous system.

Odors repellant to the insect usually produce a protective response. Other odors assist insects in recognizing and locating their fellow insects, food and even their mates.

For example, among the Lepidoptera, the order of insects consisting of the butterflies and moths, many species are dependent upon windborne female sex odors to stimulate mating. These odors can be detected by the male in concentrations of 1 in 1,000,000 or less and over considerable distances. One species of arctiid moth is known to have been attracted from a distance of almost seven miles.

Insect olfactory receptors also are sensitive to variations in concentration. Receptors of some species are odor-specific; they respond only to one or to a limited group of odors; those of the male may respond to one odor or group of odors while those of the female may not and vice versa.

Insect receptors also apparently discriminate well between odors that affect them and the "background" odors. Many insects also respond to odors of byproducts produced by some microorganisms.

Army chemists working at Fort Detrick propose to investigate the possibility of adapting insect receptors or other biological receptors as a part of a detection system for biological agents. Such receptors might operate by being arranged to sense agents presented to them and to respond as transducers by creating an electrical or other output.

The electrical output from such a system could be handled by electronic equipment already developed. Computer and communications equipment now available is capable of counting, storing, analyzing and reporting the pulse output of such a system.

Tissue cultures also offer possibilities as receptors for use in a detection system. When an infectious organism invades the human body, the body reacts with various responses such as inflammation. Such responses are rapid and can be triggered by a single microorganism. Thus, if tissue culture response can be instrumented, such cultures may prove effective as the sensing elements in a detection system.

Allen Wins RSA Award For Tularemia Studies

Dr. William P. Allen is the recipient of the Fort Detrick Branch, Research Society of America's annual certificate for performing outstanding research at the U.S. Army Biological Laboratories during the year 1961.

Dr. Allen's research in the Virology Division has demonstrated that acquired resistance resulting from infection with tularemia is associated with specialized cells from blood and spleen. This resistance can be passively transferred by administering these cells from the immune donor to normal animals. His observation will provide a basis for further study of the mechanisms of resistance to tularemia. The results of his work were published in the February 1962 Journal of Experimental Medicine.

A native of Buffalo, N.Y., Dr. Allen received his Ph. D. degree in microbiology and immunology at the University of Michigan in 1955. Since then he has been at Fort Detrick.

NEWLY PROMOTED DIVISION DIRECTORS at the Quartermaster Research and Engineering Center, Natick, Mass., Dr. S. David Bailey, Pioneering Research Division (second from left) and Dr. Stephen J. Kennedy, Clothing and Organic Materials Division (second from right) are formally congratulated by Brig Gen Merrill L. Tribe and Scientific Director Dr. Dale H. Sieling.

ASA Larsen's Yen Leads Top Brass to 'Hit Silk'

Stifled secret ambition of top military leaders may reflect a characteristic daring—like wanting to make a first parachute jump at age 46.

Satisfying that desire recently put more "top brass" on a parachute stick than is recorded in the proud history of the U.S. Army airborne troops — an Assistant Secretary of the Army, two 3-star and one 2-star generals.

Dr. Finn J. Larsen, ASA (R&D), a Navy officer for three years in World War II, casually mentioned his secret ambition to Lt Gen Dwight E. Beach, Army Chief of Research and Development.

Known as a man never disposed to dawdle when the occasion calls for action, General Beach soon set the wheels in motion. A request to Fort Bragg, N.C., where the general commanded the 82nd Airborne Division for 22 months until April 1961, scheduled Dr. Larsen for special parachute training.

In preparation for the jump, General Beach sweated it out with Dr. Larsen during two days of gruelling training and instruction at Fort Bragg. Together they jogged down roads like prize fighters, to condition leg muscles. They went through an exhausting series of push-ups and other calisthenics. They practiced parachute landing falls and worked out on the landing swing trainer.

DR. FINN J. LARSEN, Assistant Secretary of the Army for R&D, prepares for first parachute jump at Fort Bragg, N.C. After completing the jump, Secretary Larsen was made an honorary member of the 82nd Airborne Division.

Then, on August 1, Dr. Larsen jumped out of an HU-1B helicopter from an altitude of 1,250 feet. He was reported to have made a "very excellent landing," rolled up his parachute, and walked off as nonchalantly as a veteran jumper.

Following Dr. Larsen out of the helicopter in close order came three real veteran paratroopers: Lt Gen Hamilton H. Howze, Commanding General of the U.S. Strategic Army Command and also CG of the 18th Airborne Corps, Lt Gen Beach and Maj Gen John L. Throckmorton, CG of the 82nd Airborne Division.

'Hummingbird' VTOL Aircraft Passes First Test

The Army's turbo-jet vertical take-off and landing (VTOL) research aircraft, the VZ-10 "Hummingbird" recently made its first conventional flight at Marietta, Ga.

Built for the Army by Lockheed-Georgia Co. at Marietta, the VZ-10 flew for 30 minutes. The flight was pronounced "completely successful" by the test pilot.

A series of conventional flight tests is scheduled to prove the aerodynamic and handling features prior to beginning VTOL flight testing. The current test program is expected to be completed by October. A follow-on series of tests is planned to validate technical and operational feasibility.

The VZ-10 is a 2-seat, mid-wing monoplane 32 feet long with a 25-feet wing span. Power is supplied by two Pratt & Whitney JT12-A-3 turbojet engines. Vertical lift is achieved by directing the exhaust gases downward through bomb-bay type doors. For forward flight, engine diverter valves are closed and the jet flow is directed rearward.

The first test flight occurred in just over one year from the date of a U.S. Army Transportation Research Command (USATRECOM) contract with Lockheed to design, build, and test two VZ-10 research airplanes.

USATRECOM, formerly a field agency of the Army Chief of Transportation, is now a part of the U.S. Army Mobility Command, Detroit, Mich. MOCOM is a major subordinate installation under the newly organized Army Materiel Command.

VZ–10 VTOL "Hummingbird"

SCIENTIFIC CALENDAR

8th International Conference on Low Temperature Physics, sponsored by the International Union of Pure & Applied Physics, London, England, Sept. 16-22.

17th International Congress of Military Medicine & Pharmacy, Caracas, Venezuela, Sept. 16-24.

9th Ottawa Symposium on Applied Spectroscopy, sponsored by the Canadian Association for Applied Spectroscopy, Ottawa, Canada, Sept. 17-19.

Conference on Weather Effects on Aircraft Systems, Trenton, N.J., Sept. 17-21.

4th Army-Navy-AF Conference on Calibration, Washington, D.C., Sept. 18-19.

International Conference on Equatorial Aeronomy, sponsored by AFCRL and NBS, Huancayo, Peru, Sept. 18-26.

11th Annual Industrial Electronics Symposium, sponsored by ISA, AIEE and IRE, Chicago, Sept. 19-20.

International Colloquium on Organometallic Derivatives, Paris, France, Sept. 24-28.

International Symposium on Relay Systems Theory and Finite Automata, Moscow, Russia, Sept. 24-Oct. 2.

13th Defense Conference on Nondestructive Testing, Concord, Calif., Sept. 25-27.

High-Power Microwave Tube Symposium, sponsored by USASRDL, Fort Monmouth, N.J., Sept. 25-27.

Conference on Current Neutron Work, London, England, Sept. 28.

Mechanism of Failure, Rome, N.Y., Sept. 29.

Theory and Applications of Analysis in Function Spaces, sponsored by MIT and AFOSR, Cambridge, Mass., Sept. (date undetermined).

31st Symposium on Shock, Vibration & Associated Environment, Phoenix, Ariz., Oct. 1-4.

ASTM Materials Testing Exhibit, Los Angeles, Oct. 1-5.

Symposium on Space Electronics & Telemetry, sponsored by IRE, Miami Beach, Fla., Oct. 2-4.

Symposium on Physics & Nondestructive Testing, San Antonio, Tex., Oct. 2-4.

1962 National Electronics Conference, sponsored by AIEE, IRE, Illinois Institute of Technology and the University of Illinois, Chicago, Oct. 8-10.

Environment of the Arctic Basin, Hershey, Pa., Oct. 8-11.

3rd Conference on Nuclear Reactor Chemistry & 6th Conference on Analytical Chemistry in Nuclear Reactor Technology, Gatlinburg, Tenn., Oct. 9-11.

International Symposium on Comparative Medicine, N.Y.C., Oct. 10-12.

Symposium on Electrical, Optical and Magnetic Properties of Organic Crystal Semiconductors, Ottawa, Canada, Oct. 10-12.

International Symposium on Space Phenomena & Measurement, Detroit, Oct. 15-18.

17th Annual ISA Instrument-Automation Conference & Exhibit, N.Y.C., Oct. 15-18.

2nd International Congress & Exhibit of Laboratory, Measurement & Automation Techniques in Chemistry, Basle, Switzerland, Oct. 15-20.

Symposium on Military Operations Research, Santa Monica, Calif., Oct. 16-18.

8th Annual Army Human Factors Engineering Conference, sponsored by OCRD, Fort Benning, Ga., Oct. 16-19.

International Colloquium on Insect Pathology & Microbial Control, Paris, France, Oct. 17-20.

7th JANA Elastomer R&D Conference, San Francisco, Oct. 22-24.

Symposium on Solvent Extraction Chemistry, Gatlinburg, Tenn., Oct. 23-26.

8th Conference of Design of Experiments in Army Research, Development & Testing, sponsored by ARO-D, Washington, D.C., Oct. 24-26.

Dynamics of Manned Lifting Planetary Entry, sponsored by AFOSR and GE Co., Philadelphia, Oct. 29-31.

15th International Conference on Electrical Techniques in Medicine & Biology, Chicago, Oct. 29-31.

Conference on Spaceborne Computer Engineering, sponsored by IRE, Anaheim, Calif., Oct. 30-31.

84-Year-Old Dr. Lackey Launches 3rd Career in Meteorological Research

Dr. Earl E. Lackey, 84-year-old physical geographer at the Army Quartermaster Research and Engineering Center, Natick, Mass., is launching his third career—relating weather probabilities to crop production and marketing.

The first career began in 1897 when he taught in a one-room rural school in Spunky Hollow, Neb. It ended with his retirement at the age of 70 as professor of geography at the University of Nebraska.

In between, he served as principal and superintendent of schools for several Nebraska communities, taught geography at Wayne State Teachers College, also in Nebraska, and coauthored several widely used elementary and college geography textbooks.

His second career began in 1950 when, at the age of 72, he became a civilian specialist with the Army. His job was to develop methods for predicting environmental data for world areas of potential military significance. In 12 years his research results have contributed impressively to environmental science and military logistics.

Currently, he is completing a study of 24-hour rainfall probabilities, aimed at improved methods of predicting extreme rainstorms. Additional programs on his work schedule

Dr. Earl E. Lackey

are directed toward compiling weather data which will increase the Army's capabilities to operate in any part of the world during all seasons.

On his 84th birthday in May, Dr. Lackey was officially commended by Brig Gen Merrill L. Tribe, CG of the QM R&E Center. In addition to recognition for a number of past achievements, he was cited particularly for sustained superior performance from July through December 1961. The citation stated in part:

". . . He has demonstrated superior ability in his research efforts to apply environmental data to military problems. He has independently developed a system for rapid percentile and digital frequency determinations of both temperature and precipitation, when data records were not complete, which permits . . . analyses of these phenomena that otherwise would not be possible. This system has been adopted by scientists at several universities, has been used in two contract efforts, and will be valuable in future environmental research. Dr. Lackey is recognized as an innovator of geographic techniques and as an outstanding example of a natural scientist."

Dr. Lackey's weather studies for the Army are described in various publications and include six journal articles, five papers delivered at scientific meetings, and seven technical reports.

A native of Arlington, Ohio, Dr. Lackey has resided at the Wayside Trailer Park on Worcester Road in Westboro, Mass., since arriving at Natick. He has hauled his mobile home coast-to-coast several times during vacations. A widower, he has three children: Mrs. Frances E. Bailey of Los Angeles, Calif., Mrs. S. W. Purcell of Lexington Park, Md., and Paul Lackey, Falls Church, Va.

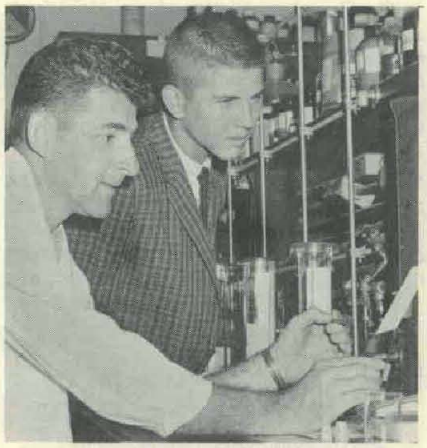
QM R&E Command Plays Host to NSF-I Winner

A 17-year-old high school graduate intent on a medical research career, Frederick A. Dombrose of Sylvania, Ohio, an award winner for the past three years in the National Science Fair-International, spent a week in August as an honored guest at the Quartermaster R&E Command.

As one of 16 Army award winners at the 13th NSF-I this year at Seattle, Wash., Mr. Dombrose was an all-expense-paid visitor. Brig Gen Merrill L. Tribe, Commanding General of the QMREC, entertained him at a luncheon and discussed Army scientific career opportunities. Various key scientists oriented him on various phases of QM R&E activities.

Much of the youth's time was spent in the Pioneering Research Division where basic research is carried on in biology, chemistry, physics and psychology. His prize-winning exhibit at the NSF-I was "Psychophysiology of Color Vision," a 3-year study to understand and explain the phenomena associated with color vision, including structure of the retina and its neural impulses.

Mr. Dombrose plans to enter Michigan State College this fall as the first step toward pre-medical training and a career in research.



Science Award winner Frederick A. Dombrose watches intently as biochemist Henry Enos, Jr., demonstrates isolation of chemical substances in nerve cords at QM R&E Command Laboratories.

GWU Offers 12 Lectures On 'Dynamic Environment'

A series of 12 lectures to project technological data on the "dynamic environment" for consideration in research and development activities is scheduled at George Washington University, Washington, D.C., beginning Sept. 25.

Arrangements for the lectures have been made by the National Capital Chapter of the Institute of Environmental Sciences in cooperation with the College of General Studies, George Washington University.

The lectures are open to the public at a cost of $35, including the complete set of course notes, and will be given at the Hall of Government, George Washington University every Tuesday from 7:45 to 9:45 p.m., Sept. 25 through Dec. 18 (omitting Oct 2).

The speakers will be representatives of the National Aeronautics and Space Administration, the National Research Laboratories and industrial organizations. Subjects include: Simulation of the Dynamic Environment; Vibration Fundamentals; Acoustics; Overall Missile Dynamics; Mechanical Problems; Thermal Environments; Vacuum Technology; Properties of Materials; Data Reduction and Analysis; Environmental Testing.

Army Meteorologist Accepts Bid to Join Indian Ocean Expedition

Paul C. Dalrymple, one of the U.S. Army's distinguished meteorologists, has been selected to participate in an International Indian Ocean Expedition under a contract awarded by the National Science Foundation to the Woods Hole Oceanographic Institution. He is a veteran employee of the Quartermaster Research and Engineering Command, Natick, Mass.

Activation of the former Presidential yacht Williamsburg as a United States biological research vessel is involved in the $500,000 contract. Title to the ship will remain with the U.S. Government and transfer of accountability from the Navy to the NSF will be effected. The NSF is an independent agency of the Government.

"The International Indian Ocean Expedition is a significant step forward in scientific cooperation," said Dr. Alan T. Waterman, NSF Director. "It represents not only the cooperative efforts of many countries, but cooperation among scientists of widely varying disciplines. Biologists as well as physical scientists will have a major share in the work."

The Williamsburg is expected to begin her Indian Ocean cruise early in 1963. Plans call for the ship to spend most of her 2-year research tour in the western half of the Indian Ocean, although a trip is included to the Bay of Bengal. Voyages will encompass the northern part of the Arabian Sea west of India down to the latitude of the Cape of Good Hope, crossing and recrossing the equator.

Among the questions that biologists aboard the Williamsburg will be seeking to answer are:

- What organisms are found in the Indian Ocean — from microscopic plankton to large fish, oceanic mammals and sea weeds?
- What is the distribution, both seasonal and geographic, of these organisms and what is their relative abundance?
- What is the productivity of these organisms—particularly organisms which if properly exploited could contribute greatly to the food needs of the peoples of the area?

As a representative of the U.S. Army on the expedition, Paul Dalrymple is backed by experience gained in the Antarctic during the International Geophysical Year, for which he was recognized by a number of honors, among them an Antarctic peak bearing his name.

Included in Mr. Dalrymple's record are two years with the Atlantic Weather Project of the U.S. Weather Bureau, and research work at the Harvard University Blue Hill Meteorological Observatory at Milton, Mass., and the Mount Washington, N.H., Observatory. He has engaged in previous research of the Woods Hole Oceanographic Institution.

Minette Frizzell Finds Waterways Experiment Station Visit Intriguing

More than a small flurry of excitement was stirred by Minette Marion Frizzell during her Aug. 14-18 rush of activity as an honored, all-expense-paid guest at the U.S. Army Waterways Experiment Station, Vicksburg, Miss.

As one of 16 U.S. Army award winners in the 1962 National Science Fair-International at Seattle, Wash., Miss Frizzell was entertained as the house guest of Station Commander Col Alex G. Sutton, Jr. and Mrs. Sutton. That rated her VIP recognition all during her visit to the Army soils center research facilities.

Minette is anything but miniature. She is a comely 6-footer with a proportionately large-scale love of laughter, a contagiously joyous exuberant extrovert. Despite her buoyant enthusiasm in describing her visit—"After the first hour of my tour, I ran out of adjectives with which to describe all that I saw"—she impressed her hosts as a "poised young lady with a keen mind and varied interests."

The research project which earned Minette honors at the National Science Fair-International and a trip to the Waterways Experiment Station (WES) was a textural analysis of samples of water collected over a distance of 350 miles of river. Army judges at the NSF-I acclaimed her exhibit as an example of exceptional scientific research competence.

WES scientific leaders and Col Sutton joined in explaining R&D operations in progress and escorting her on a tour of laboratories, the Mississippi Basin Model project, and other WES activities. Technical Director J. B. Tiffany held a general discussion with her on the Army soils research program.

Miss Frizzell later reported:

"A tour of the hydraulics models . . . was like a geographic tour of the United States. It made me feel as Gulliver might have felt in the land of the tiny people . . . one hydraulic model covers 200 acres. In nature this drainage pattern covers 1,250,000 square miles. . . . From this model floods and their crests can be predicted, thus saving money, property and lives. . . . I plan to apply for one of the summer jobs at the Station next year. I could think of no place that I would rather work."

Minette Frizzell listens intently as WES Director Col Alex G. Sutton explains operation of small-scale hydraulic models used to solve navigation, flood control, and power problems in development of the Arkansas River.

Germfree Animal Research Aided by New Feeding Equipment

Dr. Richard B. Wescott, an Army veterinarian, and John A. Gardner, a chemical engineer, have developed equipment to eliminate a feeding problem encountered during studies with germfree animals. (See feature articles on germfree research laboratory, December 1960 and January 1961 issues of this publication.)

Research at the U.S. Army Biological Laboratories, Fort Detrick, Md., requires animals free of naturally occurring diseases. For the past 12 years, the Fort Detrick animal farm has maintained specific-pathogen-free colonies of mice and guinea pigs to insure a continuous supply of high-quality animals.

Based on pioneer work with germfree animals conducted at the University of Notre Dame's Lobund Institute, and with the assistance of Prof. P. C. Trexler of that institute, germfree techniques were investigated to improve breeding stock.

Using modifications of germfree apparatus and methods developed at Lobund, Dr. Wescott initiated studies at the Fort Detrick animal farm in 1960. Plastic isolators provided adequate criteria for a germfree system.

Effective sterilization of food proved a major problem. Contaminations occurring during early attempts to operate the germfree system were traced to inadequately sterilized food.

In the method originally employed, food in paper bags was placed in a metal container designed for use with germfree isolators. The cans and their contents then were steam sterilized in an autoclave modified for vacuum operation.

Investigators showed that the time recommended for sterilization of the food in these cans was too short to insure complete sterilization. Moreover, the time required to effect complete sterilization resulted in an unacceptable loss in the nutritive value.

Consequently, Wescott and Gardner undertook an appraisal of alternative sterilization methods, such as irradiation or special processing, for preparing food for germfree animals. All alternative methods proved prohibitively expensive for the scope of the Fort Detrick operations.

Reinvestigation of steam sterilization led to the development of a unit that is both effective and economical. The unit is a sealed, sterile enclosure with provisions for the presterilization, entrance, processing, and aseptic removal of materials. Food is introduced through an autoclave.

The basic chamber is constructed of Plexiglas. A double-doored, Reyniers-type autoclave is attached with a stainless steel connector plate containing a water jacket around its outer front perimeter. Tap water circulating through the jacket maintains the adjoining plastic at 70° to 80° F. when the autoclave is in operation.

Food is placed in stainless steel, wire-mesh baskets and steam sterilized in the autoclave at 250° F. and 15 p.s.i.g. for 20 minutes. The steam is then shut off, the chamber is bled to atmospheric pressure, and the food is allowed to dry for 15 minutes.

The sterilized food is then transferred to the chamber and packaged in polyvinyl bags. The bags are filled to about 75 percent of volume, heat sealed in the unit, and cooled to room temperature.

Removed from the unit via a dunk bath filled with a two percent Lysol solution, bags can be stored for future use or transferred immediately to an animal isolator.

No accidental contaminations have occurred in the Fort Detrick germfree system since August 1961. The food sterilization unit has been in operation for the past six months and has been used regularly to prepare food for the isolators throughout that time. Thirty-three entries have been made to the isolators in supplying food prepared in the unit.

The cost to reproduce the food sterilization unit, including materials, construction, installation, autoclave and all components, is estimated at not more than $2,000. This is considered inexpensive when compared to equipment similar in capacity.

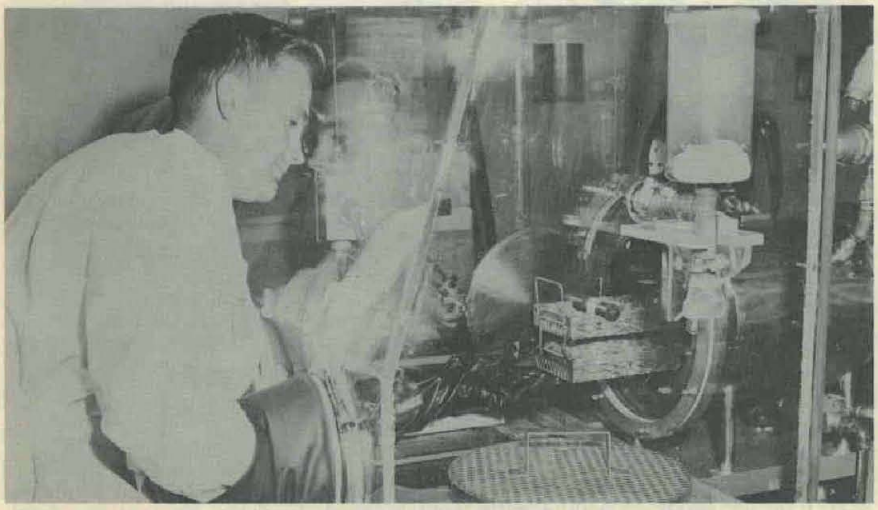
"We have been very encouraged by the performance of the unit," Dr. Wescott stated. "The charred appearance characteristic of food autoclaved for longer periods is not nearly as pronounced in our food. Also, germfree mice raised on food prepared in the unit have shown a significantly higher rate of reproduction than those raised on food processed by the previous method."

Thus far, laboratory tests have shown the germfree-reared mice to be free of Salmonella, lymphocytic choriomeningitis, and Tyler's virus, which were eliminated from the farm's conventional colonies in earlier work with Caesarean-derived stock. To date, the mice also have remained free of any clinical evidence of infantile diarrhea, and of ecto- and endoparasites, which have caused occasional problems at the farm.

Dr. Melvin M. Rabstein, Chief of the Fort Detrick Animal Farm Division, stated: "If this record can be maintained as this nucleus of gnotobiotic stock enlarges, it will effect a marked improvement in the quality of our mouse colony."

A detailed report of Wescott and Gardner's studies published recently is titled "Apparatus and Method for the Steam Sterilization of Food for Germfree Animals; An Investigation of the Practical Application of Gnotobiotic Technology to the Improvement of Breeding Colonies."

Inquiries concerning additional information on their work can be addressed to: Chief, Animal Farm Division, U.S. Army Biological Laboratories, Fort Detrick, Frederick, Md.



Dr. Richard Wescott, who helped to develop germfree animal feeding techniques, transfers sterilized food to chamber for final special processing.

AROD Reports Demand Rising for Engineering Design Handbook

Increasing demand for Ordnance Engineering Design Handbooks, some 40 of which have been published since 1954, with 35 others in varying stages of preparation, is reported by the U.S. Army Research Office—Durham at Durham, N.C.

Under a program initiated by the Ordnance Research Office, forerunners to the U.S. Army Research Office—Durham, the handbooks are published by Duke University. The first contract awarded by the Army in 1954 led to establishment of an Engineering Handbook Office at the University. The contract has been renewed periodically without interruption.

During an 8-year period Duke officials have assembled the most knowledgeable staff of handbook experts obtainable. Guidance is provided by an advisory committee composed of a representative from each Government installation involved for each handbook or series of related handbooks.

For example, the Engineer Corps and the Chemical Corps gave assistance in preparing and reviewing the handbook on *Terminal Ballistics*. Similarly, U.S. Military Academy text material was used in three handbooks comprising *Elements of Armament Engineering*.

Wide-ranging interest was evidenced in response to the series of three articles titled "Patents Knowledge Viewed as Useful Tool for R&D Personnel," which appeared in the December 1961, January and February issues of this publication. Consequently, one of the most popular new products of the Handbook Office at Duke is expected to be a revision of a handbook on "Inventions, Patents, and Related Matters." Published in 1957, this will be the first revision of an Ordnance Engineering Design Handbook. It is expected to be off the press in mid-summer.

Government scientists, engineers, inventors, administrators and contractors doing business with Government agencies use the patents handbook as a ready reference in preparation of notebooks and other records of inception and progress needed to support applications for patents.

Like other Ordnance Design Engineering Handbooks prepared under U.S. Army Research Office sponsorship for which broad public demand is assured, the handbook on patents will be placed on sale through the Office of Technical Services (OTS), Department of Commerce. Distribution to Army agencies having a bona fide interest in the subject area of a handbook is made automatically.

Aside from their primary purpose of aiding design engineers by providing design data and other information, the handbooks frequently help to reduce lead time between initial concept and production by reflecting the state-of-the-art in the field concerned. The handbooks also are proving useful as training media, as aids for orientation and indoctrination of engineers in and out of Government service, and in advancing the work of designers in adjacent fields.

Nearing the final stage of preparation for publication is a 5-volume handbook on Experimental Statistics, which is expected to have broad appeal to the outside scientific community as well as to Army users. Up to the present, one of the most sought after handbooks has been a 4-volume set on Servomechanisms, which is available through OTS.

Military security requires that a number of Design Engineering Handbooks be classified. However, classification is kept to a minimum to enhance practical utility of the handbooks.

Inquiries concerning the handbooks should be addressed to the Ordnance Engineering Handbook Office, Ordnance Liaison Group, Box CM, Duke Station, Durham, N.C. The list below contains titles and the Ordnance Corps Pamphlet (ORDP) numbers of handbooks published to date:

AMMUNITION SERIES

ORDP 20-210—Fuzes, General and Mechanical. ORDP 20-244—Section 1, Artillery Ammunition—General, with Table of Contents, Glossary and Index for Series. (C) ORDP 20-245—Section 2, Design for Terminal Effects (U). ORDP 20-246—Section 3, Design for Control of Flight Characteristics. (C) ORDP 20-247—Section 4, Design for Projection (U). ORDP 20-248—Section 5, Inspection Aspects of Artillery Ammunition Design. (C) ORDP 20-249—Section 6, Manufacture of Metallic Components of Artillery Ammunition (U).

BALLISTICS MISSILE SERIES

ORDP 20-282—Propulsion and Propellants. ORDP 20-286—Structures.

CARRIAGES AND MOUNTS SERIES

ORDP 20-341—Cradles. ORDP 20-342—Recoil Systems. ORDP 20-343—Top Carriages. ORDP 20-345—Equilibrators. ORDP 20-347—Traversing Mechanisms.

EXPLOSIVE SERIES

ORDP 20-175—Solid Propellants, Part One. (C) ORDP 20-176—Solid Propellants, Part Two (U). ORDP 20-177—Properties of Explosives of Military Interest, Section 1. (C) ORDP 20-178—Properties of Explosives of Military Interest, Section 2 (U).

EXTERIOR BALLISTICS SERIES

ORDP 20-140—Trajectories, Differential Effects, and Data for Projectiles.

FIRE CONTROL SERIES

ORDP 20-331—Compensating Elements.

GENERAL

ORDP 20-106—Elements of Armament Engineering, Part 1, Sources of Energy. ORDP 20-107—Elements of Armament Engineering, Part 2, Ballistics. ORDP 20-108—Elements of Armament Engineering, Part 3, Weapon Systems and Components. ORDP 20-135—Inventions, Patents, and Related Matters. ORDP 20-136—Servomechanisms, Section 1, Theory. ORDP 20-137—Servomechanisms, Section 2, Measurement and Signal Converters. ORDP 20-138—Servomechanisms, Section 3, Amplification. ORDP 20-139 — Servomechanisms, Section 4, Power Elements and System Design. ORDP 20-270—Propellant Actuated Devices. (C) ORDP 20-290—Warheads—General (U).

ORDNANCE MATERIALS HANDBOOKS

ORDP 20-301—Aluminum and Aluminum Alloys. ORDP 20-302—Copper and Copper Alloys. ORDP 20-303—Magnesium and Magnesium Alloys. ORDP 20-305—Titanium and Titanium Alloys. ORDP 20-306—Adhesives. ORDP 20-307—Gasket Materials (Nonmetallic). ORDP 20-308—Glass. ORDP 20-309 — Plastics. ORDP 20-310—Rubber and Rubber-Like Materials. ORDP 20-311—Corrosion and Corrosion Protection of Metals.

Tripartite Materials Meeting

The Materials Working Panel of the Tripartite Technical Cooperation Program is holding its 1962 meeting, Sept. 8-22, at the Admiralty Materials Laboratory, Poole, Dorset, England.

The U.S. Army representative taking part in the discussion on "The Brittle Behavior of Ceramics" is Mr. Allan Tarr, a staff assistant in the Physical Sciences Division, U.S. Army Research Office.

Top Representatives Tour Greenland R&D Facilities

Lt Gen Dwight E. Beach, Chief of Research and Development, headed a party of 18 high-ranking military and civilian personnel on an inspection tour of Army R&D facilities in Greenland, Aug. 20-23.

The purpose of the visit was to acquaint participants with the newest research activities at Camp Tuto and at nuclear-powered Camp Century, the Army's "City under the Snow," located 800 miles from the North Pole, 138 miles out on the Greenland icecap.

For many in the party it was the first visit to the unique polar research installation. Current projects include pioneering such concepts as the "Building in Barrels" plastic foam shelters for remote areas and studies of nuclear radiation and volcanic fallout recorded in the snow layers around the bases.

Military members of the group included: Maj Gen William F. Cassidy, Deputy Chief of Engineers for Construction; Maj Gen Chester W. Clark, Director of Army Research, OCRD; Maj Gen Niels Erik Leschly, Military Attache to the Embassy of Denmark; Col Eugene C. Oates, Assistant Chief, Doctrine and Concepts Division, Combat Developments Directorate, Office, Deputy Chief of Staff for Operations; Col Lawrence E. Schlanser, Deputy Commander, Test and Evaluation Command, AMC; Col Gerald W. Homann, CO, USA Polar Research and Development Center; Lt Col Jack F. Riggins, Assistant Executive, OCRD;

Lt Col Robert J. Giesen, Executive, USA Polar Research and Development Center; and Lt Col Richard G. Terwilliger, Trip Project Officer, Geophysical Sciences Branch, Environmental Sciences Division, ARO, OCRD.

Leading civilians included: Congressman William R. Poage (D-Tex.), Dr. Harwood Belding, Chairman, and Dr. Terris Moore and Dr. Ralph E. Fadum, members of the Environmental Research Subpanel, Army Scientific Advisory Panel; Melvin Bell, Director, Office of Ordnance, Office of the Deputy Director (Tactical War Programs), Director of Defense Research and Engineering; Dr. Paul A. Siple, Scientific Adviser, U.S. Army Research Office, OCRD;

Robert R. Philippe, Chief, Environmental Research Branch, Research and Development Directorate, U.S. Army Materiel Command (AMC); Dr. Carl Eklund, Chief, Polar and Arctic Branch, Environmental Sciences Division, Army Research Office, OCRD; and E. Francis Clark, Action Officer, Cold Regions Research and Development Program, Research and Development Directorate, Hq AMC.

Rep. William R. Poage (D-Texas), second from left, was among eminent visitors who toured the U.S. Army Polar R&D Center, Greenland. Other members of the inspection team include Lt Gen Dwight E. Beach, Chief, Research and Development; Col Gerald W. Homann, Commander, PR&DC; Amory H. Waite, USASRDL; Maj Gen C. W. Clark, Director of Army Research.

Revised DOD Instruction Clarifies WSEG Policies and Responsibilities

Policies and responsibilities of the Weapons Systems Evaluation Group (WSEG) of the Office of the Director of Defense Research and Engineering are clarified and correlated in a new instruction announced Aug. 28 by the Department of Defense.

Superseding a 1956 instruction, the new order requires that a report prepared by a WSEG contractor be separately identified as such. A contractor's report, or study, is a study by a non-DOD organization, the results of which are incorporated as an identifiable part of a WSEG Report.

The Institute of Defense Analysis, a nonprofit organization sponsored by nine of the nation's leading universities, has provided assistance to the WSEG since 1956 on a continuing contract basis.

Under the instruction, a contractor is provided with military assistance in the support of such studies. He must report directly to WSEG, which, in turn reports on a study to its ultimate user.

WSEG, a DOD organization of military and civil service personnel, continues to be charged with conducting operational analyses and evaluations for the Joint Chiefs of Staff, the Director of Defense Research and Engineering, and other elements of the Office of the Secretary of Defense as authorized by the Secretary of Defense; and with the participation in and supervision of such WSEG study contracts with civilian or other Government agencies as may be required.

A WSEG study is an operational analysis or evaluation conducted by the Director, WSEG, which makes use of contractor's reports and other inputs, and in which military personnel of WSEG participate. The results of a WSEG study are generated in consultation with appropriate divisions of the Joint Staff, JCS, approved by the Director, WSEG, and published as a WSEG Report.

Upon request for a study, the WSEG Director will arrange for a Contractor's Study and for participation of military personnel.

The Director continues to take all other appropriate actions, including internal review and consultation with appropriate divisions of the Joint Staff, other components of DOD, and other agencies or consultants to insure the highest quality of response to the assigned task.

The Director, WSEG, is required now, as previously, to submit a quarterly status report to the JCS and the Director, DDR&E, on the status of tasks and projects; and will submit an annual report on Aug. 1, as to the status as of July 1 each year.

Distribution of all completed reports is determined and made by the DOD agency initiating the study. In the case of extremely sensitive reports, distribution is determined on a case-by-case basis.