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Latta, Albright, Snead Take New Assignments

Reassignment of MG William B. Latta to Turkey, effective Nov. 11, will advance MG Jack A. Albright from deputy to succeed him as CG, U.S. Army Strategic Communications Command. Director of Army Research BG George M. Snead will become deputy CG.

Assistant Director of Army Research COL Norman R. Rosen, who has served also as commanding officer of the Army Research Office since September 1970, has succeeded BG Snead as acting director.

MG Latta's assignment in Ankara is chief, Combined Planning Group, of the Central Treaty Organization (CENTO). The group consists of Army, Navy and Air Force representatives of the five CENTO nations—United Kingdom, Iran, Pakistan, Turkey and the United States.

Until he swapped jobs with MG Walter E. Lotz Jr. in September 1969 to take command of STRATCOM, MG Latta was CG of the U.S. Army Electronics Command (ECOM) and Fort Monmouth, N.J.

General Lotz was promoted to 3-

(Continued on page 10)

DCRD Outlines Concepts of New Initiative Programs Of R&D to Meet Future Army Materiel Requirements

Concepts of new initiative/prototype programs of research and development to meet future U.S. Army materiel requirements were outlined by Deputy Chief of R&D George Sammet Jr. Oct. 20 in an address to a National Security Industrial Association Symposium.

Speaking in the State Department auditorium, Washington, D.C., General Sammet emphasized that all of the new proposals for Fiscal Years 1972–73 outlined to the industrial representatives are *only proposals*—that the FY 72 projects are still awaiting Congressional approval of the Appropriations Act.

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Promotion List Accents Value of R&D Program

Promotional opportunities in the Army Research and Development Officer Program, one of 11 special career fields for officers, are demonstrated in the recent list of selectees for lieutenant colonel rank.

Department of the Army Circular 624–10 shows that 31 officers in the program are on the promotion list. Once again, the selection rate for R&D career officers favorably considered the first time they became eligible for promotion is considerably higher than the Army-wide average —85.7 percent as compared to 77.3 percent.

Particularly significant is the fact that of the 16 specialty field members selected from the secondary zone

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O'Connor Fills Vacancy Left by Wilson's Death

Eight years after emigrating from Australia to the United States for employment with the Army Engineer Topographic Laboratories, Dr. Desmond Conroy O'Connor has achieved the prestige of PL–313 status in the Army's top environmental sciences position.

Announcement of his selection to fill the vacancy created by the death of Dr. Leonard S. Wilson, Dec. 6, 1970, was made late in October. Dr. Wilson had served 12 years as chief of the Environmental Sciences Division, Army Research Office, Office of the Chief of Research and Development. During a 28-year military-civilian career with the U.S. Government, he achieved international renown.

Naturalized as a U.S. citizen in 1968, Dr. O'Connor was born in Picton, New South Wales, Australia, Sept. 27, 1926. His initial employment with the Engineer Topographic Laboratories (ETL), Fort Belvoir, Va.,

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Nixon Converts Detrick to Cancer Research

President Nixon's decision to convert U.S. Army biological warfare research capabilities at Fort Detrick, Md., into a focal point of the national Conquest of Cancer Program, funded at $337.5 million in FY 1972, was announced Oct. 18.

Speaking at the Army Materiel Command installation, the President termed the conversion another chapter in realization of mankind's centuries-old dream of "changing the implements of war into instruments of peace. . . ."

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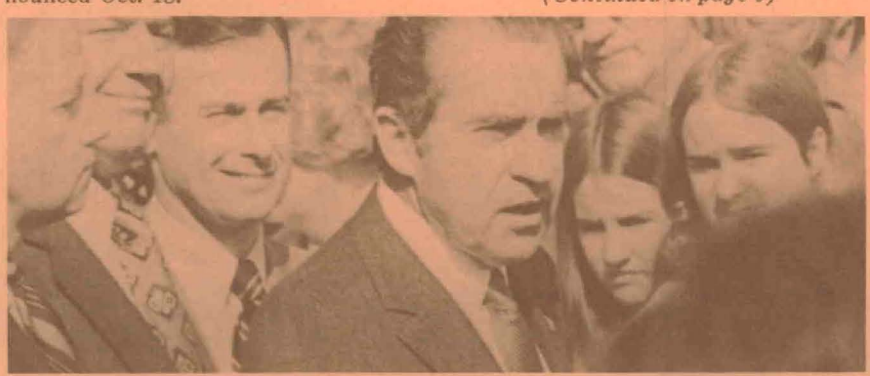

PRESIDENT NIXON was accompanied by Maryland Senators Charles McC Mathias Jr. and J. Glenn Beal Jr. and Congressman Goodloe E. Byron during visit to Fort Detrick, Md., to announce a change in mission of the complex.

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Army R&D Newsmagazine

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OTHER GOVERNMENT AGENCIES' requirements should be submitted directly to: DARD-IST-P, Highland Bldg., 3045 Columbia Pike, Arlington, Va. 22204.

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Technological 'Goodies' Bring Banes

EPA Chief Discusses Progress Without Pollution

William D. Ruckelshaus

Technological advances essential to the maintenance of a successfully competitive position in world trade, economic growth and prosperity of the nation, and to the preservation of a strongly deterrent defense posture, are frequently proving increasingly disturbing to clean environment advocates.

Antipollution activists have provoked numerous research and development leaders to speak out on this "national conflict of interests" in recent years—addressing the issue of the national desire for all the "goodies" provided by technological progress, without the price of air or water pollution.

Environmental Protection Agency Administrator William D. Ruckelshaus discussed this issue at the American Chemical Society national conference in Washington, D.C. His address follows:

* * *

By William D. Ruckelshaus

The most characteristic activity of 20th Century man has been his relentless drive to master the natural world. We have started to conquer time and space; we have provided unprecedented comforts and stabilized our food supply. We have extended life spans and opened up opportunity for millions, and we can even see the dawn of genetic and behavioral engineering in the distance.

The American Chemical Society (ACS), both collectively and through the painstaking diligence of its individual members, has contributed in countless ways to this drive.

Every age has its symbols and its heroes. The white-coated scientist locked in his laboratory, unravelling the secrets of nature with great effort and repeated applications of midnight oil, freely giving his findings to the world for whatever use can be made of them, has been a childhood hero to many of us. If the feet of a hero turn out to be made of clay, it's not always the fault of the man but rather the prism through which his feet are viewed.

The prime goal of modern society has been knowledge because knowledge meant progress, of that we were certain. But knowledge, as Adam discovered, is not an unmixed blessing. With knowledge must come responsibility and wisdom in its use or it will surely overwhelm man. Suspicion of raw knowledge shapes the new prism through which the scientist is presently perceived.

You may recall that when Prometheus stole fire from Olympus and gave it to man, Zeus chained him to a rock and condemned him to slow death by torture. Prometheus was eventually rescued by Chiron and Hercules, but not until he had paid his price in agony.

It would seem that if Prometheus had known how long it would take man to develop a total assessment of the impact of new technology—and that's what the fire symbol stands for—he might have spared himself the trouble.

There may be something in this mythical example that is germane to the predicament of scientists, engineers and technicians in our society at this juncture. Man has derived every conceivable and many inconceivable benefits from technology and, like all ingrates, he is now questioning the motivation of his former benefactor and the desirability of his handouts.

What Prometheus never knew, and what we have oftimes forgotten, is that there is no such thing as an action without reaction, an input without an output, a cause without an effect. Prometheus did not ask himself the question—Is fire really a gift to man? If he had asked, his answer would undoubtedly have been yes. More importantly, the discipline of asking the question would have been established.

You chemists have completely transformed the face of the modern world. You have provided a vast quantity of synthetic materials for man's convenience. You have dramatically raised industrial productivity. You have created products which represent a substantial part of the GNP (Gross National Product). You have altered patterns of work and leisure and consumption.

Your discoveries form an intricate part of modern life, from drugs to crop- and life-saving pesticides.

Surely, it would be naive to think

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DCRD Outlines Concepts of New Initiative Programs of R&D

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The purpose of providing industry advance information regarding the new materiel concepts, he said, is "to enable the Army to take immediate, advantage of unfolding new technology, and to be more quickly responsive to new user requirements."

In this way, he explained, "industry, which is responsible for many of the new technological approaches, can get a quicker reaction to its (the Army's) proposals. . . ." Industry, likewise, is given a clearer understanding of how to propose new initiative concepts to the Army.

General Sammet said that in addition to the FY 72 budget request for funding of seven new initiative projects, the Army has developed a FY 73 budget for 21 new proposals that include both "new initiative" and "prototype" programs.

Included in the 21 are 5 prototype proposals recommended in September 1971 for listing in the FY 72 program. The remaining 16 proposals are in addition thereto, including 7 new prototype projects and 9 additional new initiative proposals over and above those recommended for FY 72.

The complete text of General Sammet's presentation follows:

* * *

Last spring, I had the pleasure of talking with many of you at Fort Hood, Tex., on the new initiative programs the Army was proposing for Fiscal Year 1972.

As you may recall, the new initiative program was started last year with the goal of capitalizing on technology in hand or near at hand to demonstrate a new operational capability. The Army submitted for inclusion in the Fiscal Year 1972 budget request a package of seven proposals, for a total add-on of approximately $117.7 million.

The status, unfortunately, is that they are still just proposals, since the Congress has not as yet passed the FY 72 Appropriations Act. However, in anticipation of favorable action, we have already begun the paperwork that will allow us to undertake a quick start, once the funds are available. Information on these proposals still is available, in the OCD Technical Liaison Branch in the Pentagon.

Immediately after we started putting together the FY 72 package, people began asking whether this was a one-time thing or would there be a 73, a 74, and further such programs. To be quite frank, most were asking the question in order to get reassurance that we weren't going to again tamper with their "smooth-running, well-thought-out program."

To the credit of the Office of the Secretary of Defense (OSD) and the Army, there *will* be other such programs. By that statement, I am not being derogatory of the regular program at all. The regular Army R&D program is a sound, well-thought-out, balanced program designed to maximize long-range results.

The new initiative programs, and the added prototyping program, enable the Army to take immediate advantage of unfolding new technology, and to be more quickly responsive to new user requirements. This also means that industry, which is responsible for many of the new technological approaches, can get a quicker reaction to its proposals.

This leads me to comment briefly on the response to Dr. Foster's [Director of Defense Research and Engineering] request through the NSIA for industry's proposed new initiatives. To make a long story short, the Army found 167 that could have possible Army application. As these were studied by the Department of the Army staff and the developing agencies, about 70 warranted *detailed review*. As the process tightened, many fell out for the following reasons:

- Most fell out because they would not be of a size significant for inclu-

(Continued on page 4)

DEPUTY CHIEF OF R&D MG George Sammet Jr. operates Adaptive Memory Tracking Device during a recent tour of Frankford (Pa.) Arsenal. Robert M. Lehman, a physicist assigned to the Fire Control Department and Engineering Directorate, explains operation.

Promotion List Accents Value of R&D Program

(Continued from page 1)

(that is, for promotion earlier than normally eligible), 7 are from the R&D field. The estimated period to exhaust the new list is about a year after promotions are started.

R&D selectees from the secondary zone are: *Chemical Corps*, MAJ Marvin Brailsford, Army Chemical Center and School, Fort McClellan, Ala.; *Field Artillery*, MAJ Joe J. Breedlove and MAJ August M. Cianciolo, Office of the Chief of R&D, HQ DA, and MAJ Anthony G. Pokorny, Armed Forces Staff College; *Ordnance Corps*, MAJ James M. Durham, Office of the Deputy Chief of Staff for Logistics, HQ DA; *Signal Corps*, MAJ Donald B. Griggs, OCRD, HQ DA; *Engineer Corps*, MAJ Leon K. Moraski, Army Combat Developments Command, Fort Belvoir, Va.

Primary Zone R&D program selectees are: MAJ Ralph E. Badger, Field Artillery (FA), HHC Battery, 2d Bn 6th Arty, 3d Armored Division; MAJ Glenn L. Bugay, Ordnance Corps (OD), Institute of Nuclear Studies; MAJ Donald Callahan Jr., Signal Corps (SC), HQ Electronics Command; MAJ L. W. Clement, OD, U.S. Army Safeguard Systems Command; MAJ Nelson O. Conner Jr., Army Concept Team in Vietnam (ACTIV); and

MAJ Larry J. Cook, Transportation Corps (TC), HQ U.S. Army Material Command, Europe; MAJ David J. Cordonnier, SC, Office of the Assistant Chief of Staff for Intelligence; MAJ Edwin N. Dodd Jr., Medical Service (MS), U.S. Army Hospital, Sandia Base, N. Mex.; MAJ Fred W. Hall Jr., OD, Command and General Staff College; MAJ Peter D. Hidalgo, Chemical Corps (CM), Office of the Assistant Chief of Staff for Force Development; and

MAJ Richard D. Kittelson, Intelligence Corps (IN), Woodmoor Monument, Conn.; MAJ Dick S. Oberg, OD, U.S. Army Safeguard System Command; Maj Garth H. Payne, OD, U.S. Army Computer Systems Command; MAJ Richard S. Pollenz, SC, Office of the Chief of Staff, HQ DA; MAJ Stephen E. Rash, FA, El Paso, Tex.; MAJ Thomas D. Reese, FA, Command and General Staff College; MAJ Richard G. Saunders, SC, HQ, STRIKE Command; and

MAJ Robert W. Senn, OD, U.S. Army Depot, APO San Francisco; MAJ Billy L. Walker, OD, HQ, 38th Arty Bde; MAJ James S. Willis, Jr., SC, U.S. Military Academy; MAJ Sterling W. Wyatt, OD, Transportation School Brigade, Fort Eustis, Va.

DCRD Outlines Concepts of New Initiative Programs of R&D

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sion in the budget package. I might add, however, that we are right now re-looking at these.

- Some proposals had been tried and found wanting, or had been tried and completed.
- Some proposals were included by the Army as part of another package.
- Then there were those in which insufficient information was provided. Thus, we could not make a knowledgeable decision.

Some people could be discouraged by what might appear to be a cool Army reaction to the NSIA new initiatives. I see a very good sign here, in that we of the military-industry team should *never* present each other with a *bundle* of technological surprises.

If this happens, it means we haven't been talking to each other. For this reason, if no other, I am very much in favor of the continuous interchange of information between us—at all levels, and by every available communication means.

Now, let me get to the main part of my presentation. We are in a peculiar position right now of addressing both the FY 72 and FY 73 budgets. The FY 73 budget contains a total of 21 new projects, of which 5 were recently proposed for a late inclusion into the FY 72 program, in hopes that we can get an early start on them.

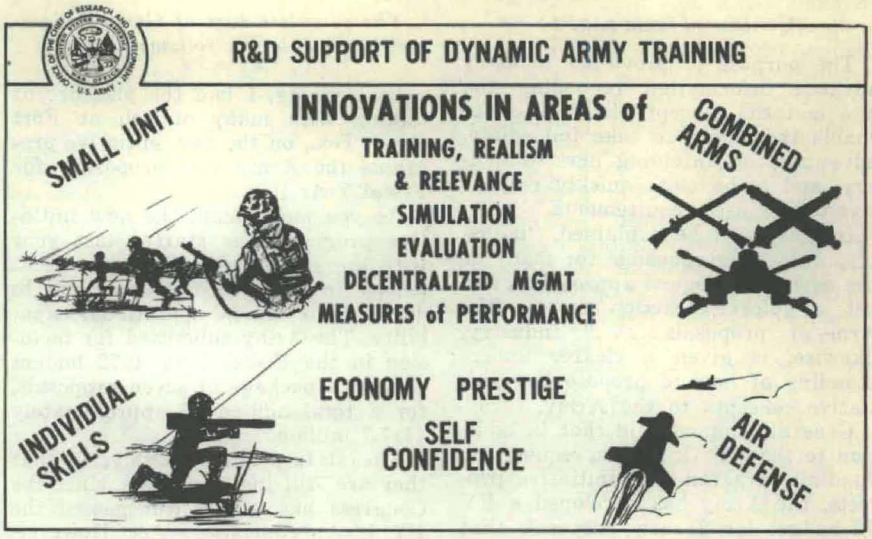
These five made up what we now call our FY 72 *prototyping program.* Most of you were briefed on them by Assistant Secretary Johnson two weeks ago at a meeting of the electronic and aerospace systems convention here in Washington.

There has also been some coverage of these items in unclassified terms in the press. But for those of you who did not hear of them before, complete summaries are available in the OCRD Technical Liaison Branch. However, here is a brief review:

Unmanned Aerial Vehicle. The first is a prototype of a small, low-cost, remotely piloted aerial vehicle for use in forward areas where risk of loss of manned observation craft would be prohibitively high.

Air Defense Effectiveness, Low Altitude. This is a 2-part effort—to improve gun fire control; also, to procure several prototype forward-looking infrared devices to permit improved acquisition and tracking for night and low-visibility conditions.

Air Defense Suppression Missile. In this concept, either a Redeye or 2.75-inch rocket could be fired against enemy low-altitude air-defense weapons, particularly radar-controlled automatic cannon.



Hybrid Engine. The Army is the government's largest user of trucks, so we are committed, as part of the President's plan for the government, to lead the way in pollution control. Our fifth FY 72 prototype is an engine that combines the advantages of the compression ignition engine. This approach seems to offer a clear promise of meeting the 1975 federal clean air standard.

That pretty well covers the Army's picture of hope-for, add-on, new business for FY 72. The rest of my time I wish to devote to the other 16 projects proposed in the FY 73 program. The projects will be in two categories—*new initiatives* and *new prototypes.* You may well ask at this point: What is the difference between the two?

I believe the best short answer is that the new initiative proposals are tied to existing requirements, whereas advanced development prototypes are usually ahead of formally stated requirements. Prototypes allow the Army more flexibility to look at potentially defense-useful ideas.

New Projects Proposed. I can group the FY 73 projects under the four general headings of Electronic Warfare, Target Acquisition, Firepower, and Resource Economies.

ELECTRONIC WARFARE. Two new initiative projects and one prototyping project are classified. Thus, I cannot describe them here today, except to say that the recently completed electronic warfare study identified a need for a major improvement in Army electronic warfare capabilities, extending from one end of the spectrum to the other. The three projects reach for these improvements. Again, let me invite you to visit OCRD's Technical Liaison Branch.

TARGET ACQUISITION. In this category, the first program is research on materials, fabrication, and performance of detectors used in surveillance, target acquisition and night observation. A 100-fold improvement in detector performance is our goal.

If successful, the range of intelligence, surveillance, target-acquisition, and night-observation equipment operating in the near infrared will be increased 10-fold. Night observation will be effective in the absence of moon or artificial illumination, and pulse-gated systems employing eye-safe laser radiation will be feasible.

Forward-looking Airborne Radar. This is a proposed prototype project to provide a small moving target indicator radar for use on a helicopter as small as our light observation helicopter. It will provide detection of moving vehicles and moving personnel. It will also aid in low-level navigation, furnish long-range pilot cueing information, and provide pointing for short-range, high-resolution sensors.

Artillery Surveillance Scanner. This is a high-risk prototype that envisions a spinning artillery round containing an imaging detector. The detected sensor information would be amplified and transmitted by equipment in the shell. The system would provide a simple, rapid means for target confirmation, damage assessment, and limited target acquisition.

Forward-Area Tactical Surveillance System. This is the third drone system in which we are interested. I dis-

cussed the first two in the FY 72 prototype program. We are proposing a simple, low-cost, high-performance, remotely piloted aerial vehicle or drone prototype to provide target acquisition and point- or small-area surveillance out to the 60-kilometer range of the division commander's area of influence.

The system would carry a camera or an infrared line-scan imaging sensor. A preprogramed flight-control system would be used to simplify and reduce electronic countermeasure vulnerability. Rapid film processing would be handled after the flight.

The last two projects being proposed in the generic category of target acquisition are both 1973 new initiative proposals. The first is to provide concentrated efforts toward determining the most promising nonradar techniques that might meet the Army's requirement to locate accurately hostile artillery positions (HATLS). Such approaches include but are not limited to infrared, flash ranging, sound ranging, seismic detection, and unintentional radiation detection.

Meteorological Satellite Applications. This concept will allow the Army to capitalize on recent technological advances, particularly resolution refinement. We would obtain tactical meteorological data from existing satellites in real time for rapid Army use.

FIREPOWER CATEGORY. An interesting prototype proposal is called the *Lockless Gun.* This concept combines high-performance with minimum system weight and volume through a new design. The face of the slotted breech and the barrel are permanently connected, eliminating the complex locking operation of today's weapons. A sliding sleeve is used to obturate the chamber. A flat, fully telescoped plastic encapsulated cartridge, which itself serves to reduce system weight, will be the round employed.

Division Support Rocket. This prototype project would evaluate the utility of a division support rocket using hardware instead of paper. Initially, there would be a shoot-off of one or more foreign systems. We would hope that this would lead to a comparision with a U.S. prototyped weapon.

The general characteristics are for a weapon system in the 3- to 40-kilometer range, with multiple-rail or tube launches capable of being mounted on an existing vehicle.

M60A1 Tank Thermal Site. The third firepower prototype project is a simplified, reconfigured version of a currently available thermal sight. It would be mounted entirely within the turret, and be integrated fully into the tank fire-control system. It would provide the tank crew with an improved capability of detecting and engaging targets during darkness where no ambient light exists, and during daylight in conditions of smoke or dust.

Two new initiative firepower programs are being suggested. Both are classified so there is little I can discuss here, other than to say they deal with improving the present Pershing missile and other selected areas. Companies that have a further interest can follow the usual procedure to obtain the classified data through our Technical Liaison Branch.

RESOURCE ECONOMIES. In this final category we are proposing two new initiative projects. The objective of the first is to improve our ability to reduce life-cycle cost through better application of reliability and maintainability technology. This will be in four parts:

- First, redesign selected components, such as a tank track, an electronic switch, a valve, etc., of a system entering development so that these components will exceed the original design, reliability and maintainability levels. Then compare the old versus the new. Are there any long run dollar savings?
- Next, look at current high-maintenance cost items to learn the design causes. Third, learn how to design components that will attain a specified degree of reliability in a manner that will allow growth of reliability; and finally, find new methods, techniques, and instrumentation for duplicating hard-life field conditions on lab simulation devices.

R&D SUPPORT OF DYNAMIC TRAINING. As I'm sure all of you are aware, the Army is changing many of its ways as it adapts to today's world. The areas of individual and unit training are under intensive study. The trend in individual training techniques is one of self-paced, hands-on training, to include peer instruction.

Recently, the Chief of Staff has directed that unit training be decentralized to battalion and company commanders. Our efforts will be aimed at providing the techniques for training, testing and evaluating the small unit programs, with particular emphasis on effective training in an environment of high personnel turbulence.

As I mentioned earlier, the Army originally proposed 12 prototyping programs, with five of them being recommended for an FY 72 start. There was a 13th which, because of internal Army staff opposition, originally fell out but now the internal problem has been resolved. This week, we forwarded a summary sheet recommending this 13th prototype be included in the FY 73 program.

The Army dearly loves the helicopter, but that doesn't mean we shouldn't be looking at something beyond the helicopter. In a joint program with NASA, we are requesting authority to build a prototype of a tilt-prop aircraft. It would give the Army the vertical-lift, slow-speed and hover capabilities of the helicopter along with the increased speed, longer loiter time, and quietness of the fixed-wing aircraft.

IN SUMMARY, for FY 73 the Army is proposing 9 new initiatives and 13 prototypes, 5 of which we are trying to move up into the FY 72 program. If that effort doesn't succeed, these five will be accomplished, hopefully, in the 1973 program.

Again, I encourage you to utilize our Industry Liaison Office where many of the details of these programs are available. A newly published brochure titled *Information for Industry,* available on request to the Technical and Industrial Liaison Branch, describes the procedures for obtaining access to this classified material.

In closing, let my last words be ones of caution. With the exception of the five prototyping programs we are trying to start in FY 72, Congress has not even heard of the FY 73 projects, let alone approved funds for them. In fact, we are not yet assured of even Office of the Secretary of Defense support of each of the FY 73 projects.

Then why do I present them to you? For the simple reason that we want industry to know materiel concepts about which the Army is thinking. Every year, you expend industrial R&D funds. If you know where our interests lie, then hopefully at least some of those funds will be pointed in those directions.

COL Luger Takes Assignment At Computer Systems Command

COL Joseph A. Luger has been assigned as deputy director for the Systems Operations Directorate in the Office of the Deputy for Tactical Systems, U.S. Army Computer Systems Command, Fort Belvoir, Va.

Until recently he was battalion commander, 1st Infantry Division, 5th Battalion, 32d Artillery in Augsburg, Germany. He also served tours of duty in Korea and Vietnam.

COL Luger has been awarded the Legion of Merit, Bronze Star Medal with "V" Device and Oak Leaf Cluster (OLC), Air Medal with three OLC, and the Army Commendation Medal with OLC.

President Nixon Converts Detrick to Cancer Research Complex

(Continued from page 1)

After commenting on two of his prior decisions leading to this action —announcement in November 1969 that the United States would no longer engage in the research, production or stockpiling of offensive biological weapons; and his State of the Union message last January, when he called for a major campaign to conquer cancer—the President continued:

"The decision to terminate biological weapons has made available for other uses some of the Nation's most sophisticated scientific facilities—including the Army's Biological Defense Research Center at Fort Detrick.

"Fort Detrick's nine major laboratory complexes and its additional smaller laboratories constitute a major portion of this Nation's containment facilities for high-hazard microbiological research. In addition, the scientists and technicians who have worked at Fort Detrick represent a pool of talent and dedication which should also be regarded as an important national asset.

"It is my strong feeling that these unique physical and human resources should not be wasted or dispersed. And this is especially the case since the particular facilities and expertise which are found at Fort Detrick can be converted so effectively and so inexpensively to an intensive program of cancer research.

"It is my hope that this specific conversion will help illustrate the general potential for using defense-related facilities to meet pressing domestic challenges. Cutbacks in certain defense needs have provided a considerable supply of expertise and equipment which can now be used for non-defense purposes—if only we take advantage of them. . . ."

The President said more people die of cancer in the United States each year than died in battle in all of World War II. Importance of Fort Detrick's new mission was pointed out in the statement that if the current rates of incidence were to continue, some 50 million people now alive would someday be victimized.

Operational plans for the cancer research program to be conducted at Fort Detrick were only partially decided as the *Army R&D Newsmagazine* went to press. National Cancer Institute Scientific Director for Etiology Dr. Frank J. Rauscher Jr. said the facilities to be used (buildings and equipment) are valued at about $135 million.

Seven buildings with more than 500,000 square feet of laboratory space have been offered for the NCI program. Included are facilities for biochemistry, physical chemistry, biophysics, microbiology and electron microscopy—capable of accommodating 600 personnel when the program is operating at full capacity.

Dr. Rauscher said operation might be assumed by an "industrial-commercial organization, or there are many private nonprofit organizations who might want to participate."

President Nixon explained that "this arrangement will do much to enhance the flexibility of its operations. A private contractor, for example, is usually in a better position to draw upon a diversified range of public and private assistance.

"Such an arrangement has been used most successfully by the National Aeronautics and Space Administration and by the Atomic Energy Commission—in its work at Brookhaven and Oak Ridge. . . ."

Some of the buildings and equipment are available immediately, with others scheduled for change-over during the next eight months. President Nixon said, "It is our hope that the converted Fort Detrick laboratories will be fully operational by the early months of 1972.

Operational costs for the first year are expected to be about $6 million. When the cancer research program is in full operation—within three to five years—costs could range, it was stated, $15 to $20 million a year.

Initially, the program will be about 70 percent research on cancer viruses, 20 percent on chemical causes of cancer, and 10 percent on treatment of the disease, Dr. Rauscher said.

Still uncertain is how many of the professional personnel still assigned to Fort Detrick may be called into the research program under private contractor operation; also, how many of those may be recalled who have been excessed or laid off (about 870) since President Nixon ordered a halt to biological warfare research in 1969.

In the hope of eventually returning to their laboratories—based upon the knowledge that conversion of Fort Detrick to a cancer research center was under consideration—many of the professional employes have found other jobs or have remained in the Fort Detrick area in an unemployed status.

In addition to the eventual maximum full-time staff, Dr. Rauscher said the Fort Detrick facilities will make it possible to create an "ad-

Dr. O'Connor Fills Vacancy Left by Wilson's Death

(Continued from page 1)

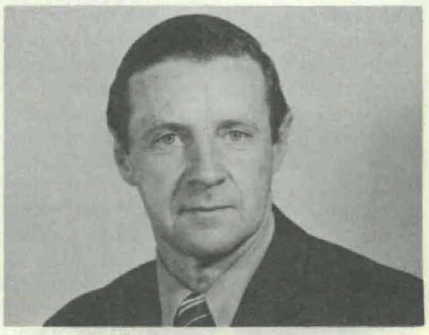
was as a research engineer. He was promoted to scientific adviser of the ETL (formerly the Engineer Geodesy, Intelligence and Mapping R&D Agency) and director of the Research Institute Apr. 4, 1971, after acting in those positions since 1967.

Dr. O'Connor was appointed to a 2-year term on The Army Research Council (TARC) in January 1971. TARC was established in January 1964 as a 9-member planning and advisory unit to assist the Assistant Secretary of the Army (R&D) and the Chief of R&D; also, to provide Army representation in the scientific disciplinary areas of the Joint Advisory Defense Forums created by the Director of Defense Research and Engineering.

Graduated with a doctorate in civil engineering (photogrammetry, physics) from the University of Illinois in 1967, while on leave from ETL, he has an MS degree in the same field from the International Training Centre for Aerial Survey, Delft, The Netherlands, in 1961. His BE degree is from the University of Sydney, Australia.

Dr. O'Connor also has an ME degree in civil engineering from the University of New South Wales, awarded in 1960 after he had served there six years as a lecturer. After returning from The Netherlands in 1961, he rejoined the university staff until he departed in 1963 for the U.S.

Among his numerous professional affiliations are: Fellow, Royal Geographical Society, London, England; member, American Society of Photogrammetry; chairman, Holography Committee and chairman of the Research Committee, American Society of Photogrammetry, and member, Irish Society of Surveying and Photogrammetry.



Dr. Desmond C. O'Connor

vanced systems laboratory." This concept would enable scientists from across the U.S. to be drawn into the program on short notice to concentrate on a problem—thereby eliminating duplication and saving time.

President Nixon amplified on this concept, saying: "The facility is now open to all people in the world. Scientists from all over the world are welcome to come and share information and work together to bring about a cure for cancer. We are now directing our efforts to saving life rather than destroying life."

Initial planning for operation of the Fort Detrick cancer research program will be advanced by a 40-member group representative of the biomedical scientific community. This group will recommend approaches to reaching key objectives in the research effort as well as providing guidance in the organization and management of the program.

President Nixon's appearance at Fort Detrick to announce its new mission was gratifying to Maryland Senators Charles McC Mathias Jr. and J. Glenn Beall Jr. and Congressman Goodloe E. Byron. They were at his side as he spoke, in recognition of their long-persistent efforts to achieve this goal.

ILLUSTRIOUS HISTORY. Capabilities of Fort Detrick for the cancer research program—at least as they existed when the staff was at full strength for the biological warfare research mission in 1969—are attested by a quarter century of impressive achievements.

More than 1,500 individual contributions to the scientific literature are credited to Fort Detrick personnel, exclusive of a number of books regarded as major reference works. Among these are the American pioneering monographs on experimental airborne infection, bacterial genetics, and development of criteria for microbiological facilities.

Immunology of various communicable diseases has been studied intensively at Fort Detrick, leading to development of several vaccines, such as a pentavalent toxoid for botulism, a cell-free antigen for anthrax, and a live vaccine for tularemia.

Another notable achievement is isolation in pure form of the paralytic poison sometimes found in certain shellfish, causing sickness and death to humans who eat them.

In response to a U.S. Public Health Service request, Fort Detrick researchers cooperated in establishing a bioassay standard based upon the purified poison. The standard is now available to all interested laboratories throughout the world.

Fort Detrick's extensive "animal farm" to develop high-quality laboratory animals essential to the validity of experimental results is widely known for major contributions to scientific research achievements.

For example, in 1950 the farm developed a method of screening for salmonellosis, a disease of wide concern to human consumers of certain meat products, that brought about establishment of mouse and guinea pig colonies totally free from that disease for experimental purposes.

Procedures developed by Fort Detrick scientists in establishing disease-free laboratory animal colonies are now widely used and accepted. The chief of the animal farm division helped organize the American Association for Laboratory Animal Science and the American College of Laboratory Animal Medicine, serving as president of both organizations.

Human viral respiratory disease is validated as being responsible for more absenteeism than all other infectious diseases combined.

A great need for information on the spread of these diseases led Fort Detrick personnel to cooperate with medical investigators at the National Institutes of Health and Baylor Medical College.

Resultant knowledge of this combined effort is directly applicable to development of an aerogenic method of administering live, attenuated vaccines to large numbers of people.

Because of the deadly nature of many bacterial agents with which Fort Detrick has worked in biological warfare investigations, extensive research has been conducted to develop adequate safety measures.

Experience accumulated during a long period of investigation, leading to design of cabinets in which hazardous laboratory operations could be conducted with safety, is reported in a 2-volume reference work published in 1966. It is titled *Design Criteria for Microbiological Facilities at Fort Detrick.*

More than 400 copies of this reference work have been provided other governmental agencies, universities, research institutions and industrial concerns involved in research in the life sciences.

Among laboratories whose design, construction and mode of safe operation were influenced by consultation with Fort Detrick experts are the Lunar Receiving Laboratory of the National Aeronautics and Space Administration, and the Emergency Virus Isolation Facility of the National Cancer Institute.

MUCOM Employee Invention Earns Initial Patent Certificate Award

An Army Munitions Command (MUCOM) Initial Patent Certificate and $50 recently rewarded Paul Symonds for his initiative in devising a method of preventing base-ejecting projectiles from prematurely ejecting payloads when subjected to heat.

Symonds' patent includes a modification to the standard-cast eyebolt lifting-plug of artillery shells. The change permits a safe venting of explosive-charge gases when the heat exceeds 260°F.

Symonds graduated from the U.S. Army Military Academy in 1960, and reported to the Office of the Project Manager for Selected Ammunition at MUCOM, Dover, N.J., in 1962. In 1963, he resigned his commission to accept employment with the same office as a civilian general engineer.

Knipp Becomes Commander of Picatinny Post, HISA

Army Munitions Command CG (MG) Erwin M. Graham Jr. has announced that COL Arthur L. Knipp Jr. will take over Nov. 1 as post commander of Picatinny Arsenal, Dover, N.J.

The assignment also gives him command of the Headquarters and Installation Support Activity (HISA), established June 25 as part of the reorganization of Picatinny Arsenal. Operating as a separate activity under HQ Munitions Command, HISA furnishes administrative and logistical support to tenant activities.

COL Arthur L. Knipp Jr.

COL Knipp came to Picatinny Arsenal from Washington where he was a member of the Special Review Board, Office of the Deputy Chief of Staff for Personnel.

He has served as deputy commander, Nuclear Defense Laboratory at Edgewood (Md.) Arsenal; chief, Radiological Safety Branch of Joint Task Force Eight; nuclear biological-chemical staff officer at Supreme Headquarters Allied Powers Europe; and chief, Chemical-Biological Briefing Team, Office of the Assistant Chief of Staff for Force Development.

CH-54B 'Flying Crane' Claims Eight World Marks

Eight world records for rotary-wing aircraft have been set recently by the U.S. Army's CH–54B Flying Crane helicopter, including a sustained altitude record of 36,711 feet in horizontal flight (zero payload category).

Record attempts were sponsored by the U.S. Army Materiel Command at the Sikorsky helicopter plant in Stratford, Conn. The Department of Defense announced that the Army has claimed a total of five world altitude records and three time-to-climb records for the CH–54B. Two of the records are returned to the United States from the Soviet Union; the other six were held by an earlier Flying Crane, the CH–54A.

The new no-payload, horizontal flight record erases a previous mark of 31,482.3 feet, held by the U.S. Army/Sikorsky CH–54A. However, it will not be a world record in the straight altitude category because it does not exceed the standing mark of 36,037 feet by more than three percent. This record has been held since 1958 by a French Alouette.

In a warm-up exercise for the record attempts, the CH–54B early in October lifted and transported a "General Sheridan" tank as a single point payload weighing 15 tons.

The largest weight lifted during the record trials was the required 10,000-kilogram payload (22,050 pounds) to try for altitude. The Flying Crane claims a new record of 16,798 feet, compared to the old world mark of 16,023 feet held by a Russian MI–6 helicopter.

The other record claimed from the USSR is for altitude with a 5,000-kilogram (11,025 pound) payload. The new mark by the CH–54B is 25,647 feet, exceeding a record of 23,461.2 feet held by a Russian MI–10.

Records which the CH–54B captured from the CH–54A include:

- Altitude with 2,000-kilogram payload, 30,581 feet. The present record is 28,743.4 feet.
- Altitude with a 1,000-kilogram payload, 31,317 feet, compared to 29,340.5 feet.
- Altitude in horizontal flight without payload, 36,711 feet, surpassing the existing record of 31,482.3 feet.
- Time to climb to 3,000 meters—1 minute, 32.3 seconds, clipping the record of 1 minute, 38.32 seconds.
- Time to climb to 6,000 meters—3 minutes, 22 seconds as compared to 3 minutes, 32.83 seconds.
- Time to climb to 9,000 meters—6 minutes, 15.2 seconds as compared to 7 minutes, 57.44 seconds.

The four U.S. Army fliers who alternated as pilots and copilots during the trials are CPT Brendan Blackwell, Aviation Systems Command, St. Louis, Mo., and CWOs Eugene Price of Fort Eustis, Va., Delbert Hunt of Fort Sill, Okla., and James Church of Fort Rucker, Ala.

The flights were observed and monitored by officials of the National Aeronautics Association, representing the Federation Aeronautique Internationale (FAI), the organization which certifies world aviation records.

MICOM Announces Promotion Of Lance Missile System PM

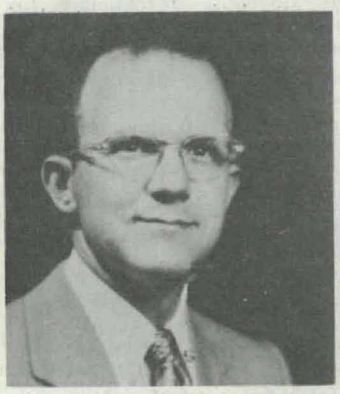
BG Robert J. Proudfoot, project manager for the Army's Lance missile system, was recently promoted to that rank in a ceremony at the Army Missile Command, Redstone Arsenal, Ala.

The 49-year-old West Virginian received his star from MG Edwin I. Donley, CG of the Missile Command. Mrs. Proudfoot helped in pinning on the new rank insignia.

GEN Proudfoot, who was Shillelagh project manager before transferring to Lance in June, has had a diverse Army career in support of armor, infantry and artillery. His experience includes about 23 years with munitions of all types, conventional and nuclear.

A graduate of the Industrial College of the Armed Forces, he holds the Legion of Merit, Air Medal with Oak Leaf Cluster, Bronze Star and Army Commendation Medal.

Dusek Heads New Motivation, Training Laboratory



Dr. E. Ralph Dusek

Meeting the motivation, training and morale goals of the Modern Volunteer Army (MVA) through research and development activities is the mission of a relatively new component of the U.S. Army Manpower Resources Research and Development Center, Arlington, Va.

Headed by Dr. E. Ralph Dusek, whose appointment as director was announced late in October, the Motivation and Training Laboratory (MTL) is actually a temporary consolidation of two of the three laboratories provided in the center's organizational structure. Separate motivation and training laboratories are being considered for establishment in about a year.

Selection of Dr. Dusek, ending a long search for a man with the desired qualifications, was announced by COL Douglas W. Poage, director of the U.S. Army Manpower Resources R&D Center.

Dr. Dusek will be starting almost from scratch in assembling his staff. As of Oct. 29, only 20 percent of the currently authorized staff of 36 was available for duty. The proposed Table of Authorization is 67 employes and the anticipated recruitment buildup is about one year.

The mission statement of the MTL includes:

- Conducts research in motivation, morale and values of the American soldier.
- Strives for improvement of the efficiency and effectiveness of training and effect on operational performance of personnel and units.
- Develops means for efficient acquisition of required military knowledge and skills; cooperates with BESRL in ways to maximize skills in performing military duties.

Currently, the MTL is initiating a major program covering motivational areas, nonfinancial incentives to military service, and attitudes toward military discipline.

Dr. Dusek was director, Behavioral Sciences Laboratory at the U.S. Army Institute of Environmental Medicine in Natick, Mass., until he departed for his new assignment. He has been an Army civilian scientist (research psychologist) since 1953.

After receiving his doctorate from State University of Iowa in 1951, he was employed with Florida State University, 1949–50, and the University of Arkansas, 1951–53.

Graduated from the Industrial College of the Armed Forces in Washington, D.C., in 1965, Dr. Dusek is a Fellow of the Amercian Psychological Association, Human Factors Society, and the Massachusetts Psychological Association. He is a member of the Psychonomic Society, the American Academy of Arts and Sciences, and the International Association of Applied Psychology.

Dr. Dodge Receives Wilks Award at 17th Design of Experiments Conference

Statistical pioneering achievements earned recognition at the 17th Conference on the Design of Experiments in Army Research, Development and Testing, Oct. 27–29, when Dr. Harold F. Dodge was honored with the seventh annual Samuel S. Wilks Memorial Medal.

Walter Reed Army Institute of Research, Washington, D.C., was host to the sessions sponsored by the Army Mathematics Steering Committee on behalf of Chief of Research and Development LTG William C. Gribble Jr.

Dr. Churchill Eisenhart, president of the American Statistical Association, presented the award to MG Leslie E. Simon, 1966 recipient, who accepted it on behalf of Dr. Dodge. Internationally known as a statistician, Dr. Dodge is retired from Rutgers University and Bell Telephone Laboratories.

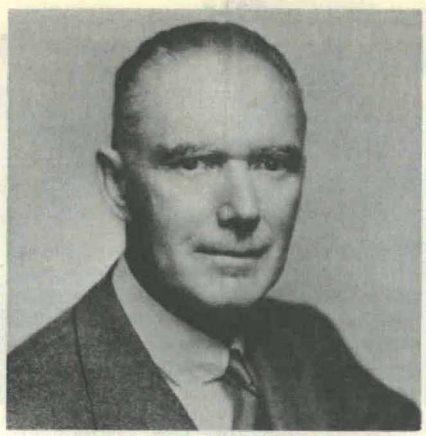
The award citation acclaims Dr. Dodge for "pioneer achievements in developing scientific sampling inspection plans and quality rating methods, his leadership in preparation of quality control standards for government and industry, and continued interest in teaching others the art and techniques of sampling and analysis and interpretation of engineering data."

Administered by the American Statistical Association, the award recognizes "contributions to the advancement of scientific or technical knowledge in Army statistics, ingenious application of such knowledge, or successful activity in fostering cooperative scientific matters which coincidentally benefit the Army, the Department of Defense, the United States Government, and our country generally."

Sampling Inspection Tables, a book coauthored with Harry Romig, is among numerous publications that have enhanced Dr. Dodge's reputation as an outstanding applied statistician.

Credited with notable contributions to the development of the Army Ordnance Standard Sampling Inspection Tables used in World War II, Dr. Dodge also has developed numerous special purpose sampling plans for industry and military requirements.

Throughout his career with Bell Telephone Laboratories, he distinguished himself as a teacher in departmental courses and in the communications development training program for new engineers. Upon retirement, he joined the Rutgers University staff as a professor in the graduate school.



Dr. Harold F. Dodge

From the American Society of Testing and Materials, he has received an award for merit and an honorary membership. He is a Fellow and a Shewhart Medalist as well as an honorary member of the American Society for Quality Control, a Fellow of the American Statistical Association, and a Fellow of the Institute of Mathematical Statistics.

Chairman of this year's conference was Dr. Frank E. Grubbs, chief operations research analyst of the Aberdeen (Md.) Research and Development Center, and also the initial Wilks Medal winner in 1964.

Dr. Grubbs announced the selection of Dr. Dodge at the banquet presentation ceremony, acting as chairman of the award committee. Other members: Prof. Robert E. Bechhofer, Cornell University; Dr. Fred Frishman, Army Research Office, OCRD; Prof. William G. Cochran, Harvard University; Dr. Badrig Kurkjian, Army Materiel Command; MG Simon (Ret.); Dr. John W. Tukey, Princeton University; and Dr. William R. Pabst Jr., Washington, D.C.

COL Charles S. Reed (Ret.), a 1916 classmate of Dr. Dodge at Massachusetts Institute of Technology, was among honored guests at the head table for the presentation ceremony. Others included MG Colin F. Vorder Bruegge, CG of Walter Reed Army Medical Center; Dr. Ivan R. Hershner Jr., Office of the Chief of R&D, HQ DA; Prof. Herbert Solomon, Stanford University; General Simon, Dr. Eisenhart and Dr. Grubbs.

INVITED SPEAKERS for the conference presented papers for discussion as follows: Randomized Response: A New Survey Tool to Collect Data of a Personal Nature, Prof. B. G. Greenberg, University of North Carolina; The Role of Mathematical Sciences in Biomedical Research, Prof. Marvin Zelen, State University of New York; The Comparison of Proportions: A Review of Significance Tests, Confidence Intervals and Adjustments for Stratification, Dr. John J. Gart, National Cancer Institute; and Hotelling's Weighing Designs, Prof. K. S. Bannerjee, University of Delaware.

Three general sessions and 25 clinical or technical sessions comprised the program. More than 100 of the nation's ranking mathematicians, representatives of the Department of Defense, industry, academic and nonprofit research organizations, and numerous Army agencies exchanged information on mathematics and statistics problem areas.

Musgrove Assumes Duties as STRATCOM Chief of Staff

COL Thomas C. Musgrave has been assigned as chief of staff for the Strategic Communications Command (STRATCOM), Fort Huachuca, Ariz., following duty as commander of the 21st Signal Group, part of STRATCOM's 1st Signal Brigade in Vietnam.

A 1945 graduate of the U.S. Military Academy, where he has served as an instructor, he has an MS degree in electrical engineering from the University of Illinois. He has completed the Signal Officers Advanced Course and is a graduate from the Command and General Staff College and the Army War College.

COL Musgrave has served with the Joint Chiefs of Staff, J–5 (Strategic Plans and Policies); U.S. European Command, J–3 (Operations); Office of the Deputy Chief of Staff, Military Operations (War Plans), HQ DA; and chief, Communications Engineering Branch, U.S. Army Forces Far East.

He has received the Legion of Merit with Oak Leaf Cluster (OLC), Bronze Star Medal, Air Medal with OLC, Army Commendation Medal with two OLC, Vietnam Medal of Honor and the Republic of Korea Order of Military Merit.

COL Thomas C. Musgrave

Albright, Snead Head STRATCOM as Latta Goes to CENTO; Rosen Moves Up

MG Jack A. Albright

MG William B. Latta

BG George M. Snead

COL Norman R. Rosen

(Continued from page 1)

star rank in May 1971 when he departed Fort Monmouth for assignment as Director General, North Atlantic Treaty Organization Central Management Agency in Brussels, Belgium. In 1965 he served as Director of Army Research, prior to a tour of duty in Vietnam.

Only a few years ago generals with PhD degrees in the major scientific disciplines, other than in medicine, were rather hard to find. Generals Lotz and Snead share that distinction. Both earned their doctorates in physics from the University of Virginia, as well as their master's in communications engineering from the University of Illinois.

MG ALBRIGHT's qualifications for his duties as the new CG of STRATCOM include a military science degree from the University of Maryland and a master's in business administration from George Washington University. He is a graduate from the Advanced Signal Officer Course, Command and General Staff College, Armed Forces Staff College, and Armed Forces Industrial College.

Prior to assignment to HQ STRATCOM, Fort Huachuca, Ariz., Jan. 31, 1971, General Albright was deputy CG of STRATCOM-Pacific's 1st Signal Brigade in Southeast Asia. He commanded the White House Communications Agency (1965–69) following duty as secretary, Military Communications Board, Defense Communications Agency, Washington, D.C. (1963–65).

MG LATTA graduated with distinction and a master's degree in business administration from Harvard University. He graduated from the United States Military Academy in 1938 as a classmate of General Lotz, and is a graduate from the Army Command and General Staff College as well as the Armed Forces Industrial College.

Among numerous key assignments he has held was a 3-year tour of duty as deputy chief of staff, Communications and Electronics, HQ North American Air Defense Command and HQ Continental Air Defense Command. He was CG of the Electronics Command, 1965–69.

BG SNEAD has served as Director of Army Research since Sept. 30, 1968, following an assignment as executive to the Assistant Chief of Staff for Communications Electronics, HQ DA. In June 1964 he was assigned to HQ U.S. Seventh Army in Europe as division signal officer and signal battalion commander, 24th Infantry Division until June 1965. He then commanded the 505th (later 7th) Signal Group, Europe.

General Snead, who received his BS degree in electrical engineering (with distinction) from Virginia Military Institute in 1943, will return to Fort Huachuca after a 15-year absence. He was chief, Technical Requirements Division, Army Electronic Warfare Center at Fort Monmouth, N.J., for about a year and served two more years in this capacity when the center was relocated at Fort Huachuca in 1954.

Following a tour of duty in Vietnam as a signal officer, he served as assistant executive, Office of the Chief Signal Officer, HQ DA, until assigned to the Ballistic Missile Defense Program, Advance Research Projects Agency in 1960. Later he served more than two years with the ADVENT Agency (later SATCOM) at Fort Monmouth as chief of the Systems Analysis Division. He commanded the Aleutian Sector, Alaska Communications System, 1948–50.

COL ROSEN returned to the Army Research Office to assume his present dual assignment in September 1970 following a year in Vietnam as chief, Lines Communications Division, MACV, and chief, HQ U.S. Army Engineer Construction Agency. He was assigned to HQ U.S. Army Element, Supreme HQ Allied Powers Europe (SHAPE) for three years after graduating in 1966 from the Army War College.

During a 1959–63 tour of duty with the Army Research Office, he was project officer for the effort that led to its relocation from Arlington Hall Station to the Highland Building, as well as a staff officer in the Environmental Sciences Division and, later, chief of the Research Programs Office and assistant executive to the Director of Army Research.

Graduated from the U.S. Military Academy in 1947, he has served as military assistant to the Deputy Director of Defense Research and Engineering (Administration and Management), staff assistant to the Army member of the Coordinating Committee on Science, and research director, Autoprobe Task No. 2.

In August 1971, he completed an R&D Management course at Massachusetts Institute of Technology "uniquely structured to bring together top management talent in all areas of R&D . . . (and) develop a nucleus of eminently qualified military officers in the R&D career field. . . ."

Dobbins Receives Assignment As AACOMS Project Manager

Army Area Communications Systems (AACOMS) are now under the project managership of COL John P. Dobbins, who succeeded COL Emmett R. Arnold. In a change of command ceremony at HQ U.S. Army Electronics Command, COL Arnold ended a year of duty at Fort Monmouth, N.J., to become commandant of the Southeastern Signal School, Fort Gordon, Ga., where he formerly was deputy commandant.

COL Dobbins was transferred from an assignment as deputy director, Research, Development and Engineering, HQ Army Electronics Command. He previously was director of the ECOM Communications/Automatic Data Processing Laboratory.

AACOMS, in general, is an integrated system of multi-channel field Army communications equipment providing secure or nonsecure, high-quality circuits capable of telephone transmission via radio and cable.

Industry Honors Army for Computer Pioneer Role

When a quarter-century of growth of the computer industry worldwide —from its inauspicious origin at the U.S. Army's Aberdeen Proving Ground, Md.—was observed recently, the Army was honored for its pioneering role.

"The limitations of the use of the computer are the limitations of the human mind and imagination. The limitations aren't in the computer, they're in us." So spoke J. Presper Eckert when he and John Mauchly were honored as coinventors and builders of ENIAC, the first electronic computer.

During 25th anniversary celebrations of the Association for Computing Machinery in mid-September, the coinventors recalled their work as young professors at the Moore School of Electrical Engineering, University of Pennsylvania—in response to the Army's critical need during World War II for a high-speed, reliable means of calculating trajectories of artillery shells and compiling firing tables.

The "computer's fathers" worked under contract with the Ballistic Research Laboratories of the U.S. Army Ordnance Corps on development of ENIAC, acronym for Electronic Numeric Integrator and Calculator.

During the annual meeting of the Association of the U.S. Army, Oct. 12, C. A. Christopher, vice president of UNIVAC Federal Systems Division, Sperry Rand Corp., presented a large plaque and scroll to MG Henry C. Schrader, CG of the U.S. Army Computer Systems Command.

ENIAC, which cost approximately $750,000 to build, provided the initial impetus for development of the nation's current multibillion-dollar computer and automatic data processing industry. More than 75,000 computers are now operating in the United States.

The men who invented and built ENIAC for the Army are still involved in data processing, Eckert as a vice president of UNIVAC and Dr. Mauchly as head of his own company, Dynatrend.

They still remember how all the lights in West Philadelphia would dim when ENIAC (with its 18,000 vacuum tubes) was turned on, and how the starting transient would always burn out three or more tubes.

The ENIAC was quite successful. Completed in 1946, it was used as a productive computer for about 10 years at Aberdeen Proving Ground—from its dedication on Feb. 15, 1946, until it was turned off for the last time Oct. 2, 1955.

ARMY Computer Systems Command CG MG Henry C. Schrader accepts plaque from C. A. Christopher, vice president of UNIVAC Federal Systems Division, for Army's role in developing ENIAC, first electronic computer.

Many established companies, as well as new companies, entered the computer field during the first generation (1947–59), when the vacuum tube was used almost universally as the active component in the implementation of computer logic.

The second generation was characterized by the transistorized computers that began to appear in 1959. Some of the computers built then and since are considered super computers, in that they stretched the limit of existing technology in terms of size, speed and logical complexity.

From 1965, most new computers belong to a third generation, which features integrated circuit technology and multiprocessor multiprograming systems.

USAMC Selects Meyer as Director, RD&E

Selection of MG Stewart C. Meyer as Army Materiel Command Director of Research, Development and Engineering was announced Sept. 14 by GEN Henry A. Miley, CG of the AMC.

MG Meyer is a former XXIV Corps Artillery commander, U.S. Army Vietnam, with experience in a succession of high-level research and development assignments. He succeeds BG Mahlon E. Gates, who has returned to his former position as deputy director, Research, Development and Engineering.

The assignment gives MG Meyer responsibility for preparation and execution of AMC research, development, test and evaluation programs, foreign science and technology intelligence, and product engineering.

MG Meyer served as military assistant to the Deputy Director of Defense Research and Engineering (Tactical Warfare Programs), Office, Secretary of Defense, following more than five years in the Office of the Chief of Research and Development, Department of the Army. In OCRD he served progressively as chief, Policy Division; Deputy director, Plans and Programs; and in 1968 as executive. His first assignment in Vietnam, in 1967–68, was executive officer, II Field Force Artillery and, later, commanding officer, 9th Division Artillery.

He was graduated from the U.S. Military Academy in 1943 and Army War College in 1963. His medals include the Distinguished Service Medal, Silver Star, Legion of Merit, Bronze Star Medal with "V" device (with five Oak Leaf Clusters), Army Commendation Medal with Oak Leaf Cluster, Purple Heart and Air Medal with 10 Oak Leaf Clusters.

MG Stewart C. Meyer

Watervliet Man Gains Patent On 'Whiskers' Material Process

Whiskers have come back into vogue, after being virtually tabued for the last half century, as a manifestation of manly qualities, but "whiskers" imbedded in composite materials are more meaningful regarding strength.

An invention titled "Process for forming Iron Whiskers of Uniform High Quality" earned a patent award recently for Dr. Iqbal Ahmad, a research chemist at Watervliet (N.Y.) Arsenal.

Investigations by Dr. Ahmad demonstrated that if crystals were grown under the influence of a magnetic field, kinking and branching would be eliminated, thereby improving the quality and strength of the whiskers.

Dr. Ahmad, a Fellow of the Royal Institute of Chemistry, London, has been granted patents on three inventions and has made application for several others on chemical processes.

Weapons Briefing, Demonstration Mark ASAP Meet

Field artillery developments and a fire power demonstration highlighted the Oct. 21–22 fall meeting of the Army Scientific Advisory Panel (ASAP) at Fort Sill, Okla.

Panel members and invited consultants were briefed on cannon and missile systems, target acquisition, terminal homing, TACFIRE (Tactical Fire Direction System), field artillery requirements, and the Soviet field artillery threat.

During the field artillery fire power demonstration they observed special ammunition effects and weapons ranging in caliber from the French 75mm cannon to the Honest John missile. They also viewed the Lance and Pershing missile systems.

Distinguished participants included Assistant Secretary of the Army (R&D) Robert L. Johnson; GEN Henry A. Miley, CG of the Army Materiel Command (AMC); LTG William C. Gribble Jr., Army Chief of Research and Development; MG C. W. Chapman, deputy CG, Combat Developments Command; Army Chief Scientist Dr. Marvin E. Lasser and Charles L. Poor, Deputy Assistant Secretary of the Army (R&D). BG Gordon Duquemin and BG Donald H. Brooks represented the Continental Army Command (CONARC) and the U.S. Marine Corps, respectively.

Dr. William H. Martin, an ASAP member since 1959, when he terminated four years service as Director of Research and Development, HQ DA, announced his retirement from the panel and from active participation in the Army scientific community.

The meeting served to inform participants of many current aspects of the field artillery research and development program.

AMC Chief Scientist Commends WECOM Colloquium

Dr. Craig M. Crenshaw, chief scientist of the Army Materiel Command (AMC), has formally commended the U.S. Army Weapons Command Research Colloquium for its contributions during the period February 1967–June 1971.

In a letter to MG Henry A. Rasmussen, WECOM commanding general, Dr. Crenshaw praised the colloquium for serving "to increase knowledge in research significant to weapon materiel, to connect Army researchers with those in universities, other government laboratories and industry, and to exchange findings among Army scientists and engineers."

Citing WECOM leadership in arranging outstanding speakers, Dr. Crenshaw lauded the role of John V. Hlubek, principal administrator of the colloquium. He also named Edward J. Haug Jr., John D. Hwang and Gary W. Fischer as "doctoral qualified U.S. Army Reserve officers." Drs. Haug and Fischer are with the WECOM Research, Development and Engineering Directorate. Dr. Hwang recently joined the Aeronautical Research Laboratory, Moffett Field, Calif.

Concluding his letter, Dr. Crenshaw wrote that his "appreciation extends to speakers and to the many engineers and scientists who participated."

Nixon Nominates Smith for Rare Promotion in OTSG

Promotions from colonel to major general—that is, skipping the rank of brigadier general—are rare in the U.S. Army, but President Nixon has nominated COL Edwin H. Smith Jr. for that distinction, subject to confirmation by the Senate.

Effective Dec. 1, COL Smith is scheduled to succeed MG Robert B. Shira, who is retiring, as Assistant Surgeon General and Chief of the Dental Corps. Only one other man in the history of the corps, COL Joseph L. Bernier, has achieved the bypass of BG rank. He became chief of the corps Aug. 1, 1960.

COL Smith is chief of the Department of Dentistry at Walter Reed General Hospital, chief of the Removable Prosthodontics Section and director of Dental Education for the hospital's Department of Dentistry.

Educated at the University of Pennsylvania, Northwestern University and the University of Maryland, he served his dental internship at Walter Reed General Hospital in 1941. He returned to WRGH 1947–48 and 1952–56 tours of duty.

COL Smith has served assignments at Valley Forge General Hospital, Phoenixville, Pa., Tripler General Hospital in Hawaii, Fitzsimons General Hospital in Denver, the U.S. Army Hospital at Fort Benning, Ga., and HQ Heidelberg (Germany) Medical Service Area.

He has been honored with the distinctive "A" Prefix for outstanding accomplishments as a prosthodontist, is a Fellow of the American Academy of Dentists, a member of numerous dental societies, and has authored numerous publications in professional journals.

COL Edwin H. Smith Jr.

ALMC Offers Programs For Certificate Students

The U.S. Army Logistics Management Center (ALMC), an educational agency of the U.S. Army Materiel Command, has established seven certificate programs for military and civilian Department of Defense personnel.

This program is designed to encourage participation by Defense Department personnel in courses in the field of logistics, and to develop and broaden professional potential and skills of participants.

Certificate programs, which require completion of certain sequences of courses in the field of logistics, include research, development, test and evaluation; contract, inventory, distribution and maintenance management; disposal operations and logistics management information systems.

Enrollees must satisfactorily complete two or three required courses offered by the ALMC, depending upon the certificate desired. Satisfactory completion of five or six elective courses is required for certificate eligibility. Any type of ALMC course, either resident, on-the-job education, on-site education of extension will satisfy required or elective courses.

Students may petition to have up to four courses completed at other service schools or civilian universities accepted for elective courses. Courses should be two weeks or longer in duration to qualify. Shorter courses will be evaluated for partial credit. Official transcripts will be required for review and evaluation by ALMC.

For additional information, write: Commandant, U.S. Army Logistics Management Center, ATTN: AMXMC–A–R, Fort Lee, Va. 23801.

NAS Head Names Unit to Study Auto Pollution Control Feasibility

One of the hottest controversies raging these days in the automotive world is centered on the achievability of motor vehicle combustion emission standards established by the Clean Air Act Amendments of 1970.

Major automobile manufacturers appear to believe an engine that will meet the standards cannot be mass produced within the prescribed time limits. Required is a 90 percent reduction from 1970 levels of carbon monoxide and hydrocarbons in the 1975 model year; also, a 90 percent reduction from 1971 emissions of nitrogen oxides in 1976 models.

Dr. Philip Handler, National Academy of Sciences president, announced in mid-September the appointment of a committee to determine whether the automobile industry is technologically capable of designing and mass-producing a reliable engine that will meet required standards as scheduled.

Early in October many major newspapers carried articles expressing the contention of automobile manufacturers that a *reliable engine*—meaning one that will have the 50,000 to 100,000-mile durability of engines currently in service—cannot be produced in the 1975–76 time frame to meet the prescribed emissions standards.

Congress apparently anticipated such a development by writing into the 1970 Clean Air Act Amendments an authorization for the Environmental Protection Agency to contract with the National Academy of Sciences to investigate "the technological feasibility of meeting the emission standards required."

The resulting study committee announced by Dr. Handler is headed by E. L. Ginzton, chairman of Varian Associates, Palo Alto, Calif. Vice chairman J. A. Hutcheson is retired vice president of Westinghouse Electric Corp. and the executive director is J. E. A. John, chairman, Department of Mechanical Engineering, University of Toledo.

The group will determine whether it is feasible for the auto industry to:

- Design an engine, control system, or device capable of meeting emissions standards using fuels which are or could be available;
- Mass-produce such an engine, control system, or device;
- Maintain such an engine, control system, or device so that it will continue to safely meet the emissions standards for five years or 50,000 miles, whichever comes first.

The study will include a consideration of the estimated time and costs involved in developing and producing such an engine or system. Reports on the progress of the study will be sent to Congress and to EPA on Jan. 1 and July 1 of each year.

During the course of the study, the committee will appoint individual panels to consider specific aspects of the emissions problem, such as fuels, engines, exhaust treatment devices, and costs.

Other members of the committee are: Sidney W. Benson, Department of Kinetics and Thermochemistry, Stanford Research Institute; Robert W. Cairns, at time of appointment, vice president, Hercules Inc., and now deputy assistant secretary for science and technology, U.S. Department of Commerce; Charles H. Elmendorf III, assistant vice president, American Telephone and Telegraph Co.;

Also, James A. Fay, Department of Mechanical Engineering, Massachusetts Institute of Technology; Richard L. Garwin, Thomas J. Watson Research Center, IBM; Irvin Glassman, Department of Aerospace and Mechanical Sciences, Princeton University; A. J. Haagen-Smit, Division of Biology, California Institute of Technology; Harold S. Johnston, Department of Chemistry, University of California, Berkeley;

Also, Arthur R. Kantrowitz, director, AVCO-Everett Research Laboratory, Everett, Mass.; J. Ross Macdonald, vice president of corporate research and engineering, Texas Instruments, Inc., Dallas; M. Eugene Merchant, director of research planning, Cincinnati Milacron, Inc., Cincinnati; Donald A. Schon, president, Organization for Social and Technical Innovation, Cambridge, Mass.; and Glenn C. Williams, Institute of Technology, Massachusetts Institute of Technology.

MICOM Test Fires Missile Using Plastic Airframe

An unguided test missile built with a molded plastic airframe was fired successfully by engineers, the Army Missile Command at Redstone (Ala.) Arsenal has announced.

The 56-inch-long test vehicle, 6½ inches in diameter, was launched to a range of nearly two miles at the Redstone test area, using a modified motor from a Falcon missile. Additional tests are planned at Redstone to explore and refine the new technique.

Engineers said the experimental firing has demonstrated the structural integrity of the plastic airframe concept, which they believe could have "a multitude of applications."

Envisioned are plastic airframes for training and target missiles, flight research vehicles and tactical weapons. Plastics can readily be molded into a variety of shapes and sizes for both air and ground roles, the research engineers say.

Cost savings are anticipated, in that the manufacturing process for plastic would require less time and labor than most other missile manufacturing processes. Hughes Aircraft Co. has delivered to the Army a limited number of plastic airframes under contract to the Missile Command.

The test frame used in the successful missile firing was composed of glass fiber and polyester resin. Preimpregnated sheets were pressed into a mold and cured under pressure to form four identical quadrants, each with a fin, and bonded together without mechanical fasteners or threaded joints.

Additional research will be conducted to determine capabilities of the plastic material under other missile environments such as vibration, impact loading, deflection, high and low temperatures, and storage. Studies are planned to adapt the material and manufacturing to specific missiles.

The Redstone Arsenal engineering program is under technical supervision of the Ground Equipment and Materials Directorate in the Research, Development, Engineering and Missile Systems Laboratory.

UNGUIDED MISSILE, built with a molded plastic airframe, is checked by Clatus Rutledge, flight-test engineer for plastic rockets research at Redstone Arsenal, Ala., Missile Command.

Beckett, Richardson Gain Appointments as PL-313s

Appointments to PL–313 positions, signifying status among a selective group of the U.S. Army's top scientists and engineers, have rewarded the achievements of Dr. Royce E. Beckett and Cecil D. Richardson.

Announced Sept. 14, Dr. Beckett's promotion came with his elevation to the position of director, Weapons Laboratory, Army Weapons Command, after two years as acting technical director.

Newly recruited from industry, Richardson is chief of the Technology Division, Hardsite Defense Directorate, Safeguard Systems Office, Office of the Chief of Staff, Department of the Army.

In 1968–69 Dr. Beckett was director of systems analysis at HQ Army Weapons Command, Rock Island, Ill., following a year as a physical sciences administrator with HQ WECOM.

He earned his BS degree in mechanical engineering (1944) and MS degree in applied mechanics (1950) from the Universtiy of Illinois. In 1953, he received his PhD degree in applied mechanics from Washington University, St. Louis, Mo.

Following graduation, he was employed 14 years as assistant professor, associate professor, and professor in the Department of Mechanics, University of Iowa.

Dr. Beckett received the Western Electric Award, North Midwest Section of the American Society of Engineering Education, for excellence in teaching in 1966 and a 1960 Ford Foundation fellowship for a year of study at the University of Michigan.

He is a member of the Society for Industrial and Applied Mathematics, American Ordnance Association, American Society for Engineering Education, Research Society of America, and the Association of University Professors.

Dr. Royce E. Beckett

Cecil D. Richardson

RICHARDSON is now responsible to Julian Davidson, deputy Safeguard System manager for hardsite defense and head of the Hardsite Defense Directorate, for timely and economical development of technology related to the Hardsite Defense Program.

Authorization has been granted to proceed with prototype development and demonstration of a system to augment the defense of Minuteman provided by the Safeguard Ballistic Missile Defense System.

Since graduating from the University of Michigan in 1957, Richardson has been employed by the McDonnell Douglas Astronautics Co., Santa Monica, Calif., as an engineer in missile programs. He has managed major programs pertaining to the analysis and development of concepts for the defense of Minuteman since 1965, and is credited with major contributions to the Army studies that resulted in the present concept for the Hardsite Defense System.

A member of the American Institute of Aeronautics and Astronautics, he has published numerous documents on Hardsite Defense concepts.

Report Lists 1966-71 RLE Publications in 5 Classes

Special Technical Report No. 17, titled *Publications, Research Laboratory of Electronics 1966–1971*, listing journal articles, contributions to conference proceedings, technical reports, and student theses for advanced degrees, is a new Massachusetts Institute of Technology document.

Issued as a supplement to Special Technical Report No. 16, which listed Research Laboratory of Electronics publications for a 20-year period, the new document lists publications in five classes: I, General Physics; II, Plasma Dynamics; III, Communication Sciences and Engineering; IV, General Publications; and V, books by RLE authors.

Established with funds provided by MIT, the U.S. Army, U.S. Navy and U.S. Air Force under a joint services contract, the Research Laboratory of Electronics has expanded its operations steadily during the past quarter of a century.

Currently, support also is being provided by numerous U.S. Government and private agencies. Over the years support of a general nature has been furnished by the U.S. Atomic Energy Commission, the National Science Foundation, the National Institutes of Health, the National Aeronautics and Space Administration, the Advanced Research Projects Agency, the Teagle Foundation, Inc., Bell Telephone Laboratories, Inc., and the MIT Fund for Basic Research.

Ceremonies Mark Historical AEHA Command Change

COL Hunter G. Taft Jr. has succeeded COL Roswell G. Daniels as CO, Army Environmental Hygiene Agency (AEHA), Aberdeen Proving Ground, Md.

The Sept. 23 change of command ceremonies marked the first time in its 29-year history that AEHA has been commanded by other than a medical doctor.

COL Taft, a veteran of 22 years active Army service, previously served as interim chief, Preventive Medicine Division, Medical Field Service School, Fort Sam Houston, Texas.

COL Daniels, commander of AEHA for two years, retired after 21 years active Army service and is now medical director, Washington, D.C., branch, Chesapeake and Potomac Telephone Co.

AEHA provides services worldwide to maintain the health of U.S. Army military and civilian personnel. As the operating arm for the Army Surgeon General in the field of environmental hygiene, the agency has the responsibility of assuring that military operations do not adversely affect the quality of the environment in the area or areas involved.

COL Hunter G. Taft Jr.

CRREL Scientists Conduct NSF Antarctic Field Studies

Three scientists from the U.S. Army Cold Region Research and Engineering Laboratory (USACRREL) will conduct field studies in Antarctica during the upcoming austral summer.

Sponsored by the National Science Foundation, Anthony Gow, USACRREL research geologist, and PVT William Sheehy will carry out their work at Byrd Station and McMurdo Sound. LT John Rand will work at the South Pole.

Gow and Sheehy will take measurements of snow accumulation along two 10-kilometer stake lines which were established at Byrd Station in 1962. They will also remeasure the elevations of stakes to determine effects of the topography on surface snow accumulation. Temperature and deformation measurements will be made there in a 309-meter drill hole as part of a continuing study of the internal deformation of ice sheets.

The two scientists will visit several locations along the edge of the McMurdo Sound ice sheet where the glacier bed is exposed and accessible for observation and sampling. They will examine the details of debris patterns in the ice and collect samples that will include glacier ice above the debris zone. These will be analyzed for ice-debris ratios, electrolytic conductivity, air content, isotopic composition and fabrics.

At the South Pole, Rand will determine a depth-temperature profile using a pendulum probe. These measurements will provide data for use in planning deep-core drilling of ice at other locations on the high plateau of East Antarctica, as part of the planned International Antarctic Glaciological Project.

This thermal pendulum probe will be released to melt its way, at a rate determined by operators at the surface, to the base of the icecap 2,900 meters below the surface. Temperature measurements will be taken at intervals within the icecap.

The temperature profile, analyzed with the known rate of snow accumulation, and the climatic history of the Pole Station area, will allow a reasonably accurate estimate to be made of the age of the ice at each level in the icecap profile. Particularly significant will be the determination of whether the base of the icecap at the South Pole is at the pressure-melting point.

Gow has made 11 trips to Antarctica and is the author of more than 40 scientific reports and papers published on his research there.

CRREL research geologist, Anthony Gow, a veteran of 11 research trips to Antarctica, discusses 1971 field studies with LT John Rand and PVT Wm. Sheehy.

13 MERDC, ETL Employes Go Into Advanced Training

Approval for full-time college training under the Army's education program was given recently to seven engineers and scientists at the Army Mobility Equipment R&D Center (MERDC) and six at the Army Engineer Topographic Laboratories, Fort Belvoir, Va.

The Army program is designed to upgrade the capabilities of scientists, engineers, technicians and managers considered to have outstanding potential for future research and development assignments.

With the Army paying the full cost of their training and education, including tuition, books and incidental fees, they also will receive their regular salaries as employes. Any employe receiving long-term training at Army expense must be committed to working for the Army or the Department of Defense for a period equivalent to three times the training period.

MERDC employes receiving training are Paul L. Blum, studying for an MS degree in systems analysis, George Washington University (GWU); J. Louis Berger, an MS degree in electrical engineering, GWU; Steve Merritt, a PhD in business administration, GWU; James A. McLean, Jeffrey A. Smith and James A. Smith, MS degrees in engineering administration, GWU; and Walter G. Taschek, an MS degree in chemical engineering at the University of Wisconsin.

The ETL employes receiving training and their goals are Francis G. Capece, MS degree in technology of management, American University; Louis B. Wisniewski, BS degree in mathematics, American University; Donald G. Orr, graduate work in geology, Colorado School of Mines; Robert S. Pazak, MS degree in computer science, University of Maryland; and John R. Benton, PhD in electrical engineering, University of Michigan.

BG ALBERT B. CRAWFORD JR. now heads the Office of the Project Manager of the Army Tactical Data Systems (ARTADS)—no change of title but of rank, effective Sept. 9. MG Hugh F. Foster Jr., CG of the Army Electronics Command and Fort Monmouth, pinned on the insignia of new rank, assisted by Mrs. Bettie H. Crawford, wife of the ARTADS' leader. Present were BG Crawford's parents, Mr. and Mrs. Albert B. Crawford of Tuscon, Ariz., and MG H. C. Schrader, CG of the Computer Systems Command, Fort Belvoir, Va. ARTADS was established this year and is responsible for developing new field computer operations.

Wagner Spur Memorializes Historic Feat of Drilling to Bedrock in Antarctica

Testifying permanently but mutely to the role of a U.S. Army officer in one of the most historically significant scientific achievements in Antarctica is newly named Wagner Spur, honoring COL John E. Wagner.

Currently commanding the U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Va., he was commander/director of the U.S. Army Cold Regions Research Engineering Laboratory (CRREL), 1967–70.

Secrets stored thousands of years ago deep in successive layers of ice were probed to the bottom Jan. 19, 1968, when a CRREL team drilled 7,101 feet to the bedrock of Antarctica.

That epochal feat, including the collecting of ice cores in 15-foot sections through the nearly 1½ miles to bedrock, climaxed effort started in 1966 and conducted continuously from Nov. 1, 1967. Within the sedimentation in those ice cores lies a chronological record of climatic changes for several thousand years.

COL Wagner was in Antarctica at the remote Byrd Station when the CRREL drillers reached bedrock, and was later awarded the Antarctic Service Medal for his part in the historic operation.

The National Science Foundation informed him recently that the U.S. Board on Geographic Names, Department of the Interior, had approved the naming of Wagner Spur to honor him. This geographical feature is in the USARP (U.S. Antartcic Research Program) Mountains in northern Victoria Land, at 70°09's latitude, 159°36'e longitude.

Deep-core drilling in ice was one of the principal study programs recommended by the National Academy of Sciences' Panel of Glaciology. CRREL's responsibility for implementing the entire program included designing and modifying drilling equipment, establishing techniques of ice core analysis, and developing borehole instrumentation methods.

Other exploits of U.S. Army scientists and explorers in Antarctica are memorialized by Mount Ruth Siple—named for the widow of the illustrious Dr. Paul A. Siple, who as an 18-year-old Boy Scout accompanied Admiral Richard E. Byrd on his first Antarctic Expedition—and Mount Paul C. Dalrymple.

As a researcher, meteorologist and geographer, Dalrymple distinguished himself in Antarctica while employed by the Quartermaster Research and Engineering Command, forerunner of the U.S. Army Natick (Mass.) Laboratories.

ARO-D Plans Operations Research Symposium

Techniques of "Risk Analysis," of prime concern to high-level R&D decision-makers on major weapons systems and tactics, will be discussed in depth at the 11th annual U.S. Army Operations Research Symposium.

Scheduled May 16–18 in Durham, N.C., the unclassified symposium will be sponsored by the Army Chief of Research and Development through the Army Research Office-Durham (ARO–D), as it has been for 10 years.

Approximately 200 Army, academic and industrial leaders in the increasingly important field of operations research are expected to participate in the sessions. Attendance is by invitation and each of the major Army commands is given a quota of representation.

In a recent letter to all major commands concerned, the ARO–D commander requested 1) an outline of any facet of Risk Analysis considered deserving of in-depth examination; 2) abstracts (or preferably drafts) of technical papers for presentation during contributed paper sessions; and 3) an outline of problem areas of special interest for presentation during the clinical session.

Various aspects of Risk Analysis will be analyzed and presented by a single discussion leader on each day of the symposium. Following questions from the floor, a further analysis will be made by a panel selected for specialized knowledge and experience in Risk Analysis.

Contributed papers will be accorded increased importance and will not be presented at sessions concurrent with a general session.

Abstracts (or drafts) of proposed papers, along with the outlines mentioned earlier, must be submitted by Dec. 1 to: Commanding Officer, U.S. Army Research Office-Durham, ATTN: Executive Officer, Box CM, Duke Station, Durham, N.C. 27706.

Wagner Commands Engineer Topographic Labs

Command of the U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Va., was assumed recently by COL John E. Wagner, former engineer, First Field Force, Vietnam, who succeeded COL John R. Oswalt Jr. when he retired from the Army.

The laboratories, a Class II activity, U.S. Army Topographic Command, are responsible for research and development of equipment, procedures and techniques applicable to topographic sciences.

COL Wagner attended Drury College in 1945 and then entered the U.S. Military Academy, West Point, where he received a BS degree in engineering and a commission as a second lieutenant in 1950. He received his master's (1959) and doctorate (1961) in civil engineering from the University of Illinois.

He completed the basic and advanced engineer officer courses at the U.S. Army Engineer School, Fort Belvoir, Va., and graduated from the Army Command and General Staff College in 1965 and the Army War College in 1971.

Following an assignment in 1963 as engineer adviser with the Military Advisory Command in Vietnam, he served as deputy director, U.S. Army Engineer Nuclear Cratering Group, Livermore, Calif. He was reassigned to Vietnam after serving as commanding officer/director, U.S. Army Cold Regions Research Engineering Laboratory (1967–70).

COL John E. Wagner

Kent Named for 3-Star Rank As Weapons Evaluation Chief

Leadership of the Weapons Systems Evaluation Group (WSEG), Department of Defense, will pass from an Army officer to an Air Force officer Feb. 1, 1972, when MG Glenn A. Kent takes over from LTG Arthur W. Overbeck.

Secretary of Defense Melvin R. Laird announced Oct. 12 that President Nixon has nominated MG Kent for 3-star rank in his new assignment, subject to Senate confirmation. He has served since July 1968 as Air Force Assistant Chief of Staff, Studies and Analysis.

President Nixon has nominated LTG Overbeck for placement on the retirement list in that grade. He has directed the WSEG for two years.

Dr. Parrish Receives SARS Fellowship

Dr. Frederick W. Parrish, head of the Microbial Chemical Group, U.S. Army Natick (Mass.) Laboratories (NLABS) is in Australia for one year as a recent recipient of a Secretary of the Army Research and Study (SARS) Fellowship.

Parrish is spending a major portion of his fellowship year in research at the University of New South Wales and also is doing experimental work at the Commonwealth Scientific and Industrial Organization, North Ryde, N.S.W., Australia. His SARS plan also calls for visits to other research facilities in Australia, Japan, Switzerland and the U.S.

Dr. Parrish's project involves studies on microorganisms in relation to food preservation, and nuclear magnetic resonance studies of molecular interactions.

NLABS Commander BG Dean Van Lydegraf has endorsed Dr. Parrish's study program, saying that it holds "great potential for contributions of major scientific significance for solving pressing Army and DoD problems associated with the role of microorganisms on materiel deterioration and preservation."

Graduated from University College, Bangor, Wales, with a BS degree (1950) in chemistry, physics and mathematics and a certificate (1951) in education, Parrish received his PhD in organic chemistry from the University of London in 1958.

After working one year (1961) in the former Microbiological Division of NLABS Pioneering Research Laboratory, he was employed two years in the Technical Division of the Corn Products Co. at Argo, Ill., and since 1963 has served with NLABS.

Author of 32 professional papers published in journals such as *Nature*, *Canadian Journal of Chemistry*, and *Journal of Organic Chemistry*, he has written chapters for several books and has received two patents based on his NLABS work.

Dr. Parrish is a member of the American Chemical Society, American Association for Advancement of Science, Biochemical Society (London) and American Society for Microbiology. He has conducted seminars at University of Massachusetts (Amherst), Northeastern University (Boston, Mass.), New York Medical College, Queen's University (Kingston, Ontario) and Grain Processing Co., Muscatine, Iowa.

Wood Accepts Appointment DASD (Strategic Programs)

Archie L. Wood, new Deputy Assistant Secretary of Defense for Strategic Programs (Systems Analysis), spent most of his career in the U.S. Air Force (1950–71) as a research and development officer.

Included in the career of the 1950 graduate of the U.S. Military Academy is a 6-year tour with the Minuteman System Program Office. He graduated from Massachusetts Institute of Technology with an MS degree in aeronautical engineering (1955) and in management (1965), and is a graduate of the National War College.

In July 1965, he was assigned to the Office of the Assistant Secretary of Defense (Systems Analysis) as an analyst, in 1968–69 as director of the Intelligence Division.

After 17 months in an Air Force assignment as Systems Program director for the Subsonic Cruise Armed Decoy (SCAD) Program in the Aeronautical Division at Wright-Patterson Air Force Base, he retired with the rank of colonel. He returned to the Office of the Assistant Secretary of Defense (Systems Analysis) in November 1970 as special assistant for SALT.

AADB Completes Testing of New One-Shot BAT System

Talk about seeing 17-foot bats flying in broad daylight might raise a few eyebrows and perhaps a quip about "bats in the belfry" from some listeners uninitiated to the fact that BATS that big actually fly above some Army test centers.

Testing of the new one-shot Ballistic Aerial Target System (BATS) was completed recently by the Army Air Defense Board (AADB). Assigned to the Army Test and Evaluation Command (TECOM), the AADB is one of six service test activities.

BATS are colored bright red and have been sighted quite often over the desert testing vicinity near Fort Bliss, Tex., as well as at test ranges in Hawaii, Alaska and Sardinia.

The BAT System seems to offer a solution to part of the Army requirement for a simple, inexpensive target suitable for use in air-defense training and practice shots. TECOM's 9-month test and evaluation of the system's service and initial production phase was completed by the AADB.

Following careful review of the air defense community's needs, competitive designs from two manufacturers were pitted against standards established by the user. With improvements and modifications deemed necessary, the winning design was given a thorough "wring-out" to ensure effectiveness and reliability of the target system.

BATS is a 17-foot metal tube having a surface area of about 22 square feet, with structural rigidity attained by means of a plastic foam liner. In flight, it simulates typical small aerial targets for radar-assisted air-defense weapons such as VULCAN.

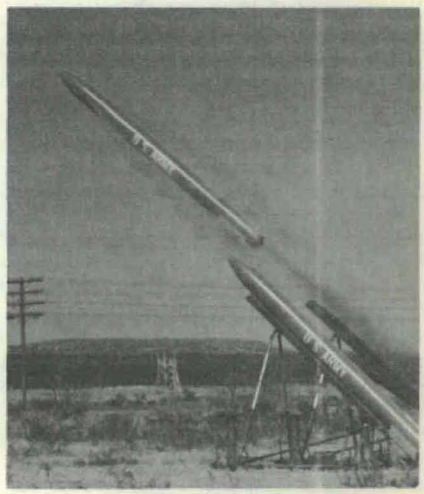
Special augmentation flares produce radiation typical of aircraft engines, thereby providing a suitable target for infrared heat-seeking missiles.

From two to five 2.75-inch standard aerial rocket motors for the boost phase and two standard jet engine starter cartridges for sustained flight power make the BATS propulsion system relatively simple.

Powered by standard 24-volt batteries, the electrical system permits the launch control officer to be separated from the launchers by as much as two miles. No special tools are required for assembly of BATS; all equipment is either mounted on the launcher or supplied in the missile container.

Simplicity and transportability of the system make it an ideal target for small ranges in remote locations, where costs for more sophisticated targets might prove prohibitive.

During more than 100 service practice firings in Europe, BATS performed without failure or any mishandling. After eight hours practice in assembling and firing BATS, troops were able to support the firings.



FLYING TARGET takes to the air at Ft. Bliss, Tex., where the U.S. Army Air Defense Board recently tested the new Ballistic Aerial Target System (BATS) to determine its suitability for use with aerial defense systems.

'Miracle Fruit' Appears Promising as More Acceptable Sweetener

"Feeding our military forces costs some $2 billion a year; the economic importance of research devoted to maintaining the sensory qualities, the highest nutritional standards, and the wholesomeness of this immense quantity of food should be clear to all."

Thus a U.S. Army scientist, described in a *New York Times* June 10, 1971 article as the "Madame Curie of miracle fruit," introduced her presentation of a technical paper at the 1970 U.S. Army Science Conference.

Among the 100 papers that were presented—selected from more than 500 proposed by Army in-house laboratory researchers—Linda M. Bartoshuk's (married name, Summerfield) report on nearly 10 years experimentation with "miracle fruit" went almost unnoticed.

In fact, it did not qualify for any part of $3,600 in cash honorariums to authors of nine papers, one of the exceptionally prestigious Paul A. Siple Memorial silver medallions, one of the "special recognition" papers, or even one of numerous "Meritorious" citation papers.

Miracle fruit is the name given to an oval-shaped red berry, ¾-inch long, that has an almost incredible effect upon the taste buds when eaten before other foods. Mrs. Summerfield's first experience with it was in 1956—about five years before she began researching its qualities at the U.S. Army Natick (Mass.) Laboratories.

"I got so excited the first time I tried it," she reports, "that I ate four lemons and got dreadfully sick. You just don't notice it because the sensation of sweetness is so powerful."

Envisioned eventually as a safe way to appease the sweet tooth of millions of diabetics and other people who want to avoid ordinary sugar, the pills produced from miracle fruit are still undergoing exhaustive toxicity tests in Natick Laboratories. Mass marketing hopefully will be achieved in the mid-1970s.

With cyclamates formerly used in soft drinks and other food products off the market, saccharin under suspicion as a possible cancer-inducing agent, and white, brown or raw sugar "under fire from the organic food world as a nutritionally depleted and depleting substance," the search for an acceptable sweetener assumes added importance.

The miracle fruit sweetener apparently poses none of these problems, is noncaloric (that is, nonfattening), produces an authentic sugar taste, and in extensive tests has produced no disturbing side effects. Lemons are described as tasting like lemonade and green strawberries as if coated with powdered sugar.

Commercial exploitation of this sweetener is being pioneered by Meditron Co. of Wayland, Mass., whose president, Robert Harvey, is a former graduate student of Mrs. Summerfield. She now does most of her research on miracle fruit with Meditron, though it is still a pet project that receives much of her own time.

"Mirilin" is the trademark Harvey has given to the miracle fruit extract, and he has instituted a full certification program for it within the Food and Drug Administration. Miracle fruit extracts already carry approval of the United Nations Food and Agricultural Organization.

Meditron Co. has been working intensively for several years to develop the technique of growing the *Synsepalum dulcificum* plants—densely foliated bushes attaining a height of about eight feet—that produce miracle fruit berries. Early efforts to grow the plants in the U.S. failed.

In West Africa the plants thrive and miracle fruit has been used by the natives for centuries to sweeten certain foods. In her Army Science Conference paper, Mrs. Summerfield reported that the first description of the qualities of the berries was probably given by a French explorer in 1725.

David Fairchild, an American explorer working with the Department of Agriculture on a trip to the Cama-

New Computer Center Opens at USACSC

Dedication ceremonies for the U.S. Army Computer Systems Command's new computer center Sept. 15 opened the "permanent home" for USACSC's three software support systems—Burroughs B–3500, IBM 360/50 and UNIVAC 1005.

Located in the Headquarters Annex recently occupied by about 500 of the USACSC's headquarters staff of nearly 1,000 employes, the center has some 7,000 square feet of floor space. The address is 7700 Arlington Boulevard, Falls Church, Va.

Staffed for 2-shift operation, the center has 17 computer operators, 11 schedulers, librarians and aides, and four auxiliary equipment operators.

The *IBM 360/50* handles programs for the Base Operating Information System, Combat Service Support System, Standard Army Intermediate Level System and budgetary funds allocated to various Directorates by Command Comptroller financial management system.

The *UNIVAC 1005* tests programs for maintenance of the Personnel Management and Accounting Card Processor System. The *Burroughs 3500* aids in development and maintenance of Major Army Subordinate Command Information System programs.

MG Henry C. Schrader, newly assigned commanding general, USACSC, dedicated the center and open house activities were sponsored by the Tech Facilities Directorate.

DEDICATION ceremonies for U.S. Army Computer System Command's computer center included ribbon cutting by MG Henry C. Schrader, USACSC commander. At left are COL Edwin W. Basham, USACSC technical facilities director, and Albert J. Forte, who represented GBA Associates, building owners.

roons in the late 1920s, her paper states, "deserves great credit for interesting Americans in this plant." He gathered seeds for introduction of the plant in the United States.

Not until 1957, however, did efforts to grow the plants in the U.S. succeed. Dr. and Mrs. Otto Churney and R. G. Newcomb of Florida obtained two seeds from the Summit Garden in Panama. Plants grown from these seeds became the parent plants for most of the miracle fruit grown in the U.S.

Meditron Co. has succeeded in making about 10,000 plants bloom in greenhouses in Sudbury, Mass., where tropical West African growing condiitions are simulated, and expects to have one million plants bearing fruit by the mid-1970s. It takes about four years to produce a mature tree.

When in full production, Mirilin pills are expected to cost about the same as most vitamin pills do.

Effects of miracle fruit on the taste buds can be counteracted by the chewing of leaves from *Gymnema sylvestre*, a woody climbing plant that runs over the tops of high trees in a large portion of southern India as well as in Ceylon and tropical Africa, Mrs. Summerfield reported in her paper.

Normally, the sweetness of chewing miracle fruit or a portion of a pill persists about an hour, but the effect can be offset almost immediately by chewing a leaf from the *Gymnema sylvestre*. A report published in 1847 first documented the finding that chewing such a leaf destroyed the taste of sugar in tea, and that the suppressive effect lasted about 24 hours.

Mrs. Summerfield, who has performed extensive research on effects of the sweetness-counteracting leaf, believes that its qualities also will find numerous applications as a tool in taste physiology studies.

Her paper states that "both *Gymnema sylvestre* and miracle fruit also have many direct applications in the area of palatability enhancement. These are occasions when sugar has desirable properties in the processing of food but then leaves the final products too sweet.

"*Gymnema sylvestre* can be diluted to suppress sweetness by a desired amount. In addition, it can curb the intake of sweets. A snack containing the proper amount of *Gymnema sylvestre* would make sweets unpalatable.

"The most obvious application of miracle fruit is as a noncaloric sweetener. Since miracle fruit works on the tongue and not the food, it avoids the dangers of additives like cyclamates. The recent reports on potential harm from ingesting cyclamates have focused public attention on food additives as a very dangerous source of environmental pollution.

"Loss of the use of cyclamates poses great problems for the diets of diabetics and weight watchers, and also eliminates other benefits that are of special interest where food transportation costs are important, as with military uses of food. Artificial sweeteners are usually very light and eliminate necessity of transporting and storing large amounts of sugar.

"A new, safe noncaloric sweetener with excellent taste properties obviously has a very large appeal. Miracle fruit appears to be entirely safe, even when eaten in quantities appropriate for a fruit (there are no reports of side effects from its consumption as a fruit in Africa and preliminary tests on mice and hamsters were unable to show any toxicity at all).

"It sweetens without a bitter aftertaste and makes normally sour fruits like lemons, rhubarb and grapefruit very palatable. Fruit-based products like jams, pies and ice cream are also sweetened well with miracle fruit.

"Foods not normally sour are not affected by miracle fruit, so meats, soups and similar foods are not sweetened. Observers report that the flavor of vegetables is improved with miracle fruit even though vegetables are not normally sour, but this may simply be the result of the addition of a very weak sweet.

"The final potential application concerns the flavor problems encountered with some kinds of processed foods and with unconventional foods. The success of processing techniques like dehydration depends to a great degree on the ability to retain flavor when the food is reconstituted.

"The success of new food sources depends on the ability to give these foods palatable flavors. Some of the sources for new foods under development—fish flour, algae, vegetable analogues of meat products, foods produced by microorganisms like yeast, and protein extractions from green leaves—offer enormous nutritional and economic advantages; however, they also pose palatability problems.

"Taste-altering substances from plants like *Gymnema sylvestre* and miracle fruit suggest a new approach to the problems of increasiing the acceptance of these nutritionally and economically desirable foods."

Cotter Named Deputy Director Of ARPA After 'Acting' Duty

"Acting" was removed from the title of Donald R. Cotter when he recently was promoted to deputy director, Advanced Research Projects Agency (ARPA), Office of the Director of Defense Research and Engineering.

Until he was appointed acting deputy director Jan. 8, 1971, Cotter was director, Overseas Defense Research for ARPA. Prior to joining ARPA, he served at Sandia Laboratories, Albuquerque, N. Mex., as director of systems planning and assistant to the president.

For two years (1966–68), he was special assistant for Counterinsurgency in the Office of Director of Defense Research and Engineering. While stationed earlier at Sandia, he was responsible for conceptual and feasibility studies of advanced strategic and tactical nuclear weapons systems. In 1946 he worked on radar and TV tubes for the Production Development Division, Philco Corp., Lansdale, Pa.

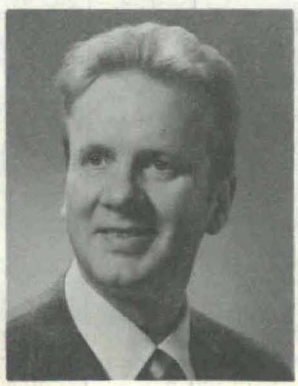
Since 1962, he has served on various consultant assignments for the Office of Director of Defense Research and Engineering, the Joint Committee on Atomic Energy, and the Atomic Energy Commission.

Cotter received his education at Lehigh University in the fields of industrial and electrical engineering and at the University of New Mexico in mathematics and physics.

Brynjolfsson Attends Advanced Management Course

Dr. Ari Brynjolfsson, U.S. Army Natick (Mass.) Laboratories research physicist, widely known for his work on radiation preservation of food, is attending the Advanced Management Program of the Harvard University Graduate School of Business Administration.

The 13-week course prepares executives for top leadership in business or in public organizations in ways that will serve their organizations and society at large. Dr. Brynjolfsson's participation is sponsored under the Natick Laboratories long-term training program.



Dr. Ari Brynjolfsson

Born in Iceland, Dr. Brynjolfsson was educated at the University of Copenhagen where he majored in mathematics and physics. He joined the NLABS staff in 1965 and serves as chief of the Food Radiation Sources Division, which has had a pioneering role in food preservation by ionizing energy.

In 1969 Dr. Brynjolfsson won the NLABS Scientific Director's Gold Key Award for his publications on the economic aspects of food irradiation, including a comprehensive discussion of technological aspects and a significant correction factor in gamma ray dosimetry.

Recently he was appointed to the editorial board of the "Journal of Radiation Engineering," an Israeli technical publication.

MUCOM Pollution Abatement Cost Estimates Soar 250 Percent

U.S. Army Munitions Command estimates of pollution control and abatement costs—based on a calculation that MUCOM requirements constitute roughly 70 percent of the total for the Army-wide program—have gained about 250 percent since 1967.

Extensive ammunition manufacturing activities at MUCOM's 24 arsenals and plants—19 of them government-owned, contractor-operated—account for the tremendous problem of pollution control and abatement confronting MG Ervin M. Graham Jr. and his staff.

"Some of our problems in pollution abatement require long-range research beyond strictly engineering solutions," he explains. "Accordingly, we have prepared and are started on an extensive R&D effort that includes new processes and materials. . . ."

The over-all program provides for treatment of effluents and wastes; also, detection and measurement of sources of pollution, including characteristics and physiological activity of materials and wastes. Metal parts fabrication and lubricant pollution is being studied.

MG Graham believes that "often a new process offers the best chance to eliminate a pollution problem (and that) . . . eliminating sulfuric acid from the process for the nitration of cellulose" is an outstanding example. This eliminated sulfur dioxide air pollution and the output of soluble sulfates into the water effluent.

Congressional recognition of the magnitude of MUCOM's problem has been increasing steadily in the form of funding support, though not in proportion to skyrocketing estimates of pollution control and abatement costs.

Early remedial measures proposed by MUCOM—resulting from a study in 1967 of sources of pollution and the existing level of control—fixed the estimate of costs for all MUCOM facilities at about $35 million.

Rapidly changing developments have compelled MUCOM leaders to reappraise each year the level of effort required for effective corrective action. Inflated labor and material costs have contributed to the rise in estimates, along with federal, state, county and city laws and programs geared to mounting national concern regarding immensity of the problem.

Consequently, the MUCOM estimate was raised almost 100 perecnt in 1968 to $60 million. The 1969 estimate was raised to $72 million, boosted to $137 million in 1970, and hiked to $153 million for 1971.

Under the Military Construction Army (MCA) program, Congress approved and funded in 1969 five of MUCOM's projects at a cost of $3.4 million. In 1970, $6.9 million was provided for six projects and in 1971 Congress approved $6.6 million for nine projects. Over-all, only about five percent of estimated funding requirements has been approved to date.

MUCOM leaders started early on pollution control and abatement efforts by action in May 1966 to educate and stimulate personnel to the requirements. Emphasis is currently on the use of the most advanced technology feasible at realistically economical cost.

MUCOM Environmental Control Officer Robert O. Matthern is responsible for coordinating command-wide control and pollution abatement activities. Considerable in-house laboratory engineering effort is being directed to solution of specific problems presented in MUCOM installation reports.

Contributing substantially to MUCOM estimates of costs of remedial action is the age of many facilities. Most of its arsenals and other manufacturing plants, located in 21 states, were built during World War II. Afterward they were placed in layaway until reactivated to support military operations in Korea in the 1950s and later in Southeast Asia.

MUCOM points out that these facilities were designed to produce mu-

Picatinny Uses 80-foot 'Tunnel' to Test Rocket Launcher

Picatinny Arsenal has a new capability, an overground "tunnel," for testing the 2.75-inch rocket launcher under actual firing conditions, thereby enhancing a longe-established program of statistical testing at the Dover, N.J., installation.

COL Lloyd Faul, program manager for the 2.75-inch system, stated the requirement. Engineers in the Development Evaluation Division, Technical Services Directorate, responded with the 80-foot-long tunnel.

Resting on adjustable stands, about three feet above the ground, the tunnel permits evaluation of various 2.75-inch launcher characteristics critical to effective performance, thus aiding the work of munitions engineers.

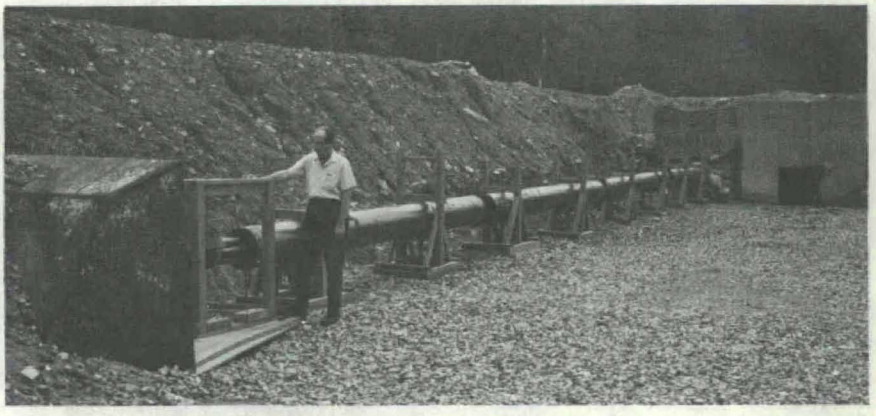
Mounted at one end of the tunnel is the launcher being evaluated. A rocket, consisting of an inert warhead and dummy fuze, is fired clear of the launcher through the 16-inch diameter pipe into an enclosed impact area.

Exiting the tunnel, the rocket is deflected downward by a steel plate into soft earth and is burned out. The impact area is enclosed with sandbags and blasting mats, offering complete confinement of fragmentation after impact.

Evaluation of pertinent launch characteristics is accomplished by high-speed photography and information from various transducers and sensors on the launcher and in the tunnel

Determinations include blast pressure, vibration, tube stresses, launch velocity and firing mechanism (detent) performance.

Engineers in the Propulsion Test Branch who built the tunnel are Frank Femia and Robert Cipoth. Stephen Smith, Data Acquisition Branch, supplied instrumentation support. Robert Reenstra and Seymour Smolin, Applications Engineering Laboratory, Ammunition Engineering Directorate, assisted in test operations.



TESTING of 2.75-inch rocket launcher, under actual firing conditions, can be accomplished with this new 80-foot steel pipe tunnel at Picatinny Arsenal, Dover, N.J. Robert Reenstra, Applications Engineering Lab., observes rocket loading.

nitions at a time when national survival had priority over pollution concern. Today, pollution abatement has become concomitant with national survival.

Accordingly, MUCOM has undertaken a plant modernization program to upgrade facilities if economically feasible and to replace or phase out those considered too obsolete for economical renovation. Coupled with this effort are engineering projects to develop new processing techniques.

COL William D. Wary heads the Manufacturing Technology Directorate responsible for the 2-pronged approach to pollution abatement and control activities. The projected funding aspect of the engineering program alone will have grown to $6.061 million in FY 1973 from $165,000 at the outset of 1969. Many tasks will mature during CY 1972–74.

Projects for modernizing the acid plants, TNT production lines, and cellulose nitration units will be active in the FY 1970–73 time frame. The Army Corps of Engineers has estimated costs for pollution abatement features of these projects at nearly $100 million.

Among the beneficial aspects for communities surrounding these plants will be the reduction of emissions of acid mists and oxides of nitrogen and sulfur into the air. Planned also is a decrease of acid wastes, dissolved solids, suspended solids, and colored or heated effluents into receiving waters.

Long before MUCOM came into being in 1962, "red water"—a mixture of TNT residues and sodium sulfate—was discharged freely by TNT-producing plants into local waterways. The solution, containing five percent solids, gave the water a reddish hue.

Current technology has enabled MUCOM plants to evaporate this solution, usually to 35 percent solids, producing a marketable byproduct. The Volunteer Army Ammunition Plant in Tennessee and the Radford AAP in Virginia sell the solution to the paper industry as a source of sodium and sulfur.

Where no available market exists in the local area, the solution is incinerated to remove organic matter, leaving an ash of sodium sulfate. Although no market has been developed for the ash, studies are being conducted on a variety of applications, including recycling.

Resolution of this major water pollution problem through evaporation and incineration has left MUCOM with an air pollution and solid-waste disposal problem, in the form of excessive particulate and nitrogen oxides emissions into the air, and sodium sulfite ash. Installation of collectors on plant smoke stacks has reduced particulates to what is considered an acceptable level.

The original batch process used to manufacture TNT at the Joliet AAP in Illinois and the Volunteer AAP in Tennessee was designed for about half the present operating capacity. With the doubling of production, undue stress was placed on the old equipment, resulting in severe air and water pollution.

New, automated, continuous TNT lines are now in operation at Radford AAP and are being built at Newport AAP in Indiana and the Volunteer and Joliet AAPs. These lines will incorporate the most current pollution abatement concepts and equipment.

Officials at these plants anticipate that balanced design—i.e., design matching production—together with applied modern technology, will reduce emissions 80 percent or more.

Installation of Brinks mist eliminators to sulfuric acid concentrators on smoke stacks at Badger AAP at Baraboo, Wis., has resulted in significant reduction in acid mist emissions. Addition of electrostatic precipitators to smoke stacks at other plants, followed by Mahon fog filters and mist pads, has reduced sulfuric acid emissions from existing equipment by about 90 percent.

Emissions of nitrogen oxides from ammonia oxidation plants and the spent acid and fume recovery units in explosives manufacturing have posed serious problems. Recent developments in flame reduction, catalytic redution, and molecular sieves are expected, in the view of MUCOM engineers, to all but eliminate these problems.

One of the techniques in operation at Volunteer and Joliet AAPs and at Rocky Mountain Arsenal near Denver, Colo., is the alarm monitoring system. Continuous air sampling, analyzing and recording equipment is located at numerous sites around each installation.

The extremely sensitive system measures nitric oxide, nitrogen dioxide, and sulfur dioxide concentrations, to protect adjacent areas against pollution.

If an error in plant operations occurs, causing an unusual outpouring of particulates, or if climatic conditions do not permit adequate dispersion of particulates—as in the case of an atmospheric inversion—alarms sound in response to increasing atmospheric concentrations. The first alarm level indicates something is amiss; the second calls for a reduction in manufacturing.

A problem in developing a long-range pollution abatement program is the difficulty of establishing realistic guidelines and standards and the fact that standards tend to become more stringent as more is learned of the physiological and ecological effects of the pollutant.

Technically, establishing standards involves correlating pollution levels with the detrimental physiological responses of man, animals and plants, and detrimental effects to materials. This requires a great deal of research and involves close coordination with the Environmental Protection Agency and the Surgeon General of the Army. MUCOM engineers admit that standards and enforcement constitute their biggest and most sensitive problem.

The importance of adequate standards can be appreciated when one realizes how rising standards can effect MUCOM pollution abatement costs, as mentioned at the beginning of this article.

Meanwhile, proposed standards formulated by the Army Ammunition Procurement and Supply Agency (APSA), a MUCOM agency based at Joliet, Ill., which directs operations of GOCO (government-owned, contractor-operated) plants, are serving to probe the future.

Although these air and water standards as yet have no legal status, they are among the more quoted papers within the Munitions Command, next to Executive Order 11507, which requires that federal programs for abatement of air and water pollution be completed or under way by December 1972.

MUCOM's three commodity centers —Edgewood (Md.) Arsenal near Baltimore, Frankford Arsenal in Philadelphia, and Picatinny Arsenal at Dover, N.J.—are also on schedule in complying with federal and state pollution regulations.

Actions include reduction of air, water and land pollutants through the use of low-sulfur coal for power and heating, with a forthcoming conversion to low-sulfur oil. Improved sewage disposal processes are being developed for treating raw organic, industrial and toxic wastes. Open-burning incinerators for certain refuse are eliminated. Low-phosphate detergent soaps are being used in post laundries, and treatment is given to grease, oil and wash-rack sludge generated by motor pool activities.

For several years prior to the present national concern about the pollution of the environment, MUCOM has fostered programs that bear directly upon the ecology of the area indigenous to its installations. These include forestry management, fish and wildlife management, and land management.

Laird Swears in BeLieu As Army Under Secretary

Secretary of Defense Melvin R. Laird presided at swearing-in ceremonies Sept. 22 that made former Under Secretary of the Navy Kenneth E. BeLieu the Under Secretary of the Army.

Secretary BeLieu succeeds Thaddeus R. Beal, who resigned after three years service. Appointed by President Nixon, BeLieu had served since Jan. 21, 1969, as Deputy Assistant to the President for Congressional Relations. He was Under Secretary of the Navy in 1965, after four years as Assistant Secretary of the Navy for Installations and Logistics.

From July 1965 to January 1969, he held positions as executive vice president, president and member of the board of the Leisure World Foundation, Laguna Beach, Calif.; member, Defense Science Board; member, Board of Advisers, Ryan Aeronautical Corp. and Continental Motors; and member, Technical Advisory Board, RCA.

Graduated from the University of Oregon in 1937, he was in business three years until he volunteered for active duty as a second lieutenant in the Infantry. By 1945, he had participated in the Normandy Landing and campaigns in France, the Battle of the Bulge, Germany and Czechoslovakia—winning the Silver Star, Legion of Merit, Bronze Star, Purple Heart and the French Croix de Guerre.

SECRETARY OF DEFENSE Melvin R. Laird administers oath of office as Under Secretary of the Army to Kenneth E. BeLieu as Mrs. BeLieu holds the Bible.

Wounds received in combat in the Korean Conflict in 1950 caused amputation of his left leg below the knee. Assigned to the Office of the Secretary of the Army upon discharge from the hospital, he was executive officer to two Secretaries of the Army before he retired from active duty as a colonel in 1955.

Subsequently he served as a professional staff member of the Senate Armed Services Committee, the first staff director of the Senate Aeronautical and Space Sciences Committee, and staff director of the Preparedness Investigating Subcommittee, Senate Armed Services Committee.

Berry Takes Over as General Counsel of Army

Swearing-in ceremonies for Robert W. Berry as the new general counsel of the Department of the Army, were held Sept. 7 with Secretary of the Army Robert F. Froehlke officiating.

Graduated with honors from Washington State University with a BA degree in 1950 and from Harvard Law School with a JD degree in 1955, Berry served until 1960 as a teaching Fellow, Harvard Defense Policy Seminar and in the Office of the General Counsel, Office of the Secretary of Defense.

From 1960 to 1963, he served as staff attorney for the Philco Corp., and then transferred to Litton Industries as assistant general counsel for public affairs. After serving four years, he became director of the Washington Office of Litton Industries, a position he held until he was sworn in as Army general counsel.

Admitted to practice in the District of Columbia and the State of California and Pennsylvania, he is a member of the American Bar Association, the Federal Bar Association, and the American Judicature Society. He also is admitted to practice before the Supreme Court of the U.S. and the Court of Military Appeals.

Robert W. Berry

CRT Systems Improve Army COMPSY Program

Cathode ray tube (CRT) display systems will be provided for use by medical personnel in three Army clinics to improve psychiatric diagnosis and treatment under a U.S. Army Medical Research and Development Command (MRDC) contract.

Patient information stored at Walter Reed Army Medical Center (WRAMC), Washington, D.C., will be available for retrieval and display by medical personnel as a part of "COMPSY," the Army's computer support in military psychiatry program.

Psychiatric wards of Walter Reed General Hospital will have seven of the systems, each with a CRT display, keyboard, control unit and hard copy printer. Two distant Army mental hygiene consultation clinics also will get single systems.

The COMPSY method speeds up all clerical functions. With automation of administration, scoring and interpretation of screening tests, psychological test evaluations will be accelerated. The system will also be time-saving in preparing social histories, routine summaries and patients' reports.

Under a $350,000 contract with Sanders Associates, Inc., of Nashua, N.H., 10 of MRDC's 720 Data Display Systems, hard copy printers, control units, modems and a communications computer, will be furnished. All systems will be connected by telephone lines to the central Army computer at Walter Reed Army Medical Center.

WSMR Atmospheric Sciences Lab Conducts Satellite Program Workshop

Meteorological satellite programs of the federal government, industry and the academic community were considered at an intensive workshop Sept. 14–23, sponsored by the U.S. Army Atmospheric Sciences Laboratory at White Sands Missile Range (WSMR), N. Mex.

The exchange of ideas, techniques and state-of-the-art developments was enhanced by outstanding speakers. Army, Navy and Air Force participants were complemented by representatives from the National Environmental Satellite Service and the Universities of Texas, Chicago and Colorado State.

Ralph D. Reynolds, research meteorologist and technical investigator of satellite meteorology at the Atmospheric Sciences Laboratory (ASL), was chairman for the workshop. The WSMR-based ASL is an element of the U.S. Army Electronics Command, headquartered at Fort Monmouth, N.J.

Key speakers included Dr. William L. Smith, chief of the Radiation Branch, National Environmental Satellite Service, Suitland, Md., "Vertical Temperature Profile Techniques," and Dr. Joseph Pierluissi, professor of electrical engineering, University of Texas at El Paso, "Infrared Band Models and Infrared Spectroscopy."

"Analysis Techniques for Geosynchronous Satellites" was discussed by Dr. Ted Fujita, professor of meteorology, University of Chicago. Dr. Thomas Vonder Haar, professor of meteorology, Colorado State University, lectured on "Quantitative Analysis of Satellite Data."

"Principles and Limitations of Radiometers was the topic of Richard Yoder of Barnes Engineering, Stamford, Conn., and "Computer Processing of Satellite Data" was presented by CPT Walter D. Meyer, U.S. Air Force Global Weather Center.

Second-week lectures were devoted to satellite data analysis and forecasting.

Cdr William E. Willingham, U.S. Navy representative of the Joint Meteorological Satellite Program Office (JMSPO), Washington, D.C., discussed satellite meteorology and the national operational satellite system —including visual synoptic and mesoscale interpretation techniques.

Vincent Oliver of the Applications Group, National Environmental Satellite Service, gave a series of lectures. He spoke on lake effects, lake-induced snowstorms, sea breezes, frictional and coastal effects; also, fog and dust effect on low clouds, severe weather and turbulence.

Cloud types associated with curvature and tropical systems, and tropical storm classification systems also were discussed at length.

MAJ J. O. Siebers, Environmental Technical Applications Center, Washington, D.C., presented three papers —"Numerical Guidance to Weather Forecasts Using Satellite Data," "Introduction to Infrared Interpretation Techniques," and 'Scanning Radiometer/Infrared Imagery Interpretation Techniques."

JMSPO participants included the chief, COL James R. Anderson, U.S. Air Force; LTC Earl Kreins, U.S. Air Force; and MAJ John W. Moore, U.S. Army.

CONFERENCE SPEAKERS at Meteorological Satellite Workshop included (from left) Dr. William L. Smith, National Environmental Satellite Service; Dr. Thomas Vonder Haar, Colorado State University; Richard Yoder, Barnes Engineering, Stamford, Conn.

METEOROLOGICAL SATELLITE WORKSHOP chairman Ralph D. Reynolds (left) with attendees MAJ John W. Moore, U.S. Army representative of the Joint Meteorological Satellite Program Office; CPT Denzel D. Waltman, USAF; CPT Richard C. Savage, USAF; COL James Anderson and LTC Earl Kreins, USAF.

OCRD Prepares 48-page Industry Guidance Brochure

Guidance for industry relative to U.S. Army research and development management, planning and programing procedures, materiel needs and opportunities for business is contained in a new brochure.

Prepared by the Technical and Industrial Liaison Office (TILO), Office of the Chief of Research and Development, the 48-page document carries a message from Army Chief of R&D LTG William C. Gribble, Jr.

A foreword states that he "recognizes that a progressive and viable industrial relations program is a necessary part of the research and development effort, if the Army-industry team is to achieve maximum exploitation of these rapidly expanding potentials of modern technology."

Information is presented on materiel life cycle management, brief descriptions of the Army and Joint Family of Plans, and which of those plans are available for review by industry; also, the materiel need concept, planning system for R&D, planning interrelationships, structuring the RDTE (Research, Development, Test and Evaluation) Program, and the RDTE project numbering system.

Major Army R&D activities (installations) are listed along with the major subordinate command headquarters of the U.S. Army Materiel Command.

Information also is provided on Unsolicited Proposals, Unfunded Study Program, and procedures and eligibility to visit TILO, OCRD, for orientation on specific interests.

Copies of the pamphlet are available from TILO, ROOM 3D 380, The Pentagon, Washington, D.C. 20310.

AUSA Speakers View Security Theat, Problems, 'Big 8' Program

Former Secretary of State Dean Rusk was honored with the George Catlett Marshall Medal, highest award of the Association of the United States Army, at the memorial dinner concluding its 17th annual meeting, Oct. 11–13, in Washington, D.C.

Awarded annually for "selfless and outstanding service to the nation," the medal recognized the achievements of Rusk in national and international affairs during eight years (1961–69) as Secretary of State. He is now a University of Georgia professor.

Keynote speaker Secretary of Defense Melvin Laird stressed that the threat of inferiority confronting U.S. Armed Forces is increasingly real, in view of the rapid gains of potential enemies. The U.S. must modernize its planned peacetime forces, he said, to preserve their capability of responding to any national emergency.

"Our Armed Forces are caught up in a swirl of changes induced in part by changes in our society and in part by changes in the world outside our borders," Secretary Laird stated, adding that he could "conceive of no circumstances in which the American people would accept military inferiority."

Secretary Laird assured the AUSA that as long as he remains in office he is committed to oppose any national security program "which would place us in an inferior position—a position that might force any American president to crawl to a negotiating table."

The American Army, he added, "remains today, as it has been in the past and will be in the future, an indispensible major element of the military power of our nation and a foundation stone in the building of a peaceful world."

DIGNITARIES at head table during annual AUSA George Catlett Marshall Memorial Dinner included General of the Army Omar N. Bradley, Army Chief of Staff General William C. Westmoreland, and former Secretary of the Army Dr. Elvis J. Stahr, currently the chairman of the AUSA Council of Trustees.

SECRETARY OF THE ARMY Robert F. Froehlke and U.S. Army Materiel Command Commander GEN Henry A. Miley discuss model of a high explosive, dual-purpose, 40mm cartridge used in grenade launchers, during the Secretary's first visit to the AMC HQ.

Secretary of the Army Robert F. Froehlke, memorial dinner speaker, lauded AUSA contributions to national defense. He called upon its membership to keep the public informed and "help portray accurately the true Army and its mission to the people of this country."

Secretary Froehlke discussed a number of people-oriented actions the Army is taking, including the Vietnamization program, personnel overseas assignments, recruiting of the Volunteer Army, and draft policies.

"The actions we are taking, the attitudes we are instilling in our people," he said, "are not limited to the Regular Army. . . . Mel Laird indicated . . . that in the Total Force Concept, 45 percent of the total Army force in FY 74 will be Reserve and National Guard components."

Army Chief of Staff GEN William C. Westmoreland, AUSA luncheon speaker, emphasized that "professionalism is the bedrock—the foundation—upon which the security of our Nation has been based throughout our national history. . . .

"Further, we must emphasize that there are exciting challenges and great satisfaction in serving and accomplishing our missions in a peacetime environment. Let us not forget that we did well what we were asked to do in Vietnam . . . and at the same time performed magnificently elsewhere around the world in recent years, despite adversity. . . ."

In closing, General Westmoreland directed his remarks to the importance of increased public understanding and support for the Army, and the role of the AUSA in this effort.

AUSA President Edward C. Logelin presents General George C. Catlett Marshall Medal to former Secretary of State Dean Rusk at Marshall Memorial Dinner, climax of the AUSA meeting.

Former Secretary of the Army Dr. Elvis J. Stahr, chairman of the AUSA Council of Trustees, presented the Anthony J. Drexel Biddle Medal to MG Fernando C. Mencaccy (USAR, Ret.), for outstanding service to the AUSA. He also awarded the President's Medal to Roy J. Smith, president of the AUSA Central Texas-Fort Hood Chapter, for outstanding service to the U.S.Army.

Assistant Secretary of the Army (Manpower and Reserve Affairs) Hadlai A. Hull, speaking at the corporate members reception and luncheon, said "constant need for change makes people management difficult."

The most significant people problems that face the Army, he said, are race relations, drug abuse, and the quantity and quality of accessions for both the Active Army and the Reserves.

Hull said that the Army is taking steps to insure that racial prejudice

or its appearance is eliminated in every area, with particular attention to promotions, military justice, and access to housing and other public accommodations off post.

The Army is combating drug abuse through enlightened leadership, credible education, and aggressive law enforcement, he said. Other actions include refining methods of identification; improving techniques of detoxification and treatment; and rehabilitation through community involvement.

General Henry A. Miley Jr., CG of the U.S. Army Materiel Command, focused attention on development of top priority materiel objectives of the Army.

Known as the "Big 8," these priorities include development of munitions in calibers ranging from hand grenades to missile warheads; antitank weapons—TOW and Dragon; the Cheyenne as a modernized gunship; the Utility Tactical Transport Air System, as a heavy-lift system; the SAM–D air defense system; the XM803 Main Battle Tank program; the Digital Tactical Communication System; and Target Acquisition efforts.

General Miley then discussed the new prototype concept of procurement which will include an unmanned aerial vehicle, a remotely controlled attack missile, a forward-looking infrared device for Chaparral and Vulcan, an air defense suppression system for Army aircraft, and improvement of fuel economy and efficiency of military engines.

In closing, the general discussed development/production transition, using the Armored Scout Vehicle Program as an example.

"We will issue solicitations for Scout. . . . As structured, the program calls first—for a hardware prototype competition between two or more significantly different approaches—wheeled and tracked, for example.

"We will test the prototypes, select the best one, and place a contract with the winner for engineering and production of 35 vehicles built over hard tooling. As soon as the 35th vehicle is delivered, we will shut down the production line.

"As the 35 vehicles begin to be delivered, engineering and service tests will be initiated followed by operational testing. Results of the tests will be cranked into the technical data package. Our plan provides for a period of up to a year to complete our testing and refine the data package before contracting for volume production.

"This approach may not be applicable to all kinds of equipment, but we are optimistic that our experience with the Scout may suggest a solution to the historic problem of transitioning from development to production."

Special assistant for the Modern Volunteer Army (MVA), LTG George I. Forsythe, chaired a panel discussion on actions, plans and progress. Army Chief of Information MG Winant Sidle led a panel on the relationship between the military and the media. Deputy Chief of Staff for Personnel LTG Walter T. Kerwin Jr. moderated a panel discussion on "Contemporary Concerns."

AUSA President Edward C. Logelin presided as toastmaster at the Marshall dinner and presented the "President's Report" at the opening session. Logelin succeeded former Secretary of the Army Frank Pace Jr. as AUSA president.

More than 6,000 members and representatives of industrial organizations attended this year's meeting. Over 90,000 square feet of Army and industrial exhibits reflected the latest developments in materiel and equipment.

Stahl Heads CBR Agency in Third McClellan Tour

When COL Kenneth L. Stahl took command of the Chemical-Biological-Radiological Agency, the assignment returned him to Fort McClellan, Ala., for his third duty tour in 12 years.

Graduated from the Chemical Officer Advanced Course in 1958, he remained as S3 (operations officer), HQ Training Command, Army Chemical Corps. In 1968 he returned to Fort McClellan as chief, Technical Department, Army Chemical Center and School. Subsequently he commanded the 100th Chemical Group (Provisional).

COL Kenneth L. Stahl

Graduated from the Command and General Staff College, Fort Leavenworth, Kans., and in 1971 from the Industrial College of the Armed Forces, Fort McNair, Washington, D.C., he has served in the Far East with the 1st Cavalry Division, as a general staff officer in the Office of the Chief Chemical Officer, Washington, and as liaison officer in London, England.

COL Stahl entered the Army after graduating from the University of Wisconsin (distinguished military graduate as an ROTC student), where he earned a BS degree in chemistry and MS in microbiology.

His decorations include the Legion of Merit, Bronze Star Medal and Army Commendation Medal (with four OLCs).

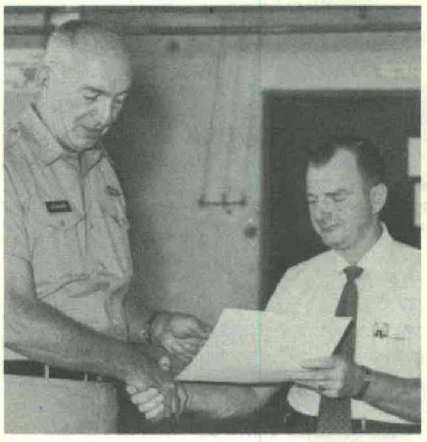
Suggestion Nets $1000; Cuts Federal Spending

Testing of rocket firing systems with an inexpensive squib instead of with a live rocket, an Army Incentive Awards Suggestion Program idea, has earned Edward L. Hogeboom Jr. a $1,000 award and returned the U.S. Government first-year savings of $201,800.

Firing live rockets or simulating the firing in tests—the previous methods—had disadvantages. Live firing was expensive in that it required elaborate safety precautions and an air-to-surface firing range. Simulation did not provide complete data.

Hogeboom modified salvaged rockets to permit the use of a squib that confirms proper firing action. The explosion is confined within the launching tube and safety precautions necessary with live rockets are not required. Firing can be accomplished anywhere during flight without danger.

Further modification of a lock ring has simplified reload procedures, reducing the manhours required for loading squibs between firing runs.



$1,000 CHECK and Army Suggestion Award Certificate are presented to Edward L. Hogeboom Jr., U.S. Army Aviation Test Board, Fort Rucker, Ala., by MG Frank M. Izenour, CG of the U.S. Army Test and Evaluation Command.

Major Army RDT&E, Procurement Contacts Total $207 Million

Army contracts for research, development, test, evaluation and procurement totaled $207,531,896 from Aug. 1 to Oct. 1. Only contracts exceeding $1 million are listed.

Lockheed Aircraft Corp. Division of Lockheed California Co. is receiving $47,800,000 for development of the AH–56 Cheyenne; AMF, Inc., $23,096,500 for bomb parts; Kentron, Hawaii, Ltd., $12,857,004 for technical support at the Kwajalein Missile Range.

LTV Electrosystems, Inc., was awarded $10,209,310 for RT–524A/VRC, RT–246A/VRC receiver/transmitters and R–442A/VRC receivers; U.S. Steel Corp., $8,494,317 for 8-inch projectile parts.

Woerfel Corp. and Towne Realty, Inc., received $7,870,533 for construction of Safeguard ABM System launch sites 1 and 4, Grand Forks, N.D.; Watervliet Arsenal, $7,272,510 for M109 self-propelled howitzer modification kits.

Thiokol Chemical Corp. was issued $6,950,452 for Spartan missile motors; North American Rockwell Corp., $6,821,837 for rocket engines for the extended-range Lance missile system; Hughes Aircraft Co., $6,090,391 (two contracts) for the contract definition phase of the hard-site defense program and for industrial engineering services for the TOW missile system.

Norris Industries, Inc., gained $5,333,876 (two contracts) for 81mm and 155mm projectile parts.

Contracts under $5 million. Gulf and Western Industries, $4,109,321 for design and development of automated equipment for assembly of 5.56mm ammunition and M67 hand grenade parts.

Union Carbide Corp., $3,551,073 for batteries; Human Resources Research Organization, $3,489,141 for continuation of research and scientific studies in support of the Army's human resources research program.

Golden Industries, Inc., $3,420,000 for 155mm ammunition parts; Heckethorn Manufacturing Co., $3,244,933 for 40mm projectile parts; Textron, Inc., $3,156,050 for repair of crash-damaged helicopters; AVCO Corp., $3,038,000 (two contracts) for overhaul and modification of turbine engines for helicopters.

Kennedy Van Saun, Inc., $2,881,795 for 105mm projectile parts; Airport Machining Corp., $2,768,001 for 60mm projectiles; Univac of Sperry Rand Corp., $2,697,770 for rental and maintenance of four Univac 494 computer systems.

Kisco Co., Inc., $2,647,260 for 105mm cartridge cases; Raytheon Co., $2,500,000 for contract definition phase of the hard-site defense program; McDonnell Douglas Corp., $2,500,000 for the contract definition phase of the hard-site defense program.

Chamberlain Manufacturing Co., $2,400,042 (two contracts) for 4.2-inch and 105mm projectile parts; Inflated Products Co., Inc., $2,099,549 for corridor passageways, shelter sections and corridor connectors for Medical Unit Self-Transportable (MUST) equipment; Bunker Ramo Corp., $2,016,873 for electronic equipment.

Contracts under $2 million. Wilkinson Manufacturing Co., $1,775,372 and R. M. Kerner Co., $1,750,166 for bomb fin assemblies; Garrett Corp., $1,673,244 for MUST components; AMBAC Industries, $1,572,000 for illumination signal devices; Aerojet Solid Propulsion Co., $1,525,000 for 2.75-inch rocket motors.

Braddock, Dunn and McDonald, Inc., $1,340,096 for nonpersonal services for scientific and experimental support for the Combat Developments Command; Sperry Rand Corp., $1,304,108 for 155mm illuminating projectile parts.

Consolidated Box Co., Inc., $1,220,767 for fiber containers for 105mm projectiles; Concept Industries, Inc., $1,203,363 for fin assemblies; Babcock Electronics Corps., $1,141,728 for Lance missile fuzes; Hazeltine Corp., $1,131,445 for AN/TPM–24 electronic test sets, associated equipment and repair parts.

Lasko Metal Products, Inc., $1,124,356 for SUU–14A bomb dispensers; Condec Corp., $1,100,000 for engineering services in support of production of M561 cargo trucks and M792 truck-ambulances; Hy-Gain Electronics Corp., $1,071,483 for AS–1729/VRC antenna.

Pennguin Industries, $1,034,700 for grenade fuzes; Boeing Co., $1,015,532 for architectural engineering services for the Ground Facilities Hardness Program, and for structural dynamic considerations of the facilities designed, constructed and installed by the Corps of Engineers for the Safeguard ABM System.

Ogden Takes Command of 2 STRATCOM Agencies

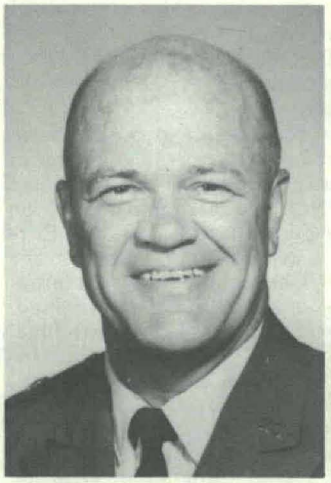
BG Dorwood W. Ogden Jr. is the new commanding general of the U.S. Army's Communications Systems Agency (CSA), Fort Monmouth, N.J., and the Communications Electronics Engineering Installation Agency (CEEIA), Fort Huachuca, Ariz.

MG William B. Latta, CG, U.S. Army Strategic Communications Command (STRATCOM), announced the appointment in a move to enable the CSA and CEEIA, major subcommands of STRATCOM, to function more efficiently.

As CG of the CEEIA, BG Ogden succeeds recently promoted MG Jack A. Albright, designated to succeed MG Latta in November. As CG of CSA, Ogden succeeds BG Richard W. Swenson, and is also the Army Materiel Command project manager for Strategic Army Communications (STARCOM).

Prior to joining STRATCOM, Ogden was chief of staff, Defense Communications Agency (DCA), Washington, D.C. Earlier he commanded the 12th Signal Group, part of STRATCOM's 1st Signal Brigade in Vietnam.

From October 1966 to July 1967, he was deputy assistant chief for programing, National Military Command System Support Center, Pentagon. He has served in Korea, Japan and Germany; with the Combat Developments Command; battalion commander, 127th Signal, 7th Infantry Division; chief, Defense Communications System Support Office; and chief, Army Command and Control Support Division, Office of the Assistant Chief of Staff (Communications-Electronics), Department of the Army.



BG Dorwood W. Ogden Jr.

Graduated with a BS degree (1959) from the University of Maryland and an MS degree (1968) in business administration from George Washington University, he has attended many industrial and service schools. Included are the commercial wire communications course, Signal Corps advance officer course, Army Command and General Staff College, Armed Forces Staff College, and the Industrial College of the Armed Forces. His decorations include the Legion of Merit, third award of the Bronze Star, Meritorious Service Medal, Army Air Medal and Army Commendation Medals.

Vietnam Evaluation Reports Acclaim Performance of Camp Sentinel Radars

Operational evaluation reports from Vietnam on Camp Sentinel Radars (CSR–III), based on service since January, indicate this development of the U.S. Army's Harry Diamond Laboratories, Washington, D.C., is performing in an "exemplary" manner.

The foliage penetration radar has achieved general acclaim from users during testing and will be subjected to several more months of operational use in Vietnam.

The original CSR project was sponsored by the Advanced Research Projects Agency (ARPA) as a program at the Massachusetts Institute of Technology Lincoln Labs.

Developmental work on the CSR by the Harry Diamond Laboratories (HDL) recently earned John R. Dent, an R&D supervisor, the Hinman Award for Technical Achievement. Wilbur S. Hinman Jr. was the first HDL technical director, and a later Deputy Assistant Secretary of the Army (R&D).

The CSR–III is demonstrating daily, according to reports, that it is effective against guerrilla operations under concealment by dense foliage. Conventional radars in service in Vietnam have been severely hampered in effectiveness under line-of-sight limitations.

Knowledge that low-frequency radio waves can propagate in heavy foliage had prompted several investigators to attempt to combine modern radar with this ability prior to the ARPA project with the MIT Lincoln Laboratories.

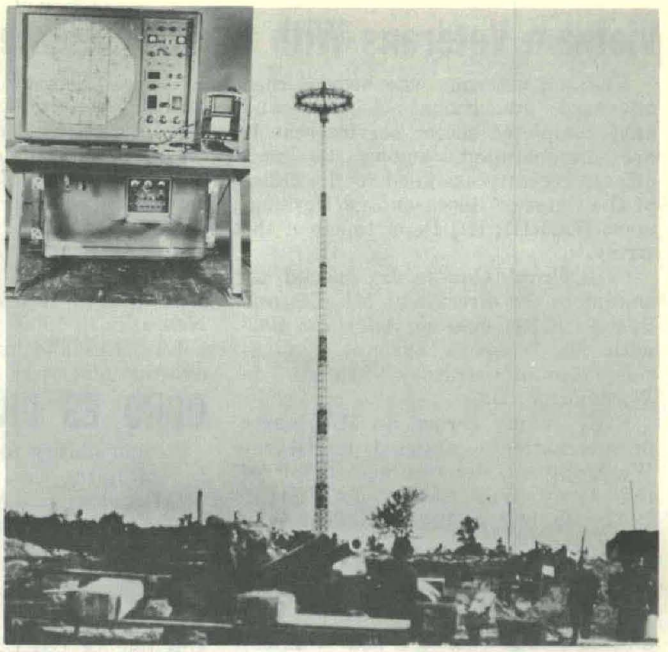
Deployment of the Lincoln experimental CSR was followed quickly by a fairly extensive field modification by HDL personnel, on a range improvement task under the VLAPA (Vietnam Laboratory Assistance Program, Army).

Following the modification, a favorable operational evaluation in Vietnam, indicated that further development of the CSR was warranted. HDL responded, on a priority basis, to develop a new-generation foliage-penetration radar dubbed the CSR–III, exploiting the Lincoln Labs fundamental concepts in light of lessons learned in Vietnam.

Based on an improved understanding of combat requirements, the HDL effort concluded with fabrication of a limited number of the radars in a cooperative effort with industry. Deployed in Vietnam with support of ACTIV and a New Equipment Training Team (NETT), the CSR–III performed successfully, resulting in a request that led to shipment of all available models.

Now, many months after return of the NETT to the United States, the CSR–IIIs are still in service continually. Army and Navy operators use them to detect the enemy, direct fire, guide ambush patrols, track canal traffic, and enhance base security.

The units normally are operated at night and have been moved to a new base during the day without losing a night of operation. Troops can determine the location of targets and can distinguish between movement of the enemy and animals.



CAMP SENTINEL RADAR (CSR–III) Tactical Setup in Vietnam

Deployment of the CSR–IIIs has been termed a "stringent but satisfying test of the adaptability of the combat units to new and sophisticated equipment. Their ability to maintain an unusually low equipment downtime, without benefit of any formal maintenance training or spares-provisioning network, is due in large part to the versatility and ingenuity of combat troops, enthusiasm with which the equipment has been received, and value placed upon its capabilities."

One CSR–III retained in the United States was subjected to extensive tests early in 1971 at Fort Hood, Tex., by Project MASSTER (Modern Army Selected Systems Test, Evaluation and Review). Resulting reports confirmed its effectiveness.

In the opinion of John R. Dent, the Hinman Award winner mentioned earlier, the CSR–III "has provided a major stepping stone toward tactical radars unburdened by the classical inability to detect targets in the radar shadows of vegetation used so conveniently by the enemy in most tactical environments."

DNA Announces Promotion of Varon to AFRRI Director

Change-of-command ceremonies at the National Naval Medical Center, Bethesda, Md., recently ended a 4-year tour of Air Force COL Hugh B. Mitchell as director, Armed Forces Radiobiology Research Institute (AFRRI), Defense Nuclear Agency.

Navy CPT Myron I. Varon, who had served as assistant deputy director (Scientific), was elevated to succeed COL Mitchell, now commander of the 6045th U.S. Air Force Hospital, Osan, Korea.

CPT Myron I. Varon

CPT VARON has a 1955 MD degree from Northwestern University School of Medicine and a PhD degree in radiation biology in 1965 from the University of Rochester in New York. He entered naval service in 1956, after completing his internship at Cook County Hospital in Chicago, Ill.

Assigned initially for one year to the Armed Forces Special Weapons Project, he then joined the Naval Reactors Branch, U.S. Atomic Energy Commission until 1960.

From 1960 to 1962, he was senior medical officer and safety officer of the *USS Long Beach*. He was assigned to the AFRRI staff in 1967 following two years as medical director, Naval Radiobiological Defense Laboratory.

Vietnam Veterans With Master Degrees Predominate in OCRD Assignments

Vietnam veterans who have earned advanced educational degrees and have completed senior service schools are predominant among 26 new officers recently assigned to the Office of the Chief of Research and Development (OCRD), HQ Department of the Army.

COL Frank Quante Jr., special assistant to the director of Missiles and Space, OCRD, has served since 1966 with the Weapons Systems Evaluation Group, Military Studies, in Washington, D.C.

COL Quante earned an MA degree in international affairs from George Washington University and completed the Army War College (AWC) in 1963. He has a 1941 BS degree in education from the University of Nebraska.

He was assistant deputy senior adviser, I Corps, Vietnam (1965–66), and commander of the 52d Artillery Group, Fort Sill, Okla. (1963–65). The latter assignment followed graduation from the Army War College.

He has received the Legion of Merit (LM) with Oak Leaf Cluster (OLC), the Air Medal (AM), and the Army Commendation Medal (ARCOM) with OLC.

COL Donald E. Kenney is deputy chief, Programs and Budget Division, following a 1968–71 assignment as RDT&E appropriations officer and chief, Programs and Budget Division, Safeguard Systems Office, Washington, D.C. He served with the 6th Battalion, 29th Artillery, 4th Infantry Division in Vietnam (1967–68).

Other assignments have included War Plans Section, VII Corps Artillery in Germany (1959–61); field artillery gunnery instructor, Fort Sill, Okla. (1954–56); battery commander, 1st Field Artillery Observation Battalion, Korea (1952–53); assistant S3, Reconnaissance and Survey, 11th Airborne Division Artillery, Fort Campbell, Ky. (1950–52).

COL Kenney earned a BS degree in education from Ohio State University (1949) and an MS degree in aerospace engineering from the University of Arizona (1964). He completed the Command and General Staff College (C&GSC) in 1962.

His decorations include the LM with OLC, Bronze Star Medal (BSM), AM with OLC and the ARCOM with two OLC, Vietnamese Cross of Gallantry with Palm, Korean Service Medal, Vietnam Service Medal, United Nations Service Medal, National Defense Service Medal, Republic of Vietnam Service Medal, and Presidential Unit Citation.

LTC Marion F. England is the new Army member of the Advanced Research Projects Agency (ARPA) Air Munitions Requirements and Development (AMRAD) Committee.

He earned an MS degree in public administration from Shippensburg (Pa.) State College and completed the AWC this year. He completed the C&GSC course in 1960 and earned a BGS degree from the University of Nebraska in 1969.

LTC England has served as deputy aviation officer, IFForce V, and CO of the 10th Combat Aviation Battalion in Vietnam; chief, Personnel Action and Education Section, Aviation Warrant Officer Branch, Officer Personnel Directorate (OPD), Office of Personnel Operations (OPO), Washington, D.C.

His military honors include the LM, Distinguished Flying Cross (DFC), BSM, Meritorious Service Medal (MSM), AM with four OLC and the ARCOM with OLC.

LTC Fred O. Bartlett Jr. is chief,

OCRD ES Division Assumes Panel XII Responsibility

Responsibility for serving as action agency and providing the U.S. principal member of Panel XII (Meteorology), NATO Army Armaments Group (NAAG), was transferred to the Office of the Chief of Research and Development, HQ DA, in mid-September.

Announcement of the transfer of this function from the Office of the Assistant Chief of Staff for Intelligence (OACSI) was made through the International Office, OCRD, which is headed by COL Henry C. Evans Jr.

ACSI was assigned this responsibility when Panel XII was established in 1967, in a reorganization of the three Service Armament Groups created within NATO effective Sept. 30, 1966.

Dr. Leo Alpert

Logic for the transfer is based on seven meetings of Panel XII and the operational experience gained in about four years—showing that interests are primarily in areas of research and development, where meteorological capability also is centered.

Dr. Leo Alpert's appointment as the U.S. principal member of Panel XII was announced following his return from the seventh meeting Sept. 13–17 in Brussels, Belgium. He attended for an orientation on his duties. Certified as a consulting meteorologist, he has served more than 12 years on the OCRD staff in the Atmospheric Sciences Branch, Environmental Sciences Division.

Panel XII's operational charter provides for consideration and exchange of information on concepts, doctrines and associated R&D of meteorological measuring techniques; also, equipment used to support land, sea and air forces.

Eight Terms of Reference of Panel XII include:

- Advise the NATO Armaments Groups and other NATO bodies on meteorological parameters, including those for ballistics, significant to weapons systems existing or under development.
- Identify suitable areas for bilateral or multilateral cooperation and recommend the development of equipment to meet agreed requirements.
- Maintain liaison with appropriate NATO meteorological groups.
- Review, prepare and recommend standard meteorological messages for weapons systems purposes.
- Exchange information on national concepts and doctrine, equipment, programs and policies, and research and development relating to meteorological measuring techniques and equipment.
- Report periodically to the NAAG on progress and submit to it those problems for which a solution is required.

The OCRD Environmental Sciences Division has now assumed responsibility as the action office for U.S. participation in Panel XII activities. The OACSI, however, will "provide fullest cooperation and appropriate participation . . . (and) will be represented at meetings held in preparation of the U.S. position for Panel XII meetings. . . ."

The United States delegation includes appointed delegates who accompany the principal member to Panel XII meetings as assistants or advisers. The delegation to the eighth meeting in June 1972 in Brussels will include Marvin Diamond, deputy director, Atmospheric Sciences Laboratory (ASL), White Sands (N. Mex.) Missile Range; John LaBedda, chief, Exploratory and Engineering Development Technical Area, Fort Monmouth, N.J., and Dr. Hoyt Lemons, chief, Environmental Sciences Division, U.S. Army R&D Group (Europe), London, England.

Systems Coordinating Branch, OCRD, following a tour of duty at Fort Carson, Colo. There he served as executive officer, 3d Brigade, 5th Infantry Division; CO, 3d Battalion, 11th Infantry, 4th Infantry Division; and G1, 4th Infantry Division.

He served in 1967–68 as chief, Combat Arms Officer Assignment Branch, HQ U.S. Army, Vietnam (USARV), after graduating from the C&GSC, and was G1, Personal Services Division, Fort Lewis, Wash., in 1966. He earned a BS degree in textile manufacturing from Clemson A&M College in 1952 and has been awarded the LM, MSM and the ARCOM.

LTC Joseph J. Leszczynski received an MS degree from Shippensburg State College and was graduated from the Army War College (both in 1971) prior to assignment with the Army and Joint Plans Branch, Plans Division, OCRD.

In 1969–70 he commanded the 1st Airborne Artillery Battalion, 320th Artillery, 82d Airborne Division, Fort Bragg, N.C., and in 1968–69 commanded the 3d Battalion, 319th Airborne Artillery, 173d Airborne Brigade in Vietnam.

The colonel completed the C&GSC in 1968, subsequent to a tour of duty as assistant G1, XVIII Airborne Corps, Fort Bragg, N.C.

Among his awards and decorations are the LM, Soldier's Medal, BSM with "V" device and two OLC, AM with nine OLC, ARCOM, Military Service Medal, and the Vietnamese Cross of Gallantry with Silver Star.

LTC Robert F. Daly, new chief of the Foreign Developments Team, International Office, OCRD, recently completed a tour of duty as commander of the 2d Battalion, 51st Artillery, Fort Baker, Calif.

He served as assistant senior standardization rerpesentative, U.S. Army Standardization Group, Canada (1968–70), after graduating from the C&GSC. In 1966–67 he was deputy senior province adviser, Military Assistance Command, Vietnam (MACV), following a tour of duty as Surface to Air Missile Development (SAM–D) project officer with the U.S. Army Combat Developments Command (CDC) Air Defense Agency, Fort Bliss, Tex. He commanded the 4th Battalion, 71st Artillery, Fort Hancock, N.J. (1956–59).

Graduated from the U.S. Military Academy (USMA) in 1953, he earned an MS degree in mechanical engineering from the University of Arizona in 1962. He has been awarded the BSM, MSM with OLC, AM and ARCOM with two OLC.

LTC Clifton R. Goodwin, a new staff officer with the communications & EW Branch, Communications and Electronics Division, OCRD, recently completed a tour of duty in Vietnam with HQ MACV, J3 (Requirements and Force Structure).

Duty as battalion commander (Air Defense) Washington/Baltimore Defense (1968–70) followed three years with the Office of the Senior Air Defense Adviser, U.S. Army Advisory Group, Korea (KMAG). During 1962–65 he was a test officer with the U.S. Army Air Defense Board, Fort Bliss, Tex.

Graduated with a BS degree in civil engineering from the University of Maine (1953) and from the C&GSC (1966), he has been honored with the BSM, MSM, Joint Service Commendation Medal (JSCM), and the ARCOM with OLC.

LTC Melvyn D. Remus, a 1954 graduate of the USMA, is assigned to the Terrestrial Sciences Branch, USARO, OCRD. He has an MS degree in civil engineering from Iowa State University of Science and Technology (1960).

In Vietnam he was battalion commander, 84th Engineer (Construction) Battalion (1970–71), and operations officer, 35th Engineer Group (1966–67).

Graduated from the C&GSC in 1967, he remained three years as an instructor and was assistant professor of military science at Norwich (Vt.) University (1962–65).

He was assistant chief of the Engineering Division and resident engineer, U.S. Army Far East Engineer District, Korea (1961–62) and served successively as platoon leader, company commander and battalion staff officer, 299th Engineer Battalion, West Germany (1955–58).

His military honors include the LM, BSM with OLC, AM, MSM, Vietnamese Star of Honor (1st class), and the Vietnamese Technical Service Medal (1st class).

LTC Robert J. Gabrielli is a staff officer with the Social Science Branch, Behavioral Science Division, USARO, following 1969–71 duty as assistant chief of staff, G1, and CO, 5th Battalion, 14th Artillery, 2d Armored Division, Fort Hood, Tex. LTC Gabrielli was battalion S3, 1st Battalion, 77th Artillery, 1st Cavalry Division (Airmobile), U.S. Army Pacific (USARPAC), Vietnam, from October 1965 to July 1966.

During 1964–65, he was assistant battalion S3, 1st Battalion, 15th Artillery/1st Battalion, 77th Artillery, 11th Air Assault/1st Cavalry Division, Fort Benning, Ga., and battalion executive officer, 15th Artillery, 2d Infantry Division, Fort Benning, Ga. (1963–64).

LTC Gabrielli earned a BS degree in health education from the University of Illinois in 1955 and is preparing his thesis for an MS degree in social psychology from Tulane University. He graduated from the C&GSC in 1967. His decorations include the BSM, MSM, AM and the ARCOM with OLC.

LTC Loyal G. Hightower, staff officer with the Programs Branch, Programs and Budget Division, OCRD, recently completed a tour of duty as deputy comptroller, U.S. Army Support, Thailand (USARSUPTHAI).

In Germany (1967–70) he commanded the 2d Battalion, 75th Field Artillery, and was a budget analyst in the Office of the Comptroller, HQ U.S. Army Europe (USAREUR). He was assigned as S3, 2d Battalion, and as CO of Battery C, 2d Battalion, 42d Artillery, Fort Benning, Ga. (1964–66).

LTC Hightower has a BA degree in business administration from Furman University (1955) and is a 1967 graduate from the C&GSC. He has been awarded the LM, MSM, ARCOM with two OLC, National Defense Service Medal, Vietnam Campaign Medal, Combat Infantryman Badge (CIB), and the Armed Forces Expeditionary Medal.

LTC William P. Farmer, an R&D Officer Program enrollee since 1964, was assigned to the Test and Evaluation Branch, Management and Evaluation Division, OCRD, following an assignment as battalion commander, 1st Battalion, 30th Artillery, Fort Sill Okla.

He served in 1968–69 as plans officer HQ MACV Civil Operations Revolutionary Development Support (CORDS) following three years as a project officer with the U.S. Armor and Engineer Board at Fort Knox Ky.

A 1956 graduate of the USMA, he earned an MS degree in mechanical engineering from Mississippi State University in 1964 and completed the C&GSC course in 1968. He has received the BSM and the ARCOM.

LTC Olen D. Thornton was chief, Schools Section Aviation Warrant Officer Branch, OPD Office of Personnel Operations, HQ DA, until assigned recently as a staff officer in the Systems Coordinating Branch, Plans Division, OCRD.

In 1968–69 was assigned to Vietnam as assistant division officer, 1st Cavalry Division, and as commander, Company B, 229th Aviation Battalion, 1st Cavalry Division.

He also served in Vietnam (1964–65) as platoon commander, operations officer, A/502d Aviation Battalion, prior to assignment as an

(*Continued on page 30*)

Vietnam Veterans With Master Degrees Predominate in OCRD Assignments

(Continued from page 29)

action officer with the U.S. Army Aviation School, Fort Rucker, Ala.

LTC Thornton received a BS degree in business administration from Southwest Missouri State College in 1956 and was graduated from the C&GSC in 1968. Military decorations include the DFC, BSM AM, ARCOM with OLC and the PH.

LTC Vernon B. Sones is assigned to the Surveillance, Target Acquisition, Night Observation (STANO) Division, OCRD, following a tour of duty as CO, 4th Battalion, 21st Infantry Division, and chief, Plans Division, G3, XXIV Corps, USARPAC, Vietnam.

He also served in Vietnam (1963–64) as psywar/civil affairs adviser and infantry battalion adviser, 7th Infantry Division, II Corps, MAAG. He was assigned the next three years as assistant professor, Office of Military Psychology and Leadership, USMA.

LTC Sones has a BS degree in forestry from Pennsylvania State University (1952) and an MPA degree from the University of Pittsburgh (1966). He graduated from the C&GSC in 1970.

He has been awarded the LM, DFC, BSM with three OLC AM with eight OLC, ARCOM, Vietnamese Gallantry Cross with Bronze Star, Vietnamese Armed Forces Medal of Honor, CIB, Senior Parachutist Badge and the Ranger Tab.

LTC Dan S. Grimes was assigned recently to the Management Information Division, U.S. Army R&D Information Systems Office, OCRD.

During 1967–68, he was chief of the Operations Training Division, 1st Region, U.S. Army Air Defense Command (ARADCOM), Newburgh, N.Y. In 1969 he earned two master's degrees from Tulane University in business administration, and in operations research.

He served with the 1st Cavalry Division in Vietnam in 1966–67 following a tour of duty as company commander, 1st Psywar Company, 1st Psywar Battalion, Fort Bragg, N.C.

Among his military awards are the BSM, AM, ARCOM and the CIB.

LTC Lewis W. Wright, who is assigned to the Military Adviser's Office, U.S. Army Research Office (USARO), OCRD, recently received an MBA degree from American University, Washington, D.C. He earned his bachelor's degree in general education from the University of Nebraska in 1963.

After completing the C&GSC course in 1967, he served 2½ years with the Aviation Division, Office of the Deputy Chief of Staff (Operations and Training), HQ 1st Army, Fort Meade, Md. In Vietnam his successive assignments were with the Standardization and Training Branch, Aviation Division, HQ USARV; 200th Assault Support Helicopter Company, 214th Combat Aviation Battalion, 12th Combat Aviation Group, 1st Aviation Brigade, USARV; and the 120th Assault Helicopter Company, 145th Combat Aviation Battalion, MACV.

He was a command pilot at the U.S. Army Garrison, Fort Leavenworth, Kans. (1965–66).

Among his decorations are the DFC, BSM, AM with 20 OLC, Vietnam Service Medal with four Battle Stars, Vietnamese Gallantry Cross (Silver Star, Gold Star, and Palm), PH and the ARCOM.

LTC Richard D. Kenyon, a recent newcomer to the Research Technology Division as staff officer, graduated from the USMA in 1957. He received a master's degree in aeronautical engineering from Princeton University in 1964 and completed the C&GSC course in 1970.

After 1966–69 duty on the USMA staff and faculty, he served in Vietnam in 1970–71 as battalion commander, 145th Combat Aviation Battalion and action officer, MACV J–4. He was in Vietnam (1964–65) as a platoon commander with the 197th Attack Helicopter Company and aide-de-camp to the commanding general, U.S. Army Support Command.

His decorations include the LM, BSM, AM with "V" device and 10 OLC, and the JSCM.

LTC Donald L. Winters is assigned to the Critical Projects Branch, STANO Division, OCRD, following a tour of duty in Vietnam. He served there as executive officer 7/17th Air Cavalry Squadron, CO of the 129th Assault Helicopter Company and staff officer, HQ USARV.

His present duties include monitoring activities at the U.S. Army Land Warfare Laboratory, Aberdeen (Md.) Proving Ground.

He also served in Vietnam (1966–67) with the 25th Infantry Division, preceding two years as chief of the Test Officers Branch, Aviation Division, U.S. Army Arctic Test Center, Alaska.

LTC Winters is a 1957 graduate from the USMA and from the C&GSC in 1970. He has been awarded the BSM with OLC and the MSM.

LTC Edgar F. Repp was graduated with an MBA degree from Syracuse University prior to a new assignment

Larsen's Death Saddens Army R&D Community

Dr. Finn J. Larsen, 1961–63 Assistant Secretary of the Army (R&D) and the first Principal Deputy Director of Defense Research and Engineering (1967–68), died of a heart attack Oct. 11.

Since his retirement from government service in 1969, Dr. Larsen, 55, had been vice president and general manager of the Turf Product Division, Toro Manufacturing Co.

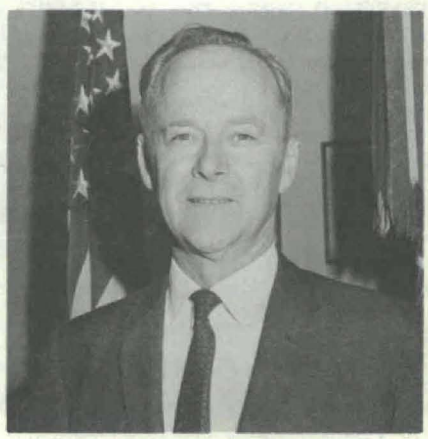
He began his scientific career with Minneapolis Honeywell Co. as a research physicist in 1948, became director of Ordnance engineering in 1952, was promoted to director of Research in 1953, and was elected vice president in charge of research in 1959.

As an officer in the Navy during World War II, Dr. Larsen was stationed in Washington, D.C., working on radar equipment. His technical experience included service as a consultant to the Army Ballistic Research Laboratories, Aberdeen (Md.) Proving Ground, and membership on the Army Signal Corps Advisory Council.

He also was recognized for his work as a member of the Maritime Research Advisory Committee of the National Academy of Sciences, the Minnesota Atomic Development Problems Committee, Minnesota State Board of Education Advisory Committee on Nature and Problems of Science and Mathematics Education, and Minnesota Nuclear Operations Group.

Dr. Larsen also served as chief U.S. representative to the NATO Council, National Armament Directors and the NATO Defense Research Group.

He is survived by his wife Valerie, son David, and daughters Nancy and Valerie.



Dr. Finn J. Larsen

as a staff officer with the Programs Branch, Programs and Budget Division, OCRD.

He earned his BS degree in general agriculture from Colorado State University in 1952 and graduated from the Armed Forces Staff College (AFSC) in 1969.

In Vietnam he was G1 and assistant artillery officer, Capital Military Assistance Command, RVN (1969–70). He was assistant fire support coordinator, 3d Infantry Division, Artillery, USAREUR (1966–68).

LTC Repp has received the LM, BSM, AM, and the Vietnam Armed Forces Honor Medal (1st class).

MAJ Jack D. Lamle is the new chief of the Korean Unit, Behavioral Science Division, USARO, OCRD, after serving as executive for Administrative Services, U.S. Army Standardization Group, United Kingdom.

MAJ Lamle served in 1967–68 as adjutant/supply officer, 29th Civil Affairs Company, Vietnam (1967–68) and in 1966–67 was assistant processing and induction officer, Armed Forces Examining and Entrance Stations (AFEES), Portland, Oreg. During 1964–66 he was assistant installation coordinator at the U.S. Army Industrial Center, Mannheim, Germany.

He has a 1961 BS degree in vocational agriculture from Colorado State University and in 1969 completed the Army Adjutant General Advanced Course.

His awards include the BSM, Vietnamese Service Medal with three stars, Navy Unit Commendation, and the Vietnamese Cross of Gallantry with palm.

MAJ Cecil L. Shrader, a 1958 graduate of the USMA, was recently assigned to the Combat Support Aircraft Branch, Air Mobility Division, OCRD. He has a 1966 MS degree in aerospace engineering from the University of Arizona and graduated from the C&GSC in 1971.

He was squadron executive officer, 8/1 Air Cavalry, Fort Knox, Ky. (1969–70), and troop commander, 1/9 Air Cavalry, 1st Cavalry Division, RVN, earlier in 1969.

From June 1967 to December 1969, he served with the CDC Armor Agency, Fort Knox, Ky., subsequent to a tour in Vietnam as weapons platoon commander, 1/9 Air Cavalry, 1st Cavalry Division.

His awards include the Silver Star (SS) with OLC, DFC with OLC, BSM with OLC, AM with 50 OLC, ARCOM with "V" device and two OLC, and the PH with OLC.

MAJ Donald B. Griggs was assigned to the Nuclear Team, Nuclear Chemical and Biological Division, OCRD, following a tour of duty as executive officer and CO of the 379th Signal Battalion in Thailand.

He served as a staff officer with the Division of Military Application, HQ U.S. Atomic Energy Commission (1967–69), following assignment as a staff officer, HQ USARV Signal Section, RVN.

MAJ Griggs earned an MS degree in nuclear physics from the University of Alabama in 1965, a BS degree in electrical engineering from Johns Hopkins University in 1958 and was graduated from the C&GSC in 1970. His military honors include the BSM, MSM and the ARCOM.

MAJ William E. Houston, a newcomer in the Medical and Biological Sciences Branch, Life Sciences Division, USARO, OCRD, recently was awarded a PhD degree in microbiology and biochemistry from Vanderbilt University.

He earned a master's degree in microbiology from the University of Kentucky in 1965 and BS degree in biology from Western Kentucky University in 1960.

MAJ Houston served in 1968 with the Department of Microbiology, 6th U.S. Army Medical Laboratory at Fort Baker, Calif., and completed the advanced course, Medical Service Corps, Fort Sam Houston, Tex., in 1967, subsequent to a tour of duty with the 5th U.S. Army Medical Laboratory, St. Louis, Mo.

He has authored "Incidence of Latent Malaria in Vietnam Returnees," published in *Military Medicine*, Vol. 1 (1970), and "Dimorphism in Histoplasma capsulatum—Cell Differentiation," now being printed in *Acta Pathologia et Mycopathologia.*

MAJ Floyd L. Evans is assigned to OCRD as an Army research associate at the Los Alamos Scientific Laboratory. Graduated with an MS degree in electrical engineering from the University of Texas in 1971, he earned a BSEE degree at the University of Wyoming in 1961.

He was a branch chief in the Studies and TACFIRE Division, U.S. Army Artillery School, Fort Sill, Okla. (1969–70), following duty in Vietnam as an operations officer with the 1st Cavalry Division.

Other assignments have included battery commander, 2d Howitzer Battalion, 31st Artillery, Fort Sill, Okla.; section commander, U.S. Army Missile Detachment, Erzurum, Turkey; and battery officer, Honest John Rocket Battalion, Fort Hood, Tex.

MAJ Evans has been awarded the BSM, AM, Vietnamese Commendation Medal, Vietnamese Service Medal, ARCOM with OLC, and Armed Forces Expeditionary Medal.

MAJ Jerry L. Gregg is assigned to the Special Projects Branch, Life Sciences Division, USARO, OCRD, following two years as a sanitary engineering and safety consultant with the Office of the Surgeon General, Washington, D.C.

Graduated with an MS degree in environmental and sanitary engineering from Washington (St. Louis) University in 1966, he has a 1962 BS degree in chemical engineering from Rose Polytechnic Institute, Terre Haute, Ind., and completed the Army Medical Department Advanced Course at Fort Sam Houston, Tex., in 1969.

During 1967–68, he was staff sanitary engineer with the U.S. Army 712th Preventive Medicine Unit in Thailand—following a year as chief of the Water Pollution Control Branch, Sanitary Engineering Division, U.S. Army Environmental Hygiene Agency, Edgewood Arsenal, Md.

MAJ Gregg has received the ARCOM, Vietnamese Service Medal and the Vietnamese Campaign Medal.

MAJ John R. Gantt, a new staff officer in the Air Movement Branch, Air Mobility Division, OCRD, was graduated in June with a master's degree in business administration from Auburn University. He has a 1959 bachelor's degree in industrial engineering from Georgia Institute of Technology.

In 1971 he also graduated from the Air Command Staff College at Maxwell Air Force Base, and in 1969 completed the Defense Weapons Systems Management Center course at Wright-Patterson AFB. He completed the signal officer career course at Fort Monmouth, N.J., in 1965.

In Vietnam in 1969–70 he commanded the 187th Aviation Company following staff officer duty with USARV Aviation, HQ USARV. He served in 1966–67 in Vietnam as signal officer and assistant S3, 25th Aviation Battalion, and as a pilot with Company A, 25th Aviation Bn.

From April 1967 to July 1969, he was assigned to the Cheyenne Project Manager's Office, HQ U.S. Army Materiel Command, Washington, D.C.

MAJ Gantt has been awarded the DFC, BSM with three OLC, MSM, the AM with 16 OLC, and the PH.

Curtis C. Morgan is a new computer systems analyst in the Systems Design and ADP Division, Army R&D Information Systems Office.

He was employed in 1970–71 as a computer systems analyst with the U.S. Army Computer Systems Command, after working as a research assistant at George Washington University (1968–70).

Morgan has a 1965 BA degree and a 1968 MPA degree from American University. He is working for a master's degree in automatic data processing and business administration at George Washington University.

AIB Develops Combat Conditions Realistic Simulation Program

Maximized realism in simulating all aspects of combat conditions during tests of weapons systems is the objective of a revised program developed by the U.S. Army Infantry Board to enhance the selection process.

Recognizing that many critical factors were not being adequately considered under the "somewhat sterile testing conditions" that had been used, the board altered its approach to the problem of selecting superior weapons among competing candidate systems.

Many factors influence the ability of soldiers to place effective fire on a target and the board is probing in depth into all aspects.

For example, performance differences can be detected during daylight, moonlight, starlight and overcast conditions, as well as on varying terrain.

Another consideration is that a soldier seldom fights alone. Effects of men fighting on his left and right influence performance; also, being under fire may tend somewhat to degrade an individual's marksmanship.

To gather data presenting a truer picture of the comparative performance of weapons systems under consideration, including various human factors affecting performance, the board conducted a study to isolate and identify combat actions and tasks.

Combat actions are such maneuvers as the attack, ambush, movement to contact, and withdrawal—just to name a few. Combat tasks are those the soldier is expected to perform during combat action; examples are clearing fields of fire, immediate action drills, and changing tactical formations.

A detailed analysis indicated that combat actions and tasks could be grouped into three basic tactical situations—attack, quick fire and defense.

The next step was to determine exactly what should be measured in order to compare two or more weapons systems. Extensive study and research led to the identification of some 28 measures of effectiveness.

MAJ RICHARD D. JAMES, Infantry, the author, is assigned as an operations research officer of the U.S. Army Infantry Board at Fort Benning. A 1963 graduate of the U.S. Military Academy, he has served two tours in Vietnam, one as a Ranger Company commander in the 173d Airborne Brigade and another as an adviser with MACV. Graduated from the Infantry Officer Advanced Course in 1970, he has a master's in civil engineering from Clemson Univ.

For example, an effective weapon is capable of the greatest hit percentage, has the highest probability of first-round hits, is the easiest to clean, has the least malfunctions, can deliver effective fire in the shortest period of time, and is the easiest to handle.

Once it was known what conditions to subject a weapon to and what to measure, attention was directed to constructing facilities and finding the right instrumentation to collect data.

The attack, defense and quick-fire facilities were constructed adjacent to one another at Fort Benning, Ga., home of the Army Infantry Center and also the Infantry Board. To maximize realism, care was taken to preserve the natural environment during construction.

The idea behind having all three facilities adjacent to one another was to develop an extended tactical exercise. Troops would arrive in a stressed condition and perform their military functions on the three facilities in accordance with a realistic tactical scenario.

The operations approach includes a certain amount of hunger, fatigue and apprehension of the test soldier, since these are normal under combat conditions.

SPECIAL TARGETS transmit impulses to mobile instrumentation van when sensitized areas are hit by projectiles.

Collecting accurate data requires a maximum amount of information without interfering with the conduct of the test. The Infantry Board has two major items of equipment for this purpose.

One instrumentation van contains an oscillograph which records electrical impulses caused by a round passing over a microphone or geophone, or passing through a silhouette target.

These targets incorporate two layers of aluminum foil sandwiched between layers of latex material. As the round passes through the target, it completes an electrical circuit by touching both layers of foil at the same time and transmits an impulse.

The second piece of equipment is a PDP–15 digital computer capable of performing one million operations per second. Thus, if several soldiers are firing at a rapid rate, the computer is able to obtain an accurate round count unless two or more rounds are fired at exactly the same one-millionth of a second, which is highly improbable.

The attack facility was constructed with the idea of having the 360-meter-long course small enough to be easily controlled and large enough to depict a true assault by an Infantry fire team of a limited objective.

The data collection center (DCC) on this facility is used in conjunction with another piece of developmental equipment, the round-count helmet, which picks up the sound and sends to the DCC a signal indicating each round fired.

On the objective, the special silhouette targets record hits; 15 meters in front of the targets are witness panels, of the same material as the targets, that record short rounds.

JM19 SERIAL FLECHETTE RIFLE is fired by BG Ray Ochs, CG of the U.S. Army Combat Developments Command Experimentation Command (CDCEC), during a recent briefing by CPT Gerald A. Melsheimer, operations officer of CDCEC's Project Team II. Commanded by COL Allen R. Champlin, the team will compare fire effectiveness of the new rifle with the M16 at the Hunter Liggett Military Reservation in California beginning in January 1972.

If a round misses both the targets and witness panels, it will usually pass close enough to one of the microphones for shock waves to be picked up and recorded in the DCC as a near miss. The black dots on the attack facility are shellhole firing positions which determine range in conjunction with hits and misses.

Prior to construction of this facility, only 12 percent of all rounds fired could be accounted for—those which actually hit the target. Now, 97 percent of all rounds fired can be counted; only three percent miss a target, a witness panel or the sound range of a microphone.

The quick-fire facility is run by a digital computer. Only one test soldier at a time traverses this facility, and a hint of a trail guides him through its 566 meters and 25 targets.

No personnel other than the test soldier need be present on the course, since camouflaged photocell beams or pressure plates activate the targets.

As the soldier disrupts the beam, or steps on a pressure plate, the target is raised, a simulator goes off, and that instant is recorded in the computer.

Such items as weight, balance and sight configurations of the weapon have a definite influence on ability of the soldier to engage a target in as little as two seconds; another weapon may require three to four seconds. This difference can be critical.

The defense facility is the most elaborate of the three ranges and incorporates advanced instrumentation developed after the first two had been built. The digital computer also is used to run this facility; it raises and lowers targets, fires simulators, records, stores and reduces data.

The basic scenario raises the most distant target array first. Each succeeding array is raised until final protective fires are initiated. In this manner the advance of enemy troops is depicted.

The test officer controlling the range is able to look at the graphical representation of the 60 stationary targets and six moving targets on the facility. He can activate them in any sequence and for any length of time he sees fit. In this manner, he is able to portray such actions as limited enemy advances, mass attacks, and/or withdrawals.

It is recognized that a target appearing for a set period and on a one-time basis does not present a very realistic situation. To cope with this problem, the actual range is divided into two sectors, which gives the illusion that the enemy is attacking on a wide front, or from two different directions.

This arrangement allows measurement of the time it takes an individual to shift fire from one sector to another. Since the target array distance varies from 50 to 430 meters, it is not always easy to discern which array is being activated.

When an enemy unit is advancing in the attack, however, they can be expected to use automatic weapons for supporting fires. So, a machine-gun simulator is activated in the vicinity of each target array when it is raised.

Additional realism is provided after initial exposure of an entire array, by having individual targets in the array raise and lower randomly, each exposed for a period of three, five or seven seconds to simulate fire and maneuver techniques. Throughout the attack scenario, six moving targets are activated, requiring the soldier to engage a laterally moving target.

With the aid of the computer, a great deal of information is obtained from the defense and quick-fire facilities. A round count is gathered by microphones in front of each firing position. The exact instant a round is fired is recorded and attributed to an individual firer.

Down range, a round striking one of the special targets is recorded at that exact instant. The computer calculates time of flight from each firing position to each target and determines which firer scored the hit.

An improved method of locating a round missing the target is also used. In front of the targets in each array are four microphones that pick up the shock waves of the rounds passing over them.

The time difference for the shock wave to reach each microphone, after mathematical calculation, determines the distance the round missed the center of the target. These rounds can also be attributed to an individual firer in the same manner as hits.

At this point, one can see the effectiveness of testing in this environment. Yet these facilities are not restricted to small-arms testing alone. Various types of field equipment can be tested during the exercises to determine either a degradation or increase in performance of the soldier and his weapon.

For instance, various types of body armor have been tested on the quick-fire course for differences in human performance effects. Boots, fatigues, helmets, load-bearing equipment and protective masks have been tested similarly.

Numerous human factors enter into consideration of weapons systems. For example, one soldier will be able to spot a target faster than another, and will also vary in markmanship ability.

RIFLEMAN negotiates attack facility at Infantry Board's Griswold Range.

To eliminate as much bias as possible from the data, test soldiers are selected to insure that they are truly representative of those who will be the ultimate users of the equipment.

Troops with representative GT scores, the proper number of left-handed and right-handed shooters, and representative eyesight, rank, MOS and marksmanship ability are sought.

In testing field equipment, consideration is given to such items as boot, clothing and helmet sizes, as well as height and weight. These factors do not complete the spectrum by any means, but it gives an idea of how test troops are selected.

Although the primary function of all three facilities is testing, using such facilities for training is not too far distant. When costs fall within acceptable levels, the Infantry Board believes these types of facilities will be a boon to the Infantry unit commander—helping to provide a definitive means of identifying individual problem areas and thereby creating a more effective combat soldier.

Busterud Sworn in as Aide To ASD (Health, Environment)

Deputy Assistant Secretary of Defense (Environmental Quality) will be John A. Busterud's title when he is sworn in Oct. 14 as an aide to Assistant Secretary of Defense (Health and Environment) Richard S. Wilbur.

COL M. G. Patton, U.S. Army Medical Corps has served as acting deputy since June 1970. As his successor, Busterud brings to his new duties professional and personal interest in conservation and environmental issues.

Graduated from the University of Oregon in 1943 with a BS degree, he received a law degree in 1949 from Yale Law School, where he was editor of the Yale Law Journal.

A member of the Army Reserve, he served with the 90th Infantry Division and 4th Armored Division in Europe during World War II. As a partner in the law firm of Busterud, Draper and Adams, San Francisco, Calif., he has been active in conservation and environmental law and antitrust law. He is a member of Phi Beta Kappa and Phi Delta Phi.

MERDC Expands Computer Capabilities

Expansion of its computer capabilities and facilities to provide improved service for scientists and engineers was announced Oct. 20 by the U.S. Army Mobility Equipment Research and Development Center (MERDC), Fort Belvoir, Va.

Moved into larger quarters, the Computation and Analysis Division, Systems Engineering and Computation Support Office, has also acquired a Control Data Corp. 6600 Computer.

Augmenting previous computer capabilities, the 6600 is a large-scale, third-generation computer with multi-programing and multi-processing capabilities. Plans have been developed to expand this computer with remote job entry and conversation mode A. G. terminals. At least one large terminal will provide remote real-time control, graphics capability, and high-speed remote job entry.

The 6600 computer presently provides support in the areas of simulations, data reduction and analysis, computer aided design, information retrieval, and scientific and engineering project support. Available general computer program packages include SIMSCRIPT, ECAP, NASTRAN and PERT TIME.

Users have developed specialized program packages for projects which are the responsibility of the Mobility Equipment R&D Center.

Several data reduction and analysis programs are being developed, such as Target Signal Analysis, Design of Decision Logic Intrusion Devices, Development of Sensor Discrimination Capability, and Statistical Scoring of Proposals.

Development of a number of computer aided design programs is continuing. Information retrieval systems, such as radioactive risk analysis, and numerous small scientific programs are being run or developed.

Frank L. Robertson, computer facility head, has a staff of 60 professional, technical and administrative personnel. Technical and computational services are provided for tenant organizations as well as for the MERDC.

Computer support is given to such agencies as the Army Engineer Topographic Labs, Army Engineer Reactors Group, Harry Diamond Laboratories, Night Vision Laboratory, Army Materiel Command Maintenance Support Center and various other Army activities.

3 Edgewood Veterinarians Gain ACALM Diplomate Status

MAJ Harry Rozmiarek, chief of the Veterinary Medicine and Surgery Branch, Biomedical Laboratory, Edgewood (Md.) Arsenal, is newly certified as a Diplomate of the American College of Animal Laboratory Medicine (ACALM).

MAJ Robert J. Beattie and CPT William C. Cole, formerly at Edgewood (Md.) Arsenal and currently assigned to Japan and Taiwan, respectively, were also certified.

All three completed the Army Laboratory Animal Medicine Preceptorship Training Program, a prerequisite for diplomate status, conducted by the arsenal's Veterinary Medicine Division.

Laboratory animal medicine, a specialty of veterinary research, deals with diagnosis, treatment and prevention of disease in animals used for biomedical studies.

Certification is bestowed only on professional veterinary specialists who have six years laboratory experience and have demonstrated research capabilities. Less than 200 veterinarians have been certified as Diplomates since the ACALM was founded in 1957.

MAJ Rozmiarek's veterinary research interests include gnotobiology, the study of germ-free animals; immunology, the subject for his master's thesis; and animal biostatistics.

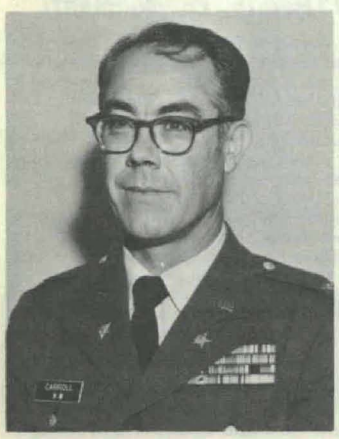
Rozmiarek entered the Army after receiving a BS degree in 1962 in veterinary medicine from the University of Minnesota and an MS degree (1969) in laboratory animal medicine from Ohio State University.

Carroll Heads NBC Materiel Test Directorate, TECOM

COL George F. Carroll has been assigned as director, Nuclear, Biological and Chemical (NBC) Materiel Testing Directorate, U.S. Army Test Evaluation Command (TECOM), Aberdeen Proving Ground, Md.

Until recently he was assigned to Korea as chief of G3 Nuclear-Chemical, Biological, Radiological Division with HQ Eighth Army.

Graduated from the University of Tennessee in 1949 with a BS degree in chemistry, Carroll completed two years of postgraduate studies in nuclear physics there in 1957. He also is a graduate from the Chemical Corps School, Fort McClellan, Ala., and the Army Command and General Staff College, Fort Leavenworth, Kans.



COL George F. Carroll

While assigned to the U.S. Army Armor Board, Fort Knox, Ky. (1957–59), Carroll was a test officer and chief, Radiological Test Branch. In 1960, he served in Korea as assistant chemical officer with HQ I Corps.

He was division chemical officer for a year with the 5th Infantry Division, Fort Carson, Colo., prior to a 4-year assignment as chemical staff officer, Ent Air Force Base, Colo., with the North American Air Defense Command. In 1967 he began a 3-year assignment as nuclear-chemical staff officer in the J5 Plans and Policy Directorate, U.S. European Command, Germany.

Among his military decorations are the Legion of Merit, Joint Service Commendation Medal, Army Commendation Medal, EAME Campaign Medal with Silver Campaign Stars, and World War II Victory Medal.

ARMY MATERIEL COMMAND Deputy Commander LTG Woodrow W. Vaughan operates laser rangefinder developed by Frankford (Pa.) Arsenal during a recent visit to the 110-acre installation. Assisting is James R. Young, project leader of the scientific team that developed the first application of laser science now used by our Armed Forces. In a 7-hour tour of the installation, LTG Vaughan was briefed by Dr. Sidney Ross, Frankford Arsenal technical director; COL Henry T. Jackson, acting deputy commander, U.S. Army Munitions Command; and COL James L. Wallace, arsenal commander.

Nation's Experts Weigh Terrorist Devices Problem

Military and civilian aspects of explosives identification and detection were considered by specialists from more than 100 organizations, Oct. 5–7, at the first symposium of this type held at historic Picatinny Arsenal.

Sessions at the U.S. Army Munitions Command facility, Dover, N.J., were programed in response to problems raised by increasing bombing incidents and terrorist activities throughout the nation. Experts from the FBI, Federal Aviation Agency, New York City Crime Laboratory, New Jersey State Police, Internal Revenue Service, U.S. Postal Service, Department of Defense and other federal agencies participated.

Heading the program for the arsenal were Dr. Raymond F. Walker, chief of the Explosives Division, Feltman Research Laboratory, and Harry W. Painter, technical director. The arsenal has one of the largest staffs of civilian and military explosives experts in the nation.

Stressed in discussions were the numerous and increasingly sophisticated explosive devices being developed and fabricated by individuals, as well as governments. Detection and identification of explosives are becoming correspondingly more difficult.

Industrial representatives gave demonstrations of the gas chromatograph and other instruments for detection of vapors from explosives.

Topics included mass spectral studies of military explosives, detection of aromatic nitro compounds with NMR (nuclear magnetic resonance), sources of information on explosives, forensic (determination of legal evidence), and the identification of lead azide.

Discussion included also the composition of military grade TNT vapor, nuclear methods for detection of buried explosives, identification of volatile petroleum products, plasma chromatography as an aircraft-mounted explosive vapor detection system, detection of explosives effluents for civil aviation security, and nuclear quadrupole resonance and mass spectrometric detection.

Specialists in various fields of explosives identification and detection who contributed to the exchange of information included Dr. Charles Kingston, John Jay College of Criminal Justice; Dr. John Kury, Lawrence Livermore Laboratory; Dr. Robert Mills, National Bureau of Standards; SGT Robert Sullivan, Police Laboratory, New York City; W. Washington and Kenneth Snow, Internal Revenue Service;

Also, Henry Heiberger, FBI; Dr. Andrew Draynieks, Illinois Institute of Technology; Paul Dougherty, San Mateo (Calif.) Sheriffs Office; John Lloyd, U.S. Postal Service; and James Given, Federal Aviation Administration.

Laird Names DACOWITS Leader

Secretary of Defense Melvin R. Laird has appointed Mrs. Estelle M. Stacy as chairman of the Defense Advisory Committee on Women in the Services (DACOWITS) for a one-year term beginning Jan. 1, 1972.

A civic leader and president of Stacy Drilling Co., Douglas, Wyo., Mrs. Stacy has been a member of the DACOWITS subcommittee on legislative matters for the past year. She will succeed Mrs. Helen K. Leslie in the nonsalaried position.

DACOWITS promotes understanding of women in the Services, seeks public acceptance of career military service for women, and advises the Department of Defense concerning women in the Armed Forces.

ECOM Tests 4½-Pound Model of Laser Rangefinder

Development of a laboratory model of a lightweight laser rangefinder capable of measuring distances from 200 to 6,000 meters (one-eighth mile to almost four miles) is reported by the U.S. Army Electronics Command.

Including a rechargeable nickel-cadmium battery, the unit weighs only 4½ pounds and is no larger than a pair of medium-size binoculars, the ECOM Combat Surveillance, Target Acquisition and Systems Integration Laboratories at Fort Monmouth, N.J., report.

A laser rangefinder determines distance by measuring the time it takes the laser pulse, traveling at the speed of light, to reach the target and bounce back to the finder. The 6 to 1 reduction in size and weight of the new unit is achieved through use of a combination of integrated and hybrid circuitry.

With a 6-power monocular optical sight containing a cross-hair reticule pattern in the eyepiece, the rangefinder is extremely easy to use. In less than a second, the range to the target is presented by a small digital display located next to the eyepiece. Readout digits are formed by a 7-segment array of miniature light-emitting diodes, easily seen in daylight or darkness.

Prevention of false target registration is achieved by a continuously variable range gate which can eliminate signal returns of objects other than the target.

The rangefinder contains an efficient Neodymium Lutetium: YAG (Yttrium Aluminum Garnet) transmitter employing a Lithium Niobate Q-switch to obtain high peak power, a nominal 1.5 megawatts. Consisting of a silicon avalanche detector with a matched low-noise, wide bandwidth, hybridized preamplifier, the receiver is capable of detecting a signal as low as ten nanowatts.

In addition to military use, researchers believe the instrument may be of value to civilian surveyors or others needing highly portable equipment to make quick, accurate measurements of visible distances.

ECOM's Combat Surveillance and Target Acquisition Laboratory is continuing experiments on the lightweight laser rangefinder, with the objective of ultimately providing field units with an effective, rugged, handheld instrument.

LIGHTWEIGHT LASER RANGEFINDER is operated by CPT M. Dennis Earl while SP4 Joseph Nelson Jr. relays range readings over an AN/PRC-25 radio.

Scientists Study Ecological Impact of Chemical Agents in Vacated Test Area

What is the current and long-range impact on the ecology in an area which has been used previously for open-air testing of lethal chemical agents in Army research?

When open-air testing was halted in July 1969 at Carroll Island, test site of the Edgewood (Md.) Arsenal's Research Laboratories—merged recently with the Aberdeen R&D Center—the stage was set for an influx of scientists from all parts of the nation to seek answers to this question.

Findings during the interim have stimulated the influx, in much the same manner that the first reports of discovery of gold led to a rush of get-rich-quick prospectors. Carroll Island, it seems, has turned out to be "an ecological wonderland."

The Edgewood Arsenal Research Laboratories initiated the study based on one of the recommendations of an ad hoc advisory committee reviewing testing and safety at Edgewood Arsenal.

Carroll Island is in a remote area of Baltimore County that juts into Gunpowder River. Into this area COL Bruce S. Ott, a U.S. Army veterinarian since retired, led a study team to investigate the ecology under guidance of Dr. Seymour D. Silver, director, Edgewood Research Laboratories.

Investigations are continuing and are presently coordinated by Dr. Duane F. Ford assisted by Dr. F. Prescott Ward. Team members include three Army officers, CPT Carlos Pinkham, a PhD ecologist, 1LT John V. Martin, a PhD algologist, and 2LT James G. Pearson, a fish physiologist.

Other participants included 1LT George D. Edwards, MS degree ecologist from San Jose State U., Calif.; 1LT James E. Roelee, now studying at the U. of Wisconsin for a PhD in upland ecology; SP4 Allen B. Sheldon, studying at the U. of Arizona for an MS degree in biology; SP5 Roy S. Slack, working on his MS in zoology at the U. of Oklahoma at Norman; SP4 Jerry C. Charles Smrchek, who earned his MS at Kansas State U. and is a PhD student at Virginia Polytechnic Institute; and SP4 Harley J. Spier, who earned an MS at the University of Tennessee and is now a fisheries biologist for the State of Maryland.

Early in the program, soil, water and vegetation within the test site and surrounding areas were surveyed and sampled. A census was taken of animals, fish, plants and trees.

To evaluate the effects, if any, the testing had on the area wildlife, biological monitors or sentries were established. They included cattle, starlings and white perch. Baseline data on the cholinesterase (ChE) measurements were determined before the species were placed throughout the test site and adjacent waters.

Although not intended for monitoring, the ChE baseline measurements were also determined on various marine and wildlife species inhabiting the area. Blue crabs, striped bass, sunfish, snapping turtles, ducks, geese, swans, cotton-tail rabbits and white tail deer were evaluated.

Basic ChE studies on these species were conducted to develop a way to determine quickly whether any of these species are affected as a result of the Army's chemical testing program.

Almost unbelievable is the way scientists describe the variety and quantity of marine and wildlife discovered while surveying the test area. Certain brackish water clams, once thought to be extinct in this area, were abundant.

The diamond-back terrapin, a gourmet's delight and historically a stranger to this area, appeared in quantity. Numerous other species of turtles, snakes and an unusually large and varied fish population were recorded.

During the program's first year of the study, 12 species of mammals, 179 different birds, 13 assorted reptiles, 11 species of amphibians and 37 species of fish were inventoried.

As reports of these findings were released to the media and scientific community, scientists from near and afar, in a wide area of disciplines, were alerted to the new opportunity to engage in ecological research in an unusual area.

Information obtained under the arsenal's test area ecology program has been exchanged with local, state and federal biologists. Wildlife experts from New England, Florida, California and points between sought infor-

ASSISTANT CURATOR of the Reptile and Amphibian Division, Smithsonian Institution, Dr. George Zug, and Dr. F. Prescott Ward, of Edgewood Arsenal ecological team, examine two of 11 Carroll Island species of turtles.

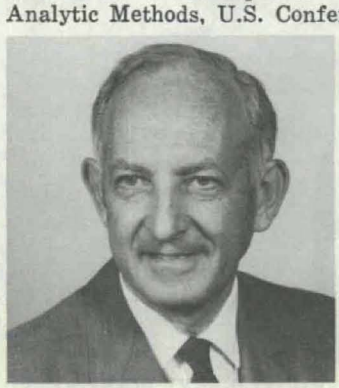
Mandel Appoints Silver to Science Advisory Council

Maryland Governor Marvin Mandel's Science Advisory Council includes, as a newly appointed member, Dr. S. D. Silver, director of the U.S. Army's Edgewood Arsenal Research Laboratories.

Dr. Silver's reputation as an international authority on toxicology has been enhanced by numerous appointments to high-level committees. Since 1963 he has served on the Maryland Governor's Science Resources Advisory Board.

Governor Mandel, in a letter notifying Dr. Silver of his 3-year appointment, stated that the purpose of the permanent Science Advisory Council "is to provide me with advice, recommendations, interpretations of scientific problems or data, forecasts of future scientific information and their relationship with the State of Maryland. . . ."

President Truman in 1950 appointed Dr. Silver to the Interdepartmental Committee on Atmospheric Pollution, also naming him chairman, Panel of Analytic Methods, U.S. Conference on Air Pollution.



Dr. Seymour D. Silver

Currently, Dr. Silver is national leader for Chemical Systems, Technical Cooperation Program, which involves representatives from the United States, England, Canada and Australia. For 18 years he has served as U.S. Army member of the Division of Chemistry and Chemical Toxicology, National Science Foundation-National Research Council.

Graduated from Yale in 1927 with a bachelor's degree in chemistry, he earned his doctorate in organic chemistry from Yale University Graduate School in 1932. Employed since 1938 at Edgewood Arsenal, he has been director of the Research Laboratories for five years. He has authored more than 100 publications in professional media.

mation, or offered advice and assistance to the program.

Dr. Van Flyger, chairman of the Department of Inland Research, Natural Resources Institute, University of Maryland, visited the site and offered first-hand advice on selecting species and techniques for conducting mammalian censuses. Following his instructions, 21 white-tailed deer were counted on the 855-acre site.

Earl Hodil, Maryland Department of Game and Inland Fish, assisted with the placement of 200 box-type rabbit traps baited with slices of fresh apples.

Rabbits were plentiful and all captured were numbered with an aluminum ear tag and released. Recaptured cotton tails were recorded and population indices established.

Songbirds of the area drew the interest of Chandler Robbins, author of *Birds of North America* published by Golden Press of New York. During a 6-hour visit to Carroll Island he counted 85 species of birds.

In May 1970, a study of fish was initiated in three areas adjacent to Carroll Island. The first area received surface water that drained from the test site; the second was down wind from the test activities; the third was in a remote area not subject to exposure to water or air from the test site.

Visiting the fish experiment area several times during the past year, Joseph G. Boone, a fisheries biologist for the Maryland Fish and Wildlife Administration, assisted arsenal investigators in establishing techniques, methods of recording data and identification.

Last month, he visited the labs to review the year-long seining program. He also identified several species of preserved fish and offered suggestions on propagation techniques, maintenance and exposure of laboratory test organisms.

After his laboratory discussions, Boone helped ecology team members make several seine hauls at Hawthorne Cove on Carroll Island. Upon his departure, he said he was especially impressed with the diversity and abundance of fish in the area.

RESEARCH BIOLOGIST Dr. Elmer G. Worthley examines wild plants growing at Carroll Island vacated test site.

During more than a year of seining at 2-week intervals, except when waters were frozen over, the ecology team has not detected any effects of the testing program on the life of fish inhabiting the area. More than 40 species of fish have been identified.

Aside from their ecological studies, three members of the research team went fishing last year at the mouth of Canal Creek in the Gunpowder River at the request of the U.S. Food and Drug Administration. They netted 15 carp, ranging from 2 to 15 pounds, and turned them over to the Baltimore District FDA Laboratory for mercury analysis.

J. Thomas Welch, FDA laboratory director, reported that the fish could be considered relatively free of mercury and "well below FDA safety limits."

The discovery of a rare colony of diamond-back terrapins in the area aroused the interest of Dr. George Zug, the assistant curator of the reptile and amphibian division of Smithsonian Institution.

Dr. Zug confirmed that the 10 diamond-backs captured and released, and the numerous others sighted in the vicinity of Carroll Island, provided without a doubt the first scientific records of these terrapins in Harford and Baltimore Counties.

The 10 rare turtles were marked with stainless steel tags requesting finders to call the arsenal's ecological team so their movements could be traced.

Dr. Zug recently toured laboratory facilities and the test area, as part of a continuing information exchange concerning the use of reptiles and amphibians as indicators of environmental stress on the Carroll Island test area. Program coordinator Dr. Ford said "His comments, criticism and advice significantly strengthened our experimental approach."

A colony of 15 hibernating black rat and northern black racer snakes discovered by chance on Carroll Island attracted the attention of representatives of Maryland's Herpetological Society.

Herbert S. Harris, curator of reptiles and amphibians for the Natural History Society of Maryland, and associates William H. Zovickian and Kenneth T. Nemuras devoted considerable time to observing the reptiles and amphibians on Carroll Island.

Species of the reptiles and amphibians identified by arsenal ecologists will be incorporated in the distribution survey published periodically in the *Bulletin of the Maryland Herpetological Society.*

ECOLOGIST SP5 Roy S. Slack displays snakes found hibernating in a well.

The hibernating snakes were uncovered by a startled repairman when replacing a faulty valve in a shallow well at the test site. Dr. Ward explained that snakes are an important member of the wildlife on Carroll Island, are quite abundant, and are of special interest to ecologists. Under normal conditions they are hard to capture.

Due to cool weather, the extremely low body temperatures of the reptiles made them inactive. Arsenal ecologists could handle and easily mark them by notching their belly scales.

The marked snakes will enable the arsenal's ecology team to make natural observations of growth, food habits, movements, population increases and hibernating habits.

Results to date of the continuing studies indicate that the ecological system has not been adversely affected by the open-air testing of chemical agents formerly conducted in the Carroll Island area.

USAIB Opens New Center For Computer Operations

Formal opening of the U.S. Army Infantry Board's new Computer Operations Center Sept. 22 is part of Project TEAM-UP, a management information network system.

The Infantry Board Computer Operations Center link-up with HQ U.S. Army Test and Evaluation Command, Aberdeen (Md.) Proving Ground, in the near future will make it the first test board facility to become operational under TEAM-UP (Part D).

Eventually, other test board computer centers will be connected to the main memory bank at HQ TECOM. The Infantry Board facility at Fort Benning, Ga., has an 029 Keypunch machine, 059 verifier, and IBM 320/20 computer system comprised of a 2020 processing unit, a 2560 multifunction card machine, 2152 console typewriter, a 2203 printer, a 1017 paper tape reader and 1018 tape punch.

CE Reports on Refuse Act Permit Program Status

Indicative of the magnitude of the nation's problem in cleaning up navigable waters and controlling pollution is the Oct. 30 Army Corps of Engineers announcement that 20,000 firms and individuals have applied for permits to discharge wastes into lakes, rivers and other waterways.

Chief of Engineers LTG Frederick J. Clarke announced also that over 8,300 applications have been processed by the Corps of Engineers field offices and sent to regional offices of the Environmental Protective Agency (EPA) for review. Certification by appropriate state agencies also is required.

President Nixon announced last December that the Refuse Act Permit Program is part of the total national effort to control pollution of the nation's rivers, lakes and other waterways. July 1, 1971, was set as the target date for filing applications for permits to continue existing discharges.

Thirty-eight Corps of Engineers field offices are conducting the program of permits in conjunction with the EPA and various state agencies. Complexity of the forms has necessitated return of many to the applicants to provide additional information.

"The program is just beginning and, although a few permits have been issued, it may be two years before some of the more complicated applications are completely processed," General Clarke said.

"State certification," he added, "can take up to one year under the law, and additional time may be required by EPA, the Corps of Engineers and other federal agencies."

Of the 20,000 applications received by the end of October, over 15,000 are from so-called critical industries, which were required to report a detailed chemical analysis of their discharges by Oct. 1.

These industries reported a total of nearly 28,000 pipes, ditches and other outfalls are discharging wastes into the waterways. To date, over half of these discharges have been analyzed by the applicants and the required detailed reports filed with Corps of Engineers field offices.

Watervliet Effects Savings on Automated Weapons

Watervliet (N.Y.) Arsenal's Herman J. Reepmeyer has overcome a problem in the firing mechanisms of automated artillery weapons with a solution expected to save the Army hundreds of thousands of dollars.

The problem arose when it was found that the hand-fed weapons primer—the powder-filled brass case that ignites the main charge—was incompatible with automatic feeding and susceptible to jamming.

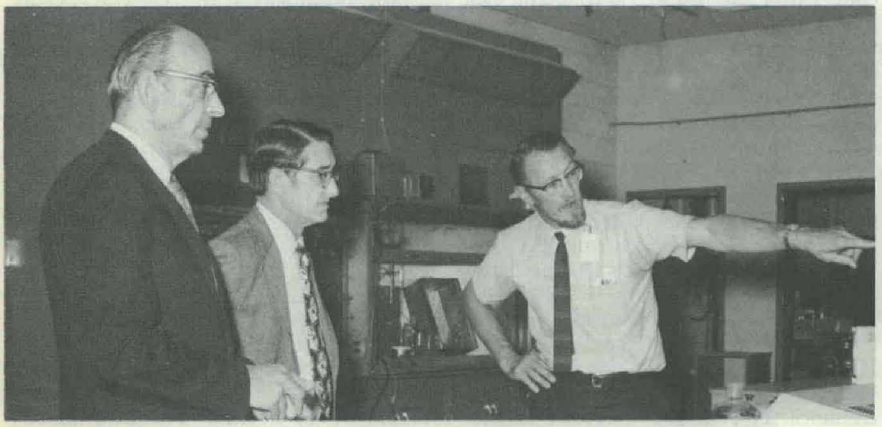
Reepmeyer, an engineering technician and a member of the arsenal's artillery weapons section whose responsibilities include design of cannon firing mechanisms, was assigned the task of developing a suitable primer.

Early investigation indicated an existing primer—the 7.62mm NATO primer, mass-produced by the million for use in the M–14 rifle—might meet requirements imposed by automatic feeding.

Comprehensive testing of every characteristic of the 7.62mm primer, conducted at Watervliet and at the Army's ammunition development agency, Picatinny Arsenal, Dover, N.J., confirmed Reepmeyer's belief. It proved satisfactory for use in the firing mechanisms of the 155mm and 8-inch howitzers and in the 175mm self-propelled cannon.

Use of the 7.62mm primer is expected to double life of the firing-mechanism. Based on a unit cost of 10 to 15 cents compared to the 60–65 cents cost of the original primer used in hand-feeding, production costs will be slashed about 80 percent.

Reepmeyer holds a number of patents for firing mechanism design and has been cited several times for his contributions to the work of the artillery weapons section.



ASSISTANT FOR RESEARCH, Office of the Deputy Assistant Secretary of the Army (R&D), Dr. K. C. Emerson (center) recently reviewed R&D activities at Dugway Proving Ground, Utah. Accompanying him on a tour of the Chemical Laboratory are Dr. M. A. Rothenberg, scientific director of Deseret Test Center, and Dr. Kenneth M. Brauner, chief of the center's Chemical Division.

Battelle Offers Free Catalog Of Publications During 1972

Free for the asking is a newly published 36-page listing of articles published during 1970 by Battelle Memorial Institute's more than 5,500 scientists, engineers and supporting specialists.

BMI researchers conducted more than 3,000 studies for some 1,700 U.S. Government, industrial and other sponsoring agencies during 1970. Many of the publications listed in the new document were presented as technical papers at scientific symposia.

In some cases, reprints of the papers or articles published in professional journals may be obtained free of charge. They are listed in the booklet under the sectional titles of: Advanced Materials and Processes; Engineering Systems and Technology; Environmental Control and Resource Management; Life Sciences; Management Planning and Information Systems; Social Systems; and Other (miscellaneous) areas.

The booklet listing the titles may be obtained by writing to Battelle Columbus Laboratories, 505 King Ave., Columbus, Ohio 43201.

NBS Schedules New Journal To Begin Publication in 1972

Publication of the Journal of Physical and Chemical Reference Data, beginning in 1972, has been announced by the National Bureau of Standards (NBS), U.S. Department of Commerce.

National Standard Reference Data System output consisting of data compilations from numerous university, industrial and federal centers, along with critical reviews covering all major areas of the physical sciences, will comprise the journal.

Initial plans call for four issues per year plus several longer supplemental compilations, handled jointly by the American Institute of Physics and the American Chemical Society.

NBS Director Dr. Lewis M. Branscomb said close government-professional society collaboration in providing information to the journal will result in increased service and benefits to the scientific and technical communities.

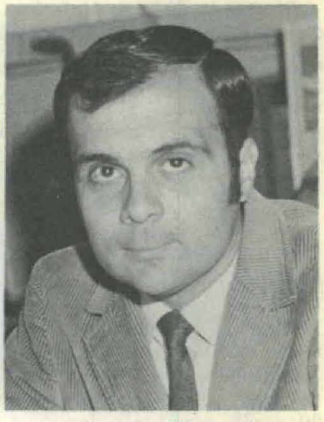
For further information, write or call the American Chemical Society, 1155 16th Street, N.W., Washington, D.C. 20006.

Outstanding Young Men of America Lists Frankford Employes

Robert J. McHugh

Dr. Leonard M. Gold

Gordon H. Sigman



Dr. Robert J. Esposito

Seven Frankford Arsenal employes whose demonstrated excellence in research and development activities has marked them for future leadership responsibilities will be listed in the 1971 edition of *Outstanding Young Men of America*, scheduled for publication in November.

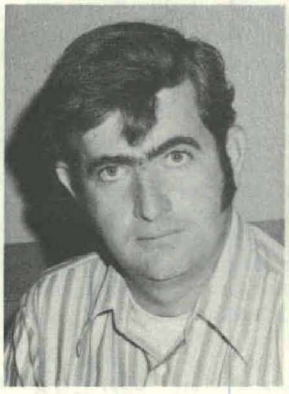
Sponsored by many national civic and service organizations, the publication honors men between the ages of 21 and 35 for demonstrated professional and community leadership. Frankford Arsenal's successful nominees are:

ROBERT J. McHUGH, a 34-year-old project engineer, is engaged in technology studies of small arms ammunition in the Ammunition Development and Engineering Laboratories. A graduate of the University of Scranton with a degree in physics, he has done graduate work at Temple University and has worked at Frankford Arsenal since 1960.

DR. LEONARD M. GOLD, a 31-year-old mechanical engineer employed since 1969 in the Pitman-Dunn Research Laboratories, is involved in materials engineering research studies. Dr. Gold earned BS and MS degrees in mechanical engineering and a PhD in applied mechanics from Drexel University.

GORDON H. SIGMAN, at 34 a 12-year Frankford Arsenal veteran, is a supervisory systems engineer concerned with the design and development of helicopter fire-control systems. He has a BS degree in mechanical engineering from Worcester Polytechnic Institute and a master's in the same field from Drexel University.

DR. ROBERT JOHN ESPOSITO, a 34-year-old project engineer in the Physics Research Laboratory presently doing work on artillery fuze problems, came to Frankford Arsenal in 1959 after receiving a BA degree in physics from Temple University. Since then he has earned a master's degree from the University of Pennsylvania and a PhD in physics from Temple University.



Patrick J. Devine

Dr. Lloyd C. Bobb

Dr. Jeffrey Waldman

PATRICK J. DEVINE, a 28-year old mathematician employed three years in the Frankford Arsenal Special Projects Branch, is working on risk-analyses studies as part of the Small Caliber Ammunition Modernization Program. He has a BS degree in physics from LaSalle College and has done graduate work at Temple University.

DR. LLOYD C. BOBB is a 32-year-old physicist in the Applied Science Laboratory. Presently working on fundamental research in the Laser Countermeasure Program, he has been a Frankford Arsenal employe since 1967. Dr. Bobb has a BA in physics from Penn State University, an MA in physics from the University of Pennsylvania, and a PhD in physics from Temple University.

DR. JEFFREY WALDMAN has been a metallurgist with the Material's Engineering Laboratory since 1968 and is presently doing studies on aluminum alloys. The 30-year-old scientist has a BS degree in metallurgical engineering from Drexel University and a doctorate in metallurgy from MIT.

Douglas Blankenship, chairman of the board of advisory editors to *Outstanding Young Men of America*, commented regarding the selections: "These young men are truly outstanding because they have distinguished themselves in one or more aspects of community and professional life."

Each year over 5,000 young men are nominated for the awards publication by Jaycee (Junior Chamber of Commerce) chapters, civic organizations, college alumni organizations and military commandants. Criteria for selection include a man's service to others, professional excellence, business advancements, charitable activities, and civic and professional recognition achieved.

President Nixon has said, "*Outstanding Young Men of America* presents a most fitting testimonial, not only to the success of many of our young people, but also to their awareness of the debt which they owe our free society."

SATCOM System R&D Phase Ends With 2 Launchings

Phase I of the Defense Satellite Communications System, concerned primarily with research and development activities, ended Nov. 2 when two satellites launched from U.S. Army earth terminals at Cape Kennedy, Fla., set the stage for initiating Phase II.

Performance tests through the new spacecraft will last for eight months. Upon completion they will operate as part of the Defense Satellite Communications System.

Phase I has provided the Department of Defense with a worldwide communications network since 1967, utilizing 23 low-power satellites and 29 earth terminals deployed globally.

The Defense Satellite Communications System is under operational control of the Defense Communications Agency. The Air Force is responsible for development and launching of the satellites. Development and initial deployment of earth terminals is a mission assigned to the U.S. Army Satellite Communications (SATCOM) Agency. COL Leland D. Wamsted, commander of the SATCOM Agency, is the Army project manager.

Phase II satellites have much higher power and greater land width than those in Phase I and each will operate through many terminals.

Each satellite carries an earth coverage antenna and two narrow-beam antennas. The earth-coverage antenna radiates power in a beam that covers the entire portion of the earth visible to it—an area about 9,000 miles in diameter—while the narrow-beam antenna covers 1,000 miles in diameter.

The effective radiated power from the narrow-beam antenna will be about 20 times greater than from the earth-coverage antenna. All three antennas may be used simultaneously, and the narrow-beam antenna can be steered to point at any portion of the visible earth's surface.

Semiautomatic data processing facilities will be relied on heavily in test data acquisition and processing. Each terminal in the network is equipped with a data acquisition facility.

The first stage of Phase II will be a combination frequency division-multiple-access system employing existing Phase I terminals. The second stage will employ time division multiple-access equipment and new terminals now being developed.

The AN/FSC–9 is a fixed ground link terminal designed to receive and transmit multiple voice, teletype and facsimile messages by direct transmission. The AN/MSC–46 is air-transportable and has a 40-foot diameter parabolic antenna.

In the first stage of Phase II, the AN/TSC–54 terminal will be modified and equipped to provide three to twelve voice channels through the satellite's earth coverage antenna. It will also provide 72 voice channels when deployed as a DCS restoral terminal utilizing the satellite's narrow-beam antenna.

The advent of Phase II terminals marks culmination of pioneering research and development of satellite communications extended over 11 years.

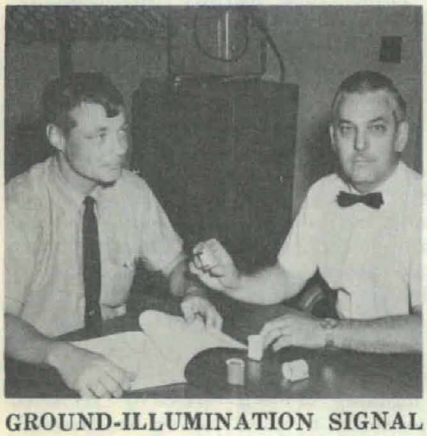
4-Man Picatinny Team Develops Rescue Signal

A pocket-size ground illumination signal designed for use in rescue operations or as a marker for an air strike in a combat zone, has been developed at Picatinny Arsenal, Dover, N.J.

A 4-man team from the Feltman Research Laboratories' Pyrotechnics Laboratory developed the flare, rugged enough to be tossed 50 to 60 feet to increase the delay time and allow for concealment of the thrower.

Howard Keyes, Clarence Riddle, Bossie Jackson and John Andrews are credited with development of the prototype. Keyes and Riddle also modified the original model.

The new signal is expected to replace the Navy's Mk–13, a heavier day-night flare with an orange smoke for daylight and a red flame at night. The Army signal provides three colors (red, yellow and green) that can be distinguished at distances up to three miles.



GROUND-ILLUMINATION SIGNAL developers Howard Keyes (holding model) and Clarence Riddle were aided on the tasks by John Andrews and Bossie Jackson.

Development of ML-635 ( ) UM Results in Savings

Significant savings are expected through action to enter in the Supply Bulletin of Expendible Items the ML–635 ( ) UM balloon used for acquisition of data on wind, temperature, humidity and pressure requirements for accurate artillery fire.

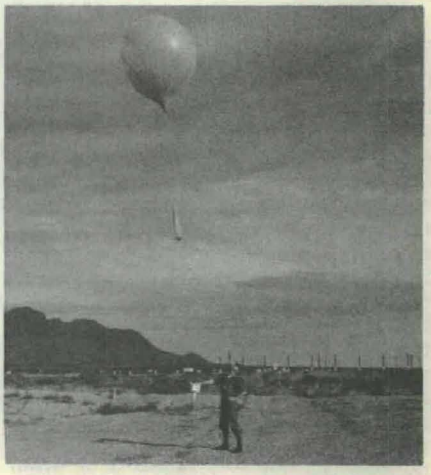
Standard ML–537 or ML–541 radiosonde balloons have been used for about 90,000 of these data-gathering flights each year. These balloons are relatively large, fly to higher altitudes than is generally required and consume significant quantities of helium or hydrogen for inflation.

Recognizing that over 75 percent of all Army requirements could be satisfied with a smaller balloon, U.S. Army Electronics Command scientists at the Atmospheric Sciences Laboratory at White Sands (N. Mex.) Missile Range have worked to develop a more economical unit.

The resulting ML–635 ( ) UM is 40 inches long, weighs 150 grams, uses 84 cubic feet of gas and has a minimum ascent rate of 400 meters a minute to altitudes of 11,000 meters. The standard 100-inch-long balloons weight 1,200 grams, use 115 cubic feet of gas, and have an ascent rate of 300 meters per minute.

After tests on 200 models were successfully completed, action was taken for an ENSURE (Expedited Nonstandard Urgent Requirement for Equipment) procurement of about 58,000. More than half of these have been successfully used in Southeast Asia.

The saving in cost of balloons, gas consumption and logistics through the use of the ML–631 ( ) UM balloon in FY 71 was in excess of $750,000.



ML–635 ( ) UM Fast-Rise Balloon

Picatinny Develops Electronic Timer for Lance

An electronic timer, believed a "first" in the tactical mission field, has been developed by an engineering team at Picatinny Arsenal, N.J., to provide sequential timing functions for the Lance missile.

Credit for the development is shared by Christ Anagnost, John Jessee, Michael Carmody and William Sarson, Nuclear Engineering Directorate; and Charles Kroll, Ernest Zambo, Soo Lee and Everett Dibble, Industrial Services Directorate.

All components in the timer are solid-state devices with the exception of the electro-mechanical setting mechanism. A crystal oscillator generates pulses of fixed time duration. Integrated circuits count the oscillator's pulses and detect elapsed time. Silicon controlled rectifiers are used for high-power output circuits.

The new timer controls motor and warhead functions in the Lance missile, is a key element in the safing and arming systems, and corrects some shortcomings encountered in mechanical timers used on other major systems.

Accuracy of the timer in tests has proved significantly greater than mechanical versions—two orders of magnitude (plus-minus 0.01 percent of set time) independent of temperature. Improvements include: environmental resistance to wider temperature extremes (minus 65 degrees F.); decreased mechanical shock and vibration; setting ease; multiple setting capability; maintenance-free operation; light weight (4 lbs.); small volume (75 cub. in.) for the number of output functions (11) and maximum count time (299 seconds); no moving parts other than the setting mechanism; and long shelf life (10 years).

The Quality Assurance Directorate's Electrical Inspection Equipment Branch designed in-house the acceptance inspection equipment. R&D timers and production test equipment resulted from in-house efforts of the Nuclear Engineering and the Industrial Services Directorates.

The timer consists of two redundant channels and a third performing a different function. Building blocks of each channel consist of an oscillator used as a time base and a number of integrated circuit decades to integrate time, with mechanical selecting switches working out desired times.

The timer has proved satisfactory in more than a dozen development flight tests at White Sands (N. Mex.) Missile Range.

ENGINEERING TEAM credited with developing electronic timer for Lance Missile includes Christ Anagnost with timer, John Jessee (seated), Everett Dibble (standing, l.), Michael Carmody.

Topo Labs Invite Aid on Improving Combat Maps

Do you have any good ideas about getting out of a bad situation in combat, where an accurate topographic map is deperately needed? If so, the U.S. Army Engineer Topographic Laboratories are calling for help.

The situation: Enemy fire has a U.S. Army unit pinned down and sustaining heavy losses. To ease the risk of getting blasted in an escape attempt, the unit needs to call for support fire—accurate fire that compels the enemy to seek cover.

But how do you call for accurate fire without being able to fix the coordinates with the aid of your map? The green vegetation symbol doesn't help, nor are there any prominent features to identify—no trail shown, no small streams flowing nearby. About the time a last-resort guess is attempted, the unit is overrun.

The U.S. Army Engineer Topographic Laboratories want to provide the best topographic product possible to aid a successful mission. Before they can improve the present topo maps, they need to know what combat men think is wrong—which explains the call for assistance. The word is: Just jot down any thought you have regarding topo maps and send directly to:

Commanding Officer
U.S. Army Engineer Topo Labs
Geographic Sciences (TPCTL–GSA 86100)
Fort Belvoir, Va. 22060

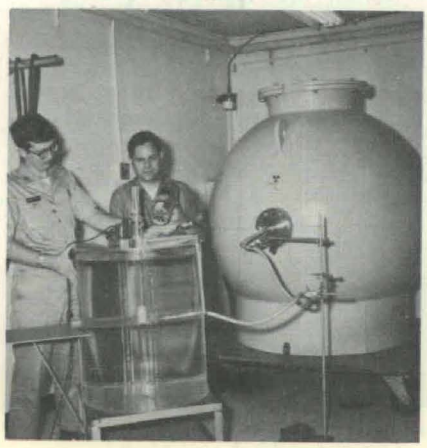
Your comment regarding any military map product you believe is pretty good also will be welcomed. Don't forget to include your address, so you can be contacted regarding your suggestions. Use pencil, crayon, pen or typewriter. *But write!*

Anticancer Compounds Probed For Potential Toxic Effects

Toxic effects of potential anticancer compounds produced in laboratory animals are being studied over a one-year period under a $56,000 funding agreement of the National Cancer Institute, National Institutes of Health with Battelle Columbus Laboratories.

Roger M. Folk heads a team of cell biologists and toxicologists participating in the study. Findings are expected to give clinical researchers a better idea of what toxic manifestations the compounds are likely to produce if used eventually as human chemotherapeutic agents.

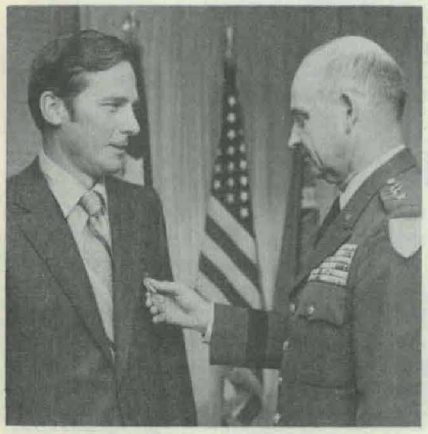
The study, involving examination of some 35 tissues including lung, kidney and brain, is but one of many that must be completed before such compounds are considered for use in humans. Chemotherapy research has screened out thousands of proposed compounds.



CALIFORNIUM-252 RADIOISOTOPE, in container at right, is used in a neutron activator analysis experiment on an explosive at Picatinny Arsenal, Dover, N.J. The Atomic Energy Commission provided the arsenal with 10 milligrams of the element for use in nondestructive testing. Californium-252 is distinguished from other radioisotopes by a combination of two properties—it emits a large number of neutrons by spontaneous fisson (2.34 thousand billion neutrons per second from one gram), and the half-life of its radioactive decay is reasonably long (2.65 years). About 100 milligrams of the new man-made element have been produced.

Kudos

EXCEPTIONAL SERVICE. *Dr. John A. Northrop,* Deputy Director for Science and Technology, Defense Nuclear Agency, was recently awarded the Exceptional Civilian



Service Medal by LTG Carroll H. Dunn, Agency Director.

Dr. Northrop was cited for extraordinary achievements in formulating, managing and directing various DoD programs related to nuclear weapons effects to "provide greater support and more rapid response to the needs of the Nation's highest priority weapons systems development effort."

MERITORIOUS CIVILIAN SERVICE. COL Bennett L. Lewis, CO, U.S. Army Mobility Equipment Research and Development Center, Fort Belvoir, presented the Army's second highest award for civilian service to *Edward Prada.* As project manager for the Diesel Engine Drive Generator Set Family, Prada was acclaimed for his "outstanding technical and managerial contributions."

Joe A. Swisher, chemist, U.S. Army Land Warfare Laboratory (LWL), Aberdeen Proving Ground, Md., was awarded the Department of the Army Meritorious Civilian Service Award (MCSA). COL Robert J. Baer, Director of Developments, Office of the Chief of Research and Development, cited him for his efforts in detection of airborne trace contaminants.

Herbert M. Decker received the MCSA for accomplishments as chief, Protection Branch, Physical Defense Division, Commodity Development and Engineering Laboratories, Fort Detrick, Md. Decker was recognized for "pioneering studies in air filtration and for outstanding contributions to air sampling of particulates."

Dr. Robert A. Darrow, supervisory plant physiologist, Vegetation Control Laboratory, Fort Detrick, Md., was presented the MCSA for "outstanding research and leadership accomplishments in the field of vegetation control and various scientific disciplines."

Robert A. Seraphin of the Automated Systems Development Division of the Communications Electronics Engineering Agency-National Communications Command (CEEIA–NCC), Washington, D.C., was honored with the MCSA and an Outstanding Performance Rating (OPR) certificate.

COL John N. Medinger, NCC commander, cited Seraphin for "extraordinary depth and breadth of knowledge" in establishing an effective test program for the Tactical Fire Direction Systems.

LEGION OF MERIT. *COL Louis F. Dixon,* director, Automatic Data Processing Activities, Army War College, was awarded the Legion of Merit (LM) by MG Franklin M. Davis Jr., commandant, U.S. Army War College, Carlisle Barracks, Pa.

COL Dixon was cited for achievements while assigned to the Office of the Assistant Chief of Staff for Force Development, Department of the Army, Washington, D.C.

COL John K. Stoner Jr., CO, Edgewood Arsenal, Md., was awarded the third Oak Leaf Cluster (OLC) to the Legion of Merit.

COL Stoner was commended for distinguished and meritorious service as commanding officer, Pine Bluff (Ark.) Arsenal in 1970–71.

BG Manley G. Morrison, chief, Medical Service Corps (MSC), awarded the Legion of Merit to *COL Harold T. Heady,* MSC, on his retirement from active duty. As chief, Facilities Branch, Plans, Supply and Operations Directorate, he was responsible for the development of a systems study for the planning and design of military medical facilities.

MERITORIOUS SERVICE MEDAL. *LTC Belman C. Maddox,* assistant chief, Dental Corps Branch in the Directorate of Personnel and Training, Office of the Surgeon General, HQ DA, was presented the Meritorious Service Medal for "professional competence and initiative" while on duty in Europe from July 1969 to June 1971.

LTC Robert K. Golden, chief, Battlefield Systems Integration Division of the Systems Integration Directorate, Combat Developments Command, received the Meritorious Service Medal during a special ceremony at Fort Belvoir, Va. He was cited for service in Europe on CHAMPUS (Civilian Health and Medical Program of the Uniformed Services).

CPT Larry Bird, now released from active duty, was awarded the Meritorious Service Medal by Arm Chief of R&D LTG William C. Gribble at recent Pentagon ceremonies. He was commended for his services as legal adviser to Director of Army Research BG George M. Snead Jr.

LTG William C. Gribble also presented Meritorious Service Medals to *LTC Loyal G. Hightower* and *LTC William F. Reilly,* both with the Programs and Budget Division, Plans and Program Directorate, OCRD.

LTC Hightower was cited for his services with U.S. Army Support, Thailand, and LTC Reilly for his services with the Office, Chief of Engineers, U.S. Army TOPOCOM.

COMMENDATION MEDAL. *CPT Norris Conner,* air delivery engineering branch, and *SFC Val Taggart,* air delivery operations section, were presented Army Commendation Medals by MG Frank M. Izenour, CG of the Army Test and Evaluation Command, for their leadership in a helicopter recovery operation.

LTG William C. Gribble awarded the Joint Service Commendation Medal to *MAJ David A. Nydam,* Nuclear, Chemical and Biological Division, Directorate of Missiles and Space, for his services on the staff of the Commander-in-Chief, Atlantic.

SP5 Paul D. Palm, now released from active duty, was awarded the Army Commendation Medal by LTG William C. Gribble, CRD, for his services in the Administrative Services Branch, Office, Chief of Administration, OCRD.

BRONZE STAR MEDAL. *LTC Clifton R. Goodwin,* Communications and Electronics Division, OCRD, was presented the Bronze Star Medal by LTG William C. Gribble for his services with the Military Assistance Command, Vietnam.

MICOM Assigns Canja to Paris

The U.S. Army Missile Command has announced assignment of LTC Safron S. Canja to the NATO Hawk Management Office in Paris, a consortium of several NATO nations responsible for production and logistical support of the Hawk missile system in Europe.

LTC Canja is a specialist in the R&D career field and has had missile system R&D assignments in 12 of his 17 years of active duty. He recently completed a 3-year tour with the Safeguard System Evaluation Agency at White Sands (N. Mex.) Missile Range.

Eichelberger Receives ECSA for BRL Achievement

Weaponry technological advances that "have contributed to the security of the United States and its Allies" achieved recognition early in October with the presentation of the U.S. Army Decoration for Exceptional Civilian Service to Dr. Robert J. Eichelberger.

Army Materiel Command Deputy CG LTG Woodrow W. Vaughan presented the Army's highest honorary awarded to a civilian employe, in recognition of Dr. Eichelberger's numerous outstanding achievements at the Ballistic Research Laboratories, Aberdeen (Md.) Proving Ground. Employed at BRL since 1955, he has served as director since 1967.

GEN Vaughan stressed that Dr. Eichelberger has qualified for the award based on "outstanding managerial ability" as well as for his significant contributions to scientific knowledge. Secretary of the Army Robert F. Froehlke signed the Certification of Citation, stating in part:

"Dr. Eichelberger had made numerous contributions to weapons technology through his original research in shaped charges, detonation physics, shock phenomena in solids, hypervelocity impact and penetration mechanics. . . ."

The citation also acclaims "his outstanding ability to identify and implement specific fundamental studies needed to provide a sound basis for subsequent applied research and development, and his unusual foresight in selecting subjects of potential military significance. . . ."

COL Rudolph A. Axelson, CO of the Aberdeen R&D Center, of which the BRL is one of the four main laboratories, headed numerous dignitaries of the installation who paid respects to Dr. Eichelberger at the ceremony.

BRL programs include research in exterior and interior ballistics, terminal effects of nuclear and nonnuclear devices, target signatures and electromagnetic wave propagation, materiel vulnerability, and supporting fundamental research in physics, mathematics, chemistry, engineering and biophysics.

Dr. Eichelberger's contributions to accomplishment of the BRL mission, to the Department of Defense and to the North Atlantic Treaty Organization and the Technical Cooperation Program are reflected in the award.

DECORATION for Exceptional Civilian Service is presented to Dr. Robert J. Eichelberger by LTG W. W. Vaughan, deputy CG, Army Materiel Command.

Until 1962, he was chief of the Detonation Physics Branch of the BRL Terminal Ballistics Laboratory, and for the next three years was BRL associate technical director. From 1965 to 1967, he was consulting physicist, interlaboratory team leader, and assistant to the technical director in planning, coordinating and reviewing BRL programs.

Dr. Eichelberger is a member of numerous scientific and professional societies, panels and committees, and the author or coauthor of many publications in professional journals. He received his master and PhD degrees at Carnegie Institute of Technology.

Joint R&D Effort Aims at Ceramic-Coated Tank Shoes

In efforts to reduce weight and increase the service life of U.S. Army vehicle components, ceramic engineers at the Army Materials and Mechanics Research Center (AMMRC), Watertown, Mass., are developing wear-resistant coatings for aluminum alloys.

Aluminum alloys have replaced steel to achieve weight reduction in many components. However, the longer service requirement has not been satisfied when these components are exposed to severe abrasion conditions.

When experiments demonstrated that a ceramic-fusion coating of tungsten carbide doubled the life of steel tank tracks shoes, research was initiated to coat aluminum tank track shoes to increase their service life to an acceptable level.

AMMRC engineers George Harris and Fred Meyer organized a project with three contracting companies, well-known for their expertise in ceramic coatings. Standard flame-spray, plasma-spray and slurry-coating processes were used for a wide range of ceramic materials for composite coatings applied to aluminum tiles.

Primary candidate coatings, one from each area, were selected from several types of abrasion tests, a spall test and a bond-strength test, all performed and evaluated at AMMRC.

Process scale-up was performed by having three candidate materials coated on aluminum tank track shoes. These coated track shoes have been submitted to the U.S. Army Tank-Automotive Command (TACOM), Warren, Mich., for final testing and evaluation.

Preliminary test results of this feasibility project encouraged the TACOM to schedule a follow-on program to optimize the coatings, coat a sufficient number of track shoes for a complete tread, and test the shoes under actual field conditions.

Fred Meyer

George Harris

Wolcott Accepts Appointment As USACDC Scientific Adviser

Appointment of a former member of the President's Science Advisory Committee, Fred H. Wolcott, as scientific adviser of the U.S. Army Combat Developments Command (CDC), Fort Belvoir, Va., was announced recently.

David C. Hardison, who has served since mid-1964 as CDC scientific adviser, is attending a one-year course at the National War College, Fort McNair, Washington, D.C.

Graduated from the University of Michigan School of Engineering in 1939, Wolcott is an Associate Fellow, American Institute of Aeronautics and Astronautics.

Since 1960, he has been a member of various presidential committees, including the Limited War Panel and the North Atlantic Treaty Organization (NATO) Long Range Scientific Study Committee.

In 1960–61 he headed the U.S. Scientific Delegation which conducted NATO Long Range Scientific studies in affiliations with other delegations.

Army Schedules 1972 Symposium on Solid Mechanics

Theoretical and experimental papers keyed to "The Role of Mechanics in Design—Ballistic Problems" are being solicited for the third biennial Army Symposium on Solid Mechanics, scheduled in Ocean City, Md., Oct. 3–5, 1972.

Acceptable papers must originate from in-house or contract researchers or designers of the U.S. Army, Navy, Air Force and the National Aeronautics and Space Administration. Papers will be unclassified and extended abstracts (about 500 words), with illustrations attached as appropriate, are required prior to Jan. 1.

Selection criteria for papers will include originality, theme relevance, soundness of approach and clarity of ideas. Authors selected on the basis of their abstracts must submit manuscripts for review by June 1.

Typical theme topics include terminal ballistics, thermal effects, armor design, ballistic weapon design, projectile design, weapons effects on structures, constitutive relations under ballistic environment, spallation, fragmentation, blast effects, rotating bands, battle damage, fuze mechanics, and extreme value statistics.

Symposium chairman is Joseph L. Bluhm, leader of the Technical Working Group and chief, Theoretical and Applied Mechanics Research Laboratory, Army Materials and Mechanics Research Center, Watertown, Mass.

The symposium will include technical sessions, a keynote address, exhibits, a banquet and a clinical problem session open for discussion.

Additional information may be obtained by an inquiry to: R. Morrissey, AMXMR–TM, Army Materials and Mechanics Research Center, Watertown, Mass. 02172 or telephone 617 926-1900, Ext. 253, or Autovon 684-8253.

CDC Completes Initial Testing Of Electronic Locating Device

Completion of initial testing of an electronic device designed to help locate lost combat patrols was announced Oct. 13 by HQ U.S. Army Combat Developments Command, Fort Belvoir, Va.

Testing of the electronic device was conducted at the CDC's Experimentation Command at Hunter-Liggett Military Reservation, a 168,000-acre field laboratory about 80 miles south of Monterey, Fort Ord, Calif.

The system consists of a receiver at a control center, a receiver-transponder in an aircraft and a 2-pound transponder carried by a unit, patrol or individual. An impulse from the patrol transponder is transmitted through the aircraft to the control center.

A geometric triangle formed by the ground unit, aircraft and control center becomes the basis for determining location of the lost unit. A computer analyzes the data from all the angles and prints out map coordinates of the position of the ground unit.

During test operations, the patrol transponder signaled successfully from positions more than 60 miles from the control center.

Various civilian applications of the system are envisioned, such as assisting forest rangers, police and rescue teams.

WRAIR Director Announces Top Assistants

Director and Commandant COL Edward L. Buescher of Walter Reed Army Institute of Research (WRAIR), Washington, D.C., recently announced key assignment for COL Robert J. T. Joy and COL Thomas H. Lamson.

COL JOY, the new deputy director, graduated from Yale University School of Medicine with an MD degree in 1954 and has a BS degree from the University of Rhode Island. He earned a master's degree in physiology from Harvard University Graduate School of Arts and Sciences in 1965.

While serving his residency at WRAIR (1956–59), he was awarded a concurrent research fellowship at WRAIR. In 1959 he began two years of duty as assistant director and then director of the Environmental Medicine Division, U.S. Army Medical Research Laboratory, Fort Knox, Ky.

After serving in 1961–62 as commander, U.S. Army Institute of Environmental Medicine (USARIEM), Natick, Mass., he remained as a research internist (1963–65). Reassigned as chief, U.S. Army Medical Research Team at WRAIR, he served until he became director of field research at USARIEM.

In June 1968 he was assigned as chief, Medical Research Division, HQ U.S. Army Medical R&D Command, Washington, D.C., and served until July 1969. He was reassigned as deputy, Medical and Life Sciences, Office of the Director of Defense Research and Engineering, Department of Defense.

COL Joy has been awarded the Army Commendation Medal, Air Medal, Legion of Merit (with two OLC), William Osler Medal of the American Association of the History of Medicine, the Hoff Memorial Medal for Achievement in Military Medicine, and the John Shaw Billings Award of the Association of Military Surgeons.

COL Robert J. T. Joy

COL Thomas H. Lamson

COL LAMSON, a graduate of Vanderbilt University and Medical College, Georgia, is the new deputy commandant at WRAIR. He recently ended a 3-year assignment in the Office of the Chief Surgeon, HQ U.S. Army Europe and Seventh Army. He served there as chief, Preventive Medicine, U.S. Army Medical Command, Europe.

Prior to serving his residency in Public Health with the New York State Department of Health in 1957, COL Lamson attended the Advanced Preventive Medicine Course, WRAIR. After serving in 1958 as chief, Preventive Medicine, Armor Center, Fort Knox, and Eighth U.S. Army Korea, he joined the staff and faculty of the Medical Field Service School, Fort Sam Houston, Tex., as deputy director, Department of Preventive Medicine.

COL Lamson served as chief, Professional Services, Walson Army Hospital and chief, Preventive Medicine (1965–68), Fort Dix, N.J.

He is a Diplomate of the American Board of Preventive Medicine, and a Fellow of the American College of Preventive Medicine. Other professional affiliations include the American Medical Association, the American Public Health Association, Association of Military Surgeons of the U.S., and the American Conference of Governmental Industrial Hygienists. His military honors include the Army Commendation Medal, Legion of Merit and the "A" prefix in Preventive Medicine.

AMMRC Reports Results of Ultrasonic Nondestructive Testing

Extensive research in ultrasonic nondestructive testing of materials conducted during the past decade at the U.S. Army Materials and Mechanics Research Center, Watertown, Mass., was reported at a recent British Nonferrous Metals Research Association (BNFMRA) symposium in London.

Otto R. Gericke, research physicist and head of the Nondestructive Testing Branch of the AMMRC, presented a paper titled "Theory and Nondestructive Testing Applications of Ultrasonic Pulse-Echo Spectroscopy."

Gericke is credited with deriving the basic concept of ultrasonic signals after they have been used to interrogate materiel, originally for his primary work in testing gun tubes.

Analogous to light spectroscopy, the technique requires the use of signals that contain a multitude of frequencies and can therefore be referred to as "white" ultrasound in inspection procedures to get detailed information on the integrity of materials.

The basic idea is to examine the color of such "white" ultrasonic signals after they have been used to interrogate a test specimen. This is done by feeding the ultrasonic signal that has been passed through the inspected item or has been reflected from the hidden defect to be explored by an electronic spectrum analyzer.

One application of ultrasonic spectroscopy for nondestructive inspection is detection of frequency independence of energy losses encountered by an ultrasonic signal while penetrating a test specimen. This frequency dependence often can be correlated to specimen microstructure.

An example is the differentiation of grain sizes in steel specimens, which can be determined very rapidly by looking at the spectral signature of ultrasonic signals transmitted through specimens, illustrated in Figure 1. Similar results can be obtained for nonferrous metals.

Another NDT application of ultrasonic spectroscopy is the examination of internal defects. Conventional ultrasonic inspection techniques often generate erroneous data regarding size and hence severity of concealed defects. They do not discriminate against geometrical factors such as defect orientation relative to the test surface.

In contrast, spectroscopic procedures expose differences in defect configuration by yielding characteristic spectral signatures for each situation.

Figure 2 shows ultrasonic echo spectra obtained for crack-like defects with different orientations with respect to the surface from which the ultrasonic test is conducted. The differences in spectral signature obtained for these defects are very obvious.

Gericke's technical presentation included a detailed discussion of the electronic instrumentation used for ultrasonic spectroscopy. U.S. Patent No. 3,538,753 was issued recently for his special electronic equipment developed for this purpose.

The London symposium was chaired by T. D. Hislop, divisional quality engineer of Rolls Royce, Ltd. and was opened by Dr. A. J. Kennedy, director of BNFMRA. Dr. Patricia M. Reynolds, head of the Process, Measurement and Control Section at BNFMRA, organized the meeting.

Presentations on other aspects of ultrasonic spectroscopy were made by E. A. Lloyd of BNFMRA and City University; E. E. Aldridge of the NDT Center, Harwell, England; W. R. Clipson of C. A. Parsons & Co., Ltd.; and R. F. Mitchell of Mullard Research Laboratories.

Dr. Reynolds plans to publish the minutes of the symposium, attended by over 70 scientists and engineers from England and other European countries.

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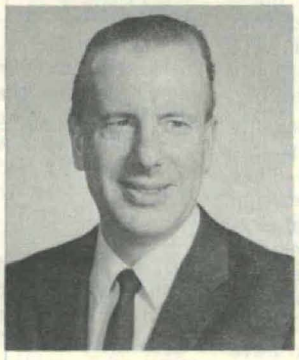
Otto Gericke, chief of the Nondestructive Testing Branch of the Materials Testing Division, Development and Engineering Laboratory, has a diploma in physics from the University of Goettingen in Germany. He has worked in nondestructive testing for 20 years, first at Siemens, Germany, and since 1958 at the U.S. Army Materials and Mechanics Research Center (AMMRC), Watertown, Mass.



Gericke conducts research and engineering projects aimed at development of new and improved methods for nondestructive testing at AMMRC. His many publications include a chapter on "Ultrasonic Spectroscopy" in *Research Techniques in Nondestructive Testing,* published in 1970.

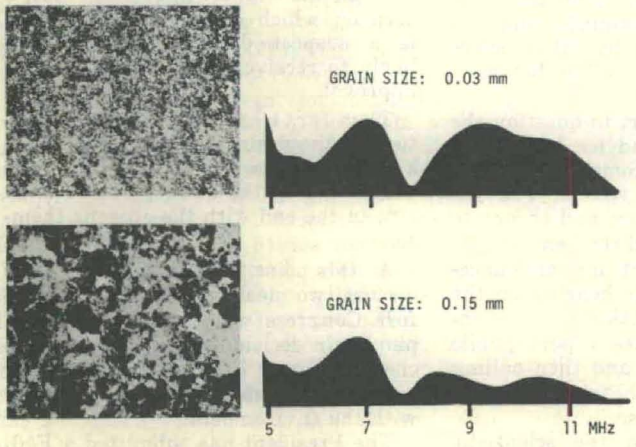


Fig. 1. AMPLITUDE SPECTRA obtained for ultrasonic signals transmitted through steel specimens having different grain structures. For the coarser grain, the spectrum exhibits a distinct decrease in 9-11 MHz amplitude.

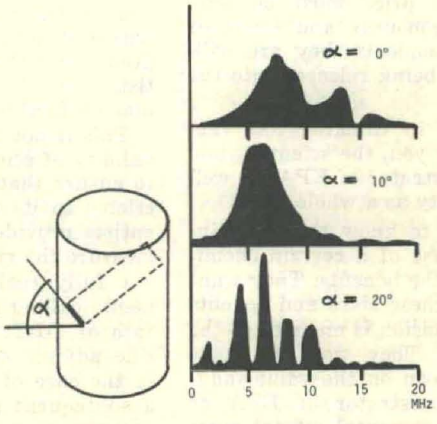


Fig. 2. AMPLITUDE SPECTRA obtained for ultrasonic echoes reflected from cracks located within a cylindrical test specimen. The angle *d* of the crack orientation varies with respect to the top cylinder surface to which the ultrasonic test probe is coupled. Significant differences in spectral signature are observed for various crack orientations.

Technological 'Goodies' Bring Banes

EPA Chief Discusses Progress Without Pollution

(Continued from page 2)

that the social, economic and environmental consequences of these breakthroughs would go unnoticed and uncommented upon forever. The question had to be asked—Are these all gifts? Just look at the facts.

Modern chemistry provides the motive power for millions of automotive vehicles, ships, RR locomotives, and aircraft.

Chemistry provides each man, woman and child in this country with thousands of pounds of raw materials every year, including foodstuffs, building materials, fabrics, wood, pesticides, metal and fuels. Each year thousands of new chemical compounds are put into use. The way we consume and dispose of these goods has become a major environmental problem and a potential threat to the health and comfort of the human race, if not to its survival.

For years the benefits of science have been accepted without either the public or the creator seriously questioning the multifaceted impact that acceptance of the benefit might have on the earth. But in recent years there has been a change in thinking.

People no longer want benefits promised without due regard to the detriments they may produce. They realize that inherent in a decision about how much nuclear-powered electricity they have is another decision about how much radiation or heat they are willing to tolerate in the environment.

They realize that the desire to have the maximum amount of food at the lowest possible price must be tempered by the amounts and kinds of agricultural chemicals they are willing to tolerate being released into the environment.

This change in thinking has vast significance for you, the scientist, and me, the administrator of EPA, as well as for the society as a whole.

People want to know the risks involved in the use of a certain chemical, as well as the benefits. They want to know what these risks and benefits are before a decision is made as to the chemical's use. They want to make their views known on the value judgment the administrator of EPA or any other governmental official must make. I believe that in a free and open society people have a right to participate in this value judgment.

Decisions such as the fate of DDT are not decisions solely within the purview of the scientist for him to make in the solitude of his laboratory. Rather, they are basic societal decisions about what kind of a life people want and about what risks they are willing to accept to achieve it.

In many cases, the responsibility for making the difficult judgments about the control of potentially hazardous and toxic substances is committed by Congress to me, but there can be no doubt of my accountability to the public.

In order to make wise decisions, I need your help. Wise decisions require the very best scientific evidence and assessments that you can give me. This is a contribution that the scientists are particularly equipped to make and which they have selflessly made in the past.

In this day and age our decisions must not only be wise, but also the public must understand the ingredients of the wisdom. The need for full public understanding places an additional burden on our shoulders and it is a burden that requires your willing assistance, if it is to be successfully borne.

First, I am convinced that if a decision regarding the use of a particular chemical is to have credibility with the public, and with the media who may strongly influence that public judgment, then the decision must be made in the full glare of the public limelight.

It no longer suffices for me to call a group of scientists to my office and, when we have finished, to announce that based on their advice I have arrived at a certain decision. Rather, it is necessary for me to lay my scientific evidence and advice on the table where it may be examined and, indeed, cross-examined by other scientists and the public alike before I make a final decision.

This is not an effort to question the validity of scientific advice, but rather to ensure that it is complete and restricted to its proper sphere. The scientists provide the fact and theory to measure the risks and the benefits.

I fully realize that my announcements calling a public hearing on the fate of DDT, and making the scientific adviser committee report public in the case of 245T, and then calling a subsequent public hearing has concerned some scientists.

I fully understand the scientist's desire to seek a quiet spot to contemplate and carefully work out rational solutions, as well as his distaste of the hysteria that sometimes accompanies public discussion of environmental issues. However, the demands of a free and open society will not permit such a luxury.

My obligation is to make a public accounting of my decision—to explain why I have taken or refused to take certain action. You, too, must participate in this explanatory process, if it is to be successful.

Regardless of whether those who support the decision speak out, some of the opposition to the action will be heard. And, all sides must be heard.

Regardless of the emotion surrounding an issue, reason must prevail. To fail to publicly support a wise decision may well be to concede defeat in the battle to convince the public of the credibility of the decision. Without such credibility, neither you nor I will long be entrusted with decisions that the public considers vital to their lives.

In addition, merely participation in the public decision-making and explanatory process is not enough. You, the scientist, and I, the lawyer—indeed, all professions—have a potentially debilitating trait that can easily undermine our case with the public.

Scientists and lawyers, and professionals of all stripes, have developed their own jargon—highly useful to conversations with members of our professions—but highly unintelligible to the layman.

This jargon tends to create an air of apartness from the public. Even worse, it may obscure our own inability to understand and thus to explain in plain English the reasons for our conclusions.

Complex as they may be, our decisions must be reduced to language and concepts which the ordinary member of the public can understand. Though we might will it otherwise, a decision which cannot be articulated is a suspect decision and one not likely to receive, or to deserve, public approval.

Thus far, I have dealt with the nature of the decision-making process in a democracy where the basic value judgments on the quality of life must rest in the end with the citizens themselves.

At this point, I think it desirable to discuss two measures now pending before Congress which can greatly expand our decision-making options on chemicals and help assure that our release of them will be in harmony with the environment.

The President has submitted a Federal Environmental Pesticide Control Bill to Congress which could ensure that these vital chemicals are employed circumspectively.

Today, all we can do is either pre-

vent a product from coming onto the market at all, or insist upon strict labeling. That is to some extent helpful, but if a product proves dangerous for certain applications, in spite of precautionary labeling, our only choice is to let it continue in use virtually uncontrolled or to ban it outright.

What we seek in the pesticide bill is not an indiscriminate ban on all uses, but more flexibility in deciding just how and when a pesticide should be employed.

The bill has been through many drafts in the House Agriculture Committee. The essence of the Administration's position is to gain control over the ultimate use of the pesticide —to maximize the benefits to the society and to minimize or eliminate the human or environmental hazards.

Many of the basic provisions of the present labeling art would be retained. The bill would streamline the cumbersome regulatory process, establish a national pesticide monitoring plan, regulate intrastate as well as interstate shipments and disposal of certain pesticides, and assist the states in training and licensing applicators, so as to minimize inadvertent poisoning of man, livestock and wildlife.

We do not oppose the addition of a Scientific Advisory Committee to this bill, but it would be vital to make sure its structure and modus operandi would not greatly delay decisions, as is happening today. We need a timely input from scientists and then fast action. As in the law, justice delayed is justice denied.

We think this bill merits your support. It certainly should greatly clarify many of the issues that now beset the pesticide industry, ease societal tensions, and ensure efficient, economical use of chemicals while providing much better protection to the world we inhabit together.

A second legislative initiative of President Nixon, the Toxic Substances Bill, would help us anticipate problems before they develop by requiring manufacturers to provide information to EPA on the names, chemical identity, molecular structure, amount produced and intended usage of each new product, plus a description of the consequences of normal use. Then the product would be tested to verify its safety.

EPA could require manufacturers of chemicals already in the market place to supply results of their own tests and could solicit comments from the public on side effects.

The administrator could conduct such research and monitoring as necessary to determine the effects of long-term, low-level exposures. If he found an imminent or other hazard to public health or the environment, he could restrict distribution of the offending substance.

A Toxic Substances Control Board, composed of members nominated by the National Academy of Sciences, would be created to advise us on test protocols and other regulations. Its objective would be to encourage rapid but responsible decision-making.

Again, we think this bill deserves the widest support in the professional community. The time to act is now, not in response to periodic scares so typified by mercury.

Applied chemistry, like science in general, is changing from a period of extraordinary and unquestioned growth and innovation to a time of caution. Until recently, it seemed there was nothing we could not do. Now, we are repeatedly and most cogently reminded that we depend on living processes for survival—processes we only dimly understand and cannot completely control or ever supplant.

The conclusion is inescapable, that from now on our applications of technology will be monitored, subjected to critical review, and modified in advance to meet social requirements.

This does not mean we should discontinue or even slow the development of new technology—rather, that we need to better understand the human and environmental impact of its ultimate use. In the long run, this will be less expensive than having to undo our mistakes after the fact.

This means that scientists will have to be more active in the public forum, laying out the facts and helping to formulate and clarify issues. When complex questions confound the layman—and outside our immediate expertise we are all laymen—there is no substitute for accurate evidence and informed advice.

I am not saying that any opinion, expert or otherwise, can expect to dominate the formation of policy, but merely that sound policy-making is impossible without a full exposition of all relevant thought.

You may, therefore, be confident of your role in our society. You are helping to assure a future that is prosperous, safe, clean, comfortable, healthy and humane.

The image of the disinterested chemist or physicist breaking down the barriers of ignorance, wiping out misconceptions, discovering new facts, laying the foundation for knowledge, prosperity, progress and peace—this image has been enormously influential and persuasive as a model of stewardship.

It will continue to be, if we treat technology as a means, and never as a goal in itself.

When historians of the future look back on this period, they will say it was an age of enlightenment, when man first understood that his limitless capacity to innovate always takes place within nature, not outside it, and that maintaining the life systems of the earth is our most sacred task. It is a time of adjustment—even for scientists. But who is better equipped for the life of creative adaptation than yourselves?

With science integrated into the total culture of mankind, I have no fear for the future. Man will not only survive, but prosper, and advance in wisdom as a guardian of the earth.

ASTM Picks Watervliet Photos For Honors in National Exhibit

Pictures displayed by Watervliet (N.Y.) Arsenal researchers at the recent national exhibit of the American Society for Testing and Materials at Atlantic City, N.J., were selected for high honors.

R. Vincent Milligan, a mechanical engineer, won first prize in the Class II division, Optical Microscopy in Metals, with his photomicrograph titled "Crack Branching at a Ferrite Pearlite Colony Interface."

In 1969 Milligan was a first prize winner in the color division of the International Metallographic Society exhibit with an earlier microphotograph.

Theresa V. Brassard, also a first-place winner at the 1969 IMS exhibit, showed a picture at the ASTM exhibit depicting a high-strength titanium alloy following heat treatment. It was selected as the cover illustration for an ASTM publication, *Applications of Modern Metallographic Techniques.*

Dr. McManigal Takes ARPA Post As Director of Advanced Sensors

Formerly manager of the Missile Systems Engineering Department at Philco-Ford Corp., Dr. Paul G. McManigal has assumed duties as director of Advanced Sensors for the Advanced Research Projects Agency (ARPA), Department of Defense.

Dr. McManigal received his PhD degree in 1963 from the University of California at Berkeley. His doctoral research in high energy physics was done at the Lawrence Radiation Laboratory in San Francisco.

Experienced in a wide variety of technical specialties, he has specialized in reconnaissance, surveillance, target acquisition, fuzing, photography, lasers, detectors and infrared devices.

During his employment with Philco-Ford, Dr. McManigal was engaged in advanced design of new missile systems, including seekers, guidance and control, aerodynamics, propulsion, fuzing and warheads.

Army Aids Forest Service on Spruce Tree Budworm Control

Worldwide concern with environmental pollution, leading to the current restriction on use of DDT, has necessitated extensive research on new insecticides and development of more efficient procedures to control forest insects.

When one considers that the United States loses more timber each year to the ravages of insects than it does to devastating forest fires, the importance of this effort appears in proper perspective.

To help solve some environmental problems, the U.S. Army's Deseret Test Center and the U.S. Forest Service recently combined talents to combat the spruce budworm (*Chroistoneura fumiferana*). It attacks stands of Douglas fir trees—the main source of lumber for construction in the northwestern U.S.

Research of U.S. Forest Service scientists recently resulted in a new insecticide, Zectran, as a substitute for DDT. Developed specifically to control the spruce budworm, Zectran reportedly has no deleterious environmental effect when used in concentrations approved by the U.S. Forest Service.

Aerial spraying operations of the U.S. Forest Service have consisted of dusting with vast amounts of Zectran particles having a mean particle diameter of plus 200 microns. Success has depended upon gravitational settling of the particles to reach the budworms. About 93 percent of the kill of budworms resulted from Zectran particles below 50 microns in diameter.

Deseret Test Center is nationally known for expertise in diffusion meteorology, aerosol sampling and aerosol dissemination. Consequently, the U.S. Forest Service Equipment Developmest Center, Missoula, Mont., requested information and technical assistance relative to developing an improved method to conduct effective aerial spraying operations.

Located at Fort Douglas, Salt Lake City, Utah, Deseret Test Center can measure air movements and air pollutants, and make difficult analyses of the diffusion meteorological regime in a particular area.

U.S. Forest Service and Deseret Test Center scientists decided to test new techniques at Nez Perce National Forest in Idaho when defoliation of the Douglas firs in the area was expected in the summer of 1971.

Tests from June 11 through July 6 included use of an Army-developed aerial spraying technique. The insecticide was disseminated above the forest canopy, under favorable wind conditions. Results were measured by the number of larvae killed downwind.

DESERET TEST CENTER project coordinator John Barry explains theory of roto-rod air sampling device to (from left) William M. Ciesla, supervisory entomologist; Robert E. Ekbland, mechanical engineer field project leader; and Fred Honig, chief, Forest Insect and Disease Branch, U.S. Forest Service Missoula (Mont.) Equipment Development Center.

The spraying technique was offered as a more efficient method of disseminating Zectran through greater area coverage, with less insecticide; also, to serve as a basis for further tests to perfect the technique.

Analyses of results are not complete but persons involved are enthusiastic about the project.

John Barry, project coordinator for the Deseret Test Center, said: "This cooperative experiment clearly demonstrates . . . the U.S. Army can make a significant contribution in reducing environmental contamination . . . through more efficient use of chemicals and biologicals to control forest and crop insects."

Robert Ekblad, project engineer from the U.S. Forest Service's Equipment Development Center, commented: "The Forest Service has been interested for some time in controling forest insects with aerosol size sprays. I believe they can control insects cheaper and with less impact on the environment than conventional sprays.

"The advanced technology and equipment of Deseret Test Center has made it possible for the Forest Service to test this concept. The cooperative tests between Deseret Test Center and the Forest Service is an excellent example of civilian use of technology developed by the military.

"The development of the technology employed by the Army in the current tests would be beyond the resources of the Forest Service. I hope that we can have a continuing program with Deseret Test Center to help solve our environmental problems."

Ray Miskus, research chemist of the Pacific Southwest Forest and Range Experiment Station, said the ability to produce a discrete spectrum of small particles that carry an insecticide and can readily reach the target pest is a goal to be desired in forest pest control, adding:

"The use of a pure undiluted chemical formulation that can be applied in a low volume and can be dispersed easily by making use of prevailing mountain meteorology in a forest canopy could be accomplished only through cooperation and with the assistance of Deseret Test Center."

METEOROLOGICAL OBSERVERS SP4 Robert Kamp and SP4 Mike Lotti prepare to track pi-ball balloon during aerial insecticide spraying tests at Nez Perc National Forest in Idaho.