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DEPARTMENT OF DEFENSE  
**Semiannual Report**  
of the  
**SECRETARY OF DEFENSE**



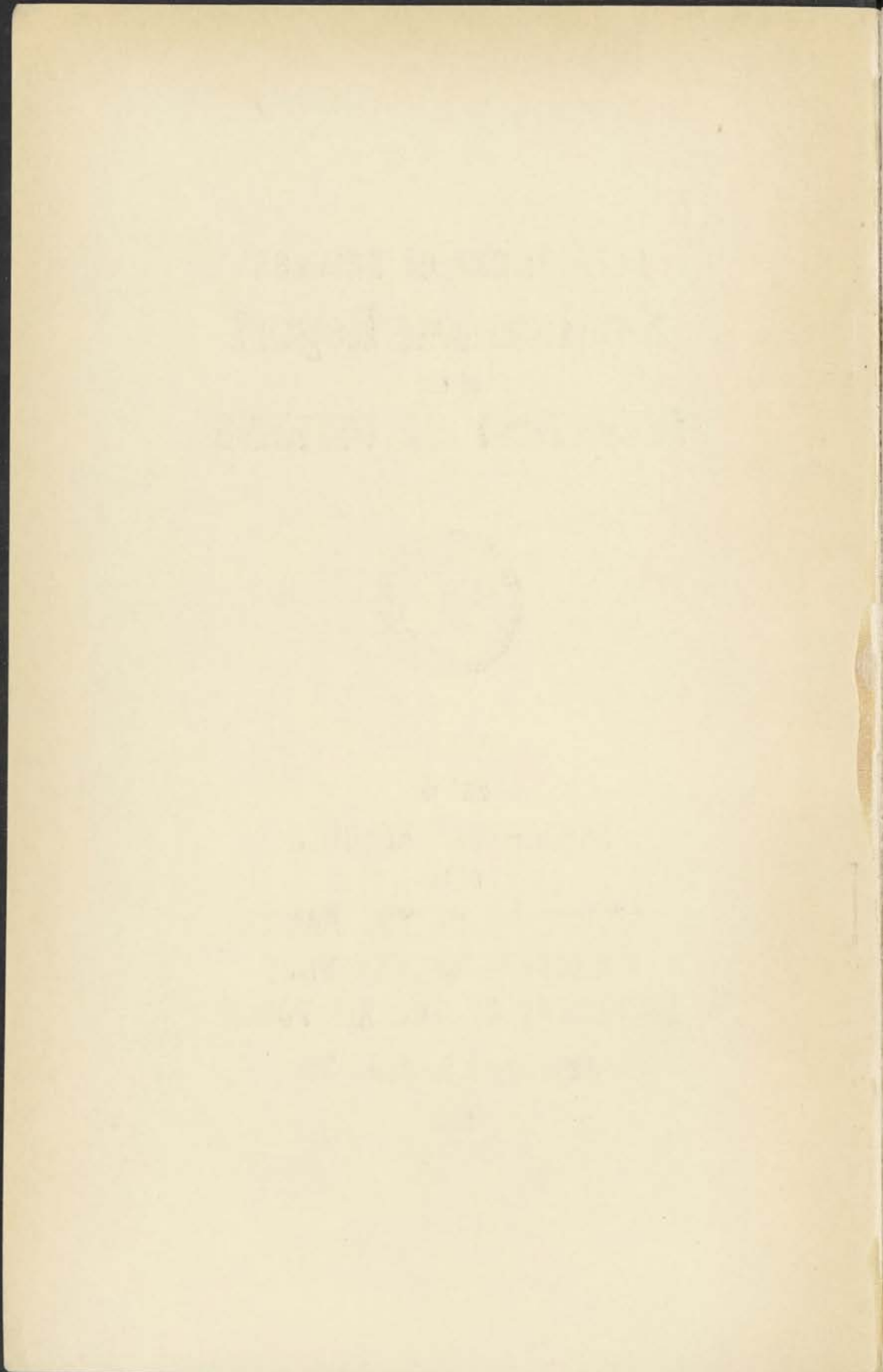
and the  
**SEMIANNUAL REPORTS**  
of the  
**SECRETARY OF THE ARMY**  
**SECRETARY OF THE NAVY**  
**SECRETARY OF THE AIR FORCE**  
**January 1 to June 30**  
**1958**

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**January 1 to June 30**

**1958**

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
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## Letter of Transmittal

THE SECRETARY OF DEFENSE  
WASHINGTON

MARCH 23, 1959

DEAR MR. PRESIDENT:

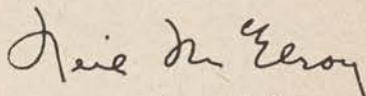
In compliance with Section 202(d) of the National Security Act of 1947, as amended, I submit the semiannual report of the Secretary of Defense, together with those of the Secretaries of the Army, the Navy, and the Air Force.

By arrangement with the Chairmen of the Senate and House Armed Services Committees, the midfiscal year reports presented the activities of the defense establishment mainly in statistical form, with the understanding that a comprehensive report would be submitted after June 30, 1958. In line with this arrangement, the enclosed reports cover activities for the entire fiscal year 1958.

The Department of Defense Reorganization Act of 1958, approved on August 6, 1958, established an annual instead of a semiannual reporting requirement. Accordingly, this report is the last of the semiannual reports by the Department of Defense.

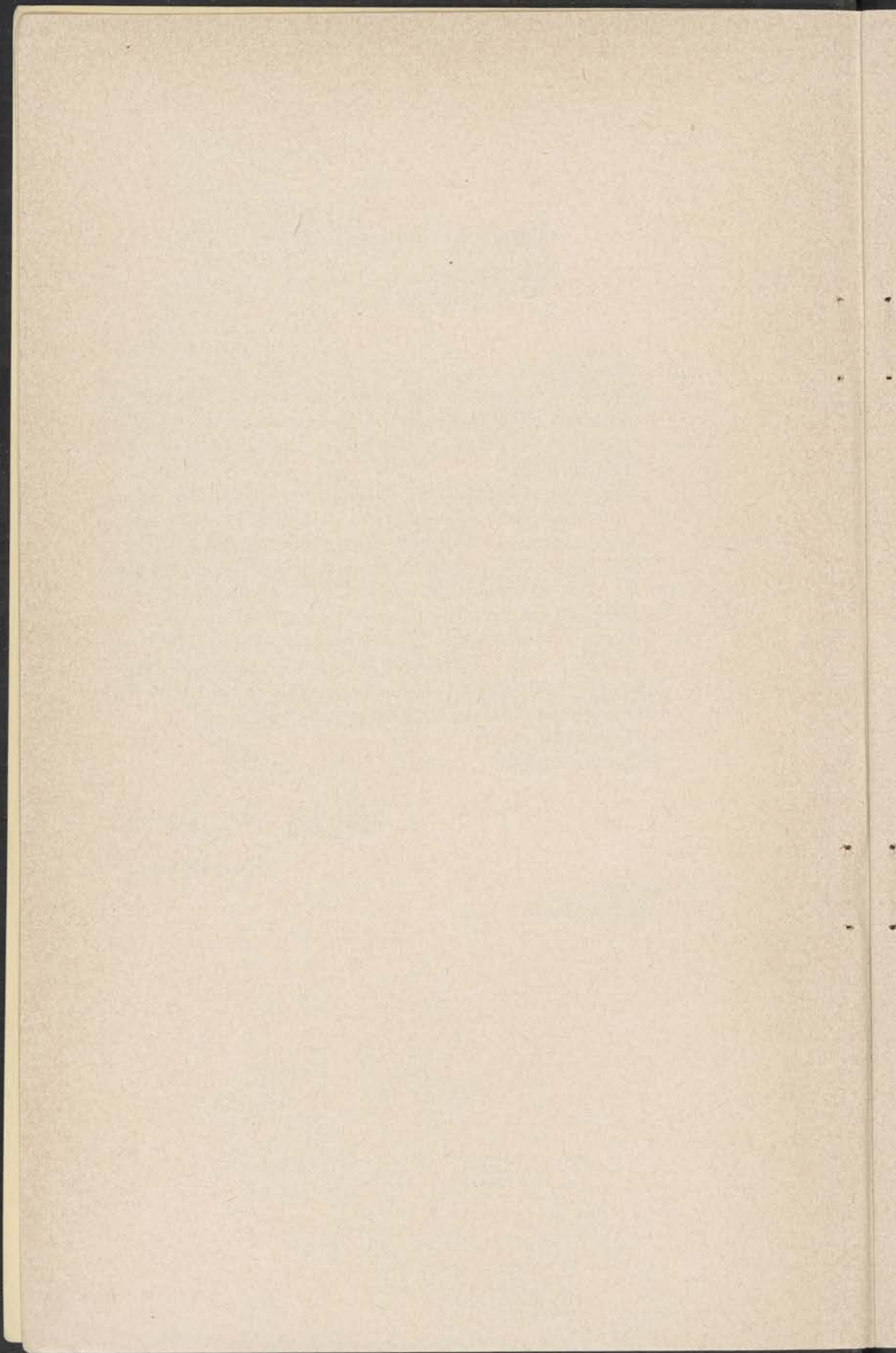
With great respect, I am

Faithfully yours,



NEIL MCELROY

THE PRESIDENT  
THE WHITE HOUSE



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## *1. Introduction*

The present international situation is governed by the fact that a totalitarian ideology is using every available means—scientific, economic, psychological, military, and political—to further its drive toward world domination.

In these circumstances, the United States, while building foundations for more certain peace, has no choice but to maintain the strength necessary to insure its safety and deter aggression. It is the mission of the Department of Defense to provide armed forces adequate for this task.

This mission determines the objectives of our defense policy:

1. To have available retaliatory weapons systems so devastating that the cost to an aggressor of an attack on the United States would be unbearable.
2. To have defenses of such strength that it will be obvious to an enemy that the military capability of our armed forces cannot be destroyed by a sudden attack.
3. To have in readiness and in reserve armed forces of all types prepared to meet effectively any local situation that may require a military response.
4. To have a research and development program that will insure our national security in the years ahead no matter how rapid the changes in the technology of weapons.
5. To maintain an effective system of collective security with the help of a sound program of military assistance to friendly countries.

These objectives were met during fiscal year 1958. Our retaliatory forces continued to provide an effective deterrent. The defenses of our home base were further strengthened. Forces primarily designed to cope with limited aggression constituted the major part of our total military establishment; in addition, our reserve forces greatly increased their effectiveness. Research and development programs were realigned and the most promising ones substantially accelerated. Military assistance to our allies provided defensive strength many times greater than if the funds involved had been merely added to our own military budget.

The cost of providing the military strength essential for our security remained high. To permit the rapid exploitation of scientific

advances, earlier estimates of fiscal year 1958 expenditures had to be increased. The same scientific factors will continue to exert an upward pressure on future expenditures.

The American people have indicated again and again their determination to maintain the necessary strength no matter what the sacrifices. The Department of Defense has the obligation to make certain that these sacrifices are not wasted, that the Defense establishment operates efficiently, and that funds and priorities are assigned where they will contribute most to our national security. This obligation dominated the policies, plans, and programs of the Department of Defense during fiscal year 1958.

## *II. The Armed Forces*

The development of the force structure of the military Services during fiscal year 1958 continued to be affected by the increasingly rapid introduction of new weapons systems.

The necessary adjustments were made in accordance with the principle, first established in 1953, that national security could best be maintained by providing a constant, effective deterrent rather than by preparing for arbitrarily selected years of danger. In determining the adequacy of our force structure, the standard of measurement has inevitably been our total defense effort—not merely the capabilities of a single Service or of a particular weapons system, and including our reserve forces as well as those on active duty and the capabilities of our allies as well as our own. By adhering to these policies, the United States has in recent years, and can in the future, maintain adequate security at a reasonable cost.

The fiscal year 1958 adjustments involved a reduction in personnel strength of 195,000, accompanied by the delivery of more powerful and effective weapons and equipment, including guided missiles, rockets, ships, aircraft, and many other types of materiel. Simultaneously, new doctrines and organizational patterns were developed to assure the effective utilization of new weapons systems. The resulting force structure provided the Nation with adequate strength to meet any threat.

### **Retaliatory Forces**

Our retaliatory capability, maintained to deter the outbreak of an all-out war, continued to be increased. Its principal element is the Strategic Air Command, including B-52's and B-47's supported by a worldwide system of operational bases. All but a few of the B-36 squadrons had been reequipped with B-52's at the close of the fiscal year, and the expansion of B-52 wings from 30 to 45 aircraft was nearly 75 percent completed. The transition from propeller to jet air-refueling tankers was well underway. Greater dispersal of these aircraft reduced the time for bomber and tanker squadrons to become airborne and reduced the vulnerability of these squadrons to attack. Manned by thoroughly trained and experienced crews, these bombers can deliver unprecedented destruction anywhere in the world.

In addition, there are the substantial nuclear capabilities of tactical air units based overseas and of the carrier task forces of the Navy deployed in the Atlantic and Pacific. In case of an all-out war, these forces could strike at numerous strategic targets of vital importance.

This combination of Air Force and Navy units has provided the United States with ample strength to deter major aggression. These forces will retain their capabilities for many years—being kept modern by the introduction of new aircraft equipped with new missile delivery systems. The extent to which the retaliatory mission can be assumed by ballistic missiles can be determined only after substantial experience with these missiles has been acquired.

### **Continental Defenses**

The defense of our home base is a joint Army-Navy-Air Force effort carried out under the direction of the Continental Air Defense Command and is linked with Canada's defense effort through the North American Air Defense Command.

This defense is backed by an extensive air detection system which stretches from the mid-Pacific around the northern edge of the American Continent across the North Atlantic approaches, including three parallel warning lines in Canada. The capability of this detection system is constantly being improved by the introduction of more modern and powerful equipment, the coverage of possible gaps in the tracing of low-flying aircraft, and increases in the number of picket ships and aircraft. Work was also started toward the end of the fiscal year on early warning stations for the detection of ballistic missiles.

Major responsibility for intercepting an enemy attack on the United States rests with the air defense squadrons of the regular Air Force, which are being continuously strengthened with the delivery of supersonic interceptors. Delivery of air-to-air FALCON and SIDEWINDER guided missiles and of GENIE rockets, with nuclear warheads, greatly increased the defensive capabilities of these squadrons. To augment this force, the Air National Guard maintained about 70 fighter interceptor squadrons. Direction and coordination of air defense battles will be greatly facilitated by the Semi-Automatic Ground Environment system (SAGE), the first sector of which is to become operational early in fiscal year 1959.

The Army contribution includes about 60 NIKE-AJAX battalions, which by June 30, 1958, had replaced practically all anti-aircraft artillery units in the regular forces. The first NIKE-HERCULES units became operational toward the end of the fiscal year and, in turn, started to replace the nonnuclear, shorter range NIKE-AJAX missiles. For the coordination of Army missiles in the point defense of vital areas, the MISSILE MASTER has been developed; in December 1957 the Washington-Baltimore area became the first defense sector to be equipped with this electronic control system.

The Navy's role in the continental defense operation involves the provision of radar picket ships and radar-equipped aircraft and re-

sponsibility for antisubmarine activities off the coasts of the United States.

The continental defense system assures our ability to defend ourselves and survive an attack, even though such an attack may be unexpected and massive. The continued development of this system, as planned, will maintain our ability in the years ahead.

### **Limited War Capabilities**

Numerically, by far the largest portion of our armed forces is available to assist our allies in case of local aggression. The mobility and firepower of these forces continued to be substantially improved during fiscal year 1958. On June 30, 1958, nearly 40 percent of all our forces was stationed abroad or with the operating forces of the Navy, afloat or mobile. Other active duty units were trained, equipped, and ready to move into action on short notice. These forces were backed by a powerful reserve establishment—better trained and more ready than ever before in our history.

The Army contribution on June 30, 1958, included 15 pentomic divisions, recently reorganized to employ more effectively both atomic and nonatomic weapons. In addition, there were 4 missile commands, 14 other major combat units ranging in size from an armored combat command to infantry battle groups, over 100 supporting combat battalions, and more than 20 aviation companies. The Tactical Air Command, reinforced by MATADOR guided missile units, furnished the necessary air support for the Army.

The Navy provided ample sealift capability for the major assault elements of the 3 combat-ready Marine Corps divisions with their 3 air wings. These Marine Corps units, like those of the Army, have a dual atomic and nonatomic capability and, at the close of the fiscal year, were being reorganized to achieve greater combat mobility and effectiveness.

The security of sea lanes is being assured by a Navy second to none—experienced in naval warfare, carrier actions, and amphibious operations. The antisubmarine capability of naval forces was greatly increased during the fiscal year as new detection systems, acoustic-homing torpedoes, and atomic depth charges were introduced. To counter enemy submarine activities, specialized units were available, including support carriers, destroyers, hunter-killer submarines, airships, and aircraft of all types; in addition, virtually all combatant ships of the Navy had some antisubmarine capability.

The versatility of all these forces is one of their greatest assets. While they could be readily deployed in case of local aggression, they also have an important role in the event of general war.

## The Military Services

For the operational purposes outlined above, land, sea, and air units are assigned to unified and specified commands, in whatever combination required for the accomplishment of the missions of these commands. The task of organizing, training, and equipping these forces and of providing administrative and logistic support is the responsibility of the military departments and of the four military Services within those departments.

The personnel strength of the military Services was reduced from 2,796,000 to 2,601,000 during the fiscal year—a decrease of 195,000. The original budget requests of the Department of Defense anticipated no change in the personnel level of the armed forces, but subsequent reviews of Defense programs identified areas in which personnel reductions could be achieved without impairing national security. In accordance with directives issued in July and September 1957, new personnel goals were established; reductions were to be made primarily in administrative and support activities and by taking full advantage of the greater effectiveness of new weapons and of the reduced turnover in military personnel.

### *The Army*

During fiscal year 1958, the Army completed the reorganization of its divisions along pentomic lines. The reorganized infantry and airborne divisions include 5 self-contained battle groups, supported by 5 batteries of artillery and 1 HONEST JOHN rocket battery, with nuclear capability. Armored divisions, already well suited for mobile, dispersed-type warfare, acquired nuclear capabilities. The new divisions have greater firepower with less personnel and are being equipped with lighter materiel for greater air transportability.

These organizational changes, accompanied by a personnel reduction from 998,000 to 899,000 and the introduction of additional modern weapons, brought major adjustments in the force structure of the Army. At the beginning of the fiscal year, the Army's major combat units consisted of 18 divisions, 2 missile commands, 9 regimental-type units, and 115 air defense battalions. On June 30, 1958, there were 15 pentomic divisions, 4 missile commands, 5 regimental-type units, and 87 air defense battalions. In addition, the Army had at the end of the fiscal year 1 armored combat command, 2 infantry brigades, and 6 infantry battle groups.

The delivery of additional HONEST JOHN rockets and CORPORAL missiles reinforced the general striking power of the Army and made possible the establishment of two more missile commands. The Army's REDSTONE missile, with a range of about 200 miles, became

operational in June 1958; two heavy missile groups were activated for handling this weapon in the field. Four of the Army divisions stationed in the United States were organized in May 1958 into a single mobile, combat-ready command, the Strategic Army Corps (STRAC), designed to meet the initial requirements of a local war or to provide initial reinforcement in a general war. The reduction in the number of air defense battalions during the past year reflected the greater protection afforded by NIKE missiles as compared to antiaircraft guns.

#### *The Navy and Marine Corps*

The Navy, like the other military Services, continued during fiscal year 1958 to modernize its equipment and weapons systems.

In August 1957, the third of the *Forrestal*-class carriers, the *Ranger*, was commissioned; 3 additional carriers of this class and 1 even larger, nuclear-powered carrier were under construction. The modernization of the carrier *Midway* was also completed during the year. The *Galveston*, converted from a regular cruiser into a guided-missile cruiser, was commissioned in May 1958—the first ship to be equipped with TALOS surface-to-air missiles. Five new destroyers joined the fleet. As for submarines, the third nuclear-powered submarine, the *Skate*, was commissioned in December 1957, and 26 additional ships of this type were under construction or authorized at the close of the fiscal year; the *Grayback*, the first submarine to be built for launching surface-to-surface REGULUS missiles, was commissioned in March 1958.

Modern jet bombers, like the Skywarrior, the Skyhawk, and the Fury, and jet fighters, like the Crusader, were introduced in increased numbers, raising the percentage of jet aircraft in the Navy's active aircraft inventory from 38 to 42 percent. Additional deliveries of air-to-air SPARROW and SIDEWINDER missiles and surface-to-air TERRIER missiles increased the striking power of the fleet; production models of the TALOS were successfully tested during the year and this surface-to-air missile with a nuclear capability became operational shortly after the close of the fiscal year.

The personnel strength of the Navy decreased from 677,000 to 641,000 during fiscal year 1958, accompanied by a reduction of 13 warships and 63 other ships. At the close of the fiscal year, the Navy was operating a total of 891 ships—396 warships and 495 other types. Major naval air combatant units on June 30, 1958, included 17 carrier air groups—the same number as a year earlier—and 22 carrier anti-submarine squadrons—an increase of 2.

The Marine Corps completed during the fiscal year the reorganization of one division and one air wing into lighter, faster, and more mobile units—completely air-transportable, with assault elements to

be lifted by helicopters. The reorganization of the remaining two divisions and two air wings will be completed early in fiscal year 1959. The striking power of Marine Corps units increased with the delivery of surface-to-surface HONEST JOHN rockets, land-based surface-to-air TERRIER's, and air-to-air SPARROW's and SIDEWINDER's. The number of Marines on active duty declined slightly during the year—from 201,000 to 189,000.

### *The Air Force*

The Air Force carried out major readjustments in its force structure during fiscal year 1958 as new strategic concepts and weapons systems were introduced.

While the overall wing structure of the Air Force was reduced from 137 to 117 during the fiscal year, the striking power of the 117 wings was at least as great, if not greater, than that of the larger number of wings at the beginning of the year. The 20-wing reduction involved 6 strategic fighter and reconnaissance wings, 4 air defense wings, and 10 tactical wings.

The almost complete withdrawal of B-36's eliminated the need for strategic fighters to assist these relatively slow bombers in reaching their targets. Simultaneously, B-52 wings were being equipped with 45, instead of 30, aircraft per wing—giving the 11 new B-52 wings a striking power equivalent to 16½ wings of the former type. Moreover, the delivery of additional KC-135 jet tankers is increasing the range and flexibility of our jet bombers, and the dispersal program is increasing our retaliatory power in case of surprise attack. A new generation of medium and heavy bombers is under development—the B-58, Hustler, already in production, and the B-70, Valkyrie, a heavy bomber being designed for speeds of more than 2,000 miles per hour.

The elimination of four air defense wings was made possible by the introduction of additional surface-to-air missiles and of faster, more effective interceptors in the Century series, equipped with nuclear weapons.

Similarly, the reduction in the tactical wing structure reflected the Army's growing missile capability, which reduced its requirements for close combat air support, and the increased availability to the Air Force of new supersonic fighters and MATADOR surface-to-surface missiles. An additional factor was the increased carrying capacity of new transport aircraft in the tactical airlift wings.

The 117 wing structure of the Air Force on June 30, 1958, included 44 strategic, 28 air defense, and 45 tactical wings. It was manned and supported by 871,000 active duty personnel, as compared to 920,000 at the beginning of the fiscal year.

### **III. Research and Development**

The constantly increasing rate of scientific and technological progress has made the military research and development effort more vital to our security than ever before. The importance of this effort is reflected by the increase in the programmed obligations for developing advanced weapons systems from \$3.5 billion in 1955 to \$5.6 billion in 1958. The 1958 total includes \$1.9 billion for research and development, \$0.4 billion for supporting activities, and \$3.3 billion for development, test, and evaluation items. For practically all of today's operational weapons systems, a successor system is under development and a third generation system in the research stage.

While the ballistic missile programs have received the greatest publicity, research and development projects of the Department of Defense cover all military needs—from clothing, foods, and paints through aircraft, ships, tanks, electronics, and fuels to the astronautical sciences. Some of these projects, when successfully completed, will cause revolutionary changes in warfare; all of them, even if less than fully successful, will contribute to an advance in scientific knowledge as well as to a steady increase in our military capabilities.

The wide scope of the military programs is indicated by the distribution of obligations for research, development, test, and evaluation during fiscal year 1958—36 percent for guided missiles, 18 percent for aircraft and related equipment, 13 percent for military sciences (including the development of special materials, components, and techniques), 7 percent for ordnance (including combat vehicles, artillery, small arms, and ammunition), 5 percent for ships and their equipment, and 21 percent for other equipment, program management, and direct support.

In addition to the Department of Defense research expenditures, the Atomic Energy Commission spent \$516 million for research in fiscal year 1958, of which \$111 million was used for nuclear weapons and production techniques and \$290 million for reactor development. To assist our allies in their research effort, \$35 million of military assistance funds was made available.

#### **IRBM and ICBM Programs**

Fiscal year 1958 was a year of major progress in the development of intermediate-range ballistic missiles (IRBM's) and intercontinental ballistic missiles (ICBM's).

After numerous successful test firings, both the JUPITER and the THOR, the two land-based IRBM's under development, were ordered into production in November 1957, even before final evaluation had been completed. Further tests during succeeding months provided additional technical data for improving the reliability of these missiles and assured that the tight schedule for the initial THOR deployment overseas by the end of calendar year 1958 would be met. The fact that these missiles will have been brought from blueprint to reality within a 3-year period marks a major achievement by both the military Services and their industrial partners.

The progress achieved in the accelerated development of the Navy's sea-based POLARIS continues to justify confidence in the attainment of an operational capability in 1960. The results of the test vehicle flight test program confirmed many of the initial design criteria, and emphasis is being placed on resolving problems related to reliability and component compatibility. Parallel progress was being made in the development of nuclear-powered POLARIS submarines; the keels for three such submarines were laid during fiscal year 1958.

Major advances were also achieved in the development of ICBM's. The ATLAS, scheduled to become operational in calendar year 1959, had its first test firing in June 1957, followed by seven further tests during fiscal year 1958. Of the total eight launchings, six were completely or partially successful. Construction for two operational sites was started—one in California and one in Wyoming. The TITAN, the other liquid propellant ICBM under development, progressed through its static test phase and the first flight test was scheduled to take place before the end of calendar year 1958. This two-stage, liquid-fueled weapon, designed as a backup to ATLAS, is being developed for launching from underground sites.

A second generation ICBM project, MINUTEMAN, using solid fuel, was approved in February 1958. It promises, being relatively invulnerable in its underground sites, to provide almost instantaneous reaction in case of enemy attack and may be less costly than its predecessors.

Work on antiballistic missile defense systems was carried forward with highest priority during the fiscal year. On January 16, 1958, the Army was directed to push ahead with the development of NIKE-ZEUS, while the Air Force was to concentrate on alternative, but compatible, radar and data-handling techniques. Responsibility for studies looking beyond the NIKE-ZEUS was given to the Advanced Research Projects Agency (ARPA).

The emphasis placed on IRBM and ICBM programs is illustrated by the rise in obligations for these missile systems from \$1,365 million

in fiscal year 1957 to \$2,077 million in fiscal year 1958—an increase of 52 percent.

### **Other Missile Programs**

The wide scope of the Department of Defense missile programs is indicated in the charts on pages 12 and 13. Obligations for other than IRBM and ICBM programs amounted to \$3,030 million in fiscal year 1958.

Substantial advances were made in all programs during fiscal year 1958. Developments in the surface-to-surface category included the deployment by the Army of a REDSTONE unit to Europe in June 1958; the initiation of the PERSHING program in January 1958 as a solid propellant successor to REDSTONE; the placing into production by the Air Force of two aerodynamic missiles, the tactical-range MACE and the strategic-range SNARK; and the placing of a Navy research contract in June 1958 for SUBROC, designed primarily for antisubmarine operations. In the air-to-air category, the testing and evaluation of SPARROW III was completed with deliveries scheduled for early in fiscal year 1959. Progress in air-to-surface missiles included the special emphasis placed on the development of HOUND DOG, which will greatly increase the striking power of strategic bombers. The introduction of NIKE-HERCULES into the air defense system in June 1958 represented another milestone in the development of surface-to-air missiles.

Rapid progress in related programs or the reorientation of projects made possible the cancellation during fiscal year 1958 of NAVAHO and TRITON, two long-range, ramjet surface-to-surface missiles and of the WIZARD antiballistic missile project as such. Technical difficulties forced the cancellation of DART, an antitank weapon. Continued review will assure that the guided missile effort will be focused on the most essential requirements of the military Services.

### **Space Research**

In the long run, fiscal year 1958 will probably be remembered principally as the first year of the space age. It marked man's first successful attempts to penetrate the limitless reaches beyond the earth.

For the International Geophysical Year, starting on July 1, 1957, United States scientists developed a program ranging through practically all of the physical sciences, including such varied contributions by the military Services as the launching of earth satellites and the further exploration of Antarctica.

To prevent any interference with the development of top priority ballistic missiles, it was decided in July 1955 to establish the

GUIDED MISSILE PROJECTS JUNE 30, 1958		
NAME	DEVELOPING SERVICE	COMMENTS
<b>SURFACE-TO-SURFACE MISSILES</b>		
LACROSSE	Army	For close tactical support. Will replace and supplement conventional artillery and tactical aircraft.
*CORPORAL	Army	Range over 75 miles. Nuclear capability.
SERGEANT	Army	Solid propellant successor to CORPORAL.
*REDSTONE	Army	200-mile range ballistic missile. Nuclear capability.
PERSHING	Army	Solid propellant successor to REDSTONE.
*MATADOR	Air Force	Subsonic, jet-propelled missile. Nuclear capability.
MACE	Air Force	Improved version of MATADOR, with longer range.
*REGULUS I	Navy	500-mile range, ship-based, subsonic, jet-propelled missile. Nuclear capability.
REGULUS II	Navy	1,000-mile range, supersonic improved version of REGULUS I.
SUBROC	Navy	Submarine-launched antisubmarine and antisurface ship tactical missile. Nuclear capability.
JUPITER	Army	1,500-mile range, land-based, liquid propellant IRBM. To be employed by the Air Force. Nuclear capability.
THOR	Air Force	1,500-mile range, land-based, liquid propellant IRBM. Nuclear capability.
POLARIS	Navy	1,500-mile range, submarine-based, solid propellant IRBM. Nuclear capability.
SNARK	Air Force	5,000-mile range, land-based, subsonic, jet-propelled missile. Nuclear capability.
ATLAS	Air Force	5,000-mile range, land-based, subsonic, liquid propellant ICBM. To become operational in 1959. Nuclear capability.
TITAN	Air Force	5,000-mile range, land-based, supersonic, liquid propellant back-up to ATLAS. Nuclear capability.
MINUTEMAN	Air Force	5,000-mile range, land-based, supersonic, solid propellant ICBM. Nuclear capability.
GOOSE	Air Force	Ground-launched diversionary missile.
<b>AIR-TO-AIR MISSILES</b>		
*FALCON	Air Force	Supersonic, solid propellant missile. Available with either radar or heat-seeking guidance.
*SIDEWINDER	Navy	Infrared or heat-seeking guidance. Used also by Air Force.
*SPARROW I	Navy	Solid propellant, radar-guided missile.
SPARROW II	Navy	Experimental missile being manufactured for Canadian use.
SPARROW III	Navy	Successor to SPARROW I. All-weather capability.
EAGLE	Navy	Long-range missile under early development.
*Operational		

Figure 1

GUIDED MISSILE PROJECTS JUNE 30, 1958		
NAME	DEVELOPING SERVICE	COMMENTS
<b>AIR-TO-SURFACE MISSILES</b>		
*PETREL	Navy	Turbojet, radar-guided missile, which drops torpedo near target. Production completed.
RASCAL	Air Force	Bomber-launched supersonic missile with range over 75 miles. Nuclear capability.
HOUD DOG	Air Force	Several hundred mile range supersonic missile with inertial guidance. Nuclear capability.
BULLPUP	Navy	Tactical missile for use against moving and stationary ground targets.
CORVUS	Navy	Tactical missile for use against ships and for penetrating defended areas. Nuclear capability.
GREEN QUAIL	Air Force	Air-launched diversionary missile.
<b>SURFACE-TO-AIR MISSILES</b>		
HAWK	Army	Mobile, low-altitude anti-aircraft missile.
*NIKE-AJAX	Army	High-altitude anti-aircraft missile.
*NIKE-HERCULES	Army	Successor to NIKE-AJAX with longer range, higher altitude. Nuclear capability.
*TERRIER	Navy	Ship- and land-based. Radar beam rider.
TARTAR	Navy	Modified TERRIER, adapted for destroyer use. Improved model under development.
TALOS	Navy	Long-range anti-aircraft missile. Ramjet engine with rocket booster. Ship- and land-based. Nuclear capability.
BOMARC	Air Force	Long-range anti-aircraft missile. Ramjet engines with rocket booster. Land-based. Nuclear capability. Improved model under development.
NIKE-ZEUS	Army	Solid-propellant, antiballistic missile weapon.
<b>ROCKET PROJECTS JUNE 30, 1958</b>		
<b>SURFACE-LAUNCHED ROCKETS</b>		
*HONEST JOHN	Army	Long-range artillery rocket. Nuclear capability.
LITTLE JOHN	Army	Successor to HONEST JOHN.
*WEAPON ABLE	Navy	Destroyer-launched antisubmarine rocket.
RAT	Navy	Rocket-thrown torpedo weapon system.
<b>AIR-LAUNCHED ROCKETS</b>		
*HVAR	Navy	High Velocity Aircraft Rocket, for use against ground targets. Production completed.
*ZUNI	Navy	Solid-propellant, all-weather, conventional explosive rocket, for use against ground targets.
*GENIE	Air Force	Air-to-air rocket. Nuclear warhead.
GIMLET	Navy	In early research stage.
* Operational		

Figure 1—Continued

VANGUARD project under Navy guidance for supplying the necessary rocketry for launching an earth satellite. A new and more sophisticated propulsion system was developed for this effort, and three early tests of the vehicle during the summer of 1957 indicated considerable promise.

With the successful launchings of Sputnik I by the Soviet Union on October 4, 1957, and of Sputnik II on November 3, 1957, top priority was assigned to VANGUARD and the Army was directed on November 8, 1957, to proceed with preparation of modified JUPITER-C test vehicles for satellite launchings. The first United States satellite, Explorer I, was placed into orbit on January 31, 1958, by the JUPITER-C, followed on March 17 by Vanguard I, after two earlier attempts at using the new launching vehicle had miscarried. While Explorer II failed to achieve orbit, Explorer III fired on March 26 became the third United States satellite and was joined almost 2 months later by the third Soviet satellite, Sputnik III.

The Explorer and the Vanguard provided new and invaluable information on radiation belts of unsuspected size and distribution in the outer atmosphere, on the density of cosmic dust, and on temperature ranges far above the earth. At the close of the fiscal year, many more advanced projects for extending our knowledge of the universe were well beyond the planning stage.

The Department of Defense will continue to play an important role in these scientific explorations, centering its efforts on projects of military significance. At the close of the fiscal year, tests were being planned for developing further vehicles to be used for human space travel and gathering additional data on environmental conditions in outer space; for using satellites in determining precise positions anywhere on the globe, in reconnaissance and early warning; for expanding the present intercontinental communications capacity by means of satellites; for obtaining reliable weather information, particularly cloud cover and surface wind conditions; and for more accurate tracking of all types of satellites, both signal-emitting and nonemitting. More powerful rockets than currently available will be required to launch some of the heavy satellites being planned, making the development of increased thrust, possibly as high as 1,500,000 pounds, a matter of urgency.

### **Nuclear Developments**

The continued maintenance of an effective deterrent to war depends to a considerable extent on the progress made in nuclear weaponry and the military application of nuclear energy. In both fields substantial advances were achieved in fiscal year 1958 under programs guided

by the Atomic Energy Commission with the participation of the military Services and the Armed Forces Special Weapons Project.

From March to October 1957 extensive tests were held in Nevada—Operation PLUMBBOB—involving the detonation of 24 nuclear devices and 6 safety experiments. These tests greatly contributed to the development of tactical and defensive weapons; of particular interest to the Department of Defense were a relatively low aerial burst to measure weapons' effects and a high-altitude test of an air-to-air rocket with nuclear warhead. New tactical concepts and modern military equipment were also tested.

Operation HARDTACK was initiated in April 1958 at the Eniwetok Proving Ground in the Pacific. The tests served to develop weapons with greatly reduced radioactive fallout and involved newly developed defensive missiles as well as devices for use against warships. Joint Task Force Seven conducted the tests for both the Atomic Energy Commission and the Department of Defense.

Progress also continued to be made in the military application of nuclear energy to propulsion. At the close of the fiscal year, 3 nuclear-powered submarines had joined the fleet, 17 more were under construction, and 9 additional ones had been authorized. Two nuclear-powered surface ships—the carrier *Enterprise* and the guided-missile cruiser *Long Beach*—were also on the ways and a nuclear-powered guided-missile frigate had been authorized. The Army, which has been operating its first package nuclear-power reactor at Fort Belvoir, Virginia, since April 1957, began construction of a second package reactor for use at Fort Greeley, Alaska. The development of a nuclear propulsion system for aircraft, which has been a joint project of the Atomic Energy Commission and the Department of Defense for many years, continued to be pursued as a matter of urgency. The objective of this program is to produce a militarily useful aircraft, not merely to demonstrate the feasibility of nuclear-powered flight.

### **Other Research Activities**

The total military research and development effort encompasses more than 2,000 individual projects—covering, in addition to the fields already mentioned, practically all other areas of military interest.

A major fiscal year 1958 addition to the extensive aircraft research effort was the Dynasoar, designed to glide for thousands of miles at hypersonic speeds in the top layers of the atmosphere. Development work was nearly completed on the X-15, a research aircraft for assisting in the resolution of the many problems connected with space flight. Several prototypes for new Navy combat and early-warning

aircraft were completed, and programs for further application of vertical or short takeoff and landing techniques, important to all the military Services, were initiated.

Increased emphasis was placed on new methods to combat submarines, and weapons of great effectiveness, including atomic depth charges as well as much improved detection radars, were developed. Future air defense operations will greatly profit from the success attained in extending the range of radars, improving the reliability of electronic equipment, and reducing the chances of enemy interference.

The Weapons Systems Evaluation Group (WSEG), supported by the scientists of the Institute for Defense Analysis (IDA), continued to make an increasingly valuable contribution. IDA, established in 1956 to attract the most competent civilian personnel, gradually expanded its professional staff from 33 to 93 by June 30, 1958, and its studies have become more comprehensive, authoritative, and useful—proportional to the greater concentration of resources. WSEG obligations in fiscal year 1958 totaled \$3.5 million. WSEG studies have involved evaluations of such varied subjects as limited warfare, effectiveness of the DEW line, deployment of missiles, passive defense, electronic countermeasures, and the relative effectiveness of competing weapons systems.

The Department of Defense continued during fiscal year 1958 its substantial support of basic research. About \$106.0 million was obligated for this purpose, two-thirds of it for work in educational institutions—more than \$86.0 million in the physical sciences, \$17.0 million in the life sciences, and \$3.0 million in the social sciences.

Recent years have brought scientific advances as notable in their effect on warfare as those of the early forties, starting on December 2, 1942, with the first nuclear chain reaction. The current advances, like those connected with atomic fission, grew out of the work of a broad scientific community, spurred on in its efforts by grave threats to our Nation's existence. As long as the present threat to our security lasts, close cooperation between professional civilian and military groups in developing effective defenses against aggression will remain a key factor in our national security.

## IV. The Defense Budget

The cost of maintaining our armed forces at adequate strength to deter war has steadily increased in recent years. This upward trend is likely to continue in the years ahead. Three major factors account for this development.

First, each new generation of weapons costs several times more than the one it replaces, and the lifespan of new weapons systems is becoming shorter year after year.

Secondly, rapid technological advances force an unprecedented investment in weapons development—an investment that will provide additional security in the future but contributes little to our current strength.

And third, expenditures by the armed forces, like those of everyone else, are affected by increases in prices and wages.

In these circumstances, economy and efficiency and careful management become imperative for our security. The principal factor to offset rising costs is the increasing combat power of the new weapons. Consequently, our principal goal continues to be the achievement of a proper balance between numbers of units and weapons on the one hand and combat power on the other. This is the crux of the budget problem.

The solution requires the development of a realistic system of priorities, designed to preserve sufficient flexibility in our armed forces to meet the many varied threats inherent in the present world situation. It requires avoiding overcommitment to any one weapons system as well as resisting the temptation to do everything. It requires prompt adjustment in programs as new weapons prove their combat worth or as technological breakthroughs indicate even shorter life spans than anticipated for weapons still in the developmental stage.

The size of the problem is indicated by the staggering rate at which the cost of developing and producing weapons has increased.

The World War II B-17 was purchased for \$250,000, while each B-47 costs more than \$2,000,000; the new B-58 is likely to cost 10 times more than the B-47. In the heavy bomber category, the World War II B-29, costing \$700,000 apiece, was replaced by the \$4,000,000 B-36, which in turn has given way to the B-52, costing nearly \$8,000,000. Many of today's fighters fly 3 times as fast as those of World War II but cost 30 times as much.

Similar increases have occurred in ship construction costs. A World War II *Essex*-class carrier cost about \$55,000,000; for the *Midway*-class carriers the cost rose to \$90,000,000 and for the *Forrestal*-class carriers to \$210,000,000. World War II submarines cost less than \$5,000,000 and the present nuclear submarines more than \$50,000,000; the price of a ballistic missile submarine is likely to reach \$100,000,000. The cost of destroyers has risen from nearly \$9,000,000 in World War II to \$34,000,000 for the present guided-missile destroyers.

The Army, too, has not been immune from these cost increases. The capital cost of an air defense battalion equipped with 120-mm. guns was \$6,000,000, while a NIKE-AJAX battalion costs about \$18,000,000 and a NIKE-HERCULES battalion about \$20,000,000, not including the cost of the nuclear warheads.

The financial management of the defense effort during fiscal year 1958 had to take full cognizance of all these factors.

### **The Fiscal Year 1958 Budget**

Department of Defense appropriations for fiscal year 1958 were approved in August 1957 and provided \$35.3 billion in new funds—\$33.8 for the regular budget and \$1.5 for military construction.

This amount represented substantial adjustments in the original budget plan submitted by the President in January 1957 for a total of \$38.4 billion. Widespread sentiment for reducing Government expenses, coupled with statutory limitations on the national debt, led to additional careful review of the budget by the Congress and the Administration. The House recommended a total of \$35.1 billion, and in July 1957 the Department of Defense presented revised estimates for \$36.2 billion in new appropriations, with decreases in working capital funds and in unobligated balances and reserves accounting for nearly 60 percent of this reduction. The total finally approved by the Congress, \$35.4 billion, was \$3.0 billion less than the original request of the President and \$0.8 billion less than the revised Defense estimates.

After approval of the budget, the Department of Defense had available for expenditure in fiscal year 1958 a total of \$70.0 billion, including \$34.7 billion in unexpended balances and \$35.9 billion in new expenditure availability less transfers in the amount of \$0.6 billion. Expenditures for the fiscal year were estimated at \$38.0 billion.

### **Budget Adjustments**

During the late summer of 1957, military programs were adjusted in line with the funds made available. An additional factor in this review was the possible impact of rising defense expenditures on the

statutory ceiling for the national debt. The Department of Defense had entered the new fiscal year with an annual expenditure rate of \$40.0 billion, while budget estimates called for \$38.0 billion. As a partial answer to these fiscal problems, the schedules for lower priority procurement and construction programs were extended and less essential activities curtailed.

During the fall of 1957, increased emphasis was placed on projects related to our current and future retaliatory capabilities. The preliminary work on the budget for fiscal year 1959 identified a number of projects which could be significantly advanced if additional funds would become available early in calendar year 1958. Changes in some of the schedules were made possible by rapid advances in the IRBM and ICBM programs and appeared advisable in view of a potential Soviet capability in this field parallel to ours, demonstrated by the launching of two satellites in October and November 1957.

In January 1958, an additional request for \$1.3 billion was submitted to the Congress—an advance installment on the fiscal year 1959 budget. It included about \$680 million in new funds for long-range missiles, \$360 million for ballistic missile and aircraft detection, and \$220 million for the further dispersal of strategic air wings. This request was approved on February 11, 1958.

Including later supplemental appropriations of \$89 million to cover increased civilian, military, and retired personnel costs, the total appropriations for fiscal year 1958 amounted to \$36.7 billion, giving the Department of Defense \$71.3 billion available for expenditures.

Actual expenditures during fiscal year 1958 totaled \$39.1 billion—\$0.7 billion more than during the preceding year. Over 38 percent of this amount—\$14.7 billion—provided aircraft, ships, missiles, and other major items of equipment; 27 percent—\$10.4 billion—covered military personnel costs; 23 percent—\$9.1 billion—was used for operations and maintenance, the day-to-day support of the military Services; and the remaining 12 percent—\$4.9 billion—financed military construction, reserve components, research and development, and Department-wide activities. The departmental share of these expenditures was \$9.1 billion for the Army, \$10.9 billion for the Navy and Marine Corps, and \$18.4 billion for the Air Force; the remaining \$0.7 billion was accounted for by interservice activities, principally retired pay. (See fig. 2.)

Additional progress was made in the Department's continuous effort to assure that unexpended and unobligated funds carried over from one year to another are strictly limited to long-range programs requiring such funding. Unexpended balances were reduced during fiscal year 1958 from \$34.7 billion to \$32.1 billion and unobligated balances from \$10.9 billion to \$7.9 billion. The unexpended balances include

DEPARTMENT OF DEFENSE EXPENDITURES FOR MILITARY FUNCTIONS  
FISCAL YEARS 1951-1959 (BILLIONS OF DOLLARS)

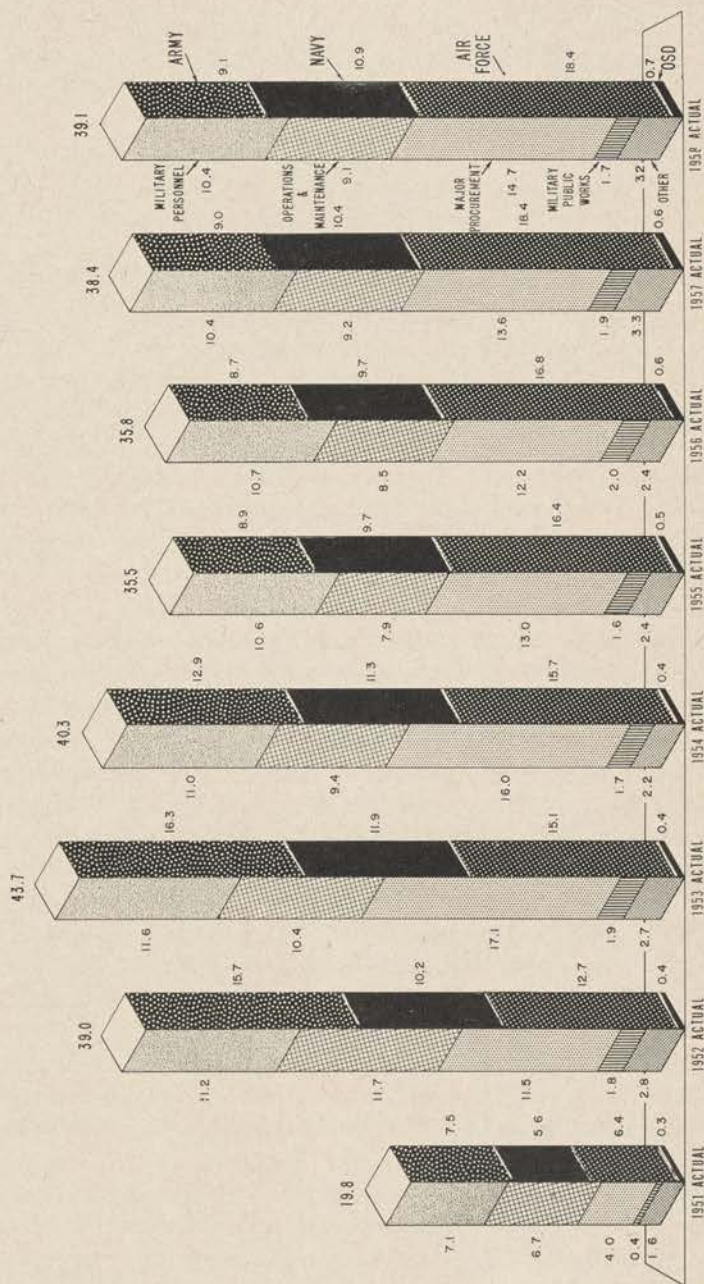


Figure 2

the unobligated funds as well as the cost of items on order but not yet delivered. The unobligated balances consist of parts of the appropriations for such long lead-time items as ships and aircraft and for short lead-time equipment and spare parts to be procured when these ships and aircraft approach completion.

### The Fiscal Year 1959 Budget

The constantly disruptive impact of rapid technological advances on financial plans continued to be demonstrated by the evolution of the budget for fiscal year 1959.

The original budget transmitted by the President in January 1958 provided for new appropriations of \$36.8 billion in the regular Defense budget, \$1.6 billion for military construction, and about \$0.7 billion to be requested after passage by the Congress of bills for military and civilian pay increases—a total of \$39.1 billion.

Subsequent review of the latest progress made in the more advanced fields of military technology disclosed additional areas in which more rapid development was both possible and necessary. To carry out these projects, the Administration asked on April 2, 1958, for an increase of \$1.5 billion in the regular budget—or for \$38.3 billion instead of \$36.8 billion. The new funds were requested to accelerate such projects as solid-propellant ICBM's and IRBM's, particularly POLARIS, antiballistic missile defense, military satellites, antisubmarine warfare, Army modernization, and the procurement of jet bombers and tankers.

Additional amendments to the original budget request were transmitted in June. To meet the cost of the newly enacted military pay legislation, \$0.5 billion was added, and \$0.1 billion was requested to meet construction requirements for new weapons development.

Thus the original January request of \$39.1 billion was increased to \$40.5 billion by June—\$38.8 billion in the regular budget and \$1.7 billion for military construction.

After the close of the fiscal year, the Congress approved a total of \$41.0 billion, including \$39.6 billion in the regular budget—an increase of \$0.8 billion over the Administration's request—and \$1.4 billion for military construction—a decrease of \$0.3 billion in the amount requested. Expenditures for fiscal year 1959 were estimated at \$40.8 billion, or \$1.7 billion more than for the preceding year.

As in the past, defense programs will be kept under continuous review to exploit technological breakthroughs whenever they occur and to adjust existing programs in accordance with new capabilities. Such periodic reviews will assure the maintenance of adequate defense to counter both local and general aggression—for the present as well as the future.

## V. Management

The revolutionary changes in warfare brought about by the scientific and technological advances of recent years are also having their profound effect on the management of the Department of Defense. The effective employment of modern weapons systems requires that orders to field commands be issued and received with a minimum loss of time. The increased importance and scope of research and development activities call for professional guidance and supervision at the highest departmental level. At the same time, the constantly rising costs of our defenses are placing an even higher premium on management efficiency.

In recognition of these facts, the Department of Defense organization was submitted to a careful and thorough review during fiscal year 1958, and previously adequate management methods and procedures were adjusted to meet the new requirements.

The importance of maximum efficiency in Defense activities was stressed by the President in his State of the Union message on January 9, 1958. On April 3, the President submitted specific proposals on this subject to the Congress, pointing out that his recommendations were based on two major principles:

First, separate ground, sea, and air warfare is gone forever. If ever again we should be involved in war, we will fight it in all elements, with all services, as one single concentrated effort. Peacetime preparatory and organizational activity must conform to this fact. Strategic and tactical planning must be completely unified, combat forces organized into unified commands, each equipped with the most efficient weapons systems that science can develop, singly led and prepared to fight as one, regardless of service. The accomplishment of this result is the basic function of the Secretary of Defense, advised and assisted by the Joint Chiefs of Staff and operating under the supervision of the Commander in Chief.

Additionally, Secretary of Defense authority, especially in respect to the development of new weapons, must be clear and direct, and flexible in the management of funds. Prompt decisions and elimination of wasteful activity must be primary goals.

In accordance with these principles, the President proposed a thorough modernization of the Defense establishment centered on six major objectives:

1. The strengthening of unified commands, with particular emphasis on full operational command by commanders of such commands over all the forces assigned to them.
2. The establishment of a clear and direct line of command to unified commands from the Commander in Chief and the Secretary of Defense through the Joint Chiefs of Staff.
3. The strengthening of the Joint Chiefs of Staff to provide the Commander in Chief and the Secretary of Defense with the professional and military assistance required for efficient strategic planning and operational control.
4. Increased emphasis on efficient management in the military departments.
5. The reorganization of research and development activities by vesting overall direction and control in the Secretary of Defense.
6. The removal of all possible doubts as to the full authority of the Secretary of Defense and providing for greater administrative flexibility and improvements in the operating methods of the Office of the Secretary of Defense.

A critical examination of the Department of Defense organization had preceded these proposals. The inquiry into satellite and missile programs by the Preparedness Investigating Subcommittee of the Senate Armed Services Committee between November 1957 and January 1958 had brought forth numerous suggestions for reorganizing the Department of Defense. On January 21, 1958, the Secretary of Defense announced the establishment of a group of consultants to study the organization of the Department. In addition to the Deputy Secretary of Defense, Mr. Donald A. Quarles, this group included Mr. William C. Foster, former Deputy Secretary of Defense; Mr. Nelson A. Rockefeller, Chairman of the President's Advisory Committee on Government Organization; two former Chairmen of the Joint Chiefs of Staff, Gen. Omar N. Bradley and Adm. Arthur W. Radford; and the present Chairman of the Joint Chiefs of Staff, Gen. Nathan F. Twining. Mr. Charles A. Coolidge was appointed as a full-time Special Assistant to the Secretary of Defense for this review. The careful study and analysis of the Department of Defense organization by this group provided the essential background for the President's recommendations.

The House and Senate Armed Services Committees carefully reviewed the President's proposals during the spring of 1958. Both Houses of the Congress expressed their full approval with the Presi-

dent's objectives, but believed it necessary to spell out in greater detail the administrative relationships within the Department and the respective responsibilities of the executive and legislative branches of the Government in the maintenance of the armed forces.

On August 6, the Department of Defense Reorganization Act of 1958 was approved by the President. The new Act, together with administrative action directed by the President's message to the Congress of April 3, 1958, provided for improvements in three major areas—the direction of the operational forces, the administration of the research and development effort, and the general management of the Department of Defense.

### **Direction of the Operational Forces**

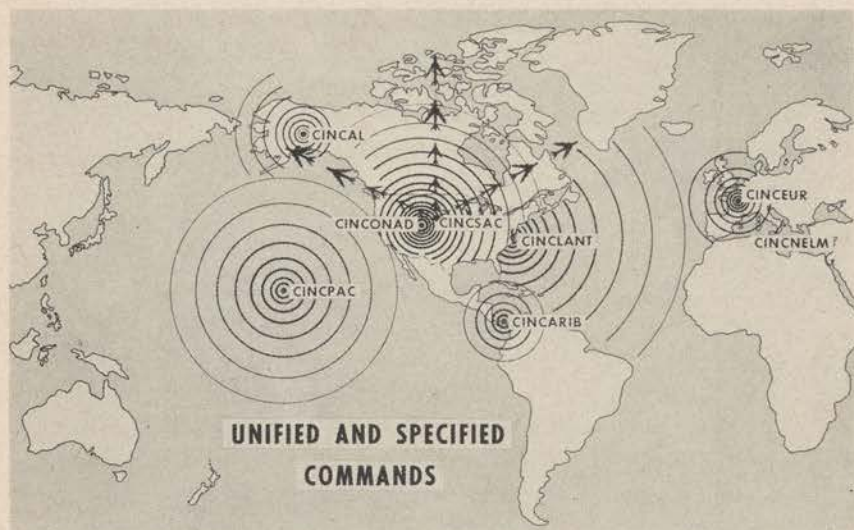
The problem area in the direction of the operational forces was highlighted by the President's statement that "separate ground, sea, and air warfare is gone forever." He further pointed out that unified and specified commands constitute "the cutting edge of our military machine—the units which would do the fighting" and that the "entire defense organization exists to make them effective."

In other words, while ground, sea, and air forces—organized, trained, and equipped on a standard basis so that they can readily be employed under any type of command in any part of the world—will continue to be needed, such forces will operate in case of emergency as a team under single command, not separately.

The single command structure in the field is provided by 6 unified commands, composed of forces from more than 1 military department, and 2 specified commands, composed of forces from only 1 military department. Unified commands include those for Alaska, the Atlantic, the Caribbean, Europe, and the Pacific and the Continental Air Defense Command. The specified commands include the Strategic Air Command and U.S. Naval Forces, Eastern Atlantic and Mediterranean. (See fig. 3.)

To improve the operational direction of the armed forces, the 1958 reorganization established a new command channel, strengthened the Joint Chiefs of Staff organization, and clarified the command authority of unified and specified commanders.

The new command channel makes the unified and specified commanders directly responsible for their military missions to the Secretary of Defense and the President, who look to the Joint Chiefs of Staff to assist them in the operational direction of the armed forces. The channel of communications for this purpose runs through the Joint Chiefs of Staff. Under the former procedures, orders, before reaching the unified commands, went through the Secretary and the chief



*Figure 3*

military officer of a military department, which acted as the executive agency for the Secretary of Defense. The executive agency system was abolished by the reorganization.

The strengthening of the organization of the Joint Chiefs of Staff was required primarily to permit the Joint Chiefs of Staff to carry out their increased responsibility for assisting the Secretary of Defense in the operational direction of the armed forces. The number of officers on the Joint Staff was increased by the new legislation from 210 to a maximum of 400 officers. The committee system of the Joint Staff was replaced by 7 Directorates, including 1 for operations—thereby aligning the Joint Staff organization more closely with that of the staffs of the military departments and the unified commands. To prevent the development of a permanent central staff, the Congress prescribed special limitations on the tenure of Joint Staff officers and directed that the Joint Staff should have no executive authority.

The full operational command vested by the 1958 Reorganization Act in the unified and specified commanders is intended to assure the effective operational direction of combat forces in case of emergency. Authoritative single direction of all forces assigned to a command is essential not only when an emergency occurs but also in preparation for such an emergency. To prevent possible command conflicts, the statutory command authority of the chiefs of the military Services was revised, and the transfer of forces from unified commands by the military departments was made subject to special procedures to be established by the Secretary of Defense.

In summary, the forces in unified and specified commands will be provided by the military departments, which will continue to remain responsible for the administration and support of these forces. Operations, however, will be carried out under unified and specified commanders, who receive their directions from the Secretary of Defense through the Joint Chiefs of Staff.

### **Research and Development**

The ever increasing importance of the research and development effort to our national security led the Department of Defense to establish special management procedures in this area even before the general reorganization of the Department was approved by the Congress.

On November 15, 1957, the position of Director of Guided Missiles was established with authority to direct all guided missile programs from the research phase through procurement. Previously, the new Director, as a Special Assistant to the Secretary of Defense, had been primarily concerned with ballistic missiles. Steps were also taken at the time to strengthen the Defense Science Board and reemphasize the importance of basic research in the national defense effort.

On February 7, 1958, the Advanced Research Projects Agency (ARPA) was created as a separate entity within the Department of Defense to handle selected military space projects as well as other advanced projects assigned by the Secretary of Defense. In general, ARPA was to be responsible for advanced projects which in the early research stage would not fall within, or would go beyond, the responsibility of a single military department. It was understood at the time that the scope of the space activities of the new agency in future years would be subject to whatever decision was reached on the establishment outside of the Department of Defense of a civilian space agency. With the passage of the National Aeronautics and Space Act of 1958 shortly after the close of the fiscal year, plans were initiated to turn over to the new civilian space agency the supervision of ARPA projects that were primarily concerned with scientific, rather than military, objectives.

Further improvements in the organization of the military research and development effort were made possible by the Department of Defense Reorganization Act of 1958. Recognizing the importance of assuring the most effective and economical use of all available resources in this area, the new Act vested overall direction and control of research and development activities in the Secretary of Defense.

To assist the Secretary in carrying out these responsibilities, the position of Director of Defense Research and Engineering was authorized—to rank immediately after the Secretaries of the military departments. The new Director is to be not only the principal adviser

of the Secretary of Defense on scientific and technological matters, but also the supervisor of all research and engineering activities in the Department of Defense—with power to direct and control those activities that require centralized management.

It will be the responsibility of the new office to prevent unnecessary delays, to assure a steady flow of funds to approved programs, to fill existing gaps in research, to shorten lead times, to eliminate unpromising programs and unnecessary duplication, and to make certain that programs are focused on national needs and objectives. Some time will be required to establish the new office and develop effective working relationships with other agencies both within and outside the Department of Defense. In the meantime, the general guidelines established by the new Act govern the activities of existing organizations concerned with military research.

### **General Management**

One of the major purposes of the new legislation, as stated in the Declaration of Policy, was “to provide more effective, efficient, and economical administration in the Department of Defense.” In accordance with this intent, the powers of the Secretary of Defense were further clarified.

The military departments became “separately organized” rather than “separately administered,” with the Secretaries of these departments continuing to be responsible to the Secretary of Defense for the operation as well as efficiency of their departments.

The extent of the authority of the Secretary of Defense to change the functions of the military departments was discussed at length by the Congress, particularly with reference to the respective constitutional responsibilities of the executive and legislative branches in this matter. As finally approved, the new legislation provided for a careful congressional review of all proposals for any changes in statutory functions, but exempted from such a review “the development and operational use of new weapons or weapons systems” and supply or service activities common to more than one military department.

The size and operations of the civilian secretariat in the Department of Defense also became the subject of extended debate. The President's proposal to reduce the number of Assistant Secretaries of Defense from 9 to 7 and the number of Assistant Secretaries in each of the military departments from 4 to 3 was approved by the Congress. To assure effective relationships between the various staffs in the Department of Defense, the new legislation directs the fullest possible cooperation between the personnel of the military depart-

ments and that of the Office of the Secretary of Defense and provides, in order to maintain the established chain of command, that instructions by the Assistant Secretaries of Defense be issued through the Secretaries of the military departments or their designee and in accordance with authority specifically delegated by the Secretary of Defense.

By direction of the President, legislative liaison and public affairs activities in the Department of Defense were being reviewed at the close of the fiscal year to strengthen overall supervision without impeding the flow of information to the Congress and the public. A critical examination of the Department's committee structure as well as of the operating methods of the Office of the Secretary of Defense was also initiated.

These actions are in line with the continued efforts of the Secretaries of Defense to have their immediate staff operate on the most economical and efficient basis possible. As the result of periodic critical reviews of activities, the civilian and military personnel in the Office of the Secretary of Defense, which totaled 2,536 at the peak of the Korean war expansion on June 30, 1952, was reduced to 1,712 on June 30, 1958. This personnel reduction of 824, or of almost 33 percent, brought employment in the Office of the Secretary of Defense even below the level existing before the start of the Korean hostilities. While the implementation of the 1958 reorganization will require a slight increase in personnel, methods of operations, functions, and job justifications will continue to be subject to careful reviews to assure maximum efficiency in the overall management of the Department of Defense. (See fig. 4.)

The Department of Defense Reorganization Act of 1958 and the administrative actions directed by the President are all designed to meet one basic objective—to improve the capability of the armed forces to fulfill their missions. A periodic critical and objective examination of the organizational structure of the defense establishment has become a vital necessity in view of the profound effect of the current scientific and technological revolution on tactics and strategy.

The results of the 1958 examination reflect the judgment of the President, the Congress, and Defense officials on current organizational requirements. The changes enacted provide improved direction of operational forces. They establish centralized supervision in the critical field of research and development. They reemphasize the importance of a truly unified defense effort by all the military Services. They will facilitate the maintenance of an effective and efficient defense establishment.

## OFFICE OF THE SECRETARY OF DEFENSE - JOINT CHIEFS OF STAFF PERSONNEL STRENGTHS

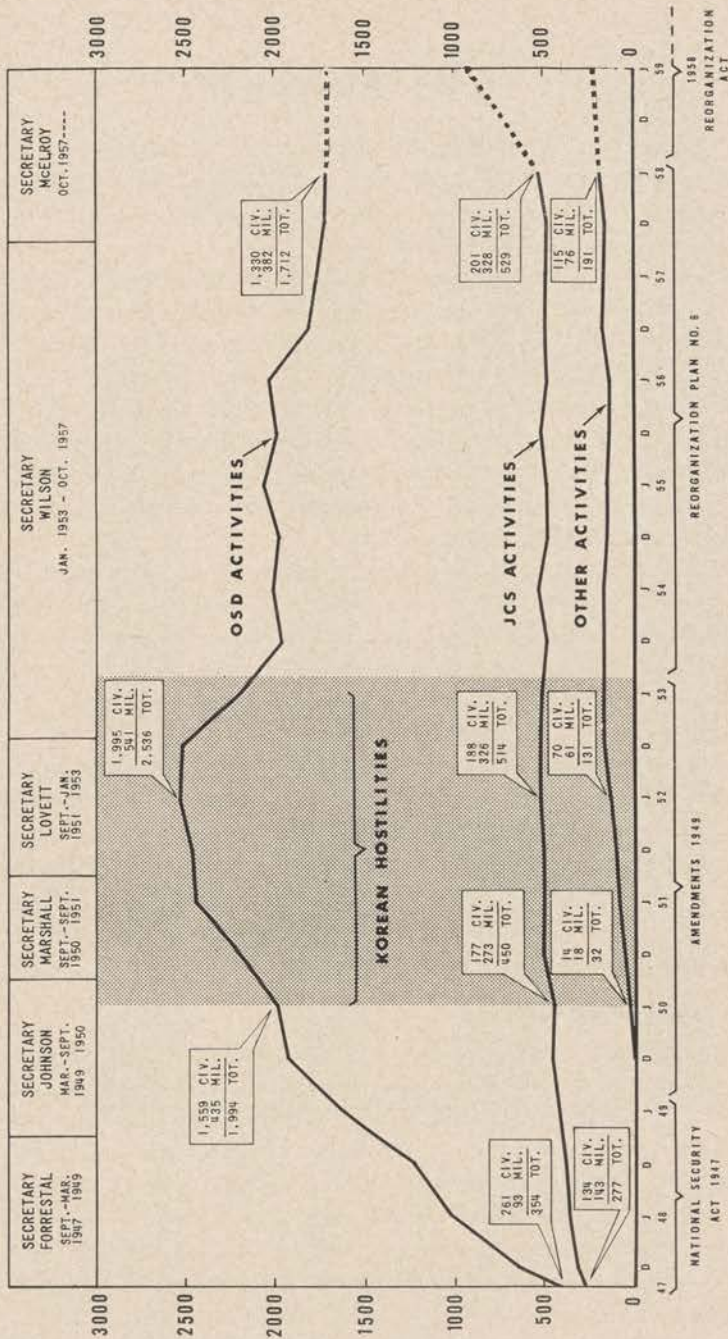


Figure 4

## VI. Manpower

During fiscal year 1958, the objective of the manpower policies of the Department of Defense was to maintain the highest levels of competency and experience in the active forces, the reserve components, and among civilian employees.

To achieve this objective, the military departments concentrated on measures for meeting the steadily expanding requirements for highly qualified military and civilian personnel to operate our increasingly complex new weapons. During the past 12 months, a modernized military pay system was adopted, programs for developing truly ready reserve forces were significantly advanced, a pay raise for Federal civil servants was enacted, and additional incentives were provided to increase the attractiveness of Government employment to scientists and technicians.

These measures have produced results. Reenlistment rates in the active forces have risen. Readiness in the reserve establishment has reached new heights. Contributions by civilian employees to improved operational efficiency have increased. Similar gains can be expected in future years as the programs initiated this year become more fully effective.

Our needs for technically trained manpower will continue to increase at an accelerating rate as the weapons of tomorrow become operational. To meet this growing requirement, our personnel programs will be kept under constant review and adjusted as necessary to assure the availability of qualified men in sufficient numbers for our national security. The objective of the Department is to keep its personnel programs as modern as its weapons systems.

### The Active Forces

Recent technological advances have had a twofold impact on the manning policies of the Department of Defense—the greater firepower of modern weapons has permitted reductions in force levels and the greater complexity of these weapons has progressively increased the requirements for skilled personnel. With improved combat capability, the armed forces were able to lower their total manpower needs during the fiscal year by 195,000—from 2,796,000 to 2,601,000. To obtain the full potential of their modern equipment, the armed forces have had to raise the proportion of highly skilled technicians to total strength by one-third since the end of World War II. (See fig. 5.)

## REQUIREMENTS FOR TECHNICIANS (Percentage of Enlisted Billets)

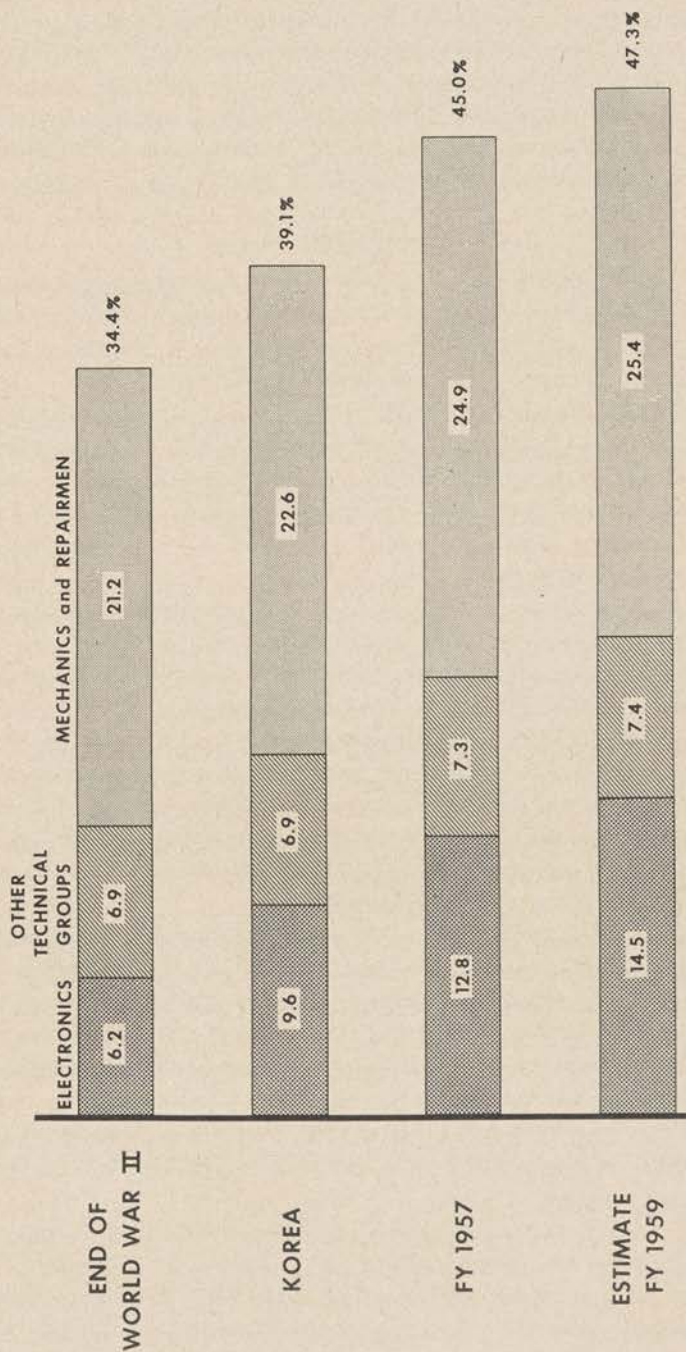


Figure 5

To overcome the difficulties of attracting and retaining the highly qualified personnel needed by the armed forces, an improved system of personnel management and compensation was initiated during fiscal year 1958. The principles of this system had been recommended at the close of the preceding year following a comprehensive study of military personnel policies by the Committee on Professional and Technical Compensation, headed by Mr. Ralph J. Cordiner.

#### *New Pay Scales*

A modernized military pay structure, embodying the concepts recommended by the Cordiner Committee, became effective on June 1, 1958, as authorized by the Congress. The new pay scales placed greater emphasis on merit and proficiency, less on length of service. Career opportunities were broadened to improve the attractiveness of military duty. Rates of compensation were adjusted and made more commensurate with responsibility, particularly for senior officers and senior enlisted personnel. Increases to cover higher costs of living were granted to all personnel who had served more than 2 years with the armed forces.

The new pay structure included two new senior enlisted grades to permit greater recognition of higher levels of responsibility. Promotions to these higher ratings had begun at the close of the fiscal year. Increased incentives and more adequate compensation for senior officers were established by providing permanent 3- and 4-star grades. These positions had been authorized for some years, but incumbents formerly were paid at the rate of 2-star officers plus an additional increment. Moreover, the retirement pay of these senior officers had been the same as that of a 2-star officer, but will now more fully accord with their greater active duty responsibilities.

The new legislation also corrected inequities that had stemmed from the automatic pay increases granted for length of service under the former pay structure. Periodic increases continue to be provided, but are concentrated earlier in an individual's career and stop after the number of years normal for promotion to the next higher grade. This procedure greatly reduces the number of individuals in lower ranks receiving higher compensation than those in higher grades who, on the basis of merit, have been selected for promotion with fewer total years of service.

To aid in retaining specially qualified enlisted personnel, authority was granted to award proficiency payments to personnel "specially proficient in military skills," either in the form of additional pay grade advances without higher rank or by payment of fixed amounts above basic pay. Regulations governing the procedures for this system were

being drafted at the close of the fiscal year, to become effective in the fall of 1958. Approximately 80,000 servicemen, or about one-fourth of those ultimately eligible, are scheduled to receive proficiency payments at a rate of \$30 monthly during fiscal year 1959. The new law also authorized the payment of additional increments to a limited number of officers holding positions of unusual responsibility. This provision will not be put into effect until a firm need for it is established.

Adoption of the revised compensation system has improved the attractiveness of military careers. It has made possible the establishment of promotional procedures, within the framework of existing law, that give greater stress to initiative, ability, and skill, less to mere seniority.

#### *Officer Personnel*

Additional legislation to complete the officer personnel management plan recommended by the Cordiner Committee was proposed by the Department of Defense during this fiscal year. These proposals were not acted upon by the Congress prior to adjournment, but will be resubmitted in 1959.

The Department sought authorization for reserve-officer term retention contracts in order to provide an incentive for the thousands of reservists needed in the armed forces to remain on active duty beyond the period of their obligated service. In addition, the Department proposed amendments to existing laws governing the promotion and retirement of regular officers. These amendments would provide a more flexible procedure for the involuntary retirement of the least effective officers in the permanent grades of lieutenant colonel, commander, colonel, and captain, would establish increased recognition and incentives for officers of outstanding ability, and would make promotional systems of all the armed forces more nearly uniform. These measures, when enacted, will assist in the development of an officers corps of the highest quality, reduce the excessive loss rates among officers with 3 to 12 years' service, and contribute to a solution of the "hump" problem created by the integration into the regular forces of a large number of officers immediately following World War II.

Further progress was achieved during the fiscal year in strengthening the regular officers corps. The Navy and the Marine Corps continued to commission sufficient numbers of new regulars to maintain a proportion of slightly over 50 percent regular officer personnel. The Army and the Air Force further implemented their programs based on the provisions of the Officers Augmentation Act of 1956. The Army awarded permanent commissions to about 4,800 officers, thereby increasing the proportion of regulars to 36 percent, as compared to 28

percent a year earlier. The Air Force commissioned 17,000 regular officers, which raised the proportion of regulars to 34 percent of total officer strength, a gain of 15 percentage points during the year.

#### *Reenlistments*

The effects of measures adopted in recent years to increase the attractiveness of military careers have been reflected in the rising trend of reenlistment rates. During fiscal year 1958, 48.6 percent of eligible regular enlisted personnel signed up for another tour of duty, as compared to 45.9 percent last year, 43.6 percent the year before, and 27.2 percent in 1955.

These gains were especially encouraging as they occurred primarily among regulars completing their first tour of duty. About 27.6 percent of first-term regulars reenlisted this fiscal year, 2.9 percent more than last year and 11.9 percent more than in 1955. While reenlistment rates among first-termers in critical occupation groups also rose during the fiscal year, these gains remained inadequate to meet the growing needs for technicians to service modern equipment. Only 17 percent of first-term electronics specialists signed up for a second tour of duty, 19 percent of other technicians, and 21 percent of mechanics and repairmen. Although further increases in reenlistments in the critical skill categories may result from the new personnel compensation and management policies adopted this year, the military Services will continue to place special emphasis on measures to retrain personnel and to recruit and retain additional technicians.

#### *Selective Service*

The effectiveness of the armed forces will be enhanced by legislation enacted shortly after the close of the fiscal year to permit the deferment of potential inductees who fall below the mental and physical standards required by modern tactics and equipment. Under this new authority, registrants will be screened more thoroughly before induction, and those least likely to assimilate training or to perform satisfactorily will be rejected. During fiscal year 1958, it was necessary to discharge about 30,000 men for inaptitude after induction. Such losses can now be cut substantially by use of the new standards for induction, thus greatly improving the efficiency of the training program.

Increased reenlistment rates and reduced force levels permitted the lowering of draft calls during the fiscal year to 125,000—50,000 fewer than last year and the lowest since the Korean war. About 240,000 inductees were on active duty at the close of the fiscal year. In addition, many men who were subject to induction entered the Service of their choice voluntarily. The effect of the Selective Service System thus extends far beyond the mere number who are actually inducted.

It is essential, therefore, that the draft authority, provided by the Universal Military Training and Service Act of 1955, be extended beyond June 30, 1959, by the next Congress. Without this authority it would not be possible to maintain the personnel strengths, active and reserve, necessary for our national security.

#### *Information and Education Programs*

The information and education programs of the armed forces supplement regular military training and make an important contribution to raising the qualitative competency of military personnel. These programs are based on the principle that an informed serviceman is a more effective serviceman. Information programs during the past fiscal year stressed the increasing role of science and the challenges of space technology in order to encourage military personnel to take full advantage of the educational opportunities available to them. Emphasis was also placed on world affairs, good citizenship, absentee-balloting procedures, and the Code of Conduct for Members of the United States Armed Forces. These themes were publicized in 35 pamphlets prepared during the year, of which 11,000,000 copies were distributed, and in 13 motion pictures, seen by an estimated 30,000,000 viewers. Other materials and services provided by the Department of Defense included 72,000 hours of kinescopes and film for use by 29 overseas television stations and 507,000 hours of transcriptions distributed to 148 overseas radio outlets.

The United States Armed Forces Institute at Madison, Wisconsin, offers high school- and college-level courses in many subject areas for group study and individual self-improvement by servicemen at home and abroad. During fiscal year 1958, over 231,000 military personnel were enrolled in individual courses—an increase of 6 percent over the previous year's enrollment—and approximately an equal number were participating in group study. Another 12,000 individuals were enrolled in college courses offered by 44 cooperating colleges and universities under contract with the Armed Forces Institute. Some 200,000 servicemen took General Education Development tests to qualify themselves for high school-equivalent certificates and an additional 80,000 took such tests to receive advanced college standing.

#### *Dependents' Medical Care*

For the past 18 months the families of uniformed personnel have received essential medical treatment at military or civilian hospitals under the Dependents' Medical Care Act of 1956. The knowledge that this protection would be available in case of need at reasonable expense contributed to improved morale among Service personnel and to higher reenlistment rates. During fiscal year 1958, admissions of de-

pendents to military treatment facilities ran slightly ahead of the number of admissions of dependents to civilian hospitals. About 43 percent of the dependents cared for by civilian physicians in civilian facilities were sponsored by Service personnel who were stationed overseas, at remote and temporary duty posts, or otherwise separated from their families. The coverage of this group of dependents was one of the primary objectives of the Dependents' Medical Care Act.

From funds made available during fiscal year 1958, payments for the medical care of dependents were made on 590,000 claims totaling \$44.5 million from physicians and on 363,000 claims totaling \$41.3 million from hospitals. For fiscal year 1959, the Congress indicated its desire that military medical facilities be utilized to the maximum extent in order to keep expenditures for dependents' care within budgetary limitations. To accord with Congressional intent, some modifications in the program will be necessary. These changes were under study at the close of fiscal year 1958.

### *Family Housing*

An important contribution to improved morale and higher retention rates was made during the past year by the programs providing additional housing for military personnel and their families. Such construction is currently being financed by military public works funds, private capital with Government-insured mortgages, and foreign currencies obtained through the sale of surplus agricultural products.

Total authorizations over the past 5 years for family housing construction by military public works funds rose to 36,600 units with the approval by the Congress of an additional 2,200 public quarters. This type of funding is being employed at the present time primarily for projects that cannot be financed by any other method. Contracts for nearly 2,500 of such units were awarded during fiscal year 1958.

The program for encouraging private contractors to build family dwellings under mortgages fully insured by the Government for operation by the military Services—so-called Capehart housing—was greatly furthered by the approval on April 1, 1958, of legislation raising the interest ceiling for such mortgages from 4 to 4½ percent. Since the authorization of Capehart construction on August 11, 1955, almost 51,000 units have been placed under contract, 29,000 of them during this fiscal year, and over 10,000 of these units have been completed. Bids had been requested by advertising for an additional 18,500 units, and preliminary contract negotiations for all but 300 of these units were under way on June 30, 1958. Planned for later construction are another 21,500 units, making a total pro-

gram of over 91,000 Capehart dwellings or almost 30 percent of the total family housing resources controlled by the Department of Defense.

By June 30, 1958, the Department had acquired title to over 44,000 housing units originally built by private capital under the Wherry amendment to the National Housing Act, which provided for partial Government mortgage insurance and for private management of the project. An additional 21,000 units are scheduled for acquisition by the Government during the coming fiscal year. After completion of this schedule, about 18,000 Wherry units will still remain in private hands.

Construction of family housing overseas has been supplemented by the use of funds obtained from the sale of surplus agricultural commodities for local currencies. It is planned to use these revenues for a total of 15,400 dwelling units, of which 2,200 have been completed, 7,000 placed under contract, and 6,200 programmed for the next fiscal year. Almost 1,500 units in the United Kingdom and 700 in Japan have been built and occupied, while contracts have been signed for 600 more units in the United Kingdom and 700 more in Japan, 500 in Italy, 2,700 in France, 500 in Morocco, and 2,000 in Spain. Additional projects planned for the coming year will be located in the United Kingdom, Spain, France, Morocco, Iceland, Bermuda, the Azores, Okinawa, and the Philippines.

With the implementation of current plans, a major part of the military requirements for family housing will have been met. Additional construction will still be required for new installations and for certain existing installations in the United States and overseas. Most of the remaining requirements in the United States, however, can probably be satisfied by private builders under the mortgage insurance program.

#### *Other Personnel Programs*

The Defense Advisory Committee on Women in the Services (DACOWITS) continued to assist the Department of Defense in matters concerning the effective utilization of the capabilities of women in the military Services and the improvement of the standards of their housing, training, and general welfare. This 50-member committee of outstanding American women leaders also carried out, in communities throughout the United States, information and education programs on behalf of all women in the armed forces. During fiscal year 1958, the number of women in the military Services declined 3 percent, from 32,200 to 31,200. Of this latter total, 8,600 were nurses and medical specialists, 2,200 women officers, and 20,400

enlisted women. The Army had 11,500 women on active duty, the Navy 7,300, the Marine Corps 1,600, and the Air Force 10,800.

At the close of the fiscal year, 3,000 chaplains were serving with the armed forces, providing religious and spiritual guidance to military personnel. These chaplains conducted 506,000 religious services attended by 29,600,000 persons during the year, and also gave 102,000 lectures to 9,200,000 servicemen as part of the regular character guidance programs within the armed forces. Further revisions were made in the Unified Protestant Sunday School curriculum which is used in most Sunday schools on military installations. A pilot teacher training project was sponsored during the year to establish procedures for training teachers in the use of the unified curriculum.

The continued policy of full integration of Negro personnel in all components of the armed forces has also contributed to the improved utilization of total available manpower resources. The adoption of this policy has raised the qualitative level of Negro personnel and facilitated assigning men to units on the basis of individual capacity and proficiency. Continued attention was devoted to the resolution of problems that would limit the armed forces from taking full advantage of all available skills. As an important byproduct, the successful integration effort of the armed forces, the results of which are visible in the many parts of the world where United States troops are stationed, has given the lie to racist themes in communist propaganda directed to nonwhite areas.

## Health

Programs initiated in recent years to provide the armed forces with medical services of the highest quality proved their merit during fiscal year 1958. Voluntary recruitment procedures attracted sufficient numbers of physicians and dentists to meet the needs of the armed forces without resort to Selective Service calls. Additional permanent treatment facilities were constructed to replace temporary World War II buildings. More economical and efficient medical supply operations were achieved through the Single Manager system.

### *Medical Personnel*

For the second successive year, the regular medical and dental corps of the armed forces increased in strength. About 4,300 physicians held regular commissions on June 30, 1958—a net gain of over 500 during the fiscal year. The regular dental corps realized a net increase of over 200 officers and totaled 1,900 at the close of the year. These gains were most encouraging because resignations had greatly exceeded the new commissions granted during the 3 years preceding approval of the Medical and Dental Officers Career Incentives Act of

1956. Although regular strengths still remain below desired levels, the recent trend has given promise that the need for career doctors can eventually be filled.

Equally encouraging was the success of the armed forces in recruiting sufficient volunteers to meet the remaining military requirements for physicians and dentists. About 600 physicians began active duty this year, following completion of residency training for which they had been deferred under the reserve medical officers commissioning and residency program. An additional 2,500 physicians are currently deferred under this program for training in the specialties required by the armed forces. It is expected that some 700-900 specialists will be entering the armed forces for 2 years of active duty during each of the next 4 fiscal years.

Approximately 560 senior medical students and 190 senior dental students were commissioned as second lieutenants or ensigns during fiscal year 1958 and completed their final year of schooling in an active duty status. These students have agreed to accept regular or reserve commissions and to serve an additional 3 years of active duty after finishing their professional training.

While the Department of Defense programs for recruiting physicians and dentists have proved most successful, a major reason for this success has been the authority to induct doctors through the Selective Service System. This authority induces a sufficient number of the physicians and dentists affected by its provisions to accept commissions and wait for subsequent orders to active duty as officers. The continuation of this authority, which expires on June 30, 1959, is essential if adequate medical service is to be provided to our armed forces.

#### *Facilities and Supply Procedures*

During fiscal year 1958 the armed forces placed 10 new permanent hospitals in service at various installations in the United States. All but one of these facilities replaced inadequate temporary structures, while the tenth was located at a new Air Force base. Overseas, new hospitals became operational during the year in Okinawa, the Philippines, Morocco, France, and Spain. All current hospital construction programs provide for the maximum joint use of facilities by the various military Services. In keeping with this policy, 9.4 percent of the military patients and 17.7 percent of the military dependents receiving treatment in military hospitals within the United States during the year were cared for in facilities operated by a military Service other than their own.

Substantial improvements in the procurement and distribution of medical supplies have been achieved by the Military Medical Supply

Agency since its activation 18 months ago on January 1, 1957, as a single manager operation under Navy management. Through its ownership of wholesale stocks, the agency reduced inventories by about \$7 million and allocated \$68 million of stocks, already in the supply system, to mobilization reserve requirements. Unnecessary duplication in the distribution systems of the military Services has been eliminated, thereby paring transportation costs, permitting the deactivation of 7 medical supply depots, and saving 100 personnel spaces at an annual cost of \$600,000. To improve its management of inventories, the agency prepared and issued at the close of the fiscal year a quality control manual that will be used at all depots to govern storage and inspection practices. The manual prescribes time schedules and sampling procedures to be used in determining the serviceability of medical supplies—the first time this information has been set forth in a single volume. With this guidance, depots will be able to keep stocks under more careful surveillance and to reduce losses from deterioration.

Considerable progress was made during the year in the development of standard packages of emergency medical items for use by the armed forces in the event of nuclear attack. Two standard packs have been developed—one for general use in first aid and the other for use by medical personnel.

While the health of the armed forces remained high during fiscal year 1958, a heavy incidence of upper respiratory infections, including asiatic influenza, was responsible for an increase in the number of admissions of military personnel to treatment facilities—from 271.5 per 1,000 in 1957 to 386.6 per 1,000 in 1958. The periods of hospitalization caused by these infections were, however, relatively short, as indicated by the small increase in the hospitalization rate—from 1.02 percent last year to 1.06 percent this fiscal year—and in the noneffectiveness rate—from 11.8 per 1,000 in 1957 to 13.0 per 1,000 in 1958.

### **The Reserve Forces**

The reserve establishment reached higher standards of readiness and combat capability during fiscal year 1958 than ever before. This progress has resulted primarily from programs initiated in recent years under the Reserve Forces Act of 1955 to insure that all Ready Reservists complete basic training and remain available to augment the active forces in an emergency.

#### *Realignment of Programs*

Reserve programs were thoroughly reviewed in the summer of 1957 and new guidance developed in the light of rapidly changing military technology and strategic concepts. Under these guidelines

the military Services began to realign reserve organizations, structures, and manpower goals to accord with the mobilization requirements set forth in the latest war plans developed by the Joint Chiefs of Staff.

In accordance with current programs some adjustments will be made in the unit strengths of the Ready Reserve and in the number of individuals placed on pay status for inactive duty training. Highest priorities will be given to the training of those units and individuals scheduled for recall to active duty during the initial phases of mobilization. This modernization of the reserve program will assure the availability of trained back-up forces to support the regular establishment during an emergency and will maximize returns from the funds expended.

Although approximately 2 years will be needed to complete the adjustments and revisions contemplated under present plans, the military Services made substantial progress in beginning the realignment of their reserve force structures during this fiscal year. Units not required during early mobilization have been deactivated or converted to conform with approved war plans.

The Army announced its intention to reorganize 27 existing National Guard and 10 Army Reserve combat divisions along pentomic lines. In addition, new unit priorities, based on the mobilization schedule, will be established. For example, units scheduled for mobilization during the first 30 days will be authorized higher manning levels than those mobilized later and will be furnished more equipment and greater materiel support. The Army Reserve will support 17 training commands for maintaining the military proficiency of Ready Reservists. The reorganization of these reserve forces into smaller, more mobile units with greater firepower will greatly increase their capability to augment regular pentomic divisions.

The Navy established a selected reserve training program under which certain surface and air reserve units will be trained as complete groups, mainly for antisubmarine warfare, and prepared for early mobilization. Destroyers and destroyer escorts are being located at selected ports on the Atlantic and the Pacific and full ship's complements of reservists will be assigned to these vessels for training. In an emergency these ships and their trained reserve crews should be able to go into immediate action with the fleet. Aviation squadrons will likewise be maintained in a high state of materiel readiness with personnel fully trained for mobilization. The remaining naval reserve programs will continue to train reservists to augment the fleet as individuals rather than in units.

During fiscal year 1958, the Air Force began deactivating 10 Reserve and 3 Air National Guard squadrons in conformity with a

realigned Reserve force structure. This structure calls for 39 operational wings composed of 128 tactical squadrons. The Air National Guard will be organized primarily for an air defense mission, while Air Reserve squadrons will concentrate on troop carrier and other support functions. This uniformity of roles will facilitate training and maintenance and thus contribute to greater readiness for an emergency.

### *Training and Screening*

Ever-growing numbers of Ready Reservists have now had either prior-service experience or 6 months of active duty for training. Men presently entering the armed forces for active service have a total military obligation of 6 years. Time not spent on active duty must be spent in the reserve. Under certain programs, men may enlist in the reserves directly from civil life. Since April 1957, men over 18½ joining a reserve unit have been ordered to active duty for training shortly after their enlistment and, since January 1958, 17-18½-year-olds entering the National Guard have also been required to complete basic training on active duty tours of 6 months' duration. In the past year about 103,000 enlisted Ready Reservists, including 43,000 National Guardsmen, began 6-month training tours and 113,000—of whom 39,000 were Guardsmen—completed these tours and rejoined their units. Since the 6-month training program was established in August 1955 over 201,000 men have entered training and almost 147,000 have completed their tours. As a result of the rising influx of trained personnel—under obligation to participate regularly in the reserves—the National Guard and other reserve components are being freed to concentrate their training efforts on improving unit readiness, rather than on schooling the individual recruit. Thus, the time required to bring reserve units to a war footing after mobilization will be materially reduced.

To insure the immediate availability of reservists for mobilization, the military Services have established procedures for screening annually the personnel records of reservists in order to retain in the Ready Reserve only those individuals qualified and available for active duty in a national emergency. The Ready Reserve, which numbered 2,818,000 at the beginning of the fiscal year after completion of the first annual screening, was screened further and reduced by 76,000 during the year. It totaled 2,742,000 on June 30, 1958. Of this total, 313,000 were serving on extended active duty and 1,025,000 were participating in paid drills or receiving training through short tours of active duty. Future annual screenings, to keep the Ready Reserve within its statutory limit of 2,900,000, will continue to emphasize qualitative factors.

Those reservists who failed to meet Ready Reserve criteria but still had some years of obligated service were transferred to the Standby Reserve, the pool of trained personnel available for recall in the event of a national emergency declared by the Congress. Reservists who had fulfilled their obligatory reserve requirements were discharged or placed in the Retired Reserve, as appropriate. Such transfers increased the Standby Reserve by 387,000 to a total of 1,479,000 on June 30, 1958, and the Retired Reserve by 13,000 to a total of 115,000. (See fig. 6.)

#### *Facilities and Materiel*

The vigorous execution of programs to provide additional facilities and modern materiel for reserve units also contributed to improved readiness.

During fiscal year 1958, \$118.6 million were expended for reserve construction, bringing total expenditures to \$437.0 million since enactment of the National Defense Reserve Facilities Act of 1950. The Congress authorized \$625.8 million and appropriated \$593.1 million for reserve facilities under this law, as amended. Obligations totaled \$535.4 million. Of the \$437.0 million of expenditures, \$121.4 million were spent by the Army National Guard, \$68.8 million by the Army Reserve, \$60.2 million by the Navy and Marine Corps Reserve, \$30.4 million by the Air Force Reserve, and \$156.2 million by the Air National Guard. Facilities built with these funds have been designed, wherever feasible, for the joint use of two or more reserve components. Under new legislation adopted shortly after the close of the fiscal year the Congress authorized \$57.3 million for reserve facilities and appropriated \$36.0 million for these projects. The funds made available for these construction programs have enabled the military Services to improve greatly the armories, air fields, and other facilities required to support an effective reserve establishment.

Reserve units were supplied with increasing quantities of modern weapons during this fiscal year. The Air National Guard equipped 2 squadrons with F-89H's, capable of carrying FALCON air-to-air missiles, and 2 squadrons with supersonic F-100's. Naval air reserve squadrons also received more modern jet fighters and began training with PETREL air-to-surface missiles. In addition, the Navy began the transfer of 14 destroyer and escort vessels to selected reserve training units. The Army National Guard achieved the highest materiel readiness standards in its history.

#### *Financial Support*

Expenditures for the reserve establishment—for personnel, operations and maintenance, procurement, and construction—totaled \$1.2

**DEVELOPMENT OF RESERVE FORCES**

1955 - 1958

(IN MILLIONS)

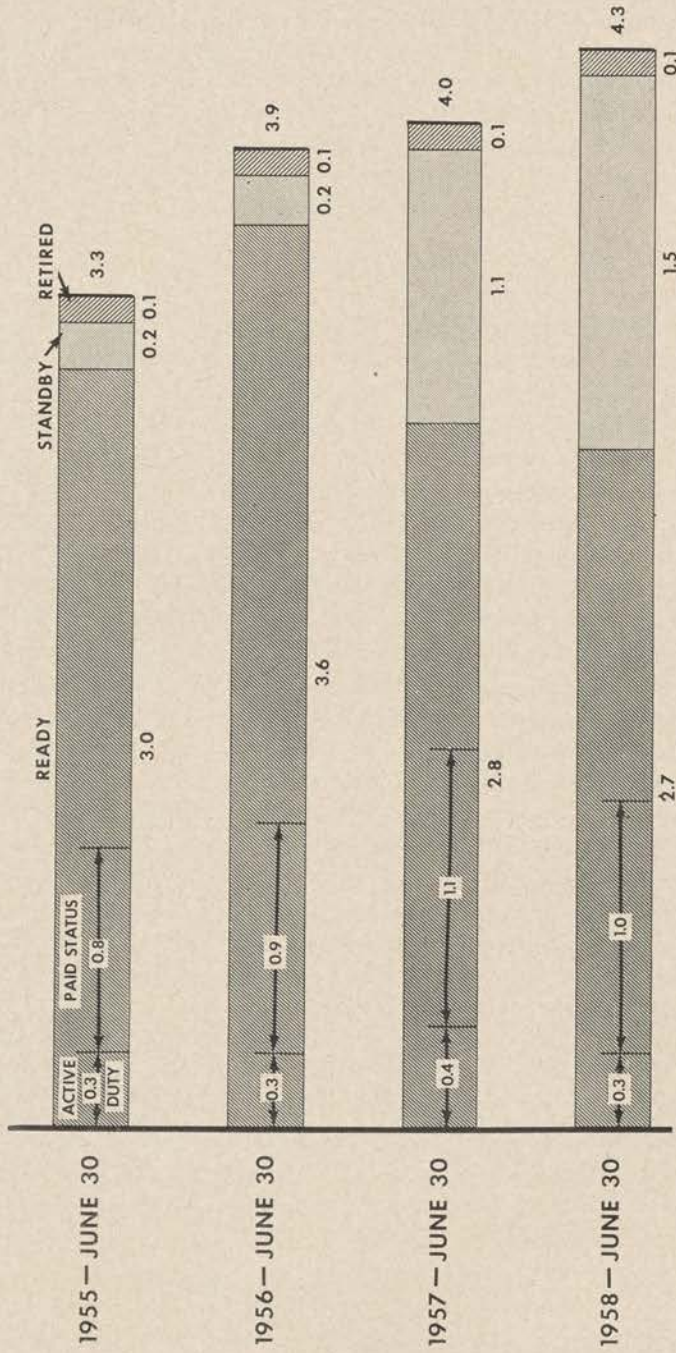


Figure 6

billion during fiscal year 1958, an increase of \$0.1 billion over the expenditures of the preceding fiscal year and of \$0.6 billion over those of fiscal year 1954. The doubling of financial support for the reserve forces in 4 years reflects the increasing role assigned to the reserve establishment.

These expenditures have produced a better trained and more ready reserve establishment than ever before to meet mobilization requirements. The continued implementation of current programs—emphasizing thorough individual and unit training, conversion of units to the needs of modern warfare, and provisions of more modern facilities and weapons systems—will assure the attainment of mobilization readiness goals required by current strategic concepts.

### **Civilian Personnel**

The civilian work force of the Department of Defense on June 30, 1958, totaled 1,314,000, including 1,097,000 direct-hire employees and 217,000 foreign nationals employed under contractual arrangements with friendly governments. Of the direct-hire personnel, 512,000 were salaried and 585,000 were wage-board employees in industrial-type activities.

During the past 12 months the Department was able to reduce civilian personnel by 115,000. This reduction of 8 percent was achieved through the introduction of modern equipment, the improved utilization of manpower resources, and the curtailment of least essential activities. Including the fiscal year 1958 reductions, some 329,000 direct-hire and 209,000 contract-hire employees, or a total of 538,000 persons, were dropped from the rolls since January 1953—a decline of 29 percent. (See fig. 7.)

Quality, rather than quantity, has become the key requirement for civilian personnel just as for military personnel. Significant progress was achieved during the fiscal year in providing increased incentives for attracting and retaining the skilled and experienced civilian personnel required to support a modern defense establishment. Many of the actions taken to this end followed recommendations advanced by the Cordiner Committee on Professional and Technical Compensation.

The Committee found that salaries for professional, technical, and managerial positions in the Federal service were considerably below those paid by private industry, and the President subsequently recommended to the Congress that this gap be narrowed. Shortly before the close of the fiscal year, the Congress established a new compensation schedule, retroactive to January 1958, that provided across-the-board pay raises of approximately 10 percent for civil service employees.

# CIVILIAN EMPLOYMENT

1955 - 1958

(IN THOUSANDS)

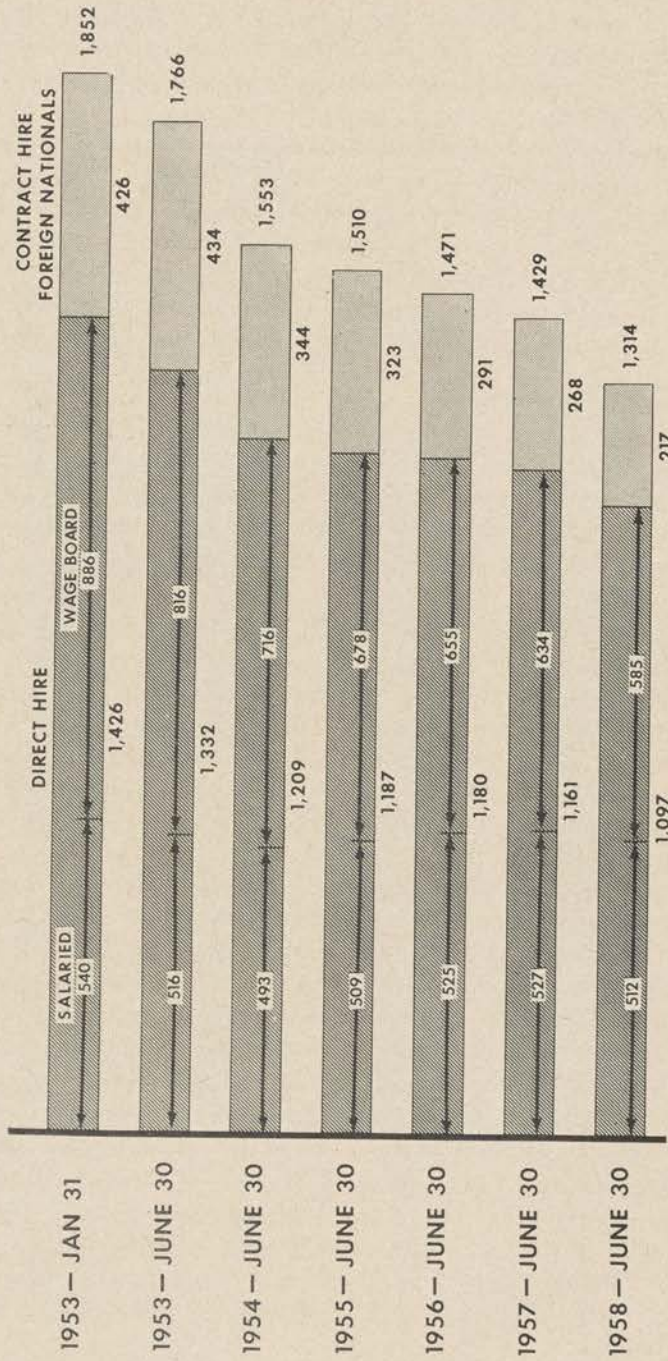


Figure 7

While this legislation increased the overall attractiveness of Federal employment, it did not resolve certain specific difficulties, such as relatively inadequate compensation in the most responsible positions, insufficient differentiation between salaries in the higher grades, the inevitable delay involved in providing reasonable adjustments in statutory compensation schedules in line with non-Government rates, and the inequalities created by differing pay systems, particularly those for wage-board and civil service employees. To find solutions for these problems, the President, shortly after the close of the fiscal year, recommended to the Congress the appointment of a Joint Commission on Civilian Employee Compensation Policy to study all pay systems in the Federal Government—numbering at least 77—and to recommend policies providing equal treatment for all employees and enhancing the Government's ability to recruit and retain adequate numbers of qualified personnel. The Congress adjourned without acting on the President's proposal, delaying until 1959 the initiation of further legislative action to modernize Government compensation policies.

Special legislative and administrative measures were adopted during this fiscal year to recruit critically needed personnel in scientific and managerial positions. In December 1957 the Civil Service Commission directed that engineers and certain other scientific and professional specialists be placed in the top salary bracket appropriate for their grade—a pay level normally reached after 6 years in the same position. Career opportunities for scientific personnel were further broadened in June 1958, when the Congress increased from 135 to 292 the number of top-level scientific and professional positions within a salary range of \$12,500 to \$19,000 that the Secretary of Defense may establish in research and development activities. This augmentation, together with 15 such posts authorized in February for the Advanced Research Projects Agency, brought the total number of these special scientific and professional positions to 307 throughout the Department. While these additions will assist in the recruitment of highly qualified scientists for the armed forces, the number of positions allocated is only two-thirds of the estimated 450 needed to fill the requirements for scientific and professional personnel of the highest caliber.

The Congress also provided some increases in the number of positions that may be placed in the so-called "supergrades." These posts, with salaries ranging from \$14,190 to \$17,500, entail great responsibility and demand outstanding ability. During fiscal year 1958, the Department of Defense received 31 of the 287 newly authorized "supergrades" and 10 such positions were specially authorized for the Advanced Research Projects Agency. The additions brought the total number of "supergrades" in the Department of Defense to 312. While these additional allocations will be of material assistance to

the Department in staffing responsible positions, the total of "super-grade" spaces available for important programs continues to fall far short of current needs.

To attract young technicians and potential managerial talent to Government service, the Congress in June 1958 authorized the hiring of college graduates at grade GS-7, rather than GS-5, which had been the entrance grade for graduates without additional experience.

These actions, based largely on the recommendations by the Cordiner Committee, should improve the ability of the Department of Defense to recruit and retain qualified civilian personnel. In addition, the Department continued to emphasize career development programs for its present employees. Broad, permanent authority to conduct in-service employee training programs was provided by the Congress at the close of the fiscal year. Previously, Department of Defense employee training had been authorized on an annual basis in appropriations acts. The military departments have established training programs in many occupational career fields and have facilitated off-duty educational programs for civilian employees. During fiscal year 1958, 13,525 employees were given training under contracts with educational institutions, representing an increase of 69 percent over a 2-year period.

Government workers continued to make valuable contributions to the improvement of operational efficiency in the Department of Defense during 1958 through the Employees' Incentive Awards Program. Some 242,000 suggestions and inventions were submitted by civilian personnel and 65,000 of these were adopted, slightly below the number accepted during the previous year. The resultant savings to the Government during the first year are estimated at \$72.8 million—an increase of \$8.3 million over last year. Almost 63,000 cash awards totaling about \$2.0 million were paid to individuals whose suggestions or inventions were adopted. An additional 33,000 employees were awarded \$5.8 million for sustained superior performance of their duties, while 53,000 individuals received certificates and lapel decorations for continued service in the Department of Defense.

The actions taken during fiscal year 1958 helped to make service in the Department of Defense more attractive to highly qualified personnel and promoted the more effective use of all available manpower resources. These actions should continue to produce substantial benefits in the future. Still, in order to maintain an effective modern defense establishment, scientific and technical specialists and able administrators will be needed in greater numbers than ever before. These requirements can be met by close cooperation between the executive and legislative branches of our Government and by an imaginative and intelligent administration of the military and civilian personnel systems of the Department of Defense.

## **VII. Weapons, Equipment, and Facilities**

The Department of Defense continued during fiscal year 1958 to modernize its supply organizations and procedures in order to assure effective support of all combat forces under any condition of warfare.

Recently established supply management systems were adjusted to promote increased cooperation between the military departments in the field of logistics. A new Armed Forces Supply Support Center was chartered to further integrate supply channels and to provide closer coordination of procurement efforts. The new management techniques adopted by the Department of Defense have produced not only better logistic support for our combat forces but also substantial monetary savings for the taxpayer.

As a result of the continuous review of real property holdings, numerous installations were closed or, where possible, converted to new uses. At the same time, the construction of new installations was accelerated to provide essential facilities for long-range missiles and for the dispersal of our strategic air forces.

The rapid development of new weapons systems has created major management problems in the logistic support field, as in all other activities of the armed forces. For example, equipment is becoming obsolete before wearing out, and existing installations require expensive alterations before they can be adapted to today's operating requirements. Problems like these can only be resolved at a reasonable cost by constant improvement in the managerial activities of the entire Department of Defense.

### **Supply Management**

In recent years, special attention has been given to measures for increasing interservice cooperation in supply operations. These measures included the Single Manager system for common supplies and services, the Federal Catalog and standardization programs, and the expansion of interservice supply support activities and single department procurement assignments. As a result, costs have been reduced and the efficiency of the supply systems substantially improved.

All these managerial procedures were extensively reviewed this year as part of a major study of supply organizations and functions in the Department of Defense. This review confirmed the value of current

practices and pointed the way to further improvements in the integration of common supply operations.

To provide for additional coordination of effort, the Secretary of Defense directed at the close of the fiscal year the establishment of an Armed Forces Supply Support Center. This new agency will administer certain supply programs common to more than one Service, such as cataloging and standardization, promote integrated supply management, and develop procedures to eliminate inconsistencies, duplication, and overlapping in supply activities. The Center, by concentrating on the overall logistic needs of the armed forces, will facilitate common solutions to the supply problems of all the military Services.

The fact that the cost of the supply items controlled by the Department of Defense, most of them priced at acquisition cost, amounted to \$119.8 billion on June 30, 1958, points up the importance of efficient management. The \$119.8 billion included \$62.1 billion in weapons and equipment issued for use by regular and reserve units, \$47.7 billion in supplies in distribution channels, \$5.8 billion in industrial fund accounts and production machinery, and \$4.2 billion in surplus and excess stocks. The procedures already in effect and the additional refinements adopted this year have provided increased assurance that these vast resources are being managed efficiently and that the needs of the armed forces are being met expeditiously and effectively.

### *The Single Managers*

During fiscal year 1958 the Single Manager system continued to demonstrate its effectiveness as a means for providing common supplies and services at minimum expense.

The Secretary of the Army was named Single Manager in 1956 for subsistence supplies, domestic traffic management, and clothing and textiles; the Secretary of the Navy was designated Single Manager for petroleum, military medical supplies, and ocean transportation; and the Secretary of the Air Force became Single Manager for airlift services. The Secretaries of the military departments established special control agencies, with representation from all using Services, to discharge the day-to-day managerial responsibilities for each group of commodities and each common service. With some exceptions in the field of petroleum, the Single Manager operating organizations determine net requirements; procure and inspect supplies; control the receipt, storage, transportation, and issuance of stocks at the wholesale level; control inventories and maintain items in a usable condition; and dispose of surplus goods. Distribution channels make full use of the existing facilities of all the military Services as long as the needs of the military consumer are met.

Although the Single Manager agencies have been fully operational for only a short time, impressive savings have already been achieved. For example, the Military Subsistence Supply Agency has materially improved the techniques for controlling its stocks, thus reducing operating inventories by \$48.2 million during the past 15 months. Inventory turnover for perishable commodities has been increased from 8 times per year in the previous fiscal year to 13 times per year in 1958, while total inventory turnover has been increased from 4 times per year to 5 times per year. In addition, 16 storage locations have been eliminated under an improved distribution system, and savings of over \$500,000 per year have been realized through purchasing fresh-frozen fruits and vegetables in larger quantity lots.

Improved reorder procedures have helped the Military Clothing and Textile Supply Agency to reduce its annual procurement program from \$290 million to \$247 million. Administrative lead time in purchasing was reduced from an average of 93 days in 1957 to an average of 52 days in 1958. Wholesale storage points were in process of being reduced from 58 to 12, thereby providing a considerable reduction in overhead costs.

Common transportation services were also provided more efficiently during the fiscal year by the Military Traffic Management Agency (MTMA), the Military Sea Transportation Service (MSTS), and the Military Air Transport Service (MATS).

MTMA prepared a joint regulation to replace numerous unilateral Service publications and to establish uniform policies and procedures for military traffic operations in the United States. The agency further streamlined its organization by consolidating 2 branch offices with regional offices; at present, 1 headquarters, 5 regional offices, and 1 branch office perform, with a reduction of 31 percent in personnel, the functions formerly handled by 4 headquarters and 16 field offices. Automatic data processing equipment was installed during the year to facilitate efficient management. Negotiations by the Agency with commercial carriers for rate adjustments on military traffic resulted in savings of \$25 million during the fiscal year—\$12 million on freight charges and \$13 million on passenger traffic.

The MSTS operations continued to improve during the fiscal year. Increased cost consciousness by all concerned permitted more realistic budgeting and more efficient service. In line with decreased sealift requirements, the MSTS nucleus fleet was reduced by 29 percent during the fiscal year—from 253 vessels to 179. With streamlined operations and the replacement of obsolescent ships by more modern carriers, the reduced MSTS fleet should continue to give prompt sealift service to its military customers and provide an adequate nucleus for expansion

in case of emergency. The approved MSTS construction program was completed in fiscal year 1958 with the delivery of six ships for Arctic operations and of the revolutionary roll/on, roll/off cargo ship, the *Comet*. A new "Optimum Ship Routing Program," based on forecasts of wave and sea conditions, was placed into effect in January 1958 and achieved savings in steaming distance, fuel, time, and weather damage.

Preparations were completed during the fiscal year for MATS to become fully operational as a single management agency on July 1, 1958. Under this new industrial fund arrangement, military customers of MATS will budget and pay for airlift services on the basis of new tariff rates approved this year; receipts will accrue to the credit of the industrial fund from which operating costs are financed. Other management improvements during fiscal year 1958 included a reduction of 50 percent in aircraft "down" time, i.e., the time required for inspection, overhaul, and repairs of aircraft. The primary mission of MATS is to maintain in being the military air transport forces and air routes and bases needed to meet possible emergency conditions. The continued maintenance of this airlift capability is an integral part of our military readiness.

#### *Cataloging and Standardization*

The Federal Catalog, which provides systematic identification of the millions of items procured and used by the armed forces, continued to expand during the fiscal year as additional modern weapons with their many new component parts entered military supply channels. About 423,000 new identifications were added to the Catalog during the year, while some 269,000 older items were dropped, for a net increase of 154,000 entries. As a result, a total of 3,481,000 active items were listed in the Catalog on June 30, 1958. Automatic data processing techniques, the introduction of which began during the preceding fiscal year, accelerated the task of keeping the Catalog current and provided the data required for the improved management of supply operations. Contracts were awarded during 1958 for the installation of a rapid wire transmission network between 40 military supply agencies to further shorten the time needed to receive, process, and transmit item identifications.

The established schedules for converting the military supply systems to the use of Federal Catalog stock numbers continued to be exceeded by the military Services. An additional 700,000 items were changed to standard identifications in 1958, bringing the total of such conversions to 3,339,000 on June 30, 1958—94 percent of the 3,550,000 transactions to be completed by January 1, 1959.

Progress was also made in the standardization programs, established to reduce the number of different items in supply channels. Schedules have been established for the review of 208 of the 422 Federal Catalog supply categories requiring detailed standardization plans. Some 140,000 different items were eliminated by such reviews during fiscal year 1958, bringing to 727,000 the total number of reductions achieved through standardization. For example, actions completed in 1958 reduced hand tools to be stocked from 854 to 330; the types of fuels and lubricants, from 1,209 to 682; the kinds of pneumatic tires and tubes, from 1,315 to 315; and industrial engine radiators, from 174 to 8.

The military Services inaugurated in 1958 an accelerated reduction program for items that can be reviewed and evaluated by available supply personnel, without the help of scarce engineering talent. This program involves the identification and consolidation of items having only minor differences not affecting use, the elimination of items for which there is no foreseeable need, and the reduction in the number of sizes and varieties in nontechnical items, such as office supplies. Work was begun during the year on 24 Federal supply classes, and additional classes have been scheduled for review during the next 3½ years.

#### *Procurement*

Military prime contracts with a net value of \$16.3 billion were placed during fiscal year 1958 for materiel and supplies with firms in the United States in transactions involving \$10,000 or more. Of this amount, \$14.7 billion was for weapons, equipment, and other "hard" goods and \$1.6 billion for food, fuel, and textiles. (See fig. 8.) The 1958 awards totaled \$2.7 billion more than for the preceding fiscal year, with the increase concentrated largely on aircraft and missile procurement.

About three-quarters of the funds obligated during the year were handled under some form of single department procurement assignment by which one supply agency acts as the contracting authority for all military customers. The Single Managers were responsible for 4 groups of commodities—subsistence, clothing and textiles, petroleum, and medical supplies—while other procurement assignments included automotive equipment by the Department of the Army, ships and small craft by the Navy, and photographic items by the Air Force—to list only a few of over 30 supply categories. Preparations were underway at the close of the fiscal year to bring the procurement of electronics equipment under the single department purchasing system and to extend to guided missiles the plant cognizance assignments that are being used in aircraft contracting procedures. Improved administrative procedures were adopted during the year to insure that the

## PROCUREMENT ACTIONS

### FOR MATERIEL AND SUPPLIES WITH U.S. BUSINESS FIRMS

#### FISCAL YEAR 1958

Actions of \$ 10,000 or more: \$16,269

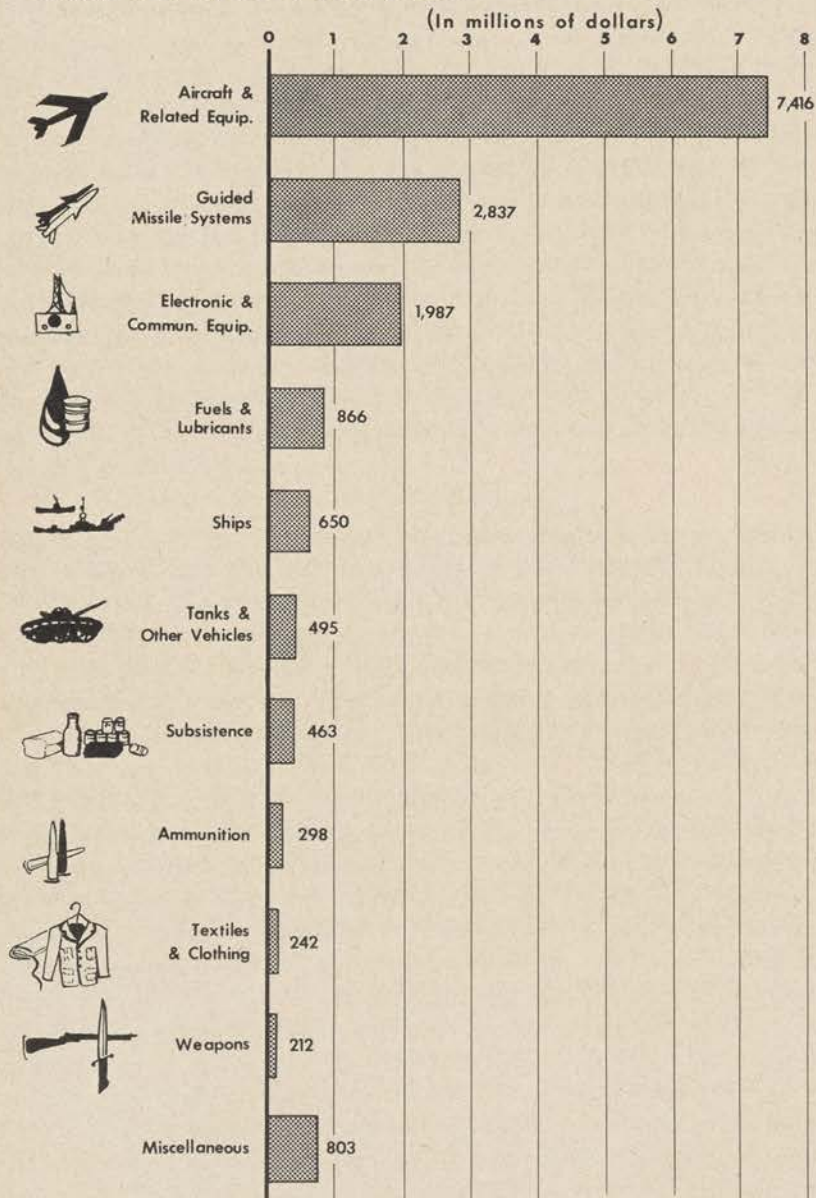


Figure 8

problems encountered by both the purchasing and the using agencies are resolved quickly and effectively.

The Armed Services Procurement Regulation, which provides the basic guidelines for all military purchasing activities, was kept under review, as in previous years, to assure adequate protection of the public interest and equitable treatment of private enterprise. During fiscal year 1958 the provisions affecting small business were consolidated in a new section of the Regulation for ready reference. Changes were adopted with respect to the use of competitive procedures in negotiations for those contracts that cannot, by their nature, be awarded through sealed bids, and amendments were added to govern the use of oral discussions and written communications in such negotiations. Additional protection was extended to data submitted by contractors as part of their proposals. Provisions relating to overtime were rewritten to eliminate Federal responsibility for unnecessary work at higher pay and to ease the administrative burdens of contractors and contracting agencies alike. The standard clauses that have been used in all fixed-price contracts were redrafted to reflect changes based on operating experience or made necessary by new legislation.

Negotiated contracts are authorized by law for items not generally available on the open market, such as highly complex weapons systems, equipment, and research services, and for set-aside programs giving preference to small business firms and labor surplus areas. The requirements for complex items and services are steadily rising, resulting in an inevitable increase in negotiated contracts. To counter this trend, procurement officers have been directed to use formal advertising procedures wherever possible. Such procedures were used for 14.3 percent of the contracts awarded in 1958, as compared to 17.4 percent in 1957 and 11.3 percent during the Korean hostilities.

Continued attention was given during the year to securing maximum participation by small business firms in defense production. Joint efforts by the Department of Defense and the Small Business Administration increased the value of procurement proposals set aside for small business firms to approximately \$1.0 billion in fiscal year 1958—\$0.3 billion more than the \$0.7 billion set aside during the preceding year. Prime contracts totaling over \$3.7 billion were awarded to small concerns, about the same amount as in 1957. As the result, however, of the increase in total procurement and the rise in requirements for complex equipment, the percentage of small business contracts declined from 19.8 percent of the total value of Defense contracts in fiscal year 1957 to 17.1 percent in 1958. In the latter year, small contractors bid successfully for 64.0 percent of the pro-

curement determined to fall within their productive capacity, as compared to 60.5 percent in the former year.

Through the Small Business Subcontracting Program of the Department of Defense, large prime contractors have undertaken to provide small firms with an equitable opportunity to compete for defense production as subcontractors. Under this program, 286 participating large producers reported that small concerns had received \$3.2 billion during fiscal year 1958 for subcontract work—an amount almost equal to the prime contracts awarded to small business. These subcontract payments represented 19.0 percent of the \$17.1 billion received by major defense contractors for work performed. Total receipts by small firms, including prime contracts, probably exceeded \$7.0 billion, since the reported amount does not include data from all military prime contractors nor does it show orders to firms below the first tier of subcontractors.

During the second half of fiscal year 1958, the Department of Defense gave increased emphasis to its program for aiding labor surplus areas and industries—designed to preserve the mobilization potential of the Nation. Contracts totaling \$35.7 million were awarded to labor surplus areas during those 6 months through the use of set-asides and of preferences in the event of tie bids. Only \$1.0 million was placed through these procedures during the first half of the fiscal year and only \$10.8 million during all of fiscal year 1957. Total awards to firms with plants in the 285 areas designated as having surplus labor amounted to \$3.8 billion during the year, as compared to \$0.4 billion to all labor surplus areas in 1957.

The inspection services of the military departments continued to provide greater assurance that producers were meeting military standards and that inspection procedures were both reliable and economical. In accordance with new instructions adopted during the fiscal year, the inspection services at prime contractors' facilities were being used increasingly to check materiel produced by subcontractors, thus achieving more efficient use of Government resources.

#### *Inventory Control, Storage, Distribution, and Disposal*

Substantial progress was made during fiscal year 1958 in promoting the more efficient and economical utilization of materiel in the military supply systems.

Existing procedures were modified to achieve the maximum possible interchange of supplies and supply facilities between the military Services and to prevent the open market purchase by one Service of supplies that are being disposed of as excess by another Service. A consolidated central control group was established in December 1957

to screen reports of surplus and excess commodities against current procurement requirements and to circulate these lists to potential military customers; this group was merged with the new Armed Forces Supply Support Center at the close of the fiscal year.

The Center has also been charged with monitoring the activities of commodity and area coordinating groups established under the Inter-service Supply Support plan. During the past 2 years, 33 commodity coordination groups have been created to identify interserviceable supplies and to encourage exchange at the wholesale level, while 6 area coordination groups in the United States and the overseas unified commands have promoted the maximum exchange of supplies and services at the retail level in their respective regions. During fiscal year 1958, exchanges of supplies and services effected by coordination groups totaled over \$301 million—an increase of \$100 million, or 50 percent, above the exchanges arranged in 1957. Of this total, commodity coordination groups at the wholesale level arranged for the interchange of \$32 million in assets, while area coordination groups and the unified commands were responsible for exchanges of \$269 million in supplies and services.

The military Services have continued to increase their joint utilization of storage facilities and to close duplicating sites. As the result of a survey of major depots in the United States, some 23 storage facilities, comprising about 28,000,000 square feet, were scheduled for deactivation before the end of fiscal year 1962. Nine of these facilities, comprising 7,500,000 square feet, were deactivated or converted to other military uses during fiscal year 1958. Ocean terminal facilities at Seattle, San Francisco, and New York have been consolidated. The Army Transportation Terminal in Seattle was deactivated on October 1, 1957, and the Navy Supply Depot there assumed responsibility for cross-servicing Army cargoes. In San Francisco, the Army's refrigeration storage facilities are being used jointly by the Army and the Navy, permitting the deactivation of naval refrigerated warehouses, while ship repair functions for the Army are being provided by the Navy. Action was also initiated during the year to close the Army Terminal at Caven Point, N.J., in the New York harbor area. At the close of the fiscal year, terminal facilities in Hawaii were being surveyed. These consolidations of storage and terminal facilities have resulted in substantial savings of manpower and other resources.

With the emphasis placed on inventory management during the year and with the rising influx of newer weapons systems, the military Services substantially increased the amount of property declared surplus or excess to current and mobilization requirements in 1958. Weapons, equipment, and supplies, valued at an acquisition cost of

almost \$8.0 billion, were reported as excess during the year, an increase of \$2.9 billion over the previous fiscal year. Items excessive to the needs of one military department are offered first to the other armed forces, then to other Federal agencies, and finally, under the donation program, to State agencies and educational institutions. Usable items not disposed of in one of these ways are sold to the highest bidder, and equipment having no further utility is scrapped.

Disposals through these procedures included, in 1958, property having an acquisition cost of \$6.3 billion—\$2.0 billion more than the previous year. Of this total, \$0.3 billion was transferred from one military department to another, \$0.1 billion to other Federal agencies, and \$0.2 billion was donated to non-Federal agencies. About \$2.5 billion of surplus materiel, or 41 percent of total disposals, was sold, bringing a return of \$128 million, about 5 percent of its original cost. In view of economic conditions and of the limited commercial use of much of this equipment, this return exceeded expectations. About half of the materiel disposed of in 1958—\$3.0 billion—was placed in the scrap category; sales of scrap yielded \$57 million during the year. Military assistance, destruction, or abandonment accounted for the remaining \$0.2 billion of the total disposals.

Disposals are expected to be higher in fiscal year 1959 as further progress is made in reducing inventories and as the introduction of new weapons will make more of the older equipment obsolete.

### **Mobilization Planning**

Planning for the mobilization of the Nation's economic resources in the event of war is a task carried out by the Department of Defense in conjunction with other Federal agencies, under policies established by the Office of Civil and Defense Mobilization. The Department has participated in developing programs for expanding and maintaining adequate productive capacity, for stockpiling critical strategic materials, and for administering the priorities and allocation system. Increasing emphasis was placed during the past year on planning to meet contingencies arising from destruction of vital industrial facilities during the first phase of a nuclear war.

The recent expansion of defense industries has been financed primarily by private capital, with the direct use of Federal funds for new facilities held to a minimum. The loan guarantee and rapid tax amortization provisions of the Defense Production Act of 1950, as amended, have served to stimulate private investment.

During 1958 the Department of Defense participated in authorizing 26 federally guaranteed loans, totaling \$113.6 million, for additional industrial capacity. As prescribed by amendments to the International Revenue Code of 1954, adopted on August 26, 1957, new admin-

istrative guidelines were adopted to restrict future tax certifications for rapid amortization to facilities for research, development, and testing, and for production of new or specialized defense equipment. Under this new guidance the Department of Defense furnished comments and recommendations to the Office of Civil and Defense Mobilization on 269 applications for the accelerated amortization of facilities. With most expansion goals already met, only a few certificates, mostly for research and development, were granted during the year.

Increased awareness by industry of the importance of dispersing facilities was indicated by the submittal of twice as many inquiries in fiscal year 1958 as in the preceding year—127 as compared to 63. Of the total of 286 requests for advice on proposed sites received from private and governmental groups, all but 34 met the established standards.

Federally owned plants needed for mobilization are maintained either in the National Industrial Reserve, managed by the General Services Administration, or in the plant reserves of the military departments. As a result of changes in the mobilization plans and the expiration of recapture clauses during fiscal year 1958, some 14 plants were removed from the National Industrial Reserve, which on June 30, 1958, included 83 facilities. Of this number, 68 had been sold subject to repossession in an emergency, 13 were being operated under leases or contracts, and 2 were inactive. The plant reserves of the military departments on June 30, 1958, stood at 387 facilities, valued at an acquisition cost of \$5.7 billion. Of these, 239 were operated by contractors and 64 by the Government; 70 were in standby status and 14 had been declared excess but have not yet been transferred to the General Services Administration.

Production equipment controlled by the Department of Defense on June 30, 1958, numbered 518,700 pieces—excluding machines costing less than \$500. The acquisition cost of this equipment was reported to be \$5.5 billion. Metalworking tools, included in the above, totaled 245,900 with an acquisition cost of \$2.9 billion; 79,000 of these metalworking tools were in the inactive inventory at the close of the fiscal year. A continuous effort is being made to keep this production equipment in maximum readiness. Substandard equipment is being repaired or sold. About 4,700 pieces in the inactive inventory of metalworking equipment were redistributed to qualified military contractors during the fiscal year. Plans were completed for the loan of machine tools to educational institutions.

Continued attention is being paid to the availability, in an emergency, of critical components, such as marine turbine gears, instrument bearings, magnetron tubes, and similar items. In 56 of 65

commodity areas no deficiencies of supply are anticipated, while the remaining 9 areas are being reviewed to determine whether further action to eliminate possible shortages would be feasible and desirable. The rapid rate of technological progress is complicating the task of estimating emergency requirements for component parts and forcing a constant reexamination of such requirements.

Cooperative mobilization planning with industry was reexamined during the fiscal year to include special procedures for use in the event of severe damage to the Nation's productive capacity. In plants to be covered by the new system, Defense Production Planning Officers will act as the central point of contact for management, maintaining up-to-date current and emergency schedules of the requirements placed on the plant and keeping managers informed on all aspects of mobilization. The system will cover prime contractors as well as subcontractors in areas most likely to develop wartime production bottlenecks. Provisions are also made for accelerating production under conditions short of general war.

New studies of the needs of the United States for stockpiling strategic materials, undertaken in light of current mobilization concepts, were completed during fiscal year 1958 under the leadership of the Office of Civil and Defense Mobilization. This review resulted in major policy revisions reducing the mobilization planning period from 5 years to 3 years and in plans for further material studies to be based on both limited and general war requirements.

Participation by the Department of Defense in the priorities and allocation system for materials, established under the Defense Production Act of 1950, has accomplished two essential objectives—keeping current military production programs on schedule and maintaining control plans and staffs in readiness for expansion during an emergency. The established procedures facilitated deliveries of high-priority new weapons systems in 1958. Approximately 1,400 requests from contractors for special assistance in obtaining materials, components, and end-items, and production equipment were processed by the Department of Defense during the year. A manual to govern priorities for the use of commercial air transportation during wartime was developed to be ready if needed.

### **Properties and Installations**

Technological advances are forcing major and continuous adjustments in the real property holdings of the Department of Defense. The introduction of each new weapons system creates additional requirements for training, operations, storage, and maintenance facilities. Changes in strategic commitments, in operational concepts, and in authorized personnel strengths are inevitably accompanied by

modifications in the supporting base structures of the military departments. The policies and programs established by the Department of Defense have been designed to meet these new requirements expeditiously and economically.

The 1958 construction programs of the military departments covered the most essential of the varied needs of the armed forces, but placed special emphasis on guided missile facilities. Work continued at the first operational site for the ATLAS Intercontinental Ballistic Missile (ICBM), Cooke Air Force Base, California, and construction began at Warren Air Force Base, Wyoming, designated as the second ICBM site. Other major building projects included research, testing, and training facilities for new strategic and tactical missiles. Additional construction for the Strategic Air Command was started to provide a separate base for each of the 33 B-52 squadrons with their supporting tankers and to increase the alert capability of these squadrons. Work on the first launching sites for NIKE-HERCULES surface-to-air missiles was completed and construction was begun at four locations for the longer range BOMARC air defense missiles. Additional shore installations were built to increase the operational readiness of the fleet.

To support the military construction program, the Congress initially appropriated \$1.5 billion for fiscal year 1958. An additional \$0.5 billion was made available in February 1958 to accelerate the construction of long-range missile sites, of dispersal airfields and alert facilities, and of missile detection and early warning installations. Obligations totaling \$1.5 billion were incurred during the fiscal year, somewhat below the obligations of \$2.0 billion incurred during the preceding year. Expenditures for construction in 1958 were \$1.7 billion as compared to \$1.9 billion in 1957. The unexpended balance in military public works funds on June 30, 1958, amounted to \$2.9 billion.

In meeting new requirements, the Department of Defense converted existing installations to current needs, wherever feasible, thereby holding the acquisition of additional real property to a minimum. Bases of one military department were modified to satisfy the requirements of another Service; for example, the ICBM site at Cooke Air Force Base was located on a former Army post. In the design and location of new missile installations, special consideration is being given to the requirements of future weapons in order to reduce construction expenditures in the years ahead. Maximum joint usage is being made of missile ranges and other test facilities.

Shortly after the close of the fiscal year, the Department of Defense completed the first 3-year cycle of a continuing review of its real property holdings. The purpose of this review is to identify all in-

installations unsuited to current requirements and to transfer excess facilities not adaptable for use by other military departments to the General Services Administration for disposal. A second 3-year cycle review to cover the latest strategic and logistical concepts is scheduled to begin during the fiscal year 1959.

During the past 3 years, all or part of 469 installations, comprising 1,800,000 acres and having an acquisition value of \$708 million, have been identified as excess to military requirements. An additional 248 facilities, valued at approximately \$1.0 billion in acquisition costs and including 4,200,000 acres, were still under review at the close of the fiscal year. The military departments have since June 1946 relinquished title to 10,690,000 acres; acquisitions during the same period to meet new requirements totaled some 6,176,000 acres—4,715,000 by withdrawals from the public domain and 1,461,000 by purchase.

On June 30, 1958, the Department of Defense controlled 32,500,000 acres, valued with buildings and other improvements at an acquisition cost of \$26.9 billion. Of this acreage, 58.2 percent, 18,900,000 acres, had been withdrawn from the public lands of the United States; about 22.0 percent, 7,200,000 acres, had been acquired by purchase or donation; and the remaining 19.8 percent, 6,400,000 acres, included foreign bases, leased facilities, property made available for temporary use, and easements. The Department of Defense controlled 26,800,000 acres within the continental United States, 3,400,000 acres in territories and possessions, and 2,300,000 acres in foreign countries. The Department of the Army controlled 32.3 percent of the total acreage; the Department of the Navy, 16.3 percent; and the Department of the Air Force, 51.4 percent.

To improve the management of these holdings, uniform standards and criteria are being applied to the programming, construction, maintenance, and operation of all military facilities. Unit cost figures, based on 3 years' experience, were developed for over 30 standard facilities; a uniform system for computing construction costs of such facilities has been adopted for use in budget estimates. Progress was made in developing criteria for new construction designs for protection against nuclear attack. New field tests were initiated to determine the relative merits of the latest concrete and asphalt airfield pavements. With maintenance costs for military installations rising steadily, continued attention was given to assuring the fullest possible utilization of all available manpower and materials.

New procedures were adopted during fiscal year 1958 to govern the preparation of military public works programs submitted to the Congress. The three military departments in submitting their proposals are now following a standard format, permitting the uniform treatment of these programs by all reviewing agencies in the Depart-

ment of Defense. The new format facilitates the identification and elimination of unnecessary duplication, of undesirable variations from standards, and of excessive cost estimates. Review procedures were designed to identify all items not essential to high priority programs as well as facilities whose future usefulness is likely to be reduced in a few years by scientific developments. Requests for the authorization of family housing units and armed forces reserve training facilities were presented in the fiscal year 1959 program for the first time on a "line item" basis, rather than as general "lump sum" accounts.

Shortly after the close of fiscal year 1958, the Congress authorized \$1.6 billion of additional construction and appropriated about \$1.4 billion for these and other previously authorized projects, almost \$0.4 billion less than the amount requested by the Department.

The additional construction for new weapons systems will continue to be required in coming years as well as protective construction for our most important operational systems. The cost of these programs will be high, but existing review procedures will facilitate the careful screening of all new proposals and thus assist in holding future expenditures to the essential minimum.

### **Financial Management**

The development of an effective integrated system of financial management, adapted to the special requirements of the military Services, has been a long-range objective of the Department of Defense. Such a system will enable operating officials to manage defense activities more efficiently, provide additional incentives for economy, and facilitate executive control of expenditures. During fiscal year 1958, budgeting, accounting, and reporting systems were further improved in line with the established objective.

Particular attention was centered on refining the operations and maintenance portion of the Defense budget structure. An accrual accounting system for operations and maintenance funds was instituted for Army activities in the continental United States on July 1, 1957, and was extended to Army overseas installations on July 1, 1958. The Navy and Air Force were also developing accrual accounting systems for their operations and maintenance expenditures.

Comparative cost studies were initiated to identify operations that are more costly in one department than in another and to develop realistic standards of performance. At the close of the fiscal year, work was nearing completion on a directive establishing uniform guidelines for cost-based budgeting, integrated account structures, operating budgets, funding, accounting records, and financial reporting for all operations and maintenance funds. These guidelines will

assist in controlling expenditures by facilitating the identification of major program costs.

The adoption of monetary accounting systems in recent years for items in the supply inventories of the military Services has paid substantial dividends in the form of operational economies and more effective management. The data provided by these accounts have permitted more accurate computation of requirements and procurement programs and have assisted in identifying excess stocks. Such Department-wide supply activities as the Interservice Supply Support plan and the Single Manager depend on monetary accounting for their success. Aided by the new controls, the military Services have substantially reduced supply inventories. Since 1953, savings of about \$4.0 billion have been achieved through such reductions; these savings were either deposited with the Treasury or utilized by the Congress in lieu of new appropriations.

Inventories of most consumable commodities are now financed through working capital stock funds by the Army, Navy, and Marine Corps, while the Air Force uses stock funds for such items as fuels, clothing, general supplies, and medical-dental items. Under this system, the cost of materiel issued for use and of work or service performed by one agency for another are charged against the funds appropriated to the user, with reimbursement to the revolving stock fund of the supplier. At the close of the fiscal year, inventories financed through stock funds totaled \$8.9 billion, or about 19 percent of all assets in military supply systems. Army stock funds amounted to \$6.1 billion, Navy, \$1.9 billion, Marine Corps, \$0.4 billion, and Air Force, \$0.5 billion. Accrual accounting has been established for all these funds.

The military Services placed 7 additional activities under industrial funds during the fiscal year, bringing the number of industrial- and commercial-type activities so financed to 135. Industrial funds financed operations producing goods and services with an annual value of approximately \$2.4 billion. The adoption of realistic cost and work standards has followed the introduction of industrial funds.

Additional progress in controlling operations was made during 1958 through the development of budgets based on the full costs of services and materiel. Cost-based budgets are being used by the military departments in requesting apportionments of funds for military construction, civil works, and procurement and production, and in developing new programs under these appropriation titles. The Department of the Army extended and refined its Command Management System, while the Department of the Navy further improved its managerial techniques by installing a complete financial control system for reimbursements.

New uniform budget and account classifications for military personnel and research and development were prescribed during the fiscal year for use in programing, budgeting, and accounting throughout the Department of Defense. Funding patterns have been simplified to give greater flexibility to local commanders in carrying out their assigned missions. Whereas in the past as many as 300 separate and distinct allotments of funds might be made to some field activities, today the number has been greatly reduced. In some cases, activities are being financed through a single, all-inclusive allotment of appropriated funds to cover all operations.

Further action was taken during the year to improve internal and contract auditing and reporting in the Department of Defense. In August 1957, basic policies and organizational responsibilities for auditing were prescribed and have now been placed into effect by the military departments. The first integrated, world-wide audit of the military assistance program was initiated during 1958. A survey by outside consultants of Defense contract audit operations was undertaken as a first step in improving procedures in this field.

Title IV of the National Security Act of 1947, as amended, together with the 1956 amendments to the Budgeting and Accounting Act of 1921, established the requirement for developing an effective integrated system of financial control in the Department of Defense. By the end of fiscal year 1958, substantial progress had been made toward reaching this goal and the achievement to date provided a firm basis for further advances.

## VIII. *Mutual Security*

Communist-bloc policy during fiscal year 1958 indicated no change in its basic objective—world domination. Technological advances, particularly in the missile field, were exploited to threaten the freedom of noncommunist nations. Economic penetration, infiltration, and the menace of local aggression were used to extend the range of communist influence. Legitimate aspirations of newly independent peoples for national unity and economic progress were subverted to illegitimate ends. In the face of communist intransigence, little progress could be made toward effective disarmament.

While communist moves involved action in every possible field, they were fundamentally based on the threat of force. For this reason, effective military safeguards are essential to the successful defense of the free world.

During the past year the United States continued to maintain such safeguards. Our retaliatory forces remained in a high state of readiness to counter nuclear attack quickly and effectively, and collective security provided assurance to free nations that they did not stand alone in their determination to resist tyranny.

The free world's strength has been built by cooperative action. Allied nations raise and support the essential forces, while the United States through its military assistance programs aids in supplying modern arms, equipment, and training to countries that require help. Without this aid, it is doubtful that all of our allies could maintain adequate military deterrents. Without the contribution of its allies, the United States would have to spend billions more for its security and substantially expand its armed forces.

This partnership has proved effective. It will be needed as long as potential communist aggressors believe that they can take over free world positions by military might. Our most important tasks are not only to maintain existing forces but also to continue their modernization in order to improve allied combat effectiveness. This course gives the best hope of maintaining free world security and independence.

### **Military Assistance**

The free world collective security system depends for much of its effectiveness on the military assistance programs administered by

the Department of Defense. These programs provide weapons and equipment otherwise unobtainable, training in the use and maintenance of this materiel, and help in the development of military bases, new weapons, and production facilities for common defense. During fiscal year 1958, special emphasis was placed on increasing the allied atomic potential and on strengthening allied capabilities for dealing with local subversion and aggression.

In accordance with agreements reached by the Heads of Government of the North Atlantic Treaty nations in December 1957, the United States has accelerated military assistance programs to provide our NATO allies with additional modern weapons, particularly guided missiles. During fiscal year 1958, about \$300 million was programmed for missiles and rockets, such as NIKE, HONEST JOHN, SIDEWINDER, and CORPORAL. Additional funds were earmarked to provide Intermediate Range Ballistic Missiles to allied forces. This year's program also stressed aircraft modernization—the modification or the replacement of older jets with more recent models. The emphasis on aircraft and missiles will continue during the coming year.

The free world's defenses were also improved by further progress in the base construction programs. These bases, serving allied as well as United States forces, are extending our defense perimeter and the effectiveness of the free world's retaliatory striking power.

For every dollar expended on military assistance by the United States since 1950, our allies have contributed more than six dollars for collective security—\$20.4 billion by the United States and \$130.0 billion by friendly states. As a result of these efforts, allied ground forces have grown from 3,600,000 poorly equipped men to 4,900,000 effective soldiers; active and reserve combat vessels in allied navies have increased from 1,200 to 2,500; and allied aircraft now number 30,000, of which 14,000 are jets, as opposed to 17,000 planes in 1950, fewer than 600 of which were jets. The cost to the United States of raising equivalent force levels without allied cooperation would have been prohibitive. (See fig. 9.)

#### *Status of Funds*

Since authorizing mutual defense assistance in fiscal year 1950, the Congress appropriated \$25.4 billion for military grant aid programs. Of this amount, \$23.8 billion has been available for obligation after adjustments of \$1.6 billion for lapsed funds, transfers, and reimbursements. On June 30, 1958, this entire amount, \$23.8 billion, had been obligated or reserved for obligation, including \$1.8 billion in obligations and reservations placed during fiscal year 1958.

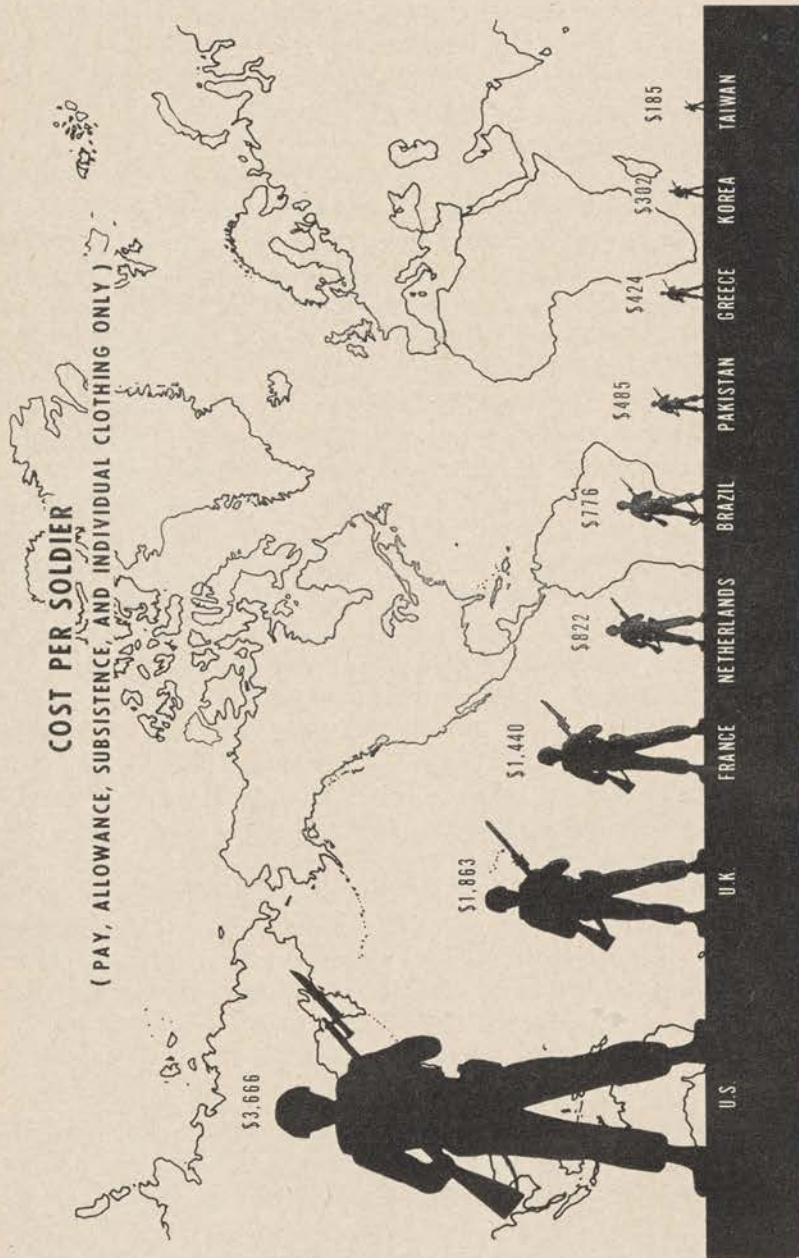


Figure 9

Expenditures during fiscal year 1958 for military assistance amounted to \$2.2 billion, bringing total expenditures since 1950 to \$20.4 billion. Unexpended balances—money for the purchase of heavy equipment requiring more than a single fiscal year to manufacture—were reduced during the year to \$3.4 billion, as compared to \$4.3 billion on June 30, 1957, and \$8.5 billion at the close of fiscal year 1953. This balance is expected to stand at \$2.6 billion after expenditures in 1959.

#### *Materiel and Training*

Nearly 87 percent—\$16.9 billion—of the military assistance funds expended were used for military equipment, ammunition, and supplies. Actual shipments were even higher than these figures indicate, for deliveries included military items, valued at an acquisition cost of over \$1.2 billion, that were excess to the current needs of our armed forces and were made available at nominal costs covering repair and rehabilitation. Thus, the materiel shipped during the past 9 fiscal years under the Military Assistance Program amounted to about \$18.1 billion, including \$1.7 billion delivered during fiscal year 1958. An additional \$1.0 billion—5 percent of total expenditures since 1950—covered the cost of packing, handling, and transporting this aid.

About \$435 million has been expended—\$60 million during fiscal year 1958—for training allied military personnel in the use and maintenance of United States equipment and military doctrine and tactics to increase the combat effectiveness of allied units. Foreign military personnel completed during the fiscal year about 11,500 training courses in the United States and 3,600 courses offered overseas under United States auspices. A total of 134,000 courses of instruction have been completed by allied personnel since 1950. In addition to improving combat effectiveness, this training has strengthened the bonds of allied friendship and promoted the free exchange of ideas.

These ends were also furthered by the establishment during the past year of regular 4-week training courses for United States personnel being assigned to Military Assistance Advisory Groups—the agencies charged with supervising supply and training operations in countries receiving grant aid. These courses explain the role of military assistance and its relationship to United States foreign policies, provide background on the nations in which United States personnel will be stationed, and otherwise prepare top military aid officials to discharge their duties more effectively.

#### *Other Military Assistance*

An additional objective of military assistance has been the development of productive capacity in allied nations for the manufacture or

repair of weapons, ammunition, and other military equipment. About 15 percent—over \$2.5 billion—of the \$16.9 billion expended by the United States for grant aid materiel has been utilized for offshore procurement—the purchase of military items from overseas producers, principally in Europe and Japan. An additional \$37 million has been expended for facilities assistance—contributions by the United States that have been matched by foreign governments for the establishment and expansion of plants to fabricate and rebuild military equipment. Offshore procurement and facilities assistance have stimulated the development of local industry, reduced allied dependence on the United States as the sole source of supply in case of war, and provided military materiel at a lower cost.

About \$72 million has been expended, including \$35 million in fiscal year 1958, to assist allied nations in the development of highly promising new weapons projects. This coordination of research efforts, including the exchange of scientific information, has greatly benefited both United States and allied development programs. Particular emphasis has been given to advanced weapons specially suited to allied needs and capable of being manufactured, operated, and maintained abroad more economically than similar items of United States design.

Countries with adequate financial resources have been encouraged to fill their requirements for weapons from European sources or by purchase from the United States rather than through grant aid. Since 1950, over 60 nations have purchased military items from the United States priced at approximately \$1.7 billion. This total includes acquisition or replacement costs for new material and a nominal charge for excess material. These sales have been for cash, except for \$100 million made available during fiscal year 1958 under credit arrangements.

#### *The Program for Fiscal Year 1959*

For fiscal year 1959, the President requested the Congress to appropriate \$1.8 billion in new funds for military assistance programs administered by the Department of Defense. This amount would support programs at approximately the same level as during 1958 and provide for the maintenance and modernization of allied forces at a rate consistent with the ability of our allies to make good use of the equipment. The 1959 programs were developed following a careful screening of allied requests and of the recommendations of United States officials in recipient countries. The Congress in August 1958 appropriated a total of \$1.5 billion in new obligational authority for military grant aid—a 17 percent reduction of the President's request. To conform to Congressional action, lowest priority items will have to be eliminated or deferred in order to place continued emphasis on

improving allied capabilities for retaliation, so essential to free world collective security.

### Europe

Members of the North Atlantic Treaty Organization (NATO) intensified their cooperative efforts during the fiscal year to adjust allied forces to constantly changing technological requirements. The bonds of the alliance were drawn tighter to meet the Soviet scientific challenge—highlighted by the launching of space satellites—and the increased Soviet aggressiveness—marked by persistent efforts at economic penetration and subversion, accompanied by threats of local aggression.

The Heads of Government of the NATO nations, meeting in Paris during December 1957, agreed that the rapid modernization of allied forces was essential to the defense of the western world. They determined to take the following important steps:

- To deploy Intermediate Range Ballistic Missiles (IRBM's);
- To stockpile nuclear warheads;
- To increase the standardization of arms and equipment;
- To promote coordinated research, development, and production of modern weapons; and
- To pool scientific manpower, facilities, and information.

Through these measures, based on the pooling of resources and the sharing of costs, NATO will continue to maintain an effective deterrent to war.

#### *Deployment of IRBM's*

The first agreement for the deployment of IRBM's in Europe was concluded in February 1958 with the United Kingdom. This agreement, based on policies approved by the President and the Prime Minister at Bermuda in March 1957, calls for the United States to provide missiles and necessary training through the military assistance program, while the United Kingdom will furnish launching sites and supporting facilities. Nuclear warheads for the IRBM's will remain in the custody of the United States.

Agreements with other European allies will be subject to arrangements between the Supreme Allied Commander, Europe, and the individual countries in which launching sites are to be located, supplemented by bilateral agreements between these countries and the United States. Discussions looking toward the conclusion of such pacts were under way at the close of the fiscal year.

#### *Nuclear Warheads and Weapons*

The United States also agreed at the December NATO meeting to establish stockpiles of nuclear warheads, under American custody,

for the increasing numbers of weapons with a nuclear capability being furnished to our allies under the military assistance program. In the event of hostilities, these warheads will be readily available for release to NATO defense forces.

At the request of the President, the Congress shortly after the close of the fiscal year amended the Atomic Energy Act of 1954 to permit the United States to give greater assistance to allied nations in the fields related to the use of nuclear weapons. Under these amendments, the Department of Defense can make available to friendly states the non-nuclear components of atomic weapons and can provide data concerning such weapons as needed for defense planning, the training of military personnel, and the development of delivery systems.

The buildup of a substantial nuclear capability is essential if NATO is to carry out its mission of deterring war and defending the people and territory of allied countries in case of attack.

#### *Standardization*

To make the best possible use of NATO resources, the allies have placed increased emphasis, after the December 1957 meeting, on measures to promote standardization and integration of weapons and equipment. Particular attention was given initially to air and naval defense weapons, logistic support, and the composition and equipment of forces. As part of this effort, a NATO-wide supply management system for more efficient control of spare parts on a regional basis has been established, as proposed by the United States. This system will promote economies in our military assistance program and allied budgets without loss of operational efficiency.

#### *Production of Modern Weapons*

As an initial step in carrying out the decision of the Heads of Government to emphasize coordinated research, development, and production of modern weapons in Europe, the NATO staff and representatives of NATO countries reviewed existing and planned weapons systems to determine which might best be produced by each ally. These cooperative efforts have been supported and encouraged by the United States, particularly through the Mutual Weapons Development Program. Funds have been made available to assist allies in completing highly promising development projects. The contribution by the United States has averaged about 35 percent of the total development cost, while allies have borne the remaining 65 percent. The mutual exchange of information on research and development techniques has proved to be of great benefit to the United States as well as to NATO allies. Several new military items, including lightweight

fighter aircraft, tactical guided missiles, and radar systems, have already been developed and adopted by NATO forces as a result of the Mutual Weapons Development Program. This cooperation has lessened the dependence of NATO upon the United States as the source for the production of modern equipment and paid substantial dividends in the early availability of improved weapons and in lowering manufacturing costs.

In addition, the NATO Council established a science committee, composed of eminent scientists from all member states, to promote close scientific and technical cooperation among the allies. A special scientific adviser to the Secretary General of NATO was also appointed. Agreement has been reached to take measures for increasing the supply of trained men in various branches of science and for achieving a greater pooling of scientific efforts and information. These steps should greatly assist in making full utilization of the scientific resources of the western world.

#### *Maintenance and Modernization of NATO Forces*

NATO's defensive strength, which has played a major role in deterring aggression since 1951, is concentrated in the forces committed to the alliance and is backed by the entire military strength of member states. Strategical retaliatory striking forces representing a major threat to would-be aggressors are the United States Strategic Air Command, the United Kingdom Bomber Command, and certain naval forces. NATO shield forces—ground, naval, and air forces directly responsible for holding the forward line of NATO territory and for guarding vital lines of communication—are under the command of the Supreme Allied Commander, Europe (SACEUR), the Supreme Allied Commander, Atlantic (SACLANT), and the Allied Commander in Chief, Channel (CINCHAN).

The numerical strength of shield forces has greatly increased since the establishment of NATO, and modern equipment has multiplied combat effectiveness many times. Despite the heavy costs involved, further progress was achieved during fiscal year 1958 in strengthening and modernizing NATO forces. Additional gains can be anticipated as a result of the decisions taken in December 1957.

European members of the alliance have assumed a steadily increasing share of the expense of maintaining conventional forces. During calendar year 1957, NATO countries expended \$13 billion for their defense, the equivalent of \$10 for every \$1 spent by the United States on military assistance programs for its European allies. The volume of military supplies sold to these countries, rather than provided through grant aid, has risen significantly. Consequently, the United

States has been able to shift the emphasis in military assistance from standard arms and equipment to advanced weapons.

The Federal Republic of Germany has now committed seven divisions to the NATO shield—three at the beginning of the fiscal year, two in December 1957, and two more at the close of the fiscal year. Some German air and naval units have also been integrated into NATO commands. While certain major items of equipment for these forces have been provided through United States military assistance programs, additional armament is being purchased by the German Government. The German contribution has materially increased NATO strength in central Europe.

#### *NATO Infrastructure*

In addition to providing military forces for common defense, NATO countries have closely cooperated in financing support bases for the deployment of these units. This effort is carried on under the infrastructure program. Typical installations include airfields, telecommunications, fuel pipelines and storage tanks, radar warning and navigational stations, port facilities, and military headquarters. Construction is financed collectively with each member country assuming a proportion of the cost appropriate to its means. The United States agreed to contribute slightly more than one-third of the currently approved program totaling \$2.6 billion. Expenditures by the United States for this purpose amounted to about \$60 million during this fiscal year, bringing its contribution to \$452 million since 1951.

Through the infrastructure program, 160 airfields have been completed for defense of NATO countries—10 times the number available in 1950; communications facilities costing almost \$350 million are now 90 percent complete; and the major part of the 5,600-mile pipeline and 2,000,000-ton storage system for petroleum is in use. The construction of additional airfields, communications networks, pipelines, and other installations has been planned and scheduled for the next 4 years.

#### *NATO Exercises*

During fiscal year 1958, NATO held the largest series of combined maneuvers in its history, involving national forces as well as units specifically assigned to the two major commands of the alliance, SACEUR and SACLANT. Naval, air, ground, and amphibious forces engaged in a number of exercises, extending from the North Cape of Norway to Turkey. Operations STRIKEBACK and SEA WATCH, conducted by SACLANT in September 1957, provided the first combined seagoing test since 1953 of NATO naval forces from

seven countries. The newest types of United States vessels demonstrated their capabilities, including *Forrestal*-class carriers, the *Nautilus* nuclear-powered submarine, and guided-missile cruisers. At about the same time, land, naval, and air forces in Europe under SACEUR carried out Operations COUNTER PUNCH, NORTH FALL, and DEEP WATER. In the spring of 1958, SACEUR forces participated in Exercise FULL PLAY, while SACLANT forces were tested in Operations DAWN BREEZE and NEW BROOM. Through these maneuvers, land, sea, and air units of many nations learned to function as a single team in combined military operations for the common defense of Europe.

#### *Other European Countries*

Assistance to Spain has been extended in order to increase that nation's potential contribution to the general defense of Europe in the event of Soviet aggression. Military grant aid to modernize Spanish forces began in 1953, following the conclusion of a bilateral agreement that permitted the United States to construct air and naval facilities in Spain. The United States Strategic Air Force has begun operations at the three major airbases, Torrejon, Zaragoza, and Moron, which are substantially completed, as are the naval air facility at Rota and the 485-mile petroleum pipeline connecting the airbases. Construction continued at the naval base at Rota. In addition, the United States provided modern equipment, construction of military facilities, and training programs to improve the combat capabilities of Spanish forces.

Yugoslavia, which in previous years had received military assistance from the United States to help it maintain an independent position, requested in December 1957 that this program be canceled. Accordingly, the United States Military Assistance Advisory Group was withdrawn in April 1958 and arrangements were made for the orderly termination of deliveries.

#### **The Middle East and Africa**

The strategically important Middle East remained a region of conflict and tension during the fiscal year. The Soviet bloc continued to expand its influence in the area, playing upon Arab nationalism and local disputes and proffering military and economic assistance in order to disrupt the friendly relations of Middle Eastern states with the free world.

Egypt and Syria, two countries that have been receptive at times to Soviet overtures, merged their governments and became the United Arab Republic in February 1958. Other states were subjected to in-

creasing pressure to join the new confederation. Internal dissension mounted in Iraq, Jordan, and Lebanon. In addition, Arab-Israeli tensions continued to smolder, while the future of Cyprus was an issue dividing Greece, Turkey, and the United Kingdom, allied in NATO.

The principal United States objective in the Middle East has been to assist the countries of the area to maintain their political independence and territorial integrity. In furtherance of this aim, the United States contributed to collective security efforts and provided military aid for defense against external aggression and internal subversion. Economic assistance was extended to help build prosperity, peace, and security in the area.

Although not a signatory of the Baghdad Pact for the collective security of the Middle East, the United States assisted the members of the treaty—Iran, Iraq, Pakistan, Turkey, and the United Kingdom—to build common defenses. A United States officer was assigned to serve as deputy director of the combined military planning staff established by the Baghdad Pact nations in the fall of 1957. High-ranking United States officials attended the January 1958 meeting of the Pact Council at Ankara.

Providing arms for common defense, the United States has expended about \$2.3 billion since 1951 for military assistance programs in the Middle East, including \$0.5 billion spent during this fiscal year. Deliveries in 1958 were more than one-third higher than the preceding year. Included in these shipments were most of the items programed as a result of special commitments, totaling \$51.1 million, negotiated after the approval on March 17, 1957, of the Congressional joint resolution to promote peace and security in the Middle East.

As a result of combined efforts, the defensive capabilities of the nations in the area have measurably improved. Greek and Turkish forces have been enabled to make a vital contribution to the security of the right flank of NATO, while Turkey also provided a link to the Baghdad Pact. Iran has been assisted in developing military strength for internal security and defense. Pakistan, a member of both the Baghdad Pact and the Southeast Asia Treaty Organization, has maintained sizable forces with American aid. Jordan and Lebanon have been provided with arms, equipment, and training for their security forces, while Saudi Arabia has purchased arms from the United States and received training assistance from grant aid funds.

Flanking both the Middle East and NATO, Africa has become the site of important defense bases and communications centers. To help maintain the freedom of the independent states in the area, many of them newly established, the United States has provided military assistance in accordance with bilateral agreements. During this fiscal year, materiel was delivered to help equip an additional 1,000 men

of the Libyan army, and a Military Assistance Advisory Group was established to assist in training local forces. The mobility and effectiveness of Ethiopian forces continued to be improved. In the fall of 1957, Tunisia purchased small arms and ammunition for its defense.

### **Asia and the Pacific**

United States policies in the Far East have been directed toward the deterrence of further Sino-Soviet expansion. To this end, the United States aimed to develop an increasingly strong free world military posture and to promote, wherever possible, the internal security of friendly Asian states. To counter the free world effort, the communist bloc placed greater emphasis on political and economic measures, but continued at the same time to build up its military capabilities. The past year provided no evidence indicating that the communists might discard force as a means for achieving dominance over the entire Far East.

To build collective security against communism, the United States has participated since 1955 in the Southeast Asia Treaty Organization (SEATO), has signed bilateral mutual security treaties with Japan, Korea, the Philippines, and the Republic of China, and has been associated with Australia and New Zealand in the trilateral ANZUS security treaty of 1951. Through these arrangements and through United States military assistance programs, Far Eastern nations significantly improved their defensive capabilities during the past year.

#### *SEATO*

The 8 members of SEATO—Australia, France, New Zealand, Pakistan, the Philippines, Thailand, the United Kingdom, and the United States—cooperated effectively during the fiscal year in maintaining allied forces at a high level of readiness, preparing national contingents for combined operations, and developing joint defense plans. The United States, the United Kingdom, and Australia supplied other members of the alliance with arms and training assistance, while France and the United States aided Cambodia, Laos, and Vietnam. These three Indochinese states are covered by the SEATO treaty but are not associated as members.

Several SEATO military exercises were conducted to develop teamwork among national forces and to improve operational procedures. Particularly noteworthy was SEATO's first major amphibious operation, PHIBLINK, during November and December 1957 in the Philippines, involving a task force of 18,000 men. Coordinated defense plans for resisting aggression in the treaty area were developed during the year by the military planning office, established in

March 1957. In addition to furthering military cooperation, SEATO allies gave considerable attention to improving their capabilities for coping with internal subversion and extended the range of their economic collaboration.

Besides being associated with the Philippines in SEATO, the United States has had a bilateral mutual defense treaty with that country since 1952. To improve military collaboration, the two allies agreed in May 1958 to establish a mutual defense board to facilitate liaison and consultation on military matters. The agreement also provides for Philippine military liaison officers to serve on the staffs of commanders of major United States military bases in the Philippines.

*Korea, Japan, and Taiwan*

North of the SEATO area, the United States has built additional free world strength through military assistance to Korea, Japan, and the Republic of China. These three countries have received about three-fourths of the military assistance programed for the Far East since 1950.

The Republic of Korea is maintaining the fourth largest free world army to protect itself against ever-possible communist incursions. This threat has not subsided despite the announcement by Communist China in the spring of 1958 of its intention to withdraw forces from North Korea. The United Nations Command in Korea began to modernize its forces during this fiscal year, as the communists had done earlier despite armistice conditions to the contrary. The two United States divisions in Korea were reequipped with weapons having a nuclear capability, while more modern arms were being provided to Korean forces through the Military Assistance Program.

Japan, with its large industrial capacity, remained a prime target of the communists during fiscal year 1958. With United States assistance, Japanese self-defense forces have taken over from the United States increased responsibility for the security of their country. Japanese ground forces became responsible for the land defense of Hokkaido and Kyushu; the air self-defense force began manning air communications and warning sites and antiaircraft artillery installations previously operated by United States Air Force and Army units that have been withdrawn; and Japanese maritime forces developed considerable effectiveness in antisubmarine warfare and naval-air operations. Further improvements in Japanese defense capabilities are essential for the security of both Japan and the United States.

To assist the Republic of China in building and maintaining strong defensive forces, the United States has continued to provide during

the past year weapons, equipment, and training. This assistance has been essential in order to enable Chinese forces to defend their territories against communist attack. Young Taiwanese entered the ranks of the Chinese forces in increasing numbers, replacing some 80,000 older mainland Chinese. The Republic of China has provided an important bastion of strength to free world defenses in the western Pacific and has remained a standing obstacle to the communist aim of permanently dominating all Chinese people.

### *ANZUS*

The cooperation of the United States, Australia, and New Zealand in SEATO and in ANZUS steadily improved in fiscal year 1958. The two Commonwealth dominions strengthened the military effectiveness of their forces through arms purchases in the United States. The procurement of C-130A military transport aircraft by Australia was facilitated by credit extension. In addition, the United States and Australia concluded an agreement in January 1958 to assist in the exchange of patent rights and technical information for defense purposes.

The forces of our allies in the Far East are backed up by the highly mobile striking units of the United States stationed in the western Pacific, operating under the unified command of the Commander in Chief, Pacific (CINCPAC). This combination of United States strategic forces and military assistance and of allied capabilities is providing an effective deterrent to communist military expansion, as long as it is backed by the firm resolution of all concerned to preserve freedom.

### **The Western Hemisphere**

Since 1947, the 21 American Republics have been jointly responsible for the defense of the Western Hemisphere under the terms of the Inter-American Treaty of Reciprocal Assistance, which established the principle that an attack on one American state would be considered an attack on all. In keeping with this principle, common security plans have been developed by the Inter-American Defense Board, on which the United States and the other American Republics are represented. Through this joint consultation and planning, military efforts directed toward mutual defense were given renewed emphasis during fiscal year 1958.

All Latin American nations have been eligible to participate in the mutual security military sales program of the United States, and all have availed themselves of this means to improve their military forces. Since 1951, these countries have purchased weapons, equipment, and

supplies from the United States totaling \$112 million, an increase of \$29 million during this fiscal year.

Under bilateral military assistance agreements with 12 Latin American nations, the United States has provided equipment and training for forces specially designated for collective defense missions, such as the protection of vital communication lines, supply sources, and strategic areas. Grant aid amounting to \$41 million was furnished for such forces during this fiscal year, bringing total deliveries since 1951 to \$159 million. In addition, the United States has supplied excess stocks of military equipment valued at an acquisition cost of \$107 million. This assistance has helped to equip and train 20 battalions of ground forces and 21 air squadrons, including 2 naval air squadrons, and to maintain 81 naval vessels. In addition, Brazil and the Dominican Republic have given valuable assistance to common defense by providing sites for missile tracking stations essential for the effective operation of our long-range ballistic missile proving ground.

The United States has encouraged the standardization of military doctrine and techniques throughout the Hemisphere by training members of the military forces of other American states, by providing military advisory missions to countries that request them, and by conducting orientation visits to United States military installations for Latin American officers and defense officials.

Since 1951, over 8,000 students have taken advantage of courses in various military specialties offered by Service schools in the United States and the Canal Zone. Military advisory missions are being maintained in 18 American Republics, including a total of 40 Army, Navy, and Air Force missions. Under legislation enacted in 1926, members of these missions have been authorized in the past to accept offices and compensation from the country to which they were accredited. This authority was restricted by the Mutual Security Act of 1958, approved on June 30, 1958, which prohibited United States officers from receiving emoluments from other governments after March 1, 1959.

Under the 1958 legislation the President will review annually the necessity for providing military assistance to American Republics. The contribution being made to collective security will remain the criterion by which the need for assistance will be determined.

Closer cooperation between Argentina and the United States was furthered by the participation of United States Air Force units in Argentina's Aviation Week in November 1957. A KC-135 jet tanker made record-breaking nonstop flights from Maine to Buenos Aires and from Buenos Aires to Washington, while 6 B-52 bombers completed a nonstop flight from Florida to Buenos Aires to New York. Demonstrations of United States aircraft in flight formations and ground

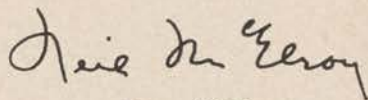
exhibits were also provided. At the request of the Brazilian Government, the air demonstration and ground exhibits were subsequently shown at Rio de Janeiro.

Canada's role in the collective defense of the Western Hemisphere is steadily increasing, largely as a result of the scientific and technological revolution in warfare. Canada has provided sites for early warning radar facilities, has manned some of these stations, and is assuming extensive responsibilities for support and operations.

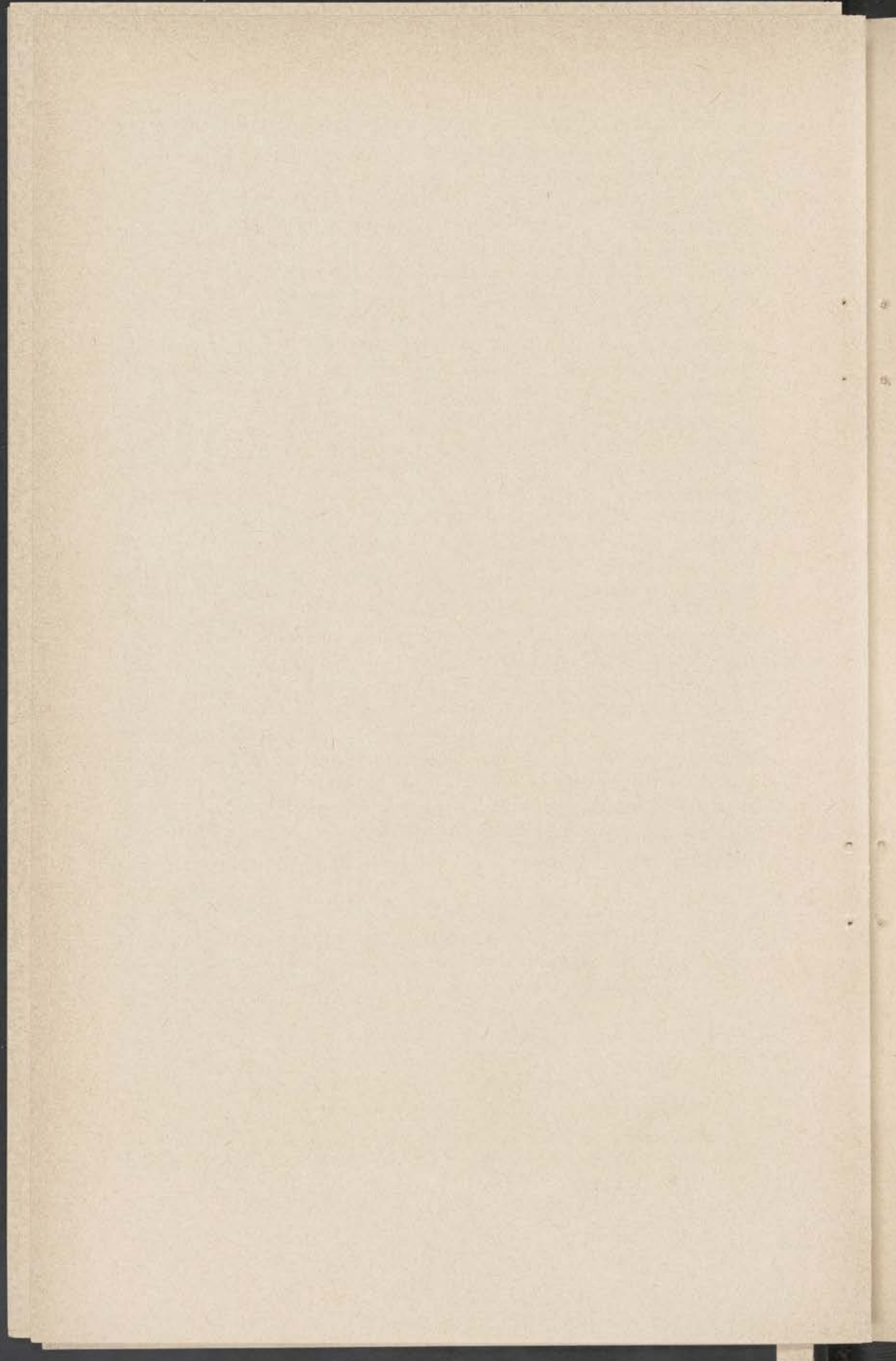
Another Canadian contribution to common defense is the additional security provided by Canadian air interceptor units. Operational control of many of these units was vested this year in the North American Air Defense Command (NORAD), established by joint agreement in August 1957. This command, with headquarters in Colorado Springs, Colorado, is responsible to the Chiefs of Staff of both countries and is currently headed by a United States Air Force officer who is assisted by a Canadian deputy commander.

Overall coordination of United States and Canadian defense efforts continued to be achieved during fiscal year 1958 through the Permanent Joint Board on Defense, Canada-United States. Canada is also a partner with the United States in NATO. Through the NATO Canada-United States Regional Planning Group the two nations have developed plans for the protection of North America. Parts of these plans were tested during the year in several joint naval training exercises under control of the Supreme Allied Commander, Atlantic.

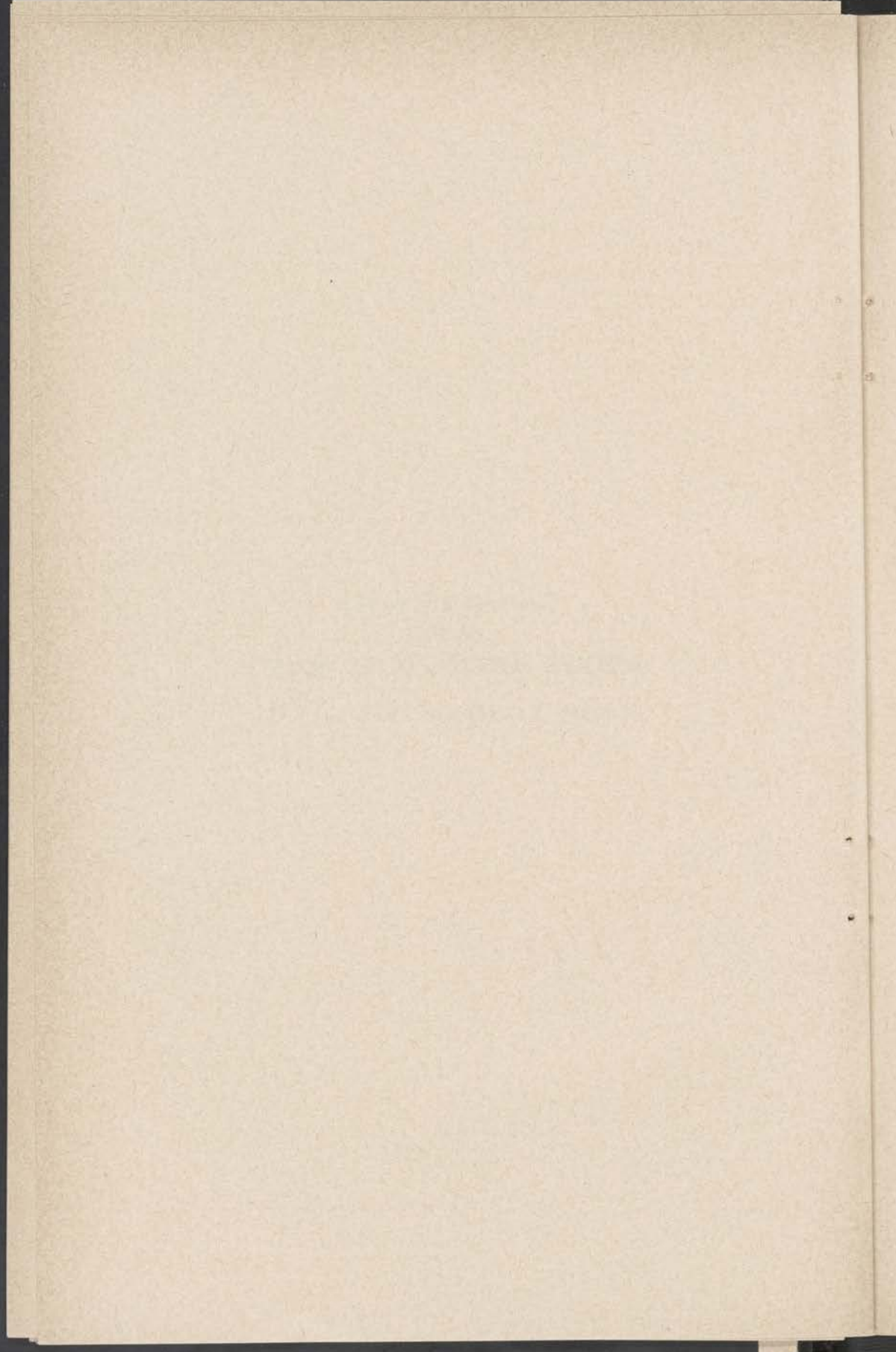
Shortly after the close of the fiscal year, the close cooperation of the two nations was symbolized by a visit of President Eisenhower and the Secretary of State to Ottawa. There the two governments agreed to establish a Committee on Joint Defense at the ministerial level to supervise existing arrangements for concerted defense planning. United States members of this committee will be the Secretaries of State, Defense, and the Treasury.



NEIL McELROY,  
*Secretary of Defense.*



*Semiannual Report*  
*of the*  
**RESERVE FORCES POLICY BOARD**  
January 1, 1958, to June 30, 1958



In accordance with the requirements of Section 257(e) of the Armed Forces Reserve Act of 1952, as amended, the following semiannual report on the status of the reserve programs of the Department of Defense is submitted for the period January 1-June 30, 1958.

The Reserve Forces Policy Board met on three occasions during the reporting period for the purpose of examining and studying the reserve components programs. The results of its studies were forwarded to the Secretary of Defense as recommendations on matters of policy and legislation affecting the reserve forces. Members of the Board made several on-site and on-board surveys of reserve activities and facilities to obtain firsthand knowledge to be used in the discharge of their duties to the Secretary of Defense.

The only changes in Board membership during the period occurred on March 19, 1958, when Maj. Gen. Clyde E. Dougherty, USAR, replaced Maj. Gen. Leif J. Sverdrup, USAR, retired, and on April 4, 1958, Rear Adm. Richard M. Ross, USCG, replaced Rear Adm. Allen Winbeck, USCG.

#### **General**

The mission of the reserve components is to provide trained and qualified individuals and units for active duty in the armed forces of the Nation, to augment their regular components, in time of war or national emergency and at such other times as the national security may require. This report is intended to reflect the actual mobilization readiness and potential of the reserve components against their assigned mission.

#### **Personnel**

The Ready Reserve changes in numbers enrolled and numbers in drill pay status, officers and enlisted men, are indicated for each component in Figure 1.

Since the enactment of the Reserve Forces Act in August 1955, the training readiness of all reserve components has shown a steady increase. The provisions of this Act, especially those that control enlistments and screening and utilization of obligors, have made it possible for the reserve components to attain a degree of readiness that will eventually enable them, upon mobilization, to meet their planned deployment schedules.

It is evident by now that parts of the provisions of the Act referred to are of greater value to one Service than another because of their particular requirements. The Army, Marine Corps, and the Air Force are disposed favorably toward the 6-month training, whereas the Navy, feeling that there is no substitute for the experience gained from extended active duty, still relies on the 6-year reserve enlistment (which requires 2 years of active duty) for its reserve manpower.

The one major unsurmountable obstacle encountered by the Services utilizing the 6-month training provision has been budgetary restriction. However, despite such restriction, this and other provisions of the Reserve Forces Act of 1955 have resulted in qualitative improvement in the growth and progress of the reserve components. The numbers of men participating in the special 6-month active duty training program, officer and enlisted, are indicated by component in Figure 2.

## PERSONNEL

## Ready Reserve (Not on Active Duty)

	June 30, 1957		December 31, 1957		June 30, 1958	
	Total	Drill pay status	Total	Drill pay status	Total	Drill pay status
	Army National Guard.....	441,798	*422,178	434,203	*403,595	442,369
Officers.....	41,801	36,795	42,458	37,229	42,755	37,942
Enlisted.....	399,997	385,383	391,745	366,366	399,614	356,387
Army Reserve.....	1,008,438	290,377	1,028,180	217,009	955,462	272,683
Officers.....	152,308	73,308	158,070	47,958	157,825	49,584
Enlisted.....	856,130	187,069	870,110	169,051	797,637	223,099
Naval Reserve.....	463,188	141,747	508,160	129,671	530,440	129,632
Officers.....	77,190	27,728	80,005	26,445	82,408	26,513
Enlisted.....	**385,998	114,019	**427,555	103,226	**448,032	103,119
Marine Corps Reserve.....	239,898	46,150	238,576	45,041	215,749	46,173
Officers.....	12,691	4,106	13,099	4,175	13,434	4,143
Enlisted.....	**227,207	42,044	**225,477	40,866	**202,315	42,030
Air National Guard.....	67,950	*67,950	69,029	*69,029	69,995	*69,995
Officers.....	8,033	8,033	8,254	8,254	8,354	8,354
Enlisted.....	59,917	59,917	60,775	60,775	61,641	61,641
Air Force Reserve.....	217,846	61,677	228,316	56,143	214,809	48,287
Officers.....	45,099	32,759	43,289	26,737	42,810	19,522
Enlisted.....	172,147	28,918	185,027	29,406	171,999	28,765

## Notes

\* Excludes Arkansas National Guardsmen on active duty.

\*\*Includes personnel undergoing 6-month ADT and excludes inactive National Guardsmen.

\*\*\*Includes Officer Candidates.

Figure 1

*The Reserve Officers Personnel Act of 1954*

In an effort to clarify certain passages and to eliminate unintended discrimination against a particular group or category of officers, the Reserve Forces Policy Board has recommended certain changes to the Reserve Officers Personnel Act of 1954, as amended (ROPA). These recommended amendments, including provisions for permanent promotion, were incorporated into the Reserve Officer Personnel Act Omnibus Amendments bill (DOD 85-250). This was forwarded to the Bureau of the Budget on May 23, 1958. It is expected that this bill will be introduced early in the first session of the 86th Congress.

*The Army National Guard*

The Army National Guard continues to maintain the highest mobilization potential in its history. The major training objective of the Army National Guard was to initiate unit training in all units by October 1, 1958. To achieve this objective, a successful concentrated effort was made to complete individual training of nonprior service personnel, and this was accomplished by September 30, 1958.

Since the last report, Federal recognition has been withdrawn from 110 units—of this number about 60 were due to TOE changes and the remainder because of low strength—in order to build up the strength of remaining units. This will facilitate unit training and the pending reorganization of the Army National Guard.

During this period the Army Service School Program of the Army National Guard remained at approximately the same level as indicated in the preceding report. Emphasis was placed upon the training of officers in basic and advanced courses and at the Command and General Staff College level, and on the training of enlisted men through noncommissioned officer courses. The numbers of Guardsmen enrolling in extension courses administered by the Army Service Schools reflect a 4 percent gain to 66 percent of the officer strength, and .1 percent loss to 5.6 percent of the enlisted strength.

During this 6-month period, 4 more states established Army National Guard Officer Candidate Schools bringing the total to 38 schools existing in 38 states. 2,600 cadets participated in training at these state Officer Candidate Schools during fiscal year 1958.

Participation in the Army National Guard training programs continues to be rated as excellent. Army drill attendance was approximately 95 percent for officers and 88 percent for enlisted men. Annual active-duty-for-training attendance continued at approximately 95 percent for both officers and enlisted men.

Aviation in the Army National Guard reached a new high in pilot strength and flying hours in fiscal year 1958. A total of 1,154 aviators on flying status flew 134,111 hours in 747 aircraft.

*The U.S. Army Reserve*

During this 6-month period, plans for the reorganization of the USAR were completed and approved with implementation being scheduled to commence about January 1, 1959. While a period of turbulence is to be expected, the reorganization should result in a strengthening and modernization of the USAR.

At the end of this reporting period, 39 of the 49 military districts had been consolidated into 11 United States Army Corps (Reserve) headquarters. Cur-

SPECIAL 6 MONTHS' ACTIVE DUTY RESERVE TRAINING PROGRAMS  
(ACTUAL AND PLANNED—FISCAL YEAR 1958)

(Data Cumulative from 10 August 1955)

	Actual					Planned 30 June 1958
	30 June 1957	31 Dec. 1957	31 Mar. 1958	31 May 1958	30 June 1958	
ENLISTED						
Army Reserve:						
Enlistments.....	90,386	101,035	114,407	117,956	118,626	119,658
Entered A.D. Training.....	64,673	91,086	99,018	105,678	109,941	109,855
Completed A.D. Training.....	24,249	70,136	80,678	87,109	87,373	87,652
Army National Guard:						
Entered A.D. Training.....	25,642	47,978	56,271	64,667	69,914	68,842
Completed A.D. Training.....	6,485	28,487	38,854	45,278	45,334	46,146
Naval Reserve:						
Enlistments.....	387	529	n.a.	n.a.	639	672
Entered A.D. Training.....	387	445	602	630	633	672
Completed A.D. Training.....	184	353	387	541	602	602
Marine Corps Reserve:						
Enlistments.....	13,224	18,271	20,354	22,073	22,654	22,524
Entered A.D. Training.....	6,059	11,233	12,539	13,095	14,850	14,911
Completed A.D. Training.....	2,355	4,460	7,785	9,000	9,149	9,203
Air Force Reserve:						
Enlistments.....	3,866	4,721	6,158	6,430	6,837	6,861
Entered A.D. Training.....	1,676	4,150	5,470	5,956	6,136	6,013
Completed A.D. Training.....	19	1,583	3,332	4,001	4,256	4,243
Air National Guard:						
Entered A.D. Training.....	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Completed A.D. Training.....	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
OFFICERS						
Army Reserve:						
Entered A.D. Training.....	11,087	13,823	15,846	17,031	17,701	17,807
Completed A.D. Training.....	4,596	11,036	12,113	12,946	13,020	13,087
Air Force Reserve:						
Entered A.D. Training.....		110	125	142	151	166
Completed A.D. Training.....			1			103

Note. n.a.—not applicable.

Figure 2.

rent plans contemplate consolidating the remaining 10 military districts into three additional corps headquarters. This consolidation has resulted in a strengthening of command and supervision of Reserve units.

The Commanding General, U.S. Continental Army Command, issued a directive late in fiscal year 1957 that all officers take steps to increase their military education qualifications. Compliance with this directive has raised the enrollment in USAR schools to 17,580, which includes 10,993 formally enrolled, 3,313 attached, and 3,274 auditor students. In addition, there were 55,288 officers enrolled in Army extension courses.

During the summer field training periods held during the 6 months covered by this report, USAR units handled a substantial part of their training requirements, 90 percent of their units' administration, and 50 percent of their mess operations. These gains in self-sufficiency should increase during future summer encampments.

The need for unit administrative assistants, storekeepers, and maintenance technicians continues to present a problem for USAR units. Against a recognized need for 5,300 such personnel, 2,187 had been hired at the end of fiscal year 1958. In an attempt to alleviate this situation, the Department of the Army has developed an Army Reserve Technician's Plan, which in purpose is very similar to the Air Reserve Technician Plan. As of the closing date of this report, the Army's plan had received Secretary of Defense approval and had been forwarded to the Civil Service Commission for consideration.

Of personnel assigned to drill pay units of the Army Reserve, 87 percent of the officers and 75 percent of the enlisted strength participated in scheduled armory training. Participation in annual unit training was 90 percent for officers and 83 percent for enlisted personnel.

#### *The Naval Reserve*

Faced with a reduction in the authorized number of reservists in drill pay status, the U.S. Naval Reserve training programs were reoriented to insure that those reservists needed immediately at the beginning of hostilities were included in the drill pay group to the maximum extent. This reorganization plan was approved on February 13, 1958, and created the Selected Reserve within the Navy's Ready Reserve. Under this new concept the "Selected Reservists," all of whom are in drill pay training, will automatically report for duty without further recall in case the country is attacked or full mobilization is ordered. To facilitate this procedure, Selected Reservists are issued precut recall orders for automatic execution under emergency conditions. The orders are printed on 3½" x 4½" cards, suitable for carrying at all times.

Realignment of the Naval Air Reserve squadrons to the Selected Reserve concept is expected to be completed by September 30, 1958. The realignment consists primarily of a major reduction in VF/VA (fighter/attack) squadrons and a major increase in ASW-(Antisubmarine Warfare)-type squadrons. All current planning within the Naval Air Reserve Program is being handled under the Selected Reserve concept. Selected Reserve pilots are receiving priority treatment with regard to available aircraft hours.

The Naval Reserve officer strength is within 80 percent of the quantitative requirements for mobilization. The enlisted strength has risen to meet the Navy's authorized ceiling of 530,000. Vigorous screening will bring about necessary qualitative capabilities. More than 80 percent of the Ready Reserve have had prior active duty, and all but about 16,000 have had the equivalent of basic

training. Of the latter, more than one-half will complete their basic training during the current year.

The Naval Reserve Officer Schools, with extensions, currently established at 157 locations, offer courses in 44 different officer training subjects.

An increase of the team-training concept, multiple (weekend) drills, and more effective afloat training have enhanced the vigor and quality of enlisted training.

#### *Marine Corps Reserve*

The objectives of the Marine Corps Reserve remained unchanged during the past 6-month period, and may be summarized by stating that efforts to establish a reserve able to fulfill its mobilization mission were continued. Although little could be done during this period to overcome mobilization deficiencies in certain fields because of inadequate funds, these deficiencies remain relatively small. Numerically, the Marine Corps Reserve can more than meet its mobilization requirements. All officers have completed tours of active duty and over 165,000 enlisted personnel have met or exceeded minimum training requirements for deployment overseas. Progress in the nondrill pay component was minimal. Severe funding limitation permitted only about 1,350 officers to be trained, which represents only 14 percent of the volunteer pool.

The aviation component made progress in strengthening the Marine Corps Reserve by the reorganization of the aviation reserve structure to more accurately reflect the mobilization requirement of the regular establishment and to improve individual pilot proficiency. Generally, the reorganization involved a reduction in the number of fighter squadrons, an increase in the number of attack squadrons, a reduction in the size of all units, and the addition of helicopter squadrons.

Rigid screening processes designed to eliminate nonavailable or noneffective personnel resulted in a distinct improvement in the readiness of the Marine Corps Reserve.

#### *The Air National Guard*

As a result of Project STREAMLINE III, a project which required the inactivation, reorganization, and conversion of the Air Reserve forces, the Air National Guard program objectives were in the main attained. A total of 72 flying squadrons had converted to more modern and complex aircraft by the end of this reporting period. Despite these many conversions, aircrew readiness increased from 27 percent to 33 percent and aircraft operationally ready increased to 63 percent. For the first time Air National Guard units received Century series aircraft, two squadrons being equipped with F-100's. Flying training objectives were accomplished as the Air National Guard aircraft operated for almost 437,000 hours. Pilot proficiency increased and the accident rate decreased to a new low.

More than 14,870 Air Guardsmen were sent to service and technical schools of the Regular Air Force, including 10,740 basic airmen sent to pretechnical training courses. The Air Defense Air Alert Program continued to provide effective air defense coverage and maximum opportunity for the combat training of all the aircrews participating. The Air National Guard now operates its own Jet Instrument School at Ellington Air Force Base, Texas, to provide the instrument phase of advanced pilot training formerly conducted at home stations. Thus far 206 students have been graduated from the new school. Seventeen additional Air Defense groups were organized to parallel Regular Air Force organizations and provide more effective operation.

*The Air Force Reserve*

Utilization of the Air Force units in Operation SWIFTLIFT continues to benefit not only the Reserves but the Air Force and the Nation. This program combines the crosscountry training of crews with useful, productive airlifting of cargo and personnel for the Air Force under control of the Tactical Air Command. Most of the airlifting has been of high-value, high-priority items, such as jet engines which cannot be flown in an assembled condition in commercial cargo aircraft. The Reserve units move those outsized items or such security cargo as must be transported by military aircraft. Thus, in the course of training, the Air Force Reserve fulfills a useful day-to-day Air Force requirement.

The Air Force Reserve now has 14 C-119 troop carrier wings of 42 squadrons, and 1 C-123 wing of 3 squadrons. The acquisition of the C-123 aircraft marks the first time that the Air Force Reserve will be equipped with first-line aircraft that are currently being utilized by the active force.

Eighteen Air Reserve squadrons (Navigator Training) were operational on June 30, 1958, manned at 99.6 percent of authorized strength. The annual navigator competition was held in May. Representatives of the gaining commands (SAC, ADC, MATS) observed the meet and expressed entire satisfaction with the state of trained readiness. Air Force Reserve units and individuals are prepared to report for active duty on a moment's notice. Emergency orders have been issued to be effective with a declaration of war or national emergency.

Sixteen Air Reserve training wings have been organized within the Continental Air Command to provide closer supervision of Center training activities. Preparation of a new professional military course for use in Air Reserve Centers was initiated at the Air University.

In implementation of the Air Reserve Technical Plan, scheduled for completion by the end of fiscal year 1959, a total of 166 personnel have been assigned.

**Equipment***The Army National Guard and Army Reserve*

The equipment situation in the Army National Guard continued to improve during this period. Equipment on hand increased in most categories, with shortages existing mainly in those categories where equipment was in national short supply. Overall, the Army National Guard, at the end of this period, was sufficiently equipped to carry out armory and field training, and to initiate post-mobilization training. Shortages affecting training were in M-106 recoilless rifles, tractors, and fixed-wing aircraft and helicopters, all of which are in national short supply. Any substantial additional issue of equipment to the Army National Guard, other than to overcome present shortages, is dependent on funds for commensurate increases in storage and maintenance facilities and personnel.

The U.S. Army Reserve units at home stations (USAR centers) now have approximately 12 percent of the equipment authorized in Tables of Organization and Equipment (TOE), computed on the basis of the average situation of all units. The goal for the end of fiscal year 1958 was 10 percent. Individual-type organizational clothing and equipment levels have also increased during this period to approximately 80 percent of authorized allowances. Quantities of individual clothing and equipment on hand have reached approximately 100 percent. To achieve economy and to meet the requirement for major items of equipment for annual summer training, substantial quantities of equipment are

pooled at various training sites and stored and maintained at Army Reserve expense. This system reduces the overall volume of equipment items and eliminates the cost of transporting these items in and out of the site yearly.

#### *The Naval Reserve*

In programs other than air, training equipment is considered barely adequate. Within fund limitations, replacement is made when possible to achieve modernization. Naval Reserve training, a large portion of which is individual training, utilizes equipment assigned to the various training activities for this purpose. Material and equipment located at training centers and aboard training ships is used fully both for individual and team training.

Special emphasis has been placed on obtaining first-line antisubmarine-warfare aircraft for Air Reserve training programs. In general, results have been satisfactory and the Reserve squadrons are training in the same type aircraft as the fleet squadrons use. However, a marked deficiency exists in the assigned long-range patrol aircraft. Only 68 percent of assigned P2V's are configured for ASW training, and only 50 percent are first-line ASW aircraft. All fighter and high-speed attack squadrons are equipped with jet aircraft. Although ASW helicopters are being assigned to the Naval Air Reserve, most of those now being used are training and utility models which do not possess ASW capabilities.

#### *The Marine Corps Reserve*

The status of unit and individual equipment of the Ground Reserve continues to be satisfactory. Unit manning levels, which are necessary due to the personnel ceilings imposed, have eliminated to a great degree the necessity for having full allowances of unit equipment on board; however, with the exception of certain AAA equipment, full allowances are available when required and requisitioned to support training.

Modernization of equipment in use for training is continuing. During this 6-month period, the tank allowances of units were changed from M47's to M48A1, the latest model tank in use by the Fleet Marine Forces. Also M33 quarter-ton trucks (jeeps) are being replaced by M38A1 when replacement is required.

Individual equipment required for the training of the aviation component is satisfactory. The Reserve air control squadrons are operating the latest service-type electronic equipment. The majority of the fighter and attack squadrons are equipped with jet aircraft, the remainder of the squadrons being equipped with the latest propeller-driven attack aircraft or helicopters. The very low availability of suitable helicopters for Reserve units severely hinders the training of the Reserve helicopter pilots in the Marine Corps vertical-envelopment doctrine.

#### *The Air National Guard and the Air Force Reserve*

As of June 30, 1958, the Air National Guard had 2,429 aircraft, which is 91 percent of its authorization. Of this number 2,135 are jet-powered (1,774 fighters, 140 reconnaissance, and 221 trainers). Many of these are first-line aircraft such as the Century series F-100's. No equipping problems is foreseen either in this category or with clothing and individual equipment.

The objective for Air National Guard unit mission and training equipment is a 100 percent level, of which units now possess 80 to 90 percent. There are some shortages of certain communications and electronic equipment, but not sufficient to impair the training program.

As of the end of this reporting period the Air Force Reserve troop carrier units had 518 C-119 aircraft assigned against an authorization of 640, and 37 of the 48 authorized C-123's. This is a much improved situation and is considered satisfactory. Prescribed "Unit Essential Equipment" allowances for the Air Force Reserve provide equipment for training as well as for wartime missions. The phase-in of equipment to individual units is geared to assigned personnel, facilities available, and the numbers of aircraft to be supported. As a result of changes in the program involving extensive unit and aircraft conversions the overall unit-equipping status for the Reserves dropped from 61 percent to 50 percent. This figure is rapidly rising as the units complete the turn-in of previously required fighter equipment and acquire equipment related to their current troop-carrier mission.

Support equipment for these units is still unsatisfactory. Over \$2 million was allocated in the fiscal year 1958 buying program for support equipment for these units. However, only 30 percent was purchased and distributed.

In addition to the flying units the Air Force Reserve includes some AACCS squadrons, AFR communication units, and one AACCS installation squadron. During this reporting period training was limited due to lack of equipment and incomplete manning in some units, especially within those of mobile type. Some training was accomplished using equipment of the Regular establishment. The limited equipment deliveries in fiscal year 1958 were due primarily to a lack of funds for procurement.

## Facilities

### *The Army National Guard and the Army Reserve*

Upon enactment of the National Defense Facilities Act of 1950, the several States and Territories had in existence only 916 armories adequate to properly house federally recognized Army National Guard units, and those facilities were constructed without Federal assistance as provided in the Act. Subsequent to the enactment of NDFA 1950, the Army National Guard has completed or placed under construction contract 1,050 armories with Federal contributions as provided under said Act, as amended. Of this total, 836 have been completed and 214 are under contract for construction. In addition, there are 74 armories (plus 23 additions to existing armories) programed for fiscal year 1959.

Existing adequate Army National Guard armories are being jointly utilized together with one or more of the other reserve components in 175 locations.

The following figures illustrate activities in the Army National Guard facilities area for the reporting period:

FISCAL YEAR 1958 PROGRAM			FISCAL YEAR 1958 PERFORMANCE		
Projects		Direct obligations (millions)	Projects (contract awards)		Direct obligations (millions)
Armory	Nonarmory		Armory	Nonarmory	
94	23	\$14.0	121	26	\$15.8

The U.S. Army Reserve had as of June 30, 1958, 1,810 U.S. Army Reserve centers in use including those constructed, leased, or donated. Of the total, 1,617 were in leased and donated spaces and 193 were constructed from standard design. Of the leased and donated facilities, 458 were reported by the Army Commander concerned to be adequate for long-range use.

The following figures illustrate activities in the U.S. Army Reserve facilities area for this reporting period:

FISCAL YEAR 1958 PROGRAM			FISCAL YEAR 1958 PERFORMANCE		
Projects		Direct obligations (millions)	Projects (contract awards)		Direct obligations (millions)
Armory	Nonarmory		Armory	Nonarmory	
83	0	\$21.0	80	30	\$22.2

Of the 193 Army Reserve centers completed through fiscal year 1958, 51 centers were completed during this fiscal year. In addition, one separate maintenance shop was also completed. Of the 112 centers under construction through fiscal year 1958, 80 were placed under contract during this fiscal year. Contracts were also awarded for 4 expansions, 13 assembly halls, and 13 maintenance shops. Adequate U.S. Army Reserve centers are jointly utilized with other reserve components to the maximum practical extent.

#### *The Naval Reserve*

On June 30, 1958, there were 300 Naval Reserve training centers, 19 Naval Reserve training facilities, 155 electronic facilities, and 9 electronic stations. Of the 319 training centers and facilities, 74 percent are used jointly with one or more reserve components of the armed forces. Progress was made during the reporting period in replacing and modernizing a few of the pre-World War II and World War II surplus-type Naval Reserve training centers. With 61 percent of the 319 training centers and facilities being of the Quonset- or Butler-type construction, and 18 percent being wood-framed barracks-type buildings, structural deterioration is occurring rapidly. Since the beginning of the Naval Reserve construction program, 21 replacement training centers and 24 electronic facilities have been completed.

As of the end of this reporting period there were 22 activities in the Naval Air Reserve Command. No new naval air stations were commissioned and six were disestablished for lack of supporting funds. Of the 22 activities, 21 are used jointly with the Marine Corps Reserve and 13 are shared with the Air National Guard, the Air Force Reserve, or both.

All Auxiliary Air Units (AAU's), of which there were 73, were decommissioned in this period. Funds saved by the elimination of these units were distributed to other areas where they were urgently needed.

#### *The Marine Corps Reserve*

At the end of fiscal year 1958 the Marine Corps Reserve occupied 230 facilities, 4 less than at the time of the last report because of certain consolidations. Of the 230 training centers, 156 are jointly occupied with the Naval Reserve, 2 jointly with both the Army and Naval Reserve, and 1 with the Army Reserve only. The remaining 71 consist of 46 federally owned and 25 leased facilities. Improvements in the facilities situation include construction of (1) five structures for storage and maintenance of automotive and engineer equipment and artillery weapons; and (2) four training centers which replaced inadequate facilities. Of the latter, two were built jointly with the Naval Reserve. Four commercially leased facilities were eliminated during this period.

Marine Aviation Reserve units are based at naval air stations and receive logistic support from the Navy. The facilities available and used in this period were adequate.

#### *The Air National Guard and the Air Force Reserve*

Fiscal year 1958 funds of \$22.1 million were used to construct facilities for the Air National Guard and to develop plans for projects to be undertaken in future

years. The major accomplishments were construction of 12 group operation and training buildings, 4 AC&W buildings, and complete new facilities at two locations; lengthening of 7 existing runways; and installation of 23 arrestor barriers. Advanced planning was authorized for the design of 15 arrestor barriers, expansion of 9 aircraft parking aprons, and complete new facilities at one location.

To accommodate the total program of 595 major and organic units of the Air National Guard, 94 flying and 41 nonflying bases will be required. As of June 30, 1958, 573 of these units were active, and all of the bases except one flying location were occupied. Thirty-nine of the flying bases are in the joint-use category.

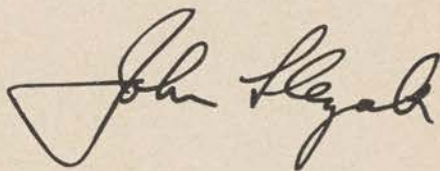
Fund requirements for Air National Guard construction and necessary base improvements for future years are estimated as follows:

<i>Year</i>	<i>Number of bases</i>	<i>Amount</i>
Fiscal year 1959.....	35	\$11, 900, 000
Fiscal year 1960.....	42	22, 000, 000
Fiscal year 1961.....	41	18, 300, 000
Fiscal year 1962.....	48	20, 300, 000

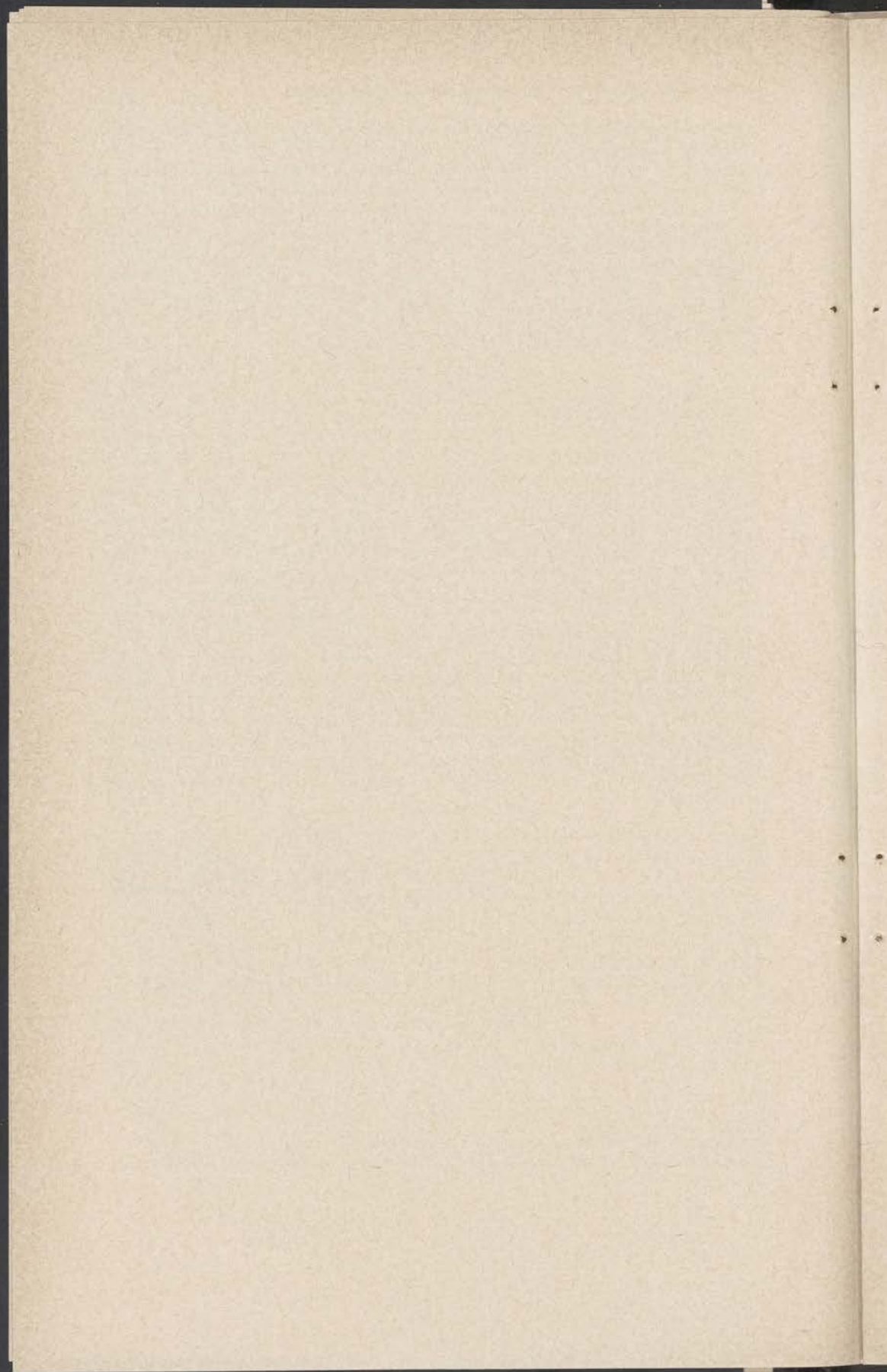
During fiscal year 1958 a total of \$16,100,000 was obligated for operational facilities at 11 Air Force Reserve flying training bases. This includes one Air Reserve Center (nonflying) constructed at Wilkes-Barre, Pennsylvania, at a cost of \$270,000. At the close of the fiscal year, 33 of the 35 reserve troop carrier flying bases were operational, in varying degrees of completeness.

Joint utilization of Reserve flying facilities is effected as far as possible in the interest of economy. Twenty bases are jointly used with the Air National Guard, 3 with the Navy, and 5 bases are used only by the Air Force Reserve.

There are now 82 Air Reserve Centers (nonflying) operational where technical nonflying training is conducted. Facilities have been constructed for this training at six locations. The remaining 76 Air Reserve Centers are either in leased or Government-owned facilities. Additional construction of these facilities will depend on construction costs and availability of adequate commercial or Government facilities, with decision dependent on the best interest of the Government and on participation necessary to meet prerequisites for construction.



JOHN SLEZAK,  
*Chairman, Reserve Forces Policy Board.*



*Semiannual Report*  
*of the*  
**SECRETARY OF THE ARMY**

January 1, 1958, to June 30, 1958

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## *i. Introduction*

As is the case with its sister Services, the Army's fundamental mission is to contribute to the deterrence of war—limited or general—and to be prepared to fight and win a war of any type, should deterrence fail. The Army is specifically charged with contributing to the security of the Nation by providing adequate forces for sustained land combat and to furnish surface-to-air missile defense of the United States and our forces overseas. Within the scope of these missions, the Army has made significant contributions to national defense during the last year in four principal areas:

The Army's combat-ready divisions in Europe and the Far East remained on guard as tangible reminders to any potential enemy that aggression against the defended areas would be challenged forcefully by American troops.

The Army held in constant readiness its Strategic Reserve Corps, primed to strike swiftly against aggression around the world.

The Army's vital air defense elements—NIKE-AJAX and NIKE-HERCULES—were on duty around the clock to guard the continental United States.

The Army's Military Assistance Advisory Groups and Missions continued their programs of strengthening 200 foreign combat divisions by teaching these forces the use of United States weapons and equipment supplied under the Military Assistance Program.

Concurrently, the Army completed the pentomic reorganization of all its combat divisions and Army Research and Development capped more than a decade of spectacular effort with the launching of the free world's first artificial satellite.

However, the Army cannot belittle the international military meaning of the Sputnik satellites which the Soviet Union has sent aloft, nor can we minimize the importance of the wide array of new missiles and other modern weapons which the Soviets revealed in the November 1957 Moscow parade marking the anniversary of the Russian revolution.

While the overall Soviet design has been evident for some years, the events of the past year have given the threat a new proportion and

greater urgency. This new danger finds its clearest expression in the advantage enjoyed by an aggressor in choosing both his objectives and the degree of force necessary to achieve those objectives. The logical answer is that the United States armed forces must have the men and facilities to meet aggression in any area with the proper application of selective military power. In this way we can help forestall the growth of "limited" warfare into the unlimited holocaust in which there could be no victor.

Thus, by virtue of the flexibility which today characterizes its combat capabilities, the Army has an increased responsibility in defense. It is with deep concern that we contemplate the immense ground combat capabilities of the communist bloc of nations and the many areas on the frontiers of the free world where that force may be applied.

In view of the nature of this threat, the urgent need to modernize further the Army's weapons and equipment becomes increasingly clear. While there have been considerable improvements in the Army's materiel in recent years, there is a critical need to hasten the provision of available new items to the troops. The requirements include not only the new weapons essential for improving combat skill, but also an increment in materiel each year to offset obsolescence and attrition. Only when these requirements are satisfied can the Army register a net gain in its combat capabilities—a vitally essential gain in challenging Soviet power.

## II. Operations

Principal developments in operations during fiscal year 1958 included:

- eight divisions, plus additional ground, air defense, and missile units, were maintained at oversea defense stations as shield forces against aggression;

- approximately 7,000 foreign nationals were trained in Army Service schools and installations and the Army continued its training of foreign army personnel in the use of United States equipment;

- STRAC achieved a higher level of combat readiness;

- all of the Army's divisions completed their pentomic reorganization;

- one Medium Missile Command, 1 Air-Transportable Missile Command, and 2 Missile Groups were activated during the year;

- the first three NIKE-HERCULES batteries became operational on-site in the United States;

- MISSILE MASTER went into operation for the first time.

On the basis of anticipated manpower cutbacks, the Army had planned to reduce the total number of its combat divisions to 16 during the year. An actual cutback in military strength from approximately 1,000,000 to 900,000 men, however, required that the total number of divisions be reduced to 15. At the end of the year, 8 of these, plus other units, were deployed overseas, and 7 divisions, plus other units, were in the continental United States or its Western Hemisphere possessions.

Related adjustments required during the year included the elimination of the understrength division in Japan, reduction of the logistical base in Japan, reduction of the Alaska forces, and the elimination of some service support units in Europe. In the continental United States one armored division was reduced to a combat command, and all 90-mm. and 120-mm. antiaircraft gun battalions were eliminated for replacement by air defense missiles.

### Foreign Operations

In foreign deployments, the Army strengthened its forces in Europe. Supporting the 2 infantry divisions, 2 armored divisions, and 1 division composed of infantry and airborne units at the end of the

fiscal year, were a total of 8 CORPORAL battalions, including 2 in Italy; 6 HONEST JOHN battalions, including 2 in Italy; 6 280-mm. gun battalions; 6 NIKE battalions which were assigned during the year; 7 helicopter companies; 8 fixed-wing tactical transport companies; and a number of tube artillery and antiaircraft units.

In the Far East, Army forces were reduced, leaving two infantry divisions in Korea.

One infantry division, less 1 battle group, remained in Hawaii, and in Alaska there were 2 battle groups and 2 air defense battalions. One battle group remained in Panama.

#### *Training of Foreign Nationals*

Approximately 7,000 foreign nationals were trained in Army Service schools and installations in the United States during fiscal year 1958. More than half of these men were officers in the armies of friendly foreign nations who received training in the management and tactics of modern warfare. For most of the trainees, the schooling afforded their first opportunity to visit the United States and to establish friendships and obtain firsthand a valid picture of this Nation—a picture certain to be of later value in foreign relations.

Concurrently, through the Army's Military Assistance Advisory Groups and Missions overseas, nearly 4,800 officers and enlisted men were giving instruction to the troops of approximately 70 foreign nations. The Army thus was improving the combat-readiness of the equivalent of some 200 foreign divisions which could go into action in the event of war. Most of the instruction pertained to the equipment supplied friendly foreign countries under the Military Assistance Program, but the Army continued to use the opportunity to improve United States relations with foreign troops and populations.

#### *Military Assistance Program*

The Army delivered materiel valued at \$868 million under the grant-aid portion of the Military Assistance Program during fiscal year 1958 and additional supplies worth \$244 million under the Mutual Security Military Sales Program, for a total of \$1,112 million. The equipment included tanks, vehicles, artillery and infantry weapons, ammunition, bridging and construction equipment, electronics and communications equipment, medical supplies, guided missiles, and aircraft.

The materiel provided on a grant basis went to 38 nations, most of them in the Middle and Far East. The 1958 deliveries brought to more than \$10 billion the value of equipment provided under this program since 1950.

The Mutual Security Military Sales Program, authorized by the Mutual Security Act of 1954, as amended, offers the sale of a variety of military equipment to a total of 65 countries and 7 international organizations. During fiscal year 1958 approximately 32 countries made purchases. The total of \$244 million in sales under this program is compared to \$15 million during fiscal year 1957.

#### *Administration of the Ryukyu Islands*

The appropriation of \$2,475,000 for the Army's administration of the Ryukyu Islands during fiscal year 1958, plus \$1,513,000 for special construction, is compared to \$52 million in fiscal year 1950, indicating the tremendous progress made in developing and maintaining a stable economy in the Islands.

A further step toward this end was the recent work of a tax mission in studying and recommending revisions in the Ryukyu tax structure. The mission, made up of representatives of the Departments of Army and Treasury, went to the Islands in April 1958. A report was received from the mission in June 1958 and is under study by the U.S. Civil Administration and the government of the Ryukyus.

Proposals for new legislation were prepared, covering American relationships with, and responsibilities for, the Ryukyus in financial affairs. The proposals were prepared following the 1957 publication of Executive Order 10713, which covers the administration of the Islands under the Treaty of Peace with Japan, now pending Congressional action. The Army had asked for legislation which would establish a basis in law for the Treaty authority and outline policies of the Congress for the administration of the Islands. No final action was taken on this request and the Army accordingly prepared proposals which would recognize United States economic obligations to the Ryukyus as part of its administrative authority. At the end of the fiscal year these new proposals were under review by the Bureau of the Budget and the Department of State.

### **Continental U.S. Operations**

#### *Strategic Army Corps*

One of the Army's most significant contributions to American defense, the Strategic Army Corps, (STRAC), was publicly announced during the year. Initiated in fiscal year 1957, the Corps has received maximum emphasis to prime its units for immediate movement into combat anywhere in the world. An idea of this readiness was provided by the incident in May 1958 when it appeared that armed protection might be necessary for Vice President Richard M. Nixon in his tour of South America. Two companies of the 101st Airborne

Division, a STRAC unit, were airlifted from their station at Fort Campbell, Kentucky, to Ramey Air Force Base in Puerto Rico, a distance of 1,700 miles. The entire operation, from the time the troops were notified until their landing in Puerto Rico, took only 13 hours.

The 101st Airborne Division is 1 of the 4 divisions which constitute STRAC. The others are the 4th Infantry, the 82d Airborne, and the 1st Infantry. They are part of the 7-division Strategic Army Force which the Army maintains in the United States to back up its overseas deployments.

In recognition of the danger of limited as well as unlimited war, STRAC units are designed for quick movement against aggression around the earth. This high level of combat-readiness requires troops who are fully trained and the provision of supplies to support sustained combat operations. In addition, a wide range of weapons and equipment—from rifles to nuclear warheads—is necessary to permit the application of force measured to fit the situation.

While STRAC is powerful, flexible, and ready, the Army defined three main areas in which improvements are being sought.

The first is *Modernization*. While the quality and quantity of weapons and equipment in the hands of STRAC troops is sufficient to meet presently anticipated needs, it is obviously in the best interest of national defense that STRAC has, continually, the most modern equipment in sufficient quantity. Currently, the modernization process—in all other Army units as well as STRAC—is not progressing rapidly enough. Part of the delay is in the long lead times required in the production of certain items, but additional funds will also be needed. To insure that STRAC, and the Army as a whole, can carry out assigned missions in the future, it is essential that modernization be given new and broader attention in future budget deliberations. (See Ch. V.)

*Manpower* is the second area in which improvements are sought. Units which can move into combat in a matter of hours must be made up of men who already have completed up-to-the-minute training. While the majority of the men in STRAC are so trained, there is the unavoidable problem of personnel turnover and the continuing need for trained replacements. In the past year it became clear that the restrictions on the Army's military strength are making it increasingly difficult to keep in the STRAC units the level of fully trained men considered necessary for the units to be combat ready. The problem is compounded by the growing complexity of the Army and the need for longer training time of personnel in more complicated weapons and equipment.

*Mobility* is the third area in which the Army needs improvement. As far as strategic mobility is concerned, the solution to the problem is

not entirely within the Army's province, since the Army must depend on the Air Force and the Navy for rapid and long-range movement, but no discussion of STRAC would be in proper perspective without its inclusion. The Middle East crisis, which developed shortly after the end of the period being reviewed by this report, gives dramatic emphasis to the need for a careful study of the policies and plans governing the quantity and quality of the Army's airlift and sealift to meet the increasing threat of limited war.

## New Combat Units

### *Pentomic Reorganization*

All of the Army's 15 combat divisions, 1 brigade, and a number of separate battle groups had completed their reorganization to the pentomic structure by June 30, 1958. Most of the changes had been effected by December 31, 1957, less than 18 months after the changeover was initiated.

The reorganization had four principal objectives:

1. To give Army forces both atomic and nonatomic combat capabilities, at the same time gaining increased firepower from smaller sized combat units;
2. To give the field commander direct control over a greater number of units, thereby increasing his span of control to more logical proportions;
3. To provide great organizational flexibility so that the structure of tactical commands within the division can be adjusted quickly to meet different combat situations;
4. To provide increased mobility by making available a greater number and variety of carriers and by reducing the amount of the combat division's organic equipment.

Army units thus can move more swiftly and with more flexibility than ever before, and, equipped with nuclear weapons, they have the capability of the greatest firepower in history.

One illustration of the effect of the reorganization is shown by the number and strength of the company-size units in the pentomic division. The former infantry division, of 17,500 men, contained 114 companies, as compared to the pentomic division of 13,700 with 77 companies. The strength of each company, however, has been increased approximately 25 percent, from 196 men to 243. Especially in consideration of new weapons, each company therefore is a much more powerful unit and yet small enough to move with the great speed that will be necessary in future wars.

A breakdown of the personnel and major equipment differences between the former triangular division structure and the pentomic division is shown in Figure 1.

# ARMY • PENTOMIC EQUIPMENT AND PERSONNEL COMPARISONS

	AIRBORNE DIVISION		INFANTRY DIVISION		ARMORED DIVISION	
	OLD	NEW	OLD	NEW	OLD	NEW
PERSONNEL	17,085	11,486	17,459	13,748	14,683	14,617
Division Strength Companies	112	25	114	77	16	16
Infantry Platoons	81	100	81	80	48	48
AIRCRAFT	16	16	16	22	18	24
Fixed Wing	10	37	10	28	10	26
Rotary Wing						
TANKS	138	0	138	92	285	306
90mm	2	0	9	33	58	54
76mm						
ANTI-TANK WEAPONS	87	85	57	60	0	0
All Types (Except Rocket Launchers)						
ARTILLERY	54	30	54	30	54	54
105mm How	18	0	18	12	18	12
155mm How	0	0	0	4	0	4
8-inch How	0	4	0	2	0	2
HONEST JOHN	0		0		0	
MORTARS	40	52	58	74	68	48
81mm	24	40	36	40	32	40
4.2-inch						
MACHINE GUNS	343	424	428	428	535	644
Cal .30						
ARMORED PERS CARS	10	0	181	181	449	536

Figure 1.

Through the pentomic reorganization, the Army believes that, given adequate resources of manpower materiel, it can fight, and win, either a limited or general war, in which either nuclear and/or non-nuclear weapons may be used. Along with the establishment of units organized around specific missiles and nuclear weapons, which are discussed below, the pentomic changeover recognizes and accepts the distinct possibility of general warfare involving nuclear weapons. At the same time, the pentomic changeover envisions the possibility of limited war, in which land forces would have a predominant role.

### *Missile Organizations*

In order of power and size, the Army's principal missile units are the Heavy, Medium, and Air-Transportable Missile Commands; the Missile Groups; and the Missile Battalions.

As of June 30, 1958, the Army had 2 Medium Missile Commands, 1 of which was activated during the past year; 2 Air-Transportable Missile Commands, 1 of which was activated during fiscal year 1958; and 2 Missile Groups which were activated during the year. Three Missile Battalions also were activated during the year, giving the Army a total of 18 separate battalions.

Conceived several years ago, in recognition of the vast power afforded by the Army's newer weapons, these units have undergone constant testing to prove and perfect their combat use. Concurrently, appropriate changes have been made in the structure and purpose of the units as the Army more clearly defined the tactical requirements of future warfare.

The built-in flexibility of the Army's new missile units is illustrated by the fact that the Missile Group, consisting normally of two RED-STONE batteries (fig. 2), can be converted to a Heavy Missile Command by enlarging the ordnance and engineer companies and by adding a signal company, an armored cavalry company, and an engineer combat company.

The Medium Missile Commands are equipped with up to four HONEST JOHN rocket battalions, each with 4 launchers, and a CORPORAL battalion with 3 launchers, a sky cavalry battalion, an armored infantry battalion, and logistical and communications support units. A Medium Command has a full strength of more than 5,000 men.

The Air-Transportable Missile Command, which can be flown *in toto* to any part of the world with minimum warning, has four HONEST JOHN launchers and units for security, survey, meteorological, administrative, and service support. Its strength is approximately 1,100 men.



*Figure 2. Army unit preparing to fire the REDSTONE.*

By the end of fiscal year 1959, the Army expects to have 2 Air-Transportable Missile Commands, 2 Medium Missile Commands, 4 Heavy Groups (REDSTONE), and 22 separate surface-to-surface Missile Battalions for the support of ground forces.

*Combat Developments Experimentation Center*

On the basis of its work during fiscal year 1957, the Army's Combat Developments Experimentation Center (CDEC) was established on

a permanent basis as one of the means by which the Army is continuing to improve the design, organization, and tactical capability of its units.

Through actual tests of organizations and tactical concepts, CDEC defines tactical problems which could arise in combat and makes recommendations for changes in doctrine and unit structure for the future.

A 3-year experimentation program has been laid out, including the following:

- The vulnerability of low-flying Army aircraft to forward area ground fire (fig. 3);

- The tactical application of passive antipersonnel devices;

- The proficiency of a rifle squad armed with a lightweight, high velocity rifle;

- The application of pentomic doctrine to combat companies in mobile operations, combat surveillance, artillery support, communications, and antitank weapons systems.



Figure 3. Infantryman fires camera-equipped rifle at plane in CDEC test.

## Air Defense

In the air defense of the continental United States, the Army continued to provide combat-ready Army air defense forces for the operational control of the Commander-in-Chief, North American Air Defense Command (CINCNORAD). These forces are assigned to the Army component command of NORAD, the United States Army Air Defense command (USARADCOM). The Army continued to mod-

ernize its forces by making NIKE-HERCULES equipment operational at missile sites formerly equipped with only NIKE-AJAX, taking antiaircraft gun units out of the active air defense inventory, and operating the first of a number of electronic air defense control systems for surface-to-air missiles. Additionally, the Army commenced specialist training in the low altitude HAWK missile system, and continued research and development and site-planning for NIKE-ZEUS in defense against intercontinental ballistic missiles.

#### *NIKE-AJAX*

As of June 30, 1958, there were 20 designated Army air defense areas in the United States receiving NIKE-AJAX protection. Certain of these included two or more major cities, such as the Washington-Baltimore defense area. In addition, there are defense areas for the protection of Strategic Air Command bases and Atomic Energy Commission installations.

The planned program of deployment of NIKE-AJAX in the United States was completed. More than 200 batteries are on duty throughout the Nation. Army National Guard NIKE-AJAX battalions in training now will soon begin to relieve the active Army units. This program will release Army personnel for new NIKE-HERCULES units. The Guard units will be considered an integral part of, rather than augmentation to, the Army air defense forces.

For the first time, NIKE-AJAX units were on duty in Europe. Six battalions arrived during the year and were assigned to defend key facilities in Western Germany, adding greatly to United States air defense capabilities in that theater.

#### *NIKE-HERCULES*

In June 1958 the Army placed on-site the first operational surface-to-air missile systems capable of delivering an atomic warhead against attacking aircraft. The batteries are in Washington, New York, and Chicago. Additional HERCULES units will rapidly follow in all existing defense systems. The AJAX sites deliberately were planned with the view toward the replacement of AJAX with HERCULES.

In addition to converting present AJAX sites to HERCULES, programs approved at this time provide HERCULES defense for additional major cities and SAC bases in the United States.

Several thousand Army personnel, to become the nucleus for new HERCULES units for both the United States and overseas deploy-

ments, are in Service schools. In addition, personnel from eight NATO countries are receiving training at Fort Bliss and Redstone Arsenal, preparatory to manning missile units in their home countries.

During March, a demonstration of the HAWK system was completed successfully at White Sands Proving Grounds, New Mexico. Training of key U.S. Continental Army Command USCONARC and Ordnance personnel began at Redstone Arsenal in April. The first HAWK battalion, a school troop battalion, is scheduled to be activated at Fort Bliss next year. The first operational HAWK units are planned for siting in the vicinity of New York and Washington shortly thereafter.

### *MISSILE MASTER*

The first fully operational electronic air defense control system in the United States was put into operation December 5, 1957, by the Army Air Defense Command.

Located at Fort Meade, Maryland, MISSILE MASTER will help defend the Washington-Baltimore government-industry complex against air attack. It is an electronic system which controls and coordinates the fire of the Army's air defense weapons to insure their maximum effectiveness.

MISSILE MASTER is the first operational integrated system for tying together all elements of Army air defense weapons from target detection to target destruction.

The system consists primarily of an automatic data communication network and of processing and display equipment. It is designed to achieve maximum effectiveness from the firings of all NIKE and HAWK weapons within a defense complex.

The increase in speed of aircraft and the high accuracy of air defense missiles has necessitated the development of a rapid, automatic, electronic system for transmission and coordination of information. MISSILE MASTER electronically stores information concerning targets in the area and presents it on TV-like picture tubes while at the same time instantaneously transmitting necessary target information and commands to all missile firing units within the defense.

MISSILE MASTER has been designed to be compatible with the Air Force Semi-Automatic Ground Environment air defense system (SAGE) when the latter is completed.

Contracts were awarded during the year for the construction of five more MISSILE MASTER sites in New York, Boston, Niagara-Buffalo, Detroit, and Seattle with additional systems planned for installation in other key locations in the near future.

### *Elimination of Antiaircraft Guns*

On September 20, 1957, the Army approved the elimination of all remaining heavy antiaircraft guns from the United States air defense system and all active Army and National Guard 90-mm. and 120-mm. gun units were relieved of their missions in October 1957 with plans for their reorganization to air defense missiles. Remaining gun units overseas and SKYSWEEPER units in the United States will be phased out of the active Army and reserve component force structures when additional missile equipment for these structures becomes available.

The 720th AAA battalion in the Los Angeles area became the first National Guard NIKE unit when it was selected to implement the National Guard NIKE test, and the first Guard students were enrolled in the U.S. Army Air Defense School at Fort Bliss, Texas, on July 5, 1957. The majority of the former on-site gun battalions have been reorganized under a NIKE table of organization until they receive various phases of training from ARADCOM units at active Army sites.

### **Aviation**

Recognizing the critical and growing importance of light aviation in giving ground units the mobility and flexibility necessary for pentomic warfare, the Army improved the training of its aviators during the year and laid plans to increase the total number of its aircraft. In addition, the Army sent more aircraft to its units in Europe and established three new world helicopter records.

#### *Aviation Training*

A total of 1,897 aviators were trained during the year, compared to 1,905 during fiscal year 1957. The 1958 figure includes 895 fixed-wing aviators, 697 observation helicopter aviators, and 305 transport helicopter aviators. The observation helicopter aviators were officers previously qualified in fixed-wing aircraft. This was part of the Army's plan to have 70 percent of its fixed-wing pilots equally qualified in rotary wing aircraft. Of the total of 1,897 aviators trained during fiscal year 1958, 259 were from National Guard and Army Reserve units.

Concurrently, the Army achieved improvements in its training program by establishing closer coordination between Camps Gary and Wolters in Texas, where trainees receive primary training in fixed-wing aircraft and helicopters, respectively, and the Army Aviation School at Fort Rucker, Alabama, where advanced tactical instruction is conducted. Improved selectivity of applicants and revisions in instruction techniques reduced the attrition rate from approximately 30 percent to 25 percent.

In a separate program, 525 ROTC college seniors completed primary training in preparation for training at Camps Gary or Wolters. Under Public Law 879, selected students receive 70 hours of flight and ground school instruction by civilian flying schools. In exchange the students agree to serve 3 years in the Active Army upon graduation. The figure of 525 graduates in fiscal year 1958 is compared to 202 during fiscal year 1957, when the program began.

#### *Aircraft Inventory*

At the end of fiscal year 1958, the Army had a total of 5,095 aircraft, an increase of 557 over the prior year. The 1958 figure included 2,858 fixed-wing aircraft and 2,237 helicopters. Procurement plans call for the Army to have a total of 5,332 aircraft by the end of fiscal year 1959.

During the year the Army activated one fixed-wing aircraft company and three helicopter companies. Two light transport helicopter companies were reorganized as medium transport helicopter companies. The fixed-wing unit was a Tactical Transport Company, to be stationed permanently at Fort Sill, Oklahoma. One of the helicopter companies was activated in Europe where it will remain on duty with the Southern European Task Force. Of the two rotary-wing companies activated in the United States, one was sent to Alaska and the other was stationed at Fort Riley, Kansas. At the end of the year, almost one-third of the Army's aircraft were in overseas stations.

The Army's uses of aviation include target acquisition, liaison and communication, observation, rapid movement of troops and critical supplies in the combat zone, and the evacuation of battlefield casualties. The Army's aircraft, therefore, must be designed for low-altitude performance and capable of taking off and landing with minimum terrain consideration. As an integral part of ground actions, these aircraft "live" with the troops. For these purposes, at the end of fiscal year 1958 the Army was operating the following types of aircraft:

L-19 (Bird Dog), a 2-place single-engine aircraft used for observation and adjustment of indirect fire weapons.

L-20 (Beaver), a 6-place single-engine aircraft used for reconnaissance, light cargo hauling, photography, aerial evacuation and command liaison.

L-23 (Seminole), a 6-place, twin-engine aircraft used for command- and passenger-type missions (fig. 4).

L-26 (not classified as standard) is a 6-place, twin-engine aircraft used on command and passenger-type missions.

U-1 (Otter) is an 11-place, single-engine aircraft used as a light transport for troops and cargo.

H-13 (Sioux) is a 2- or 3-place single-engine helicopter used for reconnaissance, observation, and tactical command missions.



Figure 4. L-23 Seminole Army aircraft.

H-23 (Raven) is very similar to the H-13.

H-19 (Chickasaw) is a 12-place, single-engine helicopter used for a variety of utility missions including the battlefield transportation of critical supplies and personnel and for the evacuation of wounded.

H-34 (Choctaw) is a 14-place, single-engine helicopter, of the light-transport category, used for tactical transportation of troops and cargo.

H-21 (Shawnee) is a 16-place, single-engine, 2-rotor helicopter of the light-transport type, used for tactical transportation of troops and cargo.

H-37 (Mojave) is a 26-place, twin-engine, single-rotor helicopter of the medium transport category for transporting troops, materiel, and supplies.

In addition, exceptions to the 5,000-pound weight limitation on Army aircraft have been made in the case of the Mohawk and the Caribou. The Mohawk is a twin-engine, 2-place observation plane. The Army has been authorized the purchase of 35 during fiscal year 1959. The Caribou is a twin-engine medium transport, five of which have been authorized for Army test purposes.

A number of additional types of aircraft are under study by the Army. (See Ch. III.)

#### *New Records Set*

The Army established three new helicopter altitude records during the year, as follows:

<i>Weight</i>	<i>Old record</i>	<i>New record</i>
No restriction.....	26,931 feet.....	30,335 feet.
1,102-2,204 pounds.....	26,931 feet.....	30,335 feet.
2,204-3,857 pounds.....	None.....	28,200 feet.

#### **Mapping**

Advancements in the Army's development and use of missiles gave added emphasis and importance to the mapping and geodetic activities of the Army Map Service during fiscal year 1958. (See fig. 5.)

Since the smallest inaccuracy in the computations necessary for aiming and firing medium-range or long-range missiles can throw the weapon considerably off its target, precise knowledge as to the distance and gravitational pull between thousands of different points will be a critical requirement in any future war.

Toward this and related objectives, the Army maintained scores of mapping teams throughout the world compiling measurement and other geodetic data during the year. At an increasing rate, Army aircraft were used for certain phases of the work. Ground teams often carried out their activities in hazardous areas.

Much of the work was accomplished under cooperative agreements with foreign nations and in conjunction with the activities of international mapping organizations.

*New Areas Mapped*

Fiscal year 1958 production efforts resulted in the completion of about 212,000 square miles of large-scale and almost 1,100,000 miles of medium-scale mapping, representing many areas of the world in-



*Figure 5. Army map technician at work.*

cluding the United States. In the latter area the compilation of complete medium-scale military mapping coverage was achieved for the first time, while continued effort in such areas as Germany, France, Italy, Thailand, and Norway, improved United States map holdings. Medium-scale domestic mapping is made available in nonmilitary form for civilian use through the facilities of the U.S. Geodetic Survey.

Agreements between the United States and friendly foreign countries have been valuable in giving this country access to additional mapping information and in improving the uniformity and currency of mapping products of foreign nations. Standardization agreements have been effected with NATO countries, and similar arrangements have been made with SEATO countries. During the year the Army participated in the Baghdad Pact and in SEATO conferences on mapping problems and was represented at the 1958 conference of the Pan American Institute of Geography and History.

Over 500,000 square miles were covered in aerial photography during the year, much of it in Laos, Cambodia, Vietnam, Mexico, Libya, and Spain.

Precise triangulation observations were made over distances of 800 miles in Iran and 400 miles in Libya during the year. Information for partial horizontal and vertical topographical control has been compiled in Iran and Libya. Similar surveys are in progress along the United States-Mexican border.

Values for the distances between the following Pacific islands were obtained by star occultation (an indirect method of measuring the distance between two remote points by observing the time difference at which a star is obscured by the moon at each point): Ngulu—Negros; Murilo—Luzon; Palau—Luzon; Yap—Luzon; Ulithi—Luzon; Wake—Japan; and Hawaii—Johnston.

Work was completed on AMS Technical Report No. 22, "A Tentative World Datum from Geoidal Heights," which provides current estimates of the geodetic relationship of principal geodetic data.

#### *Production*

During the year, 1,260 large-scale, 315 medium-scale, and 20 small-scale sheets were compiled, while 22,000,000 copies of maps were printed and 17,000,000 copies were distributed. Immediate requirements for map coverage in maneuver areas, both in the United States and overseas, were satisfied on schedule.

Normal production of the three-dimensional relief maps was curtailed during this fiscal year because of a major effort required to produce a number of special use operational models for the Air Force.

This project required the development of new techniques in the modeling field, and, because of its importance to the national defense, considerable capacity was devoted to its accomplishment.

In addition to its regular work, AMS had extensive responsibilities in the International Geophysical Year (covered in ch. III).

### Little Rock

On September 24, 1957, the President of the United States directed the Secretary of Defense to enforce an order of the U.S. District Court at Little Rock, Arkansas, "for the removal of obstruction of justice . . . with respect to matters relating to enrollment and attendance at public schools in Little Rock District. . . ."

The issue involved the admission of nine Negro students to Central High School in Little Rock.

All units of the Arkansas National Guard were called into the Federal service, and the Secretary of Defense directed the Secretary of the Army to take all further actions necessary to implement the Presidential order.

On September 24, 1957, the Army dispatched one battle group of the 101st Airborne Division from Fort Campbell, Kentucky, to Little Rock. Most of the National Guard remained mobilized at home station, and only a selected task force, composed initially of about 1,300 men, moved to Camp Robinson to take active part in the operation.

On October 15, half of the original paratroop force was returned to Fort Campbell and all of the Arkansas National Guard released, except for a task force of 1,800 men at Camp Robinson.

Night guard at the school was abandoned entirely on January 3, 1958. By early April 1958 only one officer and four men remained stationed at Central High School during the daylight hours and on April 21 two of these men were relieved.

The remaining elements of the Arkansas National Guard, 39 officers and 344 enlisted men, were released from active Federal service on May 29, 1958, the day after the close of Central High School, and with this step the Army's mission was ended. The conduct of the troops throughout the operation, both of the regulars and the National Guard in active service, was exemplary.

The cost to the Army for the Little Rock operation was \$4,898,167, of which \$3,986,953 was the cost for the Arkansas National Guard troops. Of the total remaining Active Army costs, \$211,755 was considered attributable directly to the Little Rock mission and \$699,459 would have been incurred in any case under normal requirements.

### *III. Research and Development*

Major achievements in Research and Development during fiscal year 1958 included the following:

- organizational changes were effected to accelerate Research and Development programs;

- Explorer I, America's first artificial satellite, was launched successfully;

- in connection with missile reentry into the earth's atmosphere, the critical nose cone problem was solved;

- JUPITER went into production;

- REDSTONE became operational;

- work was begun on PERSHING;

- NIKE-HERCULES became operational;

- work on NIKE-ZEUS was expedited;

- developmental work on VIGILANTE neared completion;

- new hardware was under development for improved mobility;

- the Combat Surveillance Agency was enlarged;

- a contract for a field nuclear power plant in Alaska was let;

- contracts were let for the production planning of the Ionizing Radiation Center's facilities;

- polar scientists were prepared to construct an entire installation beneath the Greenland Icecap;

- substantial contributions were made to the IGY by a number of Army agencies.

Though the Army has emphasized its Research and Development work to the maximum within available resources in recognition of the vital importance of these programs in the defense of the free world, the need for additional impetus became apparent during the past year when the Soviet Union—

- Successfully launched the world's first artificial earth satellite, Sputnik I, followed by the much heavier Sputniks II and III, the latter weighing almost 11½ tons;

- Continued its nuclear tests;

- Claimed an intercontinental ballistic missile; and

- Displayed an impressive array of both conventional and special weapons.

In the light of its responsibility for developing the weapons and equipment that will enable the Army to help deter, or to help fight and win, either limited war or all-out nuclear war, Army Research and Development moved ahead on its formidable task to counter the Soviet threats. (See fig. 6.)

### **Organization**

Three new major Research and Development organizations were established by the Army during the year:

1. The U.S. Army Ordnance Missile Command (AOMC);
2. The Army Research Office; and
3. The Polar Research and Development Center.

The U.S. Army Ordnance Missile Command was established in March 1958 at Huntsville, Alabama, to integrate and streamline all Army developments in rockets, missiles, antimissile missiles, satellites, and manned space travel. AOMC includes the Army Ballistic Missile Agency, Huntsville, Alabama, and the ABMA Project Office at Cape Canaveral, Florida; the Army Rocket and Guided Missile Agency (formerly Redstone Arsenal), also at Huntsville, Alabama; the Jet Propulsion Laboratory, operated for the Army by the California Institute of Technology, at Pasadena, California; and the White Sands Missile Range, New Mexico. The new command has direct access to the Secretary of the Army and the Chief of Staff to expedite high-priority programs.

The Army Research Office, located at Arlington Hall, Virginia, was established on March 18, 1958. Its purpose is to improve management of the Army research programs and to provide a focal point for the Army's relationship with the Nation's scientific community. It administers a worldwide program involving about 2,000 research tasks, with a yearly expenditure of about \$90 million.

Establishment of the Polar Research and Development Center in Greenland was directed by the Chief of Staff on December 27, 1957. The Center supports an accelerated Army Research and Development program in the far north.

### **Explorer**

The most spectacular achievement of Army research and development during the year was the launching of Explorer I, the free world's first artificial earth satellite, which signaled the advent of the space age for the United States and friendly foreign nations.

The vehicle for the satellite was the Army's JUPITER C rocket (fig. 7). At 10:48 p.m., Eastern Standard Time, January 31, 1958, the JUPITER C roared away from its launching pad at Cape

# ARMY • RESEARCH & DEVELOPMENT FUNDING PROGRAM

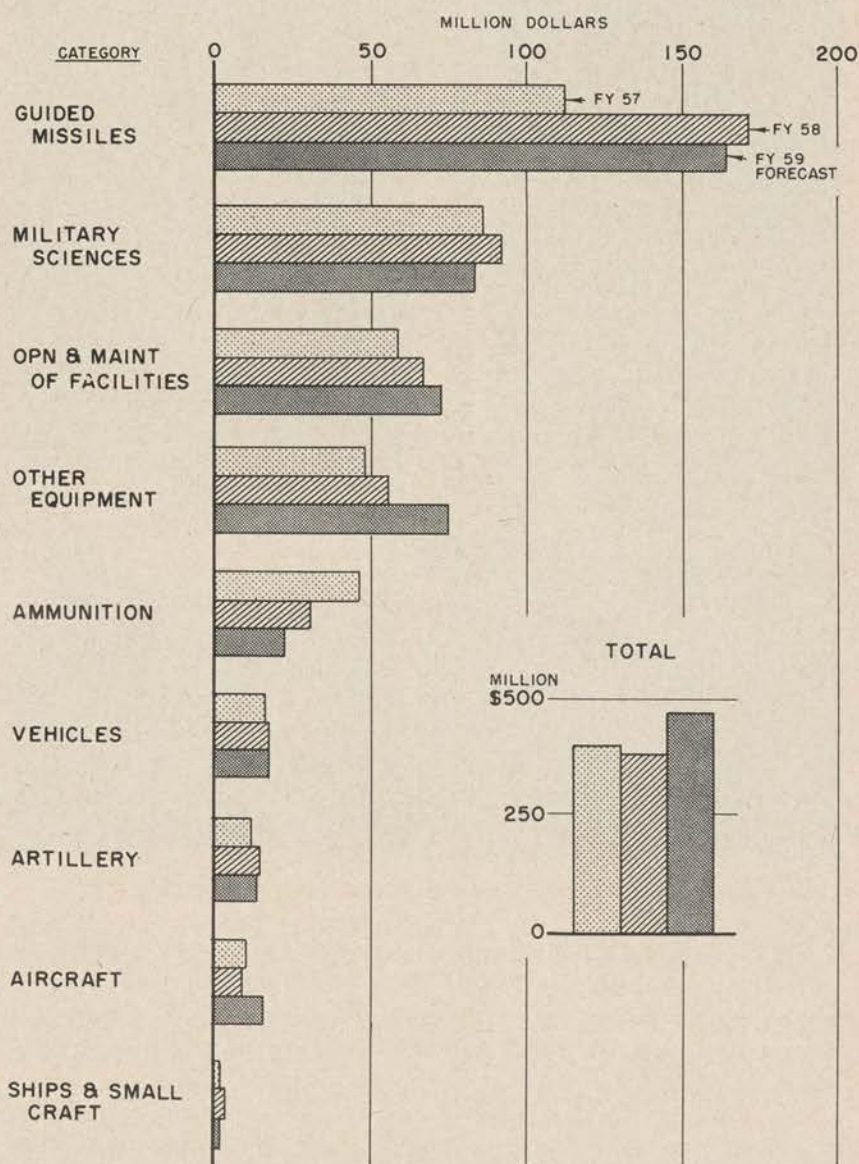
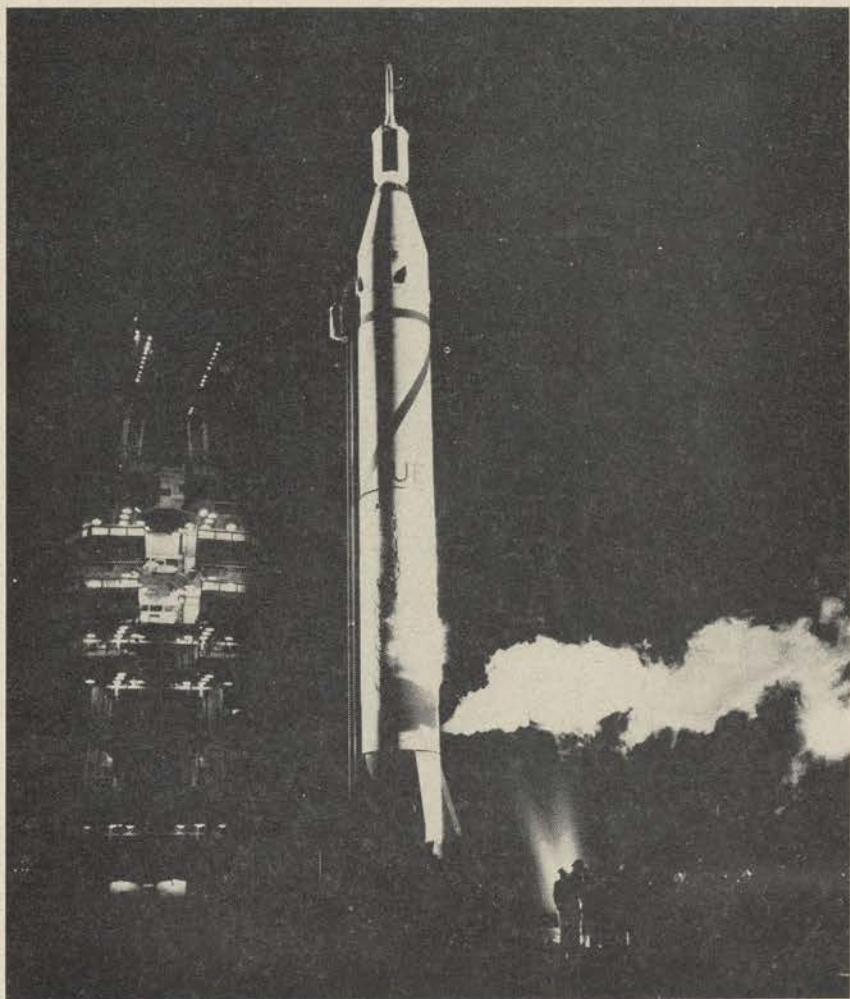


Figure 6



*Figure 7. JUPITER-C, with satellite in position, just before firing.*

Canaveral, Florida. It carried the satellite, Explorer I, more than 1,700 miles into outer space at a speed of more than 18,500 miles per hour. Seven minutes later the satellite went into orbit around the earth. It is estimated that it will remain in space approximately 5 years.

The story of this achievement started in 1955 when the Army missile development team at Redstone Arsenal, under the technical leadership of Dr. Wernher von Braun, submitted to the Department of Defense a satellite proposal entitled Project ORBITER. This was prepared in cooperation with the Navy Bureau of Ordnance and the Jet Propulsion Laboratory of Pasadena, California.

The main stage for Project ORBITER was to have been the Army's REDSTONE liquid-fuel ballistic missile, developed at Redstone Arsenal under military direction by Dr. von Braun's group.

Later that year, the Defense Department chose the Navy's Project VANGUARD instead of ORBITER as a satellite vehicle.

Early in 1956, when the Army then had been assigned the job of developing the JUPITER Intermediate Range Ballistic Missile, it was found that the staging concept and other work already accomplished on ORBITER could make a great contribution to the program of developing the JUPITER IRBM.

The aerodynamic heating problem associated with the reentry of a ballistic missile was one of the most challenging aspects of the IRBM program. The Ballistic Missile Agency, again joined by the Jet Propulsion Laboratory, used the Project ORBITER principle in this vital work. The plan was to modify the proven REDSTONE work-horse missile for the main stage, and add solid-propellant upper stages and a scaled-down JUPITER IRBM nose cone. Experiments on nose cone reentry could then be made without the expense and added delay of waiting until the JUPITER itself was ready for test launchings.

The first launching of a JUPITER C test vehicle was conducted in September 1956. It was a complete success. The inert final stage traveled more than 3,000 miles southeast from Cape Canaveral, and on August 8, 1957, a JUPITER C nose cone was recovered intact, providing much valuable data. Several other JUPITER C flights had been scheduled, but these were canceled after the August success, and the hardware became available for other purposes.

The satellite mission came November 7, 1957, when the Army was directed to launch Explorer I with JUPITER C. Much of the necessary work already had been accomplished, thanks to the relatively recent reentry tests, work on REDSTONE and JUPITER C and the general knowhow acquired by the Army in its missile work dating back to 1942. Army partners in the project were the Ballistic Missile Agency and the Jet Propulsion Laboratory. Dr. von Braun, of the Missile Agency, headed the project, assisted by Dr. J. E. Froehlich of the Pasadena laboratory.

In the following days, nights, weeks, and months, some 5,200 civilian and military scientists, engineers, and technicians of the two agencies concentrated their efforts in the orderly, careful preparation necessary for the launching.

Certain modifications were required on the JUPITER C. These were carried out by ABMA, which was responsible for the main stage, and JPL, which provided the high-speed upper assembly.

The REDSTONE was modified as follows:

1. Tanks were lengthened to hold more fuel and oxidizer.
2. A fuel mixture known as "hydyne" was employed in place of the alcohol used in the tactical REDSTONE.
3. The forward section of the REDSTONE was modified to support the launcher of the high-speed stages, which consists of a cylindrical "tub" spun by electric motors in the REDSTONE nose section.
4. A spatial attitude control system was designed to position the forward section of the REDSTONE so it could fire the high-speed stages in the correct direction at the proper point on the trajectory.

The second stage of the missile consisted of a cylindrical ring of 11 solid motors, each 6 inches in diameter and approximately 4 feet long, each containing about 50 pounds of a solid propellant in a stainless steel case.

Fitting within the ring of 11 motors were 3 identical motors which composed the third stage. The final stage of one motor, with the satellite payload attached, was then added.

The Jet Propulsion Laboratory was responsible for the satellite (fig. 8) payload and its instrumentation; for the development, construction, and operation of certain Microlock ground stations to receive and record telemetering signals from the satellite; and the design, construction, and operation of the solid propellant units.

The satellite designers paid particular attention to heat control. The metal surface of the satellite shell was striped with a flame-sprayed aluminum oxide coating, which covered 25 percent of the total surface. The remaining surface was sandblasted to give a dull, satiny finish.

This combination of aluminum oxide and sandblasted stainless steel was chosen by JPL and ABMA to give the correct ratio between absorptivity relative to solar radiation. Control of this ratio permits control of the average interior temperature of the satellite and its electronic components.

Experiments installed aboard the 80-inch, 29.87-pound Explorer I included:

1. A Geiger-Mueller cosmic ray counting tube and associated circuitry for the counting of primary cosmic radiation. This apparatus was designed and built by Dr. James A. Van Allen of the Iowa State University, and was initially prepared for Project VANGUARD. JPL repackaged the experiment to meet the cylindrical requirements of the Explorer configuration.
2. Two micrometeorite detector experiments were developed at the Air Force Cambridge (Massachusetts) Research Center by Dr. Edward Manring and Maurice Dubin. One of these was a set of 12 wire grids mounted as a parallel resistance network on

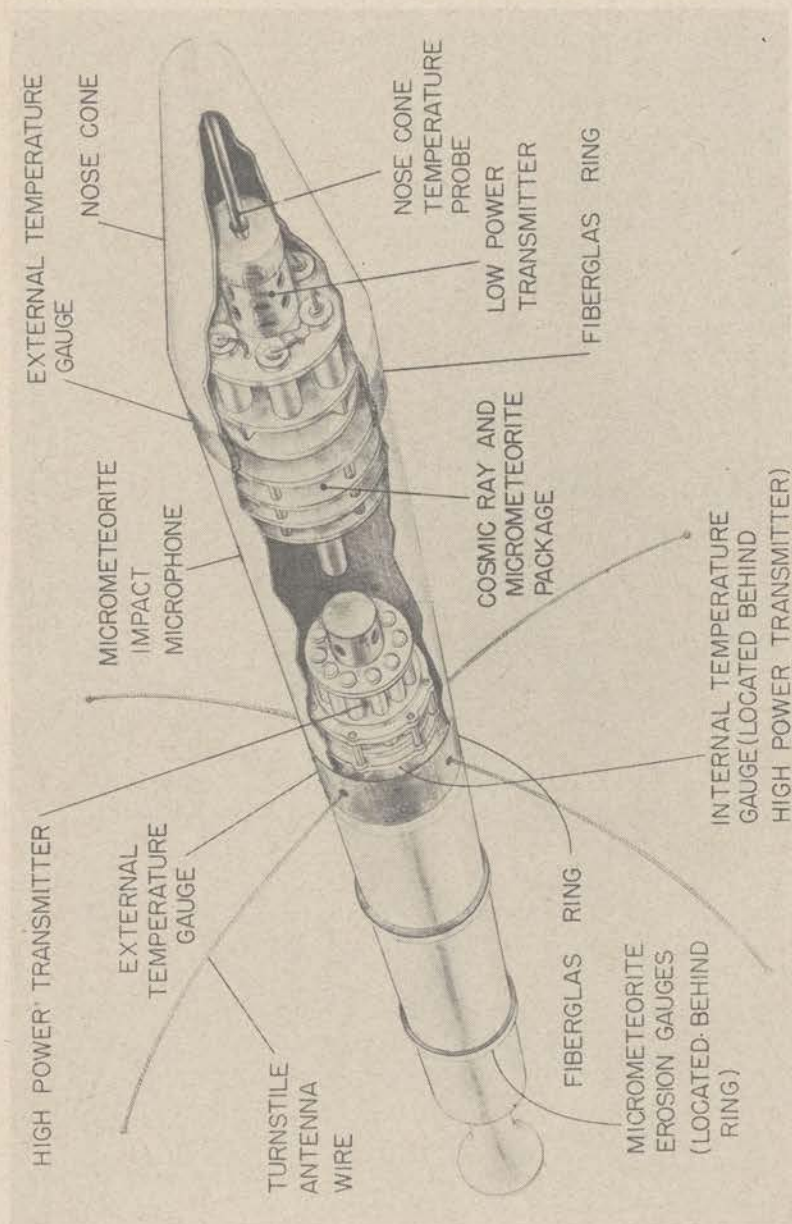


Figure 8. Components of Explorer I.

the aft end of the fourth stage rocket motor. Collision with micrometeorites would erode or fracture the grid, and variance in electrical resistance would denote the change. The second such experiment was a microphone to record impacts of micrometeorites upon the satellite shell.

3. Four temperature gages, which read the temperature at three locations on the outer shell of the satellite and at one location in its interior.

Eighty-four days after the November 7 initiation date, following a tense countdown, a technician pressed the "fire" button and JUPITER C tore into space, each stage of the rocket performing its assigned role perfectly. The skill, dedication, and prodigious work by the Army's scientists and engineers had paid off handsomely.

Extremely valuable information has been gained from Explorer's scientific apparatus. The scientific experiments and the radio have done their work well. The high-power transmitter, the batteries of which were expected to last about 2 weeks, ceased transmission about 12 days after the launch. About 10 days later it came back on the air but with an insufficiently clear signal to permit interpretation of the data it was supposed to be transmitting. It continued to send generally weak signals until about the first of March, 1 month after launching.

At mid-May, the low-power transmitter was still functioning. It was fully meeting its lifetime expectancy of 2 to 3 months.

Explorer I confirmed man's ability to control temperature within an artificial satellite. JPL scientists have determined that their technique for temperature control is adequate for the successful operation of sensitive electronic equipment. The internal temperature was maintained between 32° and 104° F.—well inside the tolerance needed to protect instruments from heat or cold failure, and easily within the range acceptable for human survival. Outside temperature, measured at the shell, fluctuated between 14° and 167° F.

JPL scientists pointed out in their initial report of findings that this experiment was designed only to study the problem of instrument environment in a very small enclosure. The success of this simple device indicated that with more elaborate techniques the inner temperature of a larger space vehicle could easily be controlled within a much narrower range of variation.

In the cosmic ray experiment, Explorer I revealed that radiation at extreme altitudes was far greater than had been anticipated. The satellite's reports from the far reaches of its orbit revealed unidentified radiation so intense it overwhelmed the cosmic ray counter. At altitudes beyond 1,000 miles the counts of particle pulses per second soared to ranges hundreds of times greater than had been expected.

*Explorers II and III*

Explorer II, the Army's second attempt to launch a satellite, ended in failure on March 5, 1958. The final stage rocket failed to fire.

Explorer III was launched successfully at Cape Canaveral, Florida, at 12:38 p.m. on March 26, 1958. Similar in many respects to Explorer I, Explorer III was 80 inches long and 6 inches in diameter. It weighed 31 pounds and carried 10.83 pounds of instrumentation to measure external and internal temperatures and micrometeorite and cosmic ray counts. The high-power transmitter was equipped with a tape recorder and a memory unit that was interrogated from the ground by a command radio signal as the satellite passed over the Minitrack receiving network. In 5 seconds, the playback head of the miniature recorder flashed to ground stations a veritable torrent of information.

Because of the high angle at which the upper stages of Explorer III were fired, the satellite's orbit extended from 1,700 miles at its farthest distance from the earth to 117 miles at its closest point. Plunging through the denser atmosphere close to the earth served to reduce the satellite's life. At the same time, this orbit provided entirely new information on the cosmic ray intensity above the earth along with other very valuable data. Explorer III completed its last orbit on June 28—the 94th day following its launching—after traveling more than 33,000,000 miles.

Examples of the invaluable data provided by Explorers I and III include:

1. The atmosphere at a height of 225 miles is about 14 times denser than had been predicted in presatellite days.
2. Unidentified radiation so intense as to saturate cosmic ray counters was encountered.
3. Man's ability to control temperature within an artificial satellite in space was confirmed by data from Explorer I.
4. Information never before available was obtained on geodesy and anomalies in the earth's gravity.
5. Information was obtained of basic importance in determining the hazard to space flight from meteorite impact and damage. Explorer III gave definite indications of impact with meteorites in early May as the earth and its accompanying satellites passed through the meteorite swarm Eta aquarids.

*Space Missions*

On March 27, 1958, the Army was assigned additional space missions by the Advanced Research Projects Agency (ARPA) of the Department of Defense. The Army was directed to launch two, and

possibly three, additional earth satellites and two lunar probes to explore space in the vicinity of the moon. Later in the year the Army was directed to prepare Explorers IV and V for firing.

### **Firepower**

The pentomic Army has required not only a tremendous increase in firepower, but unprecedented flexibility and versatility in its weaponry which must be adaptable for use with maximum efficiency under almost any condition of terrain, weather, or distance as required by any tactical condition prevailing in limited or general war.

Toward attaining these goals, Army Research and Development is providing a broad spectrum of firepower and weapons systems ranging from the individual soldier's rifle to nuclear projectiles and missiles.

#### *Surface-to-Surface Missiles*

JUPITER developments during the year included the successful testing of all five requisites for an effective Intermediate Range Ballistic Missile (1,700-mile). These included the ballistic shell, rocket engine, guidance and control system, adaption kit for warhead, and the nose cone to protect the warhead against the heat generated by friction as the warhead reenters the atmosphere.

On May 18, 1958, the Army demonstrated a completely successful solution to the nose cone problem. A full-scale JUPITER missile was fired well over 1,300 miles at a speed of more than 9,500 miles per hour at an altitude of more than 350 miles. The nose cone reentered the atmosphere, plunged into the ocean in the planned impact area, and was recovered in excellent condition. Complex instrumentation in the nose cone functioned throughout the flight. The test indicated that it is now possible to bring living creatures back to earth after a flight through space. (A second nose cone was recovered intact July 17, 1958. See fig. 9.)

The progress of JUPITER during the year was such that the missile was ordered into production by the Secretary of Defense on November 27, 1957. A total of more than \$300 million was authorized during the year for production and further research and development.

As of June 30, 1958, the Army had fired 38 JUPITER's, including the experimental JUPITER A and the JUPITER C. Twenty-nine were entirely successful, seven were partially successful, and only two were failures.

In line with a Defense Department ruling that the Air Force shall have operational responsibility for JUPITER, the Army, in the second half of fiscal year 1958, began training groups of the Air Force specialists for the assignment. Some of the Air Force trainees went

to Fort Belvoir, Virginia, for instruction in the handling of liquid oxygen for the missile; others went to the Army Ballistic Missile Agency, Huntsville, Alabama, for training in the overall JUPITER system.

REDSTONE, a ballistic missile capable of delivering a nuclear warhead over a 200-mile range, became operational in the Army units in June 1958. Battery "A" of the 40th Field Artillery Missile Group

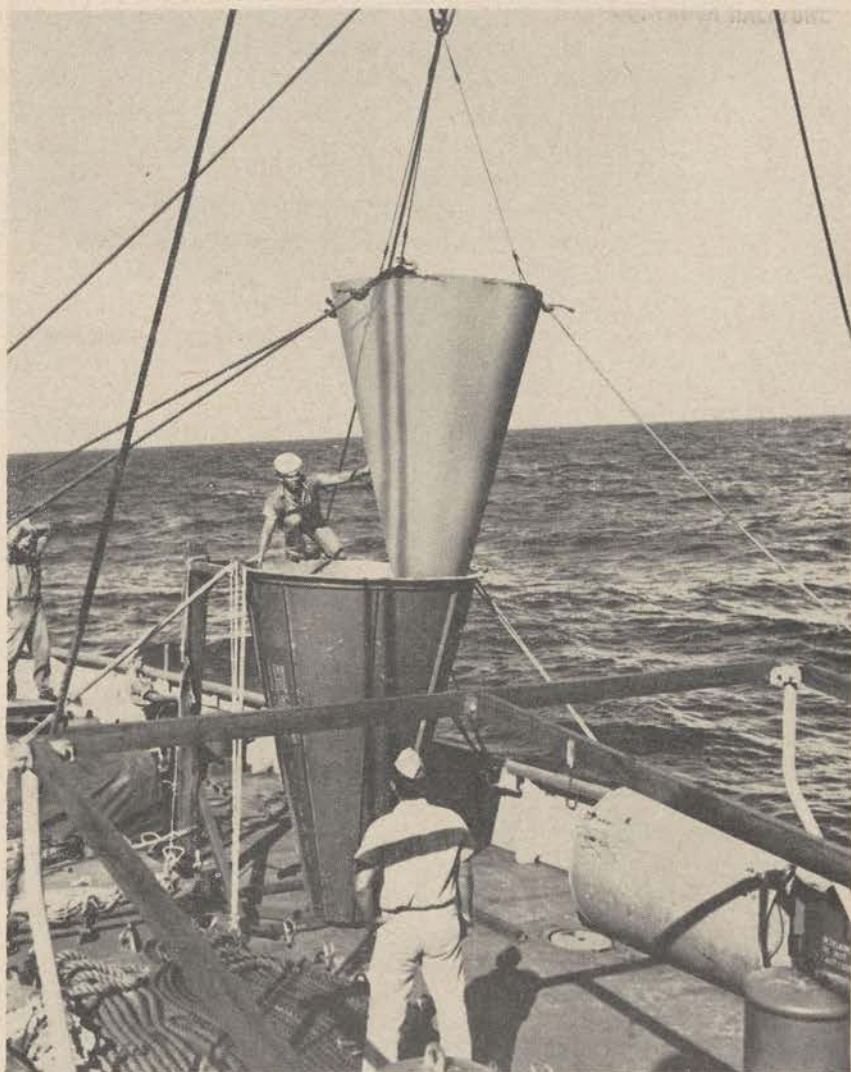


Figure 9. Recovery of JUPITER nose cone.

fired the REDSTONE at Cape Canaveral, Florida, marking the first time United States military personnel had fired a ballistic missile of the REDSTONE size and range. Later, Battery "B" of the same group fired the REDSTONE in a simulated tactical problem at the White Sands Missile Range in New Mexico.

PERSHING was selected during the year as the eventual successor to REDSTONE. Named for the late General of the Armies, John J. Pershing, the new missile will exceed the range of REDSTONE and be lighter, smaller, and more mobile. It will employ a solid propellant as opposed to the liquid fuel used in REDSTONE. Under the supervision of the Army Ordnance Missile Command and the Army Ballistic Missile Agency, a private contractor will carry out research and development, reliability testing, and production of the missile itself and of the associated ground equipment.

SERGEANT's development continued on an accelerated schedule. SERGEANT will succeed CORPORAL, one of the Army's presently operational ballistic missiles. Approximately 36 feet long, SERGEANT incorporates many improvements over its predecessor in power, accuracy, and the CORPORAL's 75-mile range. SERGEANT has greater mobility, can be stored more easily, and put into action much more quickly. It is air-transportable and can be emplaced rapidly and fired by a comparatively small crew under nearly all conditions of weather and terrain. It requires less ground equipment than CORPORAL.

LACROSSE began coming off the production line during the year. A versatile close and general support missile, LACROSSE is highly accurate and mobile. It is mounted on a standard Army truck for quick and easy movement and is controlled in flight by a forward guidance station which directs the missile to its target.

The LITTLE JOHN free rocket because of its relatively small size, simplicity, and reliability was issued to artillery units of the Strategic Army Corps during the year for training purposes. LITTLE JOHN is 12 feet long and 12½ inches in diameter. It uses a solid-propellant rocket engine with lightweight launchers and ground equipment which make it readily air-transportable.

As of the end of the fiscal year, evaluation studies continued on DART, a wire-guided missile intended for use against tanks and fortifications. Indications were that the weapon might not fulfill the Army's earlier expectations.

#### *Defense Missiles*

NIKE-HERCULES became operational in four areas of the United States during the year to augment the Nation's defenses against

enemy air attack. Successor to NIKE-AJAX, NIKE-HERCULES is a member of the NIKE family of weapons systems which acquire the enemy target electronically and guide the missile to intercept the attacker. With an atomic warhead, HERCULES is capable of destroying entire formations of enemy aircraft. The increased vertical and horizontal range of HERCULES and its tremendous speed make it capable of destroying any aircraft in use or being planned.

HAWK, designed specifically to counter the low-altitude threat, continued in successful development during the year and soon will be operational. It is designed for field Army use and will also be used in the Army's Air Defense system in the United States. Tests during fiscal year 1958 successfully demonstrated the reliability and capability of this system.

NIKE-ZEUS, one of the Army's two antimissile missile systems, was given a higher priority during the year with the Defense Department and Congress allocating additional funds to speed its development. Concurrently, ZEUS was undergoing tests which indicated that its engineering was progressing satisfactorily.

The ZEUS system is designed to counter all forms of air threat against the United States with special emphasis on the intercontinental ballistic missile.

PLATO is the Army's antimissile missile system being developed primarily for use of the field armies. It will use the ZEUS missile.

#### *Gun-Type Air Defense Artillery*

VIGILANTE, a highly mobile, crew-served, self-contained gun weapon system capable of providing enhanced air defense to forward area troops, neared the end of its developmental work during the year. It is a 37-mm. Gatling-type gun with computer and radar and capable of a very high rate of fire. It may supplant the 40-mm. gun air defense system now in use.

#### *Protection for Missile-Handlers*

To help protect missile-handling crews from the highly corrosive chemicals required by liquid-propelled rockets, the Army developed an improved suit consisting of a coverall, hood, gloves, and boots. Made of a new material, the suit is impervious to the liquid oxygen, hydrogen, peroxide, red fuming nitric acid, and other chemicals which the crews handle. In addition, crew members wear the new M-15 mask, which feeds compressed air to the worker from a pair of small tanks carried on his back.

A new shelter, to protect crews and missiles against inclement weather while the weapons are being readied for firing, also was de-

veloped during the year. Made of lightweight, coated nylon, the shelter is erected and held rigid by air inflation. A four-man crew can put the shelter up in 10 minutes and one man can dismantle it in seconds.

#### *Artillery Cannon*

Work continued on the development of the Moritzer, which will combine the best features of a mortar and a howitzer. This light artillery weapon will be mounted on a self-propelled carriage with the crew protected against small-arms fire, shell fragments, and heat and blast effects of atomic bursts. Emphasis is being placed on flexibility and air-transportability.

A prototype of the new 175-mm. gun was delivered during the year. This weapon also is self-propelled and air-transportable. It is designed to serve in the general combat support and counter-battery roles.

#### *8-inch Atomic Shell*

For the first time the Army was permitted to reveal the development of an 8-inch atomic howitzer shell. The projectile was developed several years ago, but security considerations precluded its public release until recently. With the explosive yield of several thousands of pounds of TNT, the shell greatly increases the knockout power of the Army's artillery. Though lacking the range of the Army's 280-mm. atomic cannon, the 8-inch howitzer is much lighter and more mobile, providing a faster handling advantage in combat.

The shell is an example of the Army's continued emphasis on small-yield atomic warheads for missiles and tube-type artillery. At the same time, the Army is pressing its research for other entirely new means for firing nuclear explosives.

### **Mobility**

Toward achieving the high order of land, sea, and air mobility crucial to the proficient function of the pentomic Army, Research and Development continued its programs on new land vehicles, aircraft, and seacraft. As well, advances were made in reducing the load of the individual soldier.

#### *Land Mobility*

During the year the T-113 armored personnel carrier neared the production state. Air-transportable and capable of swimming inland waters, the T-113 is one of a new family of multipurpose vehicles designed to speed the overland movement of troops.

Greater operational range was being sought for the Army's tanks in the development of a compression ignition engine, which is ex-

pected to provide economy in fuel requirements. At the same time, work continued in the development of the light gun T92 tank and the medium gun T95. Both promise improvement in mobility and firepower yet with less weight.

Greater fuel efficiency for tanks and other Army vehicles is being sought in a multifuel engine and in "free-radical" chemical fuels.

Because of the requirements for considerable cross-country travel in the pentomic Army, work continued on programs to give land vehicles a greater amphibious capability. Prototype construction is under way on a mobile assault ferry, capable of transporting a medium gun tank over water obstacles.

A new type of rough-terrain forklift truck, for the rapid handling of supplies in rugged field conditions, was developed during the year. The vehicle can move through 5 feet of water to transfer supplies from landing craft and can load and unload on beaches and in other difficult terrain situations.

Advances were made in the transportation, storage, and distribution of bulk fuel and other liquids. A family of collapsible containers will be able to transport fuels and lubricants by surface or air. Conversion kits will turn vehicles, aircraft, or railway cars into bulk petroleum carriers. The Rolling Fluid Transporter will use giant tires, filled with the fuels or other liquids, assembled into a train for movement.

For purposes of air transportability, development across the board was aimed at reducing weight while improving capability of aerial craft. Under study during the year was the use of aluminum instead of steel for tactical vehicles. Titanium also was under study for use in reducing the weight of equipment and weapons.

### *Air Mobility*

In its aircraft, as in its weapons and other equipment, the Army requires maximum versatility and flexibility for the broad and varied requirements of pentomic units. Toward these ends, during the past year, Research and Development continued its study and experiments with radically new aircraft concepts. One example was the "Aerial Jeep." Contracts totaling \$1,702,000 were awarded to three companies for the design, construction, and testing of a compact vehicle which hovers close to the ground and maneuvers in the air through tight areas. The project was prompted by recent advances in powerplant designs and in the use of the ducted propeller for vertical lift. Ultimately, the Army hopes to have a vehicle that could travel up to 25 knots and carry 1,000 pounds of weapons and equipment, including crew.

For several years, the Army has sought an aircraft capable of vertical takeoff, like a helicopter, and rapid forward movement like a fixed-wing plane. Shortly after the close of fiscal year 1958, the first transition flight of such a craft was completed successfully by a contractor carrying out research for the Army.

Service tests were begun meanwhile on the Iroquois, which is the first turbine-powered helicopter to be adopted as standard military equipment in the United States.

Flight tests were being planned for the Mohawk, which will have the capability of taking off and landing in small areas. It is designed primarily to do observation and surveillance work for the Army.

#### *Water Mobility*

A production contract for a new plastic assault boat, to carry 15 men, was awarded during the year. Developed by Army R & D, the boat is designed for assault actions across rivers, streams, and other water obstacles. It can be paddled or propelled by a 25-horsepower motor to a speed of 7.5 miles an hour with a full load or 22 miles an hour with one man aboard.

The Army's newest amphibious support vessel, the beach discharge lighter *Lieutenant Colonel John U. D. Page*, was launched during the year at San Diego, California. The 338-foot ship is designed to speed over-the-beach operations in support of landing actions. It is capable of transferring large quantities of heavy equipment between ships or from ship to shore when shallow draft landings are necessary. Its vertical axis propellers give the vessel unusual maneuvering, stopping and backing power. It has potential range of more than 4,800 miles.

#### *Individual Load-Carrying System*

Research on the comfort and efficiency of the individual soldier in carrying his personal and unit equipment culminated during the year in the development of a new individual load carrying system. Combined studies on both the tolerable weight the soldier should be able to transport and on the carrying equipment itself resulted in the design of a new belt and shoulder padded suspenders. The equipment gives the soldier greater ease of movement and more evenly distributes his load of ammunition, rations, bedding, and other items. In addition, the development of special fasteners enables him to attach, detach, or adjust his equipment more easily and quickly.

#### **Communications**

R & D moved substantially closer during the year toward achieving a truly modern, flexible, and reliable communication system. Full

advantage was being taken of the sound foundation provided by the previous Army communication system, which, in World War II and in Korea, proved itself superior to the communication system of any army in the world.

New developments included the testing of tropospheric scatter equipment to give greater ranges and savings in manpower.

Helicopter-borne and air-lifted radio relay stations promised to provide more mobile and flexible methods of overcoming obstacles to communication, such as extended distances or mountainous terrain.

Telephone toll or trunk dialing was in development in the form of an automatic switching system to eliminate the difficulties of manual routing through several switchboards.

A mobile version of radio-switching centrals, a technique now used commercially, was under test. These mobile centrals will tie a number of tactical radio sets into the communication system in a fluid tactical situation without the use of wire.

A miniature coaxial cable, no larger than the field wire of World War II yet able to carry a hundred messages at once, was under development.

#### *Combat Surveillance*

In recognition of the vastly increasing importance of maintaining a constant and accurate flow of information on the enemy and his movements in combat, the Army materially strengthened the Combat Surveillance Agency which it had established late in fiscal year 1957.

The Agency has monitorship over the planning, research, and development of surveillance systems, which, through a variety of equipment, can report on the location, size, formation, and movement of enemy troops during the day or at night under all weather conditions. The importance of this intelligence is apparent when it is recognized that missiles and nuclear explosives have given armies the capability of hitting with devastating power over great distances and moving and hitting again all in a matter of hours. Knowledge of the enemy's disposition is essential not only to hit him but to avoid giving him a profitable target for his missiles and atomics.

In terms of hardware, during the past year, the Army continued the development of high-, medium-, and low-endurance surveillance drone systems that will use a wide variety of sensory devices, such as precision radar, infrared scanners, radiological detectors, low light level television, and cameras capable of day or night photography. Future drone systems may use inertial, self-contained, precise navigational equipment, which reached the experimental stage during the past year.

Small, lightweight, portable radar sets were being developed to cover avenues of approach to battle groups, and to warn of enemy movements including guerrilla action and infiltration.

A development for night photography is a new airborne photographic reconnaissance camera that will fire its own illumination by automatic flare ejection.

One development in microminiaturization of electronic components during the year is of particular usefulness not only for communications and combat surveillance but also throughout the Army's numerous electronics systems. This is the process for printing transistors—devices for controlling the flow of electrons, similar to the vacuum tubes in a radio or television set—much as newspapers or magazines are printed. The printed transistor is comparable in size to the dot over this "i."

The Army also initiated a comprehensive program to develop microminiature modules for overall application to electronics equipment. The electronic components and transistors are constructed on 0.3-inch square wafers which are then assembled into cubical modules 0.3 inch on a side. Individual modules are stacked into circuit sub-assemblies. A tenfold advantage in size and weight can be realized in some cases with this technique—as well as increased reliability and reduced maintenance.

To augment and accelerate its own work, the Army signed a 2-year contract with a private research firm for developmental work on nearly all systems of combat surveillance, including radar, infrared, sonic, meteorological, drone, photographic, and television. On the basis of its findings the company will make recommendations to the Army on present, planned, or entirely new projects.

## **Nuclear**

During the past year there were substantive advancements in the Army's nuclear research program, which seeks to develop a variety of atomic weapons and counter weapons of varying sizes and purposes, safeguards against the effects of nuclear weapons, the production of heat and electricity with atomic power reactors, and the practical application of radiation for food preservation and other purposes.

### *Combat Uses*

The Army continued its emphasis on nuclear weapons of smaller yields. The Army's 8-inch atomic howitzer shell has been mentioned earlier in this chapter. Programs for the perfection of nuclear projectiles of even smaller size continued, concurrent with efforts to develop cheaper, lighter, and simpler delivery systems.

As a means of detecting and measuring radiation in a blast area, a new network of detectors was developed by the Army and put into test at the Nevada proving grounds. The detectors are placed at the surface of the ground, in tanks, and in balloons at a 1,000-foot altitude. Data are fed to recorders located safely below the surface of the ground and may be used by scientists in the preparation of radiation charts for combat purposes.

### *Nuclear Power Plant*

In April of 1958 the Army let a contract for the construction of its first operating field nuclear powerplant at Fort Greely, Alaska, 60 miles south of Fairbanks on the Alaskan Highway. Completion of the plant, including a 4-month test period, is expected in September 1960.

The plant will be modeled after the Army's first nuclear power plant at Fort Belvoir, Virginia, and will produce heat and electricity for Fort Greely. It will permit the Army to carry out further research in the development of a small nuclear powerplant, the components of which could be flown into devastated areas during war, or, during peacetime, into remote areas where the cost of conventional fuels is prohibitive.

One cycle in training operators for the plants already has been completed and a second started in February 1958 when nearly 50 men were selected by the Army, Navy, and Air Force to attend courses at Fort Belvoir.

### *Ionizing Radiation Center*

The Army's new Ionizing Radiation Center at Sharpe General Depot, Lathrop, California, will be the free world's first comprehensive food radiation facility in the world, a pilot project in the preservation of food through radiation.

In October 1957, the Army awarded a contract for the production planning of facilities for the Center. This contract covers the development of plans for the plant layout, work-flow diagrams, production methods and practices, and cost studies. The construction contract is expected to be let in December 1958. It is anticipated that ground-breaking ceremonies will be held about March 1959.

Research thus far has established the feasibility of utilizing nuclear emanations, such as gamma rays and electrons, instead of heat, to kill or inactivate the micro-organisms that cause spoilage. Taste-testing in troop mess for two irradiated foods has been conducted successfully with no difference in acceptance between irradiated and nonirradiated foods. Aside from the tremendous value to the Army,

in relation, for example, to the tasks of storing and transporting food, the project holds great promise for civilian uses.

United States national progress, under Army initiative and leadership in this field, has stimulated worldwide attention and response. International interest has increased rapidly during the past 2 years. The U.S.S.R. has recently announced its intention to complete a small irradiated food pilot plant in 1959. A French commercial company also has plans for a pilot plant in this field.

In the past year there were three international meetings on this subject. Another such meeting is scheduled this November in London under British sponsorship. India has recently made inquiry of the United States Atomic Energy Commission regarding the economic prospects for food irradiation under conditions prevailing in India.

(For a discussion of research in nuclear medicine see the section headed "Health" in Ch. IV.)

### **Polar Research**

One of the Army's outstanding achievements in polar research during the past year is the capability now of building an entire camp with interconnecting roadways beneath the surface of the Arctic icecap. Plans have been finalized for such a project and are awaiting the necessary funds.

This accomplishment comes as a result of the Army's polar research programs, many of which go back to World War II.

In the semiannual report of June 30, 1957, the Army reported its success in building, beneath the ice, rooms 60 feet square and 23 feet high. This work was expanded during the past year to establish the feasibility of constructing an entire installation below the surface of snow and ice. Indications are that because of the minimum of construction materials required—in many instances the ice itself is used for partitions and supports—such a "camp" would be less expensive than construction of a comparable installation in the United States. In addition, the uniform temperatures found within the ice mass would reduce greatly the fuel requirements for heating such installations, when compared to similar costs of surface installations in the United States.

Related work in the past 12 months showed that excavated ice pits and caverns could be used for storage of gasoline without the use of additional materials and that the gasoline actually improves after an extended period in the ice. It also does not evaporate as fast and picks up fewer impurities as compared to usual storage.

The Army meanwhile continued its work on a tunnel beneath the icecap. In the fall of 1957 the tunnel had reached a length of 1,170 feet through the ice and Army personnel had laid rails for a narrow-

gauge locomotive and cars to assist in the cutting and removal of ice as the tunnel is extended even farther beneath the ice.

One purpose of the tunnel was to prepare for a similar project in the Antarctic in connection with the International Geophysical Year.

A related project was the drilling of a 1,200-foot hole in the Greenland Icecap (fig. 10). The work had two purposes. The first was to study new techniques in such work, since the thawing and refreezing of the ice puts special requirements on the drilling apparatus; and the second was to study the structure of glacial ice, which is formed in layers similar to the growth rings in trees. Army scientists were particularly interested in those rings formed at the time of the Hiroshima and Nagasaki atomic bomb blasts, and in the type of snow which fell during Krakatosh Island's volcanic explosion in the Pacific during the latter part of the 19th century.

During the year, in connection with continued research on the characteristics of snow and ice, the Army discovered that radio signals can be transmitted through snow and ice. This knowledge will be valuable in what may be the need for communications between stations in the ice cap.

### **International Geophysical Year**

The Army's diversified participation in the International Geophysical Year continued during the past 12 months, developing data of interest to scientists around the world and of value in solving problems concerning the environmental conditions in which soldiers live and fight.

The successful launchings of Explorers I and III as part of the IGY already have been covered earlier in this chapter, along with the outstanding work of Dr. Paul Siple.

In addition to these specific accomplishments, the Army has assignments in the following classifications of IGY activities: Aurora and Airglow, Cosmic Rays, Oceanography, Glaciology, Ionospheric Physics, Meteorology, Latitude and Longitude, Earth Satellite Program, and Rocket Exploration.

Activities within these classifications are being carried out by a wide number of Army agencies in coordinated action with each other and in cooperation with other national departments and groups. The Army agencies include the Office of the Deputy Chief of Staff for Military Operations, the Office of the Chief of Research and Development, the Signal Corps, the Ordnance Corps, the Transportation Corps, the Corps of Engineers, and the Army Map Service.

Examples of the Army's work during the year are covered below.

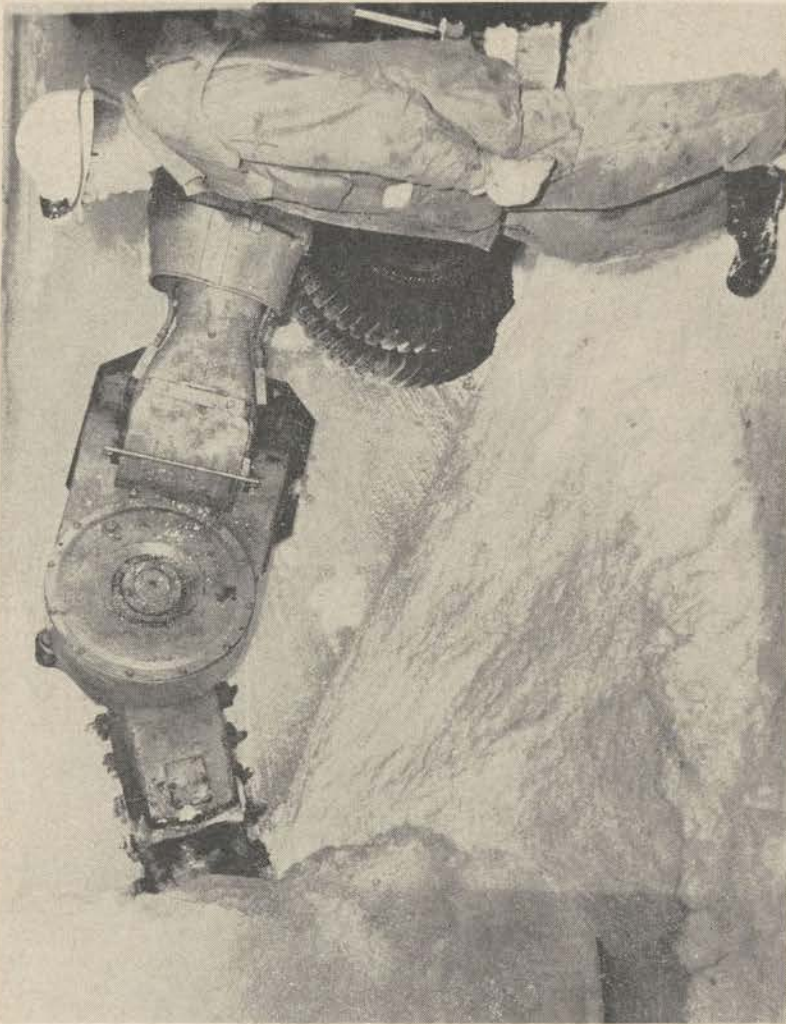


Figure 10. Tunneling beneath Arctic icecap.



Figure 11. AEROBEE rocket.

From Fort Churchill, Canada, 41 AEROBEE rockets (fig. 11) and NIKE-CAJUN combination rockets were fired into the upper atmosphere with instruments to help provide more accurate information about temperatures, wind, cosmic rays, and other matters of value in weather forecasting, high-altitude flight, navigation, and radio transmission.

Ionospheric observations were being made from stations located at Thule, Greenland; St. Johns, Newfoundland; Grand Bahama Island, and a floating ice island about 800 miles from the North Pole. These were in addition to stations which the Army regularly operates at Fort Monmouth, New Jersey; Adak, Alaska; Okinawa; and White Sands Missile Range, New Mexico. For the IGY activity, each station was using special equipment which photographically records the

characteristics of the ionosphere at 15-minute intervals. These stations participate also in monitoring the signals of artificial satellites. The station on the floating ice island had unique success in recording the signals of the Russian Sputnik I during several of its complete orbits around the earth.

In connection with the Army's role in glaciological, Arctic, and Antarctic research, Army scientists drilled a test hole between 1,000 and 1,500 feet deep in the Antarctic ice. The purpose was to analyze the cores to determine the qualities and quantities of snow which have been deposited at the South Pole in past centuries. For this work Army scientists called on their experience in the Greenland Research Program (covered earlier in this chapter). This work also was of great value to the assignments of the Navy's Task Force 43 in its IGY Antarctic projects, in snow-compacted runways, the detection of snow crevasses, and the blazing and marking of trails across the snow wastes. The joint Army-Navy effort also is seeking to determine any connection between precipitation at the North and South Poles.

#### *Aid to VANGUARD Project*

The Army was assigned primary responsibility for the establishment and operation of the Project VANGUARD Task Force under an arrangement with the Naval Research Laboratory. The group was given the assignment of setting up and maintaining a series of tracking stations as part of the Prime Minitrack System, with the establishment of six stations along 75° longitude, to track the orbit of the artificial satellites. Each station recorded the difference in time of arrival of the radio signal transmitted from the satellites at separate, accurately positioned antennas. The recordings provided data from which successive positions of the satellite in a portion of its orbit could be computed. Extrapolation of these portions, refined by the data from many such observations, predetermined the orbit of the satellites to a high degree of accuracy.

Prime Minitrack stations in the north-south fence are located at Blossom Point, Maryland; Fort Stewart, Georgia; Batista Field, Havana, Cuba; Mt. Cotopaxi, Quito, Ecuador; Ancon, Lima, Peru; Antofagasta, Chile; and Peldehue Military Reservation, Santiago, Chile. Three other stations are located at Antigua, British West Indies; San Diego, California, and Woomera, Australia. The Army operated and maintained six of the stations of the north-south fence, the one at Blossom Point, Maryland, being the responsibility of the Naval Research Laboratory.

These stations also have telemetering equipment which is used to receive from the satellite the information concerning cosmic rays,

temperatures, meteorite impacts, magnetic effects, or others as determined by the equipment installed in a given satellite. The data obtained at each station are transmitted to the Vanguard Computing Center in Washington.

The system had its first live practice during the radio life of the Soviet Sputniks. These satellites transmitted their radio signals at frequencies of 20 and 40 megacycles instead of 108 megacycles, the accepted frequency for IGY satellites. Through expedient modifications, considerable data were obtained from the 40 megacycle emissions of the Soviet satellites. Permanent modifications for 40 megacycle tracking, usable at the turn of a switch, have been installed at the Lima and Santiago stations.

Another important Army contribution to the VANGUARD Project is the solar cell converter used to power one of the satellite's two radio transmitters. This converter turns the sun's energy into electricity, and has a life of indefinite length. It is considered ideal for satellite use since it performs more efficiently at great heights than on the ground and it also avoids the weight of more standard chemical batteries. Developed experimentally by the Army, the converter is expected to find use in small radios employed by ground troops.

#### *Project BETTY*

An exclusive Army activity in the satellite field, Project BETTY, uses the orbits of the satellites to improve the data on the geodetic positions of certain islands in the Pacific in furtherance of the Army geodetic and mapping programs. In brief, the BETTY Project is the reverse of VANGUARD. By similar measuring, recording, and computing techniques, these stations locate themselves through observation of the passage of the satellite whose orbital constants have been determined from the precisely located VANGUARD stations. Being almost completely independent of weather conditions, the method is an invaluable adjunct to the classical means of determining geodetic position.

Observations are being made from six Pacific Ocean islands. The locations selected are Clark Air Force Base, Philippines; Roi Namur, Kwajalein, Marshall Islands; Guam, Marianas Islands; Ponape; Samoa; and Wake Island. The Clark AFB and Roi Namur stations were the first to be set up, and from these stations the Explorer satellites were tracked with a success which indicates possible accuracies of station location within 300 meters. Two tracking parties are operational on this project and are expected to spend approximately 3 months in each of the island locations. During fiscal year 1958 the parties operating the Clark and Roi Namur stations completed their observations from these positions and have moved to new locations.

Tracking data are now being received from Guam, and a party has moved into Wake Island where tracking operations will begin early in fiscal year 1959.

The effort expended in Project BETTY has resulted in the recording of 731 observations from Clark AFB and 529 from Roi Namur in the period of February 1 through May 6, 1958, involving only American satellites. Through the expansion of the BETTY operation to provide the location of stations tied into national triangulation nets, the various nets throughout the world can be adjusted to establish a single world-wide datum and a more accurate size and shape of the earth can be computed. From these, more precise mapping of all parts of the world can be accomplished.

#### *Army Scientist Honored*

Dr. Paul A. Siple, an Army scientist for 17 years, received multiple honors during the past year for his outstanding work in the U. S. Antarctic Program in connection with the International Geophysical Year.

Dr. Siple made his first polar expedition as a Boy Scout with Cmdr. Richard E. Byrd in 1928. In 1941, after several additional trips to the South Pole and after receiving his doctorate at Clark University, Worcester, Massachusetts, Dr. Siple was employed by the Army as Chief of the Climatology and Environmental Protection Section, Military Planning Division. Later, he organized the Army's first Climatic Research Laboratory.

In 1954, when he was Director of Basic Science Research of the Army's General Staff, Dr. Siple was chosen by Admiral Byrd as Director of Scientific Projects in Operation DEEP FREEZE I, which carried out work in preparation for the International Geophysical Year. For this purpose and additional IGY projects, Dr. Siple was loaned to the Navy. Later he was named Deputy to Admiral Byrd, who was Officer in Charge of the U.S. Antarctic Program, and had the additional title of Scientific Leader of the IGY Geographic South Pole Station.

As the result of his work, Dr. Siple received the following honors: The Department of Defense Distinguished Service Award; the Department of Army Distinguished Service Award; the David Livingstone Award of the American Geographic Society; the Hubbard Medal from the National Geographic Society; the Patron's Medal of the British Royal Geographic Society; and honorary degrees from Gannon College, Erie, Pennsylvania; University of Massachusetts, Amherst, Massachusetts; Boston University, Boston, Massachusetts; and Clark University, Worcester, Massachusetts.

In January 1958 Dr. Siple returned to the Army as Scientific Director of Environmental Research. Additionally, he is Chairman of the Coordinating Representatives Group on Polar Research and Development and serves on the National Committee for IGY, the Technical Committee for the Antarctica, which is monitored by the Department of State, and the Advisory Committee on Antarctic Names.

*Sharing Information With United States Allies*

In accordance with the President's expressed policy, Army Research and Development continued its participation in the program for sharing with selected allies scientific information relating to military research and development and its application. Army Research and Development takes part in three specific programs: The Tripartite Standardization Program among the armies of the United States, the United Kingdom, and Canada; the NATO Standardization Program; and the Mutual Weapons Development Program of the Department of Defense. The Army also supports United States efforts within NATO to improve the coordination and pooling of research and development and production capabilities of the member countries in order to make the most efficient use of free world resources.

## IV. Manpower and Training

Principal developments in manpower and training during fiscal year 1958 included:

- military strength was reduced from 1,000,000 to 900,000;
- the discharge of nonproductive enlisted men was substantially increased;
- the use of automatic data processing systems was extended in personnel management;
- promotion systems were refined;
- pay increases resulted from new legislation, with anticipated benefits in morale and proficiency;
- voluntary enlistments sharply increased;
- eight major field exercises were held to further pentomic Army training, and 164,006 men were trained in Service schools;
- additional changes were made in the Army school system for pentomic warfare;
- the Ready Reserve held generally to its assigned strength of 1,448,000 men;
- the Army National Guard attained the highest level of peacetime combat-readiness in its history;
- continued difficulties were encountered in recruiting and retaining civilian scientists and engineers;
- additional progress was achieved in programs to aid the development of civilian executives; and
- new safety records were set by the Army, resulting in benefits of \$5,147,000 over fiscal year 1957 in reduced injury costs and property damage.

### Military Personnel

The Army's principal problem in military management during the past year was to adjust to a 10 percent reduction in strength (fig. 12). In the absence of a commensurate reduction in missions and functions, a concurrent program was initiated to further increase the effectiveness of the remaining individual officers, enlisted men, and combat units.

The several interrelated factors bearing on personnel management were:

# ARMY • MILITARY STRENGTH

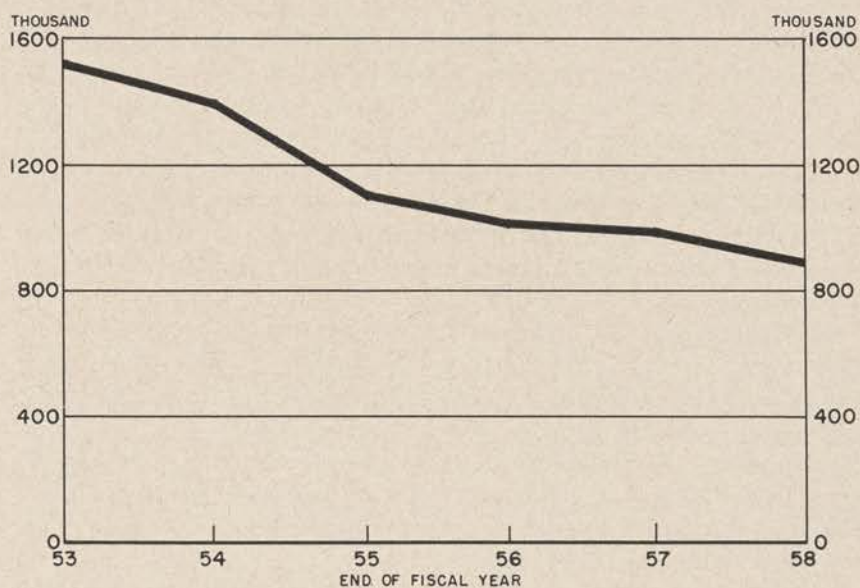


Figure 12

1. Two 50,000-man reductions in strength;
2. Programs to eliminate nonproductives from Army ranks;
3. Programs to further strengthen the officer corps and improve the quality of enlisted ranks;
4. Improvements in personnel management; and
5. Advances in training, with emphasis on training necessary for the pentomic Army.

The prime consideration was the strength reduction, with which all other personnel factors had to be reconciled and adjusted. The first cut, establishing an Army manpower ceiling of 950,000, was ordered by the Defense Department on July 16, 1957, to be effective December 31, 1957. The period of 5½ months was a minimum time in which to carry out the order, especially without seriously impairing the combat readiness of the Army's units. Limitations on expenditures ordered by the Defense Department in August compelled the Army to plan for a reduction to 929,000 by the end of December.

On September 20, 1957, the second 50,000-man cut was ordered, to be effective by June 30, 1958, with the object of giving the Army an authorized strength ceiling of 900,000. This made possible the release before Christmas of a number of men who otherwise would

have had to wait until 1958 for separation. Actual strength on December 31, 1957 was 918,111.

The Army sought to apply the reductions, as far as possible, so as to improve the overall quality of its personnel.

Among the officers, the Department of Defense ordered that 5,530 would be included in the first 50,000-man cut, and approximately 4,000 in the second 50,000-man cut. For the first reduction, even after deliberately planning on an understrength position for December 31 and applying normal attrition losses, it remained necessary to force the release of 2,130 officers, including 580 warrant officers. The chiefs of the Technical and Administrative Services and chiefs of the career branches of the Combat Arms made the nominations, which were screened and approved by the Army Active Duty Board.

In considering the proposed officer reduction of approximately 4,000 officers, in the second half of the fiscal year, the Army ascertained that the problems to be raised by additional force-outs would outweigh the dollar gains sought in the reduction. The Army recommended to the Defense Department that the second cutback in officers be canceled, with plans instead for a reduction through normal attrition of approximately 4,000 officers during fiscal year 1959. This recommendation was approved.

In discharging the total of approximately 95,000 enlisted men, the Army sought to direct the cut as far as possible toward the elimination of its minimum-potential personnel.

One of the principal projects in this effort is the Job Performance Potential Program. Initiated on July 23, 1957, the program had as its purpose the removal from the Army of those men who, because of low aptitude, could not pass the Army Classification Battery tests to the minimum extent necessary to indicate an acceptable performance capability. Under legislation then in effect, such men could be eliminated prior to entering the Army only if they were among voluntary enlistees or reenlistees. Unacceptable draftees could be eliminated only after actual induction, a practice which required an unnecessary expenditure of time and money.

After the manpower reductions were ordered, this project was accelerated so that as of December 31, 1957, 44,200 enlisted men with a less than minimum aptitude had been discharged, and by June 30, 1958, approximately 25,400 more men had been released. Many of the men discharged had served an average of only 39 days in the Army.

Public Law 85-564, which was passed shortly after the end of the fiscal year, will permit the rejection of unacceptable men prior to in-

duction, thus reducing the workload on induction and training facilities and permitting a suspension of the Job Performance Potential Program.

Thus, even as the cutbacks were being effected, the Army was advancing individual and unit training; improving personnel quality with redefined promotion procedures; and enhancing the morale and organization of enlisted ranks with two new enlisted grades. Distinct benefits were being realized, also, from pay increases.

Although at year's end the Army's combat strength had been reduced, the Army had achieved what is perhaps the highest level of effectiveness per man in the Army's history.

#### *Personnel Management*

With the object of achieving better personnel control, the Army continued the modernization of many management processes with Automatic Data Processing Systems. A large-scale computer with supporting communication devices was applied to certain functions to provide more accurate, timely, and detailed information on personnel; and expanded uses of ADP Systems are planned through all echelons of the Army as equipment becomes more proficient and proper applications become better defined.

#### *Regular Army Commissioned Officer Strength*

The commissioned officer strength of the Regular Army, male and Women's Army Corps, increased from 26,883 to 31,888 during the year. The primary source of this increase was the Regular Army Augmentation Program. Some 19,267 applications were received and 5,527 selections were made. On June 30, 1958, 35 percent of the male and WAC commissioned officers were Regulars. (See fig. 13.) Under the provisions of Project 200, an adjunct of the Regular Army Augmentation Program designed to bring into the Regular Army a maximum of 200 outstanding specialists in certain critical fields, 28 out of 173 qualified applicants were selected for integration into the Regular Army. A total of 11 was actually appointed during the year under Project 200.

The procurement goal for second lieutenants from the ROTC Distinguished Military Graduates Program for fiscal year 1958 was 725; actually, 780 Regular Army second lieutenants were appointed.

Revision of procurement regulations and simplification of the administrative procedures will make application for Regular Army appointment more attractive and should result in a substantial increase in applications in the future.

# ARMY • REGULAR WARRANT AND COMMISSIONED OFFICERS AS A PERCENTAGE OF TOTAL

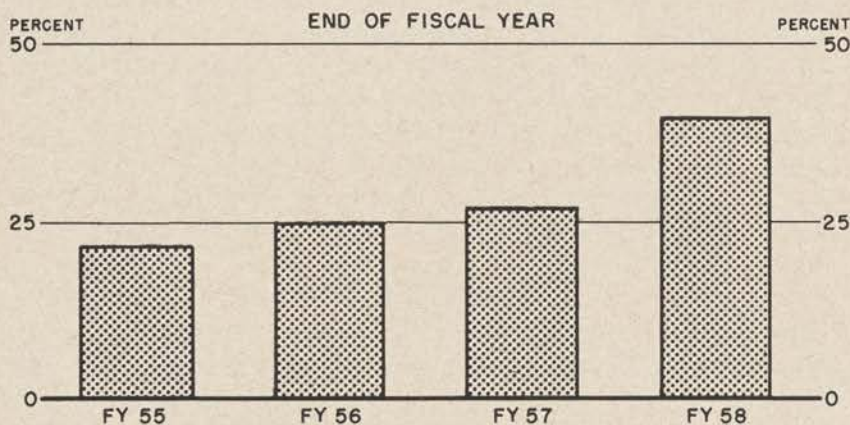


Figure 13

### *Enlisted Evaluation System*

An Enlisted Evaluation System is being established by the Army to provide an objective means for evaluating enlisted men against Army-wide standards. It will be applied to three main areas of personnel management—Proficiency Pay, Temporary Promotions, and Enlisted Classification Procedures.

The System will be a single program using written and performance tests as a means of measuring an individual against the requirements of his classification. The results of these tests, supplemented by the performance evaluation report submitted by the unit commander, will provide a composite score for an objective evaluation.

The System will be operated and controlled primarily through an Army Enlisted Evaluation Center established as a Class II activity under The Adjutant General at Fort Benjamin Harrison, Indiana. Tests will be administered at each post, camp, or station under the jurisdiction of a Test Control Officer, who will deal directly with the Army Enlisted Evaluation Center for the scheduling of tests, requisitioning of materials, and scoring.

In consonance with Department of Defense guidelines, the application of the Enlisted Evaluation System to enlisted classification will insure the award of proficiency pay to the best qualified, improve the promotion system by awarding promotions on a qualified basis rather than on length of service and on being in the right place at the right time, assist in maintaining a balance of classification, and furnish additional criteria for the reenlistment of qualified personnel.

### *Promotions*

A continued effort was made to refine promotion policy and procedures. The "best qualified" competitive system of promotion selection was extended in temporary and permanent promotions to lieutenant colonel in January, and approved for employment in selections for temporary and permanent promotions to major after July 1, 1958.

Plans were completed for the Department of the Army to reintroduce permanent enlisted promotions in the Regular Army on July 1, 1958. The plan will add stability to grades now held by noncommissioned officers and specialists on a temporary basis. Permanent appointments for Regular Army enlisted personnel were suspended in August 1950 and have not been resumed to date. At present, the only permanent appointments being made are administrative advancements to private E-2 and 1-grade permanent promotions after 29 years' service. Features of this permanent plan include:

1. A permanent enlisted grade structure of 565,000;
2. Selection by commanders based on time in temporary grade and total active Federal service;
3. Quotas for the top three grades allocated by Headquarters, Department of the Army, to allow for gradual phasing to full authorization;
4. No actual grade changes as a result of permanent status. All those considered must be in the temporary grade to be eligible; and
5. Provisions for demotion through board action.

Public Law 85-422 of the 85th Congress authorized enlisted grades E-8 and E-9. These grades are new to the Army. The Army plans to have approximately 3,500 E-9's and 11,000 E-8's by the end of fiscal year 1962. The phase-in period will be over 4 years in approximately four increments. This method is expected to provide the advantages of preventing promotion stagnation, of encouraging an even flow and progression to the highest grade, of providing additional competition, and of assuring that individuals are qualified in MOS prior to promotion. Appointments to E-9 are to be made by regimental level commanders using the "best qualified" method selection from those E-8's with 16 months in grade and 18 years of active Federal service. Appointments of E-8's are to be made using the same method from those E-7's with 14 months in grade and 15 years of service.

### *Pay Increases*

In conjunction with the other military Services and the Defense Department, the Army aided in developing and supporting passage

of Public Law 85-422, by which Service careers are made more attractive through increased emoluments.

The outstanding features of this law are—

Increased pay, with primary emphasis on keying longevity increases to service criteria for promotion prescribed in the Officer Personnel Act of 1947;

The establishment of two new senior pay grades for both officer and enlisted personnel;

The provision of extra pay for enlisted personnel who possess special proficiency in military skill;

The provision of additional pay for officers assigned to positions of high responsibility, and the elimination of full credit for future inactive service for computing retired pay.

The purpose of this legislation is to provide greater retention of highly skilled personnel and to increase career satisfaction by making remuneration more competitive with industry.

Implementation of the proficiency pay provisions of the bill was postponed pending provision of guidance by the Defense Department.

#### *Enlistments and Reenlistments*

During the first half of fiscal year 1958, enlistments and reenlistments continued a decline that began during fiscal year 1957. During the last half of fiscal year 1958, however, there was a marked upsurge in nonprior-service enlistments as well as in reenlistments. Voluntary enlistments through the Army Recruiting Service increased approximately 13 percent during the year. Regular Army reenlistment rates, as in 1957, were approximately 50 percent among both first-term categories (those completing their first enlistment) and career categories (those who have reenlisted at least once previously).

Both the increase in voluntary enlistments and the maintenance of the reenlistment rates at the high fiscal year 1957 level were attributed to a lessening of opportunity in industry, increase in Army prestige because of certain technological achievements, and substantial increases in service pay—all manifested during the last half of the fiscal year 1958—as well as to continued improvement in the Army Recruiting Service and full implementation of the "Career Counselor" reenlistment concept.

At the conclusion of fiscal year 1958, 64.7 percent of the active Army enlisted strength were Regulars.

#### *Scientific and Professional Program*

To aid in meeting the Army's constantly growing demand for scientific and professional services in nearly all fields, approximately

5,000 enlisted personnel were classified under the Scientific and Professional Program and assigned to work in 184 different activities throughout the world. Many of these men were being used on some of the Army's most critical projects.

The program, which began in 1948, seeks the proper and maximum utilization of inductees who had special training in engineering, the sciences, medicine and dentistry, and other fields prior to entering the Army.

Criteria for selecting inductees for assignment to the program are expressed in terms of scientific and professional skills, educational levels, aptitude area scores, and experience. Criteria are revised periodically in accordance with Army needs.

Personnel are classified into 1 of 2 types: (1) Enlisted personnel who hold a primary scientific and professional classification and who are assigned to duty under that classification; and (2) personnel who hold a secondary scientific and professional classification and are assigned to duty in a related field.

The program not only gives the Army greater use of the individual's previous training and experience, but enables the inductee also to advance himself in his field.

#### *Manpower Distribution*

The operating forces of the Army—combat forces and their integral supporting elements—comprised 62.5 percent of the total Army strength at the end of fiscal year 1958. The following table reflects the percentage distribution of military strength by personnel categories, including 733 reimbursables, for June 30, 1958:

	June 30, 1957 (percent)	June 30, 1958 (percent)
Operating Forces .....	65.8	62.5
Supporting Forces .....	9.3	9.9
Special Activities .....	6.1	6.8
Training Forces .....	16.6	18.1
Transients and Patients .....	2.2	2.7

The category of Special Activities includes units and elements whose missions are of an international, joint, liaison, diplomatic, political, research, or other special purpose nature. Specific examples include:

Aviation Construction .....	5,918
Research, Development, and Testing .....	15,385
Military Assistance Advisory Groups and Military Missions .....	5,616
SHAPE, Unified Headquarters and Joint Headquarters .....	2,116
Recruiting .....	3,804
Joint Medical Facilities .....	3,251
Communications .....	1,694

## Training

As the Army's weapons become more complex and the individual proficiency requirements of the pentomic Army become more demanding, the Army's training responsibilities assume unprecedented weight and importance.

From teaching the newest recruit the manual of arms to instruction for senior officers in the latest electronic developments in missiles, for example, the Army sought in the past year to refine both subject matter and methods to insure, literally, the best trained army in the world.

### *Field Exercises*

In addition to a number of field exercises overseas, the Army held 8 major exercises in the United States involving approximately 73,200 men. As far as practicable, these exercises emphasized and gave the troops training in the pentomic concept:

—Exercise INDIAN RIVER consisted of movement of the 4th Infantry Division overland and by Air Force aircraft from Fort Lewis, Washington, to Yakima Maneuver Area, Washington, to conduct a combined unit exercise. This was the 4th Infantry Division's first division-size exercise since it reorganized within the pentomic concept. The exercise enabled the division commanders, staffs, and troops to receive training in the employment of atomic weapons and in the conduct of chemical, biological, and radiological warfare.

—Exercises ALL AMERICAN and EAGLE WING provided combined unit training in airborne operations at their home stations (Fort Bragg and Fort Campbell) for the 82d Airborne and 101st Airborne Divisions, respectively. Although the mass jump phase at the end of Exercise EAGLE WING was canceled due to unfavorable weather conditions, considerable valuable training resulted from previous phases of the exercise.

—Exercise STRONG ARM, an armored combat command exercise for Combat Command "A" of the 1st Armored Division, was conducted in the Louisiana maneuver area. It provided training in defensive and offensive actions, including a pursuit phase with a company-size drop by paratroopers from the 82d Airborne Division.

—Exercise DESERT ROCK VII provided selected officers and noncommissioned officers an opportunity to witness a "live" atomic weapon test shot at the Nevada Proving Ground, Nevada. In connection with the test, a reinforced infantry company from

4th Infantry Division received training in helicopter movements, desert warfare, and exploitation of atomic capability.

—STRAC EX, conducted at the home stations of all units, provided a realistic test of the Strategic Army Corps units in their responsibility to move out quickly in the event of war.

—LOGEX 58 was a logistical command post exercise conducted at Fort Lee, Virginia, to afford approximately 1,700 students from technical and administrative service schools the opportunity to apply their recent instruction.

—Exercise COLD BAY was carried out in Alaska by a battle group from the 4th Infantry Division at Fort Lewis, Washington. The purpose of this exercise was to afford the troops experience of a sea movement to Alaska and to provide individual and unit training under Arctic weather conditions for all participants.

### *Officer Education*

Although the training of all Army personnel is changing constantly to meet the varying requirements of modern warfare, the Army in December 1957 appointed a board to carry out a new, comprehensive review of the Army's educational system for its officers.

In its surveys, the board has recognized not only the overall impact of new concepts of war and the impact of nuclear weapons and missiles but also the importance of a changing international situation.

Findings and recommendations of the board were submitted to the Chief of Staff in July 1958.

### *United States Military Academy*

Further changes in the curriculum at the United States Military Academy at West Point were effected during the year as required by developments in nuclear and missile warfare and by the pentomic Army.

Affected were courses in mathematics, military art, graphics, ordnance, social sciences, tactical organization, tactical doctrine, and the weapons systems.

In addition to classroom instruction, continued emphasis was placed on modern Army training for cadets at different Army installations during the summer months.

Upon graduation, all cadets must take training as Army aviators, paratroopers, or Rangers.

A total of 571 cadets graduated in June 1958 as compared to 546 in June 1957. The 1958 class was the last from which, under Defense Department policy, a percentage of the graduates was assigned to the

Department of the Air Force. Beginning with the 1959 class, provisions of the "Air Force Act" will be implemented, permitting up to 12½ percent of the graduates of all three military academies to be assigned to another Service.

#### *Command and General Staff College*

In keeping with the pentomic reorganization, for the 1957-58 school year the Army Command and General Staff College at Fort Leavenworth, Kansas, initiated a new curriculum, with emphasis on the incorporation of nuclear age doctrine into the tactical courses. A total of 199 units of instruction was rewritten to reflect changes in the combat operations of the modern Army. The new curriculum is designed to give students equal facility under atomic or nonatomic environment and in all degrees of conflict, from situations short of war to general war.

During fiscal year 1958, a total of 3,194 officers was graduated in all courses, including 136 officers from allied countries; 25 Navy, Marine Corps, and Air Force officers; and 1,135 reserve component officers. In addition, 13,861 officers participated in the nonresident instructional program.

#### *College Training for Enlisted Men*

During the past year the Army refined its program of sending qualified personnel to civilian educational institutions by extending the opportunity to enlisted personnel. Approximately 53 men were sent each to Purdue University and to the Milwaukee School of Engineering to take 2-year courses in electronics. Upon completion of these courses, they will be assigned to work on guided missiles and special weapons. Approximately 935 applications were received for the fall term, and the program is expected to grow tremendously during fiscal year 1959.

Authority for the program stems from the National Defense Act of 1916, as amended by Public Law 351, June 1926, and over the years the Army has used the opportunity principally for career officers of special qualifications. With the much greater need for technically qualified personnel, however, the program was extended in August 1957 to enlisted men. The necessary funds will be requested from Congress in the 1959 budget.

To be eligible for the program, the individual must be a high school graduate, have completed at least 1 year of service, possess a General Technical score of 120 or higher, and be able to complete his training before age 35. The student commits himself to 2 years of service in return for each year of college training.

*Service Schools*

The emphasis being given increased and improved training in the Army is illustrated by the attendance of Army personnel at different Service schools during the past year.

Enrollment at the Artillery and Missile School at Fort Sill, Oklahoma, totaled 7,732 during fiscal year 1958. At the Air Defense School at Fort Bliss, Texas, a sharp increase was shown in fiscal year 1958, with an enrollment of 14,553 as compared to 10,099 in 1957.

Army attendance at Service schools and other institutions during the year totaled 164,006. This was an increase of 14,653, or about 10 percent, over fiscal year 1957, as follows:

	<i>Fiscal year 1957</i>	<i>Fiscal year 1958</i>
Army Schools.....	140, 833	156, 475
Navy Schools.....	755	2, 136
Air Force Schools.....	2, 334	494
Joint Courses.....	3, 629	2, 798
Joint Colleges.....	201	200
Trade Schools.....	15	15
Civilian Institutions.....	83	1, 770
Industrial Organizations.....	1, 503	118
	<hr/> 149, 353	<hr/> 164, 006

*Basic Training*

The basic training input into the Army totaled approximately 300,000 men during the past year in comparison with 359,756 in fiscal year 1957 and 242,114 during fiscal year 1956.

The input for fiscal year 1958 included 90,000 6-month trainees, under the provisions of the Reserve Forces Act of 1955, in comparison with 75,955 under the Reserve Forces Act in fiscal year 1957 and 14,368 in fiscal year 1956.

The men given basic training other than those under the Reserve Forces Act included approximately 125,000 draftees, 75,000 enlistees, and 10,000 from the Army Reserve and National Guard.

**Health**

Despite a greater incidence of Asian influenza and upper respiratory infections during the year, the health of the Army remained quite high. The daily average of men off duty because of illness was 13.6 per 1,000 of troop strength, compared with 12.5 during fiscal year 1957. Bed occupancy, as related to the mean strength of the Army, remained close to the 1 percent figure of 1957. Because of the Army's added emphasis on the prevention and treatment of psychiatric cases, the number of hospital admissions for psychiatric reasons dropped to the lowest level yet attained by the Army.

*Research*

As part of the Army's long-standing programs of medical research on the constructive and destructive effects of nuclear radiation, an apparatus to measure the total burden of radio-isotopes in the human body was built during the year at the Walter Reed Army Institute of Research. It is the third such instrument in the United States and one of the few in the world.

Called a low-level whole-body counter, the equipment provides scientists with a complete count of the number and type of isotopes in the body of a research subject, thus marking an advance in studies of how the isotopes are absorbed and in what manner and to what extent they are passed from the body. The counter augments the Army's worldwide program of measuring and interpreting the effects of isotopes from nuclear test fall-out.

Other nuclear research during the year included the use of pigs at the Nevada proving grounds to measure radiation effects and to aid the development of techniques to combat and treat these effects.

An example of the type of project growing out of the Army's studies is the feasibility of transplanting human bone marrow, which produces the body's blood supply and which is quickly and severely damaged by radiation.

Other projects are seeking to determine the relationship between ionizing radiation and various infectious diseases.

Aside from nuclear medicine, the Army's medical research continues to cover a wide range of projects to provide new and improved techniques for the prevention of disease and injury and more effective treatment methods. During the past year, noteworthy progress was made in producing virus disease vaccines. Attenuated strains of measles virus were cultivated, indicating a possible solution to the problem of preparing an effective measles vaccine. The work as well may serve as a model for the development of other vaccines for virus diseases, which are a major cause of manpower loss.

Also during the year, the Army improved its techniques for detecting and measuring the activity of the brain, a work essential in preventing and treating psychiatric disorders. The development of a new "milieu therapy" technique for handling certain psychiatric patients succeeded in increasing recovery rates and the return of the patients to duty.

*Dependents' Medical Care*

The number of claims under the Dependents' Medical Care Act, which became effective in December 1956, increased sharply during fiscal year 1958. Whereas, during the last half of fiscal year 1957

there were approximately 68,000 claims, at a cost of \$6 million, in fiscal year 1958 there were 257,000 claims at a cost of \$24 million. Maternity cases represented about 45 percent of all patients.

### Women's Army Corps

The strength of the Women's Army Corps as of June 30, 1958, was as follows:

Officers .....	740
Warrant Officers .....	39
Enlisted .....	7,074
<b>Total .....</b>	<b>7,853</b>

Personnel were assigned throughout the United States, including Air Defense Command installations. Overseas assignment of personnel in Europe, Hawaii, and the Far East was as follows:

	<i>Europe</i>	<i>Far East</i>	<i>Hawaii</i>	<i>Total</i>
Off .....	78	21	6	105
WO .....	7	3	0	10
Enl .....	820	397	13	1,230
<b>Total .....</b>	<b>905</b>	<b>421</b>	<b>19</b>	<b>1,345</b>

A new development during the year was the inauguration of the College Junior Program, under which 19 college juniors attended the 4-week course at the WAC Center, Fort McClellan, Alabama. A much larger class is expected for fiscal year 1959.

To provide more diversified training for WAC personnel, three officers were selected for the Logistics Officer Program and three officers attended the Army Command Management School at Fort Belvoir, Virginia. A group of enlisted women was assigned to the first MISSILE MASTER unit at Fort George G. Meade, Maryland. The members of this group were trained and later assigned as trackers, plotters, and radar console operators.

### Reserve Forces

The Army's reserve forces, made up of the Army National Guard and the U.S. Army Reserve, underwent distinct improvements during the year. At the same time, fiscal year 1959 plans were made for additional changes to enhance the value of the reserve components in the Nation's defense. The plans emphasize unit training for the Army National Guard—made possible by the Guard's progress in the 6-month training program—and reorganization of both the Army Reserve and the National Guard to conform to current mobilization plans and the Active Army's pentomic structure.

### *Strength*

In addition to the Army National Guard and the Army Reserve, there are three overall classifications of the reserve components. These are the Army Ready Reserve, the Army Standby Reserve, and the Retired Reserve. As of the end of the fiscal year, the strength of the Ready Reserve was 1,397,831, somewhat below its assigned ceiling of 1,448,000. The Standby Reserve totaled 1,016,671, and the Retired Reserve, 62,465.

The Ready Reserve is comprised of National Guard and Army Reserve units. As of June 30, 1958, the National Guard component totaled 394,329 men in units, plus 48,040 men in the inactive National Guard. The Army Reserve component in the Ready Reserve totaled 955,462, including 272,683 in participating, or drill-pay, status. The 682,779 remainder included nonparticipating members of the Reserve who still have a reserve obligation and 6-month trainees.

### *Mobilization*

A program of priorities for reserve component units, based upon mobilization plans, was developed in the past year. This program primarily involved the assignment of appropriate strength and equipment levels.

Concurrently, a new concept was established for reinforcing the units of the Active Army and the Reserves upon mobilization. Designated Army Commands will maintain a reinforcement pool geared to meet personnel requirements during mobilization. Implementation of this plan is expected during the first half of fiscal year 1959.

### *Structure and Pentomic Reorganization*

In order to modernize the reserve forces in consonance with changing concepts of warfare and the development of new weapons, the Army planned two major related reserve force changes during fiscal year 1959.

The first will concern the structure of the 1,448,000-man Ready Reserve in the number and type of divisions and other combat and support units to meet currently approved mobilization plans. These plans call for a level of 37 combat divisions, including 27 Army National Guard divisions and 10 Army Reserve divisions, plus additional combat support units.

The second change will reorganize the Army National Guard and the Ready Reserve in line with the pentomic Army. Divisions will be redesigned into smaller units, with five combat groups instead of three or four regiments. The changes will make the units lighter and

more flexible and mobile, and better able to meet the requirements of all-out nuclear war as well as of the range of possible limited wars.

### *Training*

As part of the continuing effort to improve the standards of the reserve components, the training of all Army reservists received added emphasis during the year.

The 6-month training programs deserve considerable credit in this effort. During fiscal year 1958, 63,124 Army Reservists and 38,849 National Guardsmen completed 6 months' training and were returned to their home units.

On April 1, 1957, the directive requiring all new Army National Guard enlistees with no prior service to take 6 months' active duty training went into effect. As of June 30, 1958, a total of 40,739 had completed this training.

By September 30, 1958, it is expected that the National Guard no longer will be required to provide basic training for individual members, and can concentrate on advanced individual and unit training. This will be due in part to the 6-month active duty training program and in part to an increase of the number of men completing their basic training in Army National Guard summer camps. The Army National Guard thus will have attained the highest level of combat readiness in its peacetime history.

All units of the Army National Guard participated in 48 paid training assemblies during fiscal year 1958. Sixteen percent of the total authorized drills were conducted as multiple drills. Ninety-five percent of officers and warrant officers and 87.9 percent of enlisted men attended 48 armory drills during the past fiscal year. The cumulative fiscal year 1958 Army Reserve duty training participation was 87 percent for officers and 76 percent for enlisted personnel, representing an increase over fiscal year 1957 of 2 percent for officers and 5 percent for enlisted participation.

Approximately 366,200 Guardsmen, representing about 94 percent of Army National Guard strength, attended annual active duty for training at 78 sites and performed individual and unit training as prescribed in appropriate Army training programs. Ninety-nine percent of Guard units in annual active duty training were rated from satisfactory to superior by Active Army inspection.

During the year, 90 percent of the officers and 83 percent of the enlisted men participated in the Army Reserve annual active duty training program.

More than 8,000 National Guard officers and enlisted men attended courses ranging in duration from 1 week to 49 weeks at Active Army

officer candidate schools and special summer officer candidate courses conducted at the U. S. Army Infantry School at Fort Benning, Georgia, and the U. S. Army Artillery and Missile School at Fort Sill, Oklahoma.

Some 2,600 men attended 38 State-conducted National Guard officer candidate schools.

On June 30, 1958, 25,108 officers—representing 66.2 percent of total Army National Guard officer strength—and 20,039 enlisted men—representing 5.6 percent of Army National Guard enlisted strength—were enrolled in the Army extension course program.

As in the Active Army, the growing importance of Army aviation in improving the mobility and flexibility of ground units has resulted in added emphasis of this area in the National Guard. As a result the Army National Guard aviation program reached an alltime high this year in members of aviators, aircraft, and flight training hours.

In the Army Reserve during the past year, approximately 3,661 personnel attended Service schools. In addition, there were 17,580 reservists participating in instruction in the USAR school system. Of this number, 10,993 were assigned students, 3,313 were in attached status, and 3,247 were auditor students. Participation in Army extension courses totaled 55,288. Army Reserve attendance at Army area schools was 1,844 officers and 2,241 enlisted personnel.

#### *RFA Training Program*

The following table shows the status of the reserve components under the Reserve Forces Act of 1955 training programs:

	Officer USAR	Enlisted			Aggregate
		NG	USAR	Total	
Enlistments.....	-----	57,903	28,240	86,143	86,143
Inputs to training.....	6,614	44,272	45,268	89,540	96,154
Completion of training.....	8,424	38,849	63,124	101,973	110,397
In training as of 30 June.....	3,745	21,408	18,343	39,751	43,496

#### *Reserve Quality Standards*

To insure the successful accomplishment of the Army Reserve's mission and to improve the quality standards, the following requirements received continued emphasis:

(1) Enlisted personnel are required to demonstrate high standards of performance and participation.

(2) Noncommissioned officers must clearly demonstrate those attributes of leadership that are commensurate with their grade.

(3) All enlisted personnel are required to be qualified in their MOS. This may be accomplished by attendance at appropriate schools or by on-the-job training.

(4) Officers are required to demonstrate continued professional advancement, and, if assigned to a troop unit, must become branch and MOS qualified.

(5) Age limitations have been established for officers for future assignment to TOE units as follows:

Colonel .....	50
Lt. Colonel.....	45
Major.....	42
Captain.....	40
1st Lieutenant.....	35

(6) The minimum mental qualifications for enlistment or reenlistment in the U. S. Army Reserve were revised to reflect the following:

a. Nonprior service applicants for enlistment in a program which includes an initial period of active duty for training must attain a percentile score of 21 or higher on the Armed Forces Qualification Tests. Formerly, a percentile score of 10 was required for non-prior-service personnel.

b. All other enlistments, including enlistments by prior-service personnel, must attain a percentile of 31 or higher on the AFQT.

(7) Approved plans, to be effective August 19, 1958, placed in effect the means to provide for the mandatory and/or voluntary discharge of enlisted personnel on active duty who were found to lack job-performance potential and who were in the lower mental category classifications. Personnel in the lower two categories as determined by the Army Classification Battery who are to be separated under this program including those with a reserve obligation are discharged, and not released, transferred, or returned to a reserve component.

### *ROTC*

There were 218,822 men enrolled in Reserve Officer training courses during the past year, excluding 16,562 members of the National Defense Cadet Corps.

The overall figure includes 144,680 in the Senior Division, 13,575 in the Military Schools Division, and 60,567 in the Junior Division.

A total of 14,062 students completed the 6-week 1957 ROTC summer camp program at 15 Active Army installations.

*National Guard NIKE Program*

By June 30, 1958, 28 Army National Guard AAA gun battalions with on-site gun batteries had been converted to NIKE missile batteries and were in training with the Active Army in preparation for on-site NIKE operational missions commencing in fiscal year 1959. One other AAA gun battalion had been converted to NIKE in June 1957.

*Logistical Support and Materiel*

The conversion of Army National Guard AAA on-site gun units to NIKE during fiscal year 1958 enabled the Guard to redistribute sufficient quantities of M-33 fire control systems, modified 90-mm. guns, and associated equipment for the remaining Army National Guard gun battalions. A program to replace all M-47 tanks in the Army National Guard with modern M-48 tanks was started during the second half of the year, and when the 1958 annual field training began, all M-47 tanks in the field training concentration sites at Camp Drum, New York, and Fort Stewart, Georgia, had been exchanged for M-48's. In addition, limited quantities of M-48's were furnished units of the 27th, 30th, 48th, and 50th Armored Divisions. The total dollar value of equipment in the Army National Guard on June 30, 1958 was approximately \$1,454 million.

Equipment shortages in the Reserve were confined generally to certain new items. However, sufficient equipment was on hand to accomplish individual training. M-48 tanks, not heretofore available to the Reserve, will be supplied during fiscal year 1959.

The overall status of supply in the Army Reserve improved to the extent that units now possess approximately 10 percent of their TOE equipment, and reservists have approximately 78 percent of their individual-type organizational clothing and equipment and 100 percent of their individual clothing and equipment, thus achieving the goals which were established for fiscal year 1958. The program aims to attain a status of 15 percent of TOE equipment by the end of fiscal year 1959.

*Facilities and Construction*

Under the Army National Guard fiscal year 1958 Construction Program, 121 armory projects, 118 of which produced adequate armories, and 26 nonarmory projects were placed under contract. This represented a total obligation of \$15.8 million.

During the year, 173 armory projects at \$21.9 million and 21 non-armory projects at \$1.8 million were completed. The total number

of projects completed through June 30, 1958, since the enactment of the National Defense Facilities Act of 1950 is shown below.

<i>Type</i>	<i>Completed</i>	
	<i>Number</i>	<i>Federal funds (mil)</i>
Armory.....	836	\$75.4
Nonarmory.....	156	12.1
Total.....	992	87.5

The fiscal year 1959 Construction Program provides for 97 armory projects with estimated obligations of \$13.0 million in Federal funds and 21 nonarmory projects costing \$2.0 million in Federal funds.

During fiscal year 1958, 51 Army Reserve Centers and 1 separate maintenance shop were completed, bringing the total number of constructed centers to 193. An additional 32 centers, placed under contract prior to fiscal year 1958, are expected to be completed during fiscal year 1959. Eighty centers were placed under contract during fiscal year 1958.

Continued emphasis on the replacement of inadequate leased and donated facilities has resulted in a marked improvement in this category of training facilities.

Approval of the Army National Guard construction program for fiscal year 1958 was delayed until January 28, 1958. Funds were not apportioned by the Bureau of the Budget until February. The limited time available hampered the states in preparing and obtaining approval for final plans and specifications, advertising for bids, and awarding construction contracts before the end of the fiscal year.

### Civilian Personnel

The Army continued to experience difficulty in recruiting and retaining scientists and engineers during the past year.

Principally because of a poor competitive position in salaries and other benefits in securing top-flight people also sought by private industry, a total of 639 critical positions were vacant at the end of the fiscal year.

During the 1956-57 academic year, the four technical services which utilize the bulk of the Army's technical manpower were able to obtain only 32 percent of their needs for college graduates. This was despite intensive recruitment programs and the Army's full use of all employment benefits authorized by law. Legislation, approved June 20, 1958, which provided 10 percent increases in Federal salaries, undoubtedly will aid the situation. Benefits also will be realized from the Civil Service Commission's authorization of recruitment at grades above the normal entry level and from the limited use of paid

advertising which the Army is utilizing. As well, there has been an easing of the demand by private industry for personnel. But it appears that strong competition will continue for the best qualified graduates.

Positive programs to recruit and retain professional personnel have been developed and are being administered energetically throughout the Department. Cooperative training agreements with colleges permit undergraduate scientific and engineering students to work with the Army during a part of the year. Over 700 students from 60 colleges currently are working at 30 research and development activities of the Army under cooperative training agreements. Upon graduation, these students, because of their Army training and experience, are exceptionally well qualified for positions at the professional level.

Contract training of technical and engineering personnel was being provided in educational institutions and industrial organizations. During fiscal year 1958, a total of 5,101 civilian employees received training under contract at a cost of \$835,100. Included in these totals are the costs of training 2,824 employees in scientific and engineering subjects.

During the year the Army adapted the incentive awards program to the special requirement of engineering and scientific personnel by the development of a special group of awards for the authors of outstanding scientific papers. The first annual Department of Army Science Conference was held at West Point and the authors of 10 "particularly significant" papers were presented citations and honorariums of from \$300 to \$750. Special citations went to the authors of 11 additional papers. The winning papers were chosen, from a total of 96 entries, by a panel of senior American scientists.

Special awards also have been developed for employee-inventors. The purpose is to stimulate the disclosure of ideas by Army personnel for patenting through the Department of the Army facilities. The achievements of individuals and groups also are being publicized through such media as competitions, "name awards" issued as memorials to past Army personnel of great scientific nature, and vigorous sponsorship of Army personnel as candidates for awards and recognition external to the Army.

The utilization of high level professional skills of scientists and engineers has been improved through the assignment of duties of lower skill levels to aides and administrative personnel. Skill utilization committees have been set up at many installations to assure that management surveys, job engineering studies, and other actions are properly directed toward optimum use of scarce talent. The re-

quired annual evaluation of positions also has been used as a systematic device for determining the proportion of time devoted to professional work. A Skills Utilization Index is then used to indicate which situations require corrective action.

#### *Development and Retention of Executives*

Distinct progress was made in the Army's programs to develop the executive capabilities of its employees, and continued emphasis was placed on efforts to retain qualified personnel in all fields.

The programs include executive development, career management, the Secretary of the Army's research and study fellowships, and the interchange of career employees between overseas and United States commands.

The supervisor training program, designed to improve the management skills of military and civilian executives, was expanded during the year with plans for regional training conferences across the country. Formerly held in the Pentagon, these conferences provided training for only 600 executives in a 2½-year period. Seven regional training centers now have been established. During fiscal year 1958 they held 21 Personnel Management Conferences which were attended by more than 747 military and civilian executives. Future plans call for training 1,000 supervisors annually.

In career management, basic Army regulations covering the establishment and operation of civilian career programs were issued. They provide the pattern for career management and define the responsibilities for the development of Army-wide and command-wide programs.

One career management program is in the field of civilian personnel management itself. During the past year, professional entrance level requirements were established in personnel management, and a world-wide referral system—or centralized records system—was placed into operation.

Other Army-wide career programs in various stages of development include the occupational career fields of safety management, accounting, management analysis, budget administration, statistical reporting and analysis, education, librarianship, and ammunition inspection.

Command-wide programs, during the latter part of the fiscal year, were being developed for 113 different occupational specialties, covering 65,000 employees. Significant progress was made in the logistic commands, with emphasis on the development of programs in the fields of engineering, biological and physical sciences, supply procurement, contracting, and acceptance inspection.

The Army is encouraged by its progress thus far in civilian career planning, but it realizes that the full benefits of the work can be achieved only after several years of constantly refining its programs. These programs will continue to receive the full support of Army management and all appropriate personnel.

Since the Secretary of the Army's Research and Study Fellowship Program was established approximately 15 months ago, 92 applications have been received and 37 fellowships have been awarded. The program provides deserving employees the opportunity to spend up to 12 months in independent study and research in their particular fields. They are paid their full salaries during this period and relieved from other duties. Awards, which are made on an Army-wide competitive basis, have been made largely to scientists and engineers, with the remainder going to employees in management, education, or intelligence fields.

Further progress was made in the civilian interchange program which seeks to provide for a 2-way flow of career employees between United States and overseas commands. During the past year the number of unfilled requests for employees in overseas positions declined from 1,267 on July 1, 1957, to 413 at the end of the fiscal year.

#### *Personnel Administration*

Significant steps were taken during the year to assure that the Army's system of civilian personnel administration keeps pace with management needs and modern industrial practices. Basic improvements have resulted in measurable benefits.

A revised grade pattern for the Army's 191,000 Wage Board employees was worked out in conjunction with the Air Force and approved by the Army-Air Force Wage Board. The new pattern will be installed during the coming fiscal year. A 50 percent reduction in the number of grades will bring about better pay alignment with industrial concerns and other Federal agencies, as well as a savings in the time required to administer the pay system.

A new Federal merit promotion system was announced during the year by the Civil Service Commission. Although the Army's published policies and programs are in substantial conformance with the requirements of the new system, some procedural changes were found necessary. By the end of the fiscal year, the necessary changes had been made. To insure full and consistent implementations with both the spirit and letter of the new requirements, additional guidance materials have been prepared and issued.

In the administration of local national employees in overseas areas, a reduction in strength was effected without serious disruption of

operation or impaired labor or community relations. Careful planning and close cooperation between Army officials and community leaders, to soften the effects on individuals, were responsible for this accomplishment.

The Army continued to improve the overall administration of local national employees. The program reporting and evaluation system, previously in effect only within the continental United States Commands and for United States citizens employed overseas, was extended to cover local national employees. This system will provide the Army basic information required to review and evaluate the effectiveness of personnel administration for these workers.

#### *Civilian Mobilization*

The Army's civilian mobilization plans were fully tested during Operation ALERT 1957, and have been carefully reviewed throughout this fiscal year. Although basically sound, some revisions were found necessary, especially in those areas where coordination with Federal control agencies is required. During the year, primary effort has been devoted to working with these agencies to achieve full compatibility with Federal-wide mobilization plans and to obtain consideration of the Army's specific needs.

#### *Incentive Awards*

The Incentive Awards Program has shown material improvement. Project PAYDIRT, the Army-wide promotion campaign conducted early in the year, was extremely successful in focusing the attention of supervisors and employees on the benefits of a sound incentive program. Moreover, Project PAYDIRT won the 1957 National Association of Suggestion Systems' award for the year's best promotion.

Suggestions submitted increased 53 percent, from 14.6 per 100 employees during fiscal year 1957 to about 22.8 per 100 employees in fiscal year 1958. Total estimated savings are up from \$13 million last year to about \$24 million this year. Cash and honorary awards for recognized superior performance also were earned by substantially more employees during the year. Cash awards for sustained superior performance increased over 100 percent; decorations for exceptional civilian service and outstanding performance increased more than 50 percent and less formal types of awards, by over 60 percent.

#### *Strength*

The total number of Army direct-hire civilian personnel dropped from 429,217 at the end of fiscal year 1957 to 415,914 at the end of

fiscal year 1958. Of this total, the number overseas dropped from 62,505 to 59,992 and the number within the United States, from 366,712 to 355,922. The number of overseas contract-hire employees—foreign nationals hired at local prevailing wage rates—declined from 170,377 to 142,090.

### **Safety**

Indicative of the Army's continuing achievements in safety, the President's safety award for the best all-round record in 1957 in safeguarding employees against public injury was presented to the Army in June 1958.

The Army's program is responsible for both civilian employees and soldiers working in all types of official activity, including combat training and combat support functions, and civilian contractor employees doing construction work around the world.

Accomplishments are indicated by the following:

—Only 1 of every 44 soldiers was injured during fiscal year 1958, as compared to 1 of every 14 persons employed in the United States;

—Injured frequency for civilian personnel continued at a record low rate for the second consecutive year, with only 1 injury for every 345,000 hours worked.

—A new record low was established for Army motor vehicles, traveling more than a billion miles during the year. There was 1 accident for each 81,000 miles driven, well below the national rate for the motor transport industry.

—The Army aircraft accident experience continued at the 1957 level, the overall accident rate being equivalent to 1 accident for each 2,000 hours of flight, with 1 major accident per 3,500 hours in flight.

These improvements resulted in savings of \$5,147,000 over fiscal year 1957 in costs of injuries and property damages.

## V. Logistics

These were the major developments in logistics during fiscal year 1958:

—a program of modernization, essential to the full combat effectiveness of the pentomic Army, was further developed, emphasizing the need for expanded purchasing power in fiscal year 1960 and beyond;

—procurement deliveries were made totaling \$1.399 billion for the Army, with significant increases in missiles and other newer weapons;

—the number of line items in the supply system was further reduced by 10,000 from United States depot stockage;

—Operation ELIMEX was initiated, resulting in an inventory reduction of \$3.5 billion in 11 months;

—supplies and equipment in Japan were sharply reduced;

—Project MASS was completed successfully and the field stock control system was expanded;

—new construction contracts committing \$362 million were awarded; and

—equipment maintenance procedures were improved.

### Requirements

One of the most critical requirements in the Army's development and maintenance of powerful and flexible forces is the logistics responsibility of providing both the Army and friendly foreign nations with the proper equipment and weapons for modern warfare.

The task is made more complicated and more costly by—

1. The necessity that the Army be prepared to fight either limited or general war or both;

2. Rapidly evolving technology, resulting in a rate of obsolescence greater than ever before; and

3. Tremendous increases in the complexity and type of military equipment.

Even under less threatening circumstances, these factors would pose a task of great magnitude and prime importance. Now, however, the margin of technical superiority, upon which the United States traditionally has depended to offset the power of numerically larger hostile

forces, is being challenged by the rapidly growing scientific and industrial power of the Soviet Union. Thus, the Army's task of giving its troops maximum power in weapons and equipment has become more complex and certainly more urgent.

Toward this end, the greatest immediate need is the modernization of equipment—from improvements in the infantryman's shoes to new weapons of all kinds.

As applied specifically to different materiel items, the term modernization covers the newest weapons and equipment which the Army is using or wishes to use. Further, the term may apply to items in various stages of development and/or production and/or distribution as follows:

1. Items on which further development virtually was suspended after an acceptable level of proficiency was attained. These items were then produced and distributed to the troops and are still considered acceptable. Examples of this group are the 155-mm. howitzer and perhaps the bayonet.

2. Items which have been perfected to a point permitting operational use but which have received only negligible production and distribution because of limitations on funds. An example is the new M14 rifle.

3. Items which have attained a level of development permitting production and distribution but which are also continued in a program of product improvement. Hundreds of examples are included in this category, from field shoes and gas masks to missiles and nuclear warheads.

4. Items on which development is virtually completed but, because of long manufacturing lead times, require production planning now. An example is the HAWK air defense missile.

5. Items which are feasible and are undergoing advanced research and development leading to early availability. The SERGEANT is such an example.

6. Items which are considered feasible and are undergoing continued study. This category embraces a broad spectrum of weapons and equipment, from flying cranes to nuclear weapons of entirely new designs and uses.

In the logistics sense, then, modernization means the immediate availability and provision to the troops of those items covered in the first three categories above, by a carefully programed process of continually phasing in new equipment and eliminating the old.

The first step in modernization is to assess and then repeatedly reassess the required types and quantities of weapons, equipment, and facilities. In this process, changing combat tactics, the results of

research and development, and the inevitable attrition demand constant consideration.

As tactical and strategic doctrines change, so also must the weapons change to be adaptable to a variety of combat circumstances, including distance, time, the enemy's power and array, terrain, climate and varying combat objectives. Conversely, entire units may be built around certain weapons. The availability and use of specific weapons and equipment can determine to a large degree the organizational structure and purpose of units as well as the entire course and outcome of specific engagements. Missiles and nuclear weapons have necessitated the creation of combat and support units unknown in previous wars. Missile commands, aviation and aviation maintenance units, armored personnel carrier units, air ambulance units, ordnance guided missile and special weapons units, electronic warfare units, combat surveillance units, and target acquisition units are but a few examples. Such units have imposed new and additional requirements for logistics support, while the continued support of more conventional forces has not resulted in a corresponding reduction in their requirements. In addition, global commitments of the Army may require combat action anywhere in the world, and, as a result, the Army must consider the effects of geography and climate on requirements for weapons, equipment, and facilities in such possible extreme operational areas as the polar regions and the deserts.

The long supply lines which traditionally have moved materiel to combat troops in prior wars are in fact becoming a thing of the past. Survival on the modern battlefield demands dispersion, fractionalization, and new and alternate means of supply, calling for more transportation, expanded evacuation facilities, and speedier and more flexible supply and maintenance facilities to keep open the lines of communication. In turn, the required dispersion means greater susceptibility to sabotage, guerrilla warfare and infiltration; and the greater range and vastly increased power of modern weapons has intensified the need for effective rear area damage control. Thus, more troops are now needed to protect and operate our logistical support facilities. Furthermore, while new and more complex weapons increase the demand for logistical support, care must also be taken to insure that the mobility of combat units is not impaired by a logistical burden of equipment of such size and complexity as to defeat its own purpose.

In regard to the role of research and development in modernization, the Army has recognized that few weapons and equipment items are considered final and perfected when they first come off the production lines. Modifications, resulting from the constant hunt for improve-

ments, must be added to nearly all items in a continuing process. These changes, in turn, are reflected not only in the production and procurement processes, but throughout the Army's worldwide distribution system in the shipping, storage, and cataloging of the newer items and spare parts as well. Occasionally, research and development achievements make entirely obsolete weapons that were introduced into the inventory just a few years earlier. Such actions result in unexpected additional costs and increased activity in the distribution system.

Similarly, attrition, like research and development, constantly affects the balance of the Army's inventory and therefore requires close and continual attention in planning, production, purchasing, and distribution since approximately 10 percent of the inventory requires replacement every year. This includes consumed items, such as ammunition used in training, and weapons and equipment which cannot be repaired. This 10 percent, however, is aside from the thousands of items which are rebuilt every year.

As an overriding consideration for the past 5 years, funds available to the Army for the procurement of weapons and equipment have been short of the amounts needed to prepare the modern Army and to provide for its future peacetime or possible wartime needs. During most of this time, the Army's materiel program has been financed with carryover funds from 1954 and prior years' procurement and production appropriation. Consequently, 1959 is the first year that new appropriations have been necessary for this purpose. During this period, expenditures from procurement funds have dropped from \$2.6 billion in 1955 to an estimated \$1.36 billion in 1959. In addition, continued inflationary costs have further decreased the effectiveness of these funds.

In consequence, there are many combat units in the Army today which do not have a sufficient supply of the newer and better weapons and equipment that have been developed since the Korean war.

The critical problem of cost reflects not only the lesser purchasing power of the dollar in recent years, but also the tremendously increased costs of the newer weapons and equipment, such as missiles—which, with related equipment, will take approximately 40 percent of the 1959 direct obligations. The unpredictable effects of research and development—the ever-present chance of major breakthroughs in new weapons and equipment—must be anticipated in materiel financing or the very purpose of R & D can be lost and the Nation denied a proper level of defensive power. In R & D, as well, there is a direct and continuing cost to the materiel program in providing test weapons and equipment. These items are essential in research and yet are not reflected in the Army's inventory. Their costs amount to several hundred million

dollars yearly. The annual \$1.4 billion cost of attrition is relatively small compared to the Army's total effective inventory of over \$14 billion; however, when compared to the Army's total procurement appropriation, it is quite large. The replacement of this attrition is paramount in assuring that the Army is properly equipped.

In weighing the aforesaid conditions, problems, and needs, the Army feels strongly that resources must be provided, not only to counterbalance losses in obsolescence and attrition, but also to fulfill current needs adequately and to register a gain against future requirements.

### **Materiel and Industrial Mobilization Planning**

Further progress was made during fiscal year 1958 in the development and refinement of the Army's 5-year Materiel Program which enhances the effectiveness and efficiency of supply and equipment management. The program furnishes forecasts and definitive guidance for the current and succeeding 4 fiscal years, integrating all major logistic elements bearing upon the management of Army materiel. These include requirements, procurement, delivery schedules, research and development, supply and distribution, maintenance, production engineering and facilities, and losses and disposals. It also contains essential information as to required and anticipated levels of financing. Principal refinements in the program included new inventory objectives based on a system of priorities, balanced procurement programs keyed to remain within anticipated funding levels, revised maintenance programming in accord with procurement objectives, and a system for reporting the age distribution of inventory.

During fiscal year 1958 the Army reviewed and undertook a realignment of the Army-owned production base to satisfy the requirements of new planning concepts for limited and general war. Emphasis is being placed on maintaining a production base in a high state of readiness for early replacement of reserve stocks consumed in a limited war. Modernization projects to enable selected permanent arsenals to accomplish planned missions for missile systems and support of the pentomic Army concept were included in the fiscal year 1958 Industrial Mobilization Program. Policies and mobilization planning with industry also were being revised in line with the new concepts.

### **Procurement**

Deliveries of major equipment in fiscal year 1958 procurement and production contracts totaled \$1.399 billion. This is \$421 million less than fiscal year 1957 deliveries of \$1.82 billion. Most of this difference was the result of contract terminations and production stretchouts in

# ARMY • PROCUREMENT DELIVERIES

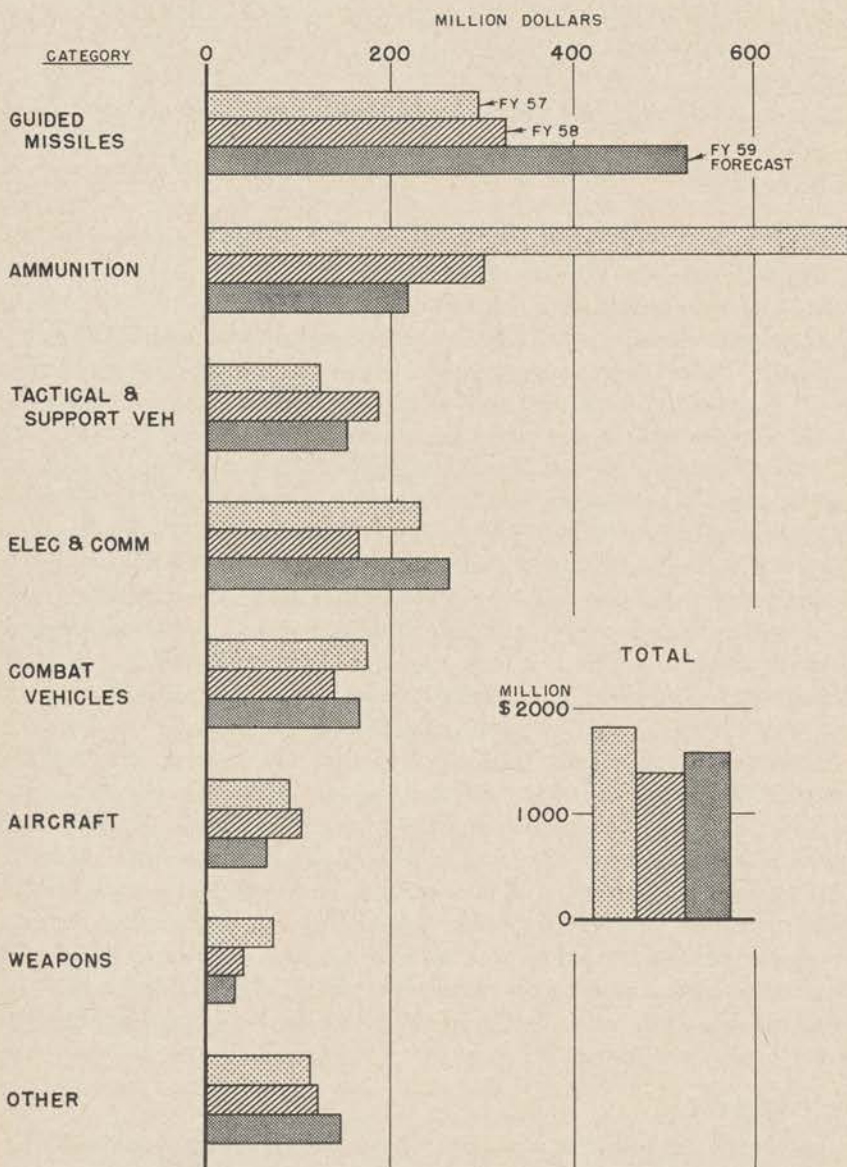


Figure 14

order to adhere to expenditure controls. Fiscal year 1959 deliveries are expected to rise.

Significant shifts have occurred in the types of items delivered. The dollar value of guided missiles continued to rise, for example. Deliveries last year were approximately equal in value to deliveries of ammunition. The value of deliveries may reach \$550 million in fiscal year 1959, approximately double the value of planned ammunition deliveries that year. Ammunition deliveries, though still large, continue to decline and are expected to decline further in fiscal year 1959. The dollar value of deliveries of weapons other than missiles has fallen sharply over the past 2 years to \$40 million in fiscal year 1958 and further reductions are forecast for fiscal year 1959. (See fig. 14.)

Tank-automotive deliveries totaled \$328 million in fiscal year 1958, about the same level as the 2 preceding years.

Electronics and communications equipment normally has comprised about 12 percent of the total value of annual deliveries. Deliveries last year were valued at \$168 million. The figure is expected to rise to nearly \$295 million in fiscal year 1959.

The value of aircraft deliveries has averaged about \$100 million a year over the past 3 years.

Deliveries of major items from production and Army stocks to the Air Force, Navy, Marine Corps, MAP, and other customers totaled \$742 million in fiscal year 1958.

To assist in alleviating unemployment while continuing to aid small business enterprises, the Army placed a revised procurement policy into effect in March 1958 to give small business located in labor surplus areas greater preference in obtaining defense contracts. Under this policy, first priority for award of the set-aside portion of the procurement was assigned to small business in labor surplus areas; second priority was assigned to other business in labor surplus areas; and third priority was assigned to small business not in surplus labor areas. The value of all procurement awards placed in labor surplus areas during fiscal year 1958 amounted to \$1.087 billion. The value of new procurement placed with small business firms during the year amounted to \$1.847 billion. This represented 35 percent of the dollars of total Army new procurement and 79 percent of all procurement actions. Some small business awards were to firms located in surplus labor areas, and the figures cited include such awards in both categories.

In addition, the Army asked its major prime contractors to place the maximum number of subcontracts with qualified firms located in labor surplus areas. In cooperation with the Interdepartmental Committee for Labor Surplus Areas, the Army was engaged in conferences and exhibits to bring to manufacturers and businessmen in these areas

information about potential sales. Information was furnished as to military requirements, procedures, standards, and specifications for items procured directly by the armed Services or for them through subcontracts.

### **Inventory Modernization**

The Army continued its great efforts to modernize its materiel inventory during the past year.

In 1952, there were a total of 1,500,000 items in the supply system. By June 30, 1957, this number stood at 971,000 line items. The figure thus has been reduced during a period in which technological advances have caused a rapid in-put of new items such as aircraft, guided missiles, and electronic systems, each of which requires thousands of repair parts. During the period July 1, 1957, to June 30, 1958, 146,000 items were eliminated while only 136,000 were added.

Specific studies have been conducted by the Continental Army Command to permit the elimination of requirements for materiel at their source. Stocks of repair parts have been physically screened to eliminate duplicate and nonessential items. Duplication has been further reduced by the assignment of single manager logistics responsibility. The varieties and complexities of equipment have been reduced by requiring the use of Federal or military standard specifications. The Department of Defense standardization program has limited the types of items authorized for use. The varieties of equipment to be supplied in a particular area have been limited through area standardization. Local procurement authorizations have reduced the numbers of items required for storage and distribution through the supply system.

### *Operation ELIMEX*

Operation ELIMEX was established during the year to determine total Army and Military Aid Program requirements, isolate and declare as excess all stocks not applicable to those programs, and expedite the physical disposal of all excess revealed in the process. The operation was initiated during the period August 7, 1957, to January 10, 1958, and is now in full force, worldwide.

The operation comprises five closely related subprograms, all designed to contribute to this downward realignment of the Army's worldwide inventory position.

Progress to June 30, 1958, is revealed by the following statistics:

By the close of the fiscal year the following disposals and transfers to Military Assistance Program accounts had been accomplished:

	<i>Billion</i>
Disposals delivered.....	\$2.465
Sold or donated—not delivered.....	.567
Transfers to MAP accounts (claimant stock).....	.022
Obligated to MAP for transfer to claimant stock upon approval of the ASD (ISA).....	.408

Total inventory reduction under Operation ELIMEX..... 3.462

Line items (end item and repair parts) stocks in the continental United States (CONUS) supply system decreased from 737,000 as of September 30, 1957, to 723,000 as of June 30, 1958, a net reduction of 14,000 lines. (See fig. 15.)

### *Japan Phasedown*

On June 30, 1956, there were 1,450,000 short tons of supplies and equipment in U.S. Army Technical Service Depots in Japan (excluding POL). This stockage was progressively reduced by May 30, 1958, to 575,000 short tons. A portion of this will be held in Japan for the support of United States and United Nations forces. The remainder will be disposed of through normal attrition and by the following means: (1) Redistribution of items to Korea and Okinawa; (2) shipments to the Military Assistance Program; (3) return of selected critical items to the United States; and (4) by disposition through property disposal channels.

Stocks in Japan have been reduced to an extent which has permitted the United States Army, Japan, to consolidate almost all of its remaining logistical installations in the Tokyo-Yokohama area. Korea and

## ARMY • ITEMS IN SUPPLY SYSTEM

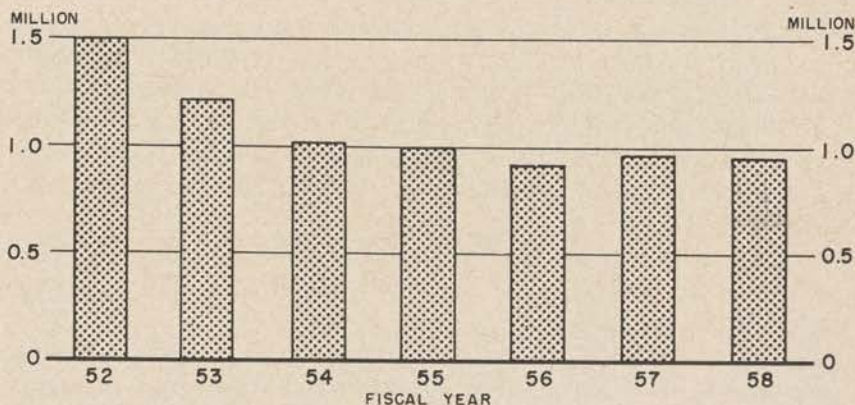


Figure 15

Okinawa have been supported directly from the continental United States since June 30, 1958 with minor exceptions.

### **Accelerated Item Reduction Program**

In compliance with instructions and guidance from the Secretary of Defense, the Army expected to initiate an Accelerated Item Reduction Program (AIR) departmentally on or about July 1, 1958. AIR had been designed to accelerate the existing Standardization Program by emphasizing interdepartmental reduction of cataloged and/or supply items through a catalog cleanup, common sense standardization, simplification, and by an increase in the commonalty of items. The program is to be accomplished in three steps, namely:

Step I—Item status coding. This step prescribes standard Department of Defense codes to reflect cataloging and inventory management responsibility, standardization status, and supply status of each item cataloged.

Step II—Catalog cleanup. This step involves elimination of catalog identifications no longer required, plus a reconciliation of the Army's cataloging records with those of the Cataloging Division, Armed Forces Supply Support Center.

Step III—Inventory cleanup. This step provides for item study listings to be made by a designated department to determine the maximum amount of standardization, simplification, and commonalty that is feasible. Based upon this, each department forwards withdrawal cards to the Cataloging Division, Armed Forces Supply Support Center, for items no longer required.

### **Distribution System**

By the end of the fiscal year, Project MASS (Modern Army Supply System) had demonstrated that a fast resupply system can replace the need for heavy storage in forward areas.

The project was initiated in July 1956 to test a plan for supplying a field army overseas—in this instance, the Seventh Army in Europe—with repair parts directly from the continental United States so as to alleviate the need for stocking these items in Europe. In April 1957 the concept was extended to support communications zone units with the merging of the two systems into a theater supply plan in May 1958.

As a result of Project MASS, it was possible to reduce the spare parts line item stockage for the entire U.S. Army, Europe, from 485,000 line items to 55,000.

The Army Field Stock Control System was expanded during the year and is in effect wherever an intermediate installation is in supply channels between depots and users. The system provides for stock-

age of fast-moving items only at installation level with slower-moving items stocked progressively to the rear. The principle of the system is to exercise materiel control based on demand experience rather than issue experience.

Progress in establishing Self Service Supply Centers at troop installations was outlined in the past three semiannual reports. Self Service Supply Centers were established as a consolidated point of distribution for specified expendable supplies to authorized consuming activities. Authorized consuming activities operate under a monetary credit rather than individual item allowances in obtaining supplies from the Center.

The Army Stock Fund finances the procurement and maintenance of inventories of common-use items for resale and for mobilization reserve. These inventories include approximately 90 percent of the line items in the Army's total inventory. The overall stock position was markedly improved during fiscal year 1958 in the reduction of inventories by approximately \$1 billion. The total Army stock fund exceeded the programed net negative expenditure of \$420 million by \$167 million. Sales were \$107.3 million short of the \$2,577.8 million included in the President's Budget.

A factor which contributed to the improved stock fund operational efficiency was the centralization of Army Stock Fund operations under the control of the Director of the Army Stock Fund who is the Director of Supply Operations for the Deputy Chief of Staff for Logistics. The Director is assisted by a complete staff branch which specializes in the administration of the Army Stock Fund and in the development of policies and procedures related thereto. The appointment of general officers as directors of the Army Stock Fund Divisions has centralized control of the stock fund within the divisions resulting in improved administration and expedited policy decisions.

### **Property Disposal**

The percentage of return from disposal for fiscal year 1958 was 6.2 as compared to 11.2 for fiscal year 1957. This reduction was primarily due to the new policy permitting certain military items to be sold with the agreement that the purchaser will demilitarize them. Since purchasers have had to accept this costly responsibility, their purchase prices have been reflected accordingly.

### **Facilities**

The fiscal year 1958 Military Construction Program, measured in terms of obligations incurred, totaled \$362 million despite the virtual suspension of all new contract awards in the first half of the year to meet expenditure limitations.

Approximately 40 percent of the program was devoted to tactical facilities, principally NIKE. Another 40 percent was used for

permanent facilities for the long-range peacetime Army. The remaining 20 percent went for operating requirements of a nonpermanent nature, including overseas construction.

Of particular significance was the work start of approximately \$6 million in support of Army ballistic missile activities at Redstone Arsenal; \$15 million in support of missile test and training at White Sands Proving Ground; approximately \$20 million for Army aviation facilities; two permanent hospitals containing 240 beds; and a nuclear powerplant at Ft. Greely, Alaska.

Preliminary design and production capability studies for certain proposed underground assembly plants were completed during fiscal year 1958. These facilities are proposed to provide a production capability for high priority combat items after a nuclear attack.

### *Family Housing*

Contract awards for 9,232 additional family housing units in the United States were made during the past year, reducing the deficit to 36,743 units. Assets as of June 30, 1958, totaled 105,357 units. This work was accomplished under the Army's three principal methods of acquiring family housing, including the Title VIII (Capehart) Program, the Military Construction, Army (MCA) Program, and the Leasing Program for tactical installations. Awards for an additional 9,511 units in the United States and possessions are expected in fiscal year 1959.

In overseas areas, under the Surplus Commodity Housing Program, contract awards were made for 469 units reducing the deficit on June 30, 1958, to 16,000 units. At the same time assets totaled 49,900 units.

Public Law 85-241, approved August 30, 1957, authorized the Secretary of the Army to determine adequacy of public quarters, pursuant to regulations approved by the President, and to permit occupancy of inadequate quarters by military personnel and their dependents upon a rental basis without forfeiture of basic allowances for quarters. Approvals have been granted for 7,028 inadequate public quarters as rental housing for military personnel.

Lanham Act housing, owned and operated by the Army, was placed on a rental basis on July 1, 1957. This housing comprises a total of 11,756 units at various Army installations.

### *Barracks*

New designs to improve the appearance and livability of barracks and bachelor officers' quarters were completed during fiscal year 1958. Improvements include replacement of dormitories with squad rooms in barracks, private living-room, bedroom, bath, and shade kitchen-

dinette for senior officers in BOQ's, and private bedroom and shared living-room, kitchen-dinette, and bath for junior officers in BOQ's. Fiscal year 1958 awards of improved-type permanent facilities will provide 9,451 additional barracks spaces and 588 BOQ accommodations. With the addition of these spaces, permanent barracks and BOQ assets will reach a little above 50 percent of the requirement for the long-range permanent Army.

The second phase of a planned 3-phase program for the improvement of mobilization-type housing facilities at permanent installations was completed during the year. This increment was placed under contract at a cost of \$27.5 million. The number of buildings improved in this phase includes:

- 978 Barracks (46,000 spaces)
- 89 Bachelor Officers' Quarters
- 6 Nurses' Quarters
- 172 Mess Halls

The program of self-help maintenance initiated during fiscal year 1957 to stimulate troops in performing maintenance and improvement of individual housing continued during fiscal year 1958. Reports indicate that material benefits are being derived from this program.

### **Equipment Maintenance**

Distinct progress was achieved in three areas primarily concerned with control of overhaul of Ordnance general purpose vehicles during the year. These were the following:

1. Greater emphasis was placed on the field maintenance of equipment as opposed to a frequent practice of sending the equipment back to higher echelon repair shops.

2. A tightening of inspection criteria with an increase in the washout of unserviceable, uneconomically repairable vehicles was effected. This enables the Army to improve the quality of the vehicle fleet through replacement with modern equipment by new procurement.

3. "Inspection and Repair Only as Necessary" procedures for Ordnance vehicles were being fully implemented in CONUS depot maintenance shops. Only those vehicle components and assemblies requiring repair will be overhauled, and there will be no complete disassembly and reassembly of vehicles. This system is being extended to overseas rebuild shops. The overall result has been a significant reduction in cost of rebuilding each vehicle.

## VI. Civil Works

In the Army's Civil Works Program, 261 projects were underway during fiscal year 1958. Located in nearly all the 48 states and territories and possessions, the work included 81 channel and harbor projects; 13 locks, dams, and canals; 5 bridge alterations; 80 local protection projects; 49 flood control dams; 28 multiple-purpose projects, which include power; and 5 shore protection projects. Of these, 40 navigation improvements, 9 local protection projects, and 9 flood control dams were completed to permit useful operation of these works. In addition, substantial progress was made on 14 construction features of the Mississippi River and Tributaries Flood Control Project.

### *Appropriations*

For fiscal year 1958, funds appropriated to the Corps of Engineers for Civil Works amounted to \$638,293,100. (See fig. 16.) For analysis purposes the 1958 appropriations applicable to the program are broken down as follows:

## ARMY • CIVIL WORKS APPROPRIATIONS

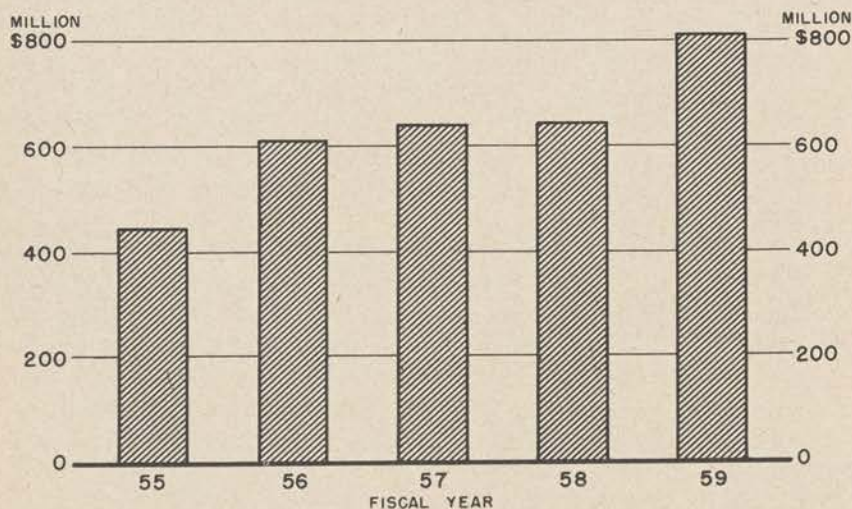


Figure 16

	<i>Millions</i>	<i>Millions</i>
Construction, General:		
Planning .....	\$7, 966, 500	
Construction .....	441, 857, 000	
		\$449, 823, 500
Operation and Maintenance:		
General .....		103, 850, 000
Mississippi River and Tributaries:		
General Investigations .....	\$569, 000	
Planning .....	50, 000	
Construction .....	44, 391, 000	
Maintenance .....	15, 705, 000	
		60, 715, 000
General Expense .....		11, 350, 000
General Investigations .....		10, 779, 600
St. Lawrence River Joint Board of Engineers .....		125, 000
Permanent Appropriation:		
(M & O Dams, Hydraulic Mining, Payment to States) .....		1, 650, 000
Total .....		638, 293, 100

### *Projects*

Of the 204 projects for which construction funds were appropriated for fiscal year 1958, 40 were new starts or resumptions, including 1 new start on the Mississippi River and Tributaries project.

Reduction of the backlog of maintenance work was continued with an appropriation of \$10 million specifically for this purpose. These funds were allocated to 76 projects for accomplishment of navigation structure repairs, channel work, and rehabilitation of operation and related facilities at reservoir and multiple-purpose projects. Maintenance operations were carried out on 266 waterway and harbor projects to accommodate the Nation's waterborne commerce now exceeding a billion tons annually.

### *Flood Control*

Large-scale benefits have accrued as a result of the Federal flood control program. Flood damage prevented by the reservoir systems and local protection projects in useful operation was estimated to total \$9.7 billion through June 30, 1958. During the fiscal year, these flood control projects prevented flood losses amounting to over \$400 million. Flooding was most severe and widespread in the southwestern region of the United States. Significant damages were also experienced in California and in the Ohio Basin in Kentucky and Indiana, in the Meramec Basin in Missouri, in the Kaskaskia Basin in Illinois, and in the lower Missouri Basin in Nebraska and Kansas.

The prolonged drought in the southwest region of the country was broken in the spring of 1957 by the most sustained general flood-

ing in the history of streamflow records for much of the area. Twenty-seven reservoirs, many of which had contributed needed water during the closing months of the drought, were pressed into heavy flood control service in six basins—the Colorado (in Texas), Brazos, Trinity, Red, Arkansas, and White River Basins. In four other basins, the Nueces, the Guadalupe-San Antonio, the Neches, and Sabine River Basins, there were considerable flooding along these rivers, but no federally constructed flood control works existed.

In the ten basins enumerated, estimates indicate that about \$125 million in flood damage was experienced, some \$140 million in damages was prevented by existing flood control works, and an additional amount of about \$55 million would have been prevented if other authorized projects had been constructed. Not included in these estimates is the great value of the 5,000,000 acre-foot increase in water stored in conservation pools, making a total of 12,000,000 acre-feet available for water supply and hydroelectric power.

The disastrous effects of recent floods have served to emphasize the fact that the Nation is still highly vulnerable to severe flood damage and will continue to experience large losses until a high degree of protection is achieved.

Some 90 investigation reports were transmitted to Congress for consideration. The reports concern additional navigation, beach erosion control, and flood control projects. An omnibus river and harbor and flood control bill, which authorizes work presently estimated to cost about \$1.5 billion, was approved July 3, 1958.

#### *Flood Disaster Assistance*

Pursuant to statutory authority of Public Law 99, 84th Congress, the Corps of Engineers performed flood fighting and rescue operations during the year and provided Federal assistance in the repair and restoration of flood control works, such as levees, threatened or destroyed by flood. Expenditures for these emergency flood control activities, principally in the Arkansas-White-Red and Lower Mississippi River Basins, totaled \$8 million for fiscal year 1958. At the request of the Federal Civil Defense Administration, pursuant to public law, work was started on an expanded program of clearing hurricane-choked stream channels in North Carolina. The total cost of this work when completed is estimated at about \$2.5 million.

#### *Passamaquoddy*

The International Joint Commission had underway a comprehensive investigation to determine the cost and economic feasibility of utilizing the tides of Passamaquoddy Bay (Maine and New Bruns-

wick) for the generation of electric power, as authorized by Public Law 401, 84th Congress. This Commission established the International Passamaquoddy Engineering Board to undertake the engineering aspects of the study, and its report is scheduled to be transmitted to the Commission next year. The Corps of Engineers is providing the major portion of the engineering services for the Engineering Board.

#### *St. Lawrence Seaway*

As the design and construction agency on the United States phase of the St. Lawrence Seaway, the Corps of Engineers essentially has completed all engineering and design work and has prosecuted construction operations on schedule. The navigation facilities required to bypass the International Rapids are completed to the extent that this section of the new Seaway was opened in July 1958 for vessels accommodated by the interim 14-foot channel depth. Work continues on the Cornwall Island channel excavation, the high-level highway bridge, and channel improvements in the Thousand Islands reach. Upon completion of these works, and collateral construction by the Canadian Government, a Seaway channel of 27-foot depth will be provided, affording larger oceangoing vessels access to the Great Lakes.

#### *Dams*

The following dams, or construction features of the projects, were placed in effective operation during the fiscal year 1958 (see fig. 17) :

<i>Dam</i>	<i>Stream and location</i>	<i>Flood-control storage (Acre-feet)</i>
Coralville.....	Iowa River, Iowa.....	475, 000
Coyote Valley.....	Russian River, Calif.....	48, 000
Barre Falls.....	Ware River, Mass.....	24, 300
Buffumville.....	Little River, Mass.....	11, 300
Ferrells Bridge.....	Cypress Creek, Texas.....	587, 200
Mathews Canyon.....	Clover Creek, Nev.....	6, 260
Pine Canyon.....	Clover Creek, Nev.....	7, 840
Otter Brook.....	Otter Brook, N. H.....	7, 600
Toronto.....	Verdigris River, Kan.....	171, 000

#### *Power Production*

During the past year the hydroelectric power generating capacity of civil works multiple-purpose projects rose to a total of 5,552,400 kilowatts installed in 31 projects in 19 States. This represents an increase of 728,000 kilowatts over the prior fiscal year. The total power production at these projects during the fiscal year exceeded 25,000,000,000 kilowatt-hours of energy.



*Figure 17. Aerial view of Coralville Dam work.*

#### *Public Attendance*

The public recreational attendance at the dams, reservoir areas, and other civil works projects reached a total of 84,700,000 during the calendar year 1957, a fourfold increase since 1951. Ready access to the waters of the projects was available at 3,085 points, and over 83,000 watercraft operated on these waters. The recreational facilities are maintained either by the Corps of Engineers or by cooperating state and local government agencies.

#### *Storm Studies*

The Northeast flood studies, authorized by the Senate Committee on Public Works in 1955, were continued and are providing valuable data for current river basin studies such as the Potomac, Delaware, and

Passaic Basins. Interim reports on the following areas have been submitted to Congress under this authority: Upper Naugatuck River above Torrington, Connecticut; Westfield River, Massachusetts; Mad River, Farmington River Basin, Connecticut; and Blackstone River Basin, Lower Woonsocket, Rhode Island.

Hurricane studies are being made under Public Law 71, 84th Congress, to develop basic knowledge and justifiable protective works. Under this authority interim reports have been submitted to Congress concerning hurricane protection for the Narragansett Bay Area, Rhode Island, and Massachusetts; and the New Bedford-Fairhaven-Acushnet Area, Massachusetts. Studies of many additional areas along the eastern and southern seaboard are in progress.

## VII. Management

Further improvements were achieved in Army management during the past year in several important areas. These included changes in the program system; the extension of the command management system; the development of the management structure; additional improvements in management training; and advancements in the establishment of procedures and techniques to save time and money in the Army's diversified operations.

As management processes are an expression of the purpose and function of any organization, the Army's programs of improving its management in recent years have been planned and carried out in terms of the new requirements on the Army, including the need—

To be ready for war anywhere in the world at any time;

To plan, train, and buy for any type of warfare;

To establish and reorganize toward combat and nontactical operational concepts of unprecedented flexibility;

To function under austere budget considerations.

The challenge to Army management, then, was to standardize, or restandardize, many procedures while concurrently insuring greater flexibility and streamlining for Army operations; and these steps had to be in accord with, and a means of achieving, maximum efficiency and effectiveness in the utilization of the Army's more limited resources in money, men, and materiel.

From a management viewpoint, money was the prime consideration, and money-management procedures had to be revised and improved not only to reduce spending, but to achieve greater benefits with the available funds. This required that the controls over the Army's many activities had to be reoriented to give dollar expression to plans and achievements, and this in turn required that the Army's functions and responsibilities be correlated and integrated to provide more cohesive and thus more efficient control.

### *Program System*

The Army Program System was an outgrowth of the aforesaid management requirements, and during the past year it attained a new level of refinement. In the simplest terms, the Program System provides the framework and processes for programing the Army's activ-

ities from quarter to quarter and year to year, for executing the work planned, and for *reviewing* and *analyzing* progress to determine whether accomplishments match the programed objectives.

In the most recent improvements on the Program System, the total number of programs was reduced from 16 Primary to 5 Control Programs, with implementation to begin July 1, 1958. The 5 Programs are—Troop, Installations, Materiel, Reserve Components, and Research and Development.

#### *Command Management System*

The next major achievement was the Army Command Management System, which, during the past 12 months after the years of intensive work, was extended to all Army agencies throughout the world. ACMS relates the processes of programing, budgeting, accounting, performance analysis, and manpower reporting. By providing flexibility of fund control and one of the means of controlling operations in terms of performance cost, it is a major management tool at all echelons.

#### *Management Structure*

In order for ACMS and related and subordinate management systems to be applied worldwide, a single uniform classification of the Army's nontactical activities was developed. This framework, formally designated as the Army Management Structure, also provides activity interrelationships for programing, budgeting, and manpower reporting. Thus, it is an essential element of the management system and provides a framework that serves as the basis for the direct correlation of resources with scheduled and accomplished workloads.

#### *Reporting and Analysis Improvement*

During the past year a total of 23 studies was begun in an effort to improve and simplify the Army reporting structure. The overall program, called the Army Establishment Reporting and Analysis Requirements Project, provides standards and prescribes and defines the principles of management under which the reporting structure will be revised. Each General Staff agency has responsibility within its field and conducts a series of studies, one for each family of related reports. Each study determines the essential requirements for data at all levels, evaluates the existing reports in terms of these requirements, and initiates the necessary corrective action. The final reporting proposals must conform to Army reporting policy and standards and be processed and cleared in accordance with the regular reports control procedures.

## Management Training

Implied in the significant progress of the Army's management systems during the year was the need for expanded management training among both military and civilian personnel. To meet this requirement the Army provided management training for a total of nearly 20,000 officers and civilians.

Some of the courses were broad in scope, dealing with the total complex of management, while others were narrow in content, covering one or two aspects of management. In addition to the formal schooling covered below, many examples of on-the-job training directed toward specific management problems were reported during the year.

### *Army Schools*

Approximately 11,000 Army officers received management instruction at 20 Army Service Schools and Colleges in career-type courses. The amount of instruction varied from a few hours to over 150 hours during the school year, according to the level of students and the type of school.

The U.S. Army Command Management School, the Army's top school for management instruction, provided a summary 3-week course of instruction on the total complex of management to 516 high-level officers and civilians.

The Army Finance School at Fort Benjamin Harrison, Indiana, gave a number of resident courses varying in duration from 3 to 6 weeks in the area of comptrollership and finance management. A total of 964 students attended these courses which were designed to meet specific training needs.

Six accounting courses were offered by correspondence to civilian employees of the Army through the Finance School. Each home study lesson required about 8 hours of preparation time. A total of 1,074 civilians enrolled in these courses.

A number of intensive, resident management engineering short courses were presented through the Ordnance Management Engineering Training Agency at Rock Island Arsenal, Rock Island, Illinois. Twenty-four separate courses, varying from 3 days to 4 weeks in duration, were attended by 2,520 civilian and military enrollees.

The Army Audit Agency provided instruction in auditing to its military and civilian personnel, in courses varying from a 5-week induction training program, given to college graduates who had entered Federal Civil Service for the first time, to a few days of refresher training provided to experienced personnel. Approximately 1,070 persons received formal training in auditing and related functions during the year.

*Civilian Colleges and Universities*

In addition to the Army's efforts through its own school-type courses, the resources of civilian colleges and universities were utilized for management instruction not economically available within the Army. During fiscal year 1958 approximately 125 officers completed graduate courses in business administration and management-type courses, ranging in length from 9 to 21 months, at more than 30 colleges.

The Army continued its program of assigning about 30 officers every year to graduate training in comptrollership. This 14-month course is offered at Syracuse University and leads to the degree of Master of Business Administration.

Advanced management courses at Harvard University and the University of Pittsburgh, of 13 and 8 weeks' duration, respectively, were attended by 20 Army officers.

The University of Toledo, Toledo, Ohio, provided financial management, supply, and storage management short-resident courses of a specialized type required by the Ordnance Corps. In the past year, about 1,500 students completed one or more of the courses which vary from 1 week to 4 weeks in duration.

*Management Improvement*

The Army's Management Improvement Program continued its emphasis on more efficient and more effective operations, particularly to help free additional men, money, and material for the combat forces. One step was the publication of a new pamphlet which furnishes guidance on making management improvement plans. Information is offered on developing the plans, putting them into effect and evaluating the management improvement effort. The pamphlet was another advancement in the Army's program of making all echelons conscious of the importance of improving management processes in all nontactical activities.

An annual plan of management improvement is required of each nontactical command and agency in the Army, with the result that thousands of new procedures, some small and others quite important, are put into effect every year with substantive, measurable benefits.

Headquarters of the Department of the Army does not attempt to maintain a record of all of the improvements effected every year because of what would be the reporting expense of this effort. Instead, Army Headquarters receives approximately 1,000 examples each year of the more significant overall improvements. Information on many of these improvements then is disseminated for application throughout the Army.

One area of emphasis, particularly with a view toward conserving funds, has been the elimination as far as possible of "marginal activities," which are defined as functions contributing but slightly to the Army's primary missions. During fiscal year 1958, a total of 76 such activities were discontinued, with benefits amounting to many millions of dollars. Examples include: Reduction in operating costs by consolidation and relocation of maintenance repair facilities at the Nashville Army Engineer District; consolidation of Alaska Communications System Transmitter sites in Seattle area; consolidation of Post Chemical and Post Ordnance at Fort Campbell, Kentucky; elimination of 50 courses from USAREUR Service schools not essential to combat readiness; transfer of U.S. Army National Guard training aids to Army training aid subcenters; elimination of mounted Military Police patrols in the Berlin Command; and the elimination of 30 recruiting stations and recruiting vehicles of the U.S. Third Army.

Examples of other management improvements, selected to show the range of value and the variety of activity, are listed below:

The Omaha Engineer District made a study of the utilization of office machines, resulting in the release of 46 machines for disposal and reassignment to other offices. This avoided an expenditure of about \$4,000 for new machines.

The Atlanta General Depot established improved methods and engineered performance time standards in all clothing and textile warehouse functions, producing benefits of \$25,248.

The Philadelphia Quartermaster Depot obtained approval for the elimination of watch pockets in certain types of trousers. Based on 2,500,000 watch pockets at an average of 0.0975 cent each an annual gain of \$243,750 will be realized.

The Military Subsistence Supply Agency reported that benefits of \$124,639 were realized by having vendors ship coffee direct to the consuming installation instead of sending it to an intermediate depot. Gains were realized in transportation costs and in "in" and "out" handling and storage charges.

Arrangements were made between the Army and the Civil Service Commission to accept each other's inspections of civilian personnel management within the Army. Different offices thus are saved the clerical time formerly required for handling about 1,000 reports every year.

Operating costs were reduced in the local Quartermaster laundry and dry cleaning service at Fort Lewis by rearranging the presses to permit each operator to operate three presses instead of two. Production for 11 operators, each working 3 presses, was increased from 68,000 to 70,400 trousers per month. Personnel

requirements were reduced from 17 to 11 with approximate monetary benefits of \$17,472.

A consolidation of motor pool facilities in the Panama area resulted in benefits totaling \$115,240 in military labor and direct cost annually. Eight vehicles were declared excess, 30 military personnel were transferred to other units, 1 administrative office was eliminated, 1 office building was vacated, and direct operation and maintenance costs were reduced.

For many years manufacturers of signal equipment were required to forward preproduction samples to the Signal Corps Engineering Laboratories for testing and acceptance. The cost of this procedure was high. Preproduction samples from contractors were received, tallied in, picked up, transported to the testing laboratory (as far as 10 miles to Evans Signal Laboratory), trucked back, and returned by the supply center to the contractor. New contracts require the contractor to test the preproduction sample and submit complete test data showing compliance with operational requirements. The field engineer prepares a form indicating acceptability or nonacceptability of the test data, and requesting date on which sample will be available for test at the contractor's plant by the field engineer. It is estimated that an annual benefit of \$605,165 in labor cost only of personnel directly concerned has been effected as a result of the In-Plant Testing Program.

#### *Automatic Data Processing*

The Army last year had installed automatic data processing systems (ADPS) in its business-type operations at 18 locations, including 2 overseas commands. Much of the paperwork in supply, personnel and manpower, and financial accounting activities formerly done by hand is now handled automatically by ADPS equipment. Six additional systems are planned for installation in fiscal year 1959.

#### *Work Simplification*

During the past year, a total of 10,650 supervisors were trained in work simplification, and 7,564 improvements amounting to \$8,540,155 in annual benefits were installed.

In work simplification training, supervisors receive 12 hours of class and laboratory sessions. Instruction covers the gathering of information pertaining to a particular project, the organizing of the relative facts into a simple chart and developing better methods of doing the work required.

During the year two new pamphlets were issued to assist in work simplification refresher courses. The booklets are on Motion Economy and Flow-Process Charting.

## VIII. Budget and Funds

### Expenditures

During fiscal year 1958, the Army had a net cash outlay of \$9,048 million, excluding the Army's portion of the Military Assistance Program. This was \$12 million lower than fiscal year 1957.

Expenditures have been directly affected by continual rises in costs, increased activities in the Reserve components, mandatory pay increases resulting from new legislation, and the costs of rebuilding inventories depleted since the Korean war. Expenditures over the past 7 years are shown as follows:

#### NET EXPENDITURES FOR MILITARY FUNCTIONS

(In billions of dollars)

1952	1953	1954	1955	1956	1957	1958
15.7	16.3	12.9	8.9	8.7	9.063	9.051

The continuing rise of the consumer price index indicates the need for additional funds in the Army each year to purchase the same goods and services as in the prior year, aside from the other money needs prescribed by the Army's expanding requirements.

### Obligational Authority and Obligations

Funds available to the Army in the Military Functions accounts for fiscal year 1958 totaled \$11,713 million. Of this amount, \$11,054 million was authorized for obligation for direct mission costs of the Army and for services to other military and civil agencies through reimbursable agreements. The balance of available funds, consisting mostly of Procurement of Equipment and Missiles and Military Construction funds, was fully committed but not planned for obligation until the first part of fiscal year 1959.

Unobligated balances of funds available for carryover were reduced to \$652 million at the end of fiscal year 1958. The major factor in this reduction was the financing of the Procurement of Equipment and Missiles Program from these balances.

### Direct Obligations

The \$9,725 million in direct obligations by the Army in fiscal year 1958 were \$33 million below the previous year.

While the purchase of heavy goods has declined rather steadily since 1956, the procurement of weapons and equipment in fiscal year 1959 is expected to increase obligations under the Procurement of Equipment and Missiles Appropriation. Most of the increase will go for guided missiles. The fiscal year 1959 appropriation is the first to this account since 1954.

In the Research and Development area there has been a steady increase in obligational authority from \$336 million in fiscal year 1955; to \$404 million in fiscal year 1956; \$427 million in fiscal year 1957; and \$492 million in fiscal year 1958. These increases are the result of the guided missile, aircraft, and electronic equipment buildup. These increases do not represent a comparable increase in the scientific research and development effort because certain responsibilities formerly funded from other appropriations have been transferred to the R & D appropriation. There also has been an increase in the cost of research and development, compounded by the Army's need for more complex, and thus more expensive, weapons and equipment.

## DIRECT OBLIGATIONS

	(In millions of dollars)		
	1956	1957	1958 Actual
Military Personnel.....	3,645	3,595	3,489
Operations and Maintenance.....	2,812	3,035	3,179
Procurement of Equipment and Missiles.....	1,894	1,796	1,603
Research and Development.....	404	427	492
Reserve Personnel.....	125	179	206
Army National Guard.....	271	306	334
Military Construction, Army Reserve Forces.....	43	51	39
Military Construction, Army.....	447	344	356
Other General and Special Accounts.....	16	25	27
Total.....	9,658	9,758	9,725

## IX. Conclusion

During the past year, work to modernize the structure of the Army's combat units was carried forward with outstanding success in the completion of the pentomic reorganization. Army units, from the division level down to the platoon, have greater combat versatility and flexibility than ever before in history. They can fight with equal skill in limited or unlimited warfare, with atomic or nonatomic weapons.

In the overall sense of modernization, however, the term has no meaning if the Army's weapons and equipment also are not brought up to date. The pentomic Army necessarily draws much of its power from new weapons. Indeed, it is the weapons themselves which, in some instances, have prescribed the design of pentomic units. Quantitatively, the supply of new weapons and equipment must be such as to meet not only the annual losses in attrition and obsolescence but also to provide ample stocks for future peacetime, or possibly wartime, needs.

It is this problem of materiel modernization that is of chief concern to the Army as it looks toward fiscal year 1960 and the years beyond and seeks to carry out its missions with more efficiency.

I am assured that the new pentomic structure gives the Army the organizational potential to fulfill its missions at present and in the immediate future. When the newer weapons are put into the hands of Army troops, the United States will obtain an increased measure of defense to counter the expanding military might of the Soviet Union.

*Wilber M. Brucker.*

WILBER M. BRUCKER,  
*Secretary of the Army.*

*Semiannual Report*  
*of the*  
**SECRETARY OF THE NAVY**

**January 1, 1958, to June 30, 1958**

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## I. Introduction

This is the report of the Department of the Navy's accomplishments in the fiscal year 1958, and a summary of the employment and condition of the Navy and the Marine Corps. Details of funds spent—for operations, maintenance and modernization—are in statistical tables appended.

This report stresses the urgency of these times. The year's events have emphasized that our freedom is threatened by Communist ideology, and have moved free nations to the task of counteracting that threat. Soviet Russia's successful earth satellites indicate her missile potentialities and intensify the "cold war" in which we are engaged. In our favor, the performances of nuclear-powered submarines and progress in modern weapons systems demonstrate welcome advances.

For the first time, there is a serious challenge to the country's position as the world's greatest seapower. Ten years ago we took that position for granted. But Soviet Russia continues to increase and improve her naval strength. She has concentrated on a powerful submarine force—a conventional submarine force now, but certain to be strengthened by nuclear-powered missile-carrying craft in the future.

Our own nuclear-powered submarines have made impressive accomplishments during the year. *Seawolf* and *Skate* set continuously submerged records of more than 30 days; recently, the mark was far exceeded. *Nautilus* and *Skate* have dramatically crossed the top of the world, from sea to sea, via the North Pole under the polar icecap.

More effective antisubmarine weapons are in sight; for example—new homing torpedoes, now developed, able to follow, track, and destroy maneuvering submarines. Guided-missile ships are in operation; we are improving them. New and converted ships, aircraft, and weapons joining the Fleet have greatly increased its striking power.

The flexibility and versatility of naval forces are among their major advantages. The Sixth Fleet in the Mediterranean and Middle East acts as a stabilizing influence from Gibraltar to the Red Sea—a force adaptable to any military need. Its readiness was demonstrated, practically and speedily, during the deteriorated political situation

in Lebanon. In the Far East, the Seventh Fleet watches the situation in the Formosan Straits, Indochina, and Korea, while units stand by to protect United States lives and property to the south. This Fleet, too, has been called upon to support national policy, more recently to protect Chinese Nationalist convoys supplying Quemoy and Matsu from bombardment by mainland Chinese Communists.

Our naval forces are growing stronger; improvements are being made as fast as funds and technology permit. Rising operation and maintenance costs have forced some difficult choices. Reductions in personnel (both military and civilian) in the shore establishment and in the number of operating ships and aircraft have been necessary. Modern management techniques help to insure best value received for all funds spent, with one aim in mind—immediate readiness of the Navy and the Marine Corps.

### **The Role of Seapower**

The U.S. Navy is now 183 years old. From a few frigates, it has grown to a round-the-world force with ships always at sea and planes always in the air. A single aircraft carrier now carries more men than were in the entire Navy in the Revolutionary War. Carrier jet planes now cross the continent in less time than John Paul Jones needed to sail across Long Island Sound.

The Navy is a growing, changing force, constantly adopting new developments and techniques—guided missiles, nuclear power, atomic weapons, vertical envelopment, supersonic aircraft. So rapid has been this growth that men now in the Navy can remember the last coal-burning ships and the first radar.

Here is emphasized one seeming paradox about the Navy. While ships, methods and current tasks are constantly changing, the basic mission of the Navy remains the same as the basic mission of navies all through history—defense of the Nation and its commerce, the deterrence of aggression, and the destruction of any active enemy forces. These tasks our Navy has performed, and will continue to perform, through judicious display and use of seapower in furtherance of the national policy.

Our ability to keep the seas free, however, is being threatened by powerful, determined challengers of the way of life of free men and free nations. Like an octopus, the Communist threat reaches out from its Russian homeland, to carry its many-armed attack to the free world through "cold war" and limited war. Though those forays may be checked, the threat continues and grows stronger through Soviet emphasis on strong submarine and surface forces able to disrupt the vital sea communications of the free world.

Here is where the whole picture of control of the seas comes into sharp focus. Soviet Russia and her satellite nations, composing the greater Eurasian land mass, are essentially a land power, with all interior communications confined to self-controlled land routes. But the strength of the free world lies in continued ability to use the sea lanes which are the interior communications tying friends and allies together. Despite the vast amount of air travel and the huge free world air fleets, over 99 percent of all the materials used by free nations are moved across the seas in some 18,000 free world merchant ships. If the flow of shipping is slowed, shortages ensue. If it is stopped, starvation—economic, industrial and personal—follows.

An obvious objective of an enemy in limited or all-out war would be to block those sea lanes and isolate this Nation from its allies. Our security and existence depend on keeping them open. We have the tool to do this. We are using it every day, in routine operations, all over the world. We call it sea power. The tool must be kept modern and large enough for the growing, changing demands placed upon it.

In our current use of sea power we have a tremendously powerful and effective weapon, able to operate at will over that seven-tenths of the earth's surface to which we have access. An inherent characteristic of sea power is its freedom to operate without infringing upon the sovereign territory of allies or neutrals, while engaged in showing the flag in the world's ports and making friends through personal contacts between our officers and men and other peoples everywhere.

As our ships move from port to port, across the legally free highways of the world, they are a visible statement of American goodwill. They have carried the spirit of American friendship in missions of mercy—flood relief in Ceylon, typhoon relief in Japan, flood relief in Spain, rescue at sea. But more than that, the Navy is effective because it is there—a constant, silent reminder to our friends and a warning to potential aggressors that we are ready.

Readiness for action of any kind is, of course, not a new development in the Navy. This has ever been the day-to-day peacetime role of seapower. But such readiness is more important to our country today than ever before. We cannot always predict where the Communists will stir up trouble. That is why this country must have the capability inherent in highly mobile naval forces—the capability to move instantly whenever and wherever trouble or aggression makes it necessary.

Such mobile forces are at sea this very moment, on the distant perimeter of the free world, along the perilous line of demarcation between the free world and the slave world.

They are flexible forces, ready and capable instantly and continuously to deal with the entire spectrum of world conditions ranging from peace through the varying stages of tension to the state of war.

They are versatile forces, highly trained in the kind of teamwork necessary for control of the seas. Russia holds a real threat in her submarine fleets, and our antisubmarine warfare effort is aimed at countering that threat. Training—consistent, daily training by destroyers, carriers, and shore-based and carrier-based aircraft, plus new weapons and techniques—keeps this first string team in top condition.

But antisubmarine warfare is only one of our strong points. We have another in the offensive strike capability of naval air forces. Here is the real balance between United States and Russian seapower—our carriers are able to launch tremendous air strike power anywhere in the world. With carriers, we hold the advantage of surprise over any enemy because he cannot always know where they are, nor can he predict where they will be.

Amphibious warfare, so rapidly developed during World War II, is still being refined. Our amphibious forces can land troops—armed to fight and ready to fight—wherever national policy determines they are necessary. The Marine Corps, teamed with special type carriers, has given amphibious warfare a new dimension in its vertical envelopment tactics, effectively hurdling that critical point, the beachhead.

The antisubmarine forces, the naval air forces, the amphibious forces, and the undersea forces all are comprised of units which may be utilized in more than one way. Each uses weapons and missiles designed for special purposes. The POLARIS missile will be a single missile with a single purpose—massive retaliation against an all-out aggressor—and on this single-purpose weapon may rest the security of the Nation and the peace of the world. But the submarines which are being built to carry and launch it remain available and fitted for conventional submarine tasks as well.

We can exploit the seas, but first we must control them. Our ability, with that of our allies, to control the seas is the foundation of the whole free world system of collective security.

## II. The United States Navy

### Fleet Operations

#### *Employment of Forces*

Strong balanced naval forces continuously deployed in the Mediterranean and Western Pacific are visible proof that the United States is ready and determined to help our allies maintain peace wherever it is threatened. The Sixth and Seventh Fleets sail these critical areas. Their striking power, built around carrier air power, protected and strengthened by supporting forces, is ready for immediate use in any emergency.

In the Atlantic and Pacific Fleets, realistic training programs, vigorously pursued, are aimed at the highest possible state of readiness in ships and units deploying to the Sixth and Seventh Fleets. The complexity of antisubmarine warfare, against much faster submarines, demands greater emphasis on improved training methods under realistic conditions and experimental operations. We are developing better weapons and detection systems; detection and attack ranges of antisubmarine warfare weapons have been increased. Once during the past year small helicopters successfully operated from destroyers in an experiment to extend antisubmarine weapon ranges and to speed delivery of those weapons. Similar training and developmental work goes on in all phases of naval warfare.

Our naval forces have cruised in many areas of the world, acquainting officers and men with operating conditions while demonstrating the readiness to go anywhere necessary to accomplish the naval mission. This year, in addition to the midshipmen cruises in the Atlantic, the Second and Sixth Fleets, as the striking force in the Atlantic and Mediterranean, visited European and Mediterranean ports after the NATO exercises in the fall. Atlantic Fleet ships operated from the Arctic to the Antarctic, from the Caribbean Sea to the Persian Gulf. Ships and aircraft frequently trained with units of South American and NATO navies. In the Pacific, our ships trained and cruised in waters from Japan and Korea to Australia and New Zealand. Occasional visits to India and Pakistan usually incorporated small SEATO exercises of great benefit to the individual navies.

*Large-Scale Exercises*

The Fleet gained operating proficiency through drills and exercises, employing units ranging from individual ships and aircraft to entire fleets. Combined exercises promote a close working relationship among members of friendly nations, usually SEATO or NATO nations. They develop and test combined plans, doctrines, and tactics; they provide training to increase the capabilities of less advanced navies among our allies.

During the latter part of November and early December 1957, four destroyers of the Middle East Force plus one submarine participated in Exercise CRESCENT, a sea and air multilateral exercise in the Arabian Sea-Indian Ocean area. Sponsored by the Pakistan Navy, naval forces of the United Kingdom, Turkey, and Iran also participated.

During the fall, 146 ships, submarines and aircraft units of the Atlantic Fleet and the entire Sixth Fleet participated in the most extensive NATO exercises held to date. Major exercises in this group were STRIKEBACK, COUNTER PUNCH, and DEEP WATER. Directed by SACLANT and SACEUR, they embodied every type of naval operation, including antisubmarine, mining, and shipping control exercises. Operations, extending over the Norwegian Sea, the Eastern Atlantic and the Mediterranean, involved a nuclear-powered submarine, *Forrestal*-class carriers, guided-missile cruisers and guided-missile submarines. All exercises were geared to atomic age warfare. PIPE DOWN, a United States and United Kingdom bilateral exercise, sponsored by SACLANT, was conducted in the Eastern Atlantic by homeward-bound forces.

In early March 36 amphibious ships and other types, two Seventh Fleet attack carrier groups, a hunter-killer task group, and a helicopter assault carrier participated in STRONGBACK, a bilateral United States-Philippine amphibious exercise. United States Marines and Philippine Army troops made a practice amphibious landing at Dingalan Bay, Luzon. Other exercises, demonstrations, and maneuvers ashore were conducted.

In June the Seventh Fleet tested its general war and limited war capabilities in Exercise KNOCKOUT which ranged from the North Pacific to the South China Sea and included units of the Seventh Fleet, First Marine Air Wing, Eighth Army, and Fifth Air Force.

Numerous training exercises for both combined types and single types of units were conducted by ships in home waters of the Atlantic and Pacific and by deployed forces to maintain their high standards of proficiency and readiness. The major intertype and type training exercises were—

INTEX 2-57, conducted off the United States east coast in August to prepare forces assigned to forthcoming NATO exercises. Both offensive and defensive in character, it employed attack carriers, guided-missile cruisers, a support carrier, a guided-missile submarine, shore-based aircraft, and other forces.

MANTLE ROCK, a joint and combined exercise with units of the U.S. Army, U.S. Air Force, and Philippine Air Force participating, was conducted in the Western Pacific in January. Thirty ships and more than 300 naval and Marine aircraft tested the abilities of the Seventh Fleet carrier striking force and other units, including the First Marine Air Wing, to carry out their roles in the event of war.

INTEX 1-58, conducted in the Virginia Capes—Bermuda—Mayport (Florida) area during January included air defense, offensive air strikes, and antisubmarine warfare. STRIKEX, a large striking force exercise conducted off the west coast in February, involved strike operations conducted from an attack squadron aircraft carrier.

LANTPHIBEX 1-8, a major amphibious exercise, conducted in March in the Onslow Beach area of North Carolina. Supported by attack carriers, cruisers, and many other ships, 36 amphibious ships and a Marine air/ground task force made a practice amphibious landing, testing the fast landing force concept using paratroops, helicopters, sea planes, and fast amphibious lift.

#### *Special Operations*

The 1957 midshipmen summer training ended in early August. Naval Academy and Naval Reserve Officers Training Corps (NROTC) midshipmen in Atlantic Fleet ships visited ports from Quebec to Valparaiso. The Naval Academy's second class completed its 6-week summer aviation training program, consisting of antisubmarine carrier cruises and flight instruction, jet indoctrination, and aircraft displays. Then NROTC midshipmen received 3 weeks' training in amphibious operations at Norfolk, Virginia, and aviation indoctrination at Corpus Christi, Texas. The Marine Corps candidates of NROTC midshipmen trained for 6 weeks at Quantico, Virginia. Some Naval Academy and NROTC midshipmen cruised in Sixth Fleet ships.

Midshipmen training in 1958 was similar. Midshipmen, in Atlantic Fleet ships, visited ports in Spain and Germany; some made a 6 weeks' cruise in Sixth Fleet destroyers. Others cruised in Atlantic Fleet submarines and with Commander Antisubmarine Defense Force. *Ranger*

and four destroyers took 300 NROTC midshipmen "around the Horn" from Norfolk, Virginia, to Alameda, California.

Some NROTC midshipmen cruised in ships of the Seventh Fleet. First Fleet ships embarked first and third class NROTC midshipmen for a summer cruise to west coast ports in the United States and Canada. Military Academy and Air Force Academy cadets participated in a short amphibious training period in Atlantic Fleet amphibious ships. During the summer of 1958, 9,813 midshipmen and cadets will participate in training cruises in 218 ships.

In other naval operations, ocean radar station ships (YAGR) supplemented by radar picket escort vessels (DER) continued to man the Atlantic picket stations of the seaward extension of the Contiguous Radar System. An airship maintained an airborne station in the Atlantic on a part-time basis. Most YAGR and DER ships received radars with improved capabilities. Conversion of the final four YAGR's from Liberty Ship hulls is in progress.

Also in the Atlantic, DER vessels and Super Constellation (WV-2) aircraft provided the forces for the Atlantic seaward extension of the Distant Early Warning line. Planning continued for the reorientation of Atlantic barrier forces. In the Pacific, DER ships and WV-2 aircraft conducted test and training operations in preparation for activating, in the near future, the Pacific seaward extension of the Distant Early Warning line.

#### *Arctic Operations*

(See under Military Sea Transportation Service, page 219.)

#### *Antarctic Operations*

Operations in support of the International Geophysical Year (IGY) were carried out in Antarctica from October 1957 through March 1958, by 8 Fleet ships (including 4 icebreakers), 2 MSTS transports, 41 aircraft including 8 helicopters attached to icebreakers, and 8 Air Force C-124 aircraft which parachuted 130 tons of equipment at the South Pole and some urgently needed supplies at Byrd Station. Crews of seven United States stations in Antarctica were relieved, and Navy aircraft furnished support to these bases. Almost 2,500 men were involved in the operation; over 2,000 of these were naval personnel. Two hundred twelve U.S. Navy men spent the winter in the Antarctica. Personnel were landed at the Pole by ski-equipped naval aircraft.

The five stations located on the sea coast (McMurdo Naval Air Facility, Wilkes Station, Ellsworth Station, Little America, and Hallett Station) were supplied by cargo ships escorted by icebreakers.

Heavy ice was encountered and 3 of the 4 icebreakers suffered damage to propellers, rudder, or hull.

The Navy assisted some Antarctic expeditions of other nations. Supplies for the New Zealand station at Hut Point, near McMurdo Sound, were carried by United States ships. The Commonwealth Transantarctic Expedition, under Dr. Vivian E. Fuchs, stopped at the Pole station, and later received medical aid by air drop when one of its members became ill. The Japanese expedition ship, *Soya*, failed to reach its base despite 2 weeks of effort by the United States icebreaker *Burton Island*, which assisted the rescue of the Japanese shore party which had wintered in Antarctica.

#### *Operation HARDTACK*

The nuclear test series, Operation HARDTACK, announced by the U.S. Atomic Energy Commission and the Department of Defense on September 15, 1957, began in April 1958. Purpose: The development of defenses against nuclear weapons and development of nuclear weapons with reduced radiation hazard.

Several test weapons have been fired at Eniwetok and Bikini atolls so far. The tests will end in late summer, 1958. Supporting naval forces include 19 Fleet units and 21 service craft and auxiliaries.

The Navy program in HARDTACK was concerned with safe stand-off distances for surface ships and submarines in delivering nuclear weapons in both deep and shallow water situations. Other programs were pursued to obtain nuclear radiation, thermal and blast data, with emphasis on the extent of the radiation hazard of underwater nuclear detonations. A deep water shot provided data on water shock phenomena and radiological problems. For that shot, manned destroyers were stationed as close as 5,000 yards, and a manned submerged submarine as close as 7,000 yards from surface zero. Fleet personnel gained valuable knowledge of the effects and limitations of nuclear weapons.

#### *Humanitarian Missions*

Last November, a Pan American airliner disappeared midway from San Francisco to Honolulu. An immediate search involved many ships and aircraft. Six days after the plane disappeared, a search plane from the carrier *Philippine Sea* located bodies and floating debris.

In the fall, *Lake Champlain*, with a Marine helicopter squadron embarked, aided in locating, sustaining, and rescuing flood victims in Valencia, Spain.

In the winter, when Ceylon faced heavy flood damage, the aircraft carrier *Princeton* and two destroyers rushed assistance to the flood victims. Navy, Marine, and Royal Air Force helicopters operated from the carrier and delivered food, medical supplies, and doctors to isolated areas. Commander Middle East Force sailed his flagship from the Persian Gulf to direct activities.

### **Fleet Readiness**

The Navy maintains strong striking forces to act in controlling aggression wherever it might break out. These forces, consisting of attack carriers, guided-missile ships, cruisers, destroyers, and amphibious components with embarked Marines are organized and equipped to meet the specific requirements of a geographic area or of a special task. They are trained in all the skills and tactics of delivering the munitions of modern warfare with discriminating effects. Naval aircraft and guided missiles, being the primary means of delivery, are the heart of this combat capability.

#### *Air Strike Capability*

The attack carrier force uses fighter, heavy attack, and light attack planes. Fighters, normally employed defensively as interceptors, are also used offensively as protective cover for bombers and to deliver bombs when speed is necessary to penetrate the enemy's defenses. Heavy attack bombers, the primary naval means for delivering nuclear weapons over long distances, can reach targets over a thousand miles from their carrier in all kinds of weather. The light attack bomber provides the force commander with the means for selective destruction of small close-in targets by the accurate delivery of both nuclear and conventional weapons.

New model attack airplanes under development include the all-weather A3J-1 and A2F-1. The A3J will incorporate high speed and altitude performance with capabilities for low-level attack and the use of standoff missiles. The A2F is being equipped to perform the accurate low-level attacks necessary for effective close support. More operational aircraft have been equipped to create electronic interference, thus increasing the probability of penetrating the enemy's defenses.

Offensive missiles greatly increase the ability of seaborne forces to strike far inland with less risk. The advantages of such a capability are tremendous. The Navy's air strike requirement for a medium range bombardment guided missile was fulfilled by the REGULUS I, a potent member of the Navy's attack forces. Its 500-mile range at effective cruising altitudes and speed, and versatility in destructive

payload, combine useful characteristics for medium range surface bombardment. The first Pacific Fleet joint cruiser-submarine operation, with the REGULUS I, conducted in November, was eminently successful. The missile was launched from the cruiser *Helena*, and guided by submarine to a target area with spectacular accuracy at long range. Two submarines and four cruisers equipped to launch and guide REGULUS I, and five submarines equipped for guidance only, were in full operation with Fleet forces during the year. The extent to which this missile has been integrated into Fleet submarines and cruisers has permitted removal of its launching apparatus from the 10 aircraft carriers initially provided with temporary REGULUS capability.

No new missile ships joined the Fleet this year, but guidance equipment was installed in submarine *Grayback*, commissioned on March 7. She will soon be available in air strike forces to provide an additional capability for launching REGULUS I.

The air-to-surface missile BULLPUP, designed for use by light attack aircraft in close support of troops and interdiction missions, has demonstrated high operating reliability and accuracy. Technical evaluation is complete. After operational and tactical evaluation the weapon will be ready for Fleet use.

Carrier strength, the hard core of naval air striking power, increased during the year as *Saratoga*, second of the *Forrestal*-class, reached the Mediterranean. *Ranger*, third in class, was commissioned in August and joined the Pacific Fleet in June. *Midway*, second ship of her class to be modernized, completed angled-deck conversion in November and is now operating in the Pacific Fleet. *Oriskany* and *Coral Sea* are currently in the yard for angled-deck conversion, marking the end of a major program, begun in 1947, to fit World War II carrier-types to accommodate modern aircraft.

Since World War II, shipbuilding programs have authorized construction of six conventionally powered and one nuclear-powered carriers. These programs have strengthened air striking forces with three modern ships already in operation, and have provided for continued strengthening in the immediate future as those in construction are completed. Future plans call for additional units with an objective of 12 new attack carriers by 1972, half of which would be nuclear-powered.

Construction of *Enterprise*, the first nuclear-powered aircraft carrier, is progressing satisfactorily. The keel was laid February 4, 1958. Current estimated completion date is September 1961. *Enterprise* is the largest and possibly the most important nuclear-powered ship so far authorized, with cruising radius infinitely greater than that of a conventionally powered carrier.

The technical feasibility of developing a nuclear propulsion system for seaplanes appears promising. Investigations in this area, through design and operational analysis studies, have progressed considerably. An operational nuclear-powered seaplane of subsonic turbo-prop design will provide the experience factors necessary to reach higher performance as well as an operational capability for antisubmarine, barrier patrol, and airborne early-warning missions. As technology grows in step with other developments in warfare, nuclear-powered seaplanes have an attractive potential for enhancing sea-air power. Preliminary estimates indicate that, using existing seaplanes, the program should reach the flight test stage in the foreseeable future.

The jet seaplane, P6M Seamaster, is another item under development which will contribute to air strike power. Tests, set back by crashes of the first two experimental models, were resumed in January 1958. Several modifications incorporated in the new model corrected earlier design deficiencies. The new plane is the first of six produced for evaluation. By operating from small, well-dispersed units in sheltered bays and inlets, or by refueling at sea from submarines, it could deliver mines or nuclear weapons against targets within a wide radius.

Development of the Fleet ballistic missile system carries high priority, with a view to its early operational employment. The system consists essentially of the POLARIS missile, nuclear-powered submarines to launch it, and facilities for logistic support. Late in 1957, development was aimed at a 1960 "ready-for-use" date instead of the previous 1963 goal. Construction of the first three nuclear-powered POLARIS submarines has begun. Funds for two additional submarines have been provided in the shipbuilding and conversion program for the fiscal years 1958 and 1959.

Underwater launching techniques are being developed, using a land-based prototype. Underwater launching tests started in March. Development of the POLARIS missile itself is proceeding satisfactorily. Numerous static tests of large-scale engines have demonstrated the satisfactory characteristics of solid propellants. Flight tests of the controls have proven their adequacy. Thus far, all aspects of missile component testing are on schedule. The test ship, *Compass Island*, is operating off the Atlantic coast, evaluating new types of navigating equipment and developing procedures for obtaining the precise navigation data necessary for accurate use of the missile.

#### *Air Defense Capability*

The defensive capability of naval forces is enhanced by mobility, ability to operate as a widely dispersed unit, and ability to employ a variety of defensive patterns. Adequate air defense also requires

modern ships equipped with high performance radars and antiaircraft guided missiles, high performance interceptor aircraft equipped with air-to-air missiles, and improved communication equipment which enables task force commanders to coordinate the action of widely dispersed task force formations.

Guided missile systems contributing to the defensive capabilities of Fleet forces are now in operation in the surface-to-air and air-to-air categories. Continued operation of the TERRIER missile cruisers, *Boston* and *Canberra*, strengthened the air defense of the Atlantic Fleet and the Sixth Fleet and added immeasurably to the experience level of the missile ship crews and of Fleet forces generally. Important steps have been made in the development of other surface-to-air missiles. The first production model of the long-range TALOS, scheduled to go into the third missile cruiser, *Galveston*, was flown successfully at the White Sands proving grounds. A land-based version of this missile, a TALOS defense unit, was turned over to the U.S. Army in October for evaluation and possible use in its continental air defense system. Development of a small short-range missile, TARTAR, suitable for destroyers and for a secondary battery on larger ships, is nearing completion. TARTAR can home on aircraft targets at extremely low altitudes. Other nations are interested in the TERRIER and TARTAR missiles. TERRIER will go into the Italian cruiser *Garibaldi* and probably into other NATO navy ships.

*Galveston*, the first long-range surface-to-air guided-missile ship (TALOS equipped) was commissioned on May 30, 1958. Keels were laid for four TARTAR destroyers, eight TERRIER frigates, and a nuclear-powered guided-missile cruiser. Conversion of two World War II cruisers to carry the TERRIER missile was begun. The nuclear-powered carrier begun in February will also carry TERRIER missiles. In summary, work started during the fiscal year on 16 missile ships, making a total of 26 under construction or conversion at the close of the year.

The air-to-air missiles—SPARROW and SIDEWINDER—have been deployed with Fleet squadrons. We are improving our capability with these missiles by attaining higher performance and greater reliability. SIDEWINDER IA, even better than SIDEWINDER I, went into production in July and still better SIDEWINDER's are being developed. In October, the evaluation of SPARROW III was accelerated. Improvements were made in the F3H-2 launching aircraft, the fire control system, and the missile itself. Test firings showed increased range, speed, accuracy, and all-weather capability. SPARROW III will soon reach the Fleet.

More squadrons have been equipped to fire air-to-air missiles. Training of pilots and ground crews has been stepped up by the availability of missile-launching aircraft. Development Squadron Four, conducting the operational evaluation of SPARROW III, received the first F3H-2 aircraft of the missile system in November and made the first firings in March.

The development of air defense aircraft points toward high speed and performance at high altitudes; in other words, quick interception. Both the F8U Crusader (first United States combat aircraft to set a speed record above 1,000 m.p.h., first to cross the continent at supersonic speed) and the F11F Tiger (with a new world altitude record of 76,938 feet in April) are operational carrier aircraft which meet the specifications. An improved F8U-2 was test flown in December and a third model (F8U-3) of the same Chance Vought line, incorporating the electronics necessary for all-weather operations, made its first flight in May. The F4H-1, a McDonnell fighter and, like the operational F3H-2N also designed for all-weather operations, made its first flight in June.

Still in the research stage, but of great potential for shipboard operation is the VTOL (vertical take-off and landing) aircraft. The current program was initiated in June 1957. A mock-up of a jet-powered tactical VTOL aircraft was completed in January. As the result of Air Force interest this is now a joint Navy-Air Force project, both Services sharing development costs. The need of funds for more urgent programs may halt this program, however. The VTOL aircraft would be most applicable in the air defense of anti-submarine carrier forces and in supporting troops in amphibious operations.

#### *Antisubmarine Warfare Capability*

Our control of the sea is threatened chiefly by enemy submarines. Current Soviet submarine force is estimated at nearly eight times that with which Germany started World War II. While we have strengthened our antisubmarine forces with new techniques and equipment, the increased underwater speed, endurance, and numbers of modern conventional submarines makes this task no easier. The prospect of attack on our coastal cities complicates a problem which was not present in preatomic years. We are investigating every plan which gives any hope of solving it.

Antisubmarine warfare may be divided into two broad phases. First is destruction of home bases, building yards, and other submarine support facilities. That is a job for carrier striking forces. Next is defeat of submarines at sea. This much more difficult task

takes more time, a wide deployment of forces, and a variety of force components, using electronics equipment and destructive weapons.

Antisubmarine defense has been strengthened by the new Antisubmarine Defense Force established in the Atlantic Fleet. Group ALFA, formed within this command, is composed of special antisubmarine units, an aircraft carrier and air group, a helicopter squadron, destroyers, shore-based patrol aircraft, and submarines. This new group concentrates solely on training in antisubmarine warfare operations. Permanent assignment of all units is expected to achieve greater efficiency and better results in developing coordinated submarine fighting tactics. Overall direction of the antisubmarine effort is provided through a group established in the Office of the Chief of Naval Operations for the purpose of expediting programs and coordinating plans.

Antisubmarine warfare is a primary mission for destroyer types, patrol ships, submarines, antisubmarine aircraft, and special aircraft carriers. Aircraft so employed are those assigned to land-plane and sea-plane patrol squadrons, special helicopter and conventional aircraft squadrons which operate from carriers, and specially equipped lighter-than-air units. The carriers *Yorktown*, *Hornet*, and *Lake Champlain* have been assigned antisubmarine roles. They have been equipped with angled decks, more powerful catapults and arresting gear, and special weapons. They can operate higher performance aircraft and represent a marked improvement over the types which they replaced.

In order to destroy submarines at sea, we have to find them first. Ship and aircraft detection ranges have been extended but greater ranges are necessary. A new sonobuoy system, tested against both conventional and nuclear-powered submarines, is going into patrol aircraft and airships. An interim version of equipment found effective for the localization and attack phases against quiet-running submerged submarines is now being installed in S2F carrier aircraft, to raise detection capabilities to higher levels. Some patrol planes will get the same equipment early next fiscal year. Towed and dipping sonar gear, used by slower moving helicopters and airships, may also increase our capabilities. Some detection equipment under development, based on radically new principles, may lead to the breakthrough necessary for future success.

New weapons far more powerful than the World War II depth charge will make it easier to kill a submarine with a pin-point hit. Torpedoes that will run down and destroy a submarine are in use. Rocket-assisted devices under development will carry these homing torpedoes and nuclear depth charges through the air at extended

ranges. The antisubmarine missile SUBROC will be capable of launching from a submerged submarine and traveling at supersonic speed before entering the water again to do its work. Its development has been given a high priority.

There has been some progress in antisubmarine warfare but many difficult problems remain to be solved. There is a definite need for a broader program that will extend beyond improving existing types of equipment and into the basic and supporting research required to realize a major breakthrough.

### *Submarine Warfare Capability*

A balanced submarine force is a major component of our naval team. Its primary mission is the destruction of enemy submarines; its added missions are surface ship destruction, missile strikes, aircraft early warning, reconnaissance, aircraft refueling, mine laying, and limited troop carrying. These functions require attack, antisubmarine, missile, radar picket, oiler, and troop carrier types of submarines.

Most of our submarines were built during World War II. We must now replace overage craft, but we need superior ships rather than more ships. We do not plan to meet the Soviet submarine threat by force of numbers.

Two new submarines joined the Fleet during the past year. *Skate*, our third nuclear-powered submarine, was commissioned in December 1957. She has been outstandingly successful. *Grayback*, the first guided-missile submarine built as such, was commissioned in March 1958. She is diesel-electric powered, capable of launching REGULUS missiles. Three more nuclear-powered submarines and a conventionally powered guided-missile submarine were launched during the past year. Thirteen nuclear-powered and three conventionally powered submarines are building or authorized. *Skipjack*, the first submarine to combine nuclear propulsion and high-speed configuration, was launched in May 1958. Construction has started on three POLARIS missile submarines, and two more are funded in the amended budget for the fiscal year 1959. The 1959 shipbuilding program includes four nuclear-powered attack submarines and one nuclear-powered guided-missile submarine.

Submarine operations themselves have been pointed toward improving antisubmarine capability. Our nuclear submarines have made a great contribution to antisubmarine warfare by developing their own capability and by enabling other units to develop tactics designed to counter enemy nuclear submarines. Important advances have been made in the techniques of using these submarines against each other and against other submarines, surface ships, and aircraft in antisub-

marine exercises. They have continued to operate with spectacular capability. *Nautilus* cruised some 1,000 miles under the Polar Ice-cap to within 180 miles of the North Pole in the fall of 1957, collecting invaluable hydrographic information. *Skate*, on her shakedown cruise to Europe, crossed the Atlantic and returned submerged, taking just over a week for each crossing.

### *Amphibious Warfare Capability*

Our amphibious forces are unmatched by any ally or potential enemy. This capability of projecting naval power onto foreign shores is an essential element of the balanced Fleet concept and a vital aspect of the naval role in defense of the United States and maintenance of our interests abroad.

However, overall strength and lift capability were not sufficient during this year to meet completely the combined requirements for support of United States policies abroad, training for the Fleet Marine Forces, and the in-port time required for ship maintenance and morale purposes. The latter two suffered, particularly during the fourth quarter of the fiscal year when the amphibious strength requirement in the Mediterranean was doubled. The requirement continued also for amphibious participation in nonamphibious tasks in Arctic and Antarctic resupply and support, support of the Eniwetok Proving Ground, the missile program, and the antisubmarine warfare program.

The material condition of the amphibious forces presents a big problem. Increasing age of almost all amphibious ships multiplies repair costs and increases the frequency of material failures. The resultant overhaul and repair periods are more costly because they are frequently unscheduled and emergency in nature.

Planned reductions in the number of amphibious ships and in the number of personnel assigned to amphibious ships and mobile units were generally made during the first half of the fiscal year. By mid-year the required readjustment of operating schedules and reallocation of functions and personnel permitted reasonable stabilization of programs.

Amphibious training was aimed at further development of vertical-envelopment and separated-unit assault tactics, using the experimental assault helicopter aircraft carrier, *Thetis Bay*. The ship also helped determine the characteristic features of the Amphibious Assault Ship (LPH) now in the construction program.

This year, the last of the slow World War II diesel LST landing ships left the Atlantic Fleet amphibious forces. These forces can now steam approximately twice as fast as in World War II. The same will be true of the Pacific Fleet when new construction ships are received.

As new ships reach the fleets, a gradual increase in amphibious capability will result. Despite obsolescence and slowness and the limited lift available, readiness for over-the-beach amphibious assault operations is adequate. If other commitments permit diversion of warships for the purpose, a significant emergency vertical-envelopment capability is available.

### **Material Condition of the Fleet**

The material condition of the ships of the Fleet is deteriorating at a growing rate. The active Fleet lacks sufficient reliability for extended combatant operations. These conditions will continue, particularly in the older World War II ships. The average age of ships of the active Fleet, 11.8 years, is increasing at the rate of about .7 of a year per year. Heavy operating schedules demanded by worldwide commitments, inadequate maintenance, fund shortages, and inexperienced personnel aggravate these deficiencies. They are substantiated by an increasing number of materiel casualties in hull and machinery components. Taken together, these factors will require more funds, time, and manpower in order to keep the ships fit.

Maximum emphasis is placed on self-maintenance by the forces afloat, but much work must be done by naval or commercial shipyards. Despite a small increase in funds, rising labor and material costs are reducing the number of productive man-days which can be bought. Additional money will be required to carry out proper overhauls and the orderly improvement program necessary to maintain ships as reliable and effective units of the Fleet. Insufficient supplies and equipment and inexperienced maintenance personnel limit the amount of self-maintenance which can be accomplished.

In accomplishing a portion of approved alterations, priority was given to those affecting antisubmarine and submarine warfare, air defense, and operation of improved types of aircraft from attack carriers. More modern electronic countermeasure equipment will be needed to give the active Fleet the effectiveness it requires in this field. A plan to improve the habitability of ships, particularly in ventilation and air conditioning for tropical operations, is but 24 percent complete.

Lack of funds for the installation of military improvements resulted in the anomaly of new and replacement equipment accumulating on the shelf in some cases, thereby delaying modernization of the Fleet and reducing the effectiveness of new weapons systems.

### **Military Sea Transportation Service (MSTS)**

MSTS ships moved Defense Department personnel, cargo, and mail across the seven seas with their usual efficiency and dispatch.

Its cargo ships carried 99 percent (13,546,593 measurement tons) of the supplies for Army, Navy, and Air Force units throughout the world. Its tankers, plus chartered commercial tankers, hauled 13,831,026 tons of petroleum products for these Services. Its transports and merchant ships under charter carried 613,440 military personnel and dependents.

Special MSTs projects included Arctic and Antarctic operations, the support of Texas Tower radar stations and missile test range sites, dumping of deteriorated mustard and lewisite gases at sea, and ocean surveys. Nine MSTs tankers sailed with NATO ships in OPERATION STRIKEBACK.

Arctic resupply operations, under Commander, MSTs, supported DEW line and other far north stations. One task force loading from Pacific ports sailed to the north Alaskan coast and the central Canadian sector, as far east as Boothia Peninsula. A second force loading from Atlantic ports sailed to DEW line stations in Fox Basin and Baffin Island, air stations in Greenland and Canada, and radar stations in Labrador. The 106 ships (70 MSTs, 27 fleet units, 8 USCG ships and 1 Canadian) moved 3,500,000 barrels of petroleum products and 388,000 measurement tons of cargo. As the western task force pulled back from the Arctic, three small Coast Guard icebreakers, aided by the Canadian icebreaker *Labrador*, smashed eastward through Bellot Strait—the Northwest Passage—into the Atlantic. This was the first United States transit of the Northwest Passage and the first west-to-east passage by any nation. The feat established a practical future “escape” route for ships that might be blocked in the Arctic by ice in Bering Strait, or for other reasons.

MSTs began the year with 253 ships: 155 major ocean-going types and 98 miscellaneous types generally operated in the Western Pacific. During the year a 29 percent reduction cut the fleet to 179 ships. This major reduction—biggest in MSTs history—was caused by several factors. Decline in tanker charter rates after the Suez crisis permitted inactivation of 55 tankers. Twenty-one excess “austerity”-type transports in Ready Reserve status were laid up in the National Defense Reserve Fleet. Service shipping requirements were reduced, so part of the Arctic resupply operation was performed by commercial ships.

The Cargo Preference Act requires that at least 50 percent of MSTs cargo move on American flag shipping. Actually, about 70 percent of the dry cargo was so moved. MSTs tanker inactivation after Suez and the use of time-chartered tankers gave at least 50 percent of the petroleum lift to private industry. Contracts for passenger space with shipping companies continued at approximately the same

levels as in the previous years, but with a large increase in space between the continental United States and Hawaii. Sea transportation of cabin passengers and troops by commercial shipping companies is being encouraged.

Considering that most of the ships were built during World War II, the material condition of the MSTS nucleus fleet is good. Eight 32,000-ton tankers are being built by private industry for long-term charter to MSTS. This program was coordinated with prospective owners and the Maritime Administration (for mortgage insurance), with MSTS guaranteeing charter of the ships. In addition, MSTS has actively encouraged programs of passenger liner replacement and modern cargo ship construction.

### **Naval Communications**

Communication, by which means command is exercised, must be rapid, secure, and instantly responsive to the needs of command to be fully effective. In recent years the degree and urgency of meeting these fundamental requirements have increased radically. Many communication improvement programs are in progress, each designed to contribute materially to their attainment.

A major problem of Fleet communications is to keep the afloat commanders in tactical communication with widely dispersed forces. One solution: Fleet use of equipment featuring the single-sideband technique which greatly increases the reliable range at no added cost in power, weight, or space. At the same time, a smaller portion of the extremely crowded frequency spectrum is used. Along with its use in voice communications, this technique will be employed in special data transmission systems engineered to permit the exchange of tactical information in data form in quantities and speeds far in excess of those now possible.

The single-sideband technique is expected also to improve the quality of the supporting shore communication system, in both ship/shore and air/ground circuits and in the Fleet broadcasts, by which the majority of the messages for ships at sea are received. Besides increasing the reliable range and, correspondingly, the area of broadcast coverage, these broadcasts will provide greater traffic capacity by means of their increased transmission speeds.

Much effort is being devoted to increasing the security of communications, while simultaneously speeding the processing of classified messages. Principal emphasis is being placed on increased automation of the encryption-decryption process, with an automatic or "on-line" process as the eventual goal. This method, virtually immune from compromise, will eliminate the time-consuming delays

inherent in the manual cryptographic systems, a serious communication bottleneck today.

### **Reserve Fleet**

The funds available for the Reserve Fleet have been devoted primarily to improvement and repair of ships for antisubmarine warfare. Maintenance, in general, has been restricted to the minimum required to preserve weather and watertight integrity and to maintain dehumidification and underwater hull protection. Ships entering the Reserve Fleet have been inactivated without overhaul.

In this year's increment of the antisubmarine warfare modernization program 10 1,620-ton destroyers, 59 destroyer escorts, and 1 auxiliary repair ship received essential repairs, modern communication equipment, and the replacement of searchlight sonar equipment with the scanning type. Of these 70 modernization overhauls, 29 were accomplished in private shipyards.

In screening the Reserve Fleet of ships with no military value, 186 ships were stricken from the Naval Vessel Register. Nineteen of them have been removed from Navy custody. Twenty-nine major warships are included among the ships found to be unfit, and disposal of these is awaiting congressional approval. Further screening and disposal of all unfit and excess units will be conducted in order that the limited maintenance funds may be concentrated on active ships and on Reserve Fleet ships with maximum mobilization potential. The entire Reserve Fleet is now costing the Navy approximately \$126 million annually.

The active fleets can be augmented quickly by many ships from the Navy and Maritime Administration Reserve Fleets, but their effectiveness is questionable. The readiness of reserve ships has declined due to the absence of proper inactivations, maintenance, and modernization. There are not enough auxiliary ships in reserve to provide balanced support for the combatant ship mobilization. The bulk of Reserve Fleet ships are obsolescent and in need of repairs.

### *III. The United States Marine Corps*

As of June 30, 1958, the three Marine divisions and three Marine aircraft wings, with their supporting force elements, were capable of meeting initial requirements in the event of limited or general war. But the staying power of these ready forces was diminished by personnel reductions.

Reorganization of the Fleet Marine Force to exploit development in modern weapons and equipment and to meet the requirement of future warfare was virtually completed this year. The new organization is under continuous review to insure the advance of the Marine Corps in keeping with the evolution of the art of war.

Equipment modernization has increased current readiness materially. The ultimate objective—complete air transportability of all division-wing elements and helicopter transportability of all assault elements—has been furthered by the introduction of lighter weight vehicles. Much still remains to be done in the research, development, and procurement fields to achieve the long-range objective, however.

Notable advances have been made in amphibious doctrine, tactics, and techniques. The Navy and the Marine Corps have revised the naval warfare publication on the doctrine for amphibious warfare, and have submitted it to the Army and the Air Force for comment. The continuing program for development, test, and promulgation of the landing force tactics and techniques which support this modern amphibious doctrine has been accelerated by the Marine Corps Schools. Field testing by the Fleet Marine Forces during training exercises continues as a major element in the accelerate program.

To achieve maximum readiness, further efforts must be made to consolidate Marine ground and air elements geographically in the Far East, to improve the effectiveness of the integrated team. More important, means must be provided for the emergency deployment of Marine air elements with their ground components. Helicopter assault transports are needed to support on a continuous basis the normal deployment to the eastern Atlantic and Mediterranean area, and in the Far East. A practical solution to the problem of rapid deployment of Marine fixed-wing aircraft must also be found.

With respect to mobilization requirements, and considering personnel and fund limitations, the Marine Corps Reserve is in good condition. Drill attendance and summer training (and correspondingly the mobilization potential) are at an all-time high.

## Organization and Structure of Forces

Operating forces of the Marine Corps comprise the Fleet Marine Forces, other combat forces, Security Forces, and Ships' Detachments.

The Fleet Marine Forces consist of three Marine divisions and three Marine aircraft wings as prescribed by law, together with necessary headquarters, combat support and service units. Approximately two-thirds of the Fleet Marine Forces are assigned to the Pacific Fleet, and one-third to the Atlantic Fleet. These forces constitute essential elements of a balanced fleet structure, providing the fleet commanders with the means of projecting naval power ashore, wherever and whenever required.

Internal reorganization of Fleet Marine Forces, commenced in 1957, was virtually completed this fiscal year. As a result, the Marine Division will be a lighter, harder-hitting, and more flexible organization, entirely air-transportable with its assault elements transportable by helicopter. The ability of the Marine Division to fight and sustain itself on the battlefield, in general or limited war, has kept pace with the development of modern weapons.

Personnel limitations made another reduction in the manning levels of all Fleet Marine Force units, in all combat support and service units, and in the supporting establishment. These reductions did not initially impair the readiness of the divisions and wings for immediate deployment, but did diminish their capability for sustained combat.

The Security Forces, second largest segment of Marine Corps operating forces, assumed increased commitments in providing security for special weapons storage sites despite reductions in their strength. To compensate for such commitments, Marine guards were replaced by civilian guards at several activities, some Marine guards were withdrawn, and several Marine Barracks were deactivated. Future demands for Marine Security Forces at special weapons sites under present personnel strengths must be compensated for by the disestablishment of some long-standing Marine Barracks.

A review of the table of organization for Marine detachments afloat, coupled with the deactivation of some ships of the Fleet, resulted in a reduction of approximately 450 Marines assigned to these detachments.

## Deployment and Operations

Deployment of the Fleet Marine Force in the Fleet has remained essentially the same: 1 division and 1 air wing plus 1 air group in the Atlantic; 2 divisions and 2 air wings in the Pacific. One major change was made in Fleet Marine Force disposition during the year.

The 9th Marines in Japan joined their parent unit, the 3d Marine Division in Okinawa. The entire division, minus one regiment in Hawaii, is now positioned ready to deploy from Okinawa.

Certain events during the year tested the readiness of Marine Corps units. In January 1958, when mob violence erupted in Caracas, Venezuela, and it appeared that United States nationals might have to be evacuated from the area, a provisional company of Marines constituted from the Marine Barracks Guantanamo Bay was embarked aboard U.S.S. *Des Moines*, prepared for possible need there. The situation later improved and the troops were not required. On May 13, 1958, violence broke out again in Venezuela during the visit of Vice President Nixon. A battalion landing team was immediately deployed. Two companies were flown to Guantanamo Bay for embarkation aboard the U.S.S. *Boston*; one company plus supporting helicopters was embarked aboard the U.S.S. *Tarawa*. Again, the situation improved before further action was necessary.

On May 14, 1958 at the time scheduled for relief of the 1st Battalion, 8th Marines, by the 2d Battalion, 2d Marines, in the Mediterranean area, the political situation in Lebanon deteriorated to such an extent that it was decided to keep both battalions there. Subsequently, both were sent to the Lebanese coast.

### **Modernization of Materiel**

During the year all remaining World War II LVT3C personnel-carrying amphibian tractors were replaced by the newer LVTP5 type. Some of the limited standard M47 medium tanks were replaced by standard M48A1 medium tanks; the rest will be replaced early in fiscal year 1959. All remaining M32B3 tank-recovery vehicles were replaced by the newer M51. All World War II tank-mounted flamethrowers were replaced by a newer model.

Fleet Marine Force elements received their full allowance of ONTOS vehicles. This armored, tracked, highly mobile vehicle, mounting six 106-mm. recoilless rifles, is the principal antitank weapon organic to the Marine division as now constituted. One such rifle mounted on a lightweight vehicle will provide the primary antitank weapon for an infantry battalion. The 1st Marine Division presently mounts this weapon on a jeep. By the end of fiscal year 1959, Marine divisions will have this weapon on a more acceptable mobile mount, the "mechanical mule."

In the guided missile field, a modification program initiated for improving the TERRIER land-based weapon system will result in a capability to fire newer missiles with double the present performance. The first production units of the TERRIER missile "go-no-go" completely automatic test equipment have been delivered.

An engineering model of the HAWK missile firing battery set was successfully demonstrated. This is the first surface-to-air missile system which conforms to the helicopter transportability requirements of the modern doctrine for amphibious operations. A height-finding radar transportable by helicopter will be phased into the Fleet Marine Forces during the fiscal year 1959, doubling accurate height determination on aircraft.

Thorough review of Fleet Marine Forces equipment allowances resulted in considerable reduction of heavy engineering equipment items.

## IV. Naval Personnel

The authorized number of naval personnel has again been lowered. Previously, support activities absorbed the larger portion of these reductions. Now, support requirements are increasing due to age and wear of equipment, training needs of new weapons systems, and other demands on manpower, and this year's reductions, accordingly, affected the operating forces in greater measure.

In 1958, officer and enlisted turnover showed the greatest improvement since 1954, possibly reflecting anticipation of the military pay increases. Reenlistment of first term personnel increased to a post-Korean war high, providing much better selection for procurement and retention. Training programs have been modernized and improved. Continued improvisation is necessary in training areas where new weapons and their associated systems develop faster than firm training programs can be formulated. The overall personnel situation during the coming year promises problems in promotions, in the quality of both officer and enlisted personnel, and in maintaining personnel stability. Skilled personnel management will meet these problems.

### Active Duty Strength

The active duty strength of the Navy, during the 1958 fiscal year, was as follows:

	<i>30 Jun 1957</i>	<i>31 Dec 1957</i>	<i>30 Jun 1958</i>
GRAND TOTAL.....	677, 108	629, 566	641, 005
Total officers.....	73, 703	72, 543	71, 560
Men.....	70, 872	69, 772	68, 864
Women.....	2, 831	2, 771	2, 696
Total enlisted.....	597, 859	551, 185	563, 506
Men.....	593, 022	546, 667	558, 955
Women.....	4, 837	4, 518	4, 551
Total Officer Candidates.....	5, 546	5, 838	5, 939
Midshipmen (Naval Academy).....	2, 635	3, 695	3, 483
Naval Aviation Cadets.....	1, 874	1, 432	1, 393
Officer Candidate School.....	780	430	918
Aviation Officer Candidates.....	257	281	145

### Officer Personnel

The reduction in naval officers necessitated reduced procurement of new junior officers and a decrease in the number of senior officers on active duty. The decrease was made by releasing reserve officers and by reverting temporary officers to permanent status. Many problems were involved in this forced reduction, but it improved the quality of junior officers by increasing the selectivity in the various procurement programs.

There is still a shortage of officers in the 4- to 11-year experience bracket. The program for voluntary recall of reserve officers of this grade and experience level has met with some measure of success. Next year, additional gains are contemplated by decreasing this shortage and increasing qualitatively the input to the regular Navy. An increase to 3½ years in the obligated service of reserve officers undergoing flight training has provided greater experience level stability for Fleet aviation units.

The active duty officer strength of the Navy is distributed by grade as follows:

	30 Jun 1957	31 Dec 1957	30 Jun 1958
TOTAL.....	73, 703	72, 543	71, 560
Fleet Admiral.....	2	2	2
Admiral.....	8	8	9
Vice Admiral.....	27	28	27
Rear Admiral.....	257	259	260
Commodore.....	1	1	1
Captain.....	3, 870	4, 065	3, 988
Commander.....	8, 325	8, 142	8, 093
Lieutenant Commander.....	10, 862	10, 870	11, 631
Lieutenant.....	15, 873	16, 207	14, 830
Lieutenant (jg).....	14, 589	15, 557	15, 632
Ensign.....	14, 368	12, 140	11, 901
Chief Warrant Officer W-4.....	859	1, 084	1, 360
Chief Warrant Officer W-3.....	1, 656	1, 273	933
Chief Warrant Officer W-2.....	2, 053	1, 856	1, 717
Warrant Officer W-1.....	953	1, 051	1, 176

Civilian and military applications for commissions during the fiscal year 1958 numbered 25,109. Of these, 11,740 were finally accepted. Reduced quotas permitted a high degree of selectivity. Officer procurement is expected to continue at the same rate next year. Programs which are barely meeting or are slightly below quota—Aviation Officer Candidate Program, Senior Medical Student Program, Nurse Corps, Reserve Officer's Candidate Corps, and the Officer Candidate Program (Women)—will receive the concerted efforts of the Recruiting Service.

## Enlisted Personnel

The quality of enlisted personnel is improving. An orderly reduction of nearly 35,000 in enlisted personnel strength afforded a means for so doing and, at the same time, for reducing fluctuations in the annual turnover. Recruit input, all volunteers, was maintained close to the anticipated annual average required in the future. To increase normal losses, approximately 25,000 selectees procured in the fiscal year 1956 were released 3 to 5 months early and most personnel who did not wish to reenlist were released 2 months early. In addition, a special program released about 16,000 low potential personnel whose past performance had been below standard. From March until November 1957, only men in the upper three mental groups were enlisted.

The petty officer situation was improved substantially by increased reenlistment, due possibly to both the anticipated pay increases and the economic recession. The high loss of new petty officers continued, making no substantial reduction in training possible. Petty officer strength has been maintained at 53.3 percent of the total enlisted strength, or slightly over 90 percent of the number of petty officers considered necessary. A better balance between ratings has been achieved. Plans were completed for effecting the new pay grades E8 (Senior Chief Petty Officer) and E9 (Master Chief Petty Officer) over a 4-year period, in numbers equal to 1.5 percent and .5 percent respectively of the total enlisted strength.

The active duty enlisted strength of the Navy by pay grade is shown in the following table. Approximately 10 percent of the total comprises reserves on active duty.

	30 Jun 1957	31 Dec 1957	30 Jun 1958
TOTAL.....	597, 859	551, 185	563, 506
E-7.....	48, 359	47, 895	47, 403
E-6.....	69, 783	68, 579	70, 163
E-5.....	71, 271	70, 931	76, 360
E-4.....	123, 638	108, 120	106, 003
E-3.....	182, 675	154, 787	158, 696
E-2.....	88, 114	86, 802	82, 804
E-1.....	14, 019	14, 071	22, 077

Plans for fiscal year 1959 include a reduction in authorized strength of approximately 15,000 enlisted personnel. The recruit input will be only slightly less than for this past year. No shortage of volunteers is anticipated. Personnel who do not intend to reenlist will be released from 1 to 2 months early in order to reduce overall costs. Reserves will be continued at approximately 10 percent of the enlisted strength. The new pay grades E8 and E9 and proficiency pay will be integrated into the enlisted pay structure.

A new detailed distribution plan, systematically rotating personnel among the several types of duty, will improve the stability of enlisted personnel—afloat, overseas and ashore. It has eliminated the cumbersome details of the old methods and greatly improved the proper utilization of skills and personnel. The plan was under development for 3 years. So far, results have been gratifying.

### **Training**

Education and training programs are placing increased emphasis on the scientific and engineering specialties. The input into the Navy's postgraduate engineering school will be doubled over a period of about 5 years. The length and content of postgraduate courses will be revised.

#### *Science and Engineering Training*

The Naval Enlisted Advanced School Program, inaugurated in 1956, sends carefully selected enlisted men to engineering universities for 2 years, then into operational assignments, and back to college for 2 more years and an engineering degree. The program has now completed its second year, and this fall there will be nearly 200 Navy enlisted men enrolled in the engineering schools at Purdue University and the University of Washington. Now, a companion Navy Enlisted Scientific Education Program has been established. The first men selected (about 100) will be assigned in September 1958 as students in engineering and scientific areas in 18 colleges and universities. They will be given a 4-year continuous education and will be required to serve 4 additional years on active duty.

Planned expansion of the postgraduate training program continues. Among other efforts to strengthen the Navy's scientific and engineering potential, eligibility is being extended to officers after 3 years of commissioned service, 2 years earlier than before; emphasis is being given to training unrestricted line officers in general engineering knowledge; and a new general engineering curriculum is under development to meet present and future requirements of the operating forces.

#### *Officer Candidate Training*

Midshipman and officer candidate training continued in the Naval Academy, the Reserve Officer's Candidate Program, the Officer Candidate School, and the Reserve Officer's Training Corps Program. Curricula have been reviewed and tailored wherever possible to increase scientific and engineering emphasis. Leadership training has been highly emphasized in these primary training grounds for junior officers who must guide and set the example for young enlisted men.

### *Nuclear Power Training*

Nuclear-powered submarines need highly specialized men, almost one-half of whom now require an additional year of advanced technical training. In December 1958, the cornerstone was laid for a permanent nuclear power training facility at the Submarine School, New London, Connecticut. It will provide a 300-man capacity during the academic phase of the submarine nuclear power training program. Training of the engineering crew for the first nuclear-powered aircraft carrier commenced in January 1958. The initial increment of personnel for the land prototype nuclear reactors for the nuclear-powered guided missile destroyer-leader and the small nuclear-powered submarine also started training this year.

### *Aviation Training*

At the beginning of the year, requirements for aviators exceeded the supply. The Air Training Command planned an annual output of 3,300 trainee graduates, later lowered to 2,900 due to a drop in requirements, but was not able to meet the goal. About 800 students, given the option of a 5-year duty obligation or immediate release, chose the latter. Incident to the reduction in air training, the Naval Air Station at Hutchinson, Kansas, and Auxiliary Air Stations at Pensacola, Florida, and Corpus Christi, Texas, were disestablished.

### *Fleet Training*

Increased emphasis has been placed on certain aspects of Fleet training. Despite personnel decreases, approximately 700 additional personnel were trained in Fleet sonar schools and the Submarine School. The increase in the sonar schools was necessary to meet rapid turnover of personnel and the introduction of new underwater sound equipment. More student billets were required for the Submarine School due to nuclear submarine training, which is approximately 1 year longer than the training period for conventional types of submarines. Further Fleet training increases will be required in the fiscal year 1959 and in subsequent years to support the expanding nuclear-power program and other technical advances.

### *Medical Training*

Medical training has been reduced in proportion to the decrease in Navy strength. Several courses have been discontinued, other new courses established, and a few existing courses consolidated in line with current conditions and requirements. For training of foreign naval medical officers, a program in cardiology was established at

the Naval Hospital, San Diego, California. The new Navy Nurse Corps Candidate Program was approved, and the first students were accepted for the 1958 spring semester. For enlisted training, classes in laboratory technique and X-ray were established at the Naval Hospital at Camp Pendleton, California, and a class in pharmacy technique was established at the Hospital Corps School, San Diego, California.

### Naval Reserve

At the beginning of the year, the Naval Reserve consisted of 678,719 officers and men. This number had increased to 759,306 by the end of June 1958. The following table indicates changes in each category for the fiscal year:

	30 Jun 1957	30 Jun 1958
Active Duty .....	94, 986	84, 543
Drilling Reserve .....	170, 991	158, 073
Active Status Pool .....	334, 627	437, 099
Officer Candidates .....	5, 707	5, 071
Inactive Status List .....	35, 048	35, 748
Retired Reserves .....	37, 360	38, 772
Total .....	678, 719	759, 306

The Secretary of Defense has established a ceiling of 135,000 reservists drawing drill pay for the fiscal years 1959 and 1960. The drill program has been changed to meet this ceiling and prevent the loss of any reservists under the new ceiling. Since funds available for 1958 would not support this ceiling, in March the drill pay strength was frozen at the January 31 level—132,265. Orders for many reservists scheduled for annual training duty during the last quarter of the fiscal year were suspended for this reason.

The most significant Naval Reserve development is the establishment of the Selected Reserve as a part of the Ready Reserve, immediately available for active duty assignments when directed by the Chief of Naval Operations. Forces of the Selected Reserve are being established to provide the Fleet with necessary additional antisubmarine warfare forces in the event of mobilization.

The antisubmarine warfare component of these forces will consist of destroyers and escort vessels (DE) and their assigned Reserve crews. These ships will be manned by reduced allowances of active duty personnel and Reserve crews, on inactive duty, residing within commuting distance of their ships. In July 1958, 18 of the 22 Reserve crews planned for the fiscal year 1959 will be authorized for activation with their assigned ships. Aircraft presently allotted for the Naval Air Reserve will be assigned to Naval Air Reserve squadrons which are being reoriented as Selected Air Reserve Forces.

The remaining paid drilling units have been assigned to three additional components of the Selected Reserve: Active Fleet Augmentation (Surface and Submarine), Fleet Support Activities, and Shore Establishment. In the future, personnel assigned to these units in a pay status will be those immediately required on active duty upon commencement of hostilities. The missions, organization, composition, scope of training, and mobilization concept of the drilling units are being revised accordingly.

The Naval Air Reserve program experienced a sharp loss in personnel strength through December 1957 due to the closing of air stations or air facilities at Akron, Birmingham, Houston, Lincoln, Spokane, and St. Louis. Recruiting at remaining Naval Air Reserve activities subsequently offset some of the loss. The drill-pay strength ceiling imposed in March 1958 prevented recouping it entirely, but improvement in quality occurred, particularly in officer strength. This improvement will continue in the fiscal year 1959 since present officer strength is close to the mobilization requirements of the Selected Air Reserve, and greater selectivity among prospective enrollees will be possible.

The Navy's Ready Reserve strength should reach its authorized ceiling of 530,000 in the summer of 1958 and will be maintained within the ceiling by screening excess numbers into the Standby Reserve. Greater control of quality will be achieved and only those reservists with assured wartime availability and qualifications will be retained.

## V. Marine Corps Personnel

The Marine Corps began fiscal year 1958 with a strength of 200,861 and a program to reach an authorized end strength of 200,000. However, in July 1957 revisions directed in force levels set a December 31, 1957 ceiling of 190,000 and an end strength for the fiscal year of 188,000. The reductions were accomplished primarily by reduced recruiting. However, an early release program had to be implemented to achieve the desired midyear strength. The fiscal year ended with a strength of 189,495.

Compared with the previous year, operating forces increased from 57.4 percent to 61.2 percent of the total Marine Corps despite the overall strength reduction. Due to the low number of enlistment expirations and the reduction in force levels, a recruit input of only 33,000 new Marines was required. This resulted in fewer Marines in recruit training, fewer recruit graduates in formal schools, and lower training overhead, and, as mentioned, a net increase in the operating forces.

The following table shows personnel distribution at the beginning and end of the year:

	<i>30 Jun 1957</i>	<i>30 Jun 1958</i>
OPERATING FORCES-----	115, 479	115, 962
Fleet Marine Forces-----	99, 119	99, 938
Experimental Unit-----		
Security Forces-----	13, 414	13, 387
Navy-----	(12, 451)	12, 203
State Department-----	(803)	731
NSA-----	(160)	276
Special Activities-----		177
Ships Detachments-----	2, 946	2, 637
TRAINING BASE-----	47, 268	38, 874
SUPPORTING BASE-----	21, 742	20, 903
TRANSIENTS, PATIENTS, AND PRISONERS-----	16, 372	13, 756
 TOTAL MARINE CORPS-----	 200, 861	 189, 495

Higher personnel turnover is expected in the fiscal year 1959 and with a further reduction in strength, personnel availability will be curtailed and cause a reduction in operating forces.

## Officer Personnel

Continued progress was made in long-range programs for achieving the best possible balance in the regular officer corps. The year started with an active duty strength of 17,434 officers (regular and reserve) and ended with 16,741, a decrease of 693. The number of regular unrestricted officers closely approximated the approved level of 8,550 at the end of the year. There were shortages, primarily in naval aviators, electronics officers, and lawyers. Efforts to reduce these deficiencies had best results in the retention of naval aviators. In the case of the lawyer shortage, legislation drafted to create a Special Duty (Legal) category of Marine officers was approved by the Secretary of Defense and the Bureau of the Budget and forwarded to Congress in January 1958. Other methods of alleviating this shortage are under study.

There were 334 candidates commissioned as regular officers from the following sources during the year :

U.S. Naval Academy.....	70
Naval Reserve Officer Training Corps.....	175
Army Reserve Officer Training Corps.....	11
Platoon Leaders Class.....	19
Meritorious Noncommissioned Officers.....	47
Limited Duty Officers.....	12
<hr/>	
Total.....	334

Procurement of regular officers from normal sources was augmented during the year by the appointment to regular status of reserve officers from the following additional sources :

Graduates of Basic School Course.....	158
Former Naval Aviation Cadets.....	64
Reserve Officers from Other Sources.....	1
<hr/>	
Total.....	223

The growing requirement for highly specialized officers is being met through a long-range program of appointment of warrant officers and limited duty officers from enlisted grades. Many such men would otherwise have been lost to more attractive civilian positions. Inaugurated in 1955, it has continued with growing success. The program is open to enlisted women, and was extended this year to the reserve establishment to provide opportunity for enlisted reservists to achieve warrant officer status. A total of 94 warrant and 12 limited duty selections was made from all sources.

In reserve officer procurement programs, the numbers appointed from each source were as follows :

Naval Reserve Officer Training Corps (Contract).....	52
Platoon Leaders Class (including aviation).....	474
Officer Candidate Course.....	727
Women Officers Training Class.....	26
Naval Aviation Cadets.....	225
Aviation Officer Candidates.....	162
Total.....	1,666

The grade distribution of Marine Corps officers was as follows at the beginning and end of the fiscal year 1958:

Grade	30 Jun 1957	30 Jun 1958
General.....	*3	*3
Lieutenant General.....	5	5
Major General.....	22	21
Brigadier General.....	**34	**35
Colonel.....	497	527
Lieutenant Colonel.....	1,315	1,324
Major.....	2,551	2,593
Captain.....	3,850	4,037
First Lieutenant.....	5,112	4,030
Second Lieutenant.....	3,114	3,379
Warrant Officers:		
W-4.....	176	182
W-3.....	308	176
W-2.....	295	229
W-1.....	152	200

\*Includes 2 retired officers on active duty with other Government agencies.

\*\*Includes 3 officers approved as extra numbers in grade, namely—

1 Reserve officer on active duty.

1 Officer assigned as Military Assistant to the Secretary of Defense.

1 Retired officer recalled to active duty as Legislative Assistant to the Commandant of the Marine Corps (fiscal year 1958 only).

The major problem in both Marine Corps and Navy promotion opportunities continued to be the "hump"—the large number of officers of similar age and service-characteristics who entered on duty during World War II. Study of this problem continued during the year and remedial legislation was sponsored by the Department of the Navy.

### Enlisted Personnel

This was a year of low enlisted turnover; fewer new recruits were required and increased emphasis could be placed on quality. The number of Mental Group IV enlistees was reduced to 12 percent of the total compared with 26 percent in the previous year; enlistment was restricted to those scoring 80 or higher in the General Classification Test.

A strength reduction next fiscal year will greatly offset the large turnover due in that period. As a result recruiting 41,000 new men poses no difficulties. Quality will be emphasized.

The reenlistment rate of first-termers, always a major problem, increased to 24.1 percent from the previous year's 17 percent, primarily due to early discharges for purposes of reenlistment. Reenlistment of those on their second and subsequent enlistments was 82.5 percent, compared with 83.1 percent for the fiscal year 1957. Only Marines who could effectively contribute to the accomplishment of the Marine Corps mission were reenlisted.

The rank distribution of enlisted Marines at the beginning and end of the year is shown in the following table:

<i>Rank</i>	<i>30 Jun 1957</i>	<i>30 Jun 1958</i>
Sergeant Major.....		313
First Sergeant.....		550
Master Sergeant.....	7, 238	6, 608
Technical Sergeant.....	9, 577	9, 619
Staff Sergeant.....	15, 856	15, 252
Sergeant.....	25, 793	27, 502
Corporal.....	32, 518	31, 715
Private First Class.....	55, 272	57, 080
Private.....	37, 173	24, 115
Total.....	183, 427	172, 754

High enlisted promotion standards have caused a shortage of noncommissioned officers in the corporal and sergeant grades, but this is preferable to compromising the traditional requirements of those grades. The continued limited vacancies in the grade of master sergeant, technical sergeant, and staff sergeant made promotion to these grades highly competitive.

Promotions to first sergeant and sergeant major filled 70 percent of the requirements of these ranks by year's end. As part of the overall program, these first sergeants and sergeants major were advanced to the new pay grades E-8 and E-9, respectively, on June 1, 1958, upon the passage of the new pay legislation. Plans are being formulated to advance others to these new pay grades but no further advancements were effected during the year.

## Training

### *Officer Training*

Individual training of officers continued to combine the advantages of on-the-job training with formal schooling. Maximum value from the former was assured by careful adherence to career-management principles which strike a proper balance between specialization and broad experience, with continued emphasis on the development of combat leaders. Formal schooling followed the standard pattern of prebasic training, basic training, specialist training, and training at

intermediate and high levels. Most schooling was conducted at the Marine Corps Schools, Quantico, Virginia, but schools of other Services and joint schools were used for certain advanced and specialist types of training.

In prebasic training, 2,953 candidates for commissions were trained in the Platoon Leaders Class and the Naval Reserve Officers Training Corps, 972 in the Officer Candidate Class programs, and 57 in the women officers training courses.

A total of 1,486 newly commissioned male officers received their initial training as officers at the Basic School, and 26 new women officers were given the indoctrination course especially prepared for them.

Original plans envisaged the training of 750 new naval aviators for the Marine Corps. Input shortages and excess attrition reduced the actual number to approximately 500, of which 320 students received fixed-wing training while 180 graduated with helicopter qualified designations. It is anticipated that 40 percent of future pilot-trainees for the Marine Corps will be qualified for rotary-wing aircraft, while the remainder will complete advanced carrier jet aircraft training.

In accordance with the accepted career-management pattern, intermediate level schooling is provided for officers between their seventh and twelfth years of service. The Marine Corps Junior School, which teaches command and staff duties at the battalion/squadron and regiment/air group level, graduated 170 Marine officers, plus 9 from other United States armed forces and 18 from foreign countries. Schools of other Services were also utilized to train Marine officers at this level.

Specialist training for Marine officers generally overlaps intermediate level schooling and comes after one tour of line duty. Approximately 2,900 Marine officers received training at schools conducted by the Marine Corps or by other Services in such fields as guided missiles, amphibious vehicles, communications and electronics, artillery, and aviation.

High-level training of Marine officers is conducted principally at the Marine Corps' Senior School, where advanced instruction in the doctrines and techniques of amphibious warfare is emphasized. A total of 106 Marine officers, generally in their fifteenth to twenty-second year of service, completed this training during the year, together with 12 officers from other United States armed forces and 8 from foreign nations. A substantial number of Marine officers also attended joint schools, foreign schools, and schools of other Services at the high level.

*Enlisted Training*

Approximately 34,000 male recruits completed the 12-week recruit training course and received individual combat training. Some 723 women completed the 8-week course at Parris Island.

Approximately 21,300 Marines received specialist and technical training during the year. The development of aviation technical skills continued to pose a difficult problem, due to the increasing complexity of aviation equipment and the introduction of new aircraft. Approximately 4,285 enlisted Marines were trained in the Aviation Fundamentals School and 5,213 were trained at other technical schools. Some difficulty was experienced in filling the desired quotas to highly complex schools, such as the advanced electrician and electronics courses.

The output from Ground Controlled Approach training was limited by the lack of equipment. However, in other respects the Marine Corps was able to meet requirements in all specialties.

About 7,500 Marines completed cold-weather and mountain training at the Marine Corps Cold Weather Training Center, Bridgeport, California, during the year.

**The Marine Corps Reserve**

The end-year strength of the Marine Corps Reserve (excluding personnel on extended active duty, officer candidates, and retired reservists) was 20,865 officers and 272,166 enlisted. The Ready Reserve totaled 215,749, and the Standby Reserve, 81,277. Through screening of the members during the year, a total of 64,662 enlisted personnel was transferred from the Ready to the Standby Reserve.

Six-month trainees enlisted in the reserve in a drill-pay status to a total of 9,430, and the drill-pay reserve finished the year with a net gain of 23, for an end strength of 46,173. Emphasis was kept on participation throughout the year; poor drill attenders were transferred to a nondrill status, and drill attendance remained high. The Marine Corps continued to utilize the 6-month training program to the maximum extent possible within personnel ceilings and availability of funds. This program has added stability and quality to the drill-pay units. As long as the program continues and as long as sufficient funds are available to maintain authorized strength in the drill-pay reserve through this program, a high degree of readiness for mobilization can be maintained. During the year, 8,791 personnel were ordered to 6 months' training and 6,794 returned to drill-pay units after training, bringing the total in the drill-pay reserve who have completed their 6 months' training to 8,094.

Training of ground units consisted of 23 or 46 drills at the training center and 15 days' annual field training for all units. During annual field training, practical field work and occupational specialties were stressed.

Reserve aviation squadrons and groups trained at home on an annual basis of 46 and 23 drills, respectively. All were double drills of at least 8 consecutive hours' duration. Annual field training of 15 days for all units was conducted at stations of the regular establishment or at home stations.

Reserve participation in active duty included periods of 15 days to 90 days for attendance in formal schools, on-the-job training with regular units, and service with the Fleet Marine Forces. Individual training included associate duty with organized reserve units and reserve elements of other Services, extension courses, active duty for training without pay, and other types of duty. Some 5,000 officers and enlisted Marines were members of Volunteer Training Units and attended regularly scheduled meetings.

During the year, a number of activations, consolidations, redesignations, and deactivations were effected in the Organized Reserve forces in the interest of efficiency and as a result of revisions in personnel strength. Organized Reserve ground units were reduced from 242 to 229. Organized Reserve aviation units were increased from 67 to 84 units, with no overall increase in personnel by reducing the size of all squadrons. In the reorganization, the number of fighter squadrons was reduced, the number of attack squadrons was increased, and the first Reserve helicopter squadrons were established.

The Reserve exists to provide the regular establishment with trained personnel in event of mobilization. The Marine Corps is reviewing the structure of the Marine Corps Reserve to determine the changes necessary to satisfy anticipated mobilization requirements during the next 5-year period.

## VI. Ship Construction and Conversion

We are building the Navy of the nuclear-missile age. Particularly noteworthy in fiscal year 1958 was the speed-up of the POLARIS submarine program. Originally one POLARIS submarine was planned for 1959. Because of rapid technical progress in the POLARIS missile itself, its submarine program has been expanded and accelerated. Three nuclear-powered ballistic missile submarines capable of underwater POLARIS launching were authorized as a supplemental 1958 item and scheduled for completion within 2 years. In addition, the Congress approved funds for construction of six POLARIS submarines in the fiscal year 1959 program. Contracts were placed for long lead-time components for two of these ships, using advance procurement funds. The remaining four are to be built to a new design.

Such acceleration involved the telescoping of design, funding, procurement, and construction stages until they nearly paralleled one another. To keep the overall program integrated and fast-moving, a management expediting center was created, maintained by a special task group with freedom to operate within both the Bureau of Ships and the Bureau of Ordnance's Office of Special Projects. In less than 4 months totally new ship design plans were produced; funds for three of these 380-foot ships were obtained; contracts were let for reactor compartment components and propulsion machinery; and construction orders were placed. In another month the keels were down and construction was well underway.

The building of these and later submarines will take place as rapidly as scientific knowledge and technical factors will allow, in order to get POLARIS submarines into the Fleet.

REGULUS missile submarines, very different from the ballistic missile types, will soon join the active fleets. *Grayback* and *Growler*, modified for missile handling after their construction as conventional submarines had already begun, are nearing completion. *Hali-but*, first submarine designed from the keel up to carry missiles and the first nuclear-powered missile submarine, should reach the Fleet early in the calendar year 1960. Plans and specifications for the three nuclear-powered guided missile submarines in the 1958 program will be completed early in the fiscal year 1959. These ships will differ

from *Halibut*—they will have larger, higher powered nuclear plants and greater antisubmarine warfare capabilities. The one nuclear-powered guided-missile submarine which is being requested in the 1959 program will be similar to the 1958 ships.

*Triton*, nearing launching, will join the Fleet within a year. Its great size—447 feet long, 58 feet high from keel to the top of the superstructure, and three decks in the main hull—will permit the inclusion of detection equipment which, combined with the unique capabilities of a nuclear-powered submarine, will greatly enhance our defense potential.

The *Skate* (SSN-578), first in a new class of nuclear-powered fleet-type submarines, was completed in December 1957. Sister ships *Swordfish* and *Sargo* will be completed by midfiscal year 1959, while the last of the class, *Seadragon*, will be completed approximately a year later. *Skipjack*, a still newer class featuring the *Albacore* form, "shoulder wings" on the sail, and a single propeller will be finished late in 1958. Five sister ships will join the Fleet in the calendar year 1960. *Thresher*—keel laid in May 1958—will incorporate improvements over the *Skipjack* Class. *Tullibee's* keel was laid in May 1958; it will be a nuclear-powered submarine smaller than any now building or authorized, with a new class of reactor and with sonar performance emphasized. Four additional fleet-type submarines requested in the 1959 program are expected to be similar to *Thresher*.

The Fleet's air arm was strengthened by the arrival of the 1,036-foot long, 60,000-ton carrier *Ranger* (CVA-61), and *Midway* (CVA-41), whose extensive conversion was completed in September 1957. The three remaining *Forrestal*-class carriers will follow at approximately 1-year intervals, as will *Oriskany* (last of the World War II *Essex*-class carriers to be modernized), and *Coral Sea* (last of the *Midway*-class) the following spring.

Construction of the Navy's most powerful, most independent carrier, the 95,000-ton nuclear-powered *Enterprise* began in December 1957. She is scheduled to be completed with all eight reactors installed less than 4 years later. Like *Kitty Hawk* and *Constellation*, she will be equipped with TERRIER missile batteries for defense and will be able to handle 80,000-pound aircraft. Unlike her predecessors, her radar antennas, which will utilize electronic scanning rather than mechanized rotation of a "bedspring" type, will be integrated with the island.

Missile protection of the Fleet against air attack will be considerably increased by the end of the fiscal year 1960, when it is expected that 3 TALOS-firing cruisers—*Galveston*, *Little Rock*, *Oklahoma City*—and 2 TERRIER missile cruisers—*Providence* and *Springfield*—will have been completed. *Topeka* (TERRIER missile) will be com-

pleted in the following year and *Albany* thereafter with TALOS, REGULUS, and TARTAR missiles. Two cruiser conversions for the TALOS missile, requested in the 1959 shipbuilding program, will be similar to the *Albany*.

Further air defense will soon be provided by TARTAR-firing guided-missile destroyers and TERRIER missile frigates. The frigates will be ready late in the calendar year 1959. Ships in the 1956 and 1957 program will have missiles aft and guns forward. The larger 1958 versions will have launchers forward and aft, higher performance sonar, and approximately 60 percent greater endurance. Six frigates requested in the 1959 program are expected to be similar. The nuclear-powered frigate requested in the 1959 program will have missile launchers forward and aft. A contract for the reactor compartment components for this ship was awarded in June 1958.

Guided-missile destroyers in the 1957 program will have guns forward and aft and launchers aft; those in the 1958 program will be similar. In the interim, before these missile ships can be available for service, the Fleet will have the latest class of conventionally armed destroyers. Five *Forrest Sherman*-class ships were completed this year. The remaining six authorized are expected to be completed during the fiscal year 1959.

All ships in the current program will be tremendously useful in either a "brush fire" war or a major conflict. Particularly valuable in limited war are the Navy's amphibious warfare ships, craft and vehicles. Five recently completed tank landing ships are a major addition to amphibious capabilities. The last two of these ships presently authorized will be finished next year. The conversion of the *Paul Revere* to attack transport (APA-248) neared completion, with a helicopter landing platform aft and facilities for landing and supporting approximately a battalion. A similar conversion requested in the 1959 programs will differ somewhat, primarily in having the combat information center, support arms control center, and troop operations control integrated in one area. Still unnamed, the amphibious assault ship LPH-2, developed in furtherance of the Marine Corps' vertical envelopment concept, will begin construction next year. Another has been requested in the 1959 program. These dual role ships will be capable of conducting antisubmarine warfare operations when not assigned to an amphibious task.

Mine forces were strengthened by the addition of four nonmagnetic ocean minesweepers (MSO) and the small but potent coastal mine hunter *Bittern*. Four MSO's and two nonmagnetic inshore sweepers (MSI) now authorized will be completed in the fiscal year 1959.

The program for converting older escort vessels to radar picket escorts ended with completion of the last six conversions. Four new

escort vessels joined the Fleet during the year, leaving four more to be completed in the balance of this program.

The three ammunition ships now building are well on the way, and one was launched in June 1958. One of the two authorized seaplane tender conversions was completed, and the other will be ready for service in 1960. All the auxiliaries building for the Military Sea Transportation Service were completed during this year. Construction of the remaining auxiliaries in the Navy's program—the *Observation Island* and three surveying ships (TAGS-21 to 23)—was proceeding rapidly.

Five floating classrooms (YP) for training midshipmen are now in use, and another five will be completed next year. The Fleet now has 13 ocean station radar ships (YAGR), with 3 more on the way. Contracts for two large harbor tugs built essentially to commercial specifications and having approximately 50 percent more power than the previous class were nearing award.

In both new construction and conversion programs, costs continued to rise. Wages and materials went up. Result—Higher cost estimates for new design projects in nuclear power, missile weapons systems, and complex electronics. Technical improvements in ships already building carried higher price tags. To balance out, the 1957-58 shipbuilding and conversion program was cut by half a dozen guided missile frigates and cruisers, and three other ships. Actually, work had started on only one of them.

## VII. Aircraft Procurement and Production

### Procurement

Due to increased costs, 1958 funds bought 587 less aircraft than did 1957 funds. The percentage of modern aircraft in the Fleet will drop as a consequence, since more of older aircraft than were planned have been kept in order to maintain required operating levels.

A few of each of four new models of aircraft, the S2F-3, GV-1, HU2K-1, and the HSS-2, were introduced into the 1958 procurement program. Of the aircraft contracted for this year, 54 percent were combat types, 37 percent were trainers, and 9 percent were utility types. A few P2V-7, P5M-2, and UF-2 aircraft were procured for the Military Assistance Program for use by the recipient countries in patrol-search missions. A few additional ski-equipped aircraft were procured for Operation DEEP FREEZE III. These included patrol aircraft (P2V-7 Neptune) and Marine Corps assault transport helicopters (HUS-1A). A number of helicopters were procured for the U.S. Army.

The 1958 aircraft engine procurement program comprised 25 percent fewer engines than that of the previous year. Of the total, 65.5 percent were turbojet, 28 percent reciprocating, and 6.5 percent turboprop engines. These included a few procured for the Military Assistance Program and a few for the Army.

### Production

Production requirements for aircraft and aircraft engines were substantially met this year. A few deficiencies occurred in new weapons systems that are in transition from research and development to the production stage, particularly when engineering modifications developed in collateral test and evaluation of prototype, pilot production, and production items.

A number of important new aircraft models were produced for the first time. Two all-weather jet fighters, the F8U-3 and F4H-1, and a jet seaplane, the YP6M-1 Seamaster, were received for evaluation purposes. Two jet trainers (TT-1 and T2J-1), photographic versions of a day jet fighter and a heavy attack airplane (F8U-1P and A3D-2P), and a new model (WF-2) of airborne-early-warning aircraft were also produced. New helicopters were a training version of light utility helicopter (HTL-7), a sea-air rescue version of a utility helicopter (HUK-1), and an antisubmarine warfare heli-

copter with instrument flight capability (HSS-1N). The HSS-1N represents a major advance in helicopter design with an entirely new concept for helicopter instrument flight. It will be valuable in anti-submarine warfare.

Current Navy production programs of aircraft models HOK-1, F3H-2M, A4D-1, FJ-4B, T-28C, T2V-1, T-34B, and ZS2G-1 were completed during the fiscal year 1958. Aircraft engine acceptances were 8.1 percent fewer than those in the previous year, due chiefly to aircraft program changes.

In the first Navy trans-Atlantic ferry of fighter aircraft, four replacement F8U-1 aircraft and four F3H-2N aircraft were flown to the Mediterranean via Newfoundland, the Azores, and North Africa. They were refueled by AJ tanker airplanes.

### **New Aviation Records**

Navy high-performance aircraft proved their effectiveness this year when three of them—the F8U-1P, the F4D-1, and the F11F-1F—set new records. The F8U-1P Crusader set a new transcontinental speed record on July 16, 1957, averaging 726 miles per hour from the Naval Air Station, Los Alamitos, Long Beach, California, to Floyd Bennett Field, Brooklyn, New York, a distance of 2,640 miles in 3 hours 23 minutes 8.4 seconds. It is the photographic version of the F8U jet fighter.

The F4D-1 Skyray established five new official world records for climbing speeds in May 1958, climbing almost vertically at nine-tenths the speed of sound. The most spectacular climb, and first of its kind, was a climb to 15,000 meters (49,212.5 feet) in 2 minutes 36.05 seconds. Significantly, the Skyray has been operating in Navy and Marine Corps squadrons on carriers and land bases for more than 2 years.

The third record event took place on April 17, 1958 when the F11F-1F Super Tiger jet fighter brought the world's altitude record for conventional aircraft back to the United States for the first time in 26 years. This plane reached an official altitude mark of 76,932 feet, exceeding the previous record by 6,624 feet. (Experimental aircraft had reached higher marks when released from other aircraft.) The F11F-1F is a modification of the F11F-1 Tiger jet fighter now in service with Fleet units, one of the smallest high-performance fighters built today.

### **New Aircraft**

Prototypes of three important new aircraft were completed and are expected to make their first flights early in the next fiscal year. The A3J-1 Vigilante is a 2-place twin-jet attack aircraft designed

to strike and withdraw successfully from both extremely low and extremely high altitudes. Coordinated in this design are high aircraft performance and an automatic bombing-navigation system. This is the first aircraft procured by the Navy in which all systems and system components have been supplied by the manufacturer. It is also the first Navy model to employ an integrated boundary-layer control system—a method of blowing high-pressure air over lifting surfaces thereby improving low-speed characteristics, of great advantage during carrier or land-based short field operations.

The new WV-2E Super Constellation is expected to play a vital role in airborne early-warning missions. It carries a discus-shaped housing containing a 37-foot wide rotadome, which rotates in flight and is a super-vision electronic "eye." A major advance in the field of airborne radar detection, the saucer antenna and the radar combination, include sharp reduction of "sea clutter" interference on radarscopes and the ability to report on objects in the skies from sea level to extremely high altitudes without shifting the antenna upward or downward.

The ZPG-3W, first of a new and larger class of nonrigid Navy airships being built for airborne early-warning picket patrol, will make its first flight early in the fiscal year 1959. This is the largest non-rigid airship ever built—50 percent larger than the ZPG-2, largest model currently in service. The new airship will be equipped with the latest electronic detection devices. Its huge envelope will contain internally mounted radar antennae.

Among other aircraft development projects, the A2F-1 is being designed to perform long-range, low-level attack missions and close air-support tasks under all-weather conditions; a vertical take-off and landing (VTOL) airplane, under experimentation for several years, is receiving further development attention; and a nuclear-powered seaplane program is being explored, with the British Princess seaplane as one of the possible aircraft designs.

There is growing Navy interest in a helicopter which is seaworthy and also comparable in flight to a carrier or land-based helicopter. The helicopter floats now in use are only auxiliary devices, adding weight and resistance, and it would be more efficient to use the floatable volume existing in the helicopter fuselage. To explore such use, an HUP-2 helicopter was converted into a "seacopter," the fuselage being modified into a hull. Engine intakes and exhausts were raised, and small outboard floats were added to provide lateral static stability. The "seacopter" was undergoing test at the fiscal year's end.

## VIII. Weapons

Guided missiles and antisubmarine weapons continued to receive high priority, with tangible progress in each field. A number of advanced-type weapons reached operational status, while others even more powerful and effective were in the process of development or production.

### Fleet Ballistic Missile

The solid propellant intermediate-range ballistic missile POLARIS combines with the nuclear-powered submarine to form the Fleet Ballistic Missile Weapons System. The accuracy and power of the ballistic missile are known; the great advantages of concealment, mobility, and surprise of the nuclear submarine complement this power. As being developed, POLARIS can be fired from underwater with a range covering many major targets. The first POLARIS submarine is scheduled to go to sea in 1960, and as a retaliatory power will provide a strong deterrent to war. Succeeding POLARIS submarines will augment this capability. Enemy effort required to counter it would be prohibitive in terms of time, men, and ships.

This year's successes in tests of POLARIS vehicles at the Atlantic missile range, of the submarine mechanism in the Pacific, and of associated navigation equipment in the *Nautilus* cruise under the Arctic icepack, all have been major milestones toward early readiness of the Fleet Ballistic Missile Weapon System.

### Other Missile Systems

Improvements continue to be made in TERRIER, the Navy's first surface-to-air guided missile. The advanced TERRIER system which incorporates these improvements is scheduled to become operational in the fiscal year 1959. To add still greater combat effectiveness, a program will be initiated to adapt a nuclear warhead to this missile.

The cruiser *Galveston*, first ship armed with the long-range TALOS surface-to-air guided missile, was commissioned May 28, 1958, and her shakedown cruise will begin in the spring of 1959. *Little Rock* and *Oklahoma City*, two cruisers undergoing conversion and scheduled for commissioning in the fiscal years 1959 and 1960 respectively, will be fitted with an improved version of TALOS. In improving

TALOS, the range, maneuverability, altitude, and velocity have been increased appreciably. Prototypes of the improved missile for *Little Rock* and *Oklahoma City* have been flight tested successfully.

Progress was made in the development of another surface-to-air missile, TARTAR, designed for use against low-flying and medium-altitude targets. This medium-range homing missile, smaller and lighter than either TERRIER or TALOS, will outperform the first operational TERRIER missile. Prototypes of various components of the overall TARTAR weapon system are being completed for evaluation testing. Flights of different types of test missiles were conducted and additional flights, including those of prototype missiles, are planned for next year.

An improved version of the air-to-air SIDEWINDER missile became operational on Navy, Marine, and Air Force fighter aircraft. The improved SIDEWINDER has longer range, operates at higher altitudes, and is more accurate at higher altitudes. Guided by a heat-seeking or infrared devices, SIDEWINDER permits defending fighter planes to stop fast aircraft miles away.

The SPARROW III air-to-air missile, improved over the already operational SPARROW I, will replace the earlier missile in Fleet use. This allweather missile can be fired accurately above or through clouds. It attains a speed of over 1,500 miles per hour within seconds after launching. Navy fighters can carry two to four SPARROW's, and the allweather fighters now with the Fleet can carry SPARROW III. Increasing numbers of Navy allweather aircraft will be armed with this advanced weapon.

BULLPUP is an air-to-surface tactical guided missile, intended primarily for use against small targets in support of ground troops. It was designed for carrier-based Navy airplanes and shore-based Marine Corps airplanes, is now in production, and is scheduled to become operational soon. It is relatively inexpensive, simple in design, and highly accurate. In a recent test, a Navy pilot launched the missile and hit a 4-inch square target 2 miles away. A non-nuclear weapon, BULLPUP is expected to be greatly effective against pillboxes, tanks, truck convoys, bridges, railroad tracks, and similar targets. Because of its simplicity, it does not require expensive test equipment or especially trained maintenance personnel. This missile has a self-contained navigational system and is powered by a solid-propellant rocket at supersonic speeds.

### **Underwater Weapons Systems**

Fleet evaluation of RAT, a new rocket-launched torpedo developed for antisubmarine warfare, neared completion. This torpedo homes on the submarine beneath the sea, after it is propelled by a rocket to

the target area and dropped to the surface. Since the launching device, complete with automatic-loading magazine, can be built onto existing 5-inch gun mounts on destroyers without major alterations, these ships can be equipped with RAT at relatively low cost.

Research and development work started in connection with SUBROC, a new antisubmarine missile system. This weapon, an underwater guided missile, will be fired from submarines, on or below the surface. The system is being designed to detect a submarine at long range, compute its course and speed, and fire the missile. The missile itself is propelled by a powerful rocket, and is being developed to destroy enemy targets in an area many square miles around the launching submarine.

Satisfactory progress was achieved in development of ASROC, a new antisubmarine missile designed for launching from surface ships. Development of a wire-guided torpedo was completed during the year. It resembles a conventional torpedo but is actually an underwater guided missile capable of closing a target despite countermeasures and evasive maneuvers. A specially designed thread-like wire connects the torpedo to its launching vessel, and is payed out as the torpedo travels through the water. Over this wire the torpedo receives guidance commands which direct it to its target.

### **Gun Systems**

Modification of the Mark 3 20-mm. aircraft gun to permit installation in A3D aircraft proceeded satisfactorily. Firing tests of this modified version, called the Mark 16, were scheduled to take place during the trials of the aircraft.

The first experimental model of an external gun pod using the Mark 11, a new high-performance 20-mm. gun capable of firing in excess of 4,000 rounds per minute, showed remarkable reliability and flexibility in successful flight and firing tests. Plans call for an evaluation of this equipment as a possible means of meeting existing defensive and offensive requirements of attack aircraft. A program for improvement of the Mark 12 20-mm. aircraft gun was continued, and improved features were incorporated in current production of this equipment.

A new gun fire control system, the Mark 75, was developed, evaluated, and accepted for Service use. It will be installed in new guided-missile destroyers and certain auxiliary and amphibious type vessels. A bombardment computer for destroyers completed evaluation and is being considered for use with the gun fire control system Mark 68.

## *IX. Health and Medicine*

### **Health of the Navy and Marine Corps**

In general, Navy men and Marines enjoyed good health this year, except for the influenza outbreak. "Flu" lifted the sick-list average to about 14 per 1,000 per day as compared to 13 last year—but that is a 35 percent reduction from the 1947 rate.

A worldwide outbreak of Asian-type influenza required measures to meet the threat of a serious epidemic. While these measures were successful, influenza nevertheless increased the overall admission rate (284 per 1,000) for the first time in several years. Acute respiratory infections occurred at a rate twice that for the previous year. Influenza first broke out aboard ships overseas during the spring of 1957, and by July had spread to installations in California. Within 6 months the effects of the epidemic were felt in all geographic areas. By December, the admission rate dropped to a level only slightly above rates for recent years, as the result of vigorous preventive action. All cases were relatively mild and of short duration.

This year's admission rate for pneumonia, watched with special concern because of the influenza outbreaks, was actually a little lower than in the previous fiscal year, although unusually high in several individual months. There were about 25 percent more cases of German measles, chiefly among recruits. Incidence of venereal disease did not change substantially.

There was little change in the number invalidated from the service. Close to 10,600 persons were permanently lost to the Navy in this manner—12 of every 1,000 on active duty. Deaths numbered 1,660, 95 more than in the previous year, including 548 from motor vehicle accidents and 431 from aviation accidents. These figures represent a decline of 22 in the former and an increase of 46 in the latter. Relative to the number of hours flown there were fewer aviation accidents than in previous periods. Deaths from disease (292) increased by 29.

On the average there were 14,702 patients occupying beds each day in Navy medical facilities, more than 80 percent of which were in naval hospitals in the United States. Of these patients, 8,622 were active duty members of the Navy and Marine Corps, 1,086 were personnel of the Army and Air Force, 659 were retired personnel, and 370

were beneficiaries of the Veterans Administration. In addition, dependents of members of the uniformed Services averaged 1,448 patients daily. Navy and Marine Corps patients in hospitals of the Army and Air Force averaged about 600. Outpatient workload showed little change from a year ago.

For the first full year, medical care at Government expense was available in civilian facilities and from private physicians to dependents of Service personnel. The program was well received both by private medical circles and by the dependents themselves. Many of the latter, who due to the exigencies of the Service do not live near and cannot use military medical facilities, were thus able to receive medical care and the morale of both Service members and their families benefited considerably.

### **Medical Advances**

As an outgrowth of the influenza epidemic, different types of influenza vaccines were tested to determine their effectiveness. The results appear to indicate those used to control the epidemic were reasonably effective, but further improvements will be made based on trials of different virus combinations in a vaccine.

Investigations of the prospect of freezing whole blood to preserve it for longer periods of time continued to show progress. A major problem is thawing the blood in such a way as to make it clinically acceptable. Current efforts are concentrating on determining how to make the freezing or thawing uniform throughout a blood specimen, in order to reduce the loss of red blood corpuscles during the production process.

At Johnsville, Pennsylvania, the gondola of the Navy's human centrifuge was modified to simulate the cockpit and flight characteristics of the experimental X-15 aircraft. Within this device a pilot can simulate a complete flying mission of this subspace test vehicle. Engineering deficiencies are noted as well as pilot training progress. Utilization of this revolutionary device should help avoid costly and fatal flight accidents. The space flight simulator, in operation for approximately 6 months, is jointly supported by the Navy and the Air Force.

Methods of transmitting medical data from space ships to earth-bound receiving stations present a challenge, successfully met by a naval medical research group which devised means of electronically recording pulse rates, respiration rates, and other physiological data on men in airborne vehicles and transmitting them by radio to earth-based receivers. This technique has a number of scientific applications for both military and civil purposes.

A recent development opened new avenues of research in the effort to protect flyers against gravity pull and was in itself an important scientific achievement. It was shown that a man surrounded completely with water can sustain acceleration more than five times his normal "G" tolerance. While under water, the body receives maximal support from all directions, and preliminary investigations have indicated that accelerations as high as 25G may be sustained for a period of several seconds without unconsciousness or loss of ability to move arms, legs, and head. A prototype device is under evaluation.

Six Navy enlisted men spent 7 days and nights under intentionally rugged conditions in a specially designed space flight and long-range flight simulator. The men were kept at a simulated high altitude, breathing high oxygen concentrations over a prolonged period of time, and standing regular 8-hour watches at the controls. They lived on precooked rations and remained isolated from outside contacts. The "flight vehicle" consisted of two adjoining compartments just large enough to accommodate the occupants—one with two bunks, a wash basin and a toilet, and the other with three work stations at which the designated tasks were performed. Duties rotated at fixed intervals as they might in actual flight. Similar tests will continue and results will be valuable when nuclear propulsion of aircraft or manned orbital flight becomes a reality.

In atomic medical research, a major advance was made in demonstrating that cell-free extract from the spleen of mice reduces the sickness of (and thus protects) guinea pigs which have been subjected to nuclear radiation. Other studies showed that mice are more subject to infections after exposure to a single large dose of radiation than after exposure to several smaller doses equal together to the one. It was learned that the use of different types of ionizing radiation produces very significant differences in mortality in one and the same animal species; also, that variation of exposure conditions in one type of ionizing radiation produces similar differences. This suggests that great caution must be exercised in applying to man quantitative data on radiation effects derived from studies of one animal species only.

Navy psychiatrists led in developing tests and standards for the selection of military personnel and civilian scientists to spend the winter in Antarctica. The choice of people emotionally adapted to withstand the novel conditions will contribute much to the success of the scientific expeditions there.

## **X. Research and Development**

Technological change continues to accelerate, and makes itself felt most strongly in the art of war. There are consequently continuing demands for more new techniques and exploration of the frontiers of knowledge, to meet the operational requirements of a modern Navy. In response to these demands the research and development program has given highest priority to projects furthering the development of striking power, antisubmarine warfare and Fleet air defense.

### **Weapons Systems**

Some of the more important new systems of significance programed for development this year are—

**SUBROC**—a submerged-launched antisubmarine missile system (described briefly in Ch. VII) intended for attacks on surfaced and submerged submarines.

**EAGLE**—an advanced medium-range air-to-air guided missile system.

**LACROSSE**—a helicopter-transportable guided missile system for use by landing forces to replace or supplement field artillery for precision target destruction.

**TORPEDO (EX-8)**—a lightweight, high-speed torpedo for use by antisubmarine ships, aircraft, airships, and helicopters.

**NUCLEAR PROPULSION PLANTS**—development of reactors suitable for use in a cruiser, frigate, and destroyer.

**3-COORDINATE FIXED-ARRAY RADAR SYSTEM**—to provide very long-range 3-coordinate target position information on high-speed aircraft.

**ASW SEAPLANE**—a new antisubmarine seaplane with greatly improved performance characteristics and the most advanced tactical system.

**LAND-BASED ASW AIRCRAFT**—a new high-performance antisubmarine land plane designed specifically for detection, tracking, and killing advanced high-speed, deep-running, quiet submarines.

**PHOTOGRAPHIC/ELECTRONIC RECONNAISSANCE AIRCRAFT**—a new reconnaissance aircraft for support of attack aircraft operations.

DRONE HELICOPTERS—development of unmanned, remote-controlled helicopters for antisubmarine warfare, airborne-early-warning, mine warfare, and other purposes.

AA TARGETS—mach 2.0 target drones for air defense training.

Among major items which successfully completed operational evaluation and are scheduled for Fleet use, the following are of interest.

#### *Antisubmarine Warfare*

An airborne radar with improved snorkel detection capability successfully completed operational evaluation, as did an improved model of the antisubmarine seaplane. Two types of expandable passive sonobuoys with associated equipment, and the expendable passive directional sonobuoy with associated equipment also completed their tests successfully. All of these provide a moderate increase in air antisubmarine capability. The idea of towing sonar equipment from an airship was proven feasible, and a lightweight low-frequency hull-mounted sonar for use in small ASW ships was recommended for service use. The Mark 37 torpedo, previously accepted, was subjected to special tests to determine the hit performance against snorkeling submarines, submerged submarines, and surface escorts. Its effectiveness was good and minor modifications are expected to improve it further.

#### *Air Defense*

Three new high-performance air defense aircraft proved ready for service use, and the TACAN navigational aid successfully completed its operational tests. These items will give the Fleet air arm an increased (supersonic) allweather air defense potential. Certain features of the guided-missile cruiser *Canberra* were evaluated, including individual elements of her missile system as well as the TERRIER missile weapon system in its entirety. The tests revealed discrepancies in certain of the equipment, but overall the air defense capability of *Canberra* was considered superior.

#### *Mine Warfare*

An aircraft-laid influence bottom mine for use against all classes of ships, primarily submarines, was approved for service use. Also approved were two items used in mine countermeasures: A precision short-to-medium-range electronic navigation system and an acoustic minesweeping device.

### Advanced Development

The majority of advanced development projects are classified, but a few items of interest can be mentioned without security classification as an indication of some of the year's accomplishments.

A revolutionary aircraft cockpit instrumentation system has made spectacular progress. Basically the system consists of a thin, but rugged, transparent television-type picture tube and a small compact computer which generates the information for display. At the turn of a switch there appears on the transparent screen, which is part of the pilot's windshield, a simulated three-dimensional picture of the outside environment. Superimposed on this background is a ribbon-like "pathway" along which the pilot literally flies. Thereby, he can tell at a glance whether or not he is flying safely and on course. The pathway steers him away from mountain tops, keeps him out of collision courses with other aircraft, and guides him in takeoff and landing. Part of the system, the central computer and the flat plate television tube, has already been flight-tested in a jet training aircraft. A version of this system is planned for installation in the new A2F aircraft. The system is not limited to aircraft. It could also simplify navigation for surface ships, submarines, tanks, and remote-controlled vehicles.

A two-place rubber airplane has been developed and successfully flown. A great deal of emphasis has been given to research in vertical takeoff and landing, and short takeoff and landing, aircraft. In the exploratory development program, the first complete transition flight of a tilting-wing model was demonstrated, and practically no control difficulties were experienced during transition.

Study of a unique idea for an amphibious vehicle promises a radical improvement of amphibious vehicle performance under adverse conditions. It would combine, in a practical way, the optimum characteristics of the wheel and the track, with a speed twice that normally achievable.

### Basic Research

The Navy basic research program saw major changes in the fiscal year 1958. The expanded national interest in science and technology in general, and in space particularly, led to provision of additional funds which greatly increased the scope and significance of many major programs. Principal cause of this increased emphasis was the launching of the Soviet earth satellites and the overall activities of the International Geophysical Year, the latter receiving major support from the Department of the Navy.

Research effort this year has ranged from underwater studies using the Piccard bathyscaph, which took Navy scientists down to ocean

depths of nearly 2 miles, to upper atmosphere studies of cosmic rays, solar flares, the ionosphere, and high-altitude phenomena many miles into the stratosphere, using both manned and unmanned balloons and research rockets. Progress was made in investigations of both the Arctic and Antarctic, including use of the atomic-powered submarine *Nautilus* in an under-ice exploration close to the North Pole.

The first VANGUARD earth satellite was successfully launched into an orbit which may last 200 years. This was the first satellite to use solar-powered batteries, which will enable information to be telemetered to us for some time to come. By attaining an apogee of about 2,500 miles, it reached farther into space by several hundred miles than any other earth satellite launched during the fiscal year.

### *Physics*

Research in the physical science has introduced revolutionary changes, in civilian applications and in techniques and concepts of warfare. It will receive expanding support as we move more boldly into space research. Additional knowledge of the environment surrounding the earth will play an important role in our ability to exploit this medium for military purposes.

Elementary particles and nuclear structure are being studied in an attempt to solve mysteries such as the properties of nuclear forces which bind nucleons together to form an atomic nucleus. The nuclear physics program, with joint support from the Atomic Energy Commission, also includes cosmic ray investigation. Knowledge of the effect on man of primary cosmic rays (those which are absorbed by our atmosphere and do not reach the earth) has become important in connection with manned space flight.

Progress in the achievement of a controlled thermonuclear (hydrogen/fusion) reaction on a laboratory scale has been made in the past year. The approach is to use high-speed shock waves to preheat a tube containing deuterium (heavy hydrogen) gas and to compress the resultant plasma by strong magnetic fields. The magnetic forces drive the hot gas or plasma away from the wall tubes toward the tube axis, forming a leakproof magnetic "bottle". Experiments using currents in excess of 5,000,000 amperes for about 6 microseconds have indicated that temperatures in excess of 10,000,000 degrees are feasible by this method.

### *Chemistry*

One of the principal tasks in chemistry is the investigation of the chemical and physical properties of polymers and their molecular structure, and more information has been gained about polymer substances. As an example, one of the solid polymers of the new class

composed chiefly of carbon, fluorine, and nitrogen, which was discovered the previous year, has been found to be stable at 700° F. Current work is directed to modifications which will have useful degrees of "rubberiness" and be useful at even higher temperatures.

In the search for high-energy fuels, the reactions of hydroborons with various electron donors are being investigated. This research will contribute to an area of hydroboron chemistry about which little is known. The possibility of using hydroborons as high-energy fuels depends on solving such problems as the economical synthesis of these fuels and their subsequent storage and handling.

Progress was made in the development of more efficient oxygen generators for nuclear-powered submarines, with a new type of electrolytic generator for supplying oxygen by electrically decomposing water.

#### *Earth Sciences*

Notable contributions are being made to space research, particularly in the fields of geophysics and astronomy, and astrophysics. A variety of advanced research tools have been developed by Navy scientists, including the high-altitude balloon, the research rocket, the earth satellite, and the radio telescope. Special plastic balloons, both manned and unmanned, have lifted telescopes as high as 80,000 feet. There, above most of the earth's distorting atmosphere, celestial observations are far more accurate. In an initial flight in November (Project STRATOSCOPE), an unmanned balloon carried to 81,000 feet a 12-inch telescope equipped with an automatic aiming device and camera system (later parachuted to earth), which obtained unprecedentedly sharp photographs of the structure of the sun. Plans are well advanced to use the balloon system in a study of planetary atmospheres at wave lengths not readily observable from the ground.

A major achievement in rocket research was completion of the development of an advanced 3-stage rocket for the VANGUARD (earth satellite) Project. In March 1958 this rocket demonstrated its capability of launching earth satellites, its successful flight occurring 2½ years after inception of the program. Considering the experience of previous large rocket programs, it was initially believed that 13 rocket vehicles would be the minimum number to insure placing a satellite in orbit during the 18-month International Geophysical Year. Seven of these were for a development and test program and six for launching attempts. One of the test vehicles placed a small test satellite in orbit, thus permitting the project to omit one test launching. At the end of the fiscal year, five rocket vehicles remained available for efforts to place into orbit the 20-inch Vanguard

satellites. These satellites are complete, tested and ready. Their payloads have been designed to yield highly significant data with minimum weight.

The mission of the VANGUARD Project, in addition to placing an object in an earth-circling orbit during the International Geophysical Year, included also proving that the object was in orbit and, in addition, conducting a scientific experiment using the object. The first two objectives have been accomplished. Further, the Vanguard I satellite's Minitrack signal provides useful scientific information, including the temperature inside the ball and the erosion by meteorites of the solar cells that power a long-life radio. The original objective of the scientific experiment will not have been fully met until a 20-inch satellite is placed in orbit. The Air Force has adapted for its moon rocket the Vanguard second stage and a third stage ordered for Vanguard use.

The worldwide Minitrack network and orbital computing facilities designed and developed by Navy were placed in operation on an impromptu basis in the fall of 1957 when the Soviet satellites were launched. It has operated with great success. So far six Soviet and United States satellites have gone into orbit, as many as three of them transmitting simultaneously.

#### *Engineering Sciences*

The extensive program in the engineering sciences is more in the nature of applied research, including the areas of mechanics, electronics, acoustics, propulsion systems, and metallurgy. It draws upon the results of the basic science programs and, at the same time, influences their direction and emphasis. Its products are often of direct use in development programs. Usable results have been achieved in the problems of towed bodies, ship forms of minimized resistance, and improvement in "seakindliness" by increasing the limiting speed of a ship in storm seas. Work is progressing on hydrofoil-supported craft including high performance seaplanes.

## *XI. Finance and Management*

### **Appropriations and Costs**

The Department of Defense Appropriation Act 1958 provided a total of \$10,076,455,000 in new obligating authority for the Department of the Navy. Included were funds totaling \$190 million transferred to the appropriation "Military Personnel, Navy" from unobligated balances in the Navy Industrial Fund, the Marine Corps Stock Fund, and the Navy Stock Fund. In addition, \$265 million were provided by appropriations for military construction.

The distribution of these new funds by major cost category and a comparison with the two previous fiscal years are shown in the table on page 260. Thus is derived the financial maintenance of active Navy and Marine Corps forces in being—ships, aircraft, weapons, and personnel in minimum strength necessary for national security. Thus also are obtained the funds required to keep the Navy and the Marine Corps effective—to accomplish their modernization and to exploit the advances of technology for their superiority.

The estimated current year cash cost has become a basic consideration in financial control. Consequently, it has become necessary to tailor the volume and rates of fund obligation to meet predetermined expenditure limits. To accomplish expenditure objectives for the fiscal year 1958, as set forth in the budget, the Department of the Navy determined that the following actions were required:

1. Reductions of personnel strength and the operating forces.
2. Reduction of the supporting establishment.
3. Reduction of major procurement, research and development, and public works programs.
4. Stretching out scheduled deliveries under some outstanding contracts.

Through application of these measures, 1958 expenditure objectives were prescribed for each Navy appropriation, within a total expenditure target of \$10,899 million. Eventual recorded expenditures exceeded this target slightly (by about \$7 million) due principally to complexities of price and wage increases and accelerated contractor deliveries during the temporary business recession.

The strenuous effort to hold down the overall cost of national defense continues, often to the extent of finely calculated acceptance of risk, and has been successful in a number of respects. However, the complexity of the implements of war continues to increase, and coupled with progressive rise in the costs of labor and materials, has offset these successes to a great extent.

DEPARTMENT OF THE NAVY COMPARISON OF NEW OBLIGATIONAL AVAILABILITY BY MAJOR BUDGET CATEGORY

(In thousand dollars)

Budget category	Fiscal year 1958	Fiscal year 1957	Fiscal year 1956
I. Military Personnel Costs .....	3,093,719	3,123,366	3,137,985
II. Operations and Maintenance .....	2,537,314	2,406,491	2,385,569
III. <i>Major Procurement and Production</i> ..	4,000,183	3,748,078	2,938,827
A. Aircraft .....	1,536,039	1,482,551	760,725
B. Ships and Harbor Craft .....	1,781,000	1,386,700	1,317,000
C. Combat Vehicles .....		31,845	30,593
D. Support Vehicles .....	16,560	30,026	28,583
E. Artillery .....		96	1,462
F. Weapons .....	1,688	23,463	24,865
G. Ammunition .....	13,520	118,654	296,455
H. Guided Missiles .....	402,460	351,831	238,244
I. Electronics and Communica- tions .....	144,410	189,438	150,521
J. Production Equipment and Facilities .....	32,458	68,441	18,939
K. Other Major Procurement and Production .....	72,048	65,033	71,440
IV. Military Public Works .....	265,000	400,000	442,628
V. Reserve Components .....	197,924	233,006	243,843
VI. Research and Development .....	573,406	541,630	474,151
VII. DOD Establishment-Wide Activities ..	28,052	25,533	25,402
Sub-total .....	10,695,598	10,478,969	9,648,405
Transfers from unobligated balances ..	-190,000	-258,000	-----
Total .....	10,505,598	10,220,104	9,648,405

### Civilian Personnel

On June 30, 1958, the Department of the Navy, with 363,729 civilian employees, was the third largest employer in the Federal Government. Total employment decreased 25,988 during the year, although an increase occurred in foreign countries. Year end totals for the Department were as follows:

<i>Management bureau or office (including field activities)</i>	<i>30 Jun 1957</i>	<i>30 Jun 1958</i>
Chief of Naval Operations.....	8, 400	8, 330
Headquarters, Marine Corps.....	17, 201	16, 242
Bureau of Aeronautics.....	88, 645	81, 218
Bureau of Medicine and Surgery.....	8, 199	7, 792
Bureau of Naval Personnel.....	9, 184	8, 614
Bureau of Ordnance.....	44, 223	39, 412
Bureau of Ships.....	122, 589	117, 326
Bureau of Supplies and Accounts.....	43, 309	40, 772
Bureau of Yards and Docks.....	22, 018	21, 247
Military Sea Transportation Service.....	12, 000	9, 418
Other.....	13, 949	13, 358
Total.....	389, 717	363, 729

### Procurement

During the business decline, efforts were intensified to channel business to labor surplus areas. Prime contractors were encouraged to place a maximum number of contracts with small business. Nevertheless, awards to small firms declined to about 19 percent of the total direct Navy purchases within the United States, compared with 21 percent in the previous year. Of the total contracts awarded to small business, approximately 20 percent was the result of the joint Navy-Small Business Administration set-aside program, which was reemphasized and publicized during the year.

The placement of contracts with firms in labor surplus areas was encouraged, and every opportunity was explored for setting aside portions of proposed procurements for award to such firms. In March 1958, procuring activities were directed to give preference to set-asides for labor surplus areas over set-asides for small business in cases where either type was equally applicable. In addition major Navy prime contractors were urged to prefer subcontracting to firms in labor surplus areas, where such subcontractors were qualified and their bids or offered prices were not higher than those obtainable elsewhere.

### Supply Management

The material complex of the Navy continues to broaden with the development of new and the modernization of existing equipments. Well over 1 million items are presently carried in the Navy Supply System and thousands more are being introduced each year. Efficient management of this material requires the use of new procedures and modern techniques and equipment. Receipt, storage, and issue procedures are being streamlined, and internal coordination and fiscal operations are being improved.

Progressive installation of automatic data processing equipment has been accelerated at the inventory manager and stock point levels. This equipment permits use of a broader demand base in predicting activity and system requirements, reduces the time needed to analyze current inventories, expedites the determination of future requirements, and speeds the processing of demands. It has made possible the extension of transaction stock status reporting, which in turn permits significant reductions in investment levels by providing the inventory manager with current stock status data in lieu of quarterly reports by previous electric accounting machine methods.

Supply effectiveness in the Fleet has been increased through purification of shipboard inventories, consolidation of stock records, and integrated stowage of technical repair parts. An allowance and load list program is underway to delineate those items essential to maintain a maximum degree of readiness. Emphasis is being placed on the expeditious determination of onboard deficiencies in load and allowance lists, in order to calculate funding requirements accurately and promptly. These programs are designed ultimately to provide maximum material endurance of ships between overhauls.

The number of items of supply identified and cataloged remained steady during the year at approximately 1,400,000. Some 255,000 new items were added to the system, and some 217,000 items which had outlived their usefulness were dropped. An accelerated program is being pursued to reduce the range of items carried to an absolute minimum within a 3½-year period. In the Federal Catalog Program, about 273,400 Navy and Marine Corps items of supply were converted to the Federal Catalog system.

### **Management Methods**

An active program is underway to harness effectively the great speed, capacity, and manipulative abilities of modern data processing machines, and the scientific approaches which they make possible. In addition to aforementioned applications to inventory management, general management information systems are being developed with the objective of providing the data necessary to cope with management problems at all levels. Progress is being made in acquiring equipment and constructing the functional data systems which will form the basic components for the eventual overall system. Concurrent attention is being given to the other end of the data chain—the office and its paperwork—and to the automation of source data as a means both of eliminating duplication in its creation and processing and of preparing its path to the large-scale processing systems.

## XII. Conclusion

This concludes the semiannual report of the Secretary of the Navy for the period ending June 30, 1958, prepared in accordance with Section 202(d) of the National Security Act of 1947 (as amended). Future reports will be submitted annually instead of semiannually, as provided by the Department of Defense Reorganization Act of 1958 (Public Law 85-599, approved August 6, 1958).

Looking ahead, we see only a continuation of the Communist subversion, provocation, and limited aggression, now familiar in international affairs. It is increasingly important that the force-in-readiness capability of the Navy and the Marine Corps be maintained and that their responsiveness to the needs of the Nation be assured at all times. They now provide a powerful support for national policy—fast and versatile. We must keep them so.

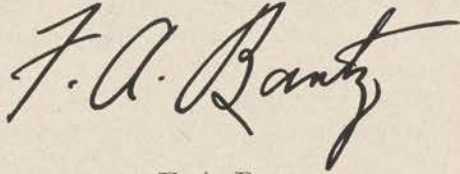
Accordingly, naval air, surface, and undersea units are forging new tools and testing their application in the multiple and fluid tactical situations of war at sea. To provide sound long-range objectives upon which naval programs can be based, a series of intensive studies has been conducted over a period of several years at the direction of the Chief of Naval Operations. Performed by the Navy's most experienced officers and by scientists, these studies have projected 10 to 15 years into the future to define objectives for adequate and effective naval power.

They visualize the future Navy with more submarines, about the same number of surface ships, and somewhat fewer aircraft than at present. It will, however, be markedly different in many respects, with nuclear power in a large proportion of ships, surface-to-air missiles in a still greater proportion, and antisubmarine missiles or aircraft aboard nearly all combatant ships. Forces required primarily for antisubmarine warfare and for air and missile defense of shipping will comprise the largest group. Modern amphibious ships, sufficient to land two Marine divisions, will be designed for maximum use of the vertical assault technique, as well as for effective over-the-beach support when required.

The point of the naval spearhead will be the striking forces, composed of attack carriers and guided missile cruisers and frigates. While these will comprise but about one-tenth of the planned total,

their mission will be important. They will form a primary tool for limited war. In addition, they will be a major flexible asset for a general war and will be required in combating the submarine as its source.

For hundreds of years, seapower has been a vital element in world affairs. The peoples of the earth, though they may never know the sea, depend on them for commerce and communication. Of necessity, seapower continues to be a fundamental and dominant factor of international strategy. It will remain so for many years to come.

A handwritten signature in black ink, reading "F. A. Bantz". The signature is written in a cursive, flowing style with a large, prominent "F" and "B".

F. A. BANTZ,  
*Acting Secretary of the Navy.*

*Semiannual Report*

*of the*

**SECRETARY OF THE AIR FORCE**

**January 1, 1958, to June 30, 1958**

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## I. Introduction

Fiscal year 1958 marked the 10th anniversary of the establishment of the Department of the Air Force as a member of the defense team of the United States. During these years, United States Air Force policy has been governed by one principal consideration: In any world crisis this Nation would survive only if it maintained a predominant nuclear deterrent capability. This policy was implemented by insuring the integrity of the Strategic Air Command above every other military consideration.

Aggression may take different shapes and forms, but whatever its contours, the greatest danger in any conflict is that it may expand in scope and intensity and spread into general war. The Air Force has the primary retaliatory role in general war, and an essential aspect of our total war force structure, as we have designed it, is its inherent capacity to wage limited war.

The dramatic improvement of the Soviet Union's nuclear capability in recent years has emphasized the urgent requirement to keep our deterrent power modern since this military power represents the strength most respected by the Communist leadership.

Substantial improvements have been made in a whole range of individual weapons, including new fighter-bombers of greater speed and longer range, plus tactical missiles of improved reliability and accuracy. These developments are discussed in detail in the body of this report.

Of additional significance, and deserving of special mention here, is a new organizational concept. The Composite Air Strike Forces (CASF), organized under the Tactical Air Command (TAC), is tailored to meet less than all-out war situations. In Exercise MOBILE ZEBRA, in November and December 1957, the CASF was presented with a sizable problem of logistics planning, air-to-air refueling, long trans-Pacific flights, and maintenance of a combat-ready status at all times. In this operation, a CASF composed of 32 F-100 fighters, plus B-66 bombers, RF-101 and RB-66 photographic, and WB-66 weather reconnaissance jets, supported by KB-50 tankers which made rendezvous over the vast Pacific Ocean, shuttled between California, Hawaii, Guam, the Philippines, southern Korea, and Formosa.

When the exercise was completed, the force gathered in Japan and again demonstrated its unique deployment capability by flying non-stop from Tokyo to Hickam AFB, Hawaii, in slightly over 6 hours, thus establishing unofficial records for the Pacific crossing.

The speed with which our Composite Air Strike Forces can move about the world and adjust to different situations makes them uniquely suited for less-than-all-out emergencies. Weight of firepower, flexibility, and quick response measured in terms of hours are all factors which make the Composite Air Strike Forces so valuable.

At the same time, the potential of our strategic forces was measurably increased by rapid progress in the ballistic field. The ballistic missile program, which in 1955 had been given highest priority by the President, approached operational status in 1958. For example, on November 27, 1957, the THOR (SM-75) intermediate range ballistic missile was ordered into production after several successful test flights. On November 30, 1957, the Air Force placed both the THOR and the ATLAS (SM-65) ICBM under the Strategic Air Command (SAC) to speed integration of these weapons into the operational forces. THOR and JUPITER training squadrons were activated within SAC in January 1958 and their training "know-how" would be transmitted to NATO allies. On February 24, 1958, an Anglo-American agreement provided for shipment of THOR missiles to the United Kingdom before the end of the calendar year. On April 1, 1958, two ICBM squadrons were activated at Cooke AFB, one for training purposes, the other to be SAC's first operational ICBM unit. Meanwhile, the USAF has already begun development of a second generation solid propellant missile, the MINUTEMAN, which will further improve SAC's reaction time in the event of an enemy attack.

The Strategic Air Command made encouraging progress in manned bombers in fiscal year 1958. The B-36, last of the propeller-driven bombers, was all but retired from frontline status, a process that was expected to be complete in the next fiscal year. At the same time, the new "wet-wing" B-52G, incorporating design features that markedly improved its range and performance, became operational. The B-58 Hustler, first known supersonic bomber, entered a period of stepped-up production, and the B-70 Valkyrie, a chemically-fueled bomber, was well into the development stage.

Modernization of SAC weapons and techniques is a high priority program. The objective is to enable SAC to launch one-third of its bomber force in less than 15 minutes, since our ballistic missile detection and warning system, when fully operational, is expected to give that much warning of a surprise missile attack. This readiness program requires the highest level of research and production capability,

adequate alert and dispersal facilities, and thousands of well trained personnel.

Additional dispersal is very expensive but there is no safe alternative if we are to reduce the vulnerability and decrease the reaction time of our counter-strike force. Dispersal offers better protection from attack and quicker reaction time for retaliation, since more aircraft can be launched faster from more bases. Our ultimate objective is to disperse the strategic bomber force so that not more than one squadron of B-52's or one wing of B-47's will occupy one base.

To carry out the Air Force missions, at least for the foreseeable future, a balanced force of missile and manned bombers is required. Missiles have a unique ability to traverse great distances at ultrasonic speeds, and are comparatively immune to the hazards of weather and enemy defenses. Manned aircraft, on the other hand, offer distinctive advantages in reaching targets that may be imprecisely located on maps. They also can attack from any direction and respond to new or diversionary orders in flight.

Obviously, the speed and the degree of response that SAC makes to attack will depend in great measure upon the effectiveness of the early air warning system, an integral part of our air defense. In July 1957, the Distant Early Warning (DEW) line went into operation in a 3,000-mile arc from western Alaska to Baffin Island, culminating 36 months of intensive construction effort. In 1958 the DEW line was being extended westward through the Aleutians and eastward across Greenland. To translate early warnings into usable interception data, the first of 29 nationwide Semi-Automatic Ground Environment (SAGE) direction centers began operation at McGuire AFB, New Jersey, just before the end of the fiscal year. The SAGE direction center contains electronic computers which, in skilled hands, determine the speed, altitude, and direction of attacking aircraft, predict their future courses, transmit the data to defensive weapon centers, and direct aircraft and missiles to interception—all in a few minutes.

More important than the technical triumph that SAGE represents is the improved air defense capability that it provides. SAGE centralizes many air defense functions, based on the concept that defense effectiveness is dependent on the coordination of air weapons and ground control, *not* on each alone. Moreover, it minimizes manual tasks. Under the old system, one man talked to another point-to-point. SAGE permits scores of units to "talk" to each other constantly.

By the end of fiscal year 1958 the United States Air Force stood on the threshold of space. Placing a man in space and controlling his return to earth require solutions to intricate and complex physical

problems. The USAF has played an important role in a many-pronged Defense Department program to explore the mysteries of space. On October 16, 1957, tiny artificial meteors were fired from the nose section of an Aerobee research rocket at an altitude of 54 miles. Some of these pellets were propelled outward at speeds up to 40,000 miles per hour (25,000 m.p.h. is necessary to escape earth's gravity). The experiment provided valuable data on the density of upper air regions. On October 21, 1957, a four-stage rocket (Operation FARSIDE) was fired from a balloon-supported platform 100,000 feet above Eniwetok Atoll. The end-stage rocket reached more than 2,700 miles into space.

In March 1958, the Air Force received authority from the Advanced Research Projects Agency (ARPA) of the Defense Department to explore space in the vicinity of the moon with small unmanned space vehicles called "lunar probes." These probes, using a THOR-VANGUARD propulsion system, were scheduled early in fiscal year 1959.

On June 16, 1958, the USAF contracted for development of Dynasoar, an advanced boost-glide aircraft which will use both centrifugal force and aerodynamic lift to fly from space altitudes down into the atmosphere. Also in June 1958, the USAF announced development of an inertial flight instrument system for the hypersonic X-15 research plane, scheduled to fly early in 1959. The manned X-15 is designed to attain speeds of a mile per second (3,600 m.p.h.) at altitudes over 100 miles.

The cost of maintaining the various Air Force programs and developing and purchasing advanced weapon systems has continued to rise. For the fiscal year beginning July 1, 1958, the Congress appropriated \$18,672,224,000 (including construction funds) for the Air Force. The trend to increasing cost of the Air Force is markedly shown in a comparison of the fiscal year just past with the one just ahead. The fiscal year 1959 budget allocates about \$4.5 billion (60 percent) for aircraft and nearly \$3 billion (40 percent) for missiles, a ratio reflecting a decided change from the ratio of 75 to 25 percent in fiscal year 1958.

Unlike aircraft, most missiles are nonrecoverable. The ATLAS, for example, costs us nearly \$15 million for each prototype missile, including launching equipment. Even when it gets into production, this ICBM will cost up to \$1.6 million for each missile.

Also indicative of the higher cost of defense were Public Law 85-422, effective June 1, 1958, which provided an increase of at least 6 percent, plus additional pay for skills to encourage capable military personnel to remain in service, and Public Law 85-462, made retroactive to January 1958, providing for an average of 10 percent increase to all civilian employees of the United States Government.

In retrospect, fiscal 1958 was an eventful year for the Air Force—a year of great accomplishments and a year of great problems. Defense costs continued to rise under the combined spur of technological change and powerful economic forces. In the other direction, there was a requirement to keep total defense expenditures sufficiently in hand so as not to affect adversely the civilian economy. The pressures of these two opposing forces upon the military establishment, and upon the Air Force in particular, were perhaps greater than those applied to any other American institution—Government or otherwise.

To achieve the highest possible degree of economy and efficiency in Defense Department operations, the President proposed a plan to streamline the organization. The Air Force, without reservation, supported his plan as a step toward true unification of the Services and believed that these proposals would accomplish the vital objectives of speeding up the decision-making process within the military establishment and tightening command channels. The critical need from the operational standpoint has been that of providing unified direction of our combat forces. Placing the unified and specified commands, which include the Strategic Air Command and the Continental Air Defense Command, under the operational control of the Joint Chiefs of Staff, and clarifying command authority within those commands, improved the ability of the defense establishment to make decisions and react to attack quickly.

The speed and effectiveness with which our fighting commands react to surprise attack may well prove to be the difference between victory and defeat in any future war. This same capacity to react is the surest hope of deterring any would-be aggressor.

## II. *Combat Forces*

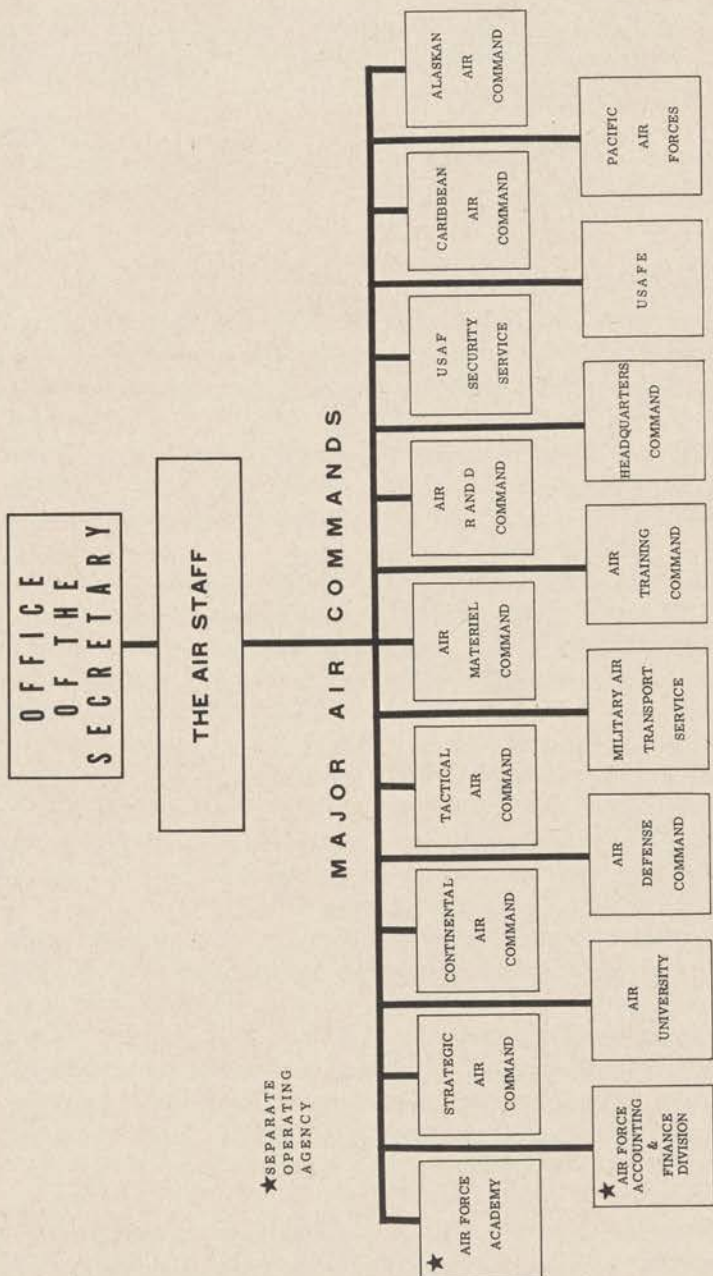
From an operational standpoint there was no more important result to be obtained from the President's proposed reorganization plan than the unified direction of our combat forces. Within its own structure, the Air Force applied the organizational principles it endorsed for the overall military establishment. Overseas, Headquarters U.S. Air Forces in Europe took over direct control of USAF combat units on the continent from its subordinate headquarters—the Twelfth Air Force. To retain the historic Twelfth among its operating units, in January 1958 the Air Force transferred the designation to the Tactical Air Command. TAC made room for the Twelfth by dissolving the Eighteenth Air Force and reallocating all combat units between the Ninth and Twelfth Air Forces.

In the spring of 1958 the Air Training Command eliminated both its Flying Training Air Force and its Technical Training Air Force and consolidated control of all activities in its own headquarters. Previously, in August 1957, the headquarters had moved from Scott Air Force Base, Illinois, to Randolph Air Force Base, Texas. Effective July 1, 1958, the Military Air Transport Service reorganized its Atlantic, Pacific, and Continental Divisions into the Eastern and Western Transport Air Forces. MATS also moved its headquarters from Andrews Air Force Base, Maryland, to Scott Air Force Base in January 1958, making room at Andrews for the Air Research and Development Command, which moved there from Baltimore that same month.

The appointments of Gen. Thomas D. White as Chief of Staff and Gen. Curtis E. LeMay as Vice Chief of Staff on July 1, 1957, assured the Air Force of continuous effective leadership. Gen. Nathan F. Twining became Chairman of the Joint Chiefs of Staff on August 15, 1957.

More than the other military Services, the Air Force has been faced with the necessity of reequipping its combat units at frequent intervals with the more advanced weapons constantly being developed. The costs of weapons for all the Services have been increasing so steadily that military budgets have required an even greater share of our economic resources. Rising costs of government impelled the

DEPARTMENT OF THE AIR FORCE



★SEPARATE OPERATING AGENCY

JUNE 30, 1958

Figure 1

President to place strict limitations on expenditures and manpower during fiscal year 1958.

By the end of June 1958, the number of combat wings had declined to 117. Programed strength by the end of fiscal year 1959 called for 105 wings. The composition of the Air Force follows:

<i>Type Wing</i>	<i>June 30, 1957</i>	<i>June 30, 1958</i>	<i>(Programed) June 30, 1959</i>
Strategic.....	50	44	43
Air Defense.....	32	28	27
Tactical.....	55	45	35
Total Wings.....	137	117	105

A major part of this reduction in combat aircraft wings is being borne by tactical air forces. However, the numerical reduction in combat wings did not portend commensurate reductions of TAC's striking power. Introduction of the F-104C, F-104D, and the F-105, which virtually double the speed of the first generation of supersonic fighters, plus aerial refueling and the use of nuclear weapons, enhanced the striking power of TAC units and added substantially to overall USAF strength.

The 105 wings of 1959 will have at least as much effective striking power as the 137 wings of 1957. In SAC, for instance, the B-52 wings replacing the B-36 wings have 45 planes each instead of 30. Moreover, the superiority of the individual B-52 is great enough to make the ratio of effectiveness of the B-52 wing over the B-36 wing about 3 to 1. The addition of the KC-135 jet tanker for refueling adds still further to the effectiveness of the B-52. The equipment of other wings with advanced aircraft types—F-102, F-104, F-105, B-58—is already having the same effect. More powerful armament in the form of air-to-air and air-to-ground missiles will still further increase the combat power of each wing.

In part, the reduction in manned aircraft wing strength is also the result of a carefully planned program for integration of missiles into the USAF combat forces. The speed with which missile units initially augment and eventually replace a portion of the manned aircraft strength will depend on how soon missiles are proved reliable for combat. The Air Force, therefore, will continue to develop advanced aircraft in order to maintain a mixed force of planes and missiles that will complement each other in performing the vital USAF missions.

Although development and operational responsibility for long-range missiles had been assigned to the Air Force in November 1956, the development of the intermediate-range JUPITER by the Army had raised questions about the responsibility for future development

and operation of IRBM's and even ICBM's. Air Force planning and programming for integration of missiles on a large scale proceeded still more firmly after February 28, 1958, when the Secretary of Defense reaffirmed USAF responsibility for "second-generation" land-based ICBM's and IRBM's.

### **Air Defense**

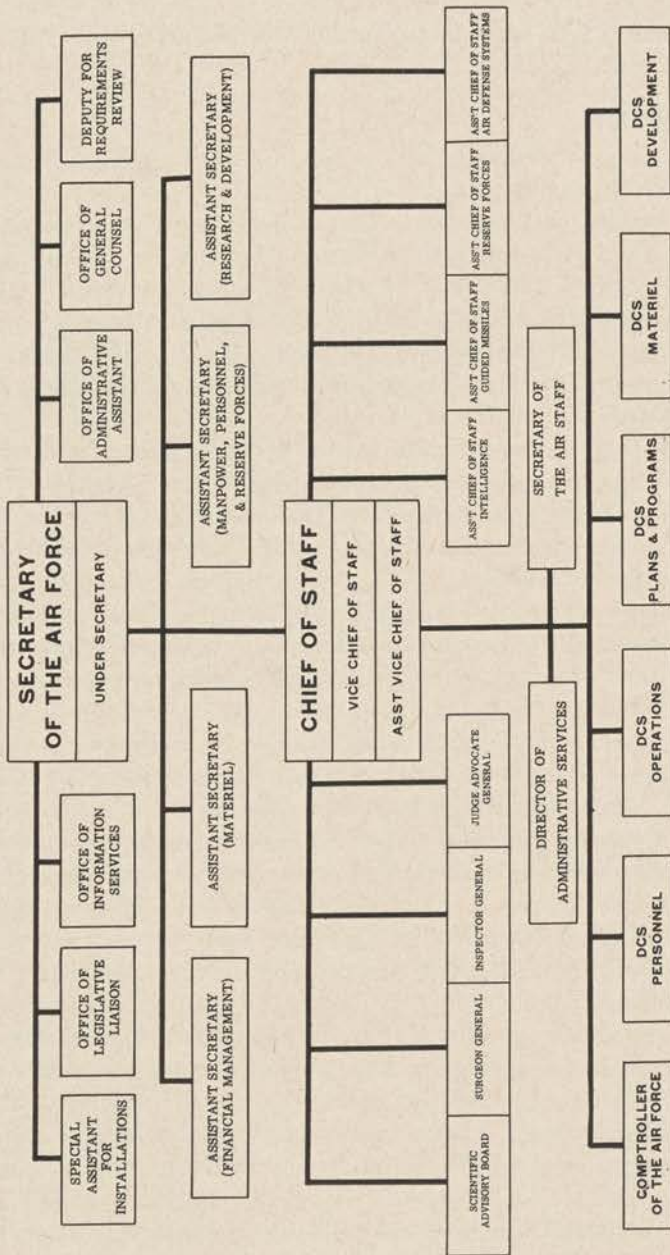
With the establishment of the North American Air Defense Command on September 12, 1957, at Colorado Springs, Colorado, the United States and Canada achieved an integrated headquarters to control air defense operations in accordance with a single plan approved by both countries. On May 12, 1958, the two Governments agreed that NORAD should be maintained for 10 years, or for a shorter period if both Governments consented. NORAD is an important step toward an integrated air defense of the whole Western Hemisphere.

Technology has steadily increased the interdependence of the retaliatory strike force and the air defense force. The growing complexity of air operations demands that the North American Air Defense Command and the Strategic Air Command work closely together. An integrated system of control and coordination is imperative because our air defense system is reaching out beyond this hemisphere and will eventually extend into space. With bombers and interceptor fighters and missiles using the same airspace, the need for integrated control is beyond dispute.

The advent of the intercontinental ballistic missile has complicated the basic air defense function of giving early warning of impending attack. Since the warning time diminishes in direct ratio to the speed of new weapons, it is of paramount importance to have a highly refined early warning system to give us time to put our retaliatory bombers and missiles into the air. At the same time, we must make the utmost effort to attain an active system of air defense—interceptors and missiles—that will greatly diminish the force of a surprise enemy attack.

To meet the threat of the intercontinental ballistic missile, the Air Force had been working on a program designed not only to detect enemy missiles but to create a countermissile that would destroy hostile missiles in flight. In January 1958 the Secretary of Defense directed that the Air Force concentrate its efforts on the detection, warning, and control elements of an anti-ICBM system, while the Army was to continue its development of a countermissile. The two Services were to coordinate their efforts to make certain that the two elements would be compatible.

OFFICE, SECRETARY OF THE AIR FORCE AND THE AIR STAFF



JUNE 30, 1958

Figure 2

Development of the radar and data-handling elements of an anti-ICBM system by the Air Force should proceed naturally from the extensive warning system already in operation. The most northerly warning network—the DEW line above the Arctic Circle—was begun late in 1954 and began operations on July 31, 1957. In February 1958 the Air Defense Command (ADC) assumed responsibility for the operation and support of the land segment of the DEW line. The westward extension of the line, down through the Aleutian Islands chain, was still under construction and under the control of the Alaskan Air Command at the end of June 1958. On the eastern end, the system was being extended from Baffin Island across Greenland. On the flanks of the North American continent, additional coverage was provided as far as Hawaii and the Azores by U.S. Navy picket ships and early-warning aircraft and by USAF early warning and control aircraft operating around the clock. One Texas Tower (fixed radar station) was operating in shoal waters off the northeast coast of the United States during the fiscal year, and two more were scheduled to begin operation before the end of 1958.

The completion of the White Alice Project in Alaska in March 1958 marked an important contribution to the air warning network. White Alice employs "tropospheric scatter" using large antennae resembling outdoor movie screens which beam ultrahigh frequency radio signals into the troposphere. Much as a powerful searchlight beam is partially deflected off a low cloud, part of the radio signal is deflected downward to be trapped in another carefully sited parabolic antenna, then sent leapfrogging to the next antenna which may be as much as 170 miles away. In this manner, the most isolated Arctic posts and headquarters are brought into instant communication, not possible before on account of rugged terrain, severe weather conditions, and assorted magnetic disturbances which exist in Arctic regions.

On June 27, 1958, the first link in the SAGE system—the New York Air Defense Sector—was formally integrated into the Air Defense Command's control network. Operations began on July 1. SAGE incorporates a completely new system that centralizes control of the air battle by the use of automatic electronic devices. This is especially important because the speed of modern weapons has made it impossible for the human mind—either the ground controller's or the pilot's—to make the complex computations required for successful interception and attack. The range of speeds over which the SAGE system can operate is limited to subsonic and supersonic targets. The system cannot track, record, or control attacks against hypersonic missiles. SAGE will be of vital importance because any attack against the United States in the foreseeable future will probably include aircraft and air-breathing missiles.

For many years the volunteer Ground Observer Corps has played an important role in the detection and warning system by spotting low-flying aircraft that could not be picked up by radar. In recent months, automatic gap-filler radars have been placed in many areas to help overcome previous low-altitude electronic deficiencies. As these radars operate automatically with greater speed and more efficiency than human observers, the burden on the Ground Observer Corps has been eased. On January 1, 1958, the Corps was placed on a ready reserve basis, leading to a reduction in the number of hours that posts were manned. As of June 30, 1958, none of the 10,000 observation posts was manned on a 24-hour basis, but some 350,000 volunteers stood ready to man the posts in event of necessity.

Technology has also produced changes in the equipment of USAF units charged with the second basic mission of air defense—destruction of enemy aircraft and missiles. F-102's have been in operational units since the summer of 1956, and F-104's began coming in during fiscal year 1958. The Air Defense Command will have largely a force of supersonic interceptors when it receives its full complement of F-101's, F-102A's, F-104's, and F-106's. The reequipment process is expected to be completed within a 3-year period. An F-104 Starfighter reached a record altitude of 91,249 feet on May 7, 1958. Another Starfighter set a new world speed record of 1,404.19 miles per hour on May 16, 1958.

Air Defense Command fighters are also being armed with more powerful weapons, the most significant of which has been the MB-1 GENIE. On July 19, 1957, the Air Force made history when an F-89 Scorpion interceptor fired a GENIE air-to-air rocket with a nuclear warhead over the heads of exposed ground observers at Yucca Flat, Nevada, with no ill effects suffered by them. The GENIE is far more powerful than any other air-to-air missile in use by the Air Force. It can destroy a whole formation of aircraft. In fiscal year 1958 it was being mounted on supersonic F-101B aircraft, and was programmed for use by the F-106.

On July 24, 1957, the FALCON (GAR-2A) rocket was successfully tested. The FALCON fires nonatomic charges at bomber targets which it locates by heat-seeking devices not susceptible to guidance-jamming.

The SIDEWINDER (GAR-8), developed by the U.S. Navy, is another effective air-to-air missile. With the advent of the F-104 it became operational as an interceptor weapon. SIDEWINDER has a minimum of moving parts and does not need complex launching equipment. It has an infrared system and homes on heat radiation from the tailpipe of its target.

At fields across the country, up to 20 Air National Guard (ANG) squadrons continued to stand daylight runway alerts, augmenting ADC interceptor strength. ADC requested that six of the squadrons be placed on 24-hour alerts, putting them in the same status as squadrons of the active forces. Two squadrons were actually on 24-hour alerts as of July 1, 1958. Plans call for annual rotation of ANG interceptor squadrons on runway alerts—20 at a time. ADC's requirement for squadrons in particular locations is the governing consideration which may delay or possibly preclude giving some of the squadrons this valuable experience. The introduction of more modern fighters has already begun to increase the effectiveness of the ANG interceptor squadrons.

The first USAF surface-to-air guided interceptor missile is the IM-99A BOMARC, which is expected to be operational in 1959. This rocket-launched ramjet missile has speeds above Mach 2 and an initial range of 200 miles. The first BOMARC training unit was organized at Eglin Air Force Base, Florida, in January 1958. BOMARC is an area defense missile, and extensive testing has demonstrated that it will be able to intercept enemy bombers long before they approach their targets. Operating in conjunction with SAGE, the IM-99A will greatly improve the Air Force's capability for area defense. By the end of June 1958 the first 4 BOMARC installations were under construction in the northeastern part of the United States, and sites had been selected for 10 more. Wherever possible, BOMARC sites are being built on or adjacent to other Air Force installations, which will save the cost of constructing new housing and support facilities.

### **Strategic Air Command**

The prime military need of the United States continues to be the existence of a powerful nuclear retaliatory force. The Strategic Air Command has met this requirement for more than a decade, but it faces now the greatest challenge in its history. SAC's ability to carry out its mission is threatened by the advent of the intercontinental ballistic missile. The reduction of warning time to 15 minutes in the era of the ICBM requires a degree of sustained alert probably never before attained by, or demanded of, any military force.

SAC made good progress toward the goal of keeping one-third of its strike force on 15-minute alert. A growing number of bombers, fully fueled and armed and with crews and supporting elements on a continuous alert, were kept ready to take off on short notice. And ceaseless training exercises kept a substantial number of SAC bombers in the air at all times. These exercises were carefully controlled, as would be the alert force if it were launched on warning of impending attack. The positive control procedure in force would

make certain that no SAC bomber would pass beyond certain points remote from enemy soil without additional, unequivocal orders from the President.

To attain the alert force desired will require further dispersal of SAC bases. A top-priority program called for dispersal of 15 B-52's and 10 KC-135 jet tankers at each of 35 bases. In addition, KC-97 nonjet tankers will be stationed at bases in the northern part of the United States. Since bases housing two B-47 wings cannot possibly meet the 15-minute alert time with the required one-third of their bomber complement, some dispersal of B-47 wings will take place also.

SAC's worldwide communications network was a vital link in its alert chain. From its subterranean control center near Omaha, Nebraska, SAC maintained effective contact with its bases, units, and more than 200,000 officers and airmen. It kept close touch with those of its 2,700 bombers and tankers that might be flying anywhere in the world during combat exercises and deployments.

SAC's alert system necessarily incorporates a high degree of security that must be continuously maintained at SAC bases. Base security measures are tested frequently by SAC teams using almost every tactic that saboteurs might devise. Realistic in every respect, these exercises have effectively served to keep taut SAC security against sabotage.

Despite their increasing vulnerability to attack—especially from intermediate-range ballistic missiles—the oversea bases remained a valuable part of SAC's pattern of operations. They added substantially to the number of bases among which SAC's forces could be dispersed, for bomber units were continuously flying overseas in the course of rotational training. The occupation of the complex of bases in Spain during the year added to SAC's operational flexibility.

This flexibility will be further enhanced by the use of mixed forces of missiles and bombers which can provide relative invulnerability or greater reliability, or both. Moreover, this versatility will be improved by advanced bombers. The supersonic B-58 Hustler, already in production, will soon replace some medium B-47's in SAC units.

When B-52's replace the last B-36's during fiscal year 1959, SAC will have an all-jet bomber force. The B-52 has been steadily improved in its later models. The B-52E, which entered the inventory during fiscal year 1958, has new and improved bombing, navigation, and electronic systems. The B-52G, already in production, has greater range than any of its predecessors, permitting it to make non-stop, round-trip, unrefueled flights against intercontinental targets from advanced bases in the Western Hemisphere. Next year B-52G

units will enter SAC equipped to carry the GAM-77 HOUND DOG supersonic guided missile that can be released in flight hundreds of miles from target. Beyond the B-52, the B-70 Valkyrie, still in its infancy, already promises the most striking advance in manned bombers yet. Using special high-energy fuels, this heavy bomber is



*Figure 3. B-58 Hustler with disposable pod.*

expected to have an intercontinental radius of action at speeds of 2,000 miles and more per hour.

The addition of a substantial and growing number of KC-135 jet tankers to the ready force greatly improves the refueling capability on which SAC depends. These fast, high-flying tankers can refuel B-52's flying 500 miles per hour at heights of 35,000 feet or more. On November 11-12, 1957, a KC-135 set a world's nonstop flight record for jet aircraft from Westover Air Force Base, Massachusetts, to Buenos Aires, Argentina—6,350 statute miles in 13 hours and 2 minutes. A few days later, B-52's dramatically demonstrated their ability to fly nonstop anywhere in the world with the aid of refueling. They flew a round trip between Homestead Air Force Base, Florida, and Buenos Aires—on November 16-17—a distance of 10,600 miles in 22 hours. They were refueled by KC-97's and KC-135's during the long flight. In April 1958 a KC-135 set a nonstop, nonrefueled distance record for jet aircraft when it flew 10,228 miles from Tokyo east to Lajes Field in the Azores.

The transition from an all-bomber to a missile-bomber force has been orderly and gradual. There will be no period when our deterrent strength will be weakened. During fiscal year 1958 the Air

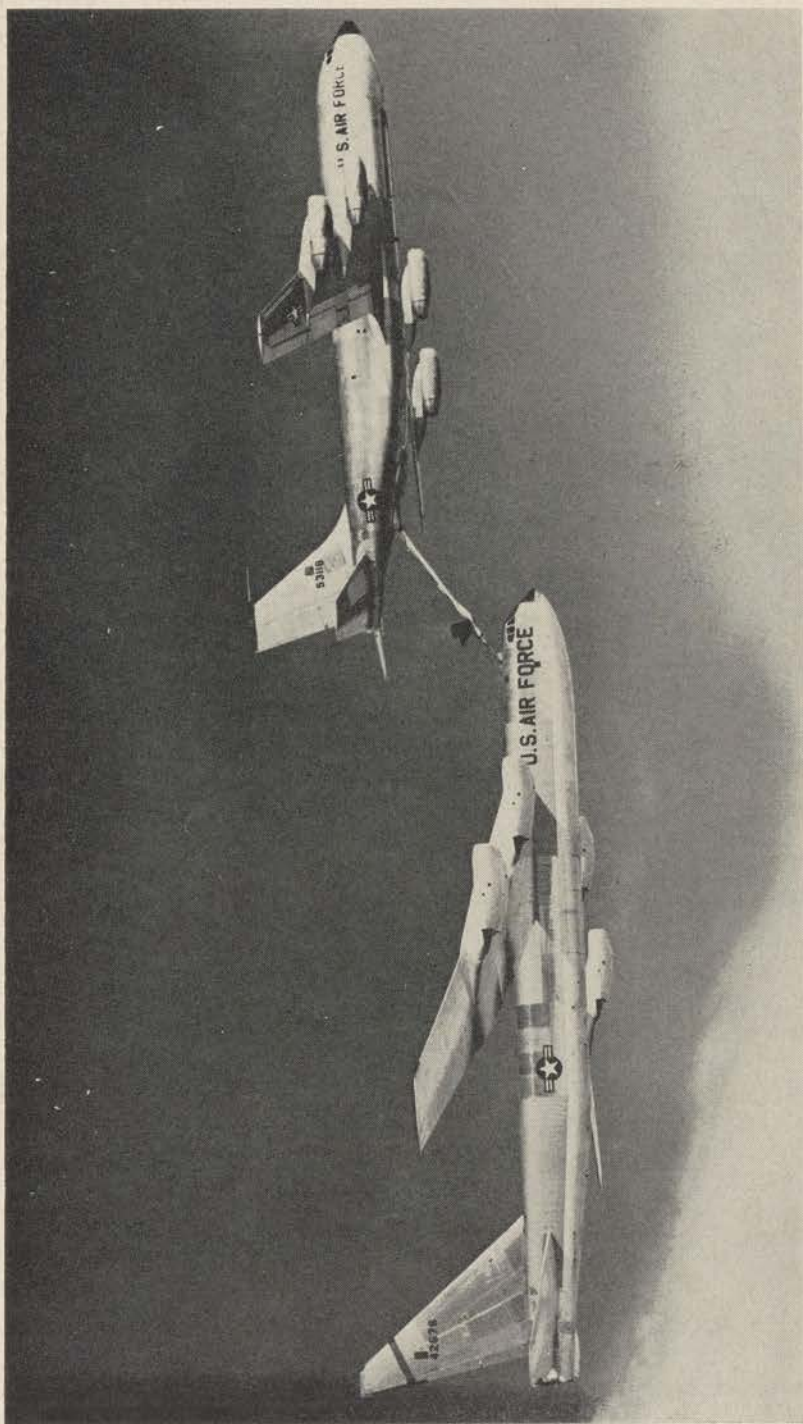


Figure 4. KC-135 jet tanker refuels B-52.



*Figure 5. SM-75 THOR IRBM.*

Force activated 4 strategic missile squadrons, 2 missile training squadrons, 1 missile technical training squadron, and 3 strategic missile wings. In November 1957, the Air Force officially gave SAC responsibility for the operation of intermediate and intercontinental ballistic missiles.

The first strategic missile squadron—the 556th—was activated at Patrick Air Force Base, Florida, in December 1957 and assigned to the Eighth Air Force. The squadron began firing the SM-62 SNARK intercontinental cruise missile in operational tests in June

1958. An operational site for SNARK is being prepared at Presque Isle Air Force Base, Maine.

In May 1958 the first of 1,700 British personnel of the Royal Air Force, which will operate the SM-75 THOR IRBM, began training in the United States. The THOR missile, already in assembly-line production, was expected to be sited in the United Kingdom before the end of calendar year 1958, pursuant to an agreement between the British and American Governments. The United States will provide the missiles, and the British will build and man the sites. USAF units were also being trained to operate the THOR. One USAF strategic missile squadron was training at the Army Missile Center at Huntsville, Alabama, to operate the Army-developed JUPITER IRBM, comparable to the THOR in performance.

On the basis of the steady progress in development of ICBM's, the Air Force began construction of sites and to provide supporting services for both the ATLAS and the TITAN. The first ATLAS squadron—the 576th Strategic Missile Squadron—is expected to be operational by the end of 1959. In January 1958, SAC took over the 1st Missile Division, located at Cooke Air Force Base, California, from the Air Research and Development Command. The division assumed responsibility for training, logistics, and other aspects of ballistic missile operations. Cooke Air Force Base became the training center for USAF missile crews. The Air Force drew plans for building ICBM sites at Francis E. Warren AFB, Wyoming, Offutt AFB, Nebraska, Fairchild AFB, Washington, and at a location near Lowry AFB, Colorado. This last site was intended for use by the TITAN.

### **Tactical Air**

Tactical air, previously the largest single element in the Air Force, sustained a heavier reduction in number of units than either strategic air or air defense during fiscal year 1958, although it still had more combat wings at the end of June 1958 than SAC and ADC. By the end of another year, tactical air units will be second in number of wings to strategic air.

The two major oversea commands—United States Air Forces in Europe and Pacific Air Forces—had strong tactical air elements under their control, although the hard core of tactical air strength remained with the Tactical Air Command in the United States. The Nineteenth Air Force served as a mobile headquarters, charged with assembling, deploying, and commanding Composite Air Strike Forces.

TAC's versatility as a fighting force for any kind of war was enhanced by its ability to deliver nuclear weapons as well as high ex-

plosives. The command redesignated its fighter-day and fighter-bomber units as tactical fighter units.

The greater USAF ability to deploy tailored tactical air strike forces anywhere in the world in a matter of hours was amply demonstrated during the year in Exercise MOBILE ZEBRA, discussed in the Introduction.

In the United States, TAC and the Army jointly conducted a number of training exercises and maneuvers. In Operation ALL-AMERICAN in December 1957, more than 100 Ninth Air Force troop carrier aircraft dropped paratroops and airlifted other troops and heavy equipment of the Army's 82d Airborne Division. F-100 Super Sabre's gave close support to the ground forces, while RF-101 Voodoo's provided photographic reconnaissance. Other joint exercises with the Army, including some under assumed conditions of atomic warfare, took place in March, April, and May of 1958.

TAC continued to supply the crews and units that formed the basis of NATO air strength in Europe. United States airpower in Europe was maintained at a high level not only by the assignment of fighter-bomber and light bomber units to USAFE, but also by the deployment of TAC units for rotational training periods of 6 months. In March 1958 the 457th Fighter-Bomber Squadron flew nonstop across the Atlantic to North Africa, and from there to Germany for a 6-month tour of duty. In June the first TAC fighter unit to be deployed to Spain—the 1st Fighter-Day Squadron—arrived at Morón Air Base, near Seville. It was placed under operational control of SAC's Sixteenth Air Force for 6 months to help defend USAF bases in Spain.

New aircraft and missiles continued to flow into TAC's combat units. Beyond the supersonic F-100 and F-101A with which fighter units were equipped during the year, TAC looked to the F-105 Thunderchief designed specifically for the tactical fighter mission. This better-than-Mach 2 fighter has an aerial refueling system, a limited all-weather attack system, an internal bomb bay, and powerful armament including air-to-air and air-to-surface missiles. By using its own fighter pilots to put the versatile F-105 through its tactical tests at Eglin Air Force Base, Florida, TAC planned to cut by 1 to 2 years the time required to make the plane combat-ready. In addition to the F-105, TAC expected to add a tactical version of the F-104 Starfighter to its complement of fighters during 1959.

From its missile training center at Orlando Air Force Base, Florida, TAC had been deploying MATADOR missile units to oversea areas since 1954. On its way to operational status by the end of June 1958, the TM-76A MACE, equipped with a new and superior guidance system, was replacing and supplementing the MATADOR.

By the end of fiscal year 1958 the Tactical Air Command had made substantial progress toward a balanced force of missile and manned planes, all of them in stages of increasing mobility which would permit their deployment on a worldwide basis within days—or even hours—after being ordered to do so.

### **Military Air Transport Service**

To be prepared to provide airlift for the Department of Defense in time of war, the Military Air Transport Service must engage in extensive transport operations in time of peace. During the past year MATS continued to operate over more than 100,000 miles of global air routes, carrying mail, equipment, supplies, and passengers to all parts of the world.

The Command's ability to provide airlift in peacetime was improved in July 1957 by the addition of the equivalent of four groups of heavy troop carriers from TAC. Largely as a result of this transfer, MATS increased its 4-engine transport fleet on hand from 488 planes to 581, although its total inventory on hand declined from 1,359 to 1,194 planes. A big increase in capacity resulted from the addition of a large number of huge C-124's, which comprised well over half of the total 4-engine fleet by the end of June 1958. The C-124 carries a far larger payload than the plane it replaced—the C-54, long the workhorse of the MATS fleet.

A small number of C-133 Cargomaster turboprop transports—a plane with greater speed, range, and payload than other MATS transports—began operations during the year. In December 1957, a C-133 set a record for carrying freight overseas when it airlifted 86,728 pounds of priority cargo from Dover Air Force Base, Delaware, to Goose Air Base, Labrador. Another C-133 set a transatlantic speed record for transports in January 1958 when it flew from Dover Air Force Base to Chateauroux Air Station, France, in 10 hours and 21 minutes.

MATS continued to provide transports for a variety of special airlifts. During the fall of 1957, eight C-124's based in New Zealand airlifted 1,015 tons of cargo in support of Operation DEEP FREEZE in the United States expedition to the Antarctic. This involved air-drops over the South Pole and Byrd Station. Other MATS planes participated in the airlift of supplies and equipment to two ice islands in the Arctic in connection with the IGY.

MATS maintained its excellent safety record. Records for major accidents per 100,000 flying hours in calendar year 1957 indicated 3.9 for all types of operations, and 1.08 for transport operations, the lowest rate yet attained by MATS. The rate declined substantially

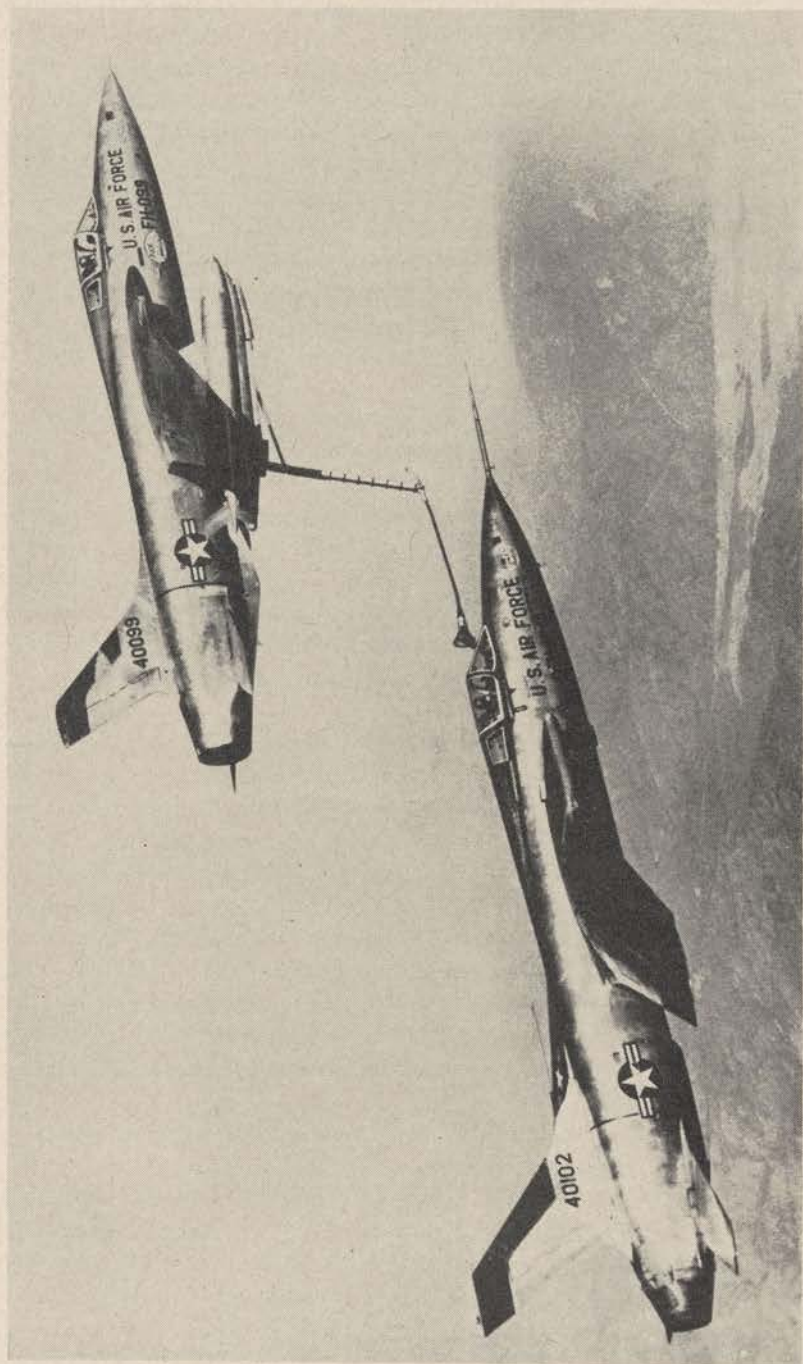


Figure 6. F-105 Thunderchiefs use "buddy" system to refuel.

further to 0.77 per 100,000 flying hours for scheduled transport operations between January and June 1958.

During fiscal year 1958, MATS operations continued to grow. For the first time MATS and its contract commercial carriers flew in excess of 1,000,000,000 ton-miles, reaching almost 1,020,000,000, a rise of 9 percent over the 935,000,000 ton-miles flown in fiscal year 1957. Of the 300,000 tons of passengers, cargo, and mail carried during the year, commercial carriers lifted some 48,000. World passenger traffic rose to 1,049,000 during the year, an increase of 83,000 over 1957. Contract commercial planes carried a third of the passengers as compared with 25 percent in 1957.

### **Air Traffic Control**

At any given moment of the day or night, the Air Force has between 1,100 and 1,300 aircraft airborne somewhere in the world—the majority of them in and around the United States. Additional hundreds of commercial and private aircraft use the skies over the United States constantly. Midair accidents and near misses involving both military and commercial planes in recent years have shown clearly that the ocean of the air is not limitless and can become overcrowded. Both military and civilian aircraft have legitimate and proper claims to the use of the airways and must be given a share of the national airspace.

After long study and investigation of the problem by both the executive and legislative branches of the Government, Congress established the Airways Modernization Board (AMB) in August 1957. To meet the requirements of all users of United States airspace for a modern navigational and air traffic-control system, the President gave the board responsibility for developing and testing major USAF navigational aid systems. As the Department of Defense representative, the Air Force strongly supported the board with personnel and funds. The Air Force also supported legislation in the second session of the 85th Congress providing for the establishment of a Federal Aviation Agency to manage the common needs of United States military and civil aviation.

The Air Force and the Civil Aeronautics Administration continue to work closely to establish more effective control of air traffic throughout the United States. CAA and the Air Defense Command agree on the joint operation of new high-power, long-range radar facilities at 31 locations, with additional facilities scheduled for the future. The equipment will be used for air traffic control by CAA and for air defense by the Air Force, Army, and National Guard. As a result of two midair collisions involving military jet aircraft flying in local training areas, the Air Force and CAA joined in a complete

review of procedures for control of flying in such areas. Procedures developed as a result of this study will be applied at all USAF bases in the United States.

At the end of May 1958 jets were forbidden to use civil airports except in case of necessity. In June the Air Force directed that its more than 13,000 nontactical aircraft be painted in a conspicuous orange color to make them more readily visible.

To attain safer and more effective control of the airways the Air Force voluntarily instituted a system for reporting and analyzing near misses to determine the reasons for the incidents and to develop constructive measures for minimizing them. In September 1957 Air Force jet pilots were forbidden to make high-speed descents on airways during routine operations.

### III. Personnel

USAF force objectives and both military and civilian manpower goals were cut back during the year. Important improvements in the military pay system and the airman grade structure resulted from the adoption by Congress of many of the Cordiner Board recommendations and their inclusion in the Pay Act of 1958. The augmentation of the Regular Air Force officer corps during the year was also expected to have important long-range effects.

#### Military Personnel

##### *Reduction of Military Strength*

Military strength declined from 919,835 on July 1, 1957, to 871,156 on June 30, 1958, well below the 875,000 authorized by the Department of Defense. This total included 132,939 officers and 738,217 airmen—634,188 stationed in the United States and 236,968 overseas.

The Air Force took a variety of actions to reduce manpower requirements—eliminating or reducing some existing or planned activities.



### USAF PERSONNEL STRENGTH

ON ACTIVE DUTY AS OF JUNE 30

	1957	1958
AIRMEN	779,272	738,217
OFFICERS	140,563	132,939
MILITARY TOTAL	919,835	871,156
CIVILIAN (DIRECT HIRE)	340,326	315,806
CIVILIAN (FOREIGN CONTRACT)	76,259	56,883
CIVILIAN TOTAL	416,585	372,689

Figure 7

In addition, each command analyzed its manpower requirements, using techniques developed by the Inspector General. The result permitted more reductions not readily discernible by Headquarters USAF. Through these and other more drastic actions—such as a reduction of 16 percent in personnel at all headquarters above wing level—manpower was conserved for high-priority activities, including modernization of weapon systems, acceleration of the ballistic missile program, and dispersal of SAC alert forces.

### *Reorganizing the Grade Structure*

The Cordiner Report, on which the military pay bill passed by Congress in May 1958 was based, grew largely out of Air Force studies on methods of retaining skilled technicians. The Air Force expects this legislation to reduce the military personnel turnover by attracting and retaining qualified individuals for career service.

To relieve the compression in officer and airman pay scales the act added two new top pay grades in each category. The two new airman grades brought changes in title and insignia. The act also authorized alternate systems of proficiency pay for airmen as well as responsibility pay for captains through colonels. In addition, it removed certain inequities in longevity and retired pay as between active-duty and non-active-duty service. Increased expenditures for military pay were expected to be more than balanced later on by reduced training expenditures and increased efficiency.

The main augmentation of the Regular Air Force officer corps, authorized in July 1956, took place in the spring of 1958. The augmentation boards, in the fall of 1957, had selected 18,540 officers from the reserve forces for appointment. Of these, 17,908 were line officers; 165, chaplain; 201, judge advocate general; 246, medical; and 20, veterinarian. At the end of the fiscal year 16,731 had received Regular commissions, increasing the total of Regular commissioned officers to about 43,000. Further additions in fiscal year 1959 should increase this number to about 47,000, well under either the administrative ceiling of 55,540 or the authorized total of 69,425.

### *Retention and Recruitment*

The Air Force was faced during the year with the requirement to reduce the total number of officers and airmen, and the apparently contradictory requirement to increase the numbers of those with certain scientific and technical skills. Reducing total numbers was easier, although care had to be applied in screening out those of least value to the Air Force. Procurement of new officers and warrant officers was reduced from a goal of 14,830 to 11,389; 6,255 non-

career officers scheduled for separation in 1958 and 1959 were released up to 6 months early; and 1,793 reserve officers were involuntarily retired or separated from active duty.

The procurement goal for airmen with no prior service was reduced from 85,940 to 59,315. Some 38,800 airmen eligible for normal release in fiscal year 1958 were released up to 6 months early; about 21,600 airmen with service expiring in the first quarter of fiscal year 1959 were released during the latter months of fiscal year 1958; and 11,461 airmen with low skill potential were involuntarily separated. A further reduction of airmen in fiscal year 1959 is scheduled to bring total military strength to 850,000.

Retaining highly skilled personnel on active duty was an entirely different problem, the crux of which was to provide sufficient incentive for the skilled technicians who could, for the most part, readily find employment in American industry. The shortage of technically qualified officers was a matter of special concern. The number of such officers who chose to stay on active duty beyond their obligated tours remained relatively small. Altogether, the Air Force lost about 18,350 officers in fiscal year 1958 and forecast a loss of 9,600 in fiscal year 1959. The immediate goal of the officer program was to retain enough highly trained and motivated individuals and potential leaders to operate and direct the complex air warfare systems. Needed were such specialists as pilots, navigators, aircraft controllers, electronics officers, and research and development officers.

The Air Force also continued its aggressive campaign to retain highly skilled airmen. Although the retention rate of needed technicians improved, it still did not keep pace with the Air Force requirement for technicians in the face of technological changes and introduction of advanced equipment. The proficiency pay systems authorized under the new pay act were expected to play an important role in keeping these men in uniform. Administratively, the Air Force planned to allot a greater number of promotion spaces to them.

The airmen reenlistment rates for fiscal years 1955-58 were as follows:

	<i>First term</i>	<i>Career</i>	<i>Overall</i>
Fiscal year 1955.....	14.4	70.2	23.5
Fiscal year 1956.....	29.3	87.9	44.2
Fiscal year 1957.....	36.4	91.4	49.4
Fiscal year 1958.....	39.8	91.8	54.8

A new method of selecting recruits designed to obtain individuals most likely to become useful and long-term members of the Air Force was adopted in April 1958. Under it, personnel were screened for potential usefulness by giving aptitude tests in addition to intelligence-type tests prior to enlistment. The Department of Defense also

authorized the Air Force to reduce the proportion of non-prior-service men in the lowest mental group (IV) from 18 to 12 percent of total recruitment. Actually, other factors during fiscal 1958 brought the actual proportion down from 15 percent to 7.7 percent. All personnel without prior service who enlisted after April 1958 possessed an aptitude relating to some USAF specialty. Airmen already in service who failed to attain a minimum grade or did not progress beyond a desired skill level during their first enlistment were denied reenlistment.

The airman procurement totals from civil life during fiscal year 1958 were—

<i>Classification</i>	<i>Objective <sup>a</sup></i>	<i>Number obtained</i>	<i>Percent of objective</i>
Nonprior Service (Q.D.)-----	59,315	59,184	99.8
Prior Service <sup>b</sup> -----	19,061	19,766	103.7
WAF-----	3,000	3,236	107.9
Air Force Reserve <sup>c</sup> Nonprior Service-----	4,130	2,992	72.4
Total-----	85,506	85,178	99.6

<sup>a</sup> Operating Program, April 24, 1958.

<sup>b</sup> Includes all enlistees from other Services and airmen with more than 90-day break since discharge.

<sup>c</sup> Includes reservists with noncritical skills for 6 months' active duty and a smaller number of reservists with critical skills for 3 months' active duty.

#### *Women in the Air Force*

The WAF strength on June 30, 1958, was 7,889 (672 officers, 5 warrant officers, and 7,212 airmen), which represented a decrease of 204 from the previous year. Final selection of all WAF airman recruits continued to be made on a centralized basis. Although the enlistment rate for WAF airmen was satisfactory, the high rate of attrition among first-team enlistees was a matter of some concern.

The total WAF officer strength increased by 42. Under the direct appointment program, 131 WAF officers entered active duty. Sixty-three out of two hundred applicants were awarded Regular Air Force commissions under the augmentation program. The first four officers commissioned under the WAF-ROTC program were graduated in June 1958 and entered on active duty. This program will be limited to 10 institutions.

During June 1958 all commands commemorated the 10th anniversary of Women in the Air Force.

#### **Civilian Personnel**

The number of civilians directly employed by the Air Force dropped during fiscal year 1958 from 340,326 to 315,806, a decrease of 7.2 percent. The ratio of 54 percent Wage Board (blue collar) workers to 46 percent Classification Act (white collar) workers remained almost stationary.

Overseas, the Air Force employed 24,127 foreign nationals, 63 percent of the 38,485 directly employed workers. In addition, 56,883 other foreign nationals were employed under contract or through agreements with other Governments.

Turnover continued high among civilian employees in nearly all categories. The number of new direct-hire employees during the year—54,374—was 15,000 fewer than in fiscal year 1957 and 50,000 fewer than in fiscal year 1956. The new hirings were balanced against 79,348 separations during the year, of which resignations accounted for about 36,000, or 45 percent, and reductions in force accounted for about 19,000, or 24 percent.

Emphasis continued on methods of attracting and retaining competent scientific, technical, and professional personnel. Increased initial salaries for certain scientific positions, the use of paid advertising, and a general easing of the labor market had a favorable effect on recruiting such employees. A recently completed attitude survey of scientific and management personnel, a current study of the management needs of scientists and engineers, and continuing analysis of the causes of voluntary turnover are expected to provide the basis for more effective utilization of professional personnel. A large number of professional employees enrolled in short-term courses in colleges and industrial organizations in order to keep abreast of the latest technological developments in their fields of specialization. Under a new arrangement the Air Force approved the participation of 11 selected individuals in long-term graduate study and research.

In June 1958 the Army-Air Force Wage Board approved a plan revising the grade structure for nonsupervisory Wage Board employees. Reducing the number of grades from 28 to 15, the new structure provides greater uniformity among Government agencies and simplifies the administration of the Wage Board pay system. Revised grading will be inaugurated on an area basis as new wage schedules are issued, with completion expected by the third quarter of fiscal year 1960.

As a result of decentralization in November 1957, 86 installations in ADC, AMC, MATS, and SAC began recruiting for oversea vacancies. Of these installations, 26 were designated as oversea employment offices, recruiting for all USAF vacancies overseas, while the remainder recruited only for vacancies submitted by their command headquarters.

The Air Force reached an agreement with the Civil Service Commission in September 1957 that established a "quality control" approach for the Commission's periodic evaluation of the USAF civilian personnel program. This approach reduces substantially the number of independent inspections by the Commission, since it relies heavily on Air Force survey reports.

In accord with new Civil Service Commission requirements, Air Force pilot studies were underway at 15 bases to develop details for a systematized merit promotion program for civilian employees.

A Civil Service Commission report revealed that the Air Force led all Federal agencies in the employment of physically handicapped workers during 1956 and 1957 with a rate of 1.66 percent of all USAF hirings.

Although the 18.8 percent participation rate in the Air Force employee incentive awards program in January 1958 was the lowest experienced in the previous 3 years, an estimated \$37.5 million in first-year benefits was realized from the program during fiscal year 1958. In addition to 18,798 suggestions adopted, 9,626 employees received recognition for superior work performance or special services under other provisions of the awards program.

## IV. Military Training

In fiscal year 1958, the Air Force adjusted its training programs for the regular establishment and the reserve forces in order to conform to reduced wing goals and manpower ceilings. Graduations from the training programs declined substantially, especially in flying and technical training. The main expansion of training was in the advanced technical areas, particularly those concerned with ballistic missiles and exploration of space.

### Flying Training

The number of pilots trained by the Air Force during fiscal year 1958 declined to 4,207 as compared to 5,858 for the preceding year. Of these, 3,618 were Air Force, 371 Air National Guard, and 218 foreign nationals for countries in the military assistance programs. Aside from the reduced force objectives, a principal factor in this marked decline was the inauguration at the beginning of the year of

## UTILIZATION OF MANPOWER

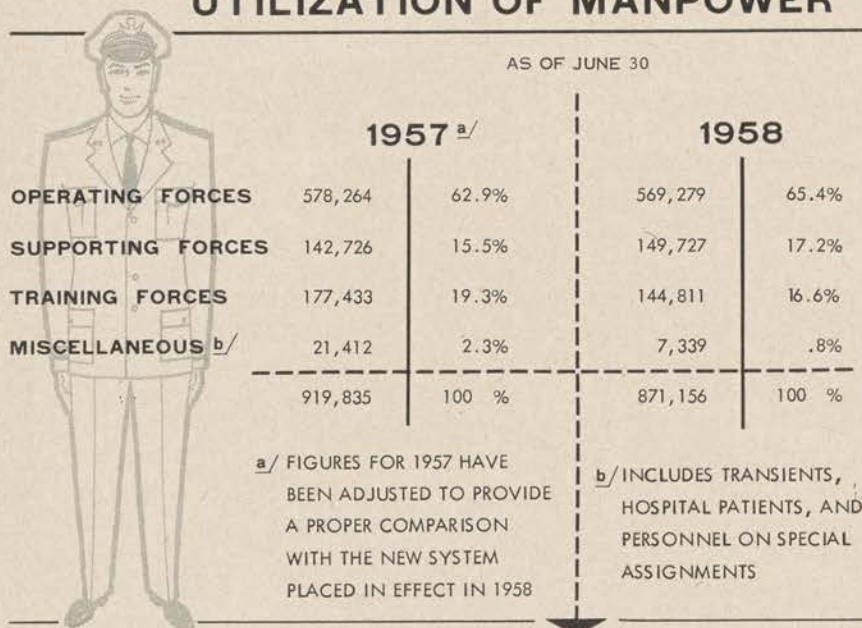


Figure 8

a new policy under which all USAF pilot training graduates would serve a minimum of 4 years. This policy was intended to stabilize the pilot cadre by reducing the turnover rate. With this in mind the USAF pilot training objective was reduced from 3,300 to 2,700 per year. Primary schools were correspondingly reduced from seven to six and basic schools from seven to five.

The Air Force was rapidly approaching its objective of an all-jet pilot training program at the end of the fiscal year, with 148 T-37 jet primary trainers already in the inventory. Bainbridge Air Base, Georgia, had already converted to regular jet primary training, with Graham and Bartow Air Bases in Florida starting to use T-37's. Reese AFB, Texas, and Vance AFB, Oklahoma, were in the process of converting to T-33 jet aircraft, and pilot training in conventional multiengine planes was coming to an end. Fighter training, employing F-84's, F-86's, and F-100's, went on at three bases, with 1,122 students graduated during the fiscal year, of whom 188 were under the military assistance programs. On July 1, 1958, the entire fighter training complex was transferred to the Tactical Air Command by the Air Training Command. At the same time B-47 and KC-97 training was transferred to SAC. ATC interceptor training bases graduated 600, including 72 Air National Guard students.

The number of navigator graduates declined from 2,863 to 2,180, of whom 2,112 were Air Force, 53 Air National Guard, and 15 foreign nationals for countries in the military assistance programs. The principal navigator training problems centered around Air Force efforts to obtain improved equipment and aircraft adapted to new navigation systems and techniques. The Air Training Command was directed to teach inertial, doppler, and automatic astro types of navigation. Meanwhile, the Air Force established requirements for the

<b>TRAINING GRADUATES</b>		<b>1957</b>	<b>1958</b>
<b>PILOTS</b> _____		5,858	4,207
<b>NAVIGATORS</b> _____		2,863	2,169
<b>TECHNICAL</b> _____ (USAF AIRMEN)		111,649	65,400

Figure 9

UCX, an advanced trainer suited for instruction in such navigation techniques and also for utility and cargo use.

The helicopter training school at Stead AFB, Nevada, graduated 223 students.

USAF flying trainees—pilots and navigators—continued to come from three main sources: The AFROTC, aviation cadets, and officers training in grade. Graduates from these sources numbered 3,427, 1,224, and 1,079, respectively, during fiscal year 1958, as compared with 5,756, 1,586, and 782 for the preceding fiscal year. A decline in the number of AFROTC trainees followed the extension of the active duty period to 4 years after completion of the training course. Coincidental with this tour extension, a reduction in the flying training rate was possible. Consequently, the deficiency in the number of trainees was of lesser magnitude than would have been expected otherwise. To meet the remaining deficiency, the aviation cadet program was to be enlarged considerably for fiscal year 1959.

The Air Force sought to raise the quality of aviation cadets by giving first priority to college graduates and second priority to those with 2 or more years of college. As a result of these measures the number of fully qualified applicants with college education increased during fiscal year 1958 from 25 percent to 43 percent.

Officers training in grade for pilot rating declined in number but increased as a percentage of the overall program. Applications from navigators for pilot training were temporarily suspended.

### **Technical Training**

During fiscal year 1958 only 76,434 airmen completed technical training, as compared with 103,499 the previous year. This sharp reduction resulted from the cut in USAF military manpower and the release of a large number of civilian employees, including technical school instructors, by the Air Training Command. The reduction made possible the release of two bases—Scott and Francis E. Warren—for other Air Force uses and the consolidation of technical training at six remaining bases.

The Air Force continued to improve the quality of technical training. ATC began to check graduates of technical courses against job training standards, which indicated the level of proficiency to be expected of airmen working at various skill levels. ATC directed the technical training wings to strive for a goal of 80 percent of all graduates qualified in all items of the job training standards. Although ATC had for some time used questionnaires to carry out regular surveys of the performance of technical school graduates on the job, major air commanders were notified during the year that they

were responsible for continuously evaluating these graduates and recommending to ATC ways of correcting any deficiencies observed.

During the year the retraining program for higher-grade non-commissioned officers, established in January 1957, was expanded to include all career airmen. The program involved the retraining of surplus airmen with noncritical skills for reassignment to technical jobs in which there were shortages. In fiscal year 1958, 5,400 non-commissioned officers graduated from formal technical schools under this program and were assigned to on-the-job training to qualify for supervisory positions in their new technical specialties. Approximately 8,000 airmen were approved for retraining during the year, and another 12,500 were scheduled for selection during fiscal year 1959.

### Reserve Forces

Combat readiness of the Air Force Reserve (AFR) and the Air National Guard (ANG) in accord with their D-day readiness roles is the primary objective of the air reserve forces program. At the end of June 1958 the AFR numbered 489,988, including 125,183 officers and 364,805 airmen—a total increase of about 68,000 over the previous year. By far the greater part of the Reserve—275,179—remained in the Standby category. The ANG numbered 69,995, including 8,354 officers and 61,641 airmen, an increase of about 2,000 over the preceding year.

In September 1957, after long study, the Air Force launched a reorganization designed to improve the combat effectiveness of the AFR and the ANG. This program called for reducing the ANG structure from 27 wings and 9 support squadrons to 24 wings and 9 support squadrons, and the AFR from 24 wings and 3 support squadrons to 15 wings and 5 support squadrons. The AFR's six fighter-bomber wings were deleted, leaving it as a troop carrier organization except for five air rescue squadrons.

The Air Force tried to absorb the personnel from deleted units into those retained. When this could not be done, excess reservists were encouraged to apply for mobilization assignments.

The Continental Air Command, in charge of reserve training, began reorganizing the reserve center training structure to provide for more economical operation and centralized control. Under the new plan, the reserve training wings each have three to seven numbered Air Reserve Centers and are staffed with active-duty personnel. The individual reservists are organized into air reserve groups and squadrons and placed under the Air Reserve Centers for administrative pur-

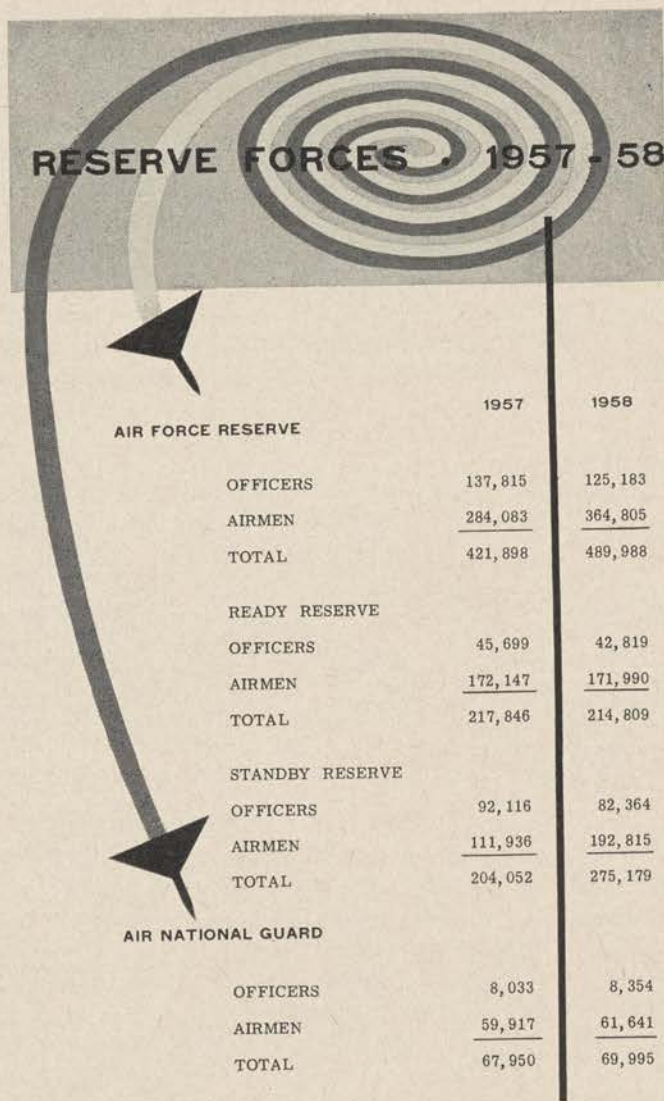


Figure 10

poses. The reserve center reorganization was expected to make for substantial improvement in supervision and quality of training.

In June 1958 the number of air guardsmen and reservists programmed to receive inactive drill pay was reduced from 165,000 to 135,000. As a result, some 10,000 Ready reservists participating in the individual training program were removed from drill pay status.

The Air Reserve Technician Program, patterned after the successful ANG program, began in January 1958. It provides full-time

support to AFR flying wings by employing civilian technicians who are also reservist members of the units they serve. ART is expected to improve the training and readiness of the reserve troop carrier units and to encourage participation by reservists. The Air Force made available some 4,700 manpower spaces to carry out ART at 35 of the 37 reserve wing flying locations.

As of June 30, 1958, AFR units had 662 aircraft for 15 troop carrier wings, 5 air rescue squadrons, and 19 navigator training units. Included were 591 C-46's and C-119's employed in the basic troop carrier mission and 71 TC-47's, SA-16's, and C-45's used respectively by the navigator squadrons, the air rescue squadrons, and for command support. The ANG had on hand 2,248 aircraft of 2,640 authorized, assigned to its 24 tactical air wings, and 1 air transport, 4 aero-medical, and 4 troop carrier squadrons. New types added during the year were the F-86H and L, F-89H, F-100, B-57, and C-119.

Materiel shortages continued to affect the reserve forces. In the AFR the lack of C-119 ground support equipment handicapped both operations and maintenance. The shortage resulted from the conversion of all AFR units to troop carrier and air rescue operations, which both increased the number of C-119's in use and distributed them over a larger number of locations. Neither purchases nor deliveries of the new equipment kept pace with the changeover. The ANG received approximately 90 percent of required equipment items, even though the conversion to modern all-weather fighter and tactical reconnaissance aircraft created a great demand for new types of equipment and supplies. There were some shortages of certain communication, electronic-test, and ground-handling equipment, but these did not seriously retard the training program.

Reduction from 59 to 37 flying locations lowered requirements for AFR construction during the fiscal year from the \$20 million authorized to \$17 million. This money went largely for construction of parking aprons for troop carrier aircraft at 11 flying locations where only partial facilities had been provided. The balance was for a permanent Air Reserve Center building at Wilkes-Barre, Pennsylvania. Reduction of the ANG from 27 to 24 wings did not cut down the number of flying locations. The 93 flying and 41 nonflying locations required were all activated by the end of the fiscal year.

The AFR continued to support the Tactical Air Command. Operation SWIFTLIFT, which was started on April 15, 1957, combined the cross-country training of aircrews with the airlift of cargo and personnel. For the most part, the cargo consisted of high-value, high-priority items, such as jet engines for the Air Materiel Command which could not be flown in an assembled condition in commercial cargo aircraft. SWIFTLIFT moved only outsized items or

security cargo that had to be transported by military aircraft. During fiscal year 1958, Operation SWIFTLIFT completed 502 missions, airlifting 7,483 passengers and 4,900,000 pounds of cargo. The missions were all flown by reservists, training to fulfill their wartime role.

### **Professional Education**

Enrollment in the Air Force Reserve Officers Training Corps (AFROTC), the principal source of new USAF officers, stood at 97,408 in units at 179 institutions at the beginning of the 1957-58 scholastic year. Of these, 86,816 were lowerclass and 10,582 upperclass students. During fiscal year 1958, 4,237 graduates were commissioned, and all were scheduled for call to active duty during fiscal years 1958 and 1959. Beginning with the graduating class of 1957, the Air Force required students desiring pilot training to accept career reserve status and a 4-year active-duty tour after completion of flying training. About 55 percent of these students elected this choice, reducing the numbers in this category, the largest, from 3,226 to 1,760. The objective was to retain more rated reserve officers on active duty after they completed expensive flying training.

The Air Force expanded AFROTC flying instruction during fiscal year 1958, letting contracts with 95 institutions to train 1,265 students. The reduced number of students seeking pilot training after the adoption of the 4-year obligation made it possible to extend the program to additional schools. A total of 112 students out of 1,218, or 9.2 percent, were eliminated during fiscal year 1957, the first year of the program, almost all for lack of basic aptitude for flying.

The Officer Candidate School graduated 533 new officers, including 13 WAF. To increase the quality and degree of technical qualification of the OCS candidates, a minimum navigator test score was included as a basic eligibility requirement for male applicants. As a result, enough students were able to meet the requirements for all technical career fields with the exception of weather, where college physics and integral calculus are established criteria. The WAF OCS objective for fiscal year 1958 was not met, and the officer qualifying score was lowered slightly to produce a higher admission rate. However, applicants marginal in any other qualification will not be accepted. Female members of the Civil Air Patrol with a certificate of proficiency and a high school diploma were also declared eligible to apply.

The Air Force Academy completed its third year of operation at Lowry AFB, Colorado, in June 1958 and was scheduled to move to the permanent site near Colorado Springs in September. The graduation date for the first class was established as June 3, 1959, the super-

intendents of the three Service academies having agreed on the 40th Wednesday after Labor Day as a common graduation date. A total of 5,613 candidates applied for admission into the fourth class of the Academy, and the 453 selected began training on June 27, 1958. Total enrollment at the end of June 1958 was 1,140 as compared with the ultimate goal of 2,496. In March 1958 the Air Force Academy established a Department of Astronautics to teach the physics of manned and unmanned flight through space.

As a result of increased demands for astronautics courses, the Air Force Institute of Technology established in April 1958 a graduate program at its School of Engineering, Wright-Patterson AFB, Ohio. Twenty officers will enter annually a 2-year course leading to the M.S. degree. The Air Force is also cooperating with the Massachusetts Institute of Technology in establishing a second program to enter 10 officers annually on a 2-year course of study leading to either the M.S. or Ph. D. In order to meet more immediate needs in the astronautics field, the Air Force arranged in January 1958 with leading contractors to provide on-the-job managerial training for selected officers. The American Association of Collegiate Schools of Business accredited the Air Force Institute of Technology School of Business during the year, permitting it to award degrees at the master's level in engineering administration, industrial administration, and applied comptrollership.

The Air Force also decided to increase astronautics instruction in the Air War College, the Command and Staff School, and the Squadron Officer School. Enrollment in the USAF Extension Course Institute increased to 209,823, although the number of courses leveled off at 88. The three military Services reached a new agreement on the administration of the Inter-Service Extension Course Program that simplified procedures and provided for an exchange of information among them.

To save manpower spaces, the Air Force reached an agreement to drop out of the Army Language School at Monterey, California. All USAF language training will be conducted on a contract basis, considered the most efficient arrangement for fundamental language training.

## V. Health and Welfare

Living conditions on Air Force bases generally improved during the year. Several thousand new family housing units became available to Air Force personnel, and a new policy permitted those living in sub-standard housing to pay fair rentals instead of giving up their entire quarters allowance. The new military pay bill, effective June 1, 1958, increased basic pay scales and authorized higher pay for proficiency and responsibility. In addition, the Air Force offered its people the choice of a professional career in many fields, family medical care, education for dependents in oversea areas, adult education through service and off-duty courses, and increased opportunities for normal community life.

Participation in educational, library, and community activities reflected a growing interest on the part of individuals and families. Enrollment in June 1958 for group study and civilian school classes was increasing. Emphasis was placed on an active family service program and a systematic recreation program to provide wholesome leisure-time opportunities.

The number of schools operated by the Air Force for dependent children overseas decreased, mainly because of the withdrawal of some units from Japan and the shifting of units in Europe. For the 1958-59 school year, the estimated enrollment of Air Force children in all oversea schools is 47,400 including 38,850 in 80 elementary and 21 high schools operated by the Air Force and 8,550 in schools operated by the Army or Navy, or through contracts. In addition, 5,270 dependents of Army, Navy, and civilian personnel are expected to attend USAF schools.

### **Medical Service**

New health problems challenged the USAF Medical Service during fiscal year 1958 as the result of technological and scientific changes in weapons. Ballistic missile units required specialized medical training and support. The medical aspects of modern mobilization and the control of mass casualties came under constant study. Medical authorities devoted special attention to defenses against the effects of nuclear weapons and agents of chemical and biological warfare.

The Air Force developed measures to provide medical assistance through liaison with the U.S. Public Health Service to cope with the possibility of contamination by radioactive materials in civilian areas.

The Air Force also cooperated with the Interagency Committee on Radiological Assistance, which was established by the Atomic Energy Commission.

To prepare for problems of environmental health and safety arising in connection with the operation of nuclear reactors and the disposition of radioactive wastes, selected Medical Corps officers began a 9-month course in radiobiology, including academic study and field research.

### *Medical Personnel*

Within the manpower ceilings, there was no shortage of physicians or dentists in the Medical Service, but there was a shortage of specialists in such fields as radiobiology, nuclear medicine, aviation medicine, psychiatry, and otolaryngology. The retention of physicians trained in these specialties who were no longer obligated to stay in the service remained a problem.

Legislation to improve career opportunities benefited two groups of medical officers. Public Law 155 (85th Congress), approved on August 21, 1957, offered additional opportunities for appointment, promotion, and retirement to both Regular nurses and medical specialists. This legislation brought an immediate increase in the number of applications by nurses and medical specialists for appointment in the Regular Air Force.

The Air Force conducted different types of medical training programs. The commissioning program, designed to obtain Regular and reserve officers, for the Medical Service, was directed toward career-motivated, qualified young people. This program included training for five groups: Senior medical students, military medical interns, civilian medical interns, senior dental students, and dental interns. The program for senior dental students is scheduled to end in fiscal year 1960, when it will have outlived its usefulness. There were about 400 students and interns sponsored under the commissioning program at the end of June 1958.

Under the residency deferment training program known as the Berry Plan, which began in 1954, approximately 100 physicians had completed residency training and became available for active duty in the Air Force by the end of June 1958. From the 1957 medical school graduating classes, the Air Force had commissioned 406 physicians who were permitted to complete their internships before entering on active duty. When they finished in June 1958, 195 were selected for residency training in needed specialties, making a total of 741 in residency training as of June 30, 1958. The remainder of the 406 were scheduled for active duty sometime in fiscal year 1959.

Airmen were trained in techniques of histopathology, air rescue and survival, aeromedical evacuation, dental laboratory, medical equipment maintenance, and disaster casualty control. The last subject was given primary emphasis in 1958.

The total officer strength in the USAF Medical Service at the end of June 1958 was 10,284, some 256 fewer than in June 1957. This total included 3,342 physicians, 1,805 dentists, 2,783 nurses, 1,891 medical service officers, 148 medical specialists, and 315 veterinarians. Medical airmen numbered 22,213, compared to 25,191 a year earlier.

#### *Health in the Air Force*

The Air Force health record continued excellent during calendar year 1957, despite an increase in the sickness indexes that paralleled the rise in the sickness rate of the civilian population during the Asian flu epidemic. An increase in the incidence of respiratory illnesses during the second half of 1957 produced a rise in the annual admission rate to medical facilities for treatment from 249 in 1956 to 340 per 1,000 average strength in 1957 and in the daily noneffective ratio (number of military personnel out of every 1,000 off duty because of medical reasons) from 9.2 in 1956 to 10.5. However, most of the respiratory cases were of short duration and many were treated in quarters. The peak in admissions (a rate of 698 per year per 1,000 for all causes) occurred in October 1957 and exceeded the corresponding rate (661) reported during the February 1951 upper-respiratory outbreak.

The daily ratio of USAF patients occupying hospital beds during calendar year 1957 was 8.4 per 1,000—slightly higher than the 8.0 of the preceding year. Out of an average military strength of 910,864, an average of 7,621 occupied hospital beds daily. An increase in the average number of USAF military patients cared for in Air Force facilities offset decreases in the number of patients who were dependents or active-duty members of the other United States armed forces. This increase in USAF military patients occupying beds in USAF facilities resulted not only from the rise in respiratory illnesses but also from the increased ability of the Air Force to provide specialized care for certain types of patients formerly treated in hospitals of the other military Services.

Injuries continued to be the largest cause of mortality. Out of a total death rate of 2.1 per 1,000, injuries accounted for 1.7 and diseases for 0.4. Of the 1.7 deaths per 1,000 caused by injuries, aircraft accidents accounted for 0.6 (28.6 percent of the total death rate), while motor vehicle accidents caused deaths that amounted to 0.7 (33.4 percent of the total death rate).

### *Hospitals*

In the spring of 1957 the Department of Defense delegated to the military Services the authority to plan their own hospitals, because the standard triservice plans did not meet the needs of the individual Services. The Office of the Surgeon General of the Air Force won recognition for its original contributions to hospital design.

Steady progress in construction during fiscal year 1958 resulted in the completion of 31 new facilities—10 hospitals, 16 dispensaries, and 5 dental clinics. Under construction in June 1958 were 13 hospitals, 5 dispensaries, and 8 dental clinics.

In June 1958 the Air Force was operating 195 fixed inpatient facilities, including 135 hospitals—94 in the United States and 41 in overseas areas. There were 60 Class A dispensaries (authorized up to 24 beds)—29 in the United States and 31 overseas. In addition, the Air Force had 63 medical treatment facilities without beds. The Dental Service had 417 fixed dental facilities and 38 trailer-mounted dental clinics.

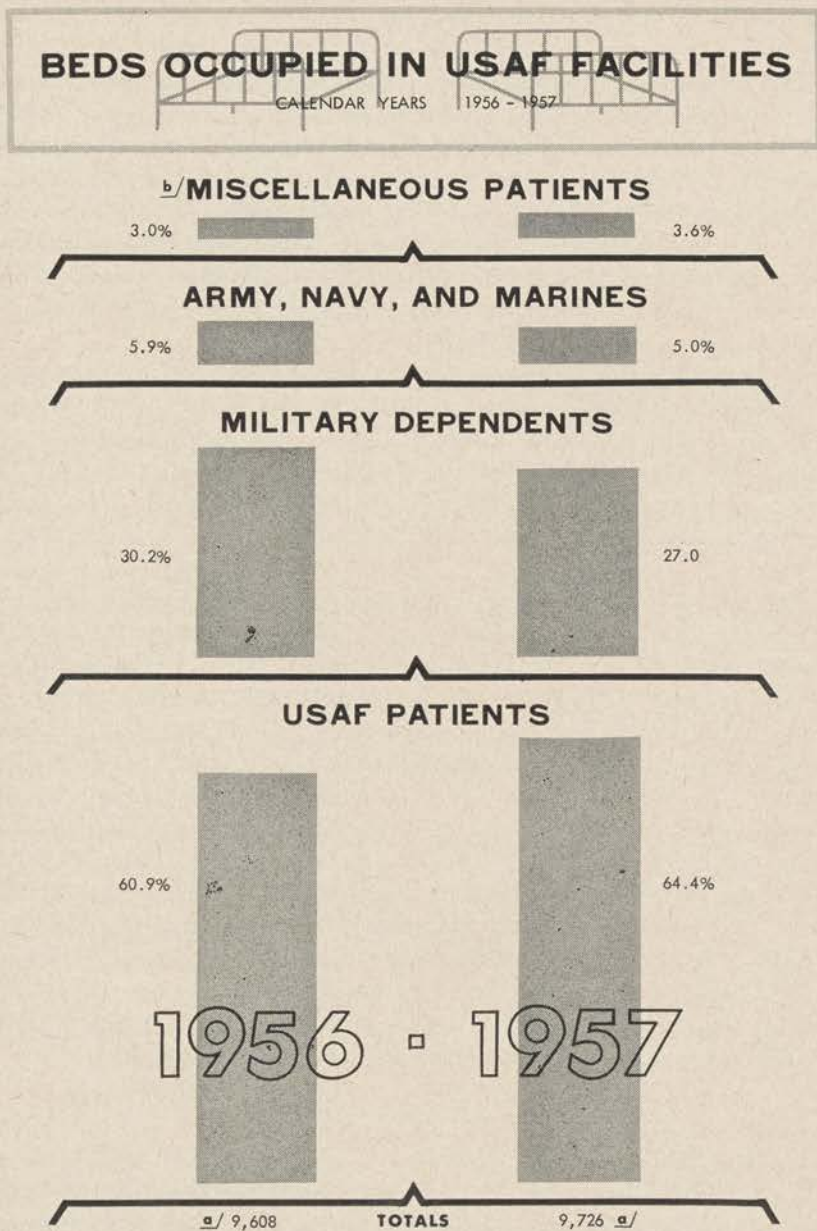
The total number of hospital and dispensary beds in June 1958 was 12,227, of which 3,150 were overseas. During calendar year 1957, 82 percent of Air Force bed patients were cared for in USAF facilities, almost as high as the 84 percent reached in 1955. A daily average of 6,265 Air Force patients occupied beds in USAF facilities. During 1956, for the first time since the establishment of the USAF Medical Service in 1949, there had been an increase in the number of Air Force patients treated by the other military Services. This resulted from the closing of the hospital at Sampson AFB, New York, in 1956 and existed until facilities could be developed for specialized care of certain types of patients formerly cared for at Sampson.

With the completion of the large modern hospital at Lackland AFB, Texas, the Air Force had a medical training center of its own for the first time. To further develop the center, the Air Force began construction of a 500-bed addition to the Lackland hospital.

### *Care of Air Force Dependents*

During fiscal year 1958 there was a decline in the utilization of USAF medical facilities, chiefly as a result of the Dependents' Medical Care Act, which became effective December 7, 1956. This act entitled dependents of military personnel to medical care at Federal expense in civilian as well as military facilities.

The first year's operation of the Medicare program bore out forecasts that military facilities might not be used to their full capacities. A comparison of the first 11 months of calendar year 1957 with the same period in 1956 showed that the number of births in USAF facili-



a/ AVERAGE NUMBER OF PATIENTS OCCUPYING BEDS IN USAF FACILITIES.

b/ INCLUDES MILITARY PERSONNEL ON SHORT TOUR OF DUTY; RETIRED MILITARY PERSONNEL; AND BENEFICIARIES OF VETERANS ADMINISTRATION, BUREAU OF EMPLOYEES' COMPENSATION, U.S. PUBLIC SERVICE, ETC.

Figure 11

ties in the United States had declined by 31.1 percent and the number of inpatients by 17.5 percent. The percentage of nonmilitary patients occupying beds in USAF facilities in calendar year 1957 also dropped to 30.6 percent as compared with more than 33 percent in 1956.

Meanwhile, the cost of Medicare to the Air Force mounted rapidly. By June 30, 1958, the Air Force had obligated \$40,628,670 under Medicare, plus an additional charge of 3.5 percent payable to the Office for Dependents' Medical Care, U.S. Army, for administering the program. The average cost per physician's claim was about \$73, and the average cost per hospital claim was about \$108. It was apparent from both the budget and managerial viewpoints that it would be necessary to restrict the freedom of dependents to choose civilian facilities when comparable military facilities were available.

### *Medical Research*

Medical research focused on aviation medicine, with growing interest in space medicine—the study of the medical problems encountered by man in flights beyond the atmosphere. Experiments were conducted on many problems, including weightlessness, explosive decompression, and the effects of isolation, extreme heat, and extremely high altitudes.

An Executive order in November 1957 extended hazard pay to subjects voluntarily performing thermal stress experiments at designated Service laboratories. In December the Secretary of the Air Force named the following laboratories to conduct such experiments: The School of Aviation Medicine at Randolph AFB, Texas; the Aero Medical Laboratory at Wright-Patterson AFB, Ohio; and the Arctic Aeromedical Laboratory in Alaska.

Under medical supervision, an airman spent a full week in a sealed cabin on a "trip to the moon" at Randolph AFB in February 1958. Five USAF officers underwent a 5-day simulated space trip at Wright-Patterson in March 1958 to determine problems aircrews would experience in space travel. To determine human tolerance to mechanical forces, officers at the Aero Medical Field Laboratory, Holloman AFB, New Mexico, continued experiments involving car crashes, wind blasts, balloon flights, and acceleration and deceleration forces.

USAF physicians participated in the investigation of causes of aircraft accidents, in research on the prevention of aircraft accidents, in the development of personal equipment, and in the physiological training of aircrew members in the use of pressure suits, ejection seats, and night vision trainers. The Surgeon General reemphasized

to the major commands the importance of medical investigation of aircraft accidents.

### *Aeromedical Evacuation*

Aeromedical evacuation within the United States was augmented in January 1958 by the activation of three casualty staging flights, able to receive casualties from overseas, give them temporary medical care, and prepare them for airlift. Assigned to the Military Air Transport Service, they were located at MATS oversea terminals at McGuire AFB, New Jersey, and Travis AFB, California, and at Headquarters MATS, Scott AFB, Illinois. The 1st Aeromedical Transport Group, with headquarters at Brooks AFB, Texas, operated five squadrons of C-131's (mostly C-131A Samaritans) on aeromedical flights of military personnel, their dependents, and special civilian cases.

In Europe the addition of several pressurized C-131A aircraft brought the aeromedical evacuation system up to modern standards of patient care and travel, but USAFE had only one aeromedical evacuation group and one casualty staging flight. In the Far East, C-54M's handled Pacific intratheater evacuation.

### **Chaplains**

At the end of June 1958 the Air Force had 1,024 chaplains on active duty, 83 short of the authorized strength and 162 fewer than the previous year. A cut in the authorized number of chaplains from 1,200 to 1,107 led to the release from active duty of 110 reserve chaplains, 93 through reduction in force. In all, the Air Force lost 190 reserve and 5 regular chaplains, but it called to active duty 33 newly commissioned chaplains. To supplement the military chaplains, there were 103 civilian clergymen who served as auxiliary chaplains, about 24 percent less than the number in fiscal year 1957.

Chaplains and civilian clergymen conducted a series of Catholic and Protestant missions for USAF personnel and their families at bases in the northeastern United States and in Europe. Torah convocations were conducted in Europe and Morocco for Jewish personnel. For the fifth year, spiritual life conferences were conducted for Protestant military personnel and their families at Estes Park, Colorado, and Ridgecrest, North Carolina. And again, in the fall of 1957, closed retreats were held for personnel of the Catholic faith throughout the Air Force. Chaplains assumed responsibility for the two servicewomen's religious-social societies, Pi Chi Sigma (Protestant) and Lisieux (Catholic).

The Air Force Chapel of the Air began its third year, telecasting a series of Protestant services weekly from Washington, D.C. After

July 1957, this service was kinescoped and sent to TV stations overseas for viewing by USAF personnel. In place of the character guidance lectures, a new chaplain lecture series, "Dynamics of Moral Leadership," helped commanders to develop and maintain a wholesome moral atmosphere within their organizations.

The Office, Chief of Air Force Chaplains, and the Armed Forces Chaplains Board sponsored spiritual retreats for chaplains and arranged retreats both in the United States and overseas for Protestant and Catholic chaplains. USAF chaplains attended courses on human factors in counseling. The Hogg Foundation for Mental Health, University of Texas, provided the instruction for Protestant chaplains, and Catholic University, Washington, D.C., gave the course for Catholic chaplains.

For the first time, the Chief of Air Force Chaplains received authority to nominate chaplains for attendance at the Air Command and Staff College. The Air Training Command approved 130 training spaces for the chaplain basic military course at Lackland Air Force Base.

At the end of June 1958 there were 519 USAF chapels, 204 in overseas areas. Ten new chapels were completed during the fiscal year, and work was continuing on 20 others at the end of the year. In the fiscal year 1958 program, Congress authorized the Air Force to build 21 chapels, 8 combination chapels with religious education wings, and 23 religious education wings as additions to existing facilities.

### **Judge Advocate General**

During the year the Boards of Review handled 2,771 court-martial cases. Of these, 446 were petitioned to the United States Court of Military Appeals by the accused, and 7 cases were certified to the Court by the Office of the Judge Advocate General. During this period, 72 petitions were granted, 334 were denied, and 17 were dismissed. In addition, one case resulted in dismissal of the charges and two were remanded to the Boards of Review for further review. The Court reversed the Boards of Review in 45 cases and sustained them in 24; 127 cases had not been decided at the close of the fiscal year.

The Office of the Judge Advocate General received 2,617 claims in the amount of \$4.7 million and closed claims in the amount of almost \$4 million. It also received a total of 188 tax and litigation cases and closed out 132 cases. There were 885 cases on hand as of June 30, 1958.

The Judge Advocate General's Department lost 273 officers during fiscal year 1958 and added 247 new ones. Although authorized a strength of 1,258 officers (judge advocates), it had only 1,195 on active duty at the end of June 1958.

## Ground Safety

Motor vehicle accidents—the most serious cause of deaths and injuries in the Air Force—declined in number during calendar year 1957 and the first 6 months of 1958. The number of accidents causing injuries or over \$25 damage in Government-operated motor vehicles in calendar year 1957 fell to 4,058, or 449 fewer than in 1956. The number of accidents causing injuries in privately operated vehicles dropped to 4,541, or 411 fewer than in 1956. Deaths resulted from all vehicle accidents totaled 640, of which more than 96 percent occurred in privately operated vehicles. These deaths were 33.4 percent of the total number of Air Force deaths (1,916). During January–June 1958 the number of disabling injuries from accidents in Government-operated vehicles fell by more than 32 percent from the same period in 1957, while those in privately operated vehicles fell by more than 20 percent.

The most significant improvement in motor vehicle safety was the reduction in 1957 in the number of deaths and disabling injuries from private motor vehicle accidents involving individuals under 25 years of age. The average strength of this age group in the Air Force decreased by 4.6 percent from 1956 to 1957, whereas the traffic fatalities for the group dropped 14.1 percent—from 440 deaths to 378. Disabling injuries dropped 7.8 percent, from 3,854 to 3,552.

The Air Force has been conducting a compulsory driver training course for all airmen under 25 years of age, a remedial training course for traffic violators, and voluntary training classes for drivers of private vehicles, besides cooperating with a number of civilian organizations in safe-driver education.

The increasing number of missiles in the inventory created new ground safety problems, including radiological hazards, operation of high-pressure fuel systems, and storage and transfer of new chemical fuels. It was therefore necessary to develop new controls, new safety devices, personal protective equipment, and a system of constant surveillance. Studies were made and a course was prepared to train ground safety personnel in the safety requirements of weapon systems employing missiles and rockets.

The Air Force received for the eighth consecutive year the National Safety Council's highest award, the Award of Honor, for ground accident reduction in calendar year 1957. The successive winning of this award was significant, since it is based each year on the improvement over the preceding 2 years. The 1957 award was given for a reduction of more than 10 percent in ground accident rates in the Air Force as compared with the 1955–56 average. Principal factors considered in the evaluation included on-duty accidents to civilian employees; on-

and off-duty accidents to military personnel, including those in privately operated vehicles; the Government-owned vehicle accident rate; and ground accident costs per capita. Reductions were made in all categories, but the most significant were 33 percent in civilian employee fatalities and 14 percent in Government-owned vehicles.

The National Safety Council also gave the Air Force its 1957 traffic safety citation award for leadership and effective support of the President's traffic action program at command, base, and community level. Through these efforts the Air Force reduced the disabling injuries and fatalities from private vehicle accidents an average of 7 percent in 1957 as compared with 1956.

## VI. Installations

### Programs

During fiscal year 1958 the Air Force had \$1,828 million available for construction. These funds included the carryover from 1957 of \$367 million, the regular 1958 construction appropriation of \$900 million, the 1958 supplemental of \$520 million, and certain reimbursements of \$41 million. Approximately \$1,546 million of the total was available for actual contract awards, the balance being required for Government costs, advance planning, and overhead.

Changes in requirements, delays in acquisition of real estate and base rights, design changes, and other factors make necessary frequent adjustments in the military construction programs during the course of a year. It has therefore become the practice for Congress to approve a military construction program that is larger than the amount of money appropriated. This permits greater flexibility in and more effective use of available funds. For construction in fiscal year 1959, the Air Force requested an appropriation of almost \$992 million against a requested program approved of \$1,156 million. The Congress responded with an actual appropriation of \$785 million against an approved program of almost \$1,012 million.

Congress authorized for construction \$952.4 million. As in the previous year, the fiscal 1959 program concentrated on facilities for the defense of the United States, for support of the strategic strike force at dispersed bases, and for research and development. The authorization bill for facilities, as passed, was divided as follows:

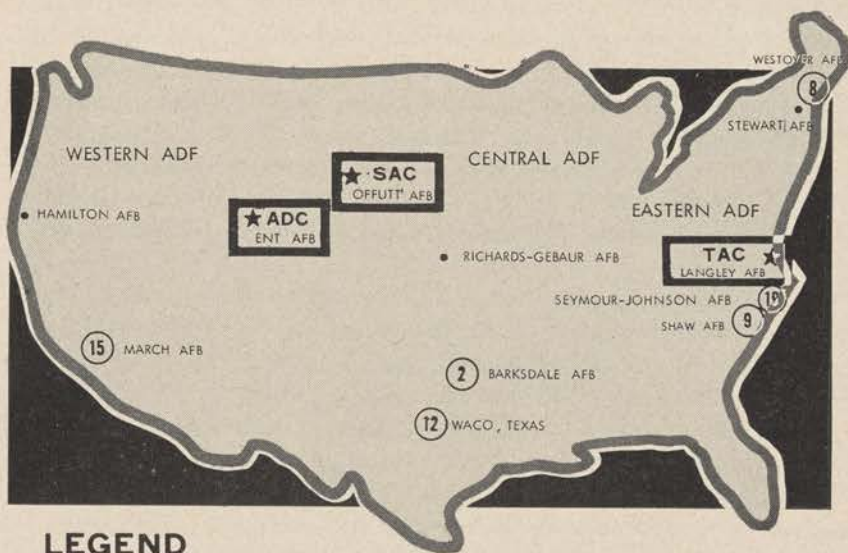
Zone of Interior.....	\$542, 161, 000
Overseas.....	123, 654, 000
Missiles.....	269, 100, 000
"Emergency".....	17, 500, 000
	<hr/>
	952, 415, 000

### Construction

At the beginning of fiscal year 1958, contract awards for construction were limited to \$190.6 million through February 1958. For this reason contract awards during the first 7 months of the fiscal year did not equal those for the first 2 months of fiscal year 1957.

# DEPLOYMENT OF USAF COMBAT FORCES

JUNE 30, 1958



## LEGEND

★ AIR FORCE OPERATIONAL COMMANDS

○ NUMBERED AIR FORCES

Figure 12

Upon relaxation of this limitation in December 1957, the contract award rate accelerated and awards reached a total of \$674.2 million at the end of May. Awards during June amounted to \$254.2 million, bringing the total for fiscal year 1958 to \$928.4 million, only \$93.6 million short of the forecast of \$1,022 million. The figure for June exceeded any single month's performance in the past 5 years. During the last quarter of the fiscal year, \$618.1 million was placed under contract, exceeding any quarter for the past 5 years.

The Air Force let contracts for the following major programs: Practically all urgent construction for B-52 dispersal; ICBM facilities at Cooke AFB, California, SAGE direction centers at Beale AFB, California, and Stead AFB, Nevada; SNARK facilities at Presque Isle AFB, Maine; research and development missile support at Patrick AFB, Florida; ICBM-IRBM training facility at Keesler AFB, Mississippi; eastern extension of the DEW line, and pavement at Richard Bong AFB, Wisconsin.

The 1958 supplemental construction program of \$520 million was approved on February 11, 1958. By June 30, 1958, the Air Force had placed \$167 million of this amount under contract. The programs included: SAGE facilities at Grand Forks, N. Dak., Syracuse, N.Y., Malmstrom, Mont. and Minot, N. Dak.; ballistic missile early warning sites; SAC alert at Ellsworth, S. Dak., Fairchild, Wash., Grand Forks, N. Dak., Griffiss, N.Y., Larson, Wash., Loring, Maine, Malmstrom, Mont., Minot, N. Dak., Mountain Home, Idaho, Offutt, Nebr., Pease, N.H., Plattsburgh, N.Y., and Westover, Mass.; most of SAC dispersal at Eglin, Fla., Glasgow, Mont., K. I. Sawyer, Mich., Robins, Ga., and Wright-Patterson, Ohio; tanker relocation at Clinton County, Ohio (pavements only), Dover, Del., Ernest Harmon, Newfoundland, Goose, Labrador, McChord, Wash., McGuire, N.J., and Otis, Mass.

Construction work was started at one new air base—Richard Bong Air Force Base, Wisconsin. By the end of June 1958, facilities were well underway at the first four BOMARC sites, located in the vicinity of the following USAF bases: Suffolk County, N.Y., McGuire, N.J., Otis, Mass., and Dow, Maine. Construction of additional facilities went forward at numerous other bases.

The USAF base complex in Spain was completed sufficiently for occupation by SAC before the end of the fiscal year. Torrejon Air Base, near Madrid, was ready for use in September 1957. The rest of the complex included bases at Zaragoza, in northeast Spain; Morón, south of Seville; and a depot at San Pablo, near Seville.

Construction for the Air Force Academy at Colorado Springs, Colorado, progressed on or ahead of schedule, insuring that classes would begin there by September 1958. Ninety million dollars' worth

of construction work had been completed by June 30, 1958, and work under contract amounted to more than \$124 million.

At the end of June 1958 the Air Force had 280 active major-type installations, 4 fewer than at the same time in 1957. At 26 of these, the Air Force had no real property interest, but it did have budget and operational responsibilities. The following table lists the total active major-type installations:

<i>Classification</i>	<i>Total</i>	<i>Zone of Interior</i>	<i>Overseas</i>
Total .....	280	163	117
USAF <sup>a</sup> total .....	254	158	96
Operational .....	156	81	75
Operational Flying Support .....	13	5	8
Operational Nonflying Support .....	12	3	9
Logistical .....	20	16	4
Research and Test .....	7	7	
Training .....	46	46	
Non-USAF <sup>b</sup> total .....	6	5	21
Contract Flying Schools .....	5	5	
Foreign Bases .....	21		21

<sup>a</sup> Installations in which the USAF has a real property interest.

<sup>b</sup> Utilized by USAF with no real property interest.

Major engineering activities included the investigation of jet-engine blast deflectors and muffling devices for field maintenance test stands. USAF engineers also worked with the Atomic Energy Commission to develop a ground nuclear power plant suitable for use in DEW line and remote aircraft control and warning stations.

The Air Force lent installation specialists to the new Airways Modernization Board to assist in research projects designed to improve aviation facilities.

Sites for 10 more BOMARC bases were included in the 1959 program. These were located at or near Camp Adair, Oregon, and the following USAF facilities: Niagara Falls, N.Y., Minross, Mich., Paine, Wash., Ethan Allen, Vt., Langley, Va., Truax, Wis., Travis, Calif., Cooke, Calif., and Duluth, Minn.

The Air Force selected ICBM sites at or near Cooke AFB, California, Francis E. Warren AFB, Wyoming, and Lowry AFB, Colorado, for the ATLAS and TITAN missiles. Cooke will be an operational training base for ATLAS, TITAN, THOR, JUPITER, and BOMARC missiles. Sites in the vicinity of Francis E. Warren Air Force Base will be used for the ATLAS, while those in the vicinity of Lowry Air Force Base will be used for the TITAN.

During the year, disposal directives were issued for approximately 39,740 acres of land in the United States and 1,115,140 acres in Alaska. These directives permit the return to the Department of Interior of public-domain land as well as disposal of Government-owned land.

### **Family Housing**

The Air Force housing programs moved at an accelerated pace, the Capehart (New Title VIII) program making particularly good progress with the help of a very favorable money market. As of June 30, 1958, there were 53,374 units in this program, of which 4,191 were completed and 22,720 more under construction. Acceptable bids were received for 15,546 of the units, while 10,151 units were under design, leaving 766 on which design was to be initiated. The Air Force estimated that by December 31, 1958, 12,000 units would be completed; 37,700 would be under construction, and acceptable bids would be in for the remaining units, or they would be in the final stage of design.

The relatively small surplus commodity and rental guarantee programs provided family housing units overseas without large expenditure of appropriated funds. The surplus commodity program as of June 30, 1958, called for 9,972 units overseas, of which 1,550 had been completed and 2,742 were under construction. The balance of 5,680 units was in varying stages leading to construction. The Air Force expected that by December 31, 1958, there would be 1,000 additional units completed and some 740 more under construction.

The rental guarantee program as of July 1, 1958, included 5,368 units, all overseas. Of these 3,386 had been completed, and 1,582 already under construction were expected to be completed by December 31, 1958. The balance of 400 units will be placed under contract as rapidly as possible.

As a part of its general program to improve the living conditions of its married personnel, the Air Force decided to acquire all Wherry housing projects serving USAF installations except where it would not be in the best interest of the Government to do so. In August 1956, Congress had authorized the Department of Defense to acquire Wherry projects, and the Air Force had acquired the first units in May 1957. As of July 1, 1958, the Air Force had acquired 44 projects (26,733 units) and expected to acquire most of the remaining 18 projects (10,374 units) during the first half of fiscal year 1959.

The program to declare certain public quarters inadequate provides relief to USAF personnel who, in the past, have been required to pay their entire quarters allowance for substandard housing. An estimated 12,500 quarters under the control of the Air Force may be declared inadequate and have a fair rent set for them. As of June 30,

1958, rents had been established for about 6,900 of these quarters. The balance of the program consisted of reparations housing for which a joint Service policy was required. The Department of the Navy as executive agent directed an on-the-spot survey of reparations housing in Japan so that a uniform determination of adequacy could be applied. Inadequate quarters will be improved where it is economical to do so. Of the 6,900 units already declared inadequate, it was estimated that possibly 1,400 could be so improved.

With the exception of airmen first class with 7 or more years of service, the four lowest grades of airman are not eligible to occupy permanent Government family housing. These airmen and their families live off base on quarters allowances that have been increased by legislation since 1949. But the authority for the increased allowances is temporary, the present legislation expiring in 1959. At the end of June 1958 the Air Force was seeking approval from the Department of Defense to build permanent family housing for this group of airmen.

The number of family housing units existing, planned, and under construction at the end of fiscal year 1958:

Type	Existing <sup>a</sup>	Planned	Under construction
Appropriated Fund-----	<sup>b</sup> 29, 519	1, 956	2, 215
Wherry-----	<sup>c</sup> 37, 107	-----	-----
New Title VIII (Capehart)-----	4, 191	26, 463	22, 720
Rental Guarantee-----	3, 386	400	1, 582
Surplus Commodity-----	1, 550	5, 680	2, 742
Total-----	75, 753	34, 499	29, 259

<sup>a</sup> Excludes 18,906 inadequate housing units and 2,689 trailers.

<sup>b</sup> Excludes reparations housing of 8,224 Yen units in Japan and 11,244 Deutschmark units in Germany.

<sup>c</sup> Excludes approximately 1,000 units made available to the Air Force by other services.

### Base Maintenance

The third conference of the Joint Canadian-USAF Construction and Maintenance Procedures Group was held at Ottawa, Canada, in June 1958. These group meetings, held twice yearly, provided for a direct exchange of ideas pertaining to maintenance. As a result, the Royal Canadian Air Force has adopted many USAF procedures, and there have been other mutual benefits.

Fire losses during fiscal year 1958 totaled about \$4.15 million, as compared with \$11.1 million for fiscal year 1957. This was the lowest annual loss since fiscal year 1951.

Major repair, modification, and alterations to buildings and systems contributed to the useful life of USAF facilities and provided for future requirements. During fiscal year 1958 approximately \$124 million was obligated for this purpose. To eliminate the back-

log of minimum essential repairs, the major commands spent about \$34 million and planned to spend another \$25 million during the next fiscal year. During this year the Air Force also obligated \$18.3 million for minor construction at its facilities.

By the end of the year the Air Force had published 15 of the 22 manuals in the series on maintenance and operation of real property and had distributed them to the field installations. Previously, Army manuals had been used for this purpose. The Air Force also revised manuals on cost-accounting procedures for installation engineer activities and on standard codes and nomenclature for real property.

## VII. *Research and Development*

When the Soviet Union shot a Sputnik into orbit on October 4, 1957, the American people realized that a new age of space had dawned. For some time before this spectacular Russian achievement, the Air Force had been studying the possibilities of space weapons. With an increased sense of urgency, it carried forward carefully prepared long-range programs to create aerial weapons that would safeguard this Nation from attacks originating on this planet or from outer space.

The Air Force sought to maintain a proper balance between the fundamental research that forms the basis for weapons 10 to 15 years from the present and the development of the operational systems needed in the relatively near future. Development planners supplied in March 1958 the data to guide the Air Force in selecting the reconnaissance and intelligence systems for the 1960-70 period. By June 1958 they had prepared a statement of research and development objectives for the decade beginning in 1965.

Congressional appropriations for USAF research and development for fiscal year 1958 totaled \$723 million. The development of weapon systems and new techniques for solving military problems requires large sums of money. Since research and development is of a long-term nature, sharp fluctuations in appropriations for USAF scientific programs have been a major obstacle to their successful completion.

Early in 1958 the Air Research and Development Command convened the Stever Committee to review progress made in USAF research and development since the establishment of the Air Research and Development Command (ARDC) in 1950. In June the Committee, composed of distinguished scientists and administrators, recommended that the Air Force revise the procedures so as to delegate authority along with responsibility, utilize scientific and technological personnel more effectively, and increase its efforts in basic research. It suggested that ARDC be reorganized along functional rather than geographic lines and be permitted to liberalize its budgeting, funding, and contracting procedures. The committee also recognized that the solution to many of the USAF problems lay outside the Air Force and would require a high degree of coordination among a number of Government agencies.

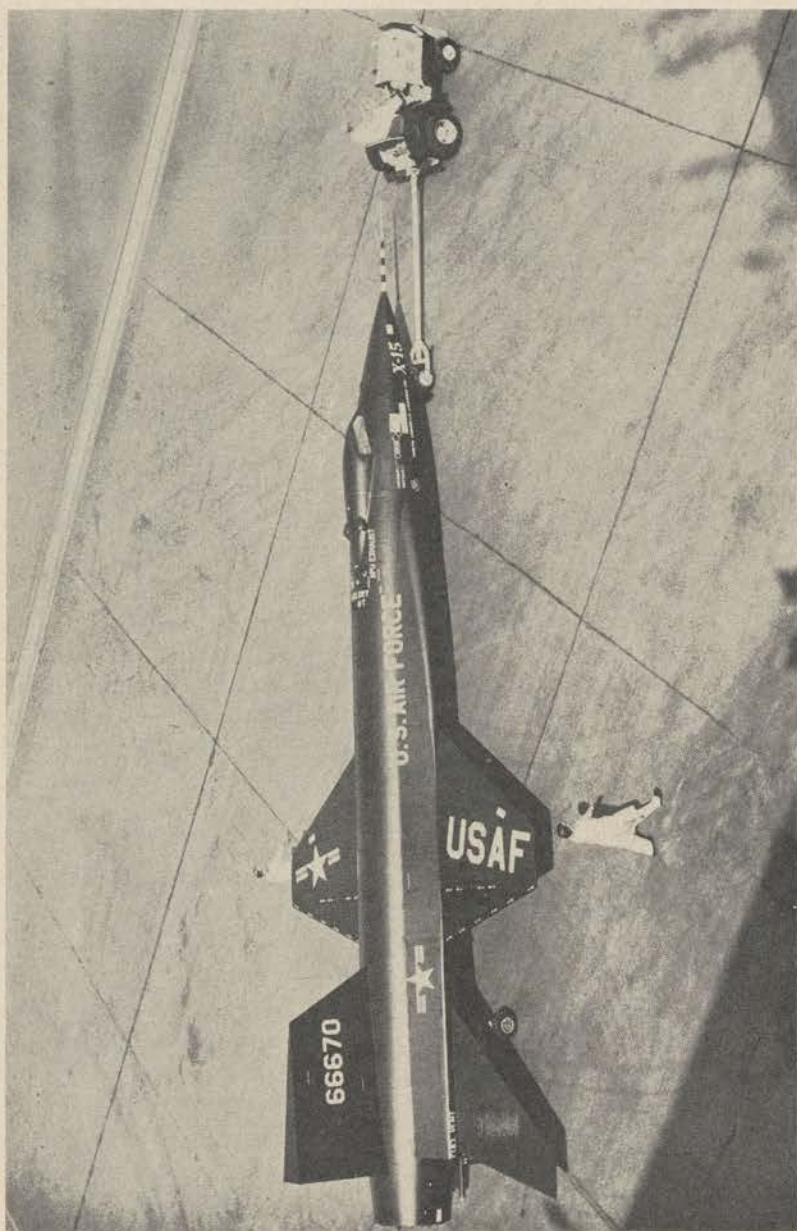


Figure 13. X-15: A step toward space.

## Astronautics

The X-15, successor to the X-2, has been designed for research in aerodynamic heating, stability, and control. Reaching heights of 100 miles and speeds of 3,600 miles per hour, it is expected to fly "weightlessly" in space and then reenter the earth's denser atmosphere.

For actual manned space flight, the Air Force, the National Advisory Committee for Aeronautics, and the aircraft industry have studied the boost-glide concept since 1951. A space craft, launched like a ballistic missile, will discard each booster stage until its final manned-aircraft stage attains an extremely high altitude and speed. The pilot will bring the vehicle back to its home base under aerodynamic control. This vehicle is known as Dynasoar (dynamic soaring) because it would glide in the top layers of the atmosphere. In June 1958 the Air Force awarded contracts for the initial development phase of the Dynasoar to two teams of contractors.

In March 1958 the new Advanced Research Projects Agency of the Department of Defense approved a program for launching small, unmanned space vehicles to explore the vicinity of the moon. Three of these "lunar probes" were assigned to the Air Force. The Air Force Ballistic Missile Division of ARDC planned to use a THOR-VANGUARD system plus a third stage for these flights.

Significant advances took place in the effort to safeguard the men who venture into space. In August 1957 a USAF doctor spent 32 hours in a balloon at a record altitude of 102,000 feet, demonstrating that current equipment could protect a crew member against the dangers of space flight for up to 3 days. More tests of this type will be made in order to increase the length of time that man can endure in space. To test endurance in the solitary and cramped quarters of space travel, an airman simulated a flight to the moon by spending 7 days in a closed cabin during February 1958. The Air Force used jet planes flying parabolic patterns to carry out extensive studies of the "weightlessness" of space.

## Weapon Development

### *Strategic Air Weapons*

The Air Force Ballistic Missile Division continued its extensive and accelerated development of ballistic missiles. The first USAF intercontinental ballistic missile (ICBM), the SM-65 ATLAS, successfully completed the first phase of flight-testing. Its structure, autopilot, and propulsion systems were demonstrated and proven.

The SM-68 TITAN, a two-stage ICBM with greater payload and range, will follow the ATLAS. It may be possible to launch the TITAN from nearly invulnerable underground installations. Engi-

neering design has advanced to the point where TITAN missiles have been built for structural testing.

In February 1958 the Defense Department directed the Air Force to begin development of a more advanced ICBM, the XSM-80 MINUTEMAN. This missile will use a solid propellant and should be easier to handle, less costly, quicker to react, and amenable to standardization.

Two intermediate-range ballistic missiles (IRBM's), the SM-75 THOR and the Army-developed SM-78 JUPITER, were in production in 1958. In October 1957 a THOR flew 2,400 nautical miles, 900 miles farther than its designed range.

In October 1957 the air-breathing, subsonic SM-62 SNARK, which will be used until ICBM's are available, became the first USAF missile to fly the full 5,000-mile length of the Atlantic Missile Range. Though deliberately launched off course, its guidance system brought its simulated warhead to its target.

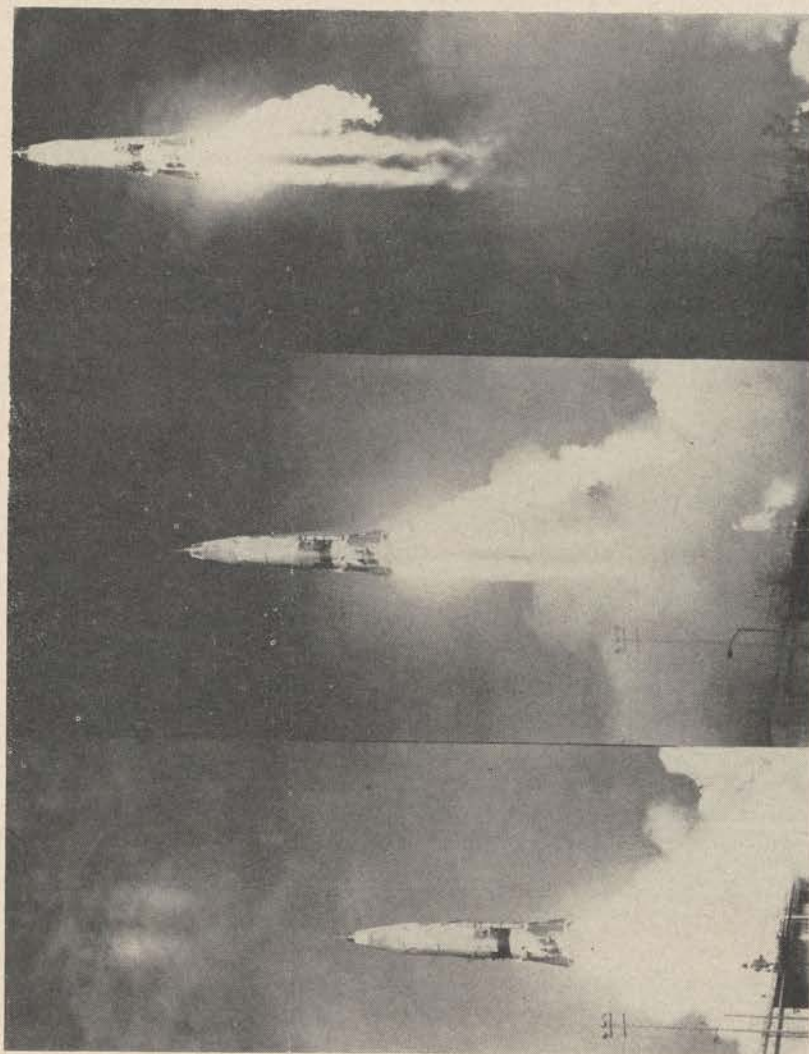
In the field of manned bombers, the B-70 Valkyrie, a supersonic bomber designed to attain speeds of Mach 3 and altitudes of more than 70,000 feet, will follow the B-52. Powered initially by highly refined jet fuels, the B-70 will eventually use high-energy boron-based fuels that are currently under development. Beyond the B-70 will be a nuclear-powered bomber which will be used not only as a missile launcher but will possess the nearly unlimited range and endurance needed to maintain a continuous strategic patrol near hostile territory.

Air-to-surface missiles and decoy missiles strengthen the strategic bomber force. Under development for launching by B-52's was the GAM-77 HOUND DOG, which will carry a warhead hundreds of miles to its target. Airframes and engines on hand are speeding the development of this missile.

### *Air Defense Weapons*

Russian technological advances emphasized the need for an electronic ground environment and weapon system that would detect and destroy ballistic missiles directed against this country. Newly developed radar sets, limited to line-of-sight signals, can detect objects out to 3,000 miles. In February 1958 the Air Force awarded a contract for the creation of a ballistic missile early warning system (BMEWS).

On July 1, 1958, the New York Air Defense Sector, with a direction center at McGuire AFB, became the first operational SAGE unit. Further progress was made in building service-test models of new search and height-finding radars with the latest techniques for coping with electronic countermeasures.



*Figure 14. ATLAS ICBM test firing.*

The IM-99 BOMARC interceptor missile operates under the control of the SAGE system. The first test of its compatibility with SAGE in June 1958 was a success. In October 1957 a BOMARC destroyed a drone bomber by scoring a direct hit more than 100 miles out over the Atlantic. Later models of this missile will have a range up to 400 miles.

F-101B and F-106 all-weather interceptors were delivered to ARDC for testing before assignment to the Air Defense Command. Development was underway on the F-108, designed to reach a speed of more than Mach 3 and an altitude above 60,000 feet. This missile-launching interceptor is designed to attack hostile air-breathing vehicles at and beyond the fringes of the area covered by the contiguous detection system.

#### *Tactical Air Weapons*

The Air Force set up a 650-mile corridor from Holloman AFB, N. Mex., to Wendover AFB, Utah, to test the TM-76 MACE missile. Beginning in February 1958, "A" versions of the MACE flew within this corridor without incident, and at no time was there need for armed escort aircraft to destroy a missile. The TM-76B, in its first flight through the corridor in October 1957, was controlled during the entire trip by its inertial guidance system, which is immune to radar-jamming.

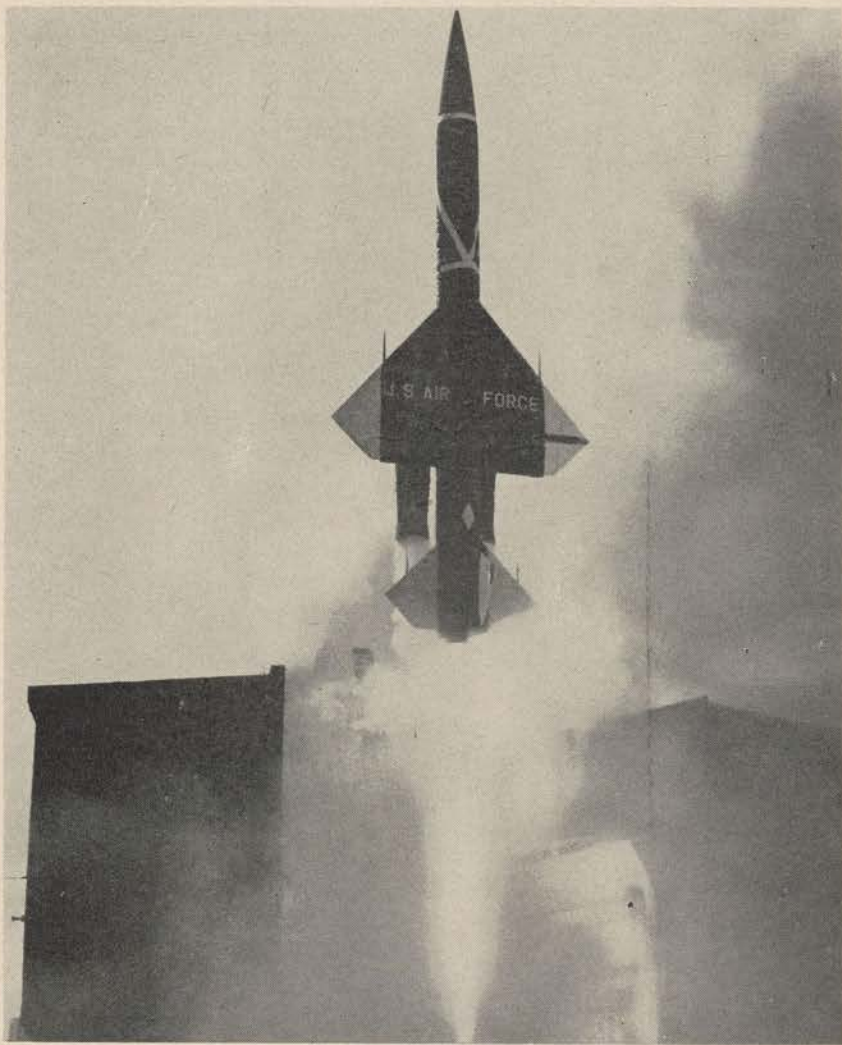
Tactical fighters equipped with the Navy-developed, air-to-surface BULLPUP missile can keep away from some enemy defenses by firing at targets from a distance of 15,000 feet. The Air Force worked closely with the Navy to adapt this missile to its purposes.

The first F-105 Thunderchief was delivered to the Air Force in May 1958. Zero launchings of a combat-loaded F-100D were successful. The Air Force is studying the development of an arresting device to recover zero-launched fighters on short runways. A joint USAF-Navy development project—the FX-V/STOL—is expected to meet TAC's need for a fighter that can take off vertically or from very short runways and continue the battle even if its base is destroyed.

### **Supporting Developments**

#### *Transport and Training Aircraft*

In September 1957, MATS received the first 275,000-pound turbo-prop C-133 cargo transports. Meanwhile, the versatile C-130 Hercules not only served as a troop carrier for the landing of men and equipment, for aeromedical evacuation, and for unit deployment, but also as a photographic and charting plane, drone launcher, and ski-equipped Arctic vehicle. The Marine Corps is buying the C-130 as



*Figure 15. BOMARC fired and guided by SAGE.*

an aerial tanker and logistic transport, while the Coast Guard is buying it for search and rescue work. Engines and propellers were selected by the Air Force for the C-130B, an improved version. The Air Force was also considering development of a boundary-layer-control version for use as a high-performance assault plane.

Testing was completed of the piston-engine H-43A helicopter, designed for rescue work near air bases, and it will be delivered to the Air Force in the fall of 1958. The turbine-powered H-43B will have a new transmission that will make a warming-up period unnecessary, permitting quick reaction in an emergency.

Sled and wind tunnel tests produced data for use in the development of the T-38, which will replace the T-33 basic pilot trainer. The first YJ-85 engines for this program will be delivered late in 1958.

The Air Force decided to purchase the UCX, a jet utility-cargo transport, for use as an advanced navigator trainer, for high-altitude checkout of radio and navigation facilities, and for training in electronic countermeasures. Plans were made to purchase a twin-engine jet, the UTX (T-39) to replace the obsolete aircraft used in combat readiness training. The UTX has a cruising speed of 500 miles per hour and a range of 1,400 miles.

In January 1958 the Air Force canceled the Q-5 target drone program. Work began on the conversion of three X-10 vehicles remaining from the NAVAHO program into drones for use in BOMARC tests.

#### *Propulsion*

In February 1958 the Air Force awarded a contract for research and studies leading to the development of a nuclear rocket engine, an extension of work begun in 1946. Late in 1958 the first reactor for nuclear rocket propulsion is expected to be ground-tested at the Nevada Test Site by the Air Force and the Atomic Energy Commission.

The Air Force has begun an advanced design competition for a liquid-propellant rocket engine that will provide 1,000,000 pounds of thrust from a single combustion chamber. This engine might be used to put up either a manned satellite weighing about 20,000 pounds or an interplanetary reconnaissance vehicle weighing about 5,000 pounds. This practice of starting work on more powerful engines before deciding upon a specific need has proved highly successful.

#### *Equipment*

During the year, SAC began converting the high-frequency air-ground stations with the Strategic Communications System and the SAC control network to the single side-band mode of operation. This latest transmission technique is more reliable, uses power more efficiently, and makes better use of the high-frequency spectrum. The Air Force also started examining operational concepts and future requirements for space and satellite communications.

A practical method was demonstrated for measuring the distance from an airborne source of electromagnetic radiation to an airborne receiver without revealing the receiver's position. This technique may ultimately permit interceptors to measure the range to jammer-equipped enemy bombers and carry out their defensive mission without interference.

The emphasis on space technology resulted in a shift in reconnaissance equipment from radar and infrared devices back to photography, since electronic devices cannot transmit a recognizable image over vast distances. New films, lenses, and reading devices, able to collect and deliver four to eight times as much data as equipment used during the Korean war, were expected to have a pronounced impact on reconnaissance aircraft, photographic laboratories, and intelligence facilities.

### *Human Factors*

The need to accommodate man to high altitudes and space flight is one of the conditioning factors in the development of space vehicles. A serious problem, the tendency of materials to stretch or contract when inflated, hindered the development of full-pressure suits suitable for high-altitude flying. A new open-weave material that generally retained its shape under pressurization promised full-pressure garments that would give flyers far greater ease of movement and comfort. To protect the X-15 pilot during his initial flights, a full-pressure suit was developed to provide ventilation and protect him against both gravity forces and the radiant heat of space.

A protective goggle was tested as an interim device to prevent flash blindness among aircrews exposed to nuclear explosions. Any sudden increase in ambient light sets off a small motor that closes a metal grid over the goggle lens in less than 500 microseconds and reduces light transmission from 30 down to 0.01 percent. Ultimately, a chemical coating may be developed for goggles and canopies that changes density in response to changes in the intensity of light.

### **Basic Research**

Events of the past year brought more general recognition of the importance of basic research. In March 1958, an additional \$7.5 million was provided to supplement the fiscal year 1958 appropriation of \$25 million for USAF basic research.

To study the intensity of cosmic rays and the earth's magnetic field at very high altitudes, the Air Force used balloons as platforms from which instrument-carrying rockets could be launched. In the last test of Project FARSIDE in October 1957, a rocket was fired successfully from a balloon 96,500 feet in the air.

During rocket and balloon flights, catalytic reagents injected into the atmosphere at altitudes between 40 and 95 miles released energy from free radicals. It appeared that the illumination and ionization produced by these chemicals could be controlled to some extent. The energy of recombination from atomic oxygen showed promise as a possible new source of power for high-altitude vehicles.

Knowledge of the structure of nucleons and the nature of the basic nuclear force was gained during the past year. By using electronic scattering techniques to study nuclear structure, researchers determined accurate sizes for the proton and the nucleon and, for the first time, probed the magnetic cloud in the neutron.

Recent nuclear and molecular research has produced as a byproduct a new experimental device known as the solid-state MASER (microwave amplification by stimulated emission of radiation). This new device may have as many military applications as the transistor, although not the same uses. MASER will give the Air Force a microwave amplifier with a low-noise variable frequency, an extremely sensitive device for long-range radar detection, better components for an automatic celestial navigation device, and more accurate weapon-firing systems and missile-guidance systems. During the past year the Air Force began operating its first solid-state MASER.

The perfection of the ion-emission microscope made it possible for the first time to view a single atom forming part of the surface of a solid. This microscope, which can magnify up to five million times, photographed a tungsten atom of about five one-thousandths of one-millionth of an inch in diameter. This capability provided information of great value in the fields of metallurgy and materials.

## VIII. Procurement and Production of Materiel

### Industrial Readiness

As procurement of missiles increased, the Air Force adapted air-frame production space to accommodate missiles, which can be assembled within a smaller area than aircraft. New facilities for missile production or testing were provided only if conversion of existing facilities was inefficient or dangerous. In some cases, missile production demanded temperature-controlled, dust-free work and test areas to insure that components would be reliable.

The Air Force used \$90.9 million of its fiscal year 1958 procurement and production appropriations to expand industrial facilities. This sum was much less than the previous year's \$338.5 million because of some program changes and much greater use of existing facilities. BOMARC production was consolidated at a single source; B-52 and KC-135 production rates were reduced and some special fuel and solid propellant plants eliminated.

The Air Force is adjusting its industrial mobilization concepts to fit its industrial base to the needs of current and future programs rather than maintaining standby plants or production lines. Also this change permits more joint investment in the future by the industry. The Air Force began to reduce its investment in industrial facilities and induce its contractors to invest more of their corporate funds in USAF programs. Air Force money was invested in industrial facilities more to support development rather than production programs.

During fiscal year 1958, tax amortization cases referred to the Air Force dropped to 174 from 258 for the previous year. Applications for tax amortization supported by the Air Force dropped even more sharply, from 135 to 57, and from \$164 million to \$68.3 million. This decline was largely attributable to Public Law 85-165 which restricted eligibility for rapid tax amortization almost exclusively to facility expansions in support of research and development.

The shift in emphasis from aircraft to missile production during the next 3 years will render surplus more than 56,000 items of industrial equipment. The Air Force has already taken steps to dispose of more than 8,000 such items. On June 30, 1958, there were 101,843 items of production equipment in the USAF industrial inventory,

valued at \$1.16 billion. Of these, 74,135 were in active use and 27,708 were idle, in storage, or awaiting disposal.

The supply and demand for basic materials remained relatively stable except for a shortage of helium. Restrictions on the use of helium were applied only to commercial orders; USAF programs were not affected.

### **Procurement Policies**

To insure uniformity in carrying out the Armed Services Procurement Act of 1947 and to provide a basis for sound decisions, the Air Force started a systematic review and comparison of the procurement directives of all the armed Services.

A new Air Force policy called for advertising contracts for repair and overhaul work although the cost of materials could not be determined. According to USAF procurement instructions, the cost of the materials to be used had to be a relatively small part of the total cost of repair or overhaul, and the materials for which reimbursement would be made were expected to be available to all bidders at basically the same price. Procurement instructions provided that qualified Canadian and American sources be given equal consideration in the placement of research and development contracts.

A joint Headquarters USAF-AMC effort introduced "two-step" advertising when only performance specifications were available and it was possible to obtain data on the item. As a first step, contractors submit technical proposals without prices. After evaluation, the contractors with satisfactory proposals can bid under normal advertising procedures, and the award is made to the lowest bidder. The purpose of this procedure is to enable the Air Force to use more formal advertising in procurement.

The Air Force has consistently pursued an aggressive small business program, both in prime contracting and subcontracting, and has assigned small business specialists to various installations to promote this program. At the end of fiscal year 1958, over 2,700 industrial concerns throughout the United States were working on Air Force prime contracts for military equipment. Of these, 1,751 plants, or 65 percent, were in the small business category. During the year, the Air Force placed almost \$757 million in prime contracts with small business. While this sum does not seem large in relation to total procurement funds, it represents 17.2 percent of all procurement other than aircraft, engine, and missile systems, which small business could not possibly provide.

The extent of small business participation in the subcontracting area was even more impressive. The large prime contractors pass on to small business subcontractors approximately 20 percent of the

dollars they receive from the Air Force each year. In fiscal year 1958 alone, small business concerns were expected to participate to the extent of more than \$2.5 billion in the contracts placed with the large industrial organizations.

### **Aircraft and Missile Production**

As a result of program changes during the summer and fall of 1957, the Air Force recouped \$555 million in fiscal year 1958. In previous years, there had been recoupments of more than \$1 billion a year as a result of price redeterminations and contract terminations based on Korean war purchases. In the future, the primary source of recoupments will be program revisions.

The mounting cost of new weapons largely invalidated earlier USAF cost estimates and necessitated reductions in the number of aircraft purchased. In revising aircraft programs, USAF policy was to economize without compromising the quality of weapons. During fiscal year 1958 the Air Force directed \$7.9 billion for new procurement. Of this figure, aircraft and parts received 49 percent; missiles, 27 percent; and modifications, industrial facilities, and components, 24 percent. Deliveries of aircraft in fiscal year 1958 amounted to only 80.2 percent of fiscal year 1957 deliveries. Aircraft acceptances reached 99.3 percent of the final schedule for this period.

Production shifted sharply from aircraft to missiles from a ratio of 75 to 25 percent in fiscal 1957 to 60 to 40 percent in fiscal 1958. In the nonballistic missile field, USAF employment and suitability tests of the SNARK missile began in June 1958, but SNARK production was stretched out and production of ground support equipment and operational facilities was decreased in favor of ballistic missiles. RASCAL procurement was also reduced in favor of higher priority missiles. MATADOR manufacture ended in August 1957 with the delivery of the last TM-61C, and its successor, the TM-76A MACE, entered production in May 1958. The number of BOMARC IM-99A's ordered in fiscal year 1958 was reduced from 99 to 78 to make funds available for the advanced IM-99B, and for QB-47 drones.

Deliveries of GAR-1D and GAR-2A FALCONS met the production schedules. The Air Force began to build up production of the GAR-3, while it delayed production of the GAR-4 for technical reasons in May 1958. Testing and production problems slowed down deliveries of the GAR-8 SIDEWINDER.

The B-52G, which went into production during the fiscal year, has longer range than other B-52 models and carries missiles. Operating units also received B-52E's with an improved bombing-navigation system. 28 KC-135's were added to the production program to pro-

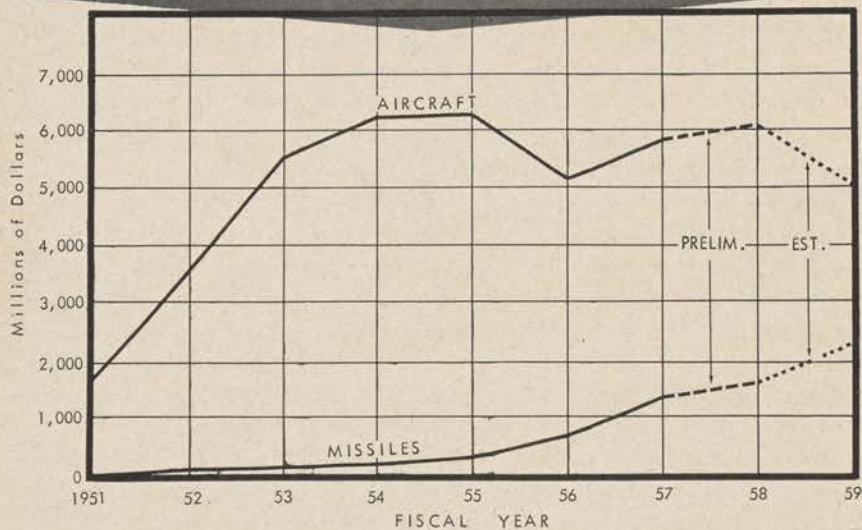
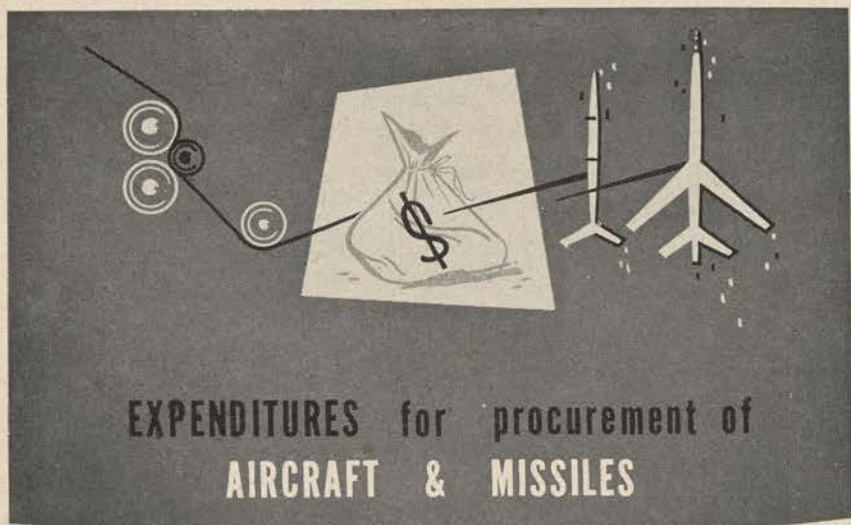


Figure 16

vide for more tanker support. After successful flight tests, the B-58 Hustler entered the initial stage of production.

Also in the early stages of production were the F-105 and the F-106. The Tactical Air Command accepted its first F-105 in May 1958, and a production-line F-106 interceptor made its first flight in August 1957. Manufacture of the first Century series fighter—the F-100—entered its final stages, and the F-104 program was curtailed because of reductions in the force structure, limitations on expenditures, and technical difficulties. F-102 and TF-102 production was

scheduled to end by December 1958. F-101C and RF-101C were to end gradually during fiscal year 1959, but the "B" interceptor version was scheduled for increased production.

Manufacture of the C-123 assault transport ended in July 1958. Deliveries of the C-130 Hercules and C-133 Cargomaster, incorporating a new forged gear and an improved propeller blade, were on schedule.

T-33 trainers were not included in the fiscal year 1959 budget, and T-38's were reduced from 26 to 13 because of development problems in the J-85-5 engine.

Rapid changes in weapons profoundly affected the aircraft engine industry. A new industrial segment made up of liquid- and solid-rocket producers became firmly established for developing missile propulsion systems. In fiscal year 1958, aircraft engines produced amounted to 86.3 percent of the previous year's production and 99 percent of the number scheduled.

Procurement of electronic equipment continued to increase with eight project offices established to integrate production of the growing number of highly complex electronic supporting systems. During fiscal year 1958, AMC received \$637 million to purchase such equipment.

### **Military Assistance Program**

During the past 9 years, the Air Force, through the Military Assistance Program (MAP), helped friendly nations to establish effective air forces, and enabled many of them to modernize by reequipping their air units. Modern aircraft, including Century fighters, have been sent to friendly countries, and the Air Force has also initiated its first MAP missile program.

The Military Assistance Program has equipped or supported approximately 210 foreign squadrons, more than 80 percent with jet aircraft. About two-thirds of these squadrons are located in the NATO nations. During fiscal year 1958, MAP-supported aircraft flew more than 1,250,000 hours. Jet aircraft flew 58 percent of this total figure, with F-84's and RF-84's accounting for 47 percent of the total jet flying time.

MAP training has emphasized the proper use and maintenance of the equipment supplied by the United States. Since 1950, USAF schools have graduated almost 3,000 MAP pilots, given specialized flying training in this country and overseas to more than 5,000 foreign pilots, and provided more than 28,000 technical training spaces under the Military Assistance Program. The Air Force has also helped friendly nations set up their own training programs.

Foreign aid is designed to meet military, political, and strategic objectives. Because of the urgent need, most military assistance went to NATO nations during the early years of the program, but more recently, larger amounts have been shipped to the Far East and Middle East as nations in these areas have been subjected to Communist pressure. Of the \$7.2 billion set aside under MAP during the past 9 years, goods and services valued at about \$6.3 billion have been supplied, or 86 percent of the total program. NATO nations have received \$3.9 billion of the materiel and services furnished.

Military assistance has been distributed primarily through grant aid and mutual security military sales. A form of grant-aid was furnished several countries under the Presidential determination clause of the Mutual Security Act of 1954, as amended, which provided for contingency funds that could be used at the President's discretion. Of the 44 countries eligible for grant aid during fiscal year 1958, 37 received benefits in the form of equipment or training, while 44 of the 65 countries entitled to buy equipment through mutual security military sales made actual purchases.

During the 9-year period of MAP operations, approximately \$4.3 billion of grant-aid funds has been programed for aircraft, spare parts, and aeronautical equipment. More than 12,000 aircraft have been shipped to these nations.

## *IX. Logistical Services*

Rapid, efficient, and economical support of modern weapons is the goal of USAF logistical planners. Using high-speed communications, electronic processing of stock-control data, increased airlift, and fast surface transportation, the Air Force expanded the system of supplying oversea bases and friendly nations directly from the United States. Applied in Europe during the year, these procedures were also scheduled for the Pacific area. As a result, the Air Force will no longer have to maintain overseas large and expensive stockpiles of materiel that rapidly grow obsolete.

In May 1958, AMC transferred the Headquarters Air Materiel Force European Area (AMFEA) from Wiesbaden, Germany, to Châteauroux, France. The Central Air Materiel Area Europe (CAMAEE) depot at Châteauroux is phasing down, and the residual functions of CAMAEE have been consolidated and combined with those of Headquarters AMFEA. In July 1958, AMC also closed the Northern Air Materiel Area at Burtonwood, England, and the Southern Air Materiel Area at Nouasseur, Morocco, and began disposing of their residual stocks. Nouasseur was turned over to SAC, and Burtonwood is scheduled for reassignment to the Royal Air Force. USAFE bases now requisition supplies directly from AMC depots in the United States, and maintenance work is handled by contractors.

Ballistic missile logistics demanded speed and accuracy in the handling of information. The Air Force is using electronic data processing equipment to handle identification and configuration records, distribution figures needed for automatic resupply, requirements computations, and failure and consumption reports. Transceivers at Norton AFB, California, and at USAF contractor plants were used to transmit missile program data to the processing center at San Bernardino, California. Here, a large-scale computer, installed in February 1958, processed ballistic missile logistics data.

To simplify and speed up missile logistic support, AMC will retain control at depots and choose the most effective combination of civilian contractor and USAF support. Existing plant facilities, whether private or Government, will be used to the maximum, avoiding new construction whenever possible.

## Supply and Services

Under the interservice supply support program, the Air Force continued to exchange items and services in common use with the Army and Navy. The Interservice Supply Support Committee, which administered this program, was replaced in July 1958 by the Armed Services Supply Support Center, which took over responsibility not only for this program but also for the Department of Defense cataloging and standardization program and for analyzing the management of common items.

Concentration on items of high value paid off in a steady drop in funds required for initial spares. In fiscal year 1951, for example, 43.4 percent of the cost of the total aircraft program was spent for this purpose; by fiscal year 1958, this cost had dropped to 23.5 percent.

The Air Force continued to purchase certain goods locally, thereby saving storage space and personnel and reducing inventories. There were 160,000 items authorized for local purchase, of which 7 percent was supplied by General Services Administration. USAF business with this agency during fiscal year 1958 amounted to \$64.5 million.

As older models of aircraft became excess to Air Force needs, their components and other valuable equipment were recovered and the remainder disposed of as scrap, donated, or sold. The San Bernardino Air Materiel Area, California, handled the distribution and disposal of excess aircraft throughout the world. Before aircraft were declared excess, a check was made to determine the impact of their disposal on the market. The Air Force began reclamation work on 260 B-36's, and the items recovered were used for B-36's, C-97's, C-124's, and other aircraft still in use.

Reduction of base inventories not only saved money but reduced the rate of aircraft out of commission for parts (AOCP). To keep down both the AOCP and the rate of aircraft not fully equipped (ANFE), SAC requisitioned supplies for B-52's and KC-135's directly from the Oklahoma City Air Materiel Area, which tried to meet emergency needs within 36 hours. During fiscal year 1958, the AOCP rate for B-52's and KC-135's averaged about 1 percent and the ANFE rate less than 3 percent. There was also a major improvement in support of ADC's F-102's during the year. But TAC's B-66's, F-100's, and F-101's showed little improvement, largely because of the high percentage of critical items needed, and AMC took steps to remedy that situation.

## Maintenance

Maintenance and modification during fiscal year 1958 cost the Air Force \$1.2 billion. Modernization costs accounted for almost half of the total—\$587.6 million. To reduce costs, minor modifications that could be approved by AMC were limited to those needed to carry out command missions and insure flight safety.

During fiscal year 1958 the Air Force continued to rely on manufacturers for much of its maintenance work, contracting for more than \$263 million worth of depot-level maintenance. About \$67 million was also authorized during this period to hire civilian contract technicians for assistance at air bases.

Until the missile program is stabilized and additional experience gained, the Air Force plans to use civilian contractors for depot maintenance of specific components and ground support equipment. The Air Force will transfer this work to a USAF depot when sufficient engineering knowledge becomes available. USAF depots normally will do depot maintenance on items common to all missiles.

In fiscal year 1958 a revised concept of maintenance was applied to MATS aircraft. This replaced IRAN with PARC, progressive aircraft reconditioning cycle maintenance for the accomplishment of depot level inspection of flying time. This type of maintenance on a flying time basis is more appropriate for the MATS high utilization aircraft. Application of the PARC concept has resulted in improved operational availability of aircraft in MATS, due to a reduction in the aircraft down-time for depot maintenance.

Continued introduction of the modern weapon systems increased the cost of the total depot maintenance and modification required. This resulted in a lack of depot maintenance funds to fully support the second-line low priority aircraft such as the C-45, C-47, and B-25. It was necessary to delete time phase scheduled IRAN for most of these aircraft and require all necessary maintenance to be accomplished at base level by the using commands. Only the minimum essential depot level maintenance required to keep the airplanes in safe operating condition was provided for these aircraft.

In July 1958, after several years of study, the Air Force published and distributed a new manual designed to keep organizational and field maintenance geared to changes in missions and in aircraft design. The prescribed procedures were made sufficiently flexible to permit each command to adapt them to its specific needs.

The increased noise generated by newly developed jet engines caused injuries to Air Force personnel and structural damage to

aircraft due to acoustically induced fatigue, and compounded the nuisance to surrounding communities. The Air Force took the lead in hastening the development and test of a family of portable noise suppressors for use during ground run-up of engines.

### **Transportation**

Routine resupply of DEW line sites in the Arctic was handled by both surface transport and airlift. The Military Sea Transportation Service (MSTS) and the Army joined in delivering equipment to sites on Baffin Island, while commercial and MSTS vessels delivered cargoes to Dutch Harbor, from where they were moved by commercial shipping to Alaskan sites. Canadian Government corporations resupplied sites in western Canada and Foxe Basin. Commercial contract carriers provided most of the necessary airlift to the sites.

Commercial pipeline companies brought petroleum products to 3 additional air bases during the fiscal year, bringing the number of bases to 16. The Air Force estimated that this service saved \$3.2 million annually in the transport of aviation gasoline and jet fuel. By July 1958, six bases were also served by Government-owned pipelines connected to nearby facilities where shipments could be received by tanker and barge.

In July 1957 the Air Force officially adopted a direct reservation system for the air movement of military personnel to oversea assignments. Officers and airmen reported directly to aerial ports of embarkation about 2 hours before they were scheduled to depart aboard a specific aircraft on which reservations had been made. Based on the movement of 41,990 people during the first year, the Air Force estimated a saving of \$604,000, as compared with surface transportation, and of 606,000 man-days in transit time. Its success prompted the Air Force to consider expanding this system to include all military personnel returning to the United States and all dependents moving to and from oversea locations.

In October 1957 the Air Force set up a packaging and consolidation point in Oakland, California, where small cargoes from USAF bases and from contractors were consolidated in reusable metal shipping containers for surface transport to Pacific locations. This method of cargo-handling reduced packing and inland transportation costs, and AMC considered establishing similar units in Brooklyn, New York, and New Orleans, Louisiana.

## X. Management

### Comptroller Service to Management

During fiscal year 1958 the Air Force faced the problem of decreasing its operational organizations, manpower, and expenditures. At the same time it had to expand activities and expenditures in certain critical areas, such as missile development. In reconciling these conflicting demands and in order to lay a basis for sound decisions, the comptroller organization worked to give management accurate, detailed information in every critical area.

#### *Reporting*

Headquarters USAF initiated a Current Status Report in January 1958 to monitor progress being made on all major Air Force programs. All major commands and all agencies of Headquarters USAF submit monthly reports on the status of these programs. The most critical of the problem areas, with an analysis of their implications, are reviewed monthly by top management. This method of management control makes possible better and quicker management decisions for speeding up, holding back, or rephrasing related programs.

The Air Force integrated reporting system was improved by the refinement of existing reports, wider use of Computer Center in the Pentagon, increased mechanization of report-handling, and continued emphasis on standardizing procedures and applications in both mechanical and electronic data-processing.

#### *Working Capital Funds*

The Industrial Fund for the Airlift Service went into operation on July 1, 1958. The Fund charter established the basis for airlift services and provided for an initial cash working capital of \$75 million. The commander of MATS was designated as executive director of the Single Manager Operating Agency for Airlift Service.

#### *Integration of Accounting and Finance Organization*

The Air Force further integrated accounting and finance operations in the field, with the help of a Headquarters USAF team which as-

sisted major commands in simplifying recordkeeping. The Air Force Accounting and Finance Center refined its organization on the basis of experience gained since the consolidation of functions.

### *Auditing*

Auditing of missile procurement costs was made more manageable by reducing clerical work in processing reimbursement claims by contractors. There was still a significant increase in unaudited costs and in the number of overdue audits. AMC requested more audit assistance to evaluate cost forecasts and also to negotiate contracts on a firm price basis.

Internally, the Air Force distributed uniform audit programs to all USAF installations to place emphasis on those portions of the activities or accounts where the greatest need existed. Accordingly, in designing the programs, consideration was given both to the results of prior audits and to management requests for audit assistance. Audit findings were also summarized and pertinent recommendations presented to individual commands or to the whole Air Force.

### **Manpower Management**

Manpower management was spotlighted during the year when the Air Force met the lowered manpower ceilings without seriously affecting Air Force combat capability. The Air Force avoided making reductions in the critical areas of operations, associated maintenance, and development. In addition, the Air Force consolidated, redeployed, or inactivated units when it appeared that this might be done without serious loss of efficiency.

Utilization of USAF military personnel for June 30, 1958, as compared with June 30, 1957, indicates the nature of the reductions made.

	1957 <sup>a</sup>	Percent	1958	Percent
Operating Forces.....	578,264	62.9	569,279	65.4
Supporting Forces.....	142,726	15.5	149,727	17.2
Training Forces.....	177,433	19.3	144,811	16.6
Miscellaneous <sup>b</sup> .....	21,412	2.3	7,339	.8
Total.....	919,835	100.0	871,156	100.0

<sup>a</sup> A revised and more accurate system for tabulating the operating, supporting, and training forces was in effect during fiscal year 1958. The fiscal year 1957 data presented in the previous report has been adjusted to the new system to provide a comparison.

<sup>b</sup> Includes transients, hospital patients, and personnel on special assignment.

In its long-term program to achieve the most effective use of manpower, the Air Force established a system for the constant review and determination of future requirements for rated officers. USAF analysts devoted considerable effort to determine the manpower costs

of USAF weapon systems—information necessary to support operational decisions. Manpower needs and costs for such programs as SAC alert and dispersal, SAGE, the ballistic missile early warning system, and the succeeding generations of aerodynamic and ballistic missiles were continually evaluated.

### **Administrative Services**

In July 1957 the Air Force took over from the Army the responsibility for administering the personnel records of units, officers, and airmen separated from the U.S. Air Force, the Air Force Reserve, and the Air National Guard. As of June 30, 1958, there were 1,784,871 cubic feet of USAF records—1,261,027 in current files, 333,307 in records staging areas, and 190,537 in records centers and the National Archives. The Air Force authorized destruction of an estimated 592,000 cubic feet of temporary records during fiscal year 1958.

The Air Force used the postal service to a much greater extent for sending small supply items and publications from its depots. AMC began mailing all small parcels, subject to postal limitations, and succeeded in speeding up deliveries, particularly of high-priority items. On the recommendation of the Air Force, the Post Office Department agreed to route official mail directly to MATS air terminals, thereby reducing costs and time in transit. By the end of June 1958, 337,984 pounds of official mail parcels had been moved in this manner.

At selected oversea locations, commercial banks instead of USAF post offices handled money orders. This service test proved so successful that the idea was to be adopted in other oversea areas. The change was expected to release 135 airmen in Europe and the Pacific area for other duties.

On the recommendation of the Air Force, the Congressional Joint Committee on Printing simplified administration of the printing program. Committee approval was no longer needed to obligate contract funds, and the delay in procuring printing at the beginning of each fiscal year was averted. The Committee also approved printing plants for Norton AFB, California, and the Air Force Academy. Combining duplicating equipment with industrially funded printing plants at 7 USAF installations resulted in the release of 339 items of equipment and a saving in manpower.

### **Inspector General Activities**

The Inspector General continued to investigate all areas of USAF activity in order to determine deficiencies and to suggest techniques that would enhance combat effectiveness. USAF inspectors paid special attention to unit readiness, procurement inspection, flying safety

training, security, and the problems arising from new and future weapons. Weapon analysts prepared a nuclear accident-prevention program and put interim measures into effect. They also informed USAF organizations and contractors of potential weak spots in their weapon system programs.

### *Inspection Activities*

Air Force inspectors kept USAF operations under constant surveillance, bringing deficiencies to the attention of the commanders concerned. Better ways to do the job were suggested during inspection of units and were publicized for the benefit of other USAF organizations.

In a thorough evaluation of USAF procurement, particular emphasis was placed on contract management, the operation of weapon system project offices, quality determination, and base procurement. Inspectors checked the effectiveness of ballistic missile management, restrictions in funding, accuracy of requirements computations, and on competition between and utilization of small business concerns. The Inspectors were especially concerned about weapons being produced and whether they would carry out the current and future operational missions for which they were designed.

Five thousand military personnel were tested during a survey of physical fitness. Electronic data-processing simplified and sped the task, demonstrating that this technique could be used for future studies of this nature. Detailed evaluation of airman basic and technical training and of officer technical training contributed to improved curricula, better testing, an increase in qualified instructors, and revived interest in physical training.

### *Flying Safety*

The goal of the USAF flying safety program is to prevent aircraft accidents by stressing training and education, and to eliminate aircraft flaws that might cause pilot or maintenance errors. A better understanding of the relationship between the man and the machine could help close the widening gap between the abilities and limitations of the pilot and those of the aircraft or component.

Flight safety experts in fiscal year 1958 completed special studies on subjects ranging from human ability in high-performance flight to guided missile flight safety. Among studies begun was a comparison of the safety of single-jet and twin-jet aircraft. The first group of officers from friendly nations, together with 613 USAF officers, completed a flight safety course at the University of Southern Cali-

fornia. Flight safety officers also explained USAF aircraft accident-prevention measures to the press and the public.

The major aircraft accident rate continued to fall, dropping to a new low of 11 major accidents per 100,000 flying hours during the first 6 months of 1958. There was not a proportionate decline in fatal accidents. Numerous recommendations to correct deficiencies in design, materiel, maintenance, operations, and training were put into effect.

#### *Security Matters*

About 355,000 investigations of Air Force military, civilian, and contractor personnel were initiated during fiscal year 1958. Most of these were personnel background investigations in connection with granting access to classified information. Security officers thoroughly probed allegations of sabotage, espionage, subversion, bribery, fraud, collusion, gratuities in the handling of USAF materiel, and other criminal acts. Commanders, alerted to weaknesses in security defenses, immediately tightened these defenses wherever indicated.

The Air Force paid particular attention to document security, the dissemination of classified information, and industrial security. Careful consideration was given to the effect that the release of USAF technical data would have on the Air Force mission. Work continued on the preparation of security measures to protect classified data entering high-speed, electronic data-processing systems. The Air Force also tried to assure prompt and timely declassification of data, since manpower, space, and equipment could be saved if documents no longer needed protection.

#### *Provost Marshal*

The priority task of the Air Force security system is to defend air and missile bases. During the year, well-armed and trained air police and sentries, together with police dogs, patrolled sensitive areas, and mobile teams were ready to resist guerrilla-sabotage attacks until friendly troops could arrive. This new procedure permitted a more rapid response to attack than the former system, which required mobilization of troops after an emergency arose.

## *XI. Budget*

The Air Force budget request for fiscal year 1958 as presented to Congress by the President totaled almost \$17.5 billion in new obligational authority, including \$1 billion for military construction. Congress approved legislation providing \$16.8 billion in new obligational authority for the Air Force, including \$900 million for military construction. This was about \$848 million less than Congress provided initially in fiscal year 1957. Together with more than \$5.4 billion in unobligated funds from previous years and anticipated reimbursements of \$730 million, the Air Force had more than \$22.9 billion available for obligation early in the fiscal year.

During the fall of 1957 it became evident that a number of pressing requirements could not be postponed. The Secretary of Defense therefore approved a fiscal year 1958 supplemental appropriation of \$910 million, which was quickly granted by Congress in February 1958. This increased the new obligational authority for fiscal year 1958 to almost \$17.8 billion and the total available during the year to more than \$23.8 billion. Actual obligations during fiscal year 1958 amounted to almost \$19.7 billion, and expenditures reached \$18.4 billion.

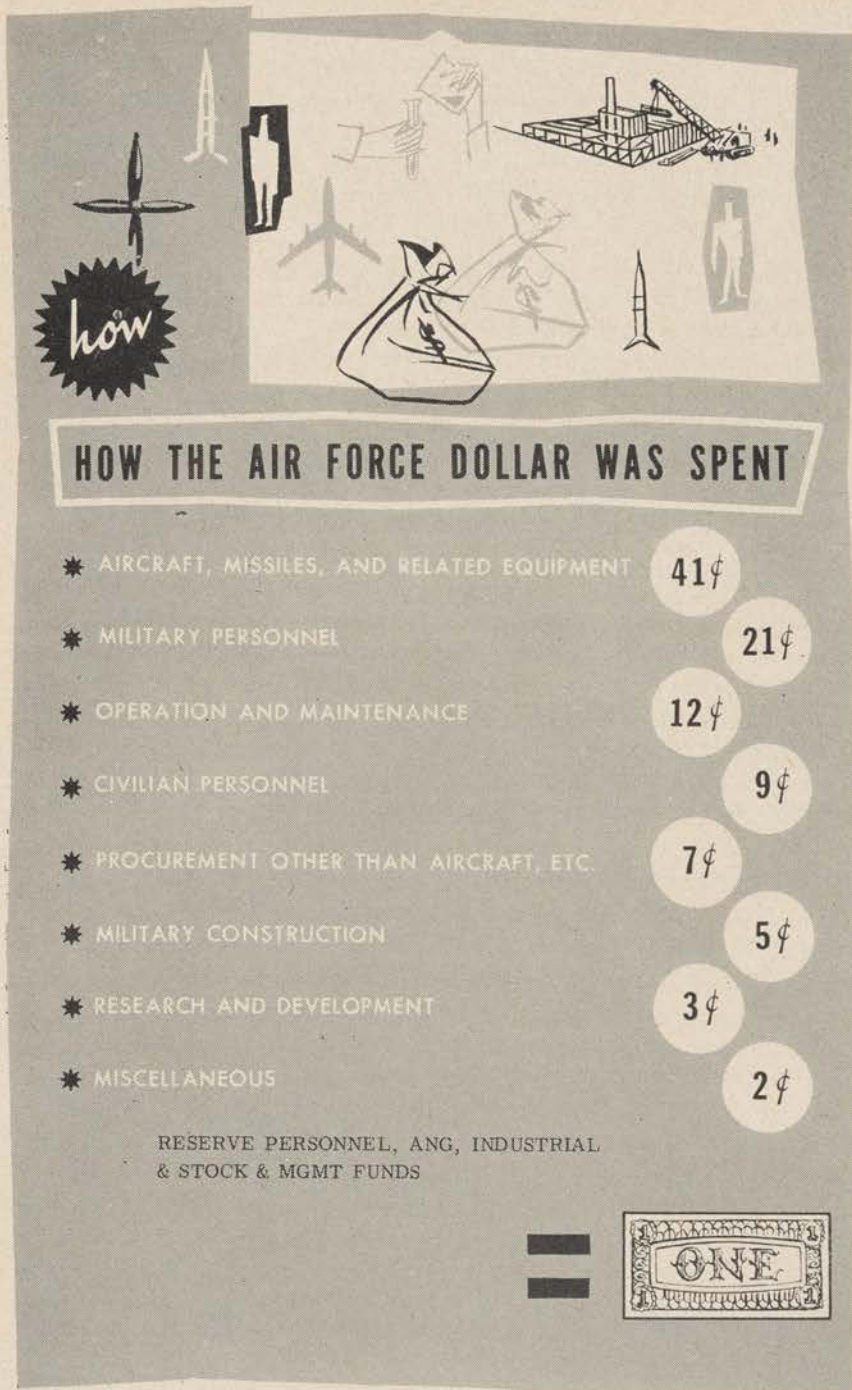


Figure 17

AMOUNT AVAILABLE FOR OBLIGATION DURING FISCAL YEAR  
1958—AS OF JUNE 30, 1958

Department of Defense Appropriation Act, 1958, PL 85-117	<sup>a</sup> \$15,930,220,000
Supplemental Appropriation Act, 1958, PL 85-170	900,000,000
Supplemental Defense Appropriation Act, 1958, PL 85-322	910,000,000
Joint Resolution, Title II, PL 85-472 (providing for increased pay cost for FY 58 and for other purposes)	16,697,400
<hr/>	
Total new obligational authority enacted	<sup>b</sup> 17,756,917,400
Unobligated balance of prior-year programs	5,424,076,538
Unobligated balance of appropriation transfer acts	7,845,476
Transfer from Aircraft and Related Procurement to DOD	-33,000,000
Transfer from Procurement Other Than Aircraft to Airways Modernization Board	- 5,693,000
Transfer from Operation and Maintenance to DOD	-18,400,000
Transfer from Operation and Maintenance to Air Force Industrial Fund	-67,700,000
Transfer from Research and Development to Airways Modernization Board	- 5,293,000
Transfer from DOD Emergency Fund to Rsch and Devmt.	29,435,000
Transfer from Reserve Personnel to AF Industrial Fund	- 4,500,000
Transfer from Air Natl Guard to AF Industrial Fund	- 2,800,000
Anticipated reimbursements	789,350,456
<hr/>	
Total avail for obligation during fiscal year 1958	<sup>c</sup> 23,870,238,870

<sup>a</sup> Includes \$21.5 million for "establishment of air navigational facilities CAA" pursuant to provisions of Title V, PL 85-117.

<sup>b</sup> Excludes funds for "preparation for sale or salvage of military property."

<sup>c</sup> Excludes \$75.0 million for transfer to Air Force Industrial Fund for industrialization of MATS.

### The Expenditure Problem

The efficient execution of the USAF program was affected by the necessity of keeping the Government from breaching the national debt limitation imposed by Congress. Late in fiscal year 1957 the Air Force had projected expenditures of \$18.8 billion for fiscal year 1958 against the programs then contemplated. Within this program, the Air Force set a relatively high rate of procurement spending during July and August 1957 which was in excess of the rate of spending contemplated. To meet the established goals, the Secretary of Defense informally set a \$17.6 billion expenditure level for initial planning for fiscal year 1958, and in August 1957, an expenditure level of \$17.9 billion for the year was formally established.

To make certain of maintaining this level, the Air Force took a number of actions to restrict expenditures. Overall, it limited expenditures for the first half of the fiscal year to 50 percent of the total available for the whole year. It delayed delivery on less urgent end-item contracts; it reduced expenditures on effort-type contracts

other than ballistic missiles by 5 percent below the planned rate; it directed a reduction by November 30, 1957, of 5 percent in stock fund inventories below the estimated June 1957 level; it directed reductions in percent of progress payments allowed on new and existing procurement. The Air Force also deferred contract awards for construction projects, reduced civilian personnel strength, and accelerated previously directed reductions in military strength. The Air Force also set specific monthly expenditure limitations on the major contractors, who accounted for about 75 percent of the major procurement categories.

In late October 1957 the expenditure ceiling was lifted somewhat. The Secretary of Defense granted the Air Force request for an increase in expenditure level of \$300 million for the first half of fiscal year 1958, and \$400 million for the entire fiscal year 1958, making a total of \$18.3 billion. The Air Force thereupon suspended the expenditure limitations imposed on contractor facilities and established target amounts in their place.

By December 1957, it was apparent that the Air Force had succeeded in controlling the expenditure rate, and the expenditure limitations were officially changed to expenditure objectives. Thus, it became possible for the Air Force to set the expenditure estimate for the entire fiscal year 1958 at \$18,441 million, which included more than \$100 million against the proposed fiscal year 1958 supplemental appropriation.

The Air Force had successfully solved the expenditure problem. At the end of the fiscal year, the net expenditure amounted to \$18,435,350,979, slightly less than the estimate established earlier.

USAF NET EXPENDITURES BY MAJOR FUND CATEGORIES  
DURING FISCAL YEAR 1958

Aircraft and Related Equipment.....	\$7, 660, 609, 716
Procurement Other Than Aircraft.....	1, 264, 242, 752
Military Construction.....	927, 983, 856
Operation and maintenance.....	3, 783, 176, 243
Military Personnel.....	3, 817, 093, 251
Research and Development.....	693, 627, 062
Miscellaneous.....	288, 618, 099
 Total expenditures.....	 18, 435, 350, 979

### The 1959 Budget

The Air Force expenditure objective for fiscal year 1959 was set initially at \$18.1 billion for both expenditures and new obligational authority. Subsequently, the Secretary of Defense authorized the Air Force to increase its objective to meet certain high-priority require-

ments which could not be funded within the \$18.1 billion amount. Some of these requirements were included in the fiscal year 1958 supplemental appropriation of \$910 million granted by Congress in February 1958. As approved by the President, the budget requested \$18.04 billion in new obligational authority for the Air Force for fiscal year 1959. During the course of Congressional hearings, budget amendments totaling \$614 million were transmitted by the President, bringing the total request to \$18.658 billion.

Although it made numerous specific reductions, the Congress also provided funds in excess of the President's budget in several areas (\$90 million added for MINUTEMAN; \$48 million for HOUND DOG; \$55.6 million for KC-135's; and \$140 million for strategic airlift aircraft), so that the total amount finally appropriated for fiscal year 1959, \$18.672 billion, was \$14 million above the amended President's budget.

*Malcolm A. MacIntyre*

MALCOLM A. MACINTYRE,  
*Acting Secretary of the Air Force.*

APPENDIX







Navy Personnel, General Expenses.....	3,994	87,946	-2,700	85,246	5,858	95,098	90,506	1,802	2,720	4,502	4,217
Military Personnel, Marine Corps.....		630,000	-20,551	609,449	6,069	615,518	606,808	9,163	-513	8,649	
Reserve Personnel, Marine Corps.....		23,309	-700	22,609	1,523	24,132	23,931	504	-303	201	
Marine Corps Troops and Facilities.....	4,068	178,408	-5,000	173,408	6,152	183,628	178,531	2,000	3,037	5,097	3,733
Marine Corps Procurement.....	387,132	857,745	-11,900	845,845	1,613	428,745	170,728	67,367	-3,011	238,016	238,016
Aircraft and Facilities.....		1,790,263		1,837,000	45,282	891,127	878,139	11,290	1,707	12,998	10,000
Aircraft and Related Procurement.....		6,068		821,784	79,763	185,502	2,427,831	1,038,420	69,803	1,464,697	1,464,613
Ships and Facilities.....	955,907	1,880,000	-900	1,879,100	18,783	845,672	827,640	9,346	686	18,033	7,397
Shipbuilding and Conversion.....		165,172	-6,000	159,172	9,019	3,947	1,854,615	276,987	-24,739	994,238	994,238
Ordnance and Facilities.....	157,412	207,800		207,800	7,968	167,140	164,710	2,166	264	2,430	314
Procurement of Ordnance and Ammunition.....		85,200	657	85,857	11,777	13,363	346,011	72,269	-44,231	44,341	44,341
Medical Care.....	4,528	135,399	-3,630	131,769	22,503	108,360	115,241	-6,749	-132	-6,882	a -6,882
Civil Engineering.....		25,725		573,406	30,487	165,784	164,969	3,513	-1,698	1,814	1,758
Military Construction, Naval Reserve Forces.....		527,200	46,206	573,406	(*)	25,725	13,260	7,476	4,989	12,464	12,464
Research and Development.....	748	300,000	1,001	301,001	16,754	612,886	602,637	14,709	-4,685	10,229	10,229
Service-Wide Supply and Finance.....		109,222	-2,600	106,622	15,338	317,147	315,553	2,838	-1,264	1,594	390
Service-Wide Operations.....		825		825	5,432	112,054	110,815	1,469	-229	1,239	
Naval Petroleum Reserves.....		13,658		13,658		10,752	8,902	1,850	-342	1,508	
Preparation or Sale or Salvage of Military Property.....	2,303	8,449		8,449							
Ships' Stores Profit.....											
Subtotal.....	3,396,810	10,257,387	173,211	10,430,598	310,796	242,812	14,345,017	11,504,820	1,527,621	1,321,371	2,806,699
Military Construction, Navy.....	177,927	265,000		265,000	666	443,393	304,492	138,451	-1,334	139,102	139,102
<b>TOTAL-DEPARTMENT OF THE NAVY.....</b>	<b>3,538,737</b>	<b>10,522,387</b>	<b>173,211</b>	<b>10,695,598</b>	<b>311,462</b>	<b>242,812</b>	<b>14,788,610</b>	<b>11,809,311</b>	<b>1,666,071</b>	<b>1,323,556</b>	<b>2,945,801</b>

See footnotes at end of table.

## MILITARY FUNCTIONS

## OBLIGATIONS

TABLE 1. OBLIGATIONS AND OBLIGATIONAL AVAILABILITY OF CURRENT GENERAL AND SPECIAL FUND APPROPRIATIONS, BY APPROPRIATION TITLE—Continued  
 FISCAL YEAR 1958—Continued  
 [Thousands of dollars]

Department and appropriation (1)	Amounts available for obligation, fiscal year 1959					Unobligated balances as of 30 June 1958					
	New obligational availability		Reimbursements (7)	Recoveries of prior obligations (8)	Total, fiscal year 1958 (9)	Total obligation for fiscal year 1958 (10)	Balance of appropriation and funds otherwise available (11)	Reserves (12)	Other unobligated balances (13)	Total preclosing balance (14)	Unobligated balance available, fiscal year 1959 (15)
	Congressional appropriations (3)	Transfers (4)									
Unobligated balance brought forward July 1957	(2)										
4,556,846	5,886,000	-33,000	5,853,000	348,480	10,758,325	8,000,455	1,129,034	-262,709	2,757,870	2,757,870	
DEPARTMENT OF THE AIR FORCE:											
Aircraft and Related Procurement other than Aircraft	422,129	1,531,500	-5,693	1,525,807	149,803	1,659,395	322,215	43,629	438,344	438,344	
Operation and Maintenance	9,336	4,099,598	-86,100	4,013,498	263,687	4,286,321	17,411	10,275	27,687	8,025	
Military Personnel		3,810,820	4,506	3,815,325	27,123	3,842,448	1,246	-430	816		
Research and Development	76,600	691,000	24,142	715,142	5,033	796,775	65,501	10,200	72,672	72,672	
Reserve Personnel		55,000	-7,202	47,798	410	48,208	429	15	444		
Air National Guard		263,000	-4,603	258,397	258	258,654	1,001	133	1,134		
Preparation for Sale or Salvage of Military Property		8,264		8,264		8,264	1,736	-1,736			
Subtotal	5,064,910	16,345,181	-107,951	16,257,230	794,794	22,096,334	18,797,967	-213,853	3,298,967	3,276,911	
Military Construction, Air Force	367,612	1,420,000		1,420,000	2,582	1,789,593	905,020	-2,418	902,601	902,601	
TOTAL-DEPARTMENT OF THE AIR FORCE	5,431,922	17,765,181	-107,951	17,657,230	797,375	23,886,527	19,684,959	-216,271	4,201,568	4,179,512	

Source. Standard Form 133.

Note. Amounts will not necessarily add to totals due to rounding.

\* Less than \$500.

<sup>a</sup> The specific action required to eliminate the credit unobligated balances will be determined at a later date.

<sup>b</sup> Includes \$8,000,000 which had been earmarked for transfer to "Medical Care, Navy" and thus was not available to cover increased civilian pay costs. The Congress subsequently disapproved the proposed transfer.

## EXPENDITURES

## DEPARTMENT OF DEFENSE

## MILITARY FUNCTIONS

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE  
FISCAL YEAR 1958  
[Thousands of dollars]

(1)	Amounts available for expenditure, fiscal year 1958										(10)	(11)	(12)
	Unexpended balance carried into fiscal year 1958	New obligational availability			Total, fiscal year 1958	Total expenditures for fiscal year 1958	Preexisting unexpended balance, 30 June 1958	Unobligated balance withdrawn (-) or re-stored (+) per Public Law 798	Total unexpended balance carried into fiscal year 1959	Gross unpaid obligations carried into fiscal year 1959 <sup>a</sup>			
		Congressional appropriations	Transfers	Total									
Department and appropriation	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
DEPARTMENT OF DEFENSE:													
General Fund Accounts	30,285,154	34,644,196	510,879	35,155,075	-54,992	65,385,237	38,416,420	26,968,817	-201,164	28,767,652	23,351,805		
Special Fund Accounts	7,515	b 44,117		44,117		51,631	49,282	2,349	5,375	7,725	5,875		
Management Funds	210,841					210,841	-328,367	637,208	-60	537,148	408,339		
Stock Funds	986,312				-470,000	516,312	-776,249	1,292,561		1,292,561	NA		
Industrial Funds	482,213		75,000	75,000	-120,000	437,213	2,254	434,959		434,959	NA		
Other Revolving Funds	91,598		55,000	55,000		146,598	39,923	106,675		106,675	9,701		
Consolidated Working Funds	5,382				e 228	5,610	-387	5,997	29	6,026	2,130		
Subtotal	32,069,014	34,688,312	640,879	35,329,191	-644,764	66,753,442	37,404,875	29,348,567	-195,820	28,152,747	23,777,850		
Military Construction Appropriations	2,591,253	2,000,500		2,000,500		4,591,753	1,656,965	2,934,788	-2,801	2,931,988	1,777,441		
TOTAL—Distributed on DD Form 1176	34,660,268	36,688,812	640,879	37,329,691	-644,764	71,345,195	39,061,840	32,283,355	-198,621	32,084,734	25,555,291		
Undistributed		6,855	-590,000	-583,145	644,764	61,626		61,626					
Nonclassified Items	7												
TOTAL—DEPARTMENT OF DEFENSE	34,660,274	36,695,668	50,879	36,746,547		71,406,821	39,061,840	32,344,981	-260,247	32,084,734	25,555,291		

See footnotes at end of table.

## EXPENDITURES

## MILITARY FUNCTIONS

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE—Continued

FISCAL YEAR 1958—Continued

[Thousands of dollars]

Department and appropriation (1)	Amounts available for expenditure, fiscal year 1958						Total ex- penditures for fiscal year 1958 (8)	Preclosing unexpended balance 30 June 1958 (9)	Unobligated balance withdrawn (-) or re- stored (+) per Public Law 798 (10)	Total unexpended balance carried into fiscal year 1959 (11)	Gross unpaid obligations carried into fiscal year 1959 <sup>a</sup> (12)
	Unexpended balance carried into fiscal year 1958 (2)	New obligational availability		Other transfers (6)	Total, fiscal year 1958 (7)	Total fiscal year 1958 (13)					
	Congres- sional appropri- ations (3)	Transfers (4)	Total (5)								
OSD AND INTERSERVICE AC- TIVITIES:											
General Fund Accounts:											
Salaries and Expenses, OSD.....	1,064	15,900	770	16,670		17,734	2,876	-82	2,794	2,794	
Salaries and Expenses, OPA.....	40	450	16	466		506	64	-10	54	54	
Salaries and Expenses, Advanced Research Projects.....											
Claims.....	589	12,000	83,100	83,100		83,100	81,958	-185	14,374	14,374	
Construction of Ships, MSTs.....	24,316		-600	11,400		11,989	747		562	562	
Contingencies.....	8,755	30,000	-29,974	26		24,316	9,143		9,143	3,533	
Emergency Fund.....		85,000	-85,000			8,781	1,206	64	1,270	1,270	
Retired Pay.....	27,440	554,000	3,000	567,000		594,440	32,658	-16,141	16,517	16,517	
Salaries and Expenses, Court of Military Appeals.....	26	375	12	387		413	45	-8	37	37	
U. S. Scientific Satellite.....			34,200	34,200		34,200	32,829		32,829	32,829	
Olympic Winter Games.....			3,500	3,500		3,500	3,500		3,500	3,500	
Miscellaneous "M" Accounts for Discontinued Appropriation Titles.....											
Other Revolving Fund: Acquisition, Rehabilitation, and Rental of Wherry Act Housing, Defense.....	74,829		55,000	55,000		129,929	90,677	(*)	90,677	4,857	

Consolidated Working Fund.....	(*)								(*)				
Subtotal.....	137,159	707,725	64,024	771,749	908,908	653,205	253,702	-10,363	239,340	80,325			
Military Construction, Foreign Coun-tries.....	56,066				56,066	6,617	49,449		49,449	40,440			
Access Roads.....	4,912				4,912	1,481	3,430	(*)	3,430	3,430			
Family Housing.....	5,737				5,737	2,629	3,208	-2,801	407	407			
Loran Stations.....		5,500		5,500	5,500								
TOTAL—Distributed on DD Form 1176.....	203,873	713,225	64,024	777,249	981,122	669,333	311,790	-19,163	292,626	133,612			
Undistributed.....													
Nonclassified Items.....													
TOTAL—OSD AND INTER-SERVICE ACTIVITIES.....	203,873	713,225	64,024	777,249	981,122	669,333	311,790	-19,163	292,626				
DEPARTMENT OF THE ARMY: General Fund Accounts:													
Military Personnel.....	191,126	3,129,300	350,000	3,489,300	3,680,426	3,548,130	132,296	-7,248	125,049	158,810			
Operation and Maintenance.....	822,930	3,236,289	-54,269	3,182,020	3,949,950	3,074,892	875,038	-14,081	860,977	942,189			
Procurement and Production.....	3,617,633		20,000	20,000	3,637,633	1,546,080	2,090,953		2,090,953	3,089,835			
Military Construction, Army Re-serve Forces.....	71,273	55,000		55,000	126,273	42,126	84,147	(*)	84,147	38,630			
Reserve Personnel.....	38,267	198,000	10,000	208,000	246,267	212,792	33,475	-7,866	25,609	25,610			
Army National Guard.....	59,859	334,800		334,800	394,639	332,233	62,426	-4,525	57,901	57,901			
Research and Development.....	308,232	405,045	100,863	505,908	814,140	476,381	337,759	-24	337,735	304,983			
Promotion of Rifle Practice.....	88	254		254	342	228	114	-13	100	100			
Operation and Maintenance—Alaska Communication System.....	1,068	5,386		5,386	6,654	5,317	1,337	-214	1,123	1,067			
Construction—Alaska Communica-tion System.....	1,268				1,268	402	866		866	194			
Miscellaneous "M" Accounts for Discontinued Appropriation Titles <sup>a</sup> .....	1,871				1,871	-9,171	11,042	-9,400	1,382	1,582			

See footnotes at end of table.



TOTAL—DEPARTMENT OF  
THE ARMY

	6,302,729	7,694,875	36,594	7,731,470	14,034,199	9,050,971	4,983,228	-98,436	4,884,792
DEPARTMENT OF THE NAVY:									
General Fund Accounts:									
Military Personnel, Navy.....	47,795	2,302,270	182,000	2,484,270	2,532,065	2,463,138	68,927	-2,384	66,543
Reserve Personnel, Navy.....	15,927	86,000	-2,732	83,268	99,105	83,159	16,035	-1,571	14,465
Navy Personnel, General Expenses.....	11,045	87,946	-2,700	85,246	96,291	85,095	11,197	205	11,401
Military Personnel, Marine Corps.....	35,630	630,000	-20,551	609,449	645,079	620,036	25,043	-5,357	19,686
Reserve Personnel, Marine Corps.....	4,759	23,309	-700	22,609	27,368	23,040	4,329	-1,129	3,200
Marine Corps Troops and Facilities.....	42,873	178,408	-5,000	173,408	216,281	168,425	47,856	-5,133	43,698
Marine Corps Procurement.....	729,728				729,728	162,817	566,910		566,910
Aircraft and Facilities.....	279,219	857,745	-11,900	845,845	1,125,063	849,040	276,023	4,841	280,864
Aircraft and Related Procurement.....	4,978,113	1,837,000		1,837,000	6,815,113	2,509,583	4,305,529		4,305,529
Ships and Facilities.....	241,955	821,784	-900	820,884	1,092,838	831,686	231,152	-25,120	206,032
Construction of Ships.....	27,214				27,214	16,734	10,480	-2,408	8,071
Shipbuilding and Conversion.....	3,095,682	1,880,000		1,880,000	4,975,682	1,514,691	3,460,991		3,460,991
Ordnance and Facilities.....	68,059	165,172	-6,000	159,172	227,240	154,126	73,113	-7,959	65,155
Ordnance for New Construction.....	7,392				7,392	3,826	3,567		3,015
Procurement of Ordnance and Ammunition.....	440,057	207,800		207,800	647,857	328,259	319,598		319,598
Medical Care.....	4,675	85,200	657	85,857	90,532	86,118	4,414	1,251	5,065
Civil Engineering.....	19,896	135,369	-3,630	131,769	151,665	119,688	31,977	1,182	33,159
Military Construction, Naval Reserve Forces.....	41,477				41,477	18,821	22,656		22,656
Research and Development.....	351,304	527,200	46,206	573,406	924,710	618,063	306,647	-35	306,612
Service-Wide Supply and Finance.....	14,344	300,000	1,061	301,061	315,405	294,369	21,035	-1,154	19,881
Service-Wide Operations.....	26,099	109,222	-2,600	106,622	132,722	102,030	30,692	-818	29,874
Naval Petroleum Reserves.....	1,167	825		825	1,992	1,664	329	-11	318
Miscellaneous "M" Accounts for Discontinued Appropriation Titles.....	3,296				3,296	2,043	1,254	417	1,671
Special Fund Accounts:									
Preparation for Sale or Salvage of Military Property.....	823	611,363		11,363	12,186	13,272	-1,085	2,156	1,069
Ships' Stores Profits.....	2,303	8,449		8,449	10,752	8,902	1,850		1,850
Miscellaneous "M" Accounts for Discontinued Appropriation Titles.....								(*)	

See footnotes at end of table.

## EXPENDITURES

## MILITARY FUNCTIONS

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE—Continued  
FISCAL YEAR 1958—Continued  
[Thousands of dollars]

Department and appropriation	Amounts available for expenditure, fiscal year 1958										Gross unpaid obligations carried into fiscal year 1959 <sup>a</sup>	
	(1)	New obligational availability			(5)	(6)	(7)	(8)	(9)	(10)		(11)
		(2)	(3)	(4)								
	Unexpended balance carried into fiscal year 1958	Congressional appropriations	Transfers	Total	Other transfers	Total, fiscal year 1958	Total expenditures for fiscal year 1958	Preclosing unexpended balance 30 June 1958	Unobligated balance withdrawn (-) or restored (+) per Public Law 798	Total unexpended balance carried into fiscal year 1959		
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
DEPARTMENT OF THE NAVY—Continued												
Management Fund.....	155,586					155,586	-365,573	521,159	137	521,295	394,032	
Business Enterprise Accounts:												
Navy Stock Fund.....	315,175				-100,000	215,175	-141,155	356,330		356,330	N A	
Marine Corps Stock Fund.....	57,530				-20,000	37,530	-15,095	52,625		52,625	N A	
Industrial Fund.....	215,661				-70,000	145,661	-21,139	166,800		166,800	N A	
Other Revolving Funds:												
Laundry Service, Naval Academy.....	133					133	25	108		108	32	
Naval Working Fund.....	15,341					15,341	1,166	14,175		14,175	4,498	
Defense Housing.....	631					631	-200	831		831	221	
Consolidated Working Fund.....												
Subtotal.....	11,250,889	10,255,092	173,211	10,428,305	-189,992	21,489,210	10,536,665	10,952,545	-43,441	10,909,104	7,770,466	
Military Construction.....	587,049	265,000		265,000		852,049	369,531	482,518		482,518	343,417	
TOTAL—Distributed on DD Form 1176.....	11,837,938	10,520,092	173,211	10,693,303	-189,992	22,341,249	10,906,185	11,435,063	-43,441	11,391,622	8,113,882	
Undistributed.....												
Nonclassified Items.....	7	2,295	-190,000	-187,705	189,992	2,293		2,293	-2,293			
TOTAL—DEPARTMENT OF THE NAVY.....	11,837,944	10,522,387	-16,789	10,505,598		22,343,542	10,906,185	11,437,357	-45,735	11,391,622		



Source: DD Form 1176.

Note: Amounts will not necessarily add to totals due to rounding.

NA—Not Applicable.

\*—Less than \$500.

<sup>a</sup> Amounts in this column are gross, i.e., inclusive of reimbursements receivable and anticipated, and, thus, may exceed the cash unexpended balance in column (11).

<sup>b</sup> Includes adjustments to prior year appropriations as follows:

Army.....	-\$3,368,199
Navy.....	-2,294,832
Air Force.....	-1,192,403

Total.....

-6,855,434

<sup>c</sup> Represents reappropriation of amount withdrawn as of 30 June 1957 in anticipation of reappropriation in fiscal year 1958.

<sup>d</sup> Signal Service; Dept. of the Air Force Prior Years; Ordnance Service and Supplies; Expediting Production.

<sup>e</sup> Represents reversals of 30 June 1957 withdrawals as follows:

Army.....	\$3,148,416
Navy.....	2,155,482
Air Force.....	61,490

Total.....

5,365,388

<sup>f</sup> Represents restoration accomplished prior to 30 June 1958.

<sup>g</sup> Facilities; IRNV: Construction and Machinery; Retired Pay; IRNV: Armor, Armament, and Ammunition; Public Works, Bureau of Yards and Docks; Naval Petroleum Reserve, #4; Construction, Water Supply Facilities.

<sup>h</sup> Special Procurement.

<sup>i</sup> Replacement of Personal Property Sold.



**CIVIL FUNCTIONS**  
**TABLE 3. OBLIGATIONS AND OBLIGATIONAL AVAILABILITY OF CURRENT GENERAL APPROPRIATIONS, BY APPROPRIATION TITLE—Continued**  
**FISCAL YEAR 1958—Continued**  
 [Thousands of dollars]

Appropriation	Amounts available for obligation fiscal year 1958				Unobligated balance as of 30 Jun 1958				
	Unobligated balance carried over fiscal year 1958	New obligational availability		Reimbursements	Total, fiscal year 1958	Obligations, fiscal year 1958	Total, preclosing balance	Expired balance withdrawn 30 Jun 1958	Unobligated balance available, fiscal year 1959
		Congressional appropriations	Transfers						
DEPARTMENT OF THE ARMY—Cont. Corps of Engineers—Continued Payments to State Flood Control Act, June 28, 1938, as amended	1,461	1,472		1,472	2,934	1,531	1,403		1,403
TOTAL—CORPS OF ENGINEERS	103,489	648,168	-37	648,131	753,418	675,190	78,228	-8,948	69,280
Cemeterial Expenses	(*)	6,878		6,878	6,886	6,854	32	-32	
Payments to Claimants, Disaster at Texas City, Texas	11,789				11,789	162	11,626		11,626
Entombment of Unknown Americans of World War II and Korea	159				159	159	(*)	(*)	
Construction of Power Systems, Ryukyu Islands		1,513		1,513	1,513	1,247	266		266
Administration, Ryukyu Islands		2,523		2,523	2,523	2,401	32	-32	
TOTAL—DEPARTMENT OF THE ARMY	115,436	659,082	-37	659,045	776,287	686,103	90,185	-9,012	81,173
DEPARTMENT OF THE NAVY									
DEPARTMENT OF THE AIR FORCE									

Note. Amounts will not necessarily add to totals due to rounding.  
 \* Less than \$500.

## EXPENDITURES

## DEPARTMENT OF DEFENSE

## CIVIL FUNCTIONS

TABLE 4. EXPENDITURE AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE  
FISCAL YEAR 1958  
[Thousands of dollars]

Appropriation	Amounts available for expenditure, fiscal year 1958						Expenditures, fiscal year 1958	Preclosing unexpended balance	Unobligated balance with- drawn (-) or restored (+) per P.L. 798	Total unexpended balance carried into fiscal year 1959	Gross unpaid obligations carried into fiscal year 1959
	Unexpended balance carried into fiscal year 1958	New obligational availability		Other transfers	Total, fiscal year 1958	Total, fiscal year 1958					
		Congressional appropriations	Transfers								
<b>DEPARTMENT OF DEFENSE—TOTAL</b>	307,787	659,105	-37	659,068	3	966,858	71,7802	249,056	-8,933	240,123	156,048
<b>DEPARTMENT OF THE ARMY:</b>											
Corps of Engineers:											
Flood Control, Mississippi River and Tributaries	13,866	64,965		64,965		78,831	50,634	22,197	-3,713	18,483	18,474
General Investigations	2,108	10,915		10,915		13,023	9,502	3,521	-135	3,386	1,279
Construction, General	290,282	452,674		452,674		661,956	513,267	148,689	-2,850	145,839	84,235
Operation and Maintenance, General	17,678	106,050		106,050		123,728	104,408	19,320	-2,200	17,000	13,720
General Expenses	704	11,797		11,797	3	12,504	11,550	954	-49	905	864
Hydraulic Mining in California, Debris Fund	17	18		18		35	17	18		18	
Niagara Remedial Works	288					288	130	158		158	(*)
Maintenance and Operation of Dams and Other Improvements of Navigable Waters	152	152		152		304	152	152		152	
United States Section, St. Lawrence River Joint Board of Engineers	6	126	-37	89	(*)	94	84	11	-4	7	7

See footnotes at end of table.

## CIVIL FUNCTIONS

## EXPENDITURES

TABLE 4. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE—Continued  
FISCAL YEAR 1958—Continued

[Thousands of dollars]

Appropriation	Amounts available for expenditure, fiscal year 1958					Expenditures, fiscal year 1958	Preclosing unexpended balance	Unobligated balance withdrawn (-) or restored (+) per P.L. 798	Total unexpended balance carried into fiscal year 1959	Gross unpaid obligations carried into fiscal year 1959
	Unexpended balance carried into fiscal year 1958	New obligational availability		Other transfers	Total, fiscal year 1958					
		Congressional appropriations	Transfers							
<b>DEPARTMENT OF THE ARMY—</b>										
Continued										
Corps of Engineers—Continued										
Payments to State Flood Control Act, June 28, 1968, as amended	1,461	1,472	1,472	2,934	1,531	1,403		1,403		
Revolving Fund	29,620			29,620	1,496	27,683		27,683		35,287
<b>TOTAL, CORPS OF ENGINEERS</b>	275,181	648,168	-37	923,316	3	699,272	224,044	-8,951	215,083	153,866
Material Expenses	1,248	6,878	6,878	8,126	7,279	846		-148	699	699
Entombment of Unknown Americans of World War II and Korea	159		159	159	158	1		(*)	1	1
Civilian Relief in Korea	30		30	30	10	20		7	27	27
Payments to Claimants, Disaster at Texas City, Texas	11,780			11,780	162	11,626			11,626	
Defense Production Guarantees	1,918			1,918	-354	2,272			2,272	
Construction of Power Systems, Ryukyu Islands	219	1,513	1,513	1,513	53	1,460			1,460	1,194
Administration, Ryukyu Islands		2,523	2,523	2,742	2,640	102		158	259	259
<b>TOTAL, DEPARTMENT OF THE ARMY</b>	290,544	659,082	-37	949,592	3	709,220	240,372	-8,933	231,439	156,046

DEPARTMENT OF THE NAVY:													
Defense Production Guarantees.....	7, 969						7, 969	7, 102	867			867	
DEPARTMENT OF THE AIR FORCE:													
Defense Production Guarantees.....	9, 257						9, 257	1, 459	7, 798			7, 798	
Wildlife Conservation, etc., Eglin Field Reservation.....	16	23			23		40	21	19			19	1
<b>TOTAL, DEPARTMENT OF THE AIR FORCE.....</b>	<b>9, 274</b>	<b>23</b>			<b>23</b>		<b>9, 297</b>	<b>1, 480</b>	<b>7, 817</b>			<b>7, 817</b>	<b>1</b>

Note. Amounts will not necessarily add to totals due to rounding.

\*Less than \$500.

TABLE 5. MILITARY ASSISTANCE PROGRAM  
OBLIGATIONS/RESERVATIONS  
BY BUDGET ACTIVITY

[Millions of dollars]

Major classification	Obligations/Reservations		
	Fiscal years 1950-57	Fiscal year 1958	Total as of June 30, 1958
<b>TOTAL</b> .....	<b>21,941.3</b>	<b>1,828.3</b>	<b>23,769.7</b>
Equipment and Supplies.....	18,333.1	1,333.3	19,666.4
Accessorial Charges.....	872.2	152.8	1,025.0
Training.....	424.4	55.7	480.1
Facilities Assistance.....	80.0	(*)	80.0
Development of Advance Design Weapons.....	114.3	21.3	135.6
Infrastructure.....	527.6	50.0	577.6
Administrative Expenses.....	230.9	21.8	252.7
International Military Headquarters.....	29.5	5.5	35.0
Other Services.....	1,329.4	187.9	1,517.3

Note. Includes "Common Use Item" appropriation administered by International Cooperation Administration. Includes reimbursements of \$28.3 million. Amounts will not necessarily add to totals due to rounding.

\*Less than \$50,000.

TABLE 6. MILITARY ASSISTANCE PROGRAM  
EXPENDITURES  
BY BUDGET ACTIVITY

[Millions of dollars]

Major classification	Expenditures		
	Fiscal years 1950-57	Fiscal year 1958	Total as of June 30, 1958
<b>TOTAL</b> .....	<b>18,228.0</b>	<b>2,189.8</b>	<b>20,417.9</b>
Equipment and Supplies.....	15,156.0	1,694.7	16,850.7
Accessorial Charges.....	841.8	160.6	1,002.4
Training.....	375.6	59.6	435.2
Facilities Assistance.....	12.4	24.5	37.0
Development of Advance Design Weapons.....	37.0	35.0	71.9
Infrastructure.....	392.1	60.1	452.2
Administrative Expenses.....	224.7	20.0	244.7
International Military Headquarters.....	26.0	5.4	31.4
Other Services.....	1,162.5	129.9	1,292.4

Note. Includes "Common Use Item" appropriation administered by International Cooperation Administration. Includes reimbursements of \$28.3 million. Amounts will not necessarily add to totals due to rounding.

TABLE 7. MILITARY ASSISTANCE PROGRAM  
OBLIGATIONS/RESERVATIONS AND EXPENDITURES  
BY DEPARTMENT OF DEFENSE AGENCY  
AND OTHER AGENCIES

[Millions of dollars]

	Obligated or reserved		Expended	
	Total as of June 30, 1957	Total as of June 30, 1958	Total as of June 30, 1957	Total as of June 30, 1958
<b>TOTAL</b> .....	21,941.3	23,769.7	18,228.0	20,417.9
Army.....	11,119.6	12,253.3	9,832.1	10,739.6
Navy.....	2,432.5	2,629.7	1,971.9	2,182.3
Air Force.....	6,511.7	6,906.1	4,789.7	5,740.9
OSD.....	776.3	868.5	559.9	660.9
Other Agencies.....	1,101.3	1,112.1	1,074.5	1,094.1

*Note.* Includes "Common Use Item" appropriation administered by International Cooperation Administration. Includes reimbursements of \$28.3 million. Amounts will not necessarily add to totals due to rounding.

TABLE 8. ACTIVE DUTY MILITARY PERSONNEL

Date	Total, Department of Defense	Army	Navy	Marine Corps	Air Force
<i>TOTALS</i>					
June 30, 1957.....	2,795,798	997,994	677,108	200,861	919,835
Dec. 31.....	2,617,042	918,111	629,566	190,708	878,657
Jan. 31, 1958.....	2,613,316	909,642	633,628	193,030	877,016
Feb. 28.....	2,617,762	906,910	639,770	193,258	877,824
Mar. 31.....	2,623,046	911,578	642,921	192,827	875,720
Apr. 30.....	2,607,583	905,638	641,919	187,166	872,860
May 31.....	2,600,370	902,214	639,935	187,481	870,740
June 30.....	2,600,581	898,925	641,005	189,495	871,156
<i>OFFICERS</i>					
June 30, 1957.....	342,887	111,187	73,703	17,434	140,563
Dec. 31.....	330,180	105,178	72,543	16,930	135,529
Jan. 31, 1958.....	327,733	105,452	71,816	16,793	133,672
Feb. 28.....	326,032	105,175	71,530	16,615	132,712
Mar. 31.....	324,628	105,016	70,457	16,608	132,547
Apr. 30.....	323,701	104,915	69,958	16,598	132,230
May 31.....	323,199	104,713	69,657	16,439	132,390
June 30.....	325,956	104,716	71,560	16,741	132,939
<i>ENLISTED</i>					
June 30, 1957.....	2,442,849	885,056	597,859	183,427	776,507
Dec. 31.....	2,276,438	810,524	551,185	173,778	740,951
Jan. 31, 1958.....	2,275,620	801,847	556,243	176,237	741,293
Feb. 28.....	2,281,874	799,402	562,717	176,643	743,112
Mar. 31.....	2,288,662	804,234	567,012	176,219	741,197
Apr. 30.....	2,273,867	798,402	566,248	170,568	738,649
May 31.....	2,267,352	795,195	564,693	171,042	736,422
June 30.....	2,264,506	792,508	563,506	172,754	735,738
<i>OFFICER CANDIDATES<sup>1</sup></i>					
June 30, 1957.....	10,062	1,751	5,546	-----	2,765
Dec. 31.....	10,424	2,409	5,838	-----	2,177
Jan. 31, 1958.....	9,963	2,343	5,569	-----	2,051
Feb. 28.....	9,856	2,333	5,523	-----	2,000
Mar. 31.....	9,756	2,328	5,452	-----	1,976
Apr. 30.....	10,015	2,321	5,713	-----	1,981
May 31.....	9,819	2,306	5,585	-----	1,928
June 30.....	10,119	1,701	5,939	-----	2,479

<sup>1</sup> Consists of cadets, U.S. Military Academy (Army); midshipmen, U.S. Naval Academy, aviation cadets, and enlisted officer candidates (Navy); and cadets, U.S. Air Force Academy, and aviation cadets, including enlisted aviation students (Air Force).

TABLE 9. RESERVE COMPONENTS PERSONNEL

[Excludes reserve personnel on extended active duty]

	June 30, 1957		June 30, 1958	
	Total enrollment	In drill pay status	Total enrollment	In drill pay status
<b>TOTAL—DEPARTMENT OF DEFENSE</b> .....	<b>3,631,671</b>	<b>1,000,079</b>	<b>4,022,061</b>	<b>961,099</b>
<b>DEPARTMENT OF THE ARMY</b> .....	<b>2,281,272</b>	<b>682,555</b>	<b>2,476,967</b>	<b>667,012</b>
National Guard.....	<sup>a</sup> 441,798	422,178	<sup>a</sup> 442,369	394,329
<i>Officers</i> .....	41,801	36,795	42,755	37,942
<i>Enlisted</i> .....	399,997	<sup>b</sup> 385,383	399,614	<sup>b</sup> 356,387
Army Reserve.....	1,839,474	260,377	2,034,598	272,683
<i>Officers</i> .....	212,908	73,308	227,620	49,584
<i>Enlisted</i> .....	1,626,566	187,069	1,806,978	223,099
<b>DEPARTMENT OF THE NAVY</b> .....	<b>854,033</b>	<b>187,897</b>	<b>976,139</b>	<b>175,805</b>
Naval Reserve.....	583,733	141,747	674,763	129,632
<i>Officers</i> .....	179,303	27,728	184,760	26,513
<i>Enlisted</i> .....	<sup>c</sup> 404,430	114,019	<sup>c</sup> 490,003	103,119
Marine Corps Reserve.....	270,300	46,150	301,376	46,173
<i>Officers</i> .....	28,039	4,106	25,192	4,143
<i>Enlisted</i> .....	241,361	<sup>d</sup> 42,044	276,184	<sup>d</sup> 42,030
<b>DEPARTMENT OF THE AIR FORCE</b> .....	<b>496,366</b>	<b>129,627</b>	<b>568,955</b>	<b>118,282</b>
Air National Guard.....	67,950	67,950	69,995	69,995
<i>Officers</i> .....	8,033	8,033	8,354	8,354
<i>Enlisted</i> .....	59,917	59,917	61,641	61,641
Air Force Reserve.....	428,416	61,677	498,960	48,287
<i>Officers</i> .....	144,121	32,759	133,686	19,522
<i>Enlisted</i> .....	284,295	28,918	365,274	28,765

<sup>a</sup> Includes Inactive National Guard.<sup>b</sup> Includes enlisted personnel undergoing 6 months' active duty for training: 18,758 on June 30, 1957, and 21,408 on June 30, 1958.<sup>c</sup> Includes Regular NROTC and Merchant Marine midshipmen.<sup>d</sup> Includes enlisted personnel undergoing 3-6 months' active duty for training: 3,028 on June 30, 1957, and 3,438 on June 30, 1958.

TABLE 10. CIVILIAN PERSONNEL

Date	Total, Department of Defense	Office of Secretary of Defense	Department of the Army	Department of the Navy	Department of the Air Force
<i>A. DIRECT HIRE EMPLOYEES <sup>a</sup></i>					
June 30, 1957 .....	1,160,915	1,655	429,217	389,717	340,326
Dec. 31 .....	1,085,326	1,604	406,942	365,258	311,522
Jan. 31, 1958 .....	1,082,828	1,581	405,617	364,133	311,497
Feb. 28 .....	1,083,888	1,583	405,641	363,660	313,004
Mar. 31 .....	1,084,455	1,617	406,401	362,492	313,945
Apr. 30 .....	1,087,539	1,580	409,218	362,327	314,414
May 31 .....	1,089,085	1,580	411,122	361,757	314,626
June 30 .....	1,097,095	1,646	415,914	363,729	315,806
<i>B. OVERSEAS SUPPORT PERSONNEL (CONTRACT HIRE) <sup>b</sup></i>					
June 30, 1957 .....	267,894	-----	170,377	21,258	76,259
Dec. 31 .....	232,394	-----	147,778	20,035	64,581
Jan. 31, 1958 .....	228,090	-----	145,663	19,654	62,773
Feb. 28 .....	226,997	-----	145,748	19,457	61,792
Mar. 31 .....	223,024	-----	143,961	18,637	60,426
Apr. 30 .....	221,871	-----	143,764	18,092	60,015
May 31 .....	221,436	-----	144,968	17,884	58,584
June 30 .....	216,695	-----	142,090	17,722	56,883

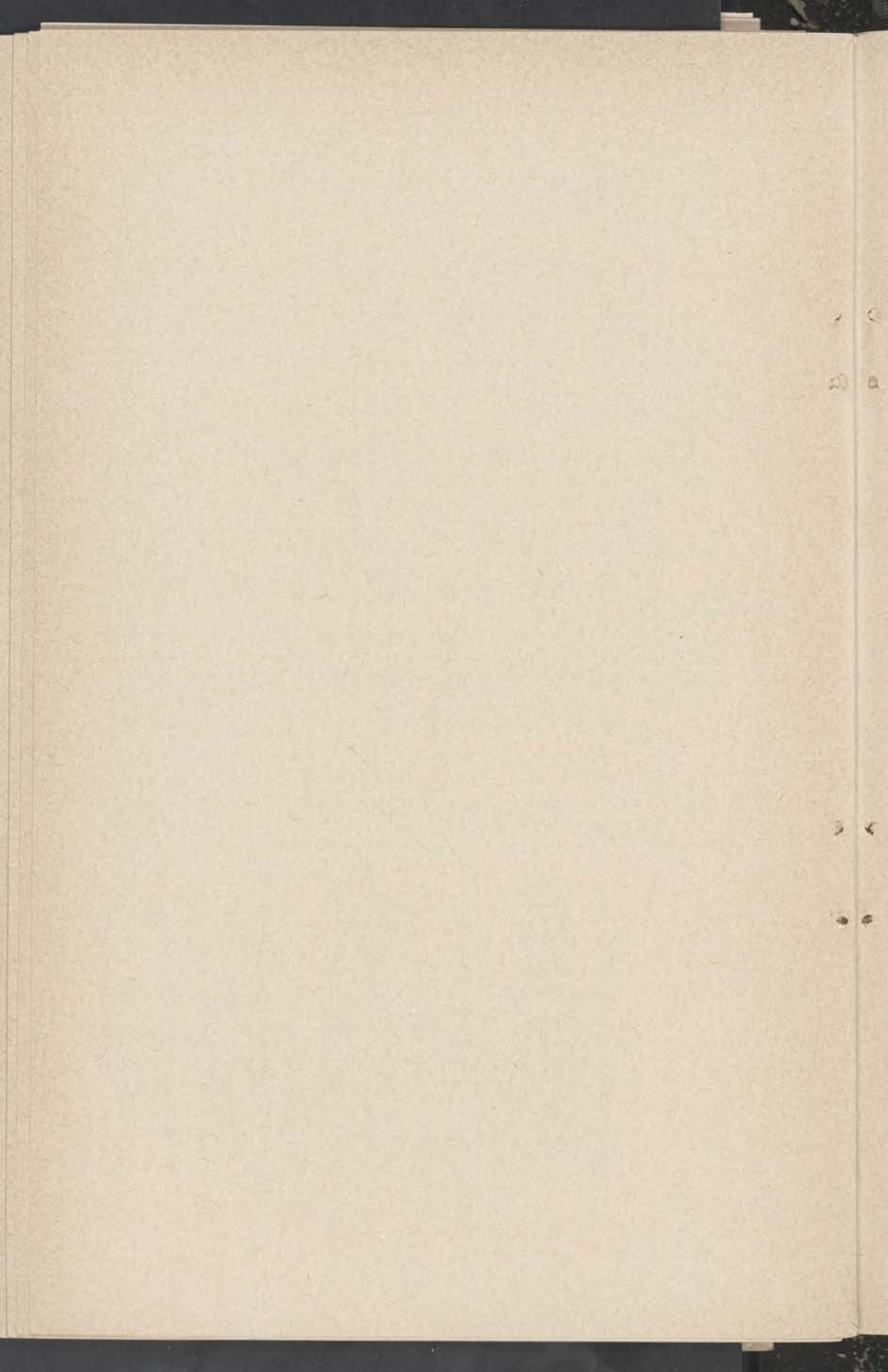
<sup>a</sup> Total paid employees (full-time, part-time, and intermittent) as reported officially to the Civil Service Commission. Includes employment charged to the Military Assistance Program and to Civil Functions.

<sup>b</sup> Foreign nationals supporting the armed forces in certain overseas areas under contracts or agreements with foreign governments.

TABLE 11. PERSONNEL, OFFICE OF THE SECRETARY OF DEFENSE

	1957						1958									
	June 30		Dec. 31		Jan. 31		Feb. 28		Mar. 31		Apr. 30		May 31		June 30	
	Civilian	Military	Civilian	Military	Civilian	Military	Civilian	Military	Civilian	Military	Civilian	Military	Civilian	Military	Civilian	Military
<b>SECRETARY OF DEFENSE ACTIVITIES</b>	1,511	695	1,460	686	1,454	686	1,450	686	1,446	690	1,442	691	1,423	692	1,488	710
Office of the Secretary *	167	63	160	63	158	62	160	62	163	62	161	62	158	62	163	60
Assistant to the Secretary (Atomic Energy)	13	19	12	19	12	19	12	19	12	19	12	20	11	20	12	21
Assistant to the Secretary (Legislative Affairs)	9	4	7	5	7	5	7	5	7	5	7	5	7	5	8	5
Assistant to the Secretary (Special Operations)	12	7	12	6	12	6	12	6	12	6	11	6	11	6	12	6
Director of Guided Missiles	23	8	23	7	25	7	24	7	25	7	27	7	28	7	29	7
General Counsel	61	56	56	56	56	57	57	57	57	57	57	57	55	57	57	57
Assistant Secretary (Public Affairs)	63	48	72	47	72	46	70	47	71	48	72	49	70	47	72	47
Assistant Secretary (International Security Affairs)	205	85	207	85	206	83	208	85	207	87	206	89	204	90	206	93
Joint Chiefs of Staff	178	317	177	310	177	314	179	316	178	314	177	311	174	313	201	328
Assistant Secretary (Comptroller)	148	4	147	4	147	4	146	4	146	4	146	4	144	4	146	4
Assistant Secretary (Manpower, Personnel and Reserve)	100	55	85	51	86	49	85	47	88	49	86	48	83	47	84	47
Assistant Secretary (Supply and Logistics)	260	12	240	19	238	19	234	18	231	18	230	18	229	18	226	18
Assistant Secretary (Properties and Installations)	73	68	68	68	68	67	67	67	66	66	67	66	66	66	66	66
Assistant Secretary (Health and Medical)	11	11	11	10	10	10	10	10	10	10	11	10	11	11	11	11
Assistant Secretary (Research and Engineering)	174	58	163	55	162	57	162	58	161	58	160	59	160	59	165	60
Special Programs	14	4	20	5	18	5	17	2	12	2	12	2	12	2	30	2
<b>OTHER ACTIVITIES</b>	89	78	91	72	92	70	92	68	100	72	106	71	110	76	115	76
United States Portion of the Standing Group, NATO	37	70	38	70	38	69	38	67	38	71	37	68	37	72	37	72
United States Court of Military Appeals	39	41	41	41	41	41	40	42	42	42	42	42	41	42	42	42
Interdepartmental Activities	13	8	12	2	13	1	12	1	10	10	10	10	12	12	12	12
Advanced Research Projects Agency							2	2	10	1	17	3	20	4	24	4
<b>TOTAL, FULL-TIME PERSONNEL</b>	1,600	773	1,551	758	1,546	756	1,542	754	1,546	762	1,548	762	1,533	768	1,603	786
Intermittent Consultants	55		53		35		41		71		32		47	43	43	
<b>TOTAL PERSONNEL</b>	1,655	773	1,604	758	1,581	756	1,583	754	1,617	762	1,580	762	1,580	768	1,646	786

\* Includes Offices of the Deputy Secretary and Administrative Secretary, and the Administrative Office of the Secretary.



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