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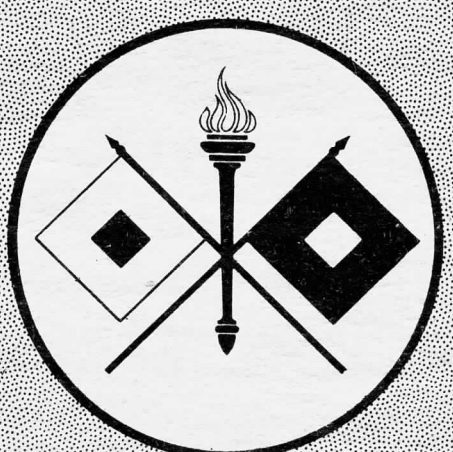
SIGNAL CORPS

TECHNICAL

INFORMATION LETTER

MARCH · 1944

ARMY SERVICE FORCES · OFFICE OF THE CHIEF SIGNAL OFFICER



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SIGNAL CORPS TECHNICAL INFORMATION LETTER

Number 28 March 1944

RESTRICTED

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WAR DEPARTMENT · ARMY SERVICE FORCES

OFFICE OF THE CHIEF SIGNAL OFFICER

SERVICE DIVISION · SPECIAL ACTIVITIES BRANCH

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SCTIL

The Signal Corps Technical Information Letter is a monthly publication designed to keep personnel informed on Signal Corps matters. It provides means for the general dissemination of information of widely varied nature to Signal Corps officers as a whole and for the interchange of information among the different Signal Corps organizations and installations.

SOURCE OF MATERIAL

This Letter is compiled largely from information available in the divisions and branches of the Office of the Chief Signal Officer. All Signal Corps training centers and other agencies are invited to submit items of general interest. Such items should reach the Office of the Chief Signal Officer (SPSAY) not later than the 15th of each month for inclusion in the Letter of the following month.

DISTRIBUTION

Distribution of the Letter is made to Signal Corps organizations, Signal sections of organizations and headquarters not Signal, and Signal headquarters and installations here and overseas. It is also available for distribution to communications officers of other arms and to others who, though not Signal Corps officers, nevertheless have direct technical interest in Signal Corps equipment or for other reasons are aided by this publication in performing the functions of their assignments.

Distribution is to organizational units rather than individuals and it is expected that a single copy will serve each smaller unit, while in larger units copies will in general be required on the basis of one to each five interested officers (or other key personnel).

Any organization, installation or other unit mentioned above which does not now receive the SCTIL, or receives too few or too many copies, can rectify the condition by addressing the Chief Signal Officer, SPSAY, Washington.

* * * * *

The material presented in the SCTIL is informative and suggestive. Nothing herein should be construed as directive nor should requisitions for new types of equipment be submitted on the basis of data contained herein.

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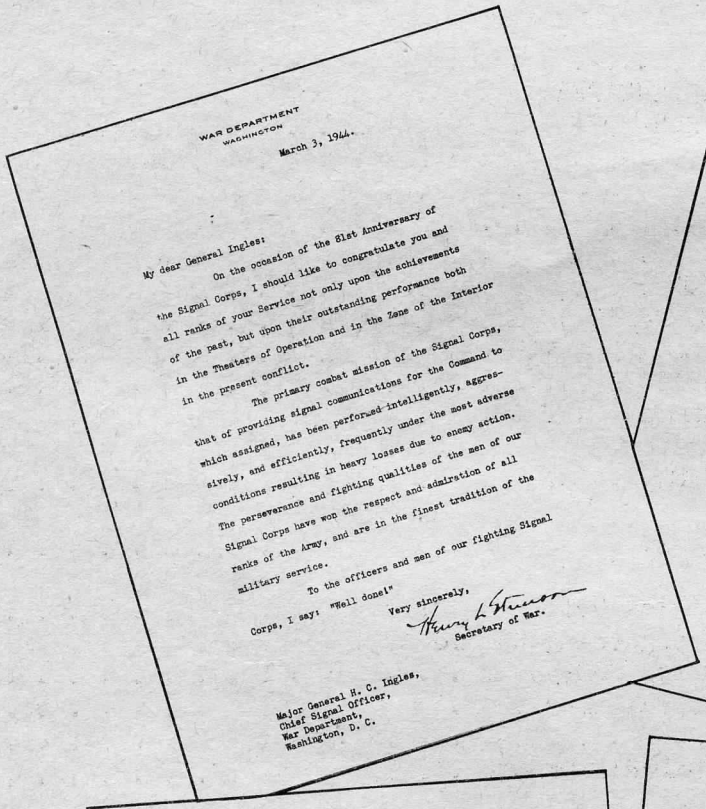


WAR DEPARTMENT
WASHINGTON

March 3, 1944.

My dear General Ingles:

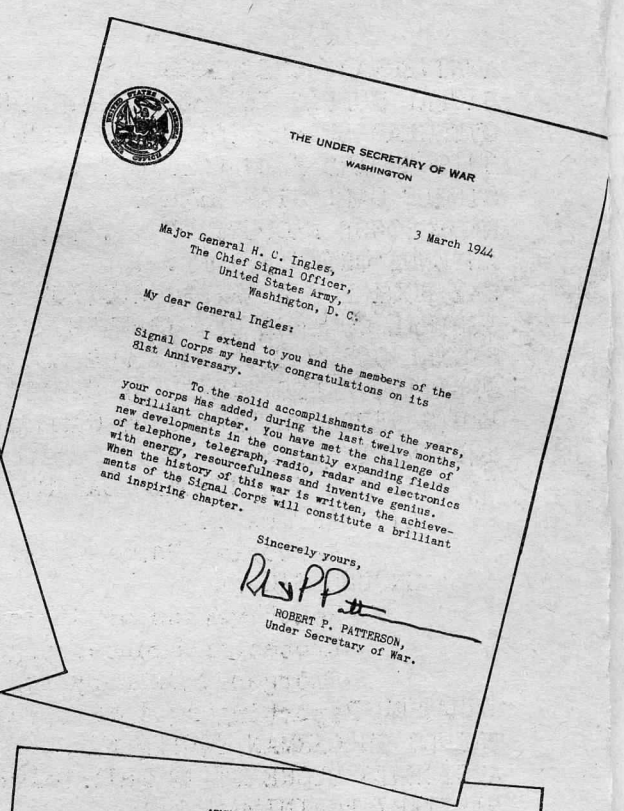
On the occasion of the 81st Anniversary of the Signal Corps, I should like to congratulate you and all ranks of your Service not only upon the achievements of the past, but upon their outstanding performance both in the Theaters of Operation and in the Zone of the Interior in the present conflict.

The primary combat mission of the Signal Corps, that of providing signal communications for the Command to which assigned, has been performed intelligently, aggressively, and efficiently, frequently under the most adverse conditions resulting in heavy losses due to enemy action. The perseverance and fighting qualities of the men of our Signal Corps have won the respect and admiration of all ranks of the Army, and are in the finest tradition of the military service.

To the officers and men of our fighting Signal Corps, I say: "Well done!"

Very sincerely,
Henry L. Stimson
Secretary of War.

Major General H. C. Ingles,
Chief Signal Officer,
War Department,
Washington, D. C.



THE UNDER SECRETARY OF WAR
WASHINGTON

3 March 1944

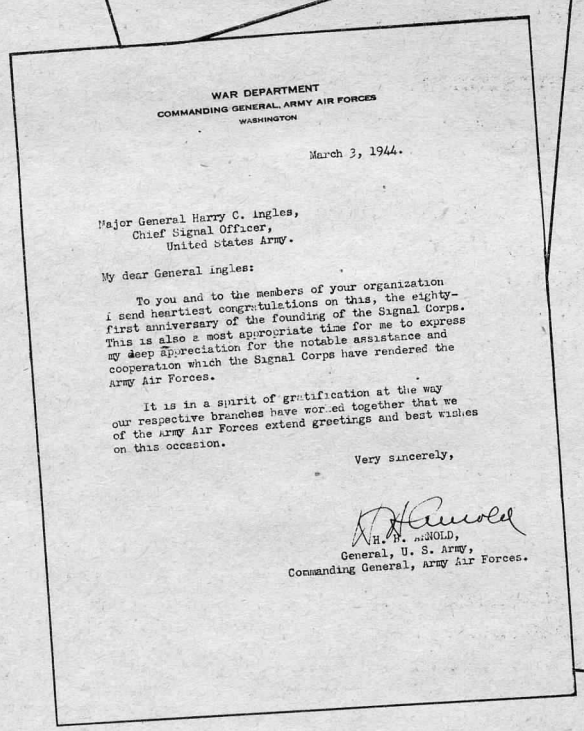
Major General H. C. Ingles,
The Chief Signal Officer,
United States Army,
Washington, D. C.

My dear General Ingles:

I extend to you and the members of the Signal Corps my hearty congratulations on its 81st Anniversary.

To the solid accomplishments of the years, your corps has added, during the last twelve months, a brilliant chapter. You have met the challenge of new developments in the constantly expanding fields of telephone, telegraph, radio, radar and electronics with energy, resourcefulness and inventive genius. When the history of this war is written, the achievements of the Signal Corps will constitute a brilliant and inspiring chapter.

Sincerely yours,
ROBERT P. PATTERSON,
Under Secretary of War.



WAR DEPARTMENT
COMMANDING GENERAL, ARMY AIR FORCES
WASHINGTON

March 3, 1944.

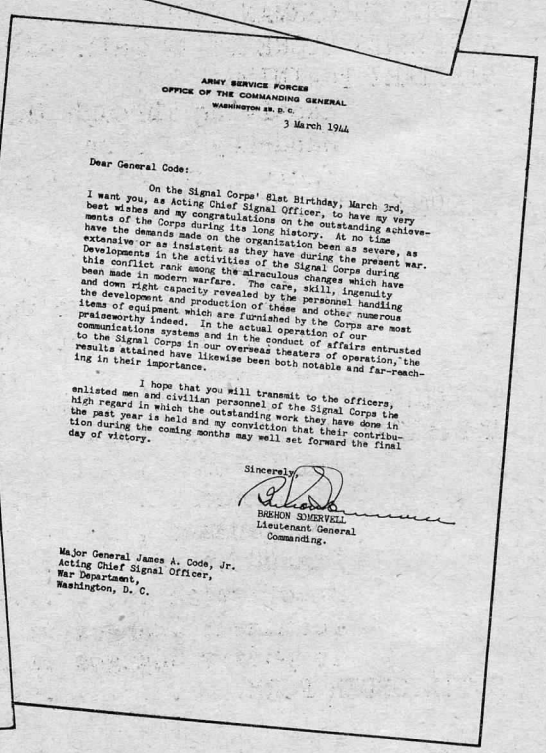
Major General Harry C. Ingles,
Chief Signal Officer,
United States Army.

My dear General Ingles:

To you and to the members of your organization I send heartiest congratulations on this, the eighty-first anniversary of the founding of the Signal Corps. This is also a most appropriate time for me to express my deep appreciation for the notable assistance and cooperation which the Signal Corps have rendered the Army Air Forces.

It is in a spirit of gratification at the way our respective branches have worked together that we of the Army Air Forces extend greetings and best wishes on this occasion.

Very sincerely,
H. H. ARNOLD,
General, U. S. Army,
Commanding General, Army Air Forces.



ARMY SERVICE FORCES
OFFICE OF THE COMMANDING GENERAL
WASHINGTON 25, D. C.

3 March 1944

Dear General Code:

On the Signal Corps' 81st Birthday, March 3rd, I want you, as Acting Chief Signal Officer, to have my very best wishes and my congratulations on the outstanding achievements of the Corps during its long history. At no time have the demands made on the organization been as severe, as extensive or as insistent as they have during the present war. Developments in the activities of the Signal Corps during this conflict rank among the miraculous changes which have been made in modern warfare. The care, skill, ingenuity and down right capacity revealed by the personnel handling the development and production of these and other numerous items of equipment which are furnished by the Corps are most praiseworthy indeed. In the actual operation of our communications systems and in the conduct of affairs entrusted to the Signal Corps in our overseas theaters of operation, the results attained have likewise been both notable and far-reaching in their importance.

I hope that you will transmit to the officers, enlisted men and civilian personnel of the Signal Corps the high regard in which the outstanding work they have done in the past year is held and my conviction that their contribution during the coming months may well set forward the final day of victory.

Sincerely,
BREHON SOMERVELL
Lieutenant General
Commanding.

Major General James A. Code, Jr.
Acting Chief Signal Officer,
War Department,
Washington, D. C.

SIGNAL CORPS' 81ST ANNIVERSARY

WAR DEPARTMENT
ARMY SERVICE FORCES
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON

TO ALL SIGNAL CORPS PERSONNEL:

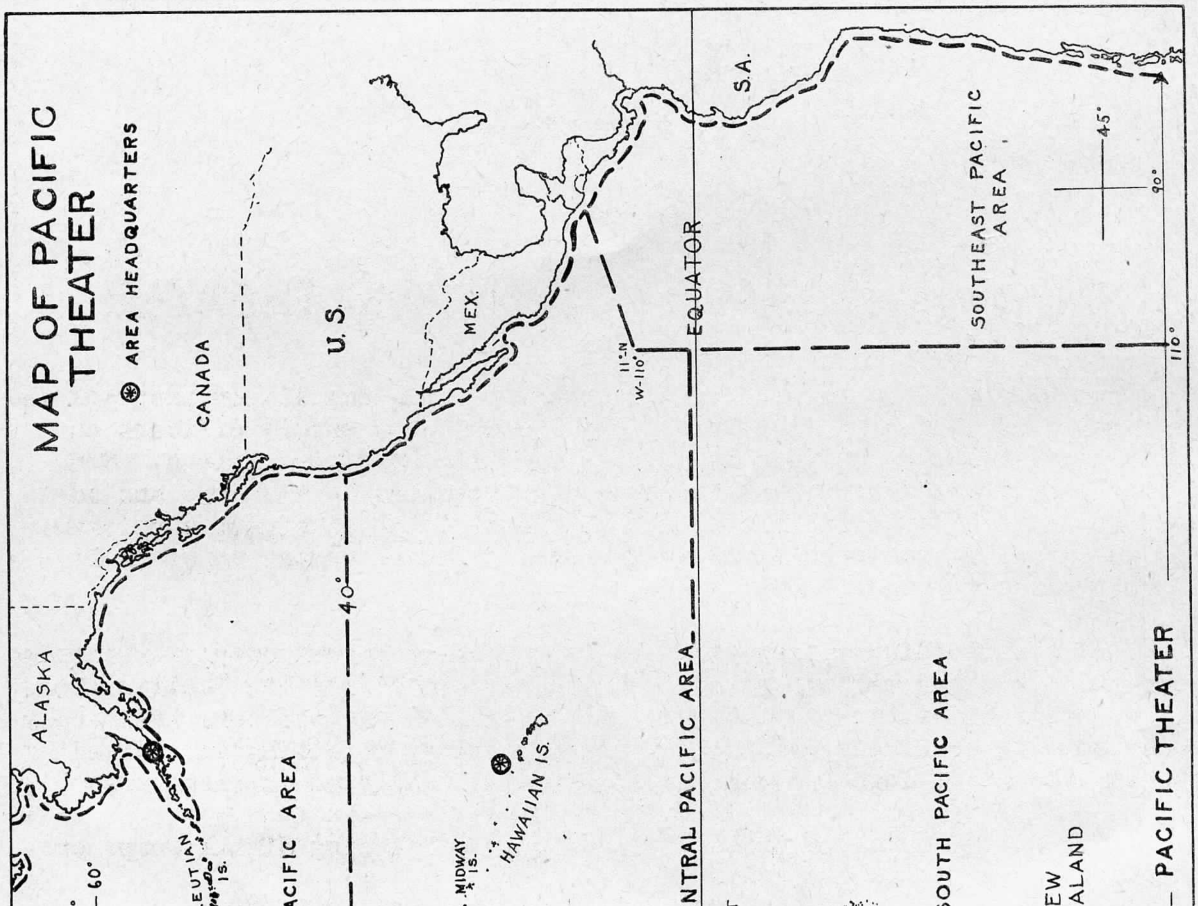
The Signal Corps has just rounded out 81 years of continuous service to our country. From an humble beginning on March 3, 1863, when Congress established the Signal Corps, it has grown from a handful of soldiers equipped with only the crudest sort of apparatus, to a formidable force of specialists using billions of dollars' worth of the most modern signal communication equipment the world has ever known.

The intervening years have been rich in research and unprecedented progress in the development of every form of signal communication. Signal Corps experiments during the present world struggle have provided our Army with the best signal communication equipment in the world.

This excellent record would not have been possible without the magnificent cooperation, great skill, and untiring efforts of our personnel, both military and civilian. Toiling under the utmost pressure in order to meet the demands of our fighting men in every quarter of the globe, all of you have met the challenge of war with characteristic American courage and ingenuity.

Gigantic forces of American fighting men now stand poised for the great attack on Europe and Japan. In these forces are large numbers of signal communication personnel operating the signal equipment that will control and direct the operations. No armies have been better equipped. Their task is a tremendous one, but we have every confidence in them. Thus far, all of you have shown what can be done by determination, loyalty, devotion to duty, and perseverance. With your continued unyielding support there can be but one outcome for our cause -- Victory!!

H. C. Ingles,
Major General,
Chief Signal Officer.


MAP OF PACIFIC THEATER
⊛ AREA HEADQUARTERS
CANADA
U.S.
MEX.
S.A.
ALASKA
NORTH PACIFIC AREA
ALEUTIAN IS.
MIDWAY IS.
HAWAIIAN IS.
CENTRAL PACIFIC AREA
EQUATOR
11°N W-110°
SOUTHEAST PACIFIC AREA
45°
90°
110°
40°
180°
60°
SOUTH PACIFIC AREA
PACIFIC THEATER
NEW ZEALAND
GILBERT IS.
MARSHALL IS.
WAKE IS.
SOLOMON IS.
NEW CALEDONIA
159°
MARIANAS IS.
CAROLINE IS.
KURILE IS.
JAPAN
TASMANIA
AUSTRALIA
NEW GUINEA
20° N 130° E
SOUTHWEST PACIFIC AREA
45°
120°
U.S.S.R.
MANCHUKUO
CHINA
BORNEO
JAVA
16° 30S 110° E

SIGNAL SUPPLY IN THE PACIFIC THEATER

From known Allied plans for global warfare it seems likely that before the final victory is won many U. S. Army Signal Corps supply officers and supply units will see service in the Pacific Theater of Operations. Some of this personnel will operate signal supply agencies in the base and advance sections of each Pacific area, but the majority of signal supplymen will be in the combat zone with Air and Ground Forces combat units or Signal sections of advance supply bases.

This article discusses typical Pacific Theater Signal Supply Organizations and operating methods rather than the system of any one Pacific area. It presents some of the problems solved by Signal Corps officers intimately concerned with acquiring, inspecting, distributing, repairing and salvaging the vast amount of Signal communication materiel employed in these areas.

Information in this article does not change existing Signal Corps or Army Service Forces supply policies.

ORGANIZATION AND OPERATION - SOS

Organization

The Services of Supply system in each of the Pacific Theater areas is organized on the general principles set forth in FM 100-10, Field Service Regulations - Administration. Specifically each area supply organization is based on the tactical situation, geographical location, terrain and personnel problems peculiar to the area, and is activated by War Department, Theater, and Area regulations which state the missions, functions, and operating methods of each supply agency.

The skeleton area SOS organization chart illustrated in Figure 1 emphasizes typical signal supply technical, administrative and command channels.

Signal Supply Distribution

The channels and means of transportation by which signal supplies are moved forward from factories and depots in the U. S. and other Allied nations to combat and service units in Pacific area combat zones are outlined in Figure 2. As operations are extended in the European, North

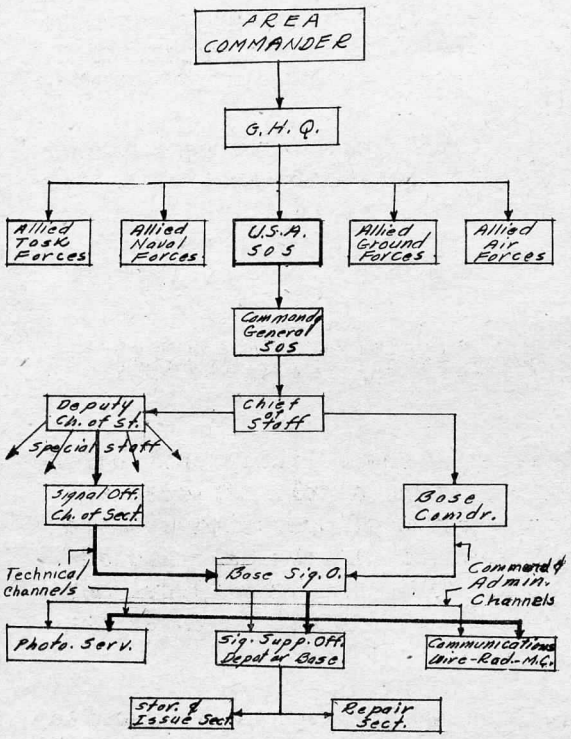


FIG. 1 - AREA ORGANIZATION -- SIGNAL SUPPLY

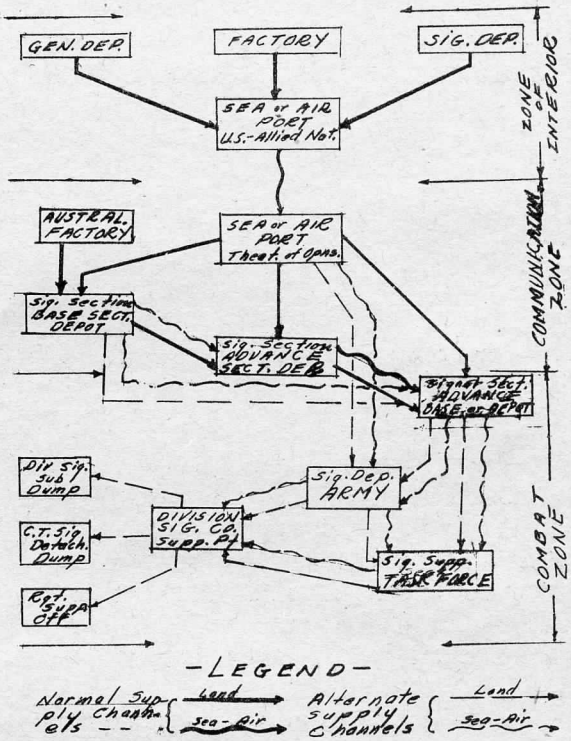


FIG. 2 - SIGNAL SUPPLY DISTRIBUTION

African or Middle Eastern Theaters of Operation more intra-theater supply traffic can be moved by land, but in the Pacific Theater an ever increasing amount of supplies must be carried forward by sea and air as the scope of operations increase.

Locating Bases

The location of supply bases in the Pacific areas is determined by the local tactical situation, the troop units which must be supplied and the accessibility to tentative sites by sea and air. Some idea of the difficulty of selecting ideal supply base sites in any one of the Pacific Area can be gained by consulting a large scale map of the Pacific and the small scale map, which accompanies this article, showing the approximate Pacific area boundaries.

The general tactical situation in each area is as follows:

1. North Pacific Area - American ground forces have been on the defensive since the capture of Attu and Kiska in the Aleutian chain of islands. Naval and air forces have attacked Paramushiro Island in the Kuril chain.

2. Central Pacific Area - Allied ground forces - principally American - have seized key bases in the Gilbert and Marshall island groups. Wake Island is still in Jap hands. Allied air and naval forces are using the major islands seized as bases for attacks on Jap-held islands farther west.

Japan lies within this Area.

3. South Pacific Area - Ground forces in this area have been most active in the Solomon Island group and are now operating on Bougainville (within the SWPA). Air force units have consistently attacked Jap bases to the north and west.

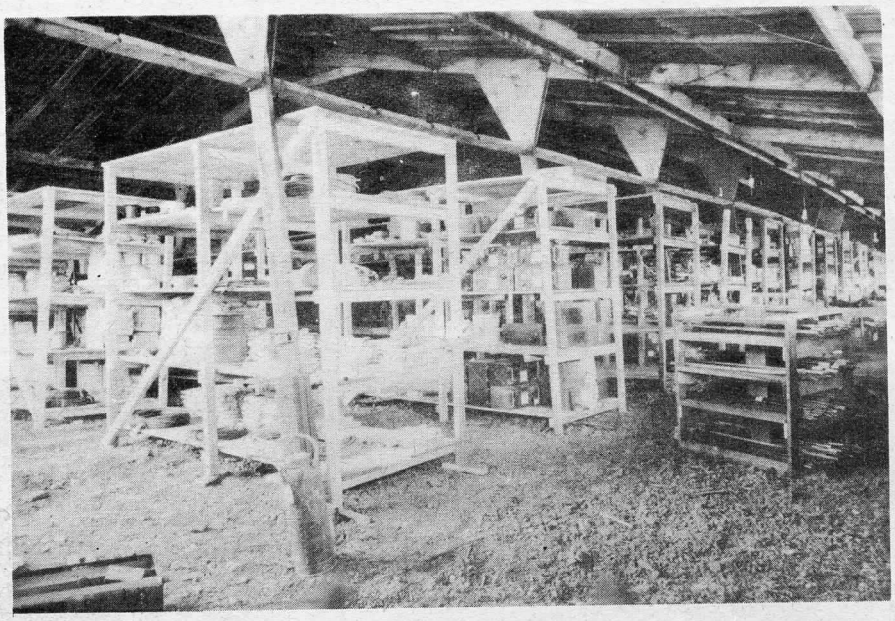
4. Southwest Pacific Area - This area contains the largest amount of land area in the Pacific Theater. Of this territory only Australia, Tasmania, parts of New Guinea and a few smaller islands are in Allied hands. The major Allied effort to date has been concentrated against New Guinea and New Britain.

A THEATER SIGNAL DEPOT WAREHOUSE IN AUSTRALIA

5. Southeast Pacific Area - This is a defensive area protecting the Panama Canal and western South America and will not be considered in this article.

When combat units moved into an operation a given "Number of Days of Supply" was carried with each unit. For any given operation advance SOS supply bases were so situated that each base could furnish material replacements, maintenance supplies and repair facilities to the greatest number of troop units.

In determining the location of a new supply base the area signal officer had to consider the relative accessibility to combat or service units forward of the base and to supply echelons in the rear. Naturally, it was necessary to select a site from which supplies could be moved forward to combat units



BIN AND SHELF STOCK WAREHOUSE IN NEW GUINEA

over existing roads or trails and which was adjacent to points where ships, cargo planes, or both could land supplies. At some points, as along the north coast of New Guinea or on Guadalcanal, docks and airfields had not existed before Allied occupation or had been badly damaged during occupation. New facilities had to be built at these locations before any large operation could be adequately supplied.

Transportation of Supplies

During the early phases of Pacific Theater operations, ships, cargo planes, and trucks were at a premium, and only supplies essential to combat operations were sent to and distributed throughout active areas. In the past year, however, transportation equipment has been supplied to these areas faster than docks, airfields, and roads could be built and military or native crews trained to unload and sort supplies at newly acquired island bases.

Initially, signal maintenance supplies were shipped to base section depots rather than to advance bases or task force signal supply officers. More recently, as better docking and airfield facilities were built at bases in newly acquired territory, shipments have been made directly to these advance bases.

In some instances urgently needed signal supplies aboard cargo ships had to be separated in the ship's hold and brought ashore on DUKWs or landing craft. When a large amount of signal equipment was unloaded some of it was certain to be mislaid and recovered, at a later date, from the warehouse or dump of another service.

By the middle of 1943 air transport planes began to carry a ton-mile load of war materials comparable to that handled by trucks and railroads in the Pacific areas. The reasons were as follows:

1. Air and ground forces units stationed on numerous small islands could be supplied only by sea or air. Since even smaller supply ships were profitable targets for enemy bombers, air transport was the surer means of delivery.

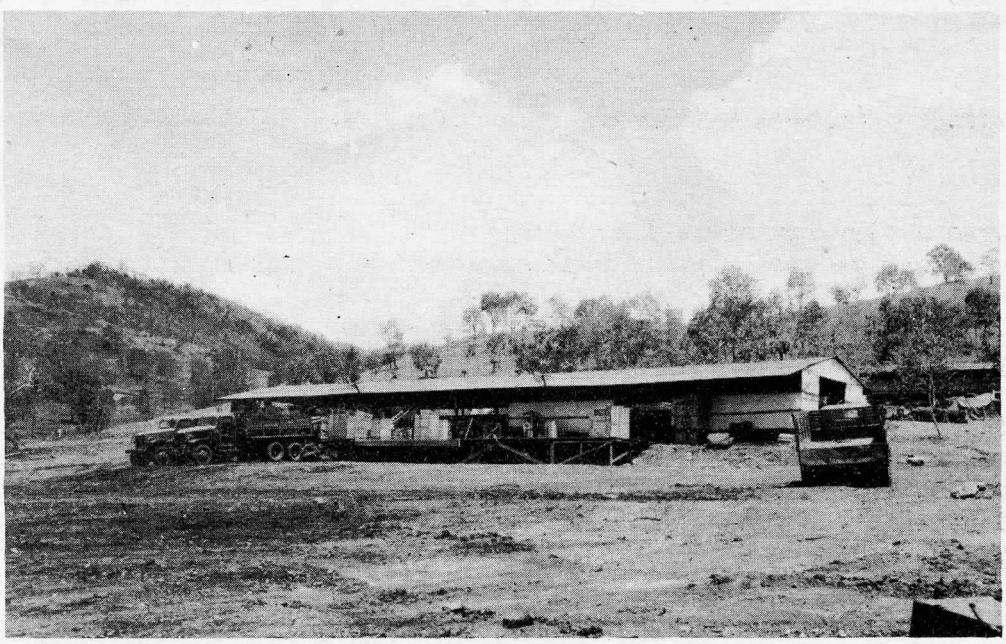
2. Within Allied territory only Australia had a rail or highway system worthy of the name. Shipping delays and losses were frequent on Australian railroads, due to the necessity for reloading at points where rail gauges changed, and to slow handling at all transfer points.

3. It was often easier to build airfields at two widely separated supply bases (such as Brisbane and Darwin, Australia, or Port Moresby and Milne Bay, New Guinea) than to construct a road between these points or even to docks serving each base.

4. Cargo planes were capable of carrying practically any piece of signal equipment that could be loaded through the plane's cargo doors.

Because of their weight, cargo planes require a level, fairly solid landing field at least 4,000 feet long for takeoffs and landings with only an average load aboard. Consequently these planes rarely could be employed to bring supplies into a newly occupied area until landing strips were built, or captured Jap fields repaired.

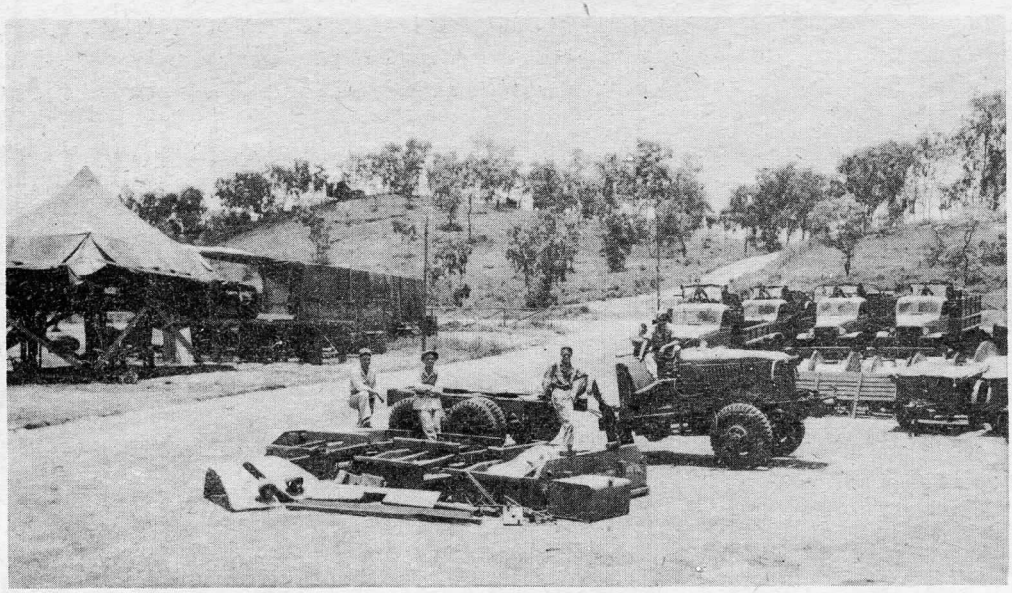
Despite the increased number of cargo planes now available, priorities must still be obtained for supply shipments by air.



ONE OF THE LARGER SIGNAL DEPOTS IN NEW GUINEA

Reasonably good vehicular roads, adequate for the movement of military supplies, were available in Australia, Hawaii and those islands where large American, British, French, and Dutch commercial enterprises had been established before the war. Elsewhere the Allied military forces had to build or improve roads between supply bases, docks, and airfields. In the Solomon Islands, for example, construction of new roads was frequently started within 24 hours after Allied forces landed.

DUKWs, weapon carriers, jeeps, and pack animals were employed when heavier trucks could not negotiate existing roads and trails. In one case,



SIGNAL BATTALION TRUCK IN NEW GUINEA, DISASSEMBLED AND CUT APART FOR TRANSPORT BY PLANE

2½ ton trucks were cut apart with hacksaws and torches for air shipment to an advance base so that signal supplies could be handled more expeditiously.

In spite of consistent Jap air attacks, small coastal ships continued to carry the bulk of supplies from base depots in Australia, New Caledonia, Alaska and the Hawaiian Islands to advance depots or bases in the combat zone. These ships had a good cruising speed and could dodge Jap bombing or torpedo attacks, or hide in bays and inlets by day or travel by night. With their shallow draft such small ships could be unloaded at docks and improvised piers which larger ships could not approach, even at high tide. Various types of landing and assault craft were utilized to carry supplies to islands which had no docks but where shallow draft boats could be beached, unloaded and maneuvered away quickly when necessary.

Storage and Issue

Before Pearl Harbor the only U. S. Army storage facilities in the Pacific were located at long established bases in Hawaii, the Philippines and other American island bases. When the Pacific Theater area headquarters establishments were set up in Australia, New Caledonia and Alaska, existing commercial buildings were taken over as supply warehouses. Advance depots and bases were often established in unpopulated areas, and frequently put in operation, with inexperienced personnel, during enemy bombing raids.

In the Aleutians, forward supply bases were first set up in sod-covered dugouts cut into the tundra, and later moved into Quonset huts. Supply shelters at advance bases in the southern Pacific areas were often huts built of bamboo, with thatch roofs, sometimes of imported lumber roofed with tarpaulins or galvanized iron. Occasionally prefabricated buildings were made available for the storage of special equipment. Tropical supply shelters were designed to keep equipment dry during heavy rains and to permit good air circulation in drier weather. Duck tentage or tarpaulins had to be reversed at least once a month to prevent the underside from mildewing and rotting.

Signal supply officers in all areas urged that more care be taken in packing delicate electrical apparatus and perishable supplies like dry batteries. They had discovered that if packages of such material did not weigh more than 40 or 50 pounds there was less breakage from rough handling. They also suggested that signal equipment packed in small, moisture-sealed or water-proofed cases could often be kept in the sealed case until it was to be placed in service.

In the North Pacific Area, signal supply agencies had no trouble in keeping dry batteries "cool" and dry, but in the tropical areas every known method for preventing "shelf" deterioration was tried. When cold storage facilities were not available several base signal supply sections packed dry batteries in flour and potato tins. Signal supply officers also felt that dry batteries, factory-packed in sealed cartons (containing 12, 24 or 48 batteries each), would retain a maximum of their power.

The channels through which signal supplies were issued in each operation were largely contingent upon the size and disposition of the tactical forces engaged. As indicated by the distribution chart (Figure 2), several alternate channels were provided between SOS bases and the tactical forces employed in the theater.

Once a major unit had begun operations equipment and supplies were issued on the basis of T/BA and T/E replacements, Maintenance Factor Tables, Automatic Supply Tables and special authorizations. Issues were made at a "day of supply" rate set up for each tactical or service unit. Any equipment and supplies carried in supply base stock, but not listed on issue tables, could be issued only upon authorization from the area SOS signal officer.

It was not uncommon for a year to lapse between the time a periodic,

A SIGNAL DEPOT AND EQUIPMENT BORDERING A NEW GUINEA BEACH

consolidated base requisition was prepared and the date when all stock requisitioned had been received. Consequently, in computing stock allowances, each advance depot or base was allowed a 30 to 120 day supply, a 30 to 120 day supply was allowed as reserve in base section depots, and a 120 to 180 day allowance was made for delays due to paper work and handling of the materiel requisitioned while enroute. When special needs arose, stocks were transferred between depots of an area, or, less frequently, between depots of two areas. One area SOS signal officer set up a control section in his office to keep a centralized record of stock in area depots and to expedite transfers and special issues.

Some signal equipment, particularly that used for open wire lines and fixed radio station construction, was obtained from commercial firms in Australia. However, no great dependence could be placed on this source of supply, as few pieces of equipment are made by mass production methods in that country.

Controlled item reports were inaugurated in the South Pacific Area about 1 July 1943 so that a better control of signal equipment could be maintained and a more equitable distribution made between tactical units. Even with a master control system it was difficult to determine whether special items requisitioned were actually needed or were merely "desirable." Every effort was made to supply materiel needed by forces in combat areas, but, with signal equipment still scarce, the final decision on issue often rested with the area SOS signal officer. The difficulties involved in obtaining shipping priorities for signal equipment and in getting enough personnel to handle

such shipments were often more serious than actual shortages of supplies.

Records of supplies received and issued by advance bases and sub-bases were necessarily simple and consist of tallyins, tallyouts, and a simple form of stock record.

Repair

Repair sections of the advance bases normally performed 3d echelon maintenance, but it was sometimes necessary for them to do 4th echelon work, particularly when the base was some distance from an advance depot, and equipment replacements were urgently needed by combat units.

During earlier operations in the Pacific Theater base, repair crews seldom had more than a minimum of the tools and test equipment authorized for any echelon of repair. However, by improvisions, they managed to keep the most needed equipment functioning and received many commendations for their work. Damaged equipment usually was exchanged at the signal supply base for new or repaired equipment and turned over to the repair section. If repairable -- and if replacement parts were available -- the equipment was put in working order and placed in stock for reissue. When equipment could not be repaired it was shipped to the next higher supply base or depot for salvage. Repair priority for each type of equipment was determined by the demand for the item and the number of man-hours of repair.

Damage to wire equipment was primarily due to mishandling, inadequate 1st echelon maintenance or enemy action. Failure to keep equipment clean and dry caused considerable corrosion of metal parts, swelling of wood members and rotting of leather or fabric pieces. The simpler field wire equipment could usually be repaired, but carrier apparatus and the other types of electronic wire equipment were frequently deadlined until repair parts or units could be acquired from area base depots.

Radio equipment troubles were generally those common to other theaters and inherent in the particular piece of equipment, although corrosion and mishandling accounted for some trouble. Radio repairmen sometimes found it necessary to make complicated repairs without the aid of test sets, special repair tools and spare parts that had been available to them in the U. S. The shortage of spare parts was partly unavoidable, since many radio sets employed in the theater were new types. Only time would show which parts required periodic replacement and how often such replacements would have to be made. Minor modifications, such as relocation of a tube base to permit the installation of new parts or to prevent ground or arcing due to dampness, were sometimes necessary.

Only simple emergency repairs could be performed on cryptographic equipment at the advance bases. Maintenance crews from base depots made periodic inspections of this equipment and were provided with the tools needed to make complete overhauls or adjustments and to replace or repair defective parts or assemblies.

Reclamation and Salvage

As noted previously, signal equipment which could not be repaired by advance base signal repair crews was normally marked for salvage and shipped to depots through supply channels. In an emergency, base repair crews were authorized to cannibalize equipment held for salvage and use any part to repair other equipment. As a result of this policy, many pieces of damaged equipment were returned to combat units weeks before they would have been if repairs had depended on replacement parts available only at depots hundreds of miles to the rear.

Repair crews found that some smaller pieces of wire and radio equipment could be put in working order by drying them out thoroughly. "Baking ovens," improvised from gasoline drums, oil cans, and scrap metal - welded together - were built by several repair sections to control and speed up the drying process. Several types of desiccants, placed in equipment cases to absorb moisture, were partially successful. When damp-proofing kits were provided, equipment passing through the repair section for other work was treated before being returned to base stock. It was found that most of the preservation treatments improved the operating efficiency of the equipment and increased the time between repairs.

Technical experts who have visited the southern areas of the Pacific Theater indicate that tropical treatment of signal equipment should include:

1. Impregnation of coils, condensers, wiring, etc., with a waterproof wax or varnish having a 180° melting point and a -32° cracking point.
2. Treatment of metal surfaces to withstand salt water immersion without rusting.
3. Insulation of cords and wires sufficient to prevent arcing, leakage, and carbonization. Several observers noted that ants thrived on various kinds of insulation and on bakelite bases and frames.
4. Full glazing of ceramic parts to prevent fungus growth and water absorption.
5. Screening of air vents to keep out insects. Fly sprays helped to destroy the bugs but also short-circuited the apparatus at close contact points.
6. Impregnation of fabric parts with rubber compound to prevent rot. (Rubberized fabric or laminated fabric and rubber bags have been found most practical for keeping equipment dry during transportation.)

Base Signal Communication Facilities

As indicated in Figure 1, supply base signal communication facilities were normally provided by the base signal officer. Temporary wire circuits to major tactical headquarters were usually installed by combat signal units and turned over to the base signal officer when the tactical units moved forward.

Fixed radio installations and message centers served all agencies stationed at the base. A typical base might have radio circuits to:

1. Higher and lower supply echelons.
2. One or more tactical units served by the base.
3. Small ships carrying personnel and materiel between bases.
4. Air transport administrative agencies.
5. Other area SOS headquarters and agencies.

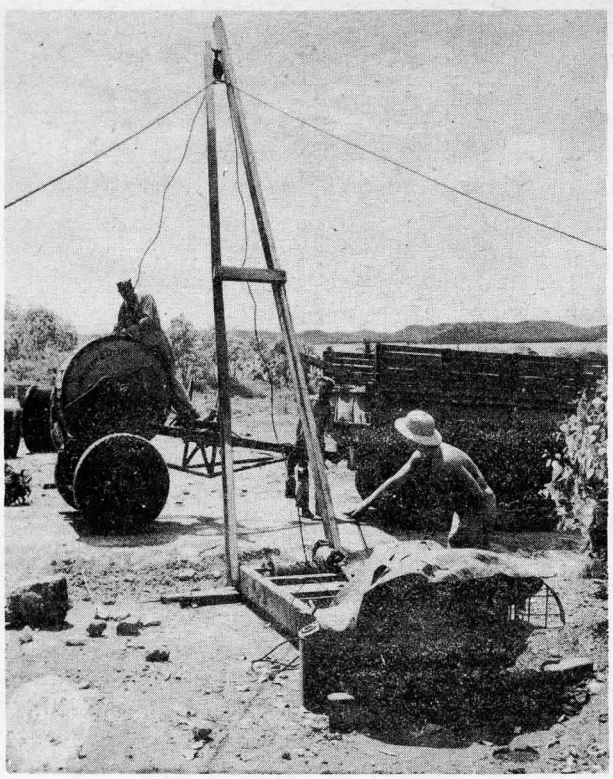
Radio equipment might be of the fixed, mobile, or portable type depending on which type could best be spared by tactical units and how long the station had been established.

At small bases, message centers were usually set up adjacent to the radio stations and, unless the base was widely dispersed, only local messengers are needed to pick up and distribute messages.

Administration and Training

The primary administrative considerations were quartering, messing, individual health, defense of the base area, and unit training.

Base units were generally quartered in tents, new native type huts, or dugouts in the combat areas; sometimes in semipermanent cantonments or billets in the rear. New, well-built thatch huts were often preferable to tentage in the southern Pacific areas, since they shed water well and provided better ventilation. The ideal base cantonment was located on high ground, under natural cover, and close to the service area.



A SALVAGED TRUCK CHASSIS PROVIDES BOTH BASE AND MOTIVE POWER FOR THIS IMPROVISED "A" FRAME USED IN NEW GUINEA

The main messing problems were sanitation and variation of diet. Particular attention was given to washing all food containers before and after use to prevent intestinal disorders. In the tropics food molds or putrefies rapidly and, as few units have refrigerated storage, perishable leftovers could not be saved. Base personnel had a better opportunity than combat units to take the essential sanitary measures but were more likely to be lax if not closely supervised.

The monotony of field rations was relieved by using native plants and fruit selected by someone who knew which native foods could be eaten safely and how each should be prepared.

Despite all sanitary measures taken and the extensive use of preventative medicines like quinine and atabrine, malaria and intestinal diseases were still prevalent.

Base area defenses were primarily designed to fight off enemy air and raider patrol action and might be manned by attached tactical units or by the base service units. Individual weapons, machine guns, light AA and AT guns were employed in area defense.

Although base personnel received training in their given specialty and normally obtained enough exercise during their daily work, some specialist and combat training was essential to the maintenance of morale, adequate area defense, and technical efficiency. Such training was particularly necessary to acclimate newly assigned replacements.

Enemy Equipment

Under existing Signal Corps policies on processing captured enemy equipment the advance base or depot was normally only a forwarding agency for captured equipment but might be charged with packing such equipment for safe shipment to the rear depots.

On occasion a base might be authorized to rehabilitate enemy equipment for local use or to salvage parts that were needed to repair allied or enemy equipment.

TACTICAL UNIT SUPPLY

While there was no great difference between the methods of operating signal supply agencies of either an SOS unit or a combat force unit, the latter had the advantages of precedent and definitely limited functions on which to base its operating methods. This advantage became more apparent when a supply unit found it necessary to revise its SOP to conform to the tactical situation, climatic conditions, available means of transportation, or the ability of assigned personnel.

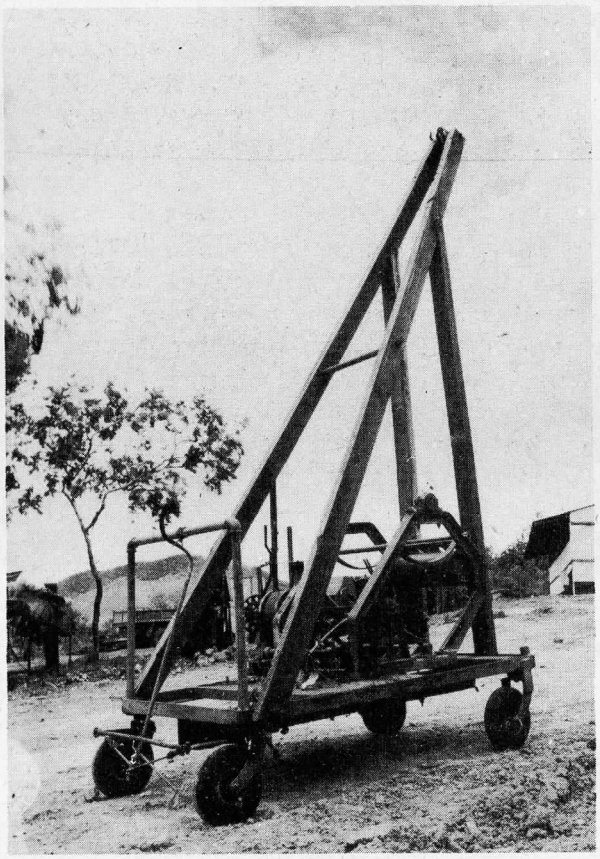
It seems evident, from the following information, that there is no one approved solution for operating any tactical signal supply unit.

Landing Operations

Most tactical operations against new objectives in the Pacific Theater were initiated by light amphibious task forces, followed by heavier landing forces or airborne troops. Each of these forces carried only a minimum of signal equipment. As soon as beachheads were established signal supply teams were landed to set up dumps and repair stations on or near the shore.

Some damage and loss of signal equipment and supplies always occurred during the landing operation - which required immediate repair or replacement. Those signal supply units which had already landed had to be prepared to do all of this work, since the higher supply and repair echelons were too far to the rear to be of any immediate assistance.

Transportation As combat troops moved forward through roadless jungle or over trackless tundra, signal supply and repair channels had to be extended to handle equipment maintenance. Supply and repair points were normally set up at the rear echelon of the unit served and distribution effected by jeep, pack trains, native porters, or "paradrops" from planes. When overland trails were too narrow to accommodate vehicles, jeeps could sometimes be routed along dry streambeds or beaches during the dry season.



REEL UNIT RL-26 SERVES AS THE POWER UNIT FOR THIS IMPROVISED DOLLY IN NEW GUINEA

Even the shallower streams would generally accommodate rubber assault boats (LCR's) or native canoes, but there were two distinct disadvantages to this mode of transporting supplies. There was always the problem of keeping boat-carried supplies dry and the ever present danger of ambush or frontal attack by enemy forces, which frequently dispatched patrols along streams in flanking or infiltration movements. Occasionally it was practical to supply isolated units fighting along the shore of an island by boat; employing light landing craft or amphibious vehicles to carry in supplies.

Considerable time and effort was gained when jeeps, with trailers, or heavier vehicles could be employed to move signal equipment forward. Several estimates reveal that 35 native porters (and 5 or 6 "boss boys") were needed to move the load which one ¼-ton jeep and trailer could handle. Approximately 7 to 10 able pack animals were required to move the same cargo. However, when supplies had to be moved over mountain trails only pack trains, porters, or troop packs could do the job. British and Australian units reported that machine gun and similar light carts could be used to advantage on narrow trails for hauling equipment and supplies.

In emergencies, wire, batteries, spare parts, and even radio and telephone sets were successfully dropped by planes. This method of delivery required parachutes or heavily padded bundles and a well cleared and marked dropping ground, though drops were normally made from only a 200 to 300 foot altitude.

Small task forces, sent to isolated islands 25 to 50 miles from the main task force supply base, were sometimes accompanied by a detachment of signal supply men. When such a task force was sent on an observation or patrol mission it was essential that radio communication be maintained with headquarters of higher echelons and one radio repairman might well be worth a dozen riflemen.

Natural hazards combined with enemy action to make supply routes and storage areas as dangerous as the front lines. Extreme heat, high humidity, torrential rain, and heavy clouds in the southern Pacific areas; snow, sleet, fog, and almost continuous zero visibility in the Northern Pacific Area, all greatly increased the difficulty of keeping land, sea, and air supply lanes open to the fighting forces. The Japs were ever alert to capture, disable, and destroy supply trains and dumps.

Storage and Issue

Since one well placed Jap bomb or shell could wipe out a mass of signal supplies at a storage, issue, or repair point the first essential operation in setting up such a point was selection of a suitable area. Natural cover, native type huts, and tundra dugouts were best; dispersal and partial concealment was the alternate choice for a semi-permanent installation. When the combat troops served were advancing and dumps had to be moved forward every few days, supplies were placed on raised platforms or on the ground and protected by tents or tarpaulins.

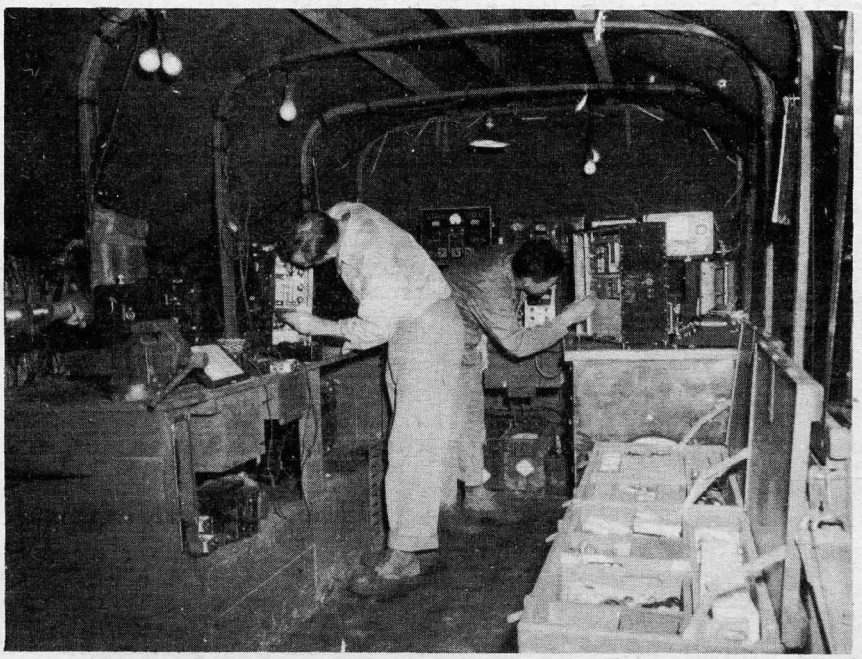
The issue of unit equipment to combat troops was necessarily based on T/BA's and, for maintenance supplies, on some form of automatic supply table. Damaged equipment was normally exchanged for new or rebuilt assemblies of the same type at division or task force signal dumps so that there would be little or no lapse in operations. Replacement units and maintenance supplies were, in some cases, delivered to combat units by ration and ammunition parties or scheduled and special message center messengers.

Several supply officers reported that native porters could distinguish between various types of supplies if each type was marked with a simple geometrical figure (○, △, ×, □). Bands of colored paint were also used to mark supplies but were not as satisfactory as the figures.

Natives employed as porters and laborers were usually paid in trinkets, cigarettes, and food instead of in cash - which is of little value to natives in isolated Pacific islands and jungle villages. The Japs seldom treated natives well (by American standards) and often forced them into virtual slavery. This made natives more receptive to friendly gestures by the Allies and more readily available as porters, laborers, guides, and scouts.

Repair

Signal repair sections generally set up shop near the main unit supply area - in tents, dugouts, huts, or vehicles - and went to work at once on disabled field wire and radio equipment. Several area signal officers provided division and task force signal dumps with spare T/BA equipment to ease the demand



THIS TRUCK-HOUSED RADIO WORKSHOP IS LOWEST ECHELON REPAIR ON NEW GEORGIA ISLAND

on repair sections and to keep the maximum amount of communication equipment in operation on the front lines.

When spare communications equipment units were not available at the signal dump, defective equipment was brought directly to the repair shop by the using combat unit or was picked up by messengers and supply parties returning to the rear echelon. One division signal company operating in New Guinea found it expedient to assign one or more general repairmen to each separate task force. These men were capable of performing 2nd echelon repairs on the simpler apparatus and of determining when major repairs were necessary. They also encouraged better preventative maintenance in all echelons of the force. Another signal repair agency, while involved in the Aleutian Campaign, sent repairmen to advance points to make simple repairs on the spot. A third report, from Guadalcanal, tells how a division signal repair section provided 24-hour repair service; repaired 74 radio sets and 8 field phones in one week. The same report estimated that 20 percent of the combat unit communication equipment employed in that campaign was either damaged or lost during combat operations. Fast service appeared to be the rule rather than the exception for the small repair sections. It should be noted here that task forces of divisional and corps size were seldom provided with shop trucks, since there were seldom any roads over which such trucks could be moved.

Repairmen were frequently unfamiliar with new Signal Corps apparatus which was brought in for repair and often had no maintenance manuals or parts

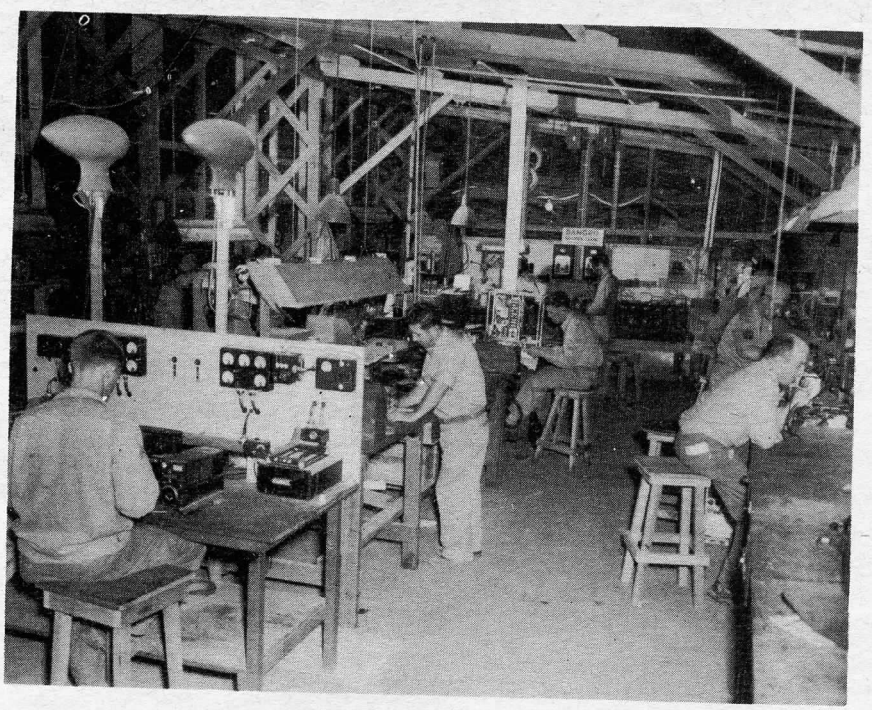
lists to guide them in obtaining new parts or unit assemblies. When maintenance manuals were provided with apparatus some spare parts were made from descriptions and illustrations of the part. One area SOS signal officer issued tables listing the average life of the most frequently replaced parts so that an adequate stock of needed parts could be kept on hand at depots and issued to repair shops on an automatic supply basis.

The lower Army Air Forces echelons reported considerable success in keeping airborne signal equipment in service. This was largely due to periodic inspections which were SOP in Air Corps units and to the fact that radio repairmen assigned to squadrons had fewer types of equipment to maintain. Aircraft radio repairmen generally worked at airbases to the rear of the combat zone but sometimes set up shop at advance landing field when extensive air operations were in progress. Spare sets and parts were supplied to squadron repairmen through Army Air Forces supply channels.

Salvage

Army supply publications generally define salvage as "any article that is abandoned in time of war." Since signal communication units in a combat zone were always short of equipment, all were interested in collecting salvaged signal equipment and, when possible, putting it into working shape.

Because of the climate in Pacific Theater areas signal equipment abandoned for more than a few weeks needed 3d or 4th echelon repairs to put it



A RECORD OF 450 SEPARATE JOBS IN ONE MONTH WAS ESTABLISHED BY THIS SIGNAL DEPOT COMPANY SHOP IN AUSTRALIA

into operation again. Division and task force signal repair sections were able to handle a good percentage of such repair work or, if the apparatus could not be repaired, were satisfied with the usable parts that could be taken from recovered Allied equipment.

New types of light enemy signal apparatus captured or recovered were forwarded to higher echelons for intelligence inspection. Heavier equipment was usually left in place and guarded until inspected by intelligence agents. In an emergency enemy signal equipment which could be repaired and used locally was employed by American troops. Jap "transceivers" (small, light, field radio transmitter-receiver units) were used successfully by American troops in several campaigns.

Although troops were frequently warned that abandoned enemy signal equipment was likely to have booby traps attached, several souvenir hunters and authorized collectors were wounded by explosions. No chemically contaminated apparatus was discovered.

Administration and Training

The majority of U. S. signal supply troops working in the combat zones of the Pacific Theater were component sections of combat signal units and had no separate administrative functions. Depot and repair companies assigned to armies or large task forces were often split among several sub-depots or sub-task forces. Unless these sections of supply and repair companies were attached to combat units for long periods, or sent to a distant base, all unit administrative matters except quarters and rations were handled by the company headquarters section. For operational and technical matters each team or section was self sufficient.

Very little training could be done while combat signal supply units were working in the combat zone. Several reports from southern Pacific areas have noted that Air and Ground Forces signal supply units were, as a whole, better trained and more capable of operating as a team than SOS signal supply units. This situation was particularly evident during early campaigns, when SOS signal supply units were made up of any available personnel which met the minimum specialist requirements.

RESTRICTED
OVERSEAS EVALUATION OF THE SCR-299

There have been two articles in recent issues of SCTIL which emphasized troubles encountered in the use of Radio Set SCR-299 in the field. The purpose was to point out steps that are being taken in manufacture to eliminate future trouble with this equipment, but more especially to call attention to some corrective measures that can be taken in the field.

It has been suggested that this emphasis on troubles in this equipment may have created the erroneous impression on the parts of some readers that this mobile headquarters set and its later forms, the SCR-399 and SCR-499, are fundamentally undependable. Actually such is far from the case.

A great deal of the trouble encountered to date is the result of attempts to extend the use of these mobile sets beyond those originally anticipated. For example, the original plans certainly did not contemplate that 299's would be used on beaches during landing operations, nor was it expected that these sets would be kept in round-the-clock operation, day in and day out. Yet so effective has this equipment proved in its intended applications that it is being used for these other purposes, or in other manners, and some of these uses have imposed undue strains and hazards resulting in breakdowns.

In order to offset the impressions that may have been created by previous stressing of troubles in this equipment, and provide a better balanced picture of its effectiveness and of the regard in which it is held in actual combat zones, the following comments have been extracted from reports received in the OCSigO and are presented here, with as specific references to sources as are permitted in a "Restricted" publication.

Report on observations of North African Signal matters from Major L. C. Sheetz, dated 18 January 1943:

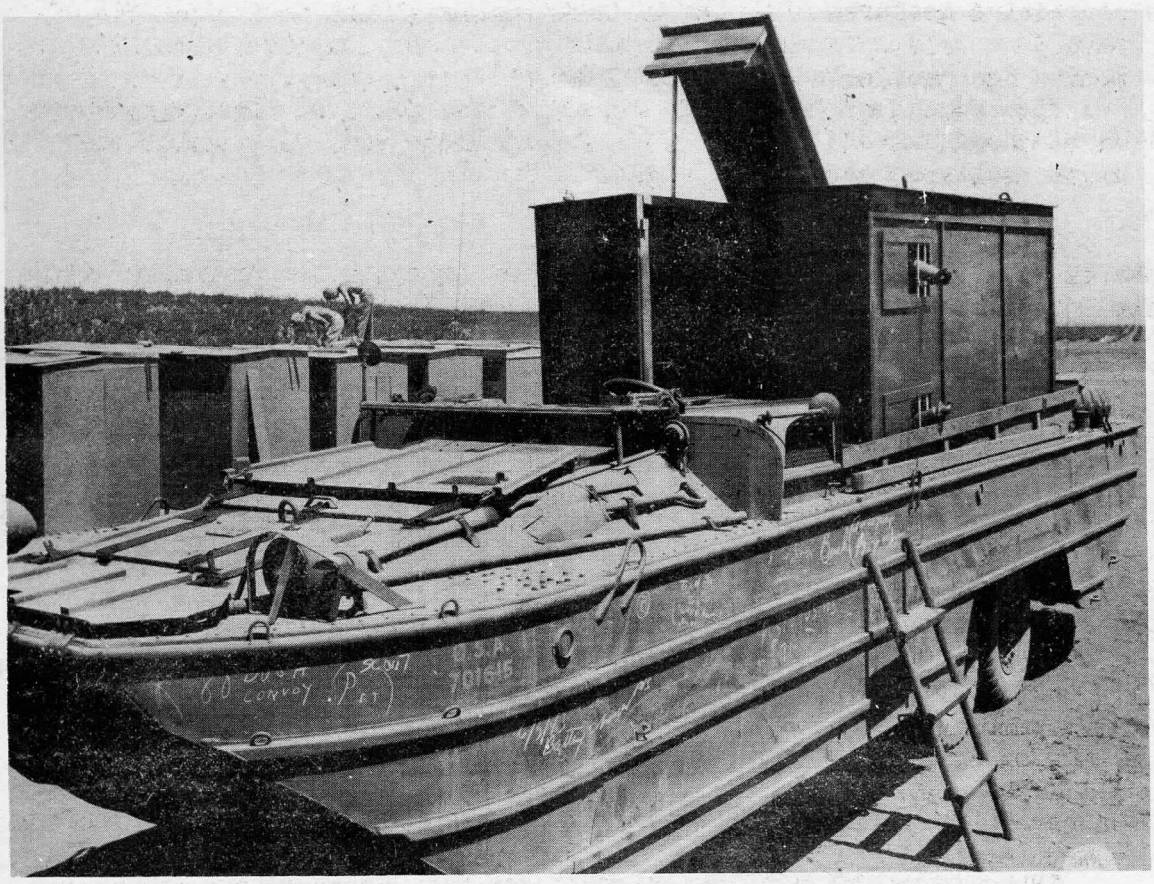
> "Frequently the SCR-299, by virtue of its power and mobility, is the only long distance point-to-point station available for some time after a landing.
>
> "The SCR-299 is far and away the best field radio equipment in the theater. This is the unanimous opinion of all British and American officers interviewed. Its performance has exceeded all expectations. For example, the SCR-299 with the normal whip antenna is used to work from Oran to the United Kingdom, and from Oran to Accra."

Col. Ankenbrandt's Report covering Pacific Area, dated 2 February 1943:

> "The SCR-299 of course is too powerful for our ground forces use in island warfare but these sets have come in exceedingly handy for meeting our present needs for location, administrative and airway circuits; also for fighter-director ground sets. They have paid

for themselves many times over in that respect even though they are not always being used by the unit that brought them down.

"Incidentally, the power unit of the SCR-299 is exceedingly valuable and most popular. It is the proper size to be able to handle at most any place and is heavy-duty enough to permit twenty-four hour operation for most of our small radio stations."



AN IMPROVISED SHELTER INSTALLED IN AMPHIBIAN DUKW TO HOUSE SCR-299 EQUIPMENT. "MASS PRODUCTION" OF SHELTERS FOR THIS PURPOSE IS SHOWN IN LEFT BACKGROUND

Letter from Major General W. B. Smith, Chief of Staff, Allied Force Headquarters, North Africa, 19 February 1943:

"Radio Set SCR-299 has proved to be the outstanding field radio set in this theater. It has only two important shortcomings:

1. Lack of a horizontal doublet antenna system for medium distance transmission over mountainous terrain. The doublet antenna is being used in this theater made from standard Signal Corps parts.

2. The 1st Armored Division have mounted a number of radio sets SCR-299 in half tracks with armored roof. Some of the 299's

should be provided mounted in this sort of a vehicle. There have been several instances where SCR-299's have been damaged by small caliber gun fire which could have been avoided by use of the half track."

Comments of Lt. E. P. Parks, detachment of an observation battalion, North Africa, 28 February 1943:

"Lt. Col. Latta, C.O. of an armored battalion, stated new SCR-299's have just arrived installed in half tracks and location of machine gun mounts is excellent. Col. Latta feels it is a good set.

"Lt. Col. Reynolds, SigO, Atlantic Base Section. 'Used SCR-299 for fixed plant installation. It is an excellent set, very stable and gives necessary frequency range'."

Report of Lt. Col. J.P. North, 29 March 1943, on visit to the Allied Forces in the North African Theater and to the British Forces in the Middle East:

"These sets have proved very useful over and over again. A British Staff Officer stated 'using a 299 after using any British R/T set is like driving a private car after handling a 3-ton lorry'.

"Frequency Calibration Signals. In the 8th Army a signal is sent out daily on a No. 33 set or a SCR-299 which is very carefully calibrated. To this signal all units and formations check their wavemeters and sets."

Letter from Col. Tully, Signal Officer, II Corps, North Africa, 9 April 1943:

"During the entire period to date that the American forces have been in North Africa, the SCR-299 radio sets have been the main means of radio communication. They have been operated on channels that cover a range of as much as 2,300 miles, have given satisfactory performance at all distances, and it is believed that, operated on the correct frequency, these radios will cover any distance and furnish 24-hour per day communication.

"The only difficulty experienced has been to cover the distances from 75 to 150 miles consistently. This difficulty was surmounted by the use of doublet antenna systems when the occasion warranted that increase in emitted power.

"We have, under combat conditions, maintained constant CW communication over distances up to and including 300 miles and 'voice' communications up to and including 100 miles.

"Generally speaking, the SCR-299 has more than paid its way and is very popular with all concerned."

Letter to CSigO from Brig. Gen. Jerry V. Matejka, Allied Force Headquarters, North Africa, 18 April 1943:

"A parts kit and instruction should be standardized for installation of radio set SCR-299 in car, 1/2 track, M-3, or a similar vehicle. Such installations were specially made for this operation and proved highly successful."

OPERATING POSITION OF THE SCR-299 INSTALLED IN AMPHIBIAN DUKW

Report from Office of the Director of Intelligence, ASF, based on operation in Sicily, 17 August 1943:

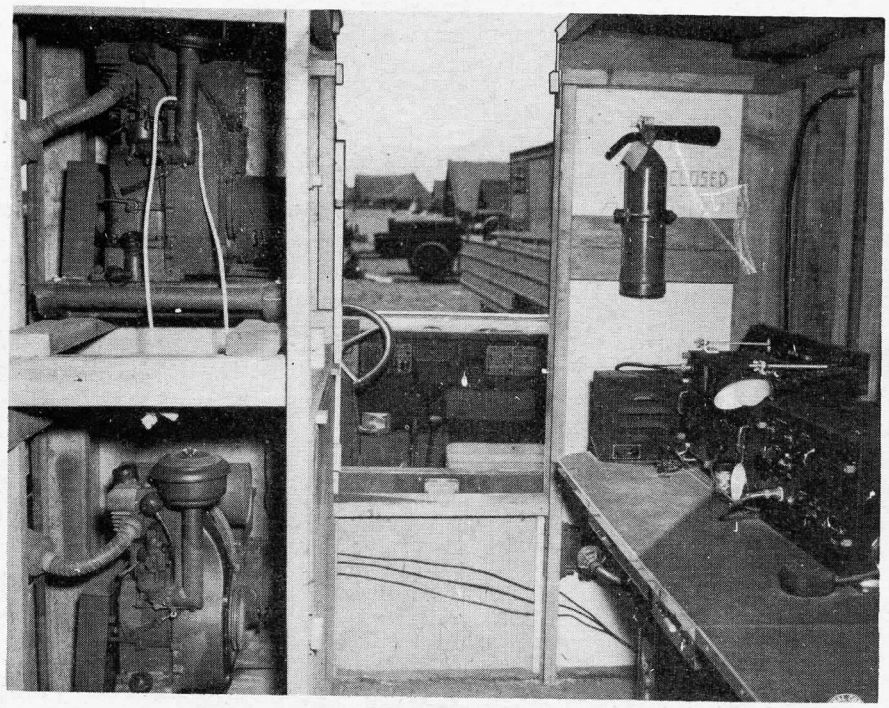
"For the amphibious stage of the Campaign, two SCR-299's in DUKWs were provided for operation in Corps Command and Army Command nets. The DUKWs proved their worth when, after being landed at the wrong beach, they cruised six miles to the Corps Command Post."

Report from Col. William W. Dick, Headquarters Northwest African Air Forces, U. S. Army, 21 August 1943:

"Although not entirely satisfactory for beach landing, the SCR-299 is the most dependable communication unit available at present. Provision should be made to bring ashore in the assault stage sufficient numbers of these sets (complete with power units) to care for all main channels of communication."

Report of visit to European and North African Theaters by Lt. Col. J. P. Berkely, U.S.M.C., 8 October 1943:

"The radio components of the SCR-299 were placed in several of the Amphibious Cargo Carriers or 'DUKW' and worked most satisfactorily."



THE TWO GENERATORS, PE-75's, ARE USED ALTERNATELY IN THE SEA-GOING SCR-299

Report from Office, Director of Intelligence, Army Service Forces, 11 November 1943:

"Radios SCR-299 installed in a box similar to the HO-10 were mounted in DUKWs and were remarkably successful. In some instances they got ashore eight hours earlier than other vehicles on the same craft and were placed in operation immediately. Two power units PE-75 were used in lieu of the conventional PE-95."

Rear Echelon Headquarters U. S. Army Forces, China-Burma-India, 11 December 1943, report by Lt. Adam E. Dogan, Unit Leader:

"At the station visited the transmitter BC-610 had been modified for use in a radio-teletype hook-up. A rhombic type antenna was constructed and beamed towards Rear Echelon Headquarters.

"In order to more fully utilize the power output of the SCR-299 when operated as a fixed station and increase its consistent reliable range, several different types of antenna have been placed into services. These include the rhombic, hertz and doublet type antennas.

Generally the tuning of antenna matching had to be modified to feed the antenna properly. This included revising the antenna tuning unit circuit and rewinding the coil.

"The use of a wider frequency spectrum enables reliable twenty-four hour contact to be maintained over the long distances encountered in this theater."

Report by Lt. Col. T. R. Putnam, AFHQ, North African Theater of Operations, 7 January 1944:

"In the North African operation, SCR-299's in Algiers were working to London actually by D plus 2.

"Talking about the larger headquarters, the SCR-299's were used almost exclusively and continued to be used in the later phases.

"The SCR-299 sets were continued in use by the higher Headquarters after the tactical phases, for administrative purposes. The chief reasons for this probably were that the troops were familiar with the equipment and spare parts for maintenance were usually readily available. In addition, many of the administrative circuits set up are in service for relatively short periods of time, with respect to location of the distant terminals. The SCR-299 set provided very satisfactory type of equipment for this purpose."

Minutes of the eleventh meeting of the Combined Signal Board, North Africa:

"Brig. Gen. Murphy stated how very satisfactory the SCR-299 set had been and it was the only set he knew that worked so well whether it was on the move, on a halt or even in a ditch. For this reason he was very much concerned about the maintenance of the units we now have, especially the parts to the power supply in the trailer."

Extract from answers to G-4 questions for Army Ground Forces observers, Signal Communication (Signal Officer, 5th Army):

"Q. What is the ability of signal equipment to perform functions intended for general service use to meet requirements peculiar to particular theater?

"A. Radio Set SCR-499 less power unit PE-95 but with two PE-75's when built into an improvised HO-17 and mounted in a DUKW makes a very satisfactory means of landing a working radio system in invasion operations. The two PE-75's are used alternately as power supply. Two BC-342's instead of one BC-312 and one BC-342 are used so as to keep the installation independent of the DUKW electrical system. The whole setup can readily be lifted out of the DUKW and installed in a standard 2½ ton cargo truck as soon as a road net beyond the beaches is reached, thus making the DUKW available for unloading ships to dumps. DUKW-mounted radio sets were placed in the sea from ships about ten miles off the beaches in the Salerno area and came ashore without incident. An SCR-499 channel is working consistently between the Salerno area in Italy and the Oran in Africa."

IMPROVISED ACCESSORY KEEPS PLUGS CLEAN

When Switchboards BD-71 and BD-72 are operated in trenches and dug-in positions, the plugs at the ends of the cords frequently come into contact with the ground when the cords are not in use, becoming muddy and corroded. When the plugs are later inserted in the jacks, these become fouled, disrupting communications and necessitating troublesome repairs and cleaning.

Corporals E. J. Schrader and A. T. Bruce of Company C, 82nd Infantry Training Battalion, Camp Fannin, Texas, where loss replacements are trained for regimental and battalion communication units, have devised a simple field method of modifying Switchboards BD-71 and BD-72 to avoid this trouble. The modification, a plug holder, is estimated to cost approximately two cents per unit and has been adopted by the Battalion. It will not be included on Parts List of Switchboards BD-71 and BD-72, nor will a Modification Work Order be issued on the subject. Full information is published here for the aid of such units as may choose to make use of it.

The major part of this "Plug Protection and Holding Panel" consists of a wood block cut as shown in the dimensional photograph, Figure 1. At an

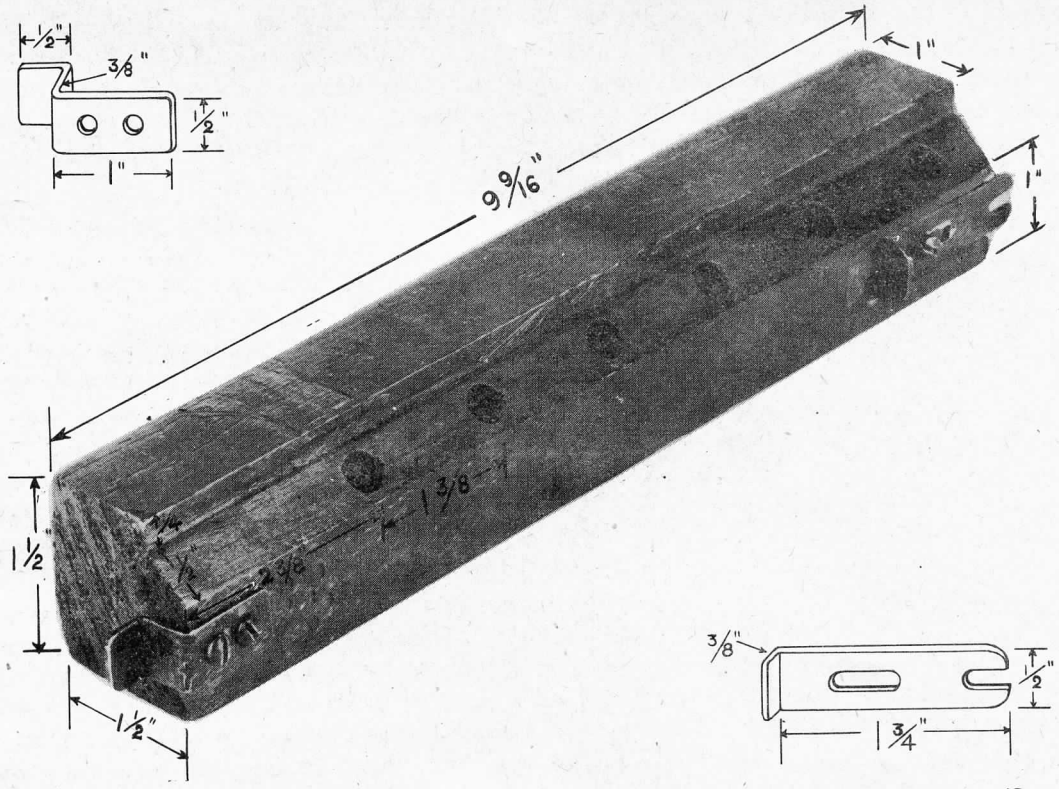


FIG. 1 - DETAILS OF THE COMPLETED PLUG HOLDER

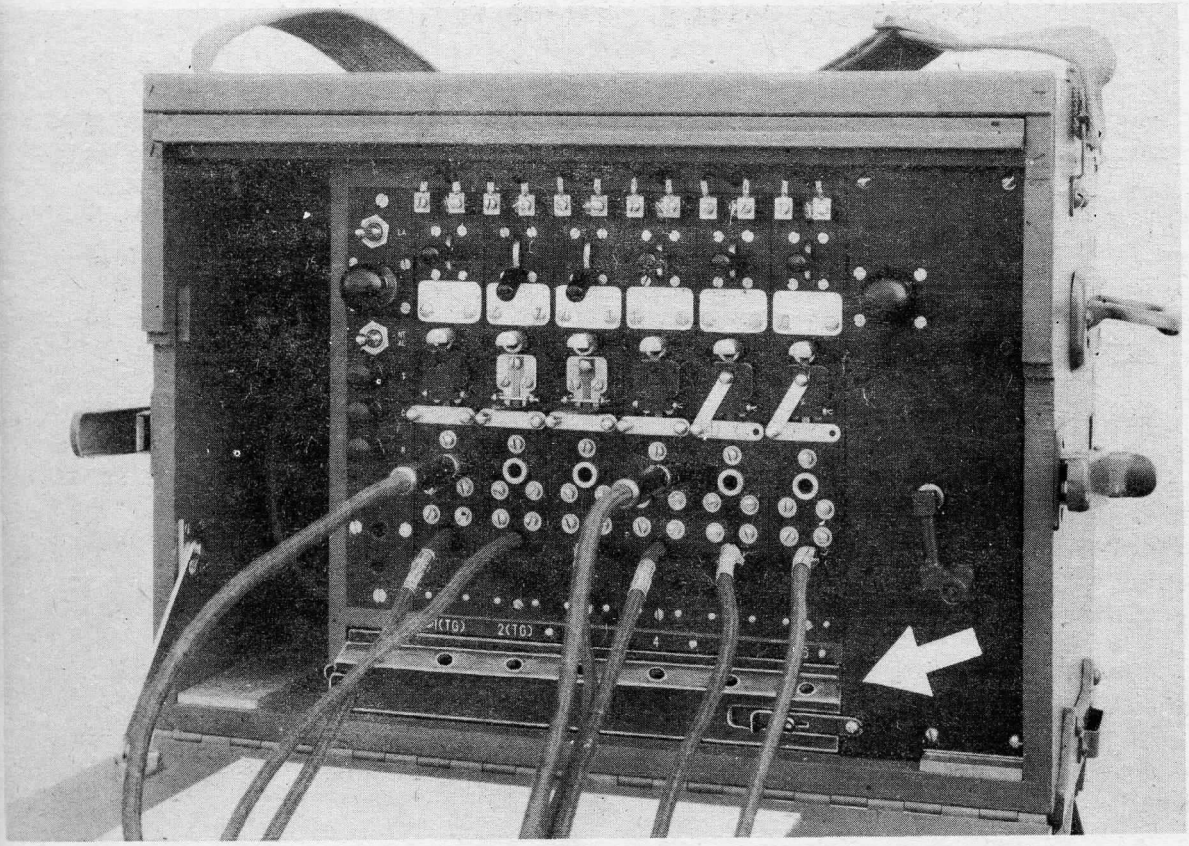


FIG 2 THE ARROW INDICATES PLUG HOLDER INSTALLED IN SWITCHBOARD BD-71

angle of forty-five degrees, and spaced as shown in the figure, six 5/16-inch holes are drilled, one for each plug. The original drawing of the Panel called for the holes to be drilled to a depth of 1-7/8 inches. It is believed, however, that if they are drilled all the way through the Panel, the accumulation of dust, dirt and moisture in the holes will be minimized.

Two minor parts are also needed. These are the mounting brackets, cut from 1/16-inch steel sheet or strap. Their dimensions are shown in the accompanying Figure 2. It should be noted that only one of these brackets is provided with a hole for attachment to Switchboard BD-71 or BD-72. This hole takes the form of a slot and is made in the right hand bracket, permitting it to be attached to a mounting screw already in the Switchboard. The left hand bracket simply bears against a partition in the Switchboard to prevent the Panel from being accidentally pushed into the compartment where the cords are carried when the Switchboard is closed.

The panel is conveniently transported in the case of the BD-71 by placing it in the rear compartment where suitable space will be found at the bottom.

SINGLE CALL SIGN METHOD

Radio operating procedure in the U. S. Army recently has been modified to include a single call sign method which provides a new procedure of calling and answering. Briefly, the purpose of the method is to conceal the identity of the net control station and the direction of the flow of traffic. In practice this system deprives enemy traffic analysts of valuable information ordinarily used in determining radio net organization. The modified procedure has been approved for combined and joint operations as well as for intra-Army use.

The Single Call Sign Method provides for the elimination of the call sign of the net control station and the prosign V in communications between the net control station and other stations in the net. The prosign T is always used in the call in communications between subordinate stations. The successful use of this method is based on three primary rules, as follows:

1. A subordinate station starts all transmissions with its own call.
2. The control station starts all transmissions with the call sign(s) of the station(s) with whom it works.
3. The prosign T, when used in the call, indicates that the station whose call sign precedes T is transmitting (or requests permission to transmit) to the stations whose call sign(s) follows T.

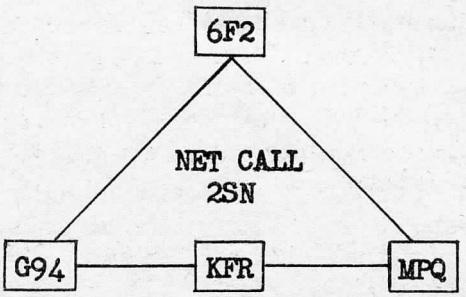
The decision to adopt the new method of calling and answering was reached after consideration had been given to the Link Call Sign Procedure, similar in many respects to the Single Call Sign Method, which was introduced by the British Army and used by the combined forces during the North African campaign. In November 1942 a proposal was made by the British members of the Combined Communications Board that Link Call Sign Procedure be adopted for combined use. This proposal was investigated in the course of which comments and recommendations were obtained from U. S. signal officers in overseas theaters. Many diverse recommendations were received and it was necessary for the Chief Signal Officer to consider all aspects of the problem, particularly from the standpoint of whether or not the procedure would be suitable for intra-Army use. Although the final decision was not in favor of adopting Link Call Sign Procedure within the U. S. Army, it was recognized that the method possessed inherent security characteristics, and that some form of procedure which would serve to conceal station identity would be beneficial to our tactical operations. The matter was considered by the Combined Communications Board and, after close study of the requirements of the various services, the Single Call Sign Method was produced. The details of this procedure will be published as Change No. 1 to CCBP-1, Combined Radiotelegraph (W/T) Procedure, which is designated in the U.S. Army as FM 24-10.

Since the principles of the Single Call Sign Method are applicable to

radiotelephone as well as to radiotelegraph procedure, it is anticipated that appropriate revisions also will be made in FM 24-9, Combined Radiotelephone (R/T) Procedure in the near future.

Below are the methods of calling and answering according to CCBP-1 (FM 24-10), the Link Call Sign Procedure and the Single Call Sign Method.

NETWORK PROCEDURE



CCBP-1	Link Sign	Single Call
Opening the Net		
2SN V 6F2 K	CQ G94 K	2SN K
6F2 V G94 K	G941 K	G94 K
6F2 V KFR K	G942 K	KFR K
6F2 V MPQ K	G943 K	MPQ K
2SN V 6F2 R $\overline{AR}$	CQ G94 R $\overline{AR}$	2SN R $\overline{AR}$
Net Control Calls Subordinate Station		
KFR V 6F2 K	KFR K	KFR K
6F2 V KFR K	KFR K	KFR K
Subordinate Calls Subordinate Station (Free Net)		
KFR V MPQ K	Not used with	MPQ T KFR K
MPQ V KFR K	Link Sign	KFR K
Subordinate Calls Subordinate Station (Controlled Communications)		
6F2 V MPQ QMM KFR K	MPQ T KFR K	MPQ T KFR K
MPQ V 6F2 K	MPQ $\overline{AR}$	MPQ K
KFR V MPQ K	KFR K	KFR K

OVERCOMING LAG IN RADIOSONDE PRODUCTION

Proportionate to the increase in air activity and greater dependence upon meteorological data, requirements of radiosondes for meteorological services have increased by a substantial percentage from year to year. In order to meet delivery requirements, it has been necessary to expand and operate at maximum capacity the two plants producing this equipment.

During 1943, conferences with the Joint Meteorological Committee, Fort Monmouth Signal Laboratory, Signal Corps Inspection Agency, Signal Corps Ground Signal Agency, the Navy Department, Weather Bureau, Production Branch (now Production Division), OCSigO, and manufacturers resulted in the elimination of practically all the restricting factors in current production of radiosondes, as indicated below:

1. The testing procedure on radiosondes being produced on current contracts was not consistent with the testing procedure outlined in the approved specifications of the Joint Meteorological Committee. Changes are being considered in the Joint Meteorological Specifications to cover this subject.

2. Complete investigation of the design of the transmitter has resulted in further studies by the Laboratory and by the facility producing this component to accomplish more uniform results.

3. Because of the limited production of miniature tubes, both 1G6-GT/G Tube and 3A5 Tube are being utilized. Both are multi-grid oscillators, the former being wired in the circuit and the latter bayonet-mounted.

4. Substitution of the ceramic temperature element for the electrolytic element has been approved by the Eatontown Signal Laboratory.

5. Up to 1 January 1944, two different types of hygrometers were incorporated in sondes. This led to considerable confusion in production planning and distribution of the specific type required by each service. A change to the electric hygrometer and 3-volt operation took place then, and nomenclature was changed from Radiosonde ML-141-( ) to Radiosonde AN/AMQ-1-( ).

6. Moisture and contact difficulties have caused the failure of relays of radiosondes to such an extent that these units required complete redesign. New sources of supply have been secured and it is considered that this difficulty has been obviated.

7. The manufacture of the switching unit of the pressure element of the radiosonde required additional finishing processes in order to reduce the large percentage of inspection rejections of these units. Processes have been incorporated in this manufacture with a view to eliminating the former difficulty.

8. Agreement has been reached by the Weather Bureau, Army and Navy to use the same type of battery connector, whereas formerly one type had been used by the Weather Bureau and another by the Army and Navy.

9. Specifications covering the printing on the box were clarified by coordination with the Army, Navy, and Weather Bureau.

10. Difficulties experienced in the production of radiosondes due

to inadequate production analyses have been, to a large extent, overcome by the establishment of new production lines with adequate testing equipment and the improvement of the labor situation.

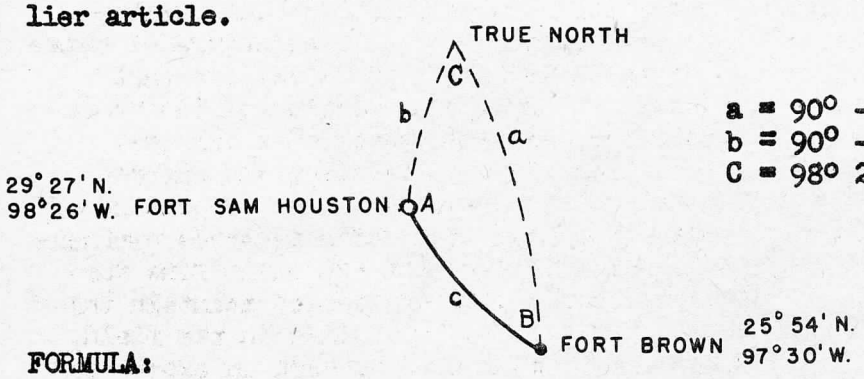
A temporary reduction in the requirements for radiosondes has relieved the necessity for additional contractors at this time. However, there are plans for the extension of tactical operations which will involve the use of this equipment to a still greater degree for the control of plane operation and artillery fire.

The uncertainty surrounding production requirements has been further complicated by the improvement that has been made in the manufacture of this equipment and the resultant reduction in shelf loss. It is certain that under present manufacturing technique a far greater proportion of the radiosondes that are produced will be available and satisfactory for service. Great care is being taken in the production of this equipment and extreme care must be taken in the operation of the equipment if a high percentage of useful sondes is to be attained. One particular item which deserves emphasis in this connection is the commutator, which is given an extremely fine surface finish at the factory. Great care should be exercised to maintain this finish. If the surface should become oily, coated, or soiled in the field, the contact and frictional resistance may be increased to such an extent as to seriously interfere with the calibration.

CHECKING ANTENNA ORIENTATION CALCULATIONS

In the January issue of SCTIL an article "Calculations for Antenna Orientation" presented a formula method for computing the Great Circle course.

It has been suggested by Communications Engineering Branch, OCSigO, that the following formula and table of calculations provide an effective means for checking calculations based on the method presented in the earlier article.



$a = 90^\circ - 25^\circ\ 54' = 64^\circ\ 06'$
$b = 90^\circ - 29^\circ\ 27' = 60^\circ\ 33'$
$C = 98^\circ\ 26' - 97^\circ\ 30' = 0^\circ\ 56'$

FORMULA:

1. $\cos c = \cos a \cdot \cos b + \sin a \cdot \sin b \cdot \cos C$

2. $\sin A = \frac{\sin C}{\sin c} \cdot \sin a$

3. $\sin B = \frac{\sin C}{\sin c} \cdot \sin b$

SOLUTION:

1. Log cos 64° 06' = 9.64028
   Log cos 60° 33' = 9.69167
   9.33195
   Antilog = .21475

   Log sin 64° 06' = 9.95403
   Log sin 60° 33' = 9.93991
   Log cos 0° 56' = 9.99994
   9.89388
   Antilog = .78321

   .21475
   .78321
   Cos c = .99796
   c = 3° 39' 30" (check)

2. Log sin 0° 56' = 8.21189
   Log sin 3° 39' 30" = 8.80486
   9.40703
   Log sin 64° 06' = 9.95403
   Log sin A = 9.36106

3. 9.40703
   Log sin 60° 33' = 9.93991
   Log sin B = 9.34694
   B = 12° 50' 39" (check)

   A = 13° 16' 30"
   A = 180° - 13° 16' 30" = 166° 43' 30" (check)

SKY HOOK USED FOR WIRE LINE DESTRUCTION

THE FOLLOWING IS A TRANSLATED
EXCERPT FROM A RUSSIAN ARTICLE

As a result of experiments with a number of different devices, the grappling iron was found to produce by far the best results (in the destruction of telegraph and telephone lines). The plane used for experiments was an IL-2 (Stormovik). It was found that the breaking of wire in one span resulted in the destruction of several adjacent spans.

Grappling irons, if not available, can be easily constructed in any field workshop. If steel or iron rods are not obtainable, a grappling iron can be made of four insulator knob supports (insulator hooks), 18 mm. in diameter (Figure 1). Four hooks are welded together and formed into a grappling iron (Figure 2). A ring is made in the base. A 4-6 mm. cable is then put through the ring and spliced to form a strong loop. The other end of the cable is attached to the bomb release lock of the plane (Figure 3). This enables the pilot to drop the grappling iron on the landing field when the mission is accomplished.

The mounting of the grappling iron on the plane is also very simple. The cable is wound on a wooden block, 15 to 20 cm. in diameter and about 30 cm. long (Figures 4 and 5). The block is tied to the fuselage. It is released first; then the pilot throws out the grappling iron. At 250 km. an hour, the unwound cable forms an angle of 30-40 degrees with the longitudinal axis of the plane, which is quite sufficient for the destruction of over-head wires (Figure 6).

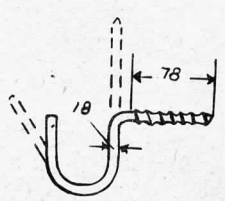


FIG. 1

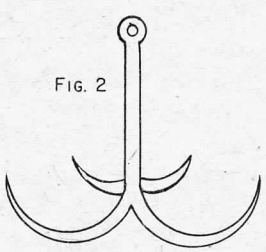


FIG. 2


FIG. 3

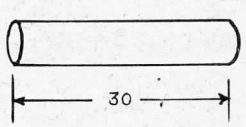


FIG. 4

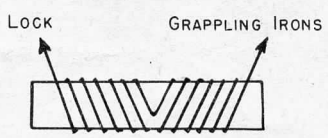


FIG. 5

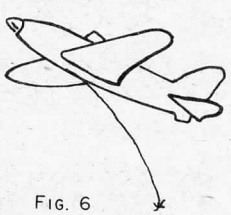


FIG. 6

CENTRAL CONTROL OF DISPERSED RADIO SETS SCR-299-( )

Following is the text of a report prepared by a Signal battalion covering a procedure found by this unit to be highly effective in the North African Theater. Because the arrangement described combines the advantages of wide dispersion of vehicular equipment with the efficiency of centralized control and operation, it is felt that the procedure described will be of more than passing interest.

During the progression of combat in the North African Theater this organization has been forced to make more and more use of mobile remote control for its radio sets in providing communication for II Corps. The following have been the causes of this trend:

1. Difficulty in concealing the large number of radio sets, as well as the other Corps Headquarters installations in a single bit of cover.
2. The practice of living in the field and the shunning of buildings as obvious bomb targets.
3. The difficulty, and resultant time lag, in locating and delivering traffic to the individual radio stations in a properly dispersed setup, especially at night or under bad weather conditions.
4. The difficulty, on the part of the chief radio operator or radio officer, of supervising and properly distributing traffic among widely dispersed radio vehicles.
5. The time loss in setting up a dismounted radio remote control in a tent in the command post.
6. The mutual interference problem caused by 5 to 7 high-powered transmitters in the same general area with the associated receivers.
7. The huge number of nets apparent at the single location (to enemy Goniometric stations) when the air liaison party net (Radio Set SCR-299-( ), SIAM station (Radio Set SCR-193), flank liaison radio (X Corps, British 19 set) and higher command liaison radio sets are added to the normal corps tactical nets.

This problem has been solved for this Corps by the construction of a seven-position radio remote control unit in an obsolescent 1½-Ton, 4x4, Dodge, Small Arms Repair Truck. From this mobile unit seven widely dispersed Radio Sets SCR-299-( ) and SCR-399-( ) are operated.

The following features of construction have made this installation highly successful:

1. Shielded key and telephone leads.

2. Shielded antenna leads.

3. Terminal Strip TM-184 to provide switching of key and telephone leads to another cable pair in case of trouble.

4. 10 pr cable connection with transmitter area (Bn Hq Co, Bivouac) which is rapidly connected by means of the stubs under the vehicle.

5. Power lead from Power Unit PE-95-( ) using German Spiral-4 Cable to vehicle power terminals. The same unit provides power for the attached SIAM detachment (4 Radio Receiver BC-342).

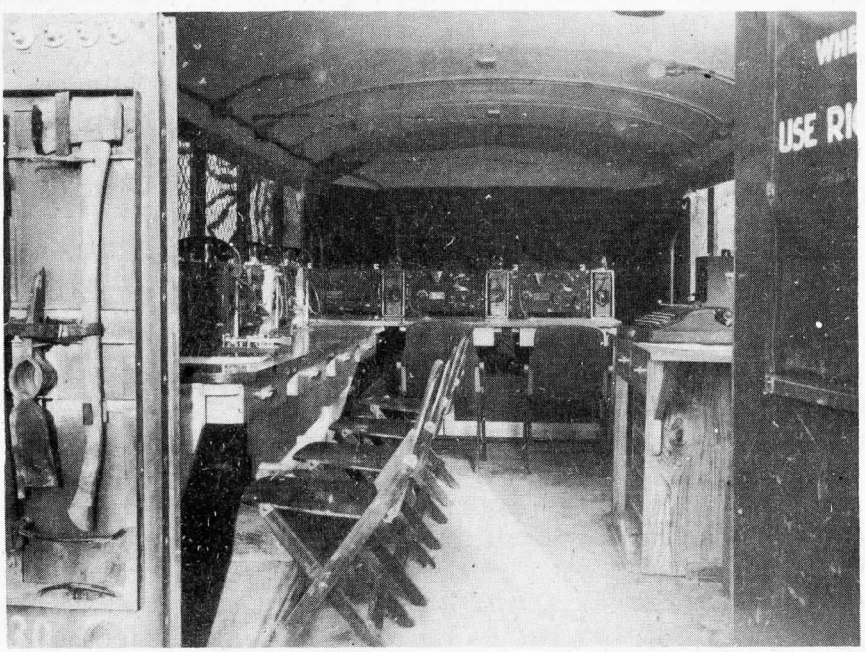
6. Convenient hardwood tables built by local Italian cabinet maker.

7. Individual drawers for each position to keep log sheets, message blanks and earphones when not in use.

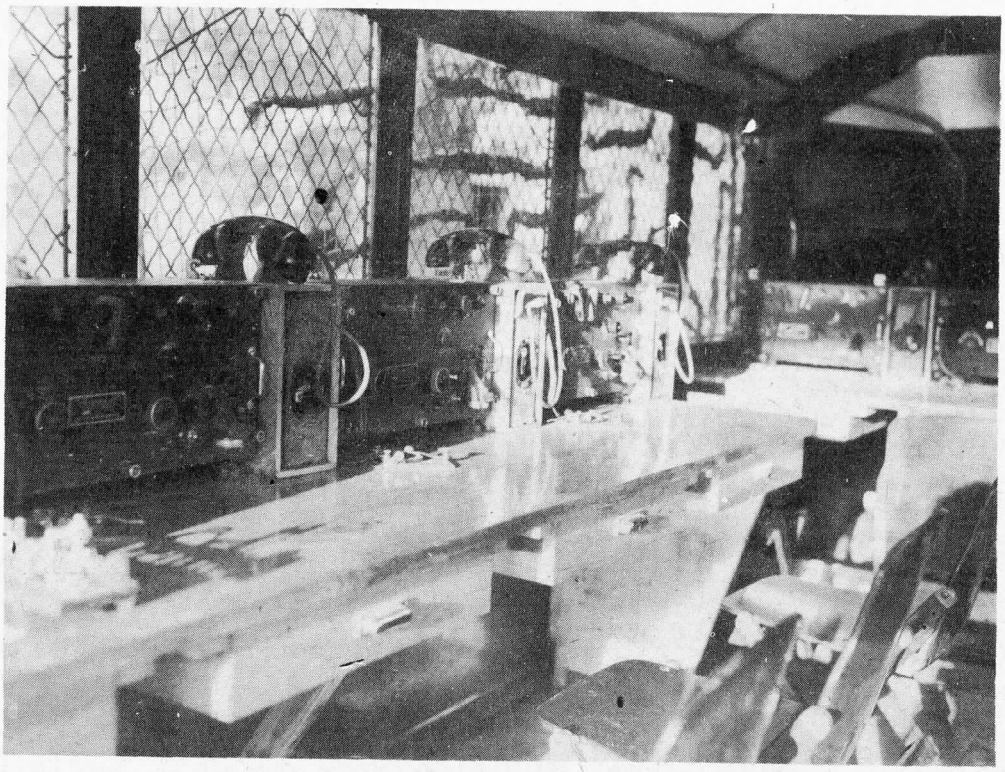
8. Telephone EE-8-A (from SCR-399-( )) installed at each set and placed across keying pair with 1 mfd. capacitors to provide direct point to point talking channel to each transmitter.

9. Excellent light and blackout facilities. The side curtains supplied with the vehicle were replaced with oversize heavy duck canvas curtains, attached permanently to the inside above the top of the windows (see photo). An additional curtain (two issue blankets) was introduced across the truck immediately behind the driver's seat for double blackout. After dark the rear door is locked on the inside and the vehicle is entered from the right front door.

10. Chief operator's desk and outside telephone (in this instance small Italian switchboard has been installed to permit switching to the radio officer's tent or section chief's tent when they are not on duty).



A MOBILE "RADIO CENTRAL" RIGGED UP IN NORTH AFRICAN THEATER TO OPERATE SEVEN WIDELY DISPERSED SCR-299's BY REMOTE CONTROL



CLOSE-UP OF THREE OF THE SEVEN OPERATING POSITIONS

11. Available Frequency Meter Set SCR-211-( ) is at the center of activity.

12. A ventilator of the type used on SCR-399-( ) is used and will quickly disperse a heavy concentration of smoke.

13. A 1,000-watt electric heater is used and is adequate to heat the entire vehicle.

14. Antennas are rapidly and easily erected by connecting them to the three antennal terminals at the rear of the truck and tying the insulators at the far end to a convenient tree or post.

It is believed that the Truck, 2½-Ton, 6x6, Small Arms Repair, is equally practical, the only advantages enjoyed by the 1½-ton model being the front exit and the drivers' seats for messengers. Also, the 2½-ton truck could tow its own Trailer K-52 (Power Equipment).

Field use of the installation described here has demonstrated the possibility of further improvements. For example, the relatively high shield-to-conductor capacity of the Spiral-4 Cable used as the antenna leads within the truck causes some alteration in the receivers on the far table. Substitution of a special low-capacity cable, such as is used in the SCR-299-( ) is suggested. Also keeping and transporting the receivers BC-342 in the vehicle would reduce installation time. A shockproof receiver mounting, such as used in the SCR-299-( ), would then be necessary for each position.

RESTRICTED

SIGNAL CORPS EQUIPMENT

FOR

ALLIED ARMIES AND THE NAVY

The following information has been issued by the Munitions Assignment Section, Requirements Planning Branch, to outline the general policy on assignment of Signal Corps equipment to Allied Nations and the Navy.

Signal Corps equipment is assigned monthly by the committees and subcommittees of the Munitions Assignment Board to the various Allied Nations and by a subcommittee of the Joint Army-Navy Allocations Committee to the Navy Department.

These assignments are based on requirements included in the Army Supply Program for the Allied Nations and the Navy. At the time these requirements are included in the Army Supply Program, a careful review is made of the capacity of the manufacturers to produce the equipment required. In many cases requirements submitted are reduced by Army Service Forces and/or Signal Corps because of an anticipated increase in U.S. requirements, or a lack of manufacturing capacity to produce quantities being asked for in addition to those required by the U. S.

After these requirements are approved for inclusion in the Army Supply Program each of the Allied Nations and the Navy is required to submit a bid each month for the quantities of each item required for delivery during the following month.

These bids are submitted to Army Service Forces representatives on the Assignment committees and distributed by them to the various technical services. The bids for ground Signal equipment are sent to the Signal Corps Assignments Working Committee. This Committee is made up of representatives of Procurement and Distribution Service, Army Pictorial Service, Army Communications Service, and Plans and Operations Division. Each bid is carefully reviewed by the Committee and a recommendation prepared as to the quantity which should be assigned by the Assignment Committee. In arriving at this recommendation, it is necessary that the Committee have available complete information as to current production, supply and demand status of each item. Consideration is given to the stock presently on hand, expected production

during the following month, and demands against this stock and production in the form of:

1. Requirements for approved theatre projects.
2. Requisitions on hand.
3. Requirements for theatre stockpiles and reserves.
4. Anticipated demands for operational projects not included in the Army Supply Program.

In addition, the overall capability of the manufacturers to produce the total Army Supply Program requirements for the current year is carefully reviewed.

On the basis of the above information, a recommendation is prepared by the Signal Corps Assignments Working Committee for the assignment of each item of ground Signal equipment being asked for. This recommendation is submitted to the various assignment committees at their regular meetings by the chairman of the Signal Corps Assignment Working Committee, who must have available sufficiently detailed data to substantiate the recommendations made.

In cases where the recommended assignment is less than the quantity being asked for, careful consideration is given by the Assignment Committee to the relative military urgency of the U.S. demands as compared with that of the Allied Nations or Navy. The representatives of the Allied Nations and the Navy are called upon to submit information as to the military need for the equipment.

The assignments made by the committees and subcommittees of the Munitions Assignment Board are subject to appeal to the Munitions Assignment Board. Those made by the subcommittees of the Joint Army-Navy Allocations Committee are subject to appeal to the Joint Army-Navy Allocations Committee. Such appeals are rarely made. A frank discussion of the relative military needs results in agreement of all members as to the quantities which should be assigned. The committees of the Joint Army-Navy Allocations Committee have the authority to assign to the Navy equipment being produced by the Army and likewise have the authority to assign to the Army equipment which is being produced by the Navy.

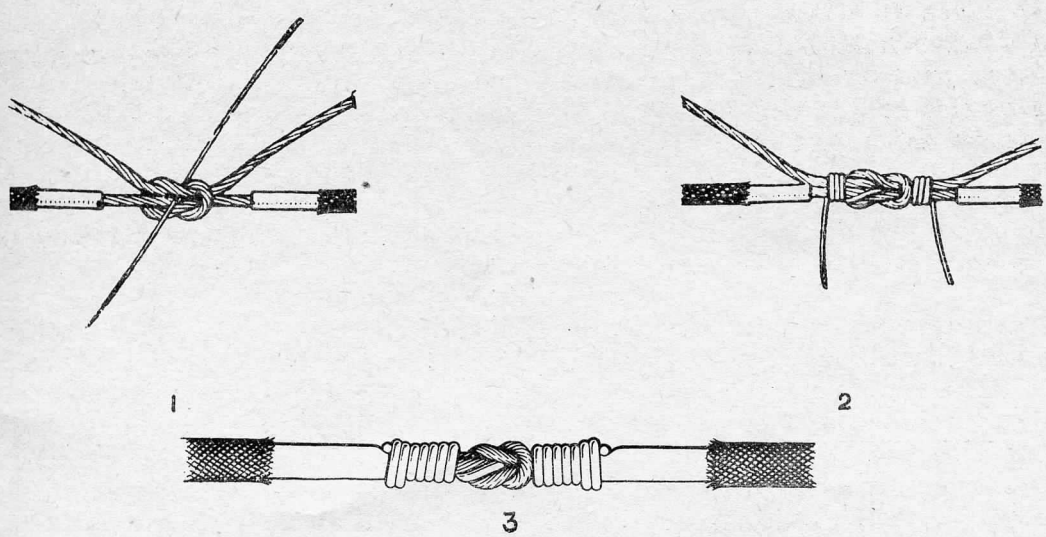
Emergency bids to meet urgent military needs are frequently handled informally between the regular meetings of the assignment committees. In handling such informal bids, concurrences are obtained from all of the members of the assignment committee.

It is obvious that in order to prevent the assignment to the Allied Nations and the Navy of Signal Corps equipment which might later be needed by the Army, and conversely in order to assure that equipment not needed to meet U.S. requirements will be made available to the Allied Nations, it is essential that complete and accurate information be made available to the Signal Corps Assignments Working Committee regarding the production, supply and demand status for all ground Signal Corps equipment.

SPLICING FIELD WIRES AND CABLES

Many suggestions for improving or simplifying standard methods of splicing field wires and cables have been received from the using arms and services, and from industry. In addition, numerous devices promising to have value for joining tactical communication wires have been considered.

Extensive studies of proposed methods and proposed devices have been completed by the Signal Corps Board during the past seven years. The Infantry Board, the Field Artillery Board, the Ordnance School, the Signal Corps Schools and others have also been actively interested in these problems. The studies have included various mechanical connectors and special tools used commercially as well as certain British equipments and methods intended primarily for military use.



STEPS IN SQUARE KNOT SPLICING: SEIZING WIRE INSERTED THROUGH KNOT (1), WOUND ON EACH SIDE (2), EXCESS ENDS CUT OFF AND WINDING CONTINUED TO INSULATION (3).

As a result of the studies, metallic splicing sleeves and the associated crimping tools have been adopted for use by Signal Corps troops responsible for the installation and maintenance of rubber jacketed multi-pair cable. The current standard methods for splicing the 5 and 10-pair cable described in TM 11-371, as well as the standard methods for splicing Spiral-4 Cable described in TM 11-369, make use of such items.

The Signal Corps Board determined, in the course of its investigations, that field Wire W-110-B and long range tactical Wire W-143 could also be spliced reliably and slightly faster by means of the metallic sleeves and crimping tools. However, insulation of these splices remained dependent upon the careful application of tapes as in the present standard field wire

splicing methods. Thorough consideration was given to the advantages offered by the sleeve splicing method, the additional training of personnel required, and the supply difficulties to be overcome before adequate splicing materials could be made available to the field forces. After appraisal of the relative merits of each method, the advantages of the sleeve method appeared insufficient to justify imposing the extra burden upon training facilities and the supply system. Consequently, the decision was made that the metallic splicing sleeves and crimping tools would be issued for use in the installation and maintenance of field cables and open wire only.

Much effort has also been directed toward devising a universal connector for field wires to avoid the necessity for skinning and taping, and to avoid the need for special tools. As yet no universal connector has been developed which will assure line continuity and line insulation at the splice under all known field conditions.

In view of the fact that no device, meeting mechanical and electrical requirements is now available, and since the difficulties of supply and necessary additional training of personnel would probably outweigh the apparent advantage of introducing a universal connector, if one were available, it is believed the "Square Knot" will continue to be used for some time for splices on assault and field wire.

PARTS REPLACEMENT REPORT CARD

The Parts Replacement Report Card described on Pages 56 and 57 of the December 1943 issue was prepared for use in reporting all equipment failures and parts replacements and should not be used in place of the "Unsatisfactory Equipment Report," Adjutant General's Office Form 468.

EQUIPMENT NOTES

SIGNAL CORPS BOARD

Signal Corps Board Case No. 529

Service Tests on Cable Assemblies CC-345 and CC-355-A. Approved by the OCSigO, 26 January 1944

The Signal Corps Board was directed to make a complete study and field test on Cable Assemblies CC-345, 5-pair; CC-355-A, 10-pair; and Cable Stub CC-344, 5-pair.

These cable assemblies were primarily intended for use as entrance cables and for local distribution purposes in congested areas. Some consideration has also been given to their utilization as main trunk line facilities.

Cable Assembly CC-345, 5-pair, consists of a specific length of Cable WC-534 equipped at each end with a molded rubber terminal fitted with a universal connector Plug PL-163. The cable is made up of 5 pairs of No. 19 AWG solid copper, tinned conductors, covered with a rubber composition insulation. The cable pairs are covered with a rubber composition or synthetic (Neoprene) jacket.

Cable Assembly CC-355-A contains 10 pairs similarly insulated and covered. The ends of the specified lengths of Cable WC-535, 10-pair, are connected by a molded pothead to two short lengths of Cable WC-534, 5-pair, each fitted with a Plug PL-163. Cable Stub CC-344 is a ten-foot length of Cable WC-534, 5-pair, with Plug PL-163 on one end. The other end may be fanned out and connected to suitable terminals.

Field reports indicated that the cable connectors Plug PL-163 were unsatisfactory, that cable conductors were breaking under tension and that in some cases there appeared to be excessive crosstalk on line facilities using these cables or assemblies.

The Signal Corps Board installed, operated and tested three facilities composed of 5-pair Cable Assemblies CC-345 each about 8½ miles in length. One facility was installed aerially, one was laid on the ground, and the other buried in the ground by means of Plow LC-61 (Cable).

center terminal strips and telephone central equipment, for rapid repairs to damaged sections in open wire routes, and for short sections of open wire facilities where pole line construction is impracticable.

The Board also concluded that in the interest of a reduction in types of cables, crosstalk, and requirements for critical materials, it would be desirable to eliminate Cable WC-535, 10-pair, substituting therefor two Cable WC-534, 5-pair. Except for special uses or for short point-to-point installations requiring five or more circuits of non-loaded cable, the Signal Corps Board does not consider favorably the use of Cable WC-534, 5-pair, or WC-535, 10-pair, as a communication axis cable. The reasons given for this decision are:

1. Its range is insufficient to provide trunk service except for short distances even if loaded or repeatered.
2. Crossfire is too great when d-c simplex telegraph circuits are used.
3. Other standard facilities such as Spiral-4 Cable and Wire W-143 will provide more satisfactory circuits.
4. Greater care must be used in its installation than is necessary with the more rugged Spiral-4 Cable and Wire W-143.

Included in this report were recommendations that consideration be given to the following program:

1. The authorization of the removal of Plug PL-163 from Cable Assemblies CC-345 and CC-355-A, and the use of expedient splices or Terminal Strips TM-184 with improvised weatherproof covers in lieu of the connectors.
2. The reclassification of Cable Assemblies CC-345, CC-355-A, and Cable Stub CC-344 as "Limited Standard" and suspension of further procurement of these items.
3. The procurement and issue of equivalent lengths of Cable WC-534, 5-pair, and WC-535, 10-pair, to meet the requirements for the reclassified Assemblies.
4. When production facilities for Cable WC-534, 5-pair, become sufficient, on a conductor-foot basis, to meet the requirements for both Cables WC-534 and WC-535, the reclassification of Cable WC-535, 10-pair, as "Limited Standard" and the suspension of its further procurement.
5. The initiation of a development project for a suitable junction device similar to the British box type and meeting the requirements outlined by the Signal Corps Board in the report in this case.
6. The revision of TM-11-371, "Cable Assemblies CC-345, CC-355-A, and Associated Equipment," 30 June 1943, to include the latest developments in standard equipment and procedures.
7. The continuation of the use of Cables WC-534, 5-pair, and WC-535, 10-pair, for the elimination of congestion due to converging communication circuits, as entrance cables, and in short lengths in the repair or in lieu of open wire lines.
8. The limitation of the use of these cables as a communication axis facility to short lengths of non-loaded cable in special operations or point to point installations where five or more circuits are required.

Signal Corps Board Case No. 530

Voice Frequency Repeater Equipment. Approved by the Chief Signal Officer, 7 February 1944

The Signal Corps Board was directed to study the need for improved type repeater and long-range telephone equipment, to test certain types developed to meet the need and to compile, coordinate and include in the report in this case the results of service tests on the development equipment by other field agencies.

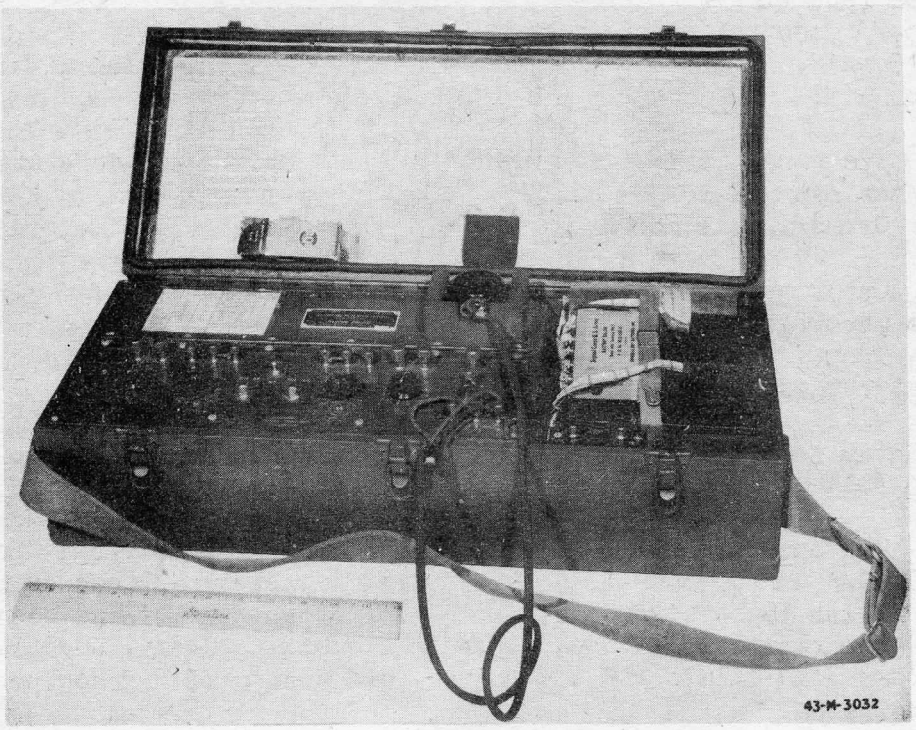


FIG. 1- TELEPHONE REPEATER TP-14-T1

The equipment tested and reported by the Board consisted of the following:

1. Telephone Repeater TP-14-T1 and TP-14-T2, two development-type, 2-wire repeaters developed by the Bell Telephone Laboratories and the Federal Radio and Telephone Corporation, respectively. Shown in Figures 1 and 2.
2. Telephone Repeater EE-99-T5, a development model of the present standard 4-wire repeater, the principal component of Telephone Repeater Set TC-29-( ).
3. Telephone Repeater EE-89-T3, a development model of the present standard 2-wire Telephone Repeater EE-89-A.
4. Telephone TP-9-T1 and TP-9-T2 development type field telephones having both transmitting and receiving gain.
5. Field Telephone EE-8 equipped with a Handset TS-9-( ), modified to include a sound power receiver.

FIG. 2 - TELEPHONE REPEATER TP-14-T2

The Signal Corps Board supervised comprehensive tests of the equipment specified above on Signal Corps wire lines near Gainesville, Florida. These facilities had been constructed by the 930th Signal Battalion for tests in connection with Signal Corps Board Case No. 440, Supplement II, "Systems of Rapid Pole Line Construction for Army Corps Signal Battalions." The results of the tests by several other field organizations were also considered in arriving at the conclusions in the report in Case No. 530.

The Board found that Telephone Repeater EE-89-A, Figure 3, due to its small size and light weight, is well received by Signal personnel for use in forward combat areas. It is a means of moderately increasing the range of field wire circuits. However, not more than two Telephone Repeaters EE-89-A may be used in tandem on a circuit. It is not suitable for use as a terminal repeater and cannot be used at points where different types of wire facilities connect. Even when used as an intermediate repeater there are rather close limitations on the location at which good results may be secured. These disadvantages are due largely to the necessity of balancing the line on each side of the repeater.

Telephone Repeater EE-99-A, the principal component of Telephone Repeater Set TC-29-A, overcomes the difficulty experienced with the Telephone Repeater EE-89-A. It may be used either as a terminal or an intermediate repeater, it is not critical as to balance, and several may be used in tandem on a circuit. However, it requires four wires for its operation which greatly increases the need for wire.

The Board found that a telephone repeater based upon combining the best features of Telephone Repeaters TP-14-T1 and TP-14-T2 will be capable of obtaining stable gains of from 12 to 14 db as an intermediate repeater and about half as much when used as a terminal repeater. Such a repeater will be capable of operating with lines of different impedances on each side of

the repeater and several repeaters may be used in tandem on long circuits. This repeater does not produce as high gains as Telephone Repeater EE-99-A but it possesses the great advantage of operating on two wires instead of the four conductors required by the latter.

Telephone TP-9-T1 was also tested on the lines at Gainesville, Florida. Certain modifications were suggested by the Signal Corps Board and have been incorporated in a model known as Telephone TP-9-T2, shown herewith in Figure 4. This device was tested later at Fort Monmouth. The Board considers this latter development to be of great utility for emergency communication between higher headquarters in rapid movement, in jungle warfare, and as an

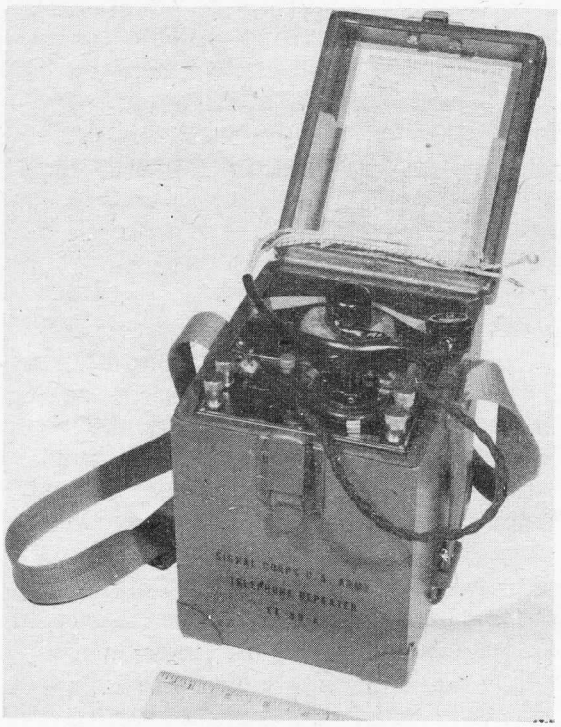


FIG. 3 - TELEPHONE REPEATER EE-89-A

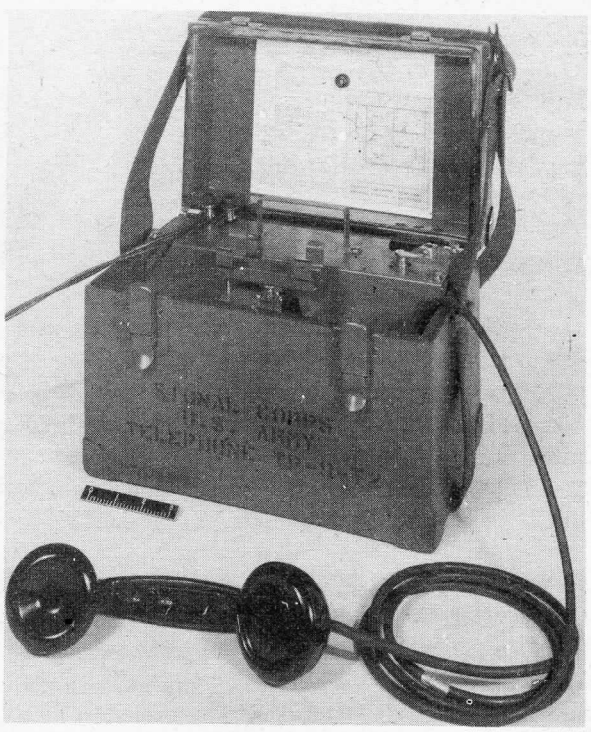


FIG. 4 - TELEPHONE TP-9-T2

emergency device to get through on circuits otherwise impossible to talk over. It is considered most suitable for point-to-point communication. When so used, a total transmitting and receiving gain in talking range of about 75 db may be obtained on field wire if no simplex telegraph other than Telegraph Set TG-5 is used on the line. With wet field Wire W-110-B, the talking range of 10.5 miles will be increased to about 36 miles. However, if simplex telegraph, using Line Unit BE-77-A, is applied, the talking range under the same conditions will be reduced to 25 miles.

The Signal Corps Board did not consider the need for Telephone TP-9-( ) eliminated by the use of Telephone EE-8 with Handset TS-9-( ) equipped with

a sound-power receiver. The latter device provides a gain of only about 1/7 that of the TP-9-( ) when used on quiet lines (14 db gain instead of 75 db). When used on lines on which considerable noise is present, the advantage is very much more favorable to the Telephone TP-9-( ). The TP-9-( ) incorporates transmitting gains which may be used to overcome noise levels while the sound-power receiver, utilizing receiving gain only, amplifies noise as well as the transmitted speech.

The above information has been forwarded to the Commanding General, Army Ground Forces, and the Commanding General, Army Air Forces, who will determine whether a need exists for equipment of this type within their respective commands.

Signal Corps Board Case No. 536

Earth Boring Equipment for Tactical Use. Approved by Chief Signal Officer, 31 January 1944

As a result of a number of complaints from the field relative to the operation of Truck K-44-B, earth borer, the Signal Corps Board was directed to make a study of the need for machine digging of pole holes in Signal Corps wire line construction and to investigate the equipment now available for performing such operations.

The Signal Corps Board reviewed the commercial experience of the present standard earth borer and other types of commercial and experimental apparatus designed for a similar purpose. Reports from the field relative to complaints on the present standard equipment were also investigated. These complaints centered principally about the inability of the Truck K-44-B to transport the earth borer over wet ground and sand, and the tendency of wet soil to pack in the small (9-inch) borer head.

The Board found that there is a need for machine earth boring equipment in Signal Corps pole line construction, due to the speed with which the work may be done and to the elimination of the high fatigue factors present in hand digging. However, not all pole holes can be dug by any one machine now available for that purpose.

Most complaints on the operation of the present standard earth borer were traced to attempts to use this machine in places where hand digging is the only economical method. When a machine digger is available in an organization there is a tendency to attempt to dig all required pole holes with the equipment. This results in taking the truck over terrain on which it should not be required to operate, or in using it to dig holes in soils which should not be attempted with a mechanical borer.

The complaints relative to the tendency of wet soils to pack in the small 9-inch borer head were found to be justified. It is considered that a redesign of this borer head would result in an improvement in this respect.

The Board concluded that the present standard Truck K-44-B is the best

equipment now available for digging pole holes for military wire line construction. If a suitable power take-off can be developed for the 1½-Ton, 6x6, Cargo and Personnel Carrier with Winch, the mounting of the HD Earth Borer upon this truck would result in an equipment of improved cross-country ability compared with the present S Truck 1½-Ton, 4x4. However, such a development is a difficult matter and it may be some time before it can be made available in the field.

The approved recommendations in Signal Corps Board Case No. 536 are:

1. Requirements for machine digging of pole holes be met by the continued procurement of Truck-K-44-B until approved equipment superior to this item is available.

2. No action be taken at the present time leading to standardization or procurement of the following items:

a. Experimental lightweight equipment such as bucket-type diggers or Digger LC-58 (Vibrating Post Hole).

b. Skid-mounted, separately powered earth borers such as Highway Trailer Company's Type HDM-S.

c. Wheeled tractor-mounted units such as the Buda Model LA-1 Earth Drill.

d. Track-laying tractor-mounted units.

e. Equipment employing the effect of controlled explosives.

3. The Chief of Ordnance be requested to redesign the present standard 9-inch diameter earth boring machine auger to reduce the tendency for moist soils to pack into the auger body.

4. Copies of this report be forwarded to the Chief of Ordnance and the Chief of Engineers.

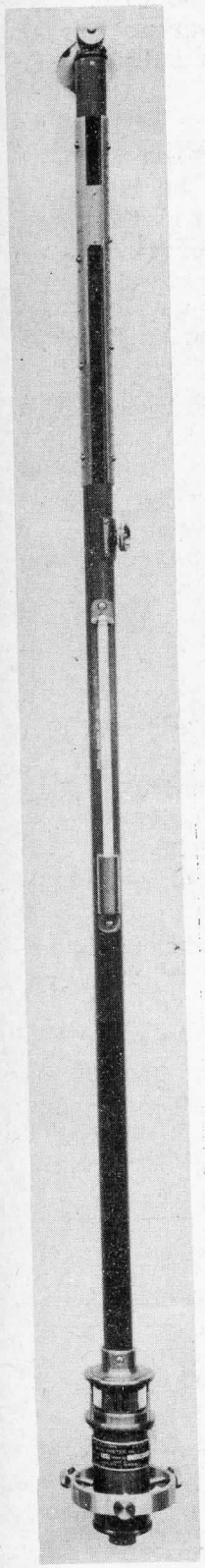
5. The Chief of Ordnance be informed that there is a need for an earth borer truck of greater ruggedness and cross-country ability, and requested to mount the standard Type HD Earth Borer on such a vehicle as soon as practicable, giving due consideration to the redesign of a power take-off for Truck, 1½-Ton, 6x6, Cargo and Personnel Carrier, with Winch, and its use for that purpose.

AIRCRAFT RADIO

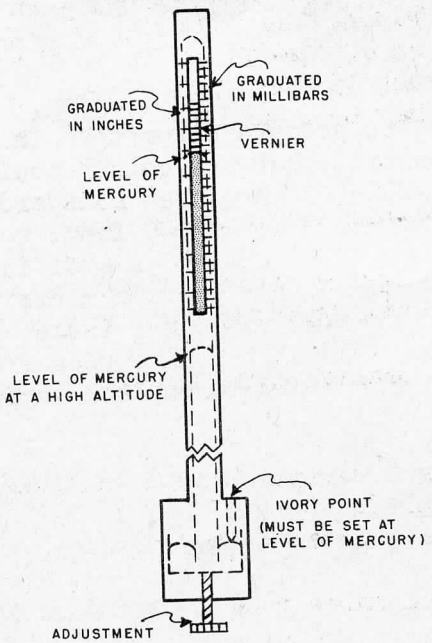
MERCURIAL BAROMETERS

The history of the mercurial barometer goes back to Galileo and his coworker, Torricelli. It was the latter who first measured the weight of the atmosphere above the surface of the earth. In his experiment, Torricelli demonstrated that the pressure of the air supported a column of mercury. The equipment he used was the forerunner of the present day mercury barometer.

One of Torricelli's associates set up an experiment on the top of a



DIAGRAMMATIC SKETCH OF A MERCURIAL BAROMETER



mountain and found that the column of mercury was actually shorter than it had been at a lower altitude. This proved, also for the first time, that there was a difference in atmospheric weights at different altitudes.

Since that time, many other scientists have shown that the height of this column of liquid also varies at any fixed location with the changes of atmospheric pressure as the various "air masses" move over the surface of the earth. These travelling "air masses" are the primary causes of weather. The energizing agent for the development of these masses is the insolation from the sun.

For a number of years, the Signal Corps has issued Barometer ML-2-( ) for the use of fixed installations, such as the Army Air Forces weather stations. This instrument is shown in the accompanying photograph. In a few instances these barometers have been installed in mobile units, but are not normally expected to be moved from place to place.

For tactical units, the aneroid barometer is most commonly used. This instrument is not as accurate as the mercury barometer, but, being smaller, it is easily transportable. The principle of operation is essentially the same in that the pressure of the atmosphere over and above a vacuum is the activating force. A thin metal disc, with corrugated surfaces, and having a vacuum inside against which the atmosphere outside pushes, is the dynamic unit of this instrument. This instrument, with a different scale, becomes an altimeter for use in airplanes.

The accompanying sketch of the mercury barometer shows a glass tube of liquid surrounded by a supporting metal tube which has a slot opening in the region where the top of the column of mercury is normally expected to be. A vernier scale slides in this opening to facilitate reading the height of the column of mercury from scales etched on either side of the slot, millibars on one side and inches on the other. (The millibar is a convenient unit of measure of pressure which has been adopted by meteorologists in recent years.) However, if this instrument were taken to a sufficiently high

altitude, the column of mercury would not rise to the bottom of the slot opening. Since this war started, it has been necessary to use such barometers at high altitudes in various parts of the world, including locations outside of the United States.

It has been necessary, therefore, to procure barometers in which the slot opening was located in such a position that the column could be read. Barometer ML-222-( ) and Barometer ML-232-( ) have been standardized for use at altitudes of 4,000 to 9,000 feet and 9,000 to 14,000 feet, respectively. Barometer ML-2-( ) with a range of 24 to 32 inches and a modified version of Barometer ML-2-( ) with a range of 19 to 32 inches, which meets the operating requirements for Barometer ML-222, are now available for issue. To extend the slot so that the barometer could be read at all altitudes from sea level to 14,000 feet is not practicable since it would weaken the supporting metal case.

GROUND SIGNAL

REACTIVATION OF SILICA GEL IN THE FIELD

A number of Signal Corps radio sets are provided with silica gel, in the form of large particles and inclosed in bags woven from spun glass, for the purpose of absorbing moisture from the air in the radio set housing. The silica gel has been found to be most effective when it is used in radio sets which have substantially sealed cases such as Radio Sets SCR-509, SCR-510, SCR-609 and SCR-610, for example.

The silica gel has also been found useful in limiting the growth of fungus in the sets in which it is used. The silica gel, by removing the moisture from the set, retards the growth of fungus.

When the silica gel reaches a state of equilibrium so that it cannot further reduce the relative humidity, it should be reactivated to restore its moisture absorbing properties. Reactivation consists of applying heat for a sufficient length of time to dry it out, and this process may be repeated an indefinite number of times without affecting the moisture absorbing qualities of the silica gel.

The bag containing the silica gel may be marked with a moisture-sensitive dye which acts as an indicator of the activity condition of the gel. The indicator is usually a blue dye which turns pink when the gel has lost its power of absorbing any more moisture.

The effectiveness of this silica gel is being lost in many instances in the field by failure to reactivate.

One procedure for reactivation is to spread the glass cloth bags con-

taining the silica gel in a single layer on flat open trays and heat them in any available oven which is capable of maintaining a temperature of at least 300° F. and not exceeding 1000° F. for a period of at least two hours. Another procedure that may be used is to hang the bags in an oven by any available means so that the hot air can circulate around the bags and remove the moisture. The length of time required will depend upon the temperature.

After reactivation, the bags must be placed immediately in sealed cans, preferably before cooling, so that the silica gel will not pick up moisture from the atmosphere while cooling or before reinstallation in equipment.

The following precautions should be observed in reactivating silica gel in the field:

1. Do not attempt reactivation while the silica gel is contained in a cotton cloth bag as the necessary drying temperature will scorch or char the cloth.
2. Do not place the bags directly on a metal shelf, which is in turn directly above the source of heat, as the temperature may be too high.
3. Do not attempt to regenerate the silica gel by placing the gel in compact form in a container and applying heat to the bottom of the container. This method is ineffective because the silica gel is a fairly good thermal insulator and circulation of air about the bag of silica gel is necessary.
4. No attempt should be made to reactivate bags of gel that are saturated with oil.

PROTECTOR AR-6 REDUCES LIGHTNING HAZARD FOR TELEPHONE REPEATER EE-89-A

Reports from the field indicate that in some areas Telephone Repeater EE-89-A is damaged by lightning or unusually heavy static discharges. As lightning protectors are not provided as an integral part of this unit, the following suggestions are offered:

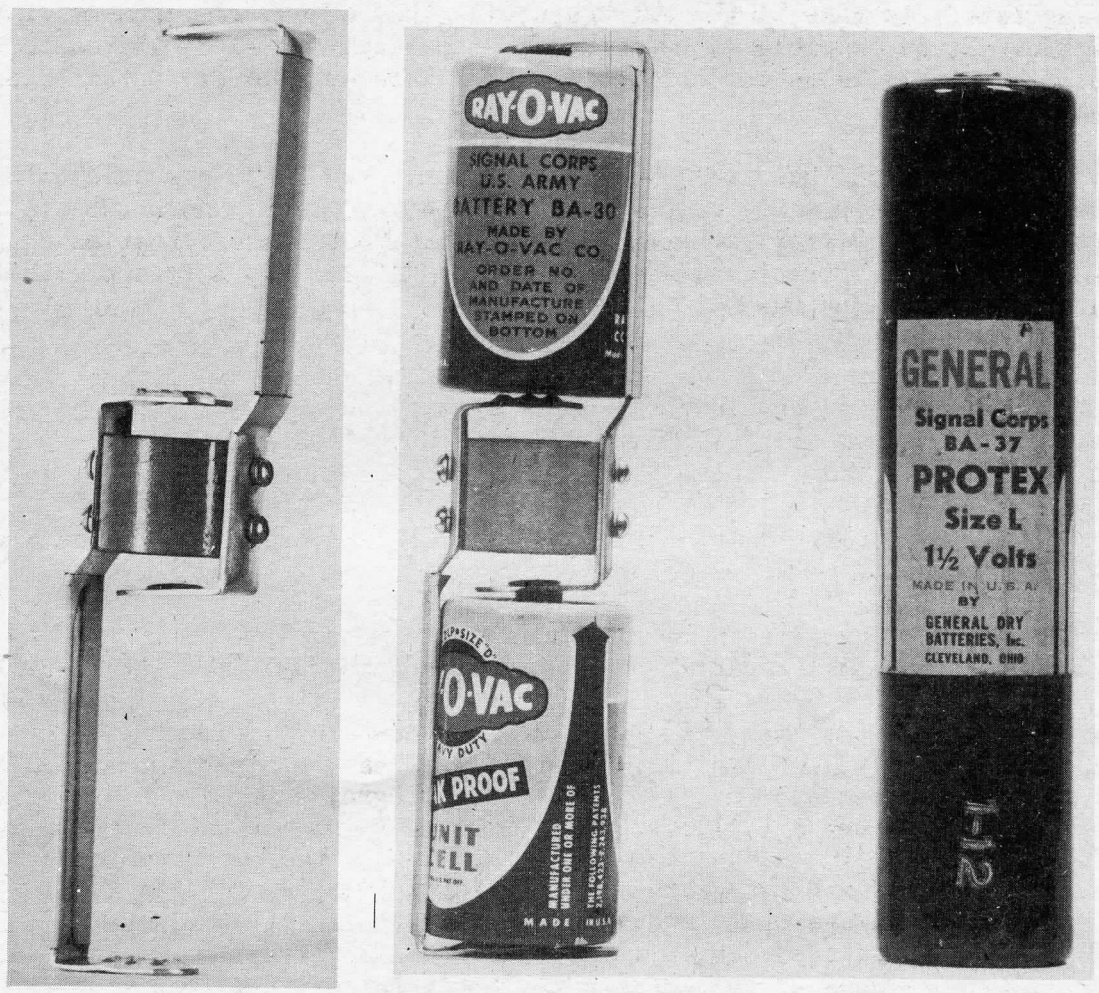
In permanent or semi-permanent installations, where lightning storms are frequent, or where snow or dust static is severe, it is desirable to protect the repeater from the high voltage induced in the lines. A carbon block protector, such as Protector AR-6, connected between each line and the repeater and to a good ground, is effective and easily installed.

The connection from the protector to ground should be made with the largest available wire, preferably No. 12 or larger. It should be run in the shortest and most direct manner and must be free from sharp bends or loops.

The ground itself should be some buried metallic object with a large area of contact with the earth. A water piping system is excellent. However, a clean ground rod at least 3 feet long, preferably driven in damp soil, is also satisfactory. If the soil is relatively dry, two or more

ground rods spaced at least 10 feet apart and connected with heavy wire should be used. If it is impossible to solder the wires to the ground rods, a good temporary connection can be made by wrapping the bared and cleaned wire tightly around the rod for at least ten turns and taping it with friction tape.

The carbon blocks in the protectors must be kept clean of carbon dust, dirt and moisture in order to prevent "singing" of the repeaters.



EMERGENCY "A" BATTERY SUPPLIES FOR RADIO SET SCR-536-( )

A new battery adapter, permitting two Batteries BA-30 to be used in parallel as the "A" battery for Radio Set SCR-536-( ), is about to go into production. Known as Battery Adapter FT-501, the new device will be issued as soon as available, on the basis of two per Radio Set SCR-536. In use, two BA-30's are placed in the adapter, which then is inserted in the "A" battery compartment of the radio set.

Pending the availability of the Battery Adapter FT-501, operators who lack the Battery BA-37 for use in the SCR-536 can improvise a filament sup-

ply by using a single Battery BA-30 and an empty .50 calibre shell. All that is necessary is to remove the discharged BA-37 from the set, replacing it with a discarded .50 calibre cartridge shell. On top of the shell is placed the single BA-30 with its positive terminal (brass cap) facing out, as in the case of the BA-37.

While a single BA-30 has a shorter service life than the BA-37, it is possible to get an emergency filament supply when a suitable spacer is used as suggested, to take up the extra space in the battery compartment of the SCR-536. It is possible to use spacers other than the empty .50 calibre shell, but it is believed that the shell will be more easily obtained in the field.

As the SCR-536 uses a 1½-volt "A" battery, two BA-30's should NEVER be used in series, since the resulting 3 volts would quickly burn out the tubes in the set. The Battery Adapter FT-501, which places the batteries in parallel, assures the correct voltage and affords "A" battery life approximately equal to that of the BA-37.

ERRATUM

In the article on "Reporting Equipment Failures" in the February 1944 issue of the SCTIL, No. 27, the first sentence of the sixth paragraph on page 25 should read: "3. As indicated in the example just given, 'fail' is an inadequate description of trouble..."

TRENDS IN CAPTURED GERMAN SIGNAL EQUIPMENT

Captured equipment recently received from the Mediterranean Theater of Operations, resultant from the Sicilian campaign, has indicated that the Germans are again throwing into their holding operations older type sets of the Infantry Division T/BA. Many of these sets are so-called commercial designs and were listed in the Telefunken and Lorenz catalogs of 1938.

Another notable trend is the apparent abandonment by the Germans of the use of heavy, bulky, two-man pack sets. They are now using one-man pack sets, particularly in the forward echelon, to talk from company to company

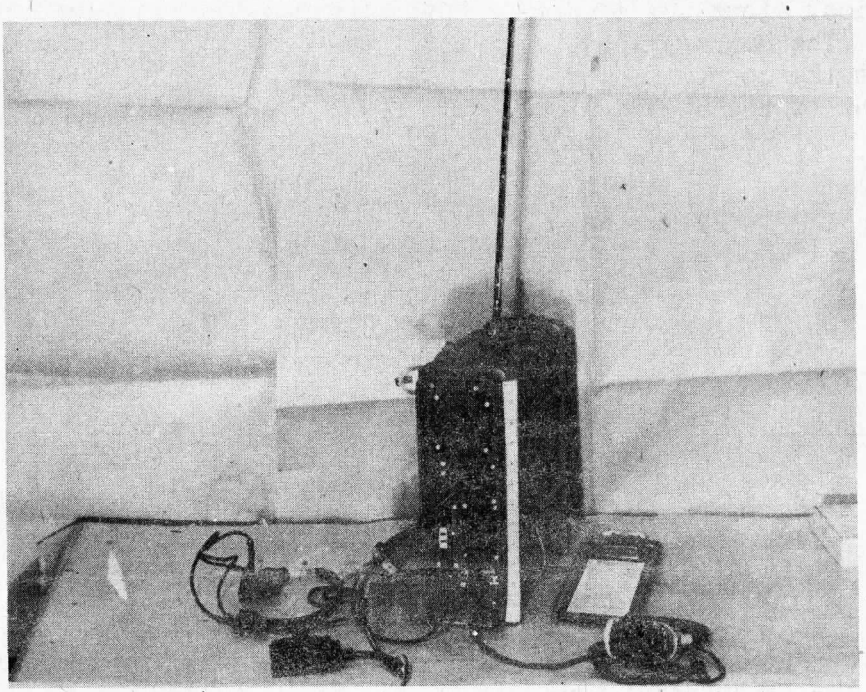


FIG. 1 - THE FELD FU TYPE B. THIS IS A FRONT VIEW WITH THE FRONT PANEL COVER REMOVED AND ACCESSORIES ATTACHED.

and to the rear, utilizing the so-called type Feld fu Type b (Figure 1) and c operating between 110 and 130 mc. Our nearest sets in technical use are Radio Sets SCR-194, SCR-195, and SCR-300.

A recent examination of a German Würzburg gun-laying type radar transmitter has indicated that the Germans are not finishing off the sets, either because of lack of time or because of effective bombing of factories. For example, the particular transmitter inspected (Figure 2) showed the rough machine tool and grinding tool marks; there was also no attempt made to paint the equipment, considered unpardonable under previous productions.

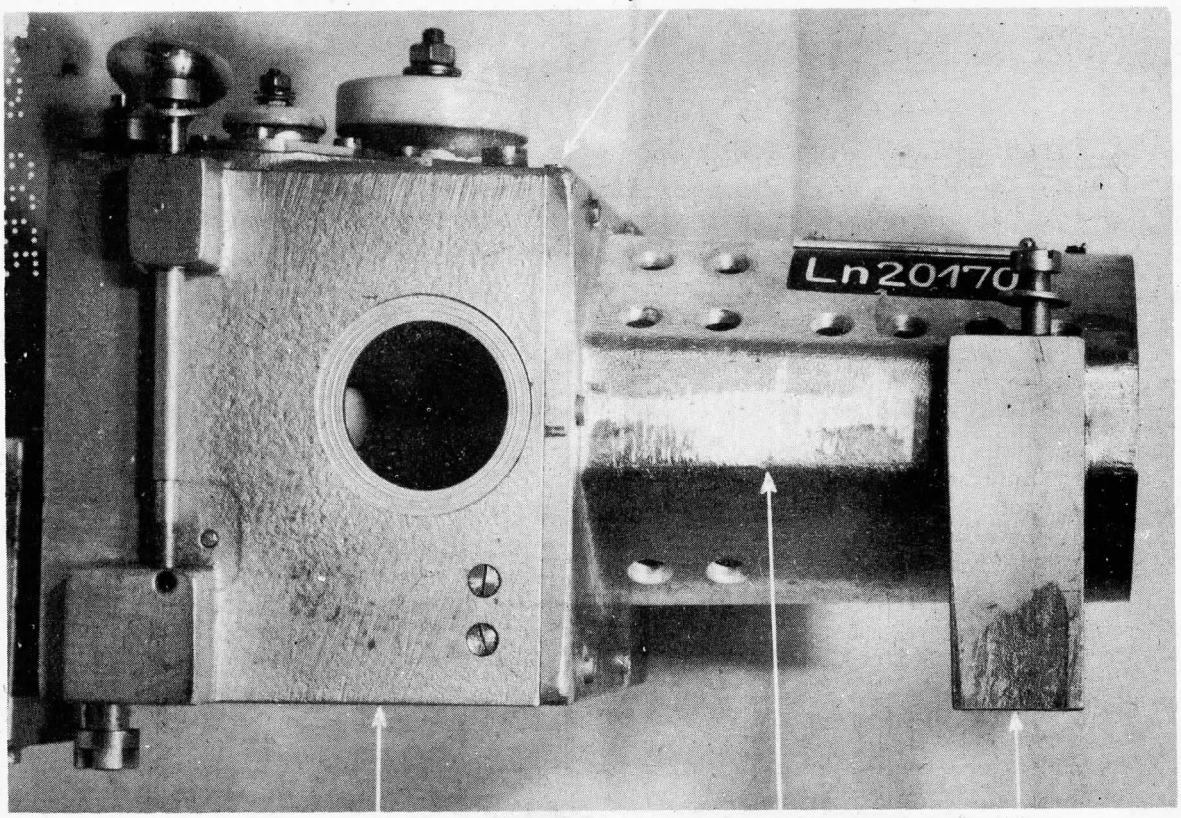


FIG. 2 - THE MILLING MACHINE HAS LEFT ITS MARKS ON THE SQUARE FACES OF THIS RADAR UNIT. NOTE THE IRREGULAR CASTING EDGE ON THE BLOCK AT TOP OF SECTION.

Captured red synthetic field wire indicates that the Germans have abandoned the use of braids and rubber coverings formerly used. This particular field wire, which has insulation similar to General Electric Flamenol, has eight steel and one large copper conductors which makes it difficult to handle. It is comparable to our W-110-B. The hidden reason for the Germans' use of this wire is to relieve an industrial "bottleneck" by reducing the footage rejected caused by "kinking" of the field wire in process.

The characteristic red color is ideal from the standpoint of camouflage in the red desert areas of North Africa. It is also valuable in that is is easier to follow through the dust storms and smoke occurring during action.

ACCIDENTS DECREASE AT PHILADELPIA DEPOT

The Post Safety Officer of the Philadelphia Signal Depot has reported a marked decrease in the number of accidents occurring at the installation. For the year 1943 the accident frequency represented an improvement of 41.6 percent over 1942. Severity of injuries sustained by employees was reduced 52.3 percent.

Although throughout the country industrial accidents have tended to increase at a greater rate than the additional number of workers employed during this period of increased production, the Depot has through the energetic campaign conducted by the Industrial Safety Committee and the War Production Drive Safety Sub-Committee avoided the hazards that frequently arise from the employment of new workers, long hours and pressure to get materiel to the fighting fronts.

A course on safety is conducted by the safety engineer of the Depot. Supervisors are required to attend a twenty-hour course, while non-supervisory personnel receive a ten-hour course of instruction. Slides and motion pictures effectively show how vital safety is to the war effort. Posters, placed in key points on bulletin boards, remind employees that "Accidents Aid the Axis." Full use, too, is made of safety equipment and protective clothing.

Workers at the Philadelphia Signal Depot are encouraged to better the safety record by making suggestions concerning the removal of possible hazards at the Depot. For those ideas which are accepted, employees receive awards from the War Production Drive Committee.

Commenting on the comparative figures of accidental injuries at Signal Corps installations, Major General H. C. Ingles, Chief Signal Officer, commended the Philadelphia Signal Depot on its safety record -- the lowest in accident frequency of all Signal Corps depots in the country. This record reflects the prevention of much human suffering and the saving of many man-hours of work, important factors in the successful prosecution of the war.

MILITARY TRAINING

RADIO OPERATORS TRAINED IN RECEIVING THROUGH COMPLEX INTERFERENCE

Student radio operators at the Enlisted Men's School, Eastern Signal Corps Schools, Fort Monmouth, N. J., are now being trained to receive code signals through various types of interference as well as battle noises.

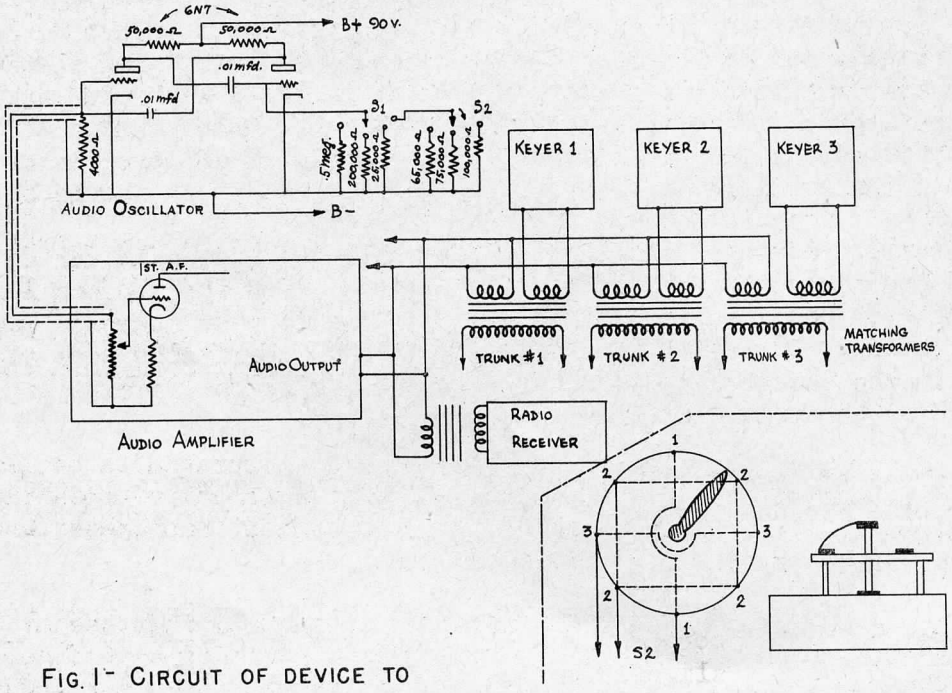


FIG. 1 - CIRCUIT OF DEVICE TO SIMULATE JAMMING INTERFERENCE.

Conditioning of the operator includes the two latest developments in copying-through-interference training technique: variable tone and jamming. Earlier training methods were described in SCTIL for November 1943.

Jamming

In order to get the student used to actual field operating conditions, the code transmissions that the students copy are jammed at odd intervals and with different types of signals. Four basic types of jamming signals are used: a steady 60-cycle low note, a 400-cycle note, a 1,600-cycle note, and a "bagpipe" signal consisting of a sequence of three notes about 150 cycles apart repeated over and over. The "bagpipe" signal has been widely used in some theaters of operation.

The circuit diagram of the jamming device in use at Fort Monmouth is shown in Figure 1. The device consists of a simple audio oscillator of the multivibrator type, the frequency of which changes with the value of the re-

sistance in the circuit. The value of the resistance is selected by a switch, S1, to provide any one of the three single notes or the "bagpipe."

The "bagpipe" signal is obtained by connecting the wiper of another switch, S2, to a phonograph motor, or any other motor with a low speed.

The switch, S2, an 8-contact circular type, is wired so that the notes produced are heard in this order: low, medium, high, medium, low, medium, high, medium. The sequence is repeated as the wiper is rotated by the motor.

Following the oscillator is an audio amplifier. The output of the amplifier is tied in parallel with the receiver supplying the static, thus mixing the jamming signal and the static interference with each code speed. The jamming signal can be added to any existing system of mixing static with the code by simply adding the jamming signal in parallel with the receiver supplying the static. However, when transformers are used, almost any type of keyer may be used. The plate and filament supply of the oscillator may be tapped off the amplifier. Plate supply of about 90 volts should be used.

In operation, the type of signal used to jam the speeds is varied each period, and the times of jamming are also varied. Thus the student learns to concentrate on the code, since he does not know at what moment a jamming signal will occur. During all periods the regular interfering code signal is kept on in the background, as usual. The volume of the jamming signal is regulated by the volume control on the amplifier.

Other types of jamming signals may be used, such as music, speech, or the carrier of a broadcast station tuned in on the receiver supplying the static.

Variable Tone

By changing code signals from a fixed tone to a constantly varying one and also varying the volume slightly as the tone changes, a signal is produced which approaches some which are heard in the field. A variable tone may be produced by varying the capacitance in the oscillator LC circuit by using a motor, the speed of which has been reduced by a rheostat or gears to about three revolutions per minute. The output of the oscillator is then amplified and fed into keyers.

The necessary revisions for changing Oscillator VO-3-A (Audio Amplifier), TCA-416-XO Oscillator Amplifier, are shown in Figure 2. The varying capacitor and its motor drive may be mounted in a separate box and two leads run to the oscillator-amplifier. Additional fixed capacitors are added to the circuit of the unit to reduce the frequency to about 950 cycles with capacitor C at minimum. The frequency is about 700 cycles with the capacitor at maximum. The basic frequency can be varied by rheostat D. In operation, the volume will drop off gradually as the frequency decreases, making the code more realistic by simulating a fading signal.

The variable tone is fed into Boehme P.E.C. keyers, type 9-D, series B,

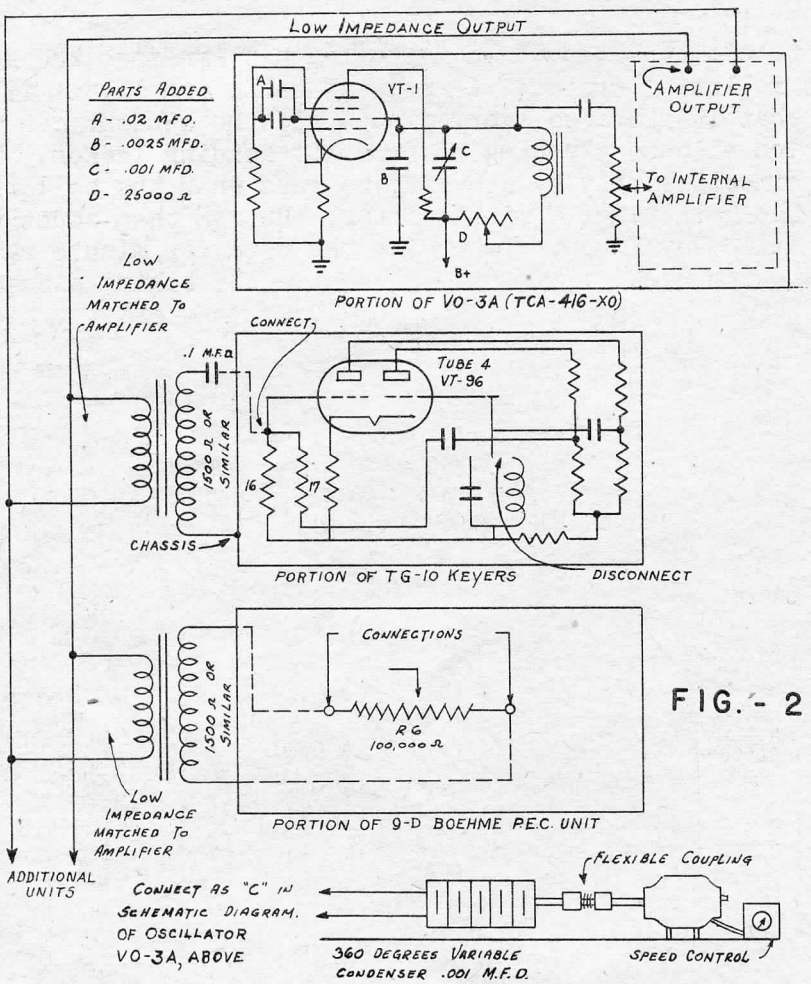


FIG. - 2

by running a common tone line from the variable tone amplifier to all the keying units through a step-up transformer at each keyer. The primaries of the transformers are matched to the tone amplifier and the secondaries to the grids of the amplifier tubes in the keyers. The secondary is tied across resistor R6 in the Boehme wiring diagram 9-D-H. This potentiometer is the volume control for the keyer. Thus the variable tone is fed into the grid of the keyer's amplifier tube, which is keyed by tape in these units. The regular oscillator tube of the keying unit is removed from its socket. The transformers, besides matching the impedances, also tend to reduce interaction among the different speeds through the common tone source.

While especially designed for use with the Boehme keyers, experiments conducted on Keyer TG-10-( ) were very satisfactory. Good results were obtained on attaching the unit to a Keyer TG-10-F as shown in Figure 2. This method uses Tube VT-96 as an oscillator by disconnecting the LC circuit of the oscillator and connecting the variable tone through a transformer and capacitor, one lead going to ground, the other to the junction of resistors 16 and 17.

AIDS FOR HAND-KEY SENDING TRAINING

In order to aid the student in improving his sending, the school has introduced the following system. A group of bells and lights is connected to a clock so that it operates every minute and the student can tell a minute's duration without glancing up from his sending lesson. Thus a student may time himself simply by starting to send when the bell rings and stopping when the bell rings a minute later. He can then count the characters sent and divide by five to determine the word per minute rate. The bells and lights are used to time the student while taking his sending test of 3 minutes' duration, and serve as a check on his speed for his own information while he is taking the test.

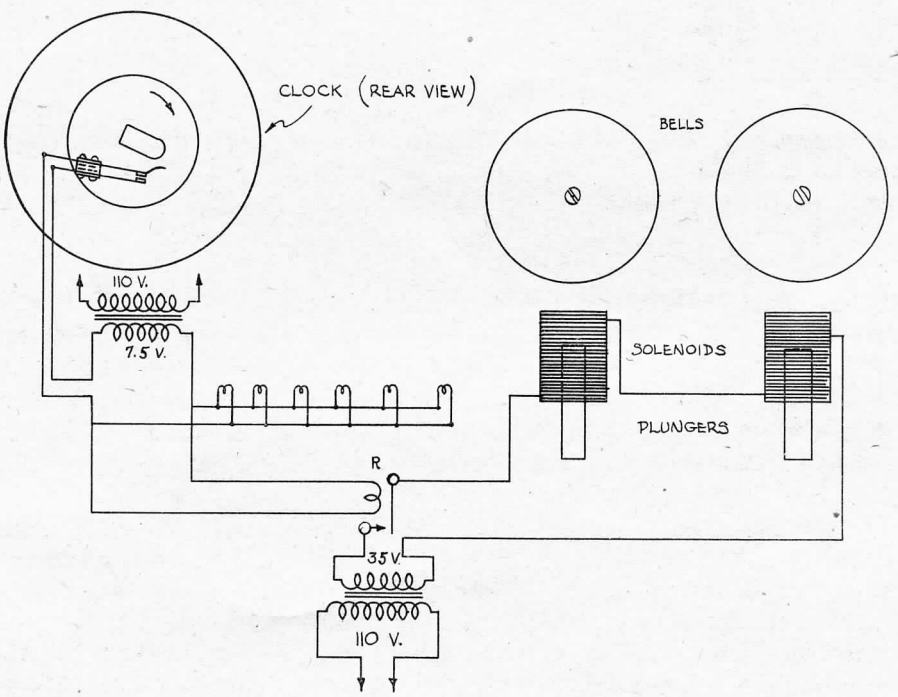


FIG. 3 - CIRCUIT OF THE CODE-PRACTICE INTERVAL TIMER.

The bells and lights are connected as shown in Figure 3. Five bells are installed in various parts of the sending room so that the sound will cover the entire room. The lights are optional, since the bells are sufficient. However, the lights may be installed in front of the sending test positions as a further aid to the student. The bells are made from old solenoids, and plungers can be obtained from old pin-ball machines. The bell is mounted above the solenoid and plunger so that when the coil is excited the plunger is drawn up and strikes the bell. This type of bell is very satisfactory as it produces a sharp sound.

The clock is a large electric clock with a sweep second hand which is

fitted with a cam connected to the rear end of the sweep-second-hand shaft in the back of the clock. The cam closes a pair of contacts as it comes to the 12 o'clock position. The contacts are wired in series with the secondary of a step-down transformer having a 7.5-volt output for the lamp supply. A small a-c relay (R) is also wired in the circuit so that it closes when the lights go on. The contacts of the relay are connected to the bells through another transformer winding supplying 35 volts needed by the bells. The relay is used to reduce the load on the contacts in the clock, since the solenoids draw relatively high current. The arrangement can be varied by using batteries and different type bells.

Another aid to the students' sending is supplied through the installation of ink recorders. Used with the bell-and-light timing system, the student can check speed and errors at the same time.

FAULT LOCATION AND TESTING

The Long Lines Outside Section of the Officers' School at Fort Monmouth now devotes a portion of its training period to instruction in some of the accepted methods of analyzing and locating faults in cable and open wire lines.

The instruction, designed to better equip Signal Corps officers to handle communications problems in the field, incorporates the fundamentals involved in the operation of the test equipment available in the splicer's kit, Tool Set TE-56. Practical work in the use of the equipment is given following a conference and demonstration to acquaint student officers with the various instruments and their principles of operation.

A wire system has been set up which includes a central station, aerial cable, buried cable, and facilities for terminating the open wire practice line built by each class. This provides an opportunity for each student to get practice in diagnosing and locating faults on both open wire and cable lines.

A conference period develops the theories involved in the use of:

1. A battery and headset to check lines for continuity, grounds, crosses, and opens.
2. A battery and voltmeter to check lines for continuity, shorts, grounds, crosses, opens, and to make a rough calculation of the resistance of the circuit by reading the voltage drop through it.
3. The use of "tone" on a cable to locate shorts, crosses, grounds, and split pairs. This includes an explanation and demonstration of the 20C and 76A tone generators, and the 19C, 75A, and "bicycle wheel" types of locating coils. Tone is applied to a section of cable and each student identifies it with both the 19C and the 75A, and with the 107A amplifier.
4. The fundamental Wheatstone bridge circuit and its application as a device for measuring straight resistance, and its application in locat-

ing faults in the line by the use of the Varley and Murray loops. This includes a description, explanation, and demonstration of the Wheatstone bridge. During this phase of the instruction a short piece of wire of the same type as the student's practice line is checked with the bridge to get the resistance per unit of length. The figure obtained in this check is later used in the practical phase to calculate the distance to a fault point on the practice line.

5. The central station main frame and its associated cross-connecting blocks, protectors, and terminal strips.

Practical Work Period — This period is used to give the student practice in using the equipment which has been explained and demonstrated to him in the conference period. A central station main frame with its associated equipment is permanently installed and is used to terminate a 102-pair silk and cotton insulated 19-gauge lead-covered cable. This cable runs underground to a manhole where it is spliced to smaller cables feeding out to areas used for testing.

One 26-pair cable is buried and extends for a distance of a half mile from the manhole. This cable has numerous faults of various types and is buried at different depths. Students are given practice in locating the patch of the cable and in locating faults on it by the use of the 20C tone generator and a "bicycle wheel" locator coil with a 107A amplifier set. The depth of the cable and also its location are determined by the use of these instruments.

A second 26-pair cable extends from the manhole to the dead-end pole of an aerial cable line carrying a 26-pair cable on which a number of faults have been set up. These faults include shorts, crosses, grounds, split pairs, reversed pairs, and opens. The students are required to diagnose the trouble and then locate the fault with the tone of the 20C tone generator imposed on the line and picked up with the 19C or 75A locator coil; or by use of the 76A tone generator and the 75A locator coil with the 107A amplifier. This line has five terminal points where it is possible to make physical checks on the circuit desired.

A third 26-pair cable extends from the manhole to a permanently installed pole on which is mounted a 26-pair terminal. The lines terminating on this terminal are connected to protectors at the top of the pole by bridle wire and are used for terminating the open wire lines built by the students. This provides central station termination for the practice open wire lines so that they are available for instruction in fault location.

Shorts, crosses, and grounds are placed at points along the open wire lines, and students are required to locate them by use of the Wheatstone bridge. A measurement is first taken to a known fault by using a straight resistance loop to measure the length of a loop on which a short circuit has been placed. The distance to the same fault is then measured by using the Varley loop and a comparison of the accuracy of the two methods is made. The three Varley methods are then used to measure the distance to grounds and crosses on the lines. The students are then required to go out and remove the troubles from the line.

MILITARY PERSONNEL

NEW PROCEDURE IN REPORTING AND REQUISITIONING ENLISTED PERSONNEL

A new procedure in reporting and requisitioning enlisted replacements for units within the continental United States has been put into operation in order to make the best use possible of soldiers who are not physically qualified for active field duty, men returned from overseas under the rotation policy, recovered battle casualties and men released from service command overhead installations as a result of reduction in authorizations and other administrative changes. The new method will enable more correct placement of men by grade and will improve the present requisitioning system, as requisitions were formerly submitted by units spasmodically when they reached 5% or 7% understrength. The new system will more adequately take care of the problem of keeping the units at full strength since the requisitions will be on an automatic monthly basis.

The mechanics of placing the system into operation were carefully considered and, as a result of several conferences, it was determined that the procedure described in the following would be used to implement the ASF directive of 24 December 1943, published in Circular No. 160.

The morning reports which are now submitted by every organization and forwarded to service command headquarters will be used as the basic record for reporting enlisted men and their occupations. This will indicate the MOS of all men joining an organization each day. When the morning reports are received for a new man, a status card is made out in service command headquarters. As men are dropped from organizations, their corresponding status cards are destroyed.

As of the 15th of each month, the machine record unit in each service command headquarters will prepare the MOS status report. When this status report is completed, it is sent to the assignment section of the service command headquarters. Between the 16th and 20th of the month, the assignment section will make such adjustments as are possible between all organizations which have either surplus personnel, or indicate shortages. Immediately upon completion of final action on the reports by the service command, the revised MOS status reports are forwarded between the 23rd and 27th of the month to The Adjutant General, Classification and Replacement Branch. Copies of the reports will be forwarded to the chief of each service concerned with a particular type of organization. In this way, the Chief Signal Officer will receive MOS status reports on each organization which carries Signal Corps men and Signal specialists on its roster. During the 26th to the 15th of the following month, The Adjutant General will assign such men as are available to make up shortages which exist despite the assignments made possible within the service commands. During the following period, from the 16th to the 26th, no assignments will be made by The Adjutant General without coordination with the service command, in order to eliminate duplication of assignment.

Such action as chiefs of services may take to transfer soldiers under their jurisdiction into organizations having shortages will also be coordinated with The Adjutant General. No assignments to, or transfers from, organizations of Class IV installations will be made without concurrence of the commanding officers of the installations concerned.

When units are alerted, a special strength return will be submitted immediately by the unit and the above process will be followed in order that early action can be taken to effect necessary adjustments and prepare the unit for movement.

As tables of organizations are changed or revised, The Adjutant General will prepare a code sheet to each service command so that their records may be changed accordingly.

The chiefs of services have been requested to cooperate to the fullest extent possible in order to make the system work effectively. The Chief Signal Officer has notified organizations under his jurisdiction of the procedure and has requested their compliance and assistance.

SIGNAL CORPS CROSSED FLAGS NOW WORN BY WACS

Women's Army Corps personnel who are detailed in or attached to Signal Corps organizations may now wear the Signal Corps crossed flags in place of the Pallas Athene in accordance with regulations regarding the wearing of branch insignia. For example, enrolled women of the WAC may replace their discs carrying the Pallas Athene with those which have the Signal Corps emblem embossed thereon. Army Regulations 600-39, 5 January 1944, gives Wacs authority to wear the insignia of a branch or service to which they are assigned.

The Chief Signal Officer is gratified that such a step has been taken; a step which has already resulted in a heightening of morale and esprit de corps. Wacs who are assigned to Signal Corps duty are proud of their crossed flags and are glad that they are now wearing the insignia of the Service which "Gets the Message Through".

RELIEF FROM ACTIVE DUTY OF OFFICERS OVER THIRTY-EIGHT YEARS OF AGE

As the nation becomes faced with a more and more acute manpower shortage, the War Department has issued directives authorizing the relief from active duty and return to civilian life of some officers over thirty-eight years of age, in order that they may fill some of the gaps left in the key positions of industry. Recent reorganizations of the Army, as well as curtailment of of certain projects which were found to be unnecessary in view of the progress of the war effort, have also made this move possible.

Under the provisions of the new directive (21 January 1944) any officer

who has served honorably, whose retention on active duty is not essential, and who desires relief from active duty, may now request his own release. All National Guard and Reserve officers will return to inactive status in the grade held upon relief from active duty and will retain that grade for the emergency and six months thereafter, at which time those holding temporary grades will revert to their permanent grades. Officers temporarily appointed in the Army of the United States will retain their appointments on inactive status during the emergency and six months thereafter, but all appointments to temporary grade in the Army of the United States, Air Corps, made under the provisions of Public Law 455, 77th Congress, will be terminated upon relief from active duty. Any officer relieved from active duty may submit his resignation at the time of relief or at any time while on inactive status in order that his military standing will not handicap reemployment in industry.

In no event is relief from active duty to be used as an alternative for reclassification or disciplinary action. The Chief Signal Officer has also stipulated that over-age troop officers are not to be affected by this policy if their services are needed and they are physically and mentally qualified for extended field duty. Due to the fact that there is at present a shortage of field grade officers and an anticipated need for Signal Corps officers to serve with troops, careful studies will be made of each case of an officer recommended for release, or applying for a release, so that his potential value to the service will not be wasted.

LOYALTY INVESTIGATIONS FOR SIGNAL CORPS PERSONNEL

The Signal Corps is now sending messages and conducting various secret operations on all the battlegrounds of our Allies. Personnel selected for training to qualify them for eventual classified assignments must be chosen with great care, and in many cases clearances must be secured as expeditiously as possible in order to schedule classes in time to meet the immediate needs of the armed forces—without in any way jeopardizing the security of our communications.

According to the best information available as of this writing, officers who are to be assigned to the following courses must receive clearances: Message Center Officer Course, M.I.T. Radar School Courses, Radar Training at the Southern Signal Corps Training Center, Advanced Radio Communication courses in Cryptographic and Cryptanalytic specialties, and any courses involving radar in the Signal Depot Supply Officers courses.

Enlisted men attending the following courses must also be cleared: SSN 738, Intercept Operator; 739 Intercept Operator, 805 Cryptographic Technician; 807 Cryptographer; 808 Cryptanalyst, 952 Radar Repairman, Gunlaying Equipment, Designated Set; 953 Radar Repairman, Reporting, Designated Set; 954 Radar Repairman, Airborne Intercept Equipment, Designated Set; 955 Radar Repairman, Airborne Search Equipment, Designated Set; and 649 Radio Repairman, Fixed Station, if any cryptographic equipment is handled.

When a commanding officer receives notice that personnel under his jurisdiction is to be assigned to one of the above courses, he should institute a loyalty check immediately. If, according to current regulations, the "Three-Way Loyalty Check" is called for, the Loyalty Check Sheet should be filled out in quadruplicate. Before these forms leave the installation, the post intelligence officer makes a preliminary check of the records. All four copies should then be sent to the service command within which the post is located, one copy to be retained by the service command, one to be sent to the Federal Bureau of Investigation, another to the Office of Naval Intelligence and a fourth to the Military Intelligence Division, so that the records of those agencies may be checked for information relative to the person under investigation. The Loyalty Check Sheets are then forwarded to the installation where the persons concerned are to undergo training, or are to be assigned. As certain courses are definitely closed to military personnel who have not been cleared, it is essential that commanding officers start loyalty checks as soon as they know that officers or enlisted men are destined for assignments requiring such clearances. The minimum length of time for such loyalty checks to be completed is three days — the maximum three months. Because of the many factors entering into the picture of loyalty checks, an overall average of thirty days is required. At least this margin must be allowed when planning to ship personnel to classified installations and courses.

It is also extremely important that the results of any investigation which is made should be entered on the enlisted men's (or enrolled women's) service record, and upon the officers' 66-1 cards. These notations should include the information that the subject has been "cleared for duty with the 'X' unit, by the 'X' service command on such and such a date," with any remarks which might indicate special findings, or the extent of the investigation made. This would obviate delays involved in ascertaining whether or not a loyalty check has already been made, and would also avoid duplication of investigations.

THE FIFTH DIGIT IN MOS CODES

MOS codes for officers may now carry a fifth digit instead of the former maximum of four. This suffix is used to designate the organizational level to which the officer is assigned. It will be appended to the four-digit code with a hyphen, in order to differentiate the position and level of responsibility within the general organization or functional area within which the MOS is performed. For example, the Chief Signal Officer will be coded with an "-X", his Executive Officer will also carry an "-X" after his MOS code, the Assistant Chief Signal Officer will be designated with a "-Y", and a chief of service will have a "-1" added to his MOS code. The assistant chiefs of services will carry the same MOS codes as the chiefs of services, with the fifth digit representing the next lowest organizational level; i.e., a "-2". Chiefs, or officers in charge of lower echelons will carry suffixes from "-3" to "-9".

This type of coding is primarily meant for troop units in ASF, AGF, or

AAF organizations and is worked out according to the chain of command in a field unit. For example, a "-9" in the field designates a lieutenant in charge of a platoon. In applying this to overhead installations, an officer in charge of a unit of a subsection would ordinarily be coded with "-9". An "-0" indicates an instructor, and this suffix is used with the hyphen following the MOS code designating his specialty.

Beginning in March 1944, Military Personnel Branch, OCSigO, will apply this system to the Office of the Chief Signal Officer, and in addition to reporting all officers under the jurisdiction of the Chief Signal Officer according to the four-digit MOS codes, will classify them according to the organizational level represented by the fifth digit.

Officers in the field are referred to TM-206, pages 207 and 208, for additional data on this method of designating the place where an officer stands in an organization.

FOREIGN COMMUNICATIONS TERMS

TM 30-490, a German-English glossary of technical communication terms, has just been published and may be secured through AGO channels. At the same time an index to the recently published TM 30-485, a Japanese-English glossary of technical communication terms, has also been issued and is available.

MOBILIZATION AND PERSONNEL

ACTIVATED

Unit	Date	Authorized Strength OFF	WO	EM	Station
584th Signal Depot Co.	Earliest Possible Date	5	4	182	Camp Crowder, Mo.
585th Signal Depot Co.	"	5	4	182	Camp Shelby, Miss.
586th Signal Depot Co.	"	5	4	182	Ft Jackson, S.C.
250th Signal Opn Co.	1 February 1944	9	1	287	Eastern Signal Corps Trng Center, Fort Monmouth, N.J.
3112th Signal Service Bn.	"	34		630	"
3104th Signal Service Bn.	"	64		623	"
3109th Signal Service Co.	Earliest Possible Date	8		233	Camp Forrest, Tenn.

DISBANDED

Unit	Date
5th Signal Mobile Photographic Laboratory Unit	31 January 1944
996th Signal Service Company	"
592nd Signal Aircraft Warning Battalion	1 February 1944
Hqs and Hqs Squadron, 1st Air Region	20 January 1944
1303rd Signal Operational Training Co., Avn.	1 February 1944
1321st Signal Operational Training Co., Avn.	"
1323rd Signal Operational Training Co., Avn.	"
1324th Signal Operational Training Co., Avn.	"
Signal Hqs and Hqs Co., AWS, XIV Fighter Command	20 January 1944
Signal Hqs and Hqs Co., AWS, XV Fighter Command	"
Signal Hqs and Hqs Co., AWS, XVI Fighter Command	"
570th Signal Aircraft Warning Battalion	"
572nd Signal Aircraft Warning Battalion	"
575th " " " "	"
577th " " " "	"
584th " " " "	"
585th " " " "	"
586th " " " "	"
587th " " " "	"
588th " " " "	"
589th " " " "	"
590th " " " "	"
591st " " " "	"
729th Signal Aircraft Warning Company	"
731st " " " "	"

(Continued) Unit	Date
737th Signal Aircraft Warning Company	20 January 1944
739th Signal Aircraft Warning Company	20 January 1944
742nd " " " "	"
743rd " " " "	"
744th " " " "	"
745th " " " "	"
747th " " " "	"
749th " " " "	"
750th " " " "	"
751st " " " "	"
752nd " " " "	"
753rd " " " "	"
754th " " " "	"
755th " " " "	"
756th " " " "	"
757th " " " "	"
758th " " " "	"
760th " " " "	"
764th " " " "	"
775th " " " "	"

REORGANIZED

Unit	Date	Authorized Strength OFF	WO	EM	Station
980th Signal Service Co.	1 Feb 1944	10		210	ESCTC, Fort Monmouth, N.J.
Hqs & Hqs Squadron, Bomber Command	Earliest Possible Date	169	3	777	
Hqs & Hqs Squadron, 58th and 73rd Bomber Wings, Very Heavy, Special	"	44	1	58	
390th Signal Company, Avn.	15 Jan 1944	12		129	

DISCONTINUED

Unit	Date	Station
Signal Field Photographic Laboratory, Hqs.	15 Jan 1944	Camp Livingston, La.

INACTIVATED

Unit	Date	Station
64th Signal Opn Battalion	31 Jan 1944	ESCTC, Fort Monmouth, N. J.
244th Signal Opn Company		

PERMANENT CHANGES OF STATION

Unit	Present Station	New Station
89th Light Division (89th Signal Platoon)	LMA - Perm. station Camp Carson, Colorado	Hunter Liggett Military Reservation, Calif.
Hq & Hq Co, III Corps	Fort McPherson, Ga.	Presidio of Monterey, Calif.
Hq & Hq Co, IX Corps	Temp. Sta., LMA (Perm. Sta., Cp Shelby, Miss.	Camp Gordon, Ga.
Hq & Hq Co, X Corps	Camp Maxey, Texas	CAM Area
61st Signal Battalion	TMA - Perm. station, Cp Forrest, Tenn.	Camp Shelby, Miss.
71st Light Division (571st Signal Pn)	Camp Carson, Colo.	Hunter Liggett Military Reservation, Calif.
245th Signal Operation Company	Fort Sam Houston, Texas	Fort DuPont, Delaware

TEMPORARY CHANGES OF STATION

Unit	Present Station	New Station
1st Combat Section, 1st Platoon, 283rd Signal Pigeon Co.	C-AMA	Hunter Liggett Military Reservation, Calif.
Hq & Hq Co, XII Corps	Fort Jackson, S. C.	Tenn. Maneuver Area