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SIGNAL CORPS

TECHNICAL

INFORMATION LETTER

FEBRUARY 1944

61

ARMY SERVICE FORCES OFFICE OF THE CHIEF SIGNAL OFFICER

SIGNAL CORPS TECHNICAL

INFORMATION LETTER

Number 27 February 1944

Classification canceled

by authority of The Chief Signal Officer

by N. M. Yoe
N. M. Yoe, Lt C, Capt., Sig C

RESTRICTED Date 15 Sep 50

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WAR DEPARTMENT ARMY SERVICE FORCES

OFFICE OF THE CHIEF SIGNAL OFFICER

OFFICE SERVICE DIVISION SPECIAL ACTIVITIES BRANCH

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.

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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.

TABLE OF CONTENTS


SOUTHEASTERN NEW GUINEA
Finschafen
Lea
Salamaua
Wau
Morobe
8°
OWEN
STANLEY
MOUNTAINS
U.S. Div.
Gona
Saputa
Buna
Dobudura
Kokoda
Kokoda Trail
ORO BAY
Sub Base
NGF
NGF Adv. Dep.
Port Moresby
Tufi
TROBRIAND IS.
GOODENOUGH IS.
FERGUSSON IS.
COLLINGWOOD BAY
NORMANBY IS.
GOODENOUGH BAY
Gabagabuna
Adv. Base
MILNE BAY
Samarai
10°
~LEGEND~
District Boundary
- Secondary Towns, Villages
- Primary Towns, Cities
- Advance Base-Sub-base
- Advance Depot
148°
150°

EXPERIENCES OF

A DIVISION SIGO IN THE S.W. PACIFIC

PART II

Part I of this article, published in the January 1944 issue of the Signal Corps Technical Information Letter, followed the Division Signal Officer and his company through pre-embarkation activities, the voyage to Australia and through various phases of training at the Jungle and Amphibious Staging Area in Australia.

This part of the article follows the operations of the Division Signal Company after the Division was committed to action in New Guinea to relieve Australian and American units that had fought their way across the Owen Stanley Mountains and routed the Japs from the Oro Bay - Gona area along the north coast.

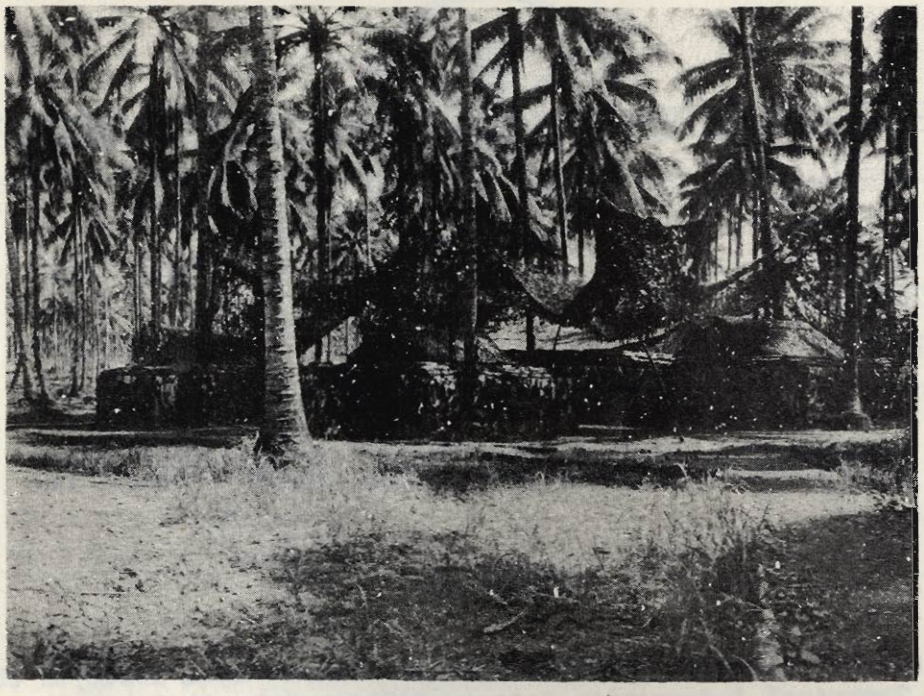
The Division operated primarily within the area Oro Bay - Kokoda - Gona, shown on the central portion of the map opposite.

THE NEW GUINEA CAMPAIGN

First Combat Mission

Late in 1942 one regimental combat team of this Division, accompanied by detachments of division service troops, was moved by rail and water to Port Moresby, then flown across the Owen Stanley's in Army transport planes and committed to action with an Australian division that was then engaged against the Jap forces in the Sanananda-Saputa areas. The Division Signal Officer and a 1st lieutenant from the Signal Company flew into the combat area shortly before the capture of Sanananda and therefore had plenty of time for reconnaissance and inspection of existing Allied signal agencies before the main body of the Division arrived.

In late January 1943 the Division was moved into the combat area on



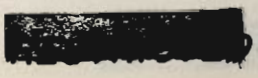
A HEAVILY CAMOUFLAGED AND WELL PROTECTED MESSAGE CENTER IN NEW GUINEA.

the north coast of New Guinea to relieve the Australian and American troops that had seized this territory from the Japs. The Division Commander assumed command of all Allied forces in the Oro Bay - Gona - Saputa Sector and was placed under the direct command of the New Guinea Force Headquarters. The location of the Divisional and New Guinea Force Headquarters, at Dobudura and Port Moresby, respectively, are shown on the map.

The assigned mission of the Division included the defense of all ground that had been captured north of the Owen Stanley mountains, the "mopping up" of the Jap patrols remaining in this area, and the manning of coast defense positions north of Oro Bay. The captured territory was taken over as rapidly as possible. The task of taking over the area defenses was made more difficult by continued bombing by the Jap air force which still maintained air superiority.

The Signal Situation

When the Division moved into the sector, all existing wire and radio nets in the Oro Bay - Gona - Saputa Sector were taken over, intact, by the Signal Company. Initially, telephone communication between the Division CP and the Oro Bay supply base was provided over two low grade field wire circuits laid along native trails for a distance of 18 miles. Wire contact with Port Moresby was provided by a ground return Fullerphone circuit that had been built by the Australian forces as they advanced across the mountains through Kokoda. This line had never been measured but it exceeded by many miles the air-line distance of 100 miles between Port Moresby and Dobudura. Australian



linemen who continued to patrol and maintain this line were stationed at four native villages along the line route. Due to the difficulty of getting men and supplies to these stations, wire teams had been changed only once a month. The natural hazards of lightning, storms and falling trees combined with the danger of attack by enemy patrols to make the assignment difficult and dangerous.

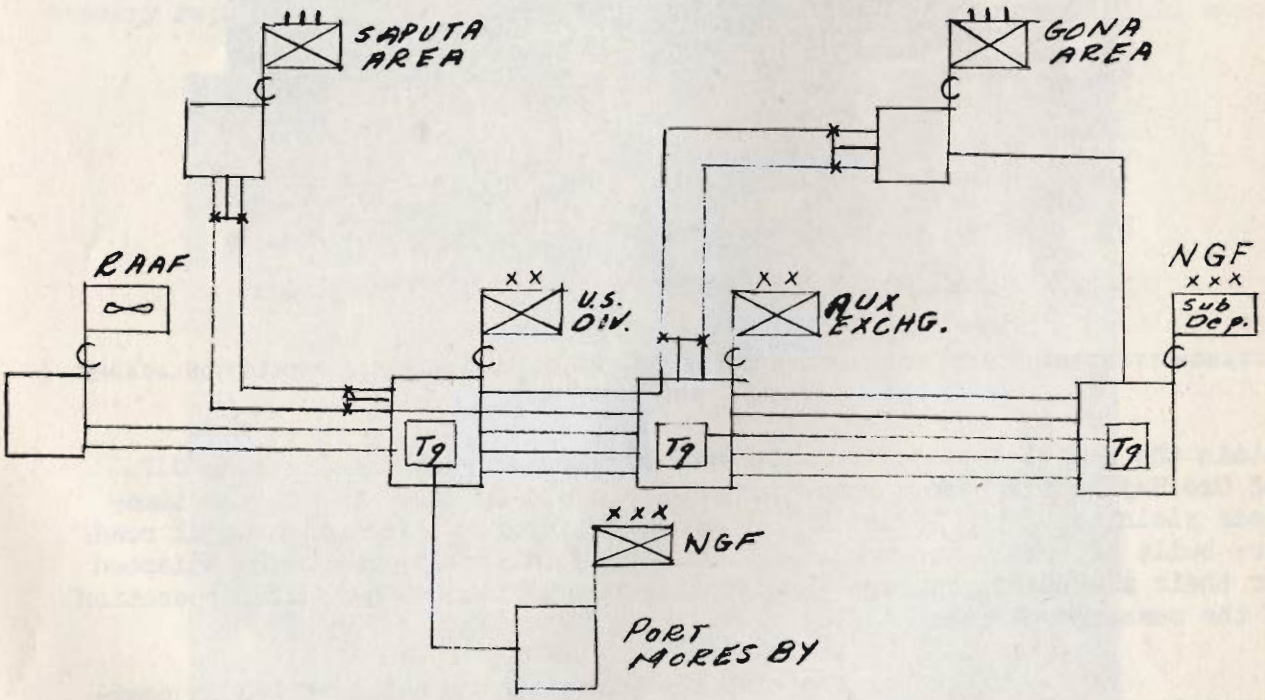
The Signal Mission

The mission of the Division Signal Company may be summarized as follows: 1. To build an efficient telephone system for adequate defense of the area, constructed to withstand the almost continuous bombing.

2. To maintain adequate communication circuits with higher headquarters.

3. To establish an axis of communication for future offensive action against enemy forces at Lae and Salamaua.

The proposed wire system had to be flexible so as to include the wire nets of the Air Force and of attached troops and supply base installations in a common net which could be readily taken over by the base signal officer when the Division moved forward. The main elements of this wire net, as eventually developed, are shown in the diagram below.



It was considered necessary to install two Division C.P. switchboards, approximately one-half mile apart, so that the net would be less vulnerable to enemy bombing raids. Trunks were laid to tactical units by alternate

routes and the two Division switching centrals were connected by tie lines.

Although radio could not be used extensively by Division units operating in dense jungle, high powered sets, when properly located, were invaluable for contact with supply bases and higher headquarters. Radio circuits generally paralleled the wire circuits shown in the above circuit diagram.

Daily air courier service to New Guinea Force Headquarters was arranged and, through cooperation with an Australian air squadron, it was possible to

A TRANSMITTER SHACK WITH ITS CAMOUFLAGE NET OVERHEAD AND SANDBAG PROTECTION AGAINST SNIPERS AND SHRAPNEL.

obtain the use of a plane for messenger service between the Division C.P. and Oro Bay supply base. Motor messengers could be used only in the immediate vicinity of the Division C.P. and the supply and air bases until roads were built or trails improved. Runners, used initially, had to be selected for their alertness, courage and intelligence to insure successful operation of the messenger system.

Signal Operations

By the time the Division was well settled in position, in the early months of 1943, Japanese ground patrol activity had diminished considerably — was limited to nuisance raids on supply and communication lines and isolated outposts.

The Signal Company commander was responsible for defense of the bivouac and signal installation areas. As noted before, all signal personnel had been equipped with rifles. Only one exception was made to this policy. Linemen were authorized to carry pistols so that they would be armed at all times. Thirty caliber light machine guns were set up to protect signal installations.

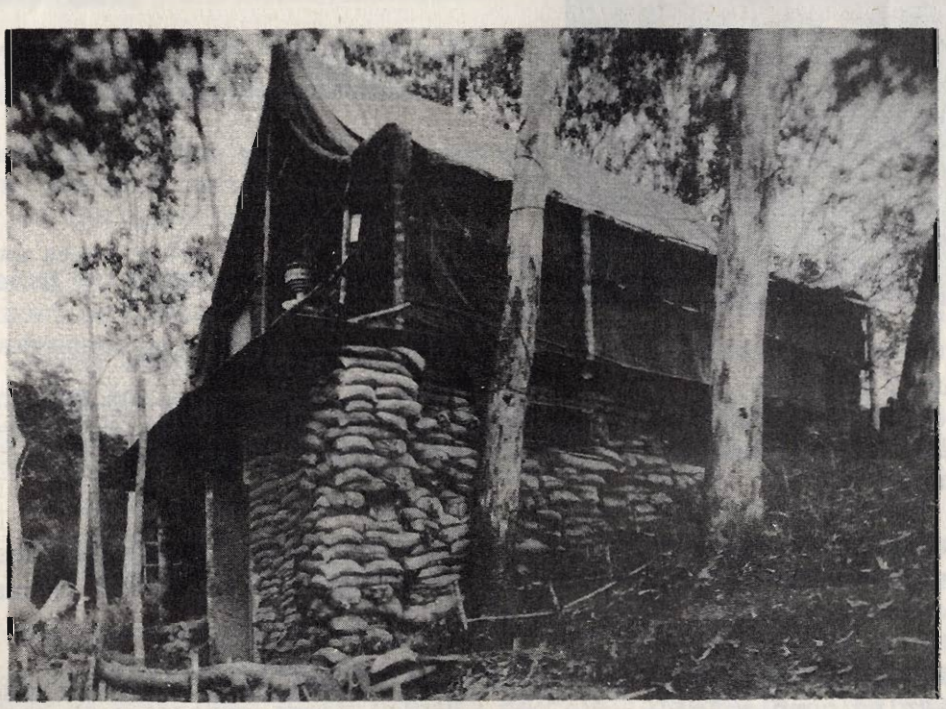
Wire Problems

The original tactical field wire net that was in use when the Division took over the area had been comparatively simple to maintain. As the sector became more stabilized, numerous factors made satisfactory wire communication more and more difficult to maintain:

1. The arrival of additional troop units and the construction of new service installations required a considerable expansion of the field wire net.

2. Existing wire lines had been run along native trails or fastened to lance poles and trees when possible. With the advent of the Jeep, trails became wider and wider as drivers drove to the side of the original trail to avoid mud holes. Wire lines which had been 10 to 20 yards off the original trail might now be in the center of a newly cut trail.

3. Two-man maintenance teams had to be stationed approximately four miles apart along the main wire line routes to patrol the lines and make necessary repairs. Because of the Jap patrol menace, only one man could work

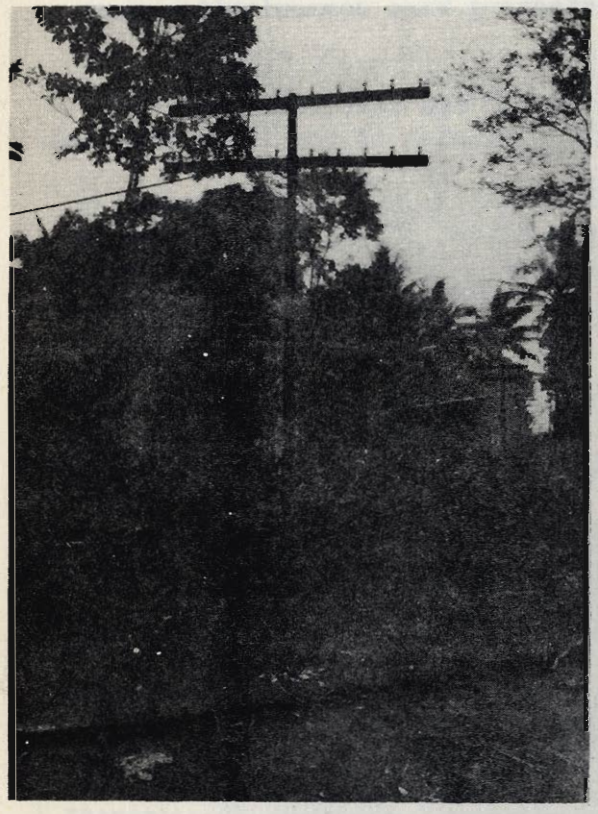


THE SEMI-DUGOUT ARRANGEMENT OF A NEW GUINEA SHIP-TO-SHORE RADIO STATION SIMPLIFIES THE PROBLEM OF PROTECTION.

while the other stood guard.

4. The original line tags nad been either lost or the line designation obliterated on tags that were still attached to the wire.

5. Lightning storms which tore out whole sections of lines in a day, jungle ants which discovered that field wire insulation was edible, and curious natives who found that field wire made the best belts they ever owned, caused frequent disruption of service.



ONE CORNER OF A NEW GUINEA MESSAGE CENTER. TELETYPE PROVED TO BE AN IMPORTANT COMMUNICATION MEDIUM IN THIS AREA.

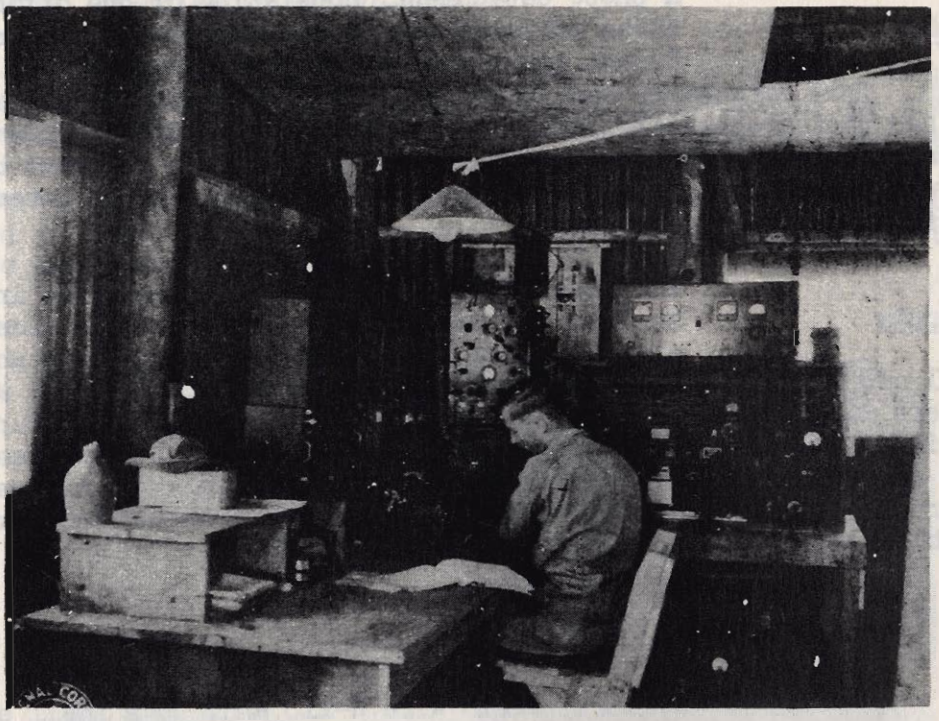
←OPEN WIRE LINE ON STEEL POLES ERECTED IN CLEARING CUT THROUGH THE JUNGLE.

It was decided, therefore, to replace the major field wire trunks with open wire lines. About 500 circuit miles of open wire line were constructed by detachments of Australian signalmen who had recently arrived in the Sector and such linemen as could be spared from the American Division Signal Company.

When possible, the new wire lines were built along all-weather roads recently constructed by engineer troops. Clearings had to be cut through jungle to provide a suitable route for other wire lines.

By the first of April many of the proposed lines were either completed or rapidly nearing completion.

At the time the Division Signal Officer joined the Division the staff was not sold on the use of teletype within the Division. Now, however,



RADIO EQUIPMENT INSIDE THE SEMI-DUGOUT SHOWN ON PAGE 9.

staff members were fully aware of its advantage and limitations and even wanted service between the Division C.P. and regimental headquarters.

Scheduled service was found to be the most desirable method of teletype operation, since it saved precious fuel and a considerable amount of wear and tear on the gasoline generators.

Generally, teletype service, over either metallic or simplexed circuits, was the most satisfactory means of communication available from the Division C.P. to adjacent air fields and other fixed installations in the rear area.

The original Division C.P. switchboard installation had been made during combat, when repeated enemy bombings required that signal equipment be placed in dugouts. The Division C.P. exchange dugout, which was 10 feet deep and had been covered with logs and earth, leaked during rains and, since it was never reached by sunlight, was always damp. Naturally, this caused trouble in the switchboard and shorted the operators' cords.

The two new Division C.P. exchanges were installed above ground in dry log huts and were protected from sniper fire and fragmentation bombs by two thicknesses of sand bags piled against six-inch log walls. The canvas roof covering each hut could be removed after damp periods, allowing the sun to dry out the interior. Two 5-pair field cable, hung on messenger wire, provided tie lines between two exchanges.

Photography

A photo detachment, consisting of one officer and three enlisted men, moved with the Division to New Guinea and filmed all important operations within the Sector. This detachment had joined the Division at the jungle staging area and had photographed all phases of the training activities there. Still and motion pictures, taken during the staging phase, were reviewed before the Division was transferred to New Guinea so that training errors detected by these pictures could be corrected.

Signal Supply

The lack of roads and other difficulties involved in distributing signal supplies to the widely spread divisional units made it necessary to establish several small signal dumps in the Sector instead of one main division signal dump. These dumps were operated by men from the Division signal supply section or, in a few cases, by personnel of Division Signal Company teams attached to regimental C.P.'s. The Division signal supply section drew materiel directly from a sub-base of the Port Moresby Advanced Depot which had been established at Oro Bay.

COMPARISON - ALLIED AND JAP SIGNAL AGENCIES

Wire

Allied: Field Wire W-110 and, to a small extent, rubber covered field cable, were used in rear C.P. areas. Trunks to regimental CT's were constructed with W-110 laid from hand-carried reels or jeep-mounted Reel Unit RL-31. Wire W-130 was used for initial lines below the regimental C.P. and was laid from hand reels. The wire Reels RL-39, part of Reel Equipment CE-11, were found satisfactory for laying W-130.

When a speedy installation was the primary need, field wire was laid on the ground initially, usually parallel to but well off existing trails, and placed on trees or improvised lance poles after the circuits were placed in service. The tagging of lines laid during the stress of combat was seldom satisfactory.

Switchboard BD-71 and 72, although too heavy to carry any distance through the jungle, were used whenever possible. Unless muffled by dugout walls, the noises created by the operation of switchboards and Telephone EE-8 carried clearly through the dead silence of the jungle night.

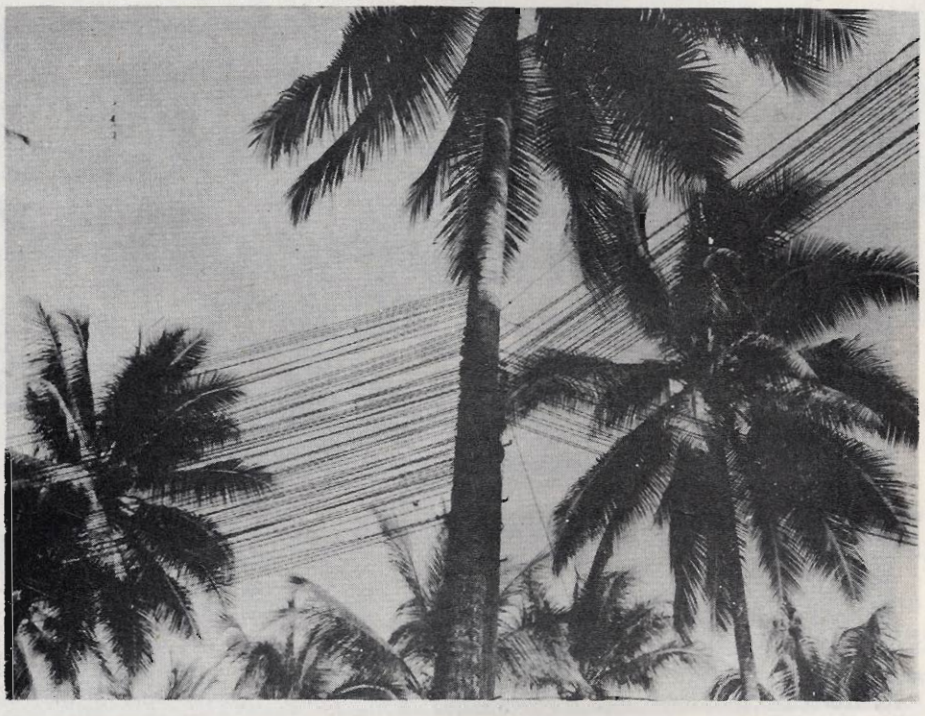
The sound powered telephone of Reel Equipment CE-11 was universally praised by the Allied services which used this equipment and was considered as one of the most desirable communication units employed in the campaign.

Japanese: The only field wire known to be used by the Japs in this area was a single conductor, five strand, yellow fabric covered assault wire. There was no obvious reason for the use of yellow wire in this area and of other colors elsewhere. This wire was almost always laid on the ground by means of a geared hand reel made of cast brass and wood, very similar in

size and wire capacity to the RL-39.

The Jap field telephone was encased in an oak box about 8" long, 4" high and 3" deep. The transmitter-receiver was aluminum, cast in one piece. As compared with the EE-8, this set was definitely inferior in every way.

There was apparently a shortage of Jap field switchboards, since few were found or heard of. Those inspected were simple and easily portable and similar to American field Switchboard BD-9 and -11.



A PALM TREE SERVES AS THE TERMINAL "POLE" FOR FIELD LINES CONVERGING AT A TELEPHONE CENTRAL.

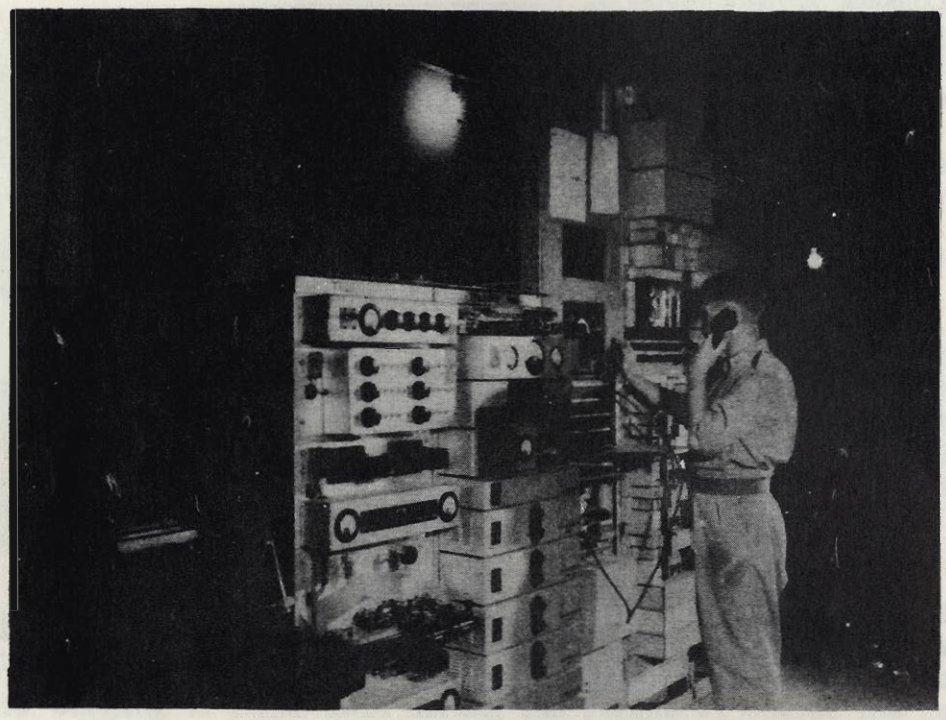
Radio

Allied: Low power field radio sets issued to the American Division were not generally suitable for this campaign because of their very limited range in jungle terrain. High power sets were indispensable in maintaining contact between the Division C.P. and the higher headquarters. Radio teams from the Signal Company equipped with high power sets could not be assigned to CT's or other task forces unless the weather and terrain conditions permitted transportation of the heavy sets in 1/4-ton trucks.

Japanese: Lower echelons of the Jap forces were known to carry well made portable radio sets, predominately of German design, but the Division Signal Officer was never able to find any such equipment or to determine definitely how well these sets functioned during jungle operations.

A 2 kw., all wave, C.W. transmitter, captured at Sanananda, had been partially demolished, but enough parts remained to permit analysis of the characteristics and capabilities. The set was built on an open aluminum frame to dissipate the heat. Meters, condensers, transformers, and inductances were all of excellent design and construction. Frequencies could be readily changed by inserting inclosed "drawers."

Most of the Jap radio traffic between lower units was in the clear. They probably guessed that few interpreters were then available to Allied units.

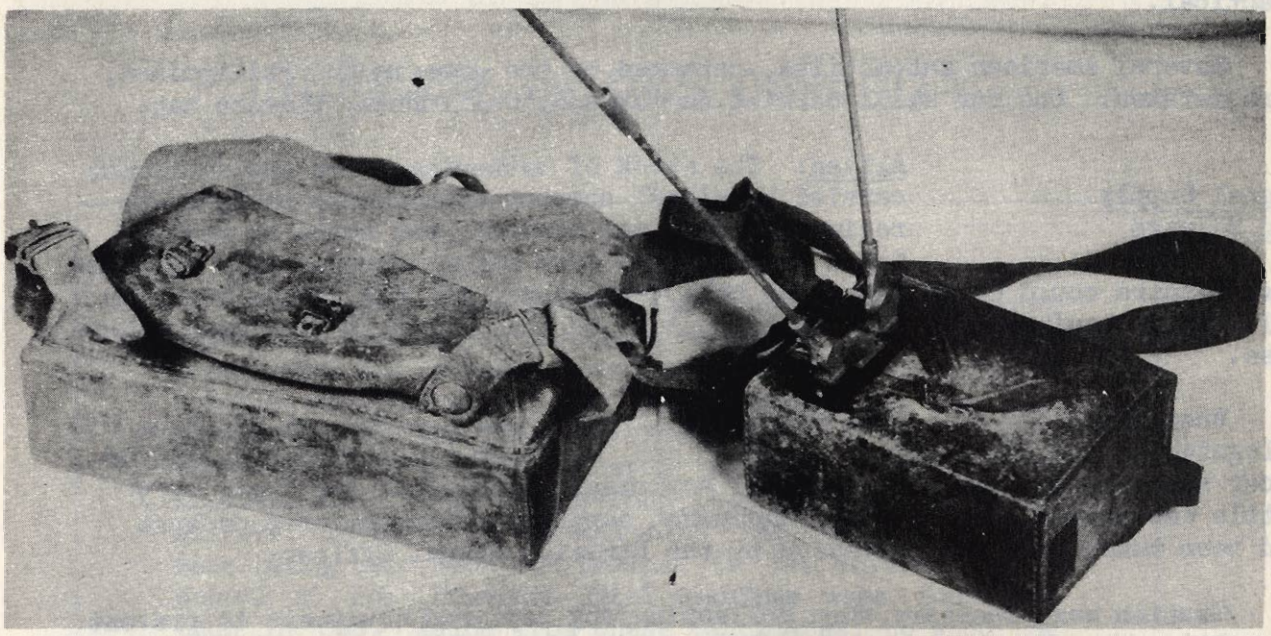


PART OF THE PORT MORESBY--DOBODURA CARRIER SYSTEM RECENTLY INSTALLED BY AMERICANS AND AUSTRALIANS.

Message Centers

Allied: The liability to capture by enemy patrols and the danger from snipers made normal operation of message centers impractical. It was found that the lower unit message centers operated best in echelons, with forward stations consisting of a man or two in the foxhole next to the unit commander. Coding and decoding, clearance of documents and message processing were handled by the rear echelon of the message center. In the regiments this echelon was frequently manned by personnel of the Division Signal Company detachment. With this procedure, capture of the forward message center would reveal no important information to the enemy.

The normal procedure of coding and decoding messages transmitted between lower echelons seemed rather foolish, since the distance between command



A JAPANESE "WALKIE-TALKIE" WITH FREQUENCY RANGE OF 24.2 TO 49.3 MC. (RIGHT). AT THE LEFT IS ITS BATTERY CASE.

posts was often so short that one CP could frequently be seen and called to from another C.P. Prearranged message codes were used very successfully by the lower echelons.

Japanese: Enemy message centers were frequently elaborate installations located adjacent to the Jap unit commander's headquarters and were apparently charged with maintaining files of official documents and operations orders, in addition to performing normal message center duties. Installations captured in this area had been almost completely demolished and little valuable information was obtained from the materials left behind.

Messengers

Allied: Unit commanders found that carefully selected, well trained messengers were indispensable. These men could not be changed frequently because they had to be kept well posted on the tactical situation. Understudies had to be provided in case regular messengers became casualties. Two messengers usually traveled together for added protection. It was SOP that messengers should repair or report damaged wire lines and report unusual occurrences or observations of any nature to G-2.

Japanese: The enemy also considered the messenger as an important means of communication. Written messages and maps entrusted to these messengers were captured - but usually from dead Japs.

The quality of captured bicycles indicated that they were intended as

a messenger conveyance, but the lack of roads and trails made their use impractical.

Several American automobiles, captured by the Japs in the Philippines, were retaken. One car still carried an Oakland, California, license tag.

Signal Supply and Salvage

Allied: The stock of batteries, wire and equipment carried by signal company detachments assigned to regimental CT's was limited, but could be replenished readily from area signal dumps. Only the simpler repairs could be performed by this detachment, but the system kept the C.T. signal equipment in much better condition than it would have been otherwise.

When Sanananda fell, the responsibility for salvage had not yet been delegated to the new American division and, although the Division Signal Officer was able to inspect the signal equipment captured at the time, very little was turned over to him. Equipment captured after the area defense had been taken over was processed by the Division Signal Officer.

Caution was necessary when collecting any captured equipment to prevent casualties from booby traps.

Japanese: No details of the enemy signal supply or salvage systems were determined.

Sound and Visual

Allied: Sound and visual communication was seldom used by Allied forces in New Guinea. A few of the enemy methods and tricks were tested, with only limited success.

Because of the scarcity of open spaces in the jungle, panels were practically useless for air-ground communication. Black panels were considered for use on beaches, but were never tried.

Japanese: Many reports were received that the Japs used bird whistles, animal howls and other weird noises as signals, but it was never definitely determined that this was a fact. It is more probable that such noises were intended to confuse and cause a psychological strain on Allied troops.

Novel visual signals, such as rags tied to trees, Jap national flags and unusual smoke signals, were used to indicate units, locations and directions.

INCREASE IN OCS CAPACITY

The Signal Corps Officer Candidate School at Fort Monmouth, New Jersey, is being expanded to accommodate troop unit and overseas candidates during early 1944. A total enrollment of 1,500 officer candidates has been authorized for the first seventeen weeks of this year, beginning with a class of about 250 in January, which includes all first and second year ROTC students and enlisted reservists, Electronics Training Group, who were being held back and trained in the enlisted men's school at Fort Monmouth until openings were found for them in OCS. Aside from these candidates, to whom the Signal Corps had already been committed for officer candidate training, around eighty approved applicants were enrolled in the January class from troops at Fort Monmouth, New Jersey; Camp Crowder, Missouri; Camp Murphy, Florida, and overseas units. Subsequent classes are scheduled for an enrollment of about four hundred candidates per month.

This expansion from the former capacity of 110 per month will enable that many more successful applicants from troop units to attend OCS. Heretofore, the OCS capacity at Fort Monmouth had been limited to accommodate primarily ROTC students and ETG's, with a few overseas candidates. The number remaining of ROTC's and ETG's not in OCS is strictly limited and OCS capacity has already been allocated to accommodate them. This latest expansion will afford to enlisted men in the continental United States and overseas much greater opportunity to become 2d Lieutenants in the Signal Corps of the Army of the United States.

EQUIPMENT PERFORMANCE OVERSEAS

RADIO SET SCR-299, SCR-399 AND SCR-499

Following is a summary of overseas experience with Radio Set SCR-299-( ) and its modified forms, the SCR-399-( ) and SCR-499-( ).

There is a continuous flow of reports from overseas to Intelligence Branch, OCSigO, concerning the various Signal Corps equipments. Such reports are evaluated and extracts forwarded for consideration and action of each interested division, branch or other unit of the OCSigO. Reports are then returned to Intelligence Branch covering the corrective action taken, if any such action is required.

The following material represents a brief summary by Intelligence Branch of reports on the SCR-299, and includes particularly a review of troubles encountered in the use of this equipment in the field, together with a discussion of the remedial steps taken in the laboratories and production lines to guard against similar troubles in the future.

The material should be of particular interest to those concerned with training activities in the U.S. and abroad, and to using units in the field. -- The Editor.

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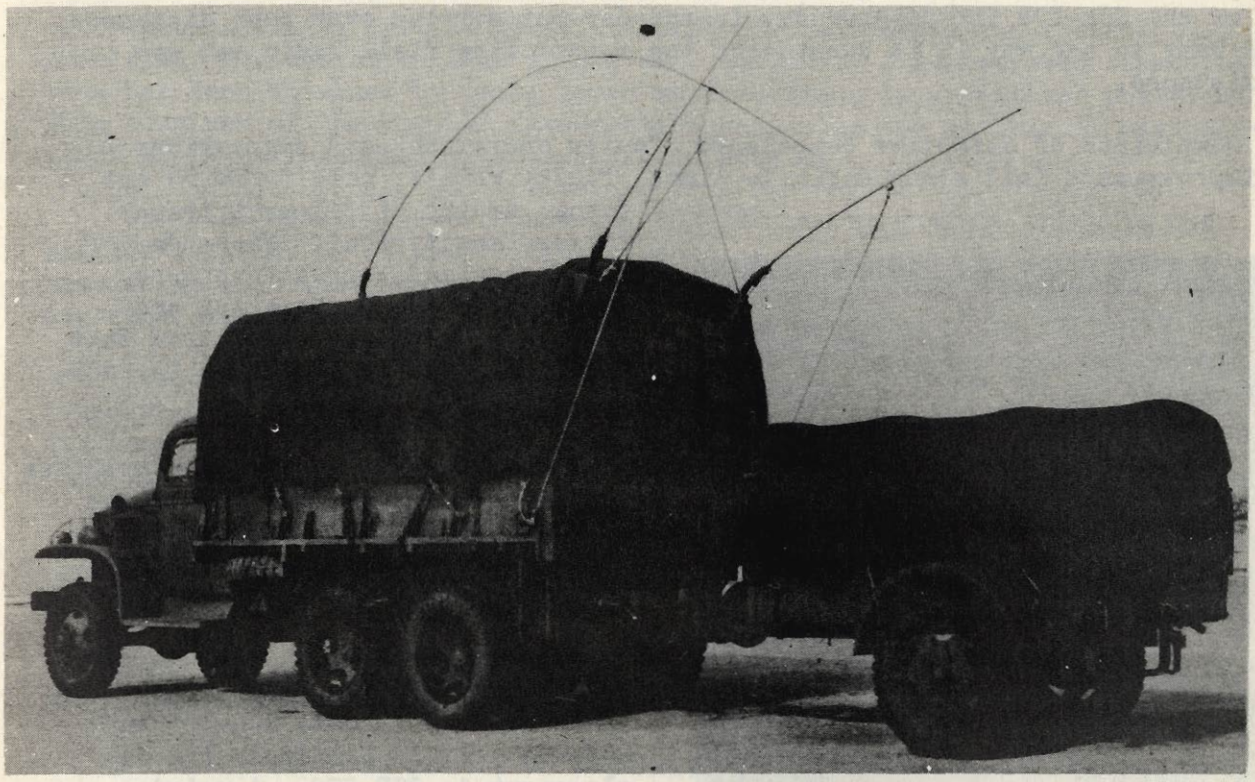
Radio Set SCR-299-( ) and later models identified as Radio Set SCR-399-( ) and Radio Set SCR-499-( ) have been the subject of more favorable comment and praise from overseas than any other piece of Signal Corps equipment. The few mechanical and electrical faults that have come to light have not prohibited users in all theaters from utilizing this set to maximum advantage.

The SCR-299 consists of Radio Transmitter BC-610-( ), one each Radio Receiver BC-312 and BC-342, Speech Amplifier BC-614-( ), and Antenna Tuning Unit BC-729-( ). The transmitter is crystal controlled and produces a maximum of 400 watts on CW and 300 watts on amplitude modulated phone. It has a frequency range of 2 to 8 megacycles and operates from commercial 110 volt, 60 cycle, a.c., or a Power Unit PE-95-( ). It uses a 15-foot whip antenna or can be adapted for use with a doublet or a long wire antenna. The set is used in Truck K-51-( ) with the PE-95 in a one-ton trailer.

This set has been mounted in half tracks by armored units, $\frac{1}{4}$ ton, 4 x 4 jeeps, and the $\frac{1}{2}$ ton amphibious DUKW. Although designed for mobile use, the SCR-299 has also been extensively used in fixed station operation. In these cases the set was removed from its truck and moved into a building.



RADIO SET SCR-399 AS SUPPLIED IN SHELTER HO-17 IS HERE MOUNTED ON TRUCK, 2 1/2-TON 6 x 6 CARGO.

Frequently, it was the only set available for fixed station administrative traffic.

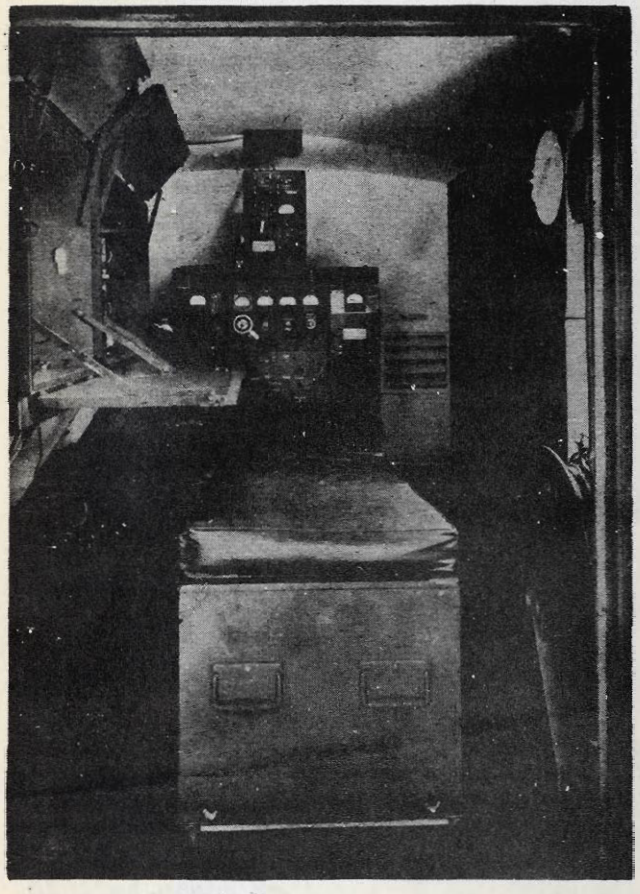
The SCR-399 differs from the SCR-299 primarily in that: (1) the frequency range is expanded to cover from 2 to 18 mc; (2) the Antenna Tuning Unit BC-939-( ) is substituted for the BC-729 to provide for this increased frequency range; and (3) the SCR-399 is supplied mounted in Shelter HO-17-( ).

The SCR-499 duplicates the SCR-399 except that it is supplied without Shelter HO-17 or the trailer for Power Unit PE-95 and is intended for transport by air.

The great distances that this set has covered serve to illustrate why it is considered the answer to the problem of communication over the distances involved in modern operations. It has operated over ranges up to 2300 miles. It has given satisfactory performance at all distances and it is felt by those who use it that, if operated with a suitable antenna and on a suitable frequency, it is capable of covering almost any distance. Under combat conditions it has covered 300 miles on CW and 100 miles on phone, this being with the whip antenna. With the same antenna, it has handled traffic from Oran to the United Kingdom. Under "freak" conditions, transmissions from this set in a glider training center in this country have interfered with units using the set in North Africa. In view of the dependable perform-

ance of the SCR-299 for 24-hour day-in-and-day-out service over such distances, it is easy to see why it is considered the outstanding field radio set now in existence.

Complaints of defective components, faulty operation, and suggestions for improvements fall along definite lines; faulty relays, need for wire antenna, arcing of filament transformer are typical. These deficiencies and suggestions were referred to the Engineering and Technical Service. The action that has been taken in each case is indicated below.



INSIDE VIEW OF THE SHELTER HO-17 SHOWING ARRANGEMENT OF THE SCR-399.

The greatest number of complaints received were regarding the relays RY-1 and RY-3 in the transmitter. The difficulty was due to arcing and sticking of the contacts.

An improved relay RY-1 which is heavier than the older model, is being used in sets SCR-399 and SCR-499. It is available for replacement in SCR-299. A maintenance letter (No. 56, dated 5 October 1943) has been issued to cover this modification. The circuit of the Relay RY-3 has been modified to eliminate the necessity of breaking high voltage circuit with the contacts of the relay. This modification will reduce the arcing and, therefore, the burning of the contacts. The modification is included in sets SCR-399 and SCR-499 and information for field modification is being prepared.

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Many requests have been received for modification to permit use of wire antennas such as a doublet or Rhombic for non-mobile operation. The use of such antennas would more fully utilize the power output and increase the reliable range of the set. Some users have improvised antenna matching networks so that Rhombic and doublet antennas may be used.

A half-wave doublet antenna has been developed for use with the SCR-299, SCR-399, and SCR-499. This is discussed in an article elsewhere in this issue and is being added to the parts lists of the SCR-399 and SCR-499 sets. Kits are now under procurement for sets already in the field.

Antenna Tuning Unit BC 939-( )(a part of the SCR-399 and the SCR-499) has provisions for operation from a long wire antenna. Also improved communication has been obtained by using seven mast sections in a vertical position. This consists of the regular five-section whip plus two additional mast sections MS-54 as furnished with these radio sets.

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The K-51 truck used to house the SCR-299 has an outline which is not similar to other U. S. Army military vehicles. Consequently the enemy has learned to spot this vehicle and will bomb and strafe the radio truck leaving other vehicles alone.

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The use of Shelter HO-17-( ) to house the SCR-399 reduces this hazard because when this shelter is mounted in a 2 1/2 ton cargo truck its only distinguishing feature is the antenna equipment. This is scarcely visible from the air, or at any appreciable distance along the ground.

- - - - -

Failures of T-2 rectifier filament transformers have occurred, due to arc-overs from the center tap to the case, the center tap to the chassis, and the secondary winding to ground.

The following changes are being incorporated in current production of transformers T-2 to eliminate the failures:

1. Improved method of potting;
2. Increasing the height of the case by approximately one inch to allow the use of a core of such dimensions as to give greater clearance between the winding and the case;
3. Placing a guide strip inside the transformer case to insure correct dressing of the internal leads;
4. Elimination of the center tap terminal (it was never used);
5. Increased clearance between the terminals and the cover;
6. Terminals mounted on ceramic stand-off insulators.

Information for field modification of this transformer to eliminate failure has been furnished the Maintenance Branch, Engineering and Technical Service, for inclusion in the general waterproofing program.

- - - - -

It has been found by units overseas, the PE-95 will not stand up under the 24-hour operation necessitated when the SCR-299 is used in fixed station operation. Parts such as the distributor and water pump have failed and there were no spare parts to replace them. Also, when the SCR-299 is used in fixed station operation, a spare power unit is desirable.

To correct the difficulty in securing spare parts for the PE-95, this unit is now equipped with the same engine as the ¼ ton 4 x 4" "Jeep", making replacement of parts much simpler since they are interchangeable with standard Jeep parts. Also, a new power unit is being shipped for each set in foreign theaters, thus providing a spare.

- - - - -

The original SCR-299 had a frequency range of 2.0 to 8.0 megacycles.

Many units wished to operate this set on higher frequencies, this being necessary so that reliable twenty-four hour contact could be maintained over the long distances encountered.

The SCR-399 and SCR-499 cover a frequency range of 2.0 to 18.0 megacycles. For the SCR-299, frequency conversion kits MC-516 and MC-517 (see article under EQUIPMENT NOTES, Ground Signal, in this issue) for extending the frequency range to 12 and 18 megacycles respectively, have been standardized and are now under procurement.

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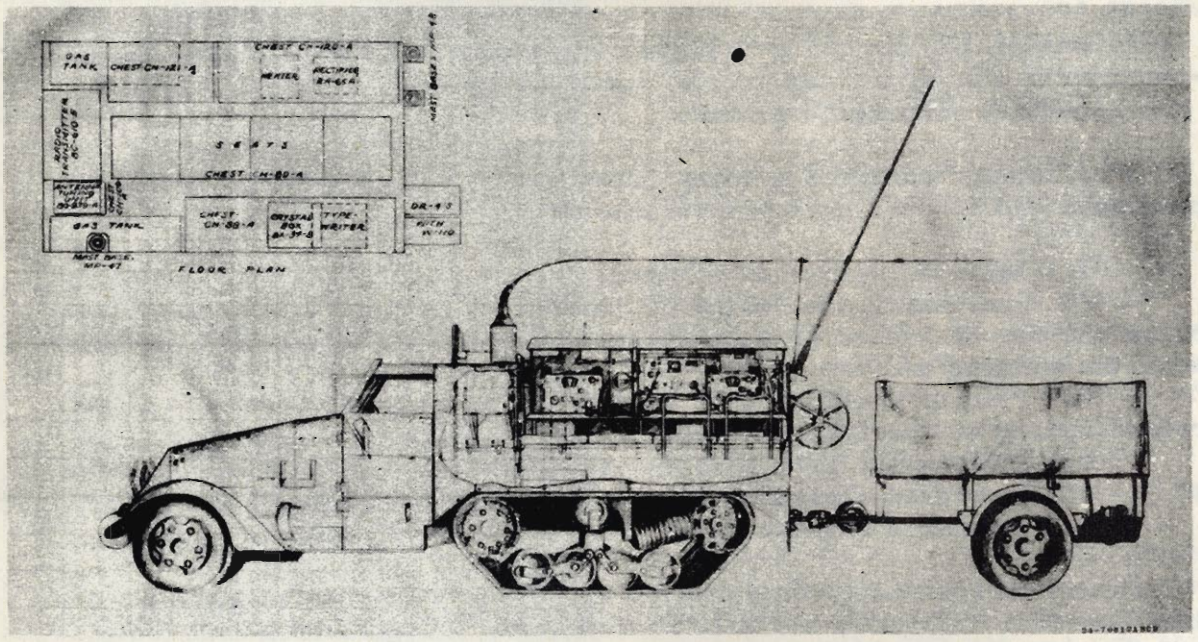
Arc-overs have occurred in the filter circuit of the high voltage power supply of the transmitter. The insulation of the filter choke insulation around the terminals has broken down permitting arc-overs to ground.



RADIO SET SCR-499-A INSTALLED IN HALFTRACK PERSONNEL CARRIER M-3. FLOOR PLAN SHOWN AT UPPER LEFT.

There has been a change in these filter chokes and it is felt that features causing the breakdown are not present in the improved choke. However, this choke is being investigated by the Laboratories to determine whether it also is subject to such failures.

- - - - -

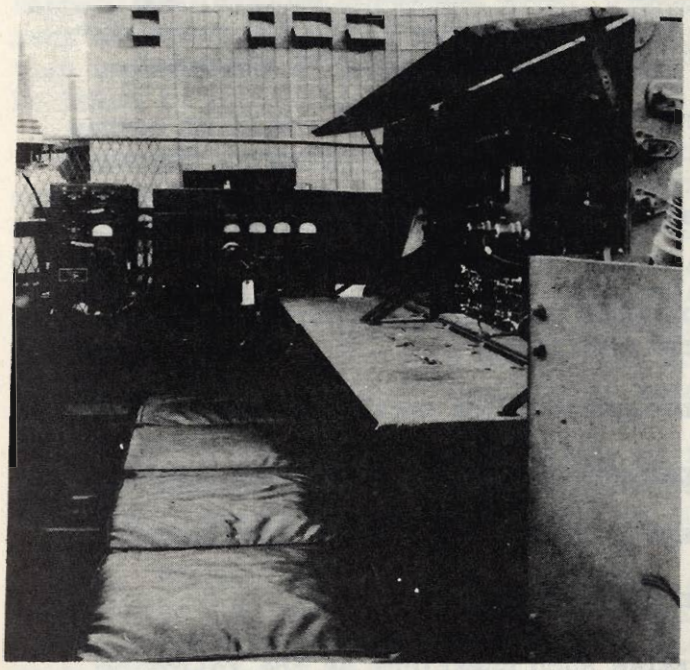
Break-in operation has been mentioned as a necessary feature.

Break-in has been provided on the SCR-399 and SCR-499. A maintenance letter (No. 14, dated 12 February 1943) has been sent to the field, giving necessary information for modification of the speech amplifier of Radio Set SCR-299 for break-in operation.

- - - - -

More extensive remote control than is provided has been requested.

In this connection it is pointed out that on voice, by using an EE-8A telephone, the set can be operated in a remote position over a mile of field wire. However, a man must remain at the transmitter, since it is not possible to shut off the carrier while receiving from the remote position. For CW operation, by moving one receiver to the remote location, the set can be operated completely remote with no one at the transmitter. Any additional remote control would require a major change in design and no request for such a change has been received from the using arm.



THE SCR-499 AS INSTALLED IN HALFTRACK PERSONNEL CARRIER M-3.

- - - - -

A great deal of trouble has been experienced with bugs, insects, and dust causing arc-overs and shorts.

The laboratory is currently working on a project to inclose the whole transmitter and tuning unit and provide forced draft ventilation. Shelter HO-17-( ) for the SCR-399 is also screened against insects.

Breakdown in the laced cabling between the high voltage lead and the bias lead, breakdown of a condenser in the keying circuit, arc-overs from a tube socket to the chassis, failure of the isolantite base for the final tank coil, and frequent failure of the fuses on the input side of the plate transformer are being investigated by the Signal Corps Laboratories.

The Chief Signal Officer can report that all defects have been corrected, except those enumerated in the two paragraphs above, which have been referred to the Laboratories.

REPORTING EQUIPMENT FAILURES

Signal Officers and others who report failures of ground signal equipment frequently give so little descriptive data that the reports, compiled at considerable cost of time and effort, are utterly inadequate as aids in correcting the trouble of which complaint is made. While it is realized that reporting personnel are busy with many other important matters, and are consequently pressed for time, it should be recalled that the prime purpose of reporting failure of equipment is to get these defects corrected.

Where "Unsatisfactory Report" forms are available, these will of course be used, and will be filled in as completely as possible. However, Observers' Reports, letters from theaters of operations and the like often do not require the use of such forms, and therefore frequently fail to give adequate information.

The following are some typical examples of inadequate reports, as received in the Office of the Chief Signal Officer:

1. SCR-536. "Battery life is inadequate...The metal cap cover for the antenna breaks off."
2. TC-3. "Troubles have been experienced with the relays and cords, due to moisture."
3. SCR-508. "For instance, relays in Radio Set SCR-508 frequently fail."
4. SCR-194 and 195. "No good in the tropics."

Data missing from these reports raise such questions as the following in the minds of the engineers charged with investigating and correcting defects:

1. SCR-536. Is the battery carrying capacity too small? Are the batteries fresh? What is meant by "inadequate" --- how long do the batteries last? Is the complaint about A or B batteries --- or both? Where does the antenna cap break? Is it covering the antenna, hanging loose or on dummy mounting when breakage occurs? Does it happen on only one set out of a hundred --- or on ninety? Does it occur during shipment, or while the sets are in use? What are the serial numbers of the sets?

2. TC-3. What's the trouble --- do the relays stick, or do they pit, or do the windings burn out? How often does it happen? Or what percentage of the sets? What are the serial numbers? As to the cords, which cords cause trouble and what is the nature of this trouble --- shorts, opens, leakage, or what?

3. SCR-508. Which model of SCR-508 is meant? Radio Set SCR-508-A, SCR-508-C, SCR-508-D, SCR-508-AM, SCR-508-CM or SCR-508-DM? What is meant by "frequently"? This term can be interpreted over a wide range of time. There are four relays in one of the major components of this set; do they

all "fail", and if not, which one (or ones) are meant? And as to "fail"—— see the preceding paragraph.

4. SCR-194 and 195. What does "no good" mean —— insufficient moisture-proofing, not designed to operate in high ambient temperatures, too heavy to carry, jungle static too heavy to work through, frequency range unsuited to jungle work where line-of-sight is impossible, etc.? While it happens that these sets are "Limited Standard" and hence no further procurement of major components will be made, much more information on the difficulties encountered is necessary to determine the required corrective action to be taken in the field.

As will be evident from the above, certain information is essential in order that complaints of equipment failure or inadequacy can be investigated and remedies for the troubles found. Other additional information is desirable in order to expedite the investigation and the finding of a cure for the complaint. The following suggestions are offered as to the information required in reports of defective equipment from the field, so that the correction of defects in design and manufacture may be expedited and instructions issued for corrections to sets already in the field.

To illustrate the specific points of information required, the following generalized, typical, incomplete statement of trouble is given, then analyzed: "Capacitors frequently fail in SCR-000".

1. "Capacitors": The set doubtless contains several capacitors; it is unlikely that the entire capacitor complement is failing. The report should state which, identifying them by their reference numbers, by their positions in the circuit, or some other positive means.

2. "Frequently" is a relative word. As used above, it may mean that a large number of "SCR-000" suffer from capacitor failures, or that the capacitors issued in replacement groups do not stand up very long. It may mean that the capacitors —— or any one of the capacitors —— fail about every thirty days, or every thirty minutes. The report should state the percentage of failures. For example, "Capacitor, Ref. No. C-77, short circuits due to high humidity in 22 percent of all sets in use in this organization." Even better would be "Out of 153 equipments, 37 have had short-circuits occurring in capacitor Ref. No. C-77, apparently due to high humidity."

3. As indicated in the example just given, "fail" is an adequate description of trouble. It might indicate that the capacitors are of too low a voltage rating, that they were defective in manufacture, that they become open or short circuited, change capacity or leak oil, that mechanical stresses destroy them, that they are of incorrect design for the climate in which they are used, etc. The report should state the nature of the failure, giving reasons for it as well, whenever possible.

4. "SCR-000" means very little — especially when it designates a series

which may include SCR-000-A, SCR-000-B, SCR-000-C, and perhaps a number of subsequent procurements. Defects are often found in early productions, and modifications to correct them are made in subsequent procurements. Perhaps 300-volt capacitors suffered from dielectric break-down in SCR-000-A so 600-volt capacitors, which stand up well, have been substituted in the later production. When a report of capacitor break-down in SCR-000 comes through, the office has no way of knowing whether the officer making the report found the trouble in an old SCR-000-A where it might be expected, or whether a batch of faulty condensers somehow happened to get into an SCR-000-C--a matter calling for investigation. Further, the descriptive as well as the numerical nomenclature should be given: the correct name of the equipment is Radio Set SCR-000-C. The reason for this is that nomenclature type numbers often have some similarity: TC-2 and TG-2 look much alike on a carbon copy, though the former is a Telephone Central Office Set, while the latter is a Relay.

5. As stated in the preceding paragraph, changes are often made during production, and unless they are major in nature, these may not ordinarily be revealed in a change in the terminal letter of the nomenclature type number. For example, a certain set was produced with a meter of a type which was found unreliable shortly after the first equipments reached the field. Consequently, the manufacturer was instructed to use a superior type of meter. The change occurred in production, and some SCR-000-A contained one type of meter, while others incorporated the improvement. Reports of meter failure in SCR-000-A meant little, for it could not be determined whether they referred to the old meter, which was known to be a source of trouble, or whether the new meter was less satisfactory than had been anticipated. However, if the reports had included the manufacturer's serial number or the lowest and highest serial numbers for the faulty equipments, the trouble could have been traced quickly, as records are usually kept showing the point in the production run where changes are made. Wherever possible, this information should be included in reports.

6. Similarly, two or more contractors may be producing equipments with the same nomenclature, the components of which, while generally interchangeable electrically and mechanically, may vary in internal construction. This is particularly true when equipment is ordered on a performance specification. Therefore when making a report, it is always advisable to mention the name of the manufacturer as it appears on the name-plate. For several months, in the latter part of 1943, code letters were used to designate the names of manufacturers. Where the manufacturers' names do not appear, these code letters should be given.

7. It also often happens that the same nomenclature is retained through two or more procurements of an equipment from the same manufacturer, while changes may be made in the later production. In cases of this sort, the manufacturer's order number, as shown on the equipment name-plate, provides valuable information, even though it may not, for some reason, be feasible to state the manufacturer's serial number for the particular equipment reported.

Summing up, then, it may be stated that the more complete the information given in reports of equipment, faults or failure, the more rapidly the trouble will be corrected.

Such reports should include:

1. Complete nomenclature of equipment reported.

    a. If possible, include manufacturer's name, order number, and serial number.

2. Accurate description of component.

    a. Identify by nomenclature, reference number, position in circuit or other positive means.

3. Nature of failure (as detailed as possible).

    a. How it failed - breakage (give complete details) short circuit, mounting failure, etc.

    b. Reason for failure - high humidity, road shocks, insufficient clearance between terminals, etc.

4. Percentage or quantity of equipments in which failures occurs relative to total equipments operated or observed.

SKY-WAVE AIDS JUNGLE COMMUNICATIONS

At the close of an article under the above title in the January SCTIL, a statement was made that a more comprehensive article on the same subject would follow in the February SCTIL. Instead, the announced article has been published in the form of a Technical Bulletin and is now being given extremely wide distribution. Copies are available from Adjutant General Depots. The number is TB SIG 4 and the title, "Methods for Improving the Effectiveness of Jungle Radio Communications."

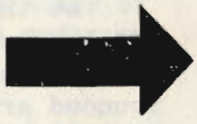
REPORT UNSATISFACTORY EQUIPMENT!

Technical Manual TM-38-250, entitled "Basic Maintenance Manual," should be required reading for all concerned with maintenance (and this includes practically everybody). This manual describes the fundamentals of the five echelon system of maintenance, methods of alteration of materiel, inspection, salvage, and other related subjects. It also includes brief sections on special maintenance procedures for each of the arms and services of the Army.

Under the Chapter on modification of materiel the TM emphasizes the "Unsatisfactory Equipment Report." So far the receipt from the field of reports on unsatisfactory equipment has been meager and hence equipment changes that may be of great importance are slow in being accomplished.

For the information of those not familiar with this report, W.D., A.G.O. Form No. 468 is reproduced on the opposite page. It carries its own instructions for use.

It is urged that readers in the field who are responsible for Signal Corps equipments take steps to keep a supply of these forms on hand and use them freely. This is the best and quickest way of insuring the elimination of faults in equipment. The form is stocked in Adjutant General Depots and can be requisitioned in accordance with Section III, Circular No. 4, W.D., 4 January 1944.



WAR DEPARTMENT

UNSATISFACTORY EQUIPMENT REPORT

(Technical service) | DATE

FOR | MATERIEL

FROM (Organization) (Station)

TO (Next superior headquarters) (Station) (Technical service)

COMPLETE MAJOR ITEM

NOMENCLATURE | TYPE

MODEL | MANUFACTURER

U. S. A. REG. NO. | SERIAL NO. | DATE RECEIVED

EQUIPMENT WITH WHICH USED (IF APPLICABLE)

NOMENCLATURE OF DEFECTIVE COMPONENT

PART NO. | TYPE

MANUFACTURER | DATE INSTALLED

LENGTH OF SERVICE

DATE OF INITIAL TROUBLE

TOTAL YEARS MONTHS DAYS

TIME INSTALLED

TOTAL PERIOD OF OPERATION BEFORE FAILURE (FILL IN WHERE APPLICABLE)

YEARS | MONTHS | DAYS | HOURS | MILES | ROUNDS

DESCRIPTION OF TROUBLE AND PROBABLE CAUSE

GIVE TYPE OF FAILURE, MECHANICAL, ELECTRICAL, WORKMANSHIP, MATERIAL, DESIGN

UNUSUAL SERVICE CONDITIONS

GIVE BRIEF DESCRIPTION

TRAINING OR SKILL OF USING PERSONNEL (CHECK ONE) POOR FAIR GOOD

DESCRIPTION OF ANY REMEDIAL ACTION TAKEN

RECOMMENDATIONS

1ST IND.

OFFICE STATION DATE

(Technical service)

TO CHIEF

NAME

STATION RANK

ORIGINATING OFFICER

SIGNATURE

NAME

RANK AND TITLE

ORGANIZATION

INSTRUCTIONS

1. It is imperative that the Chief of Technical Service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in matériel. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data.

2. This form will be used for reporting manufacturing, design or operational defects in matérial with a view to improving and correcting such defects, and for use in recommending modifications of material.

3. This form will not be used for reporting failures, isolated material defects or malfunctions of matérial resulting from fair-wear-and-tear or accidental damage nor for the replacement, repair, or the issue of parts and equipment. It does not replace currently authorized operational or performance records.

4. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in the manner described in AR 750-10 (Change No. 3).

5. It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided for in the blank spaces should be submitted as inclosures to the form. Photographs, sketches or other illustrative material are highly desirable.

6. When cases arise where it is necessary to communicate with a chief of service in order to assure safety to personnel, more expeditious means of communication are authorized. This form should be used to confirm reports made by more expeditious means.

7. This form will be made out by using or service organizations and forwarded in duplicate through command channels to the chief of technical service. The office of the chief of technical service receiving the report will forward an information copy to the Commanding General, Army Ground Forces or Army Air Forces, whichever is applicable, and to the Commanding General, Army Service Forces.

8. Necessity for using this form will be determined by the using or service troops.

W. D., A. G. O. Form No. 468
1 December 1943

DOUBLET ANTENNA FOR THE SCR-299

Radio Set SCR-299-( ), SCR-399-( ) and SCR-499-( ) are designed to provide reliable two-way voice communication at all times of the day or year with any other Radio Set SCR-299-( ), SCR-399-( ) or SCR-499-( ) operating within 100 miles, while either one or both are in motion. These results can be expected provided that the proper choice of operating frequencies be made in accordance with the time of day and time of year. When one of these sets is operated from a fixed position it may be desirable to extend the range of communication several hundred miles. The doublet antenna described here, kits for which are under procurement, may be used to increase the radiated power of the radio set, thereby increasing the range of communication many times over that obtained with the whip antenna. As soon as available these kits will be issued with these radio sets, and also to all SCR-299's, 399's and 499's now in the field.

The doublet antenna is connected to the radio set by coaxial cable and coupled to Radio Transmitter BC-610-( ) by means of variable coupling coils. The antenna is normally supported by three masts which are provided. Any other available means of supporting the antenna may be used if desired.

The following is a list of components of the doublet antenna:

Article		Complete Doublet Kit	Antenna System Only
Roll	BG-176	3	
Bag	BG-102-A	2	1
Mast Section	MS-44-A	21	
Mast Base	MP-19	3	
Guy Plate	MP-20	6	
Guy	GY-22-A	6	
Guy	GY-24-A	3	3
Insulator	IN-86-A	12	12
Stake	GP-2	18	
Reel	RL-29	2	2
Wire	W-28	250 ft.	250 ft.
Coaxial Cable		50	50 ft.
Cord	CD-1146	1	1
Coupling Coil	C-451	1	1
Coupling Coil	C-452	1	1
Coupling Coil	C-453	1	1
Soldering Lugs		2	2
Instruction Sheets		2	2

The items required for antenna system only (last column) will be packed in one Bag BG-102-A. The remaining items, except Mast Section MS-44-A, are

packed in the other Bag BG-102-A. The Mast Section MS-44-A are packed in canvas rolls, Roll BG-176, seven mast sections in each roll.

INSTALLATION

A location for the antenna should be selected away from power lines, tall trees or other obstructions. Consideration of cover will not always permit selection of the best location but in any case the best compromise between cover and a clear antenna should be used. The doublet antenna radiates a stronger signal in a direction at right angles to its length. This should be borne in mind when erecting the antenna.

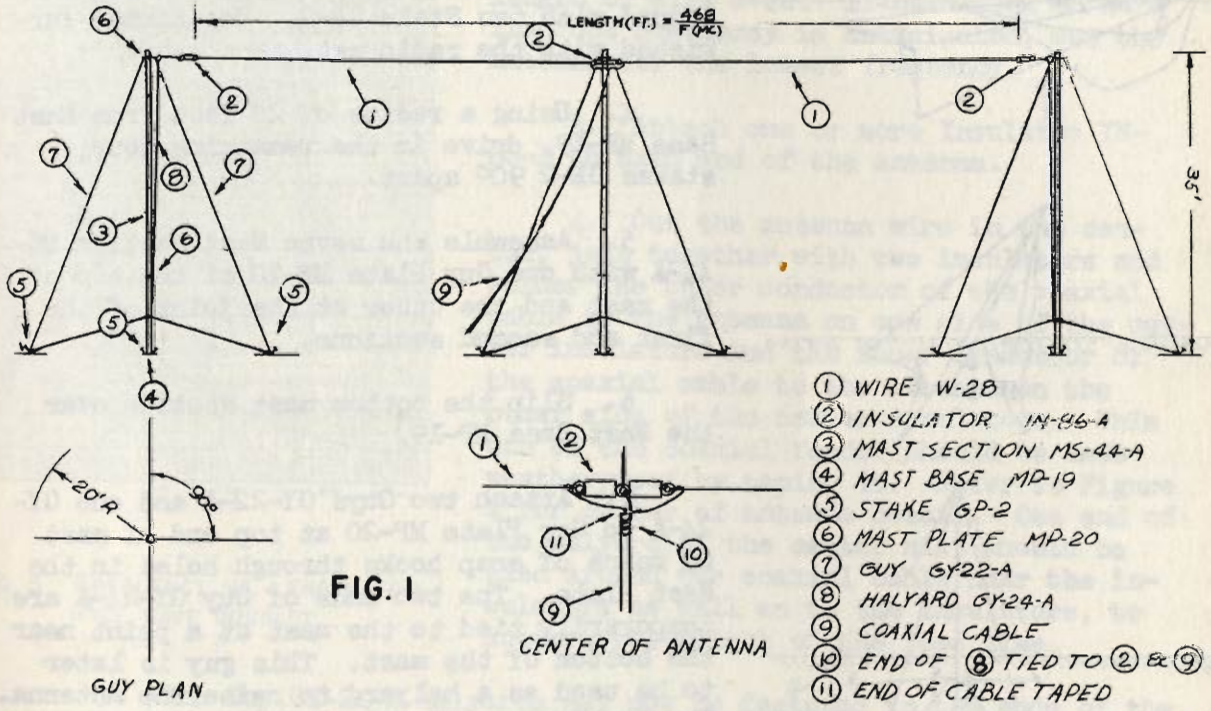


FIG. 1

Erecting the Masts

Three masts are used to support the antenna, the center mast being used to support the weight of the feeder line. The following procedure should be followed in erecting the masts:

1. Determine the length of antenna required for the lowest frequency of operation from the formula $\frac{468}{F(mc)}$ = length in feet; or reference to the Frequency vs Length Graph of Figure 3 will indicate approximate antenna length.

Add 6 or 8 feet to the length thus found. This will be the required distance between outer masts. The third mast is erected midway between the two outer masts. Refer to Figure 1 for general layout.

2. Select the following parts from the kit for one mast:

7 ea. Mast Section	MS-44-A
6 ea. Stake	GP-2
2 ea. Guy Plate	MP-20
1 ea. Mast Base	MP-19
2 ea. Guy	GY-22-A
1 ea. Guy	GY-24-A; Halyard

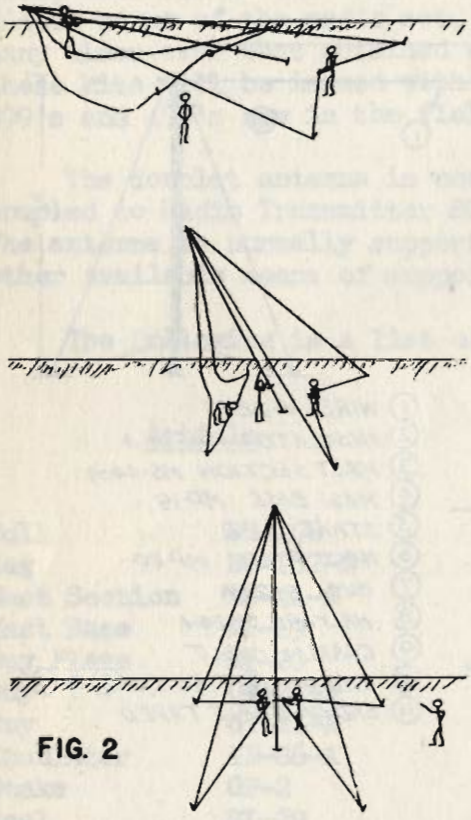


FIG. 2

3. At a point selected for one of the masts, stake the Mast Base MP-19 to the ground with two Stake GP-2. Use hammer furnished with the radio set.

4. Using a radius of 20 feet from Mast Base MP-19, drive in the remaining four stakes GP-2 90° apart.

5. Assemble the seven Mast Section MS-44-A with one Guy Plate MP-20 at the top of the mast and the other at the joint of the first and second sections.

6. Slip the bottom mast section over the Mast Base MP-19.

7. Attach two Guys GY-22-A and one GY-24-A to Guy Plate MP-20 at top end of mast by means of snap hooks through holes in the Mast Plate. The two ends of Guy GY-24-A are temporarily tied to the mast at a point near the bottom of the mast. This guy is later to be used as a halyard to raise the antenna. The loose blocks on Guy GY-22-A may be secured to the guy stakes by means of the rings attached to the blocks.

8. If the guy assembly of one Guy GY-22-A is grasped by the ring in the center of Guy GY-22-A to which the two lower pulleys are attached, the mast may be raised by walking toward the base as illustrated in Figure 2. A second man should assist in erection by lifting the mast from the ground using the same procedure as that employed in elevating a ladder. A third man on the remaining Guy GY-22-A stands by to make the necessary adjustment of length of guy when the mast is erect.

9. The other two masts are erected in the same manner.

Assembling the Antenna

The following procedure should be used in assembling the antenna:

1. Select the following parts from the kit:

   Wire W-28
   Coaxial feeder
   Two soldering lugs.

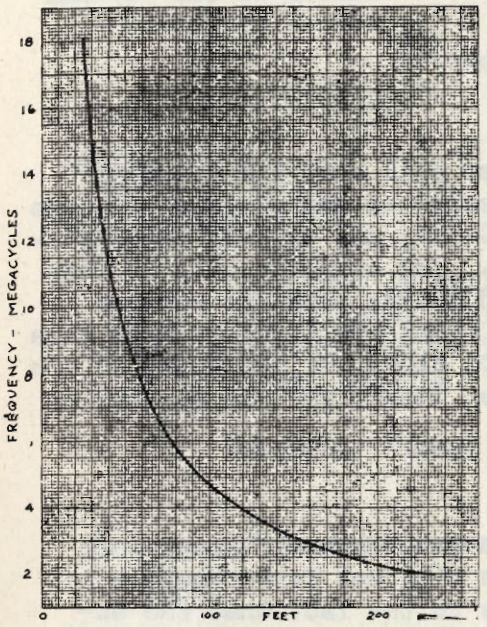


FIG. 3 - FREQUENCY VS. LENGTH FOR HALF WAVE DOUBLET.

2. Determine length of radiator by using formula $\frac{468}{F(mc)}$ = length in feet (or from Figure 3) and cut the required length of Wire W-28. If operation on more than one frequency is anticipated, cut the antenna for the lowest frequency.

3. Attach one or more Insulator IN-86-A to each end of the antenna.

4. Cut the antenna wire in the center, join together with two insulators and solder the outer conductor of the coaxial cable to the antenna on one side of the center insulators and the inner conductor of the coaxial cable to the antenna on the other side of the center insulators. This end of the coaxial feeder should be made weatherproof by taping it. Refer to Figure 1 for center of antenna detail. One end of the halyard at the center mast should be tied around the coaxial cable near the insulators as well as to the insulators, to support the weight of the feed line.

5. The Guy GY-24-A halyards may now be fastened to the ends of the antenna and the antenna raised into position.

6. The two soldering lugs are now attached and soldered to the lower end of the coaxial cable, one to the outer and one to the inner conductors.

Changes in Transmitter Connections

The following changes in wiring of Radio Transmitter BC-610-( ) are required when using the doublet antenna:

1. Remove connections between coil unit jack bar and feed-through insulators inside left side of transmitter cabinet. This may be done by removing the nuts which hold the soldering lugs in place on each of the feed-

throughs. The flexible-braid leads may now be folded and tied up away from high voltage points. Make sure they do not short out the link winding on the coil units. It is not necessary to remove leads from the coil unit jack bar. Cord CD-1146 may now be connected to the feed-throughs inside the transmitter cabinet.

2. The coaxial link between Radio Transmitter BC-610-( ) and the antenna tuning unit should be disconnected at the transmitter and the end of the coaxial line from the doublet antenna, to which the soldering lugs were fastened, should be connected to the feed-throughs on the transmitter, one lug being connected to each feed-through. The outer conductor of the coaxial feeder may be grounded if desired.

OPERATION

To place the radio set in operation the proper coil unit and transmitter tuning unit for the frequency to be used are selected and plugged into the transmitter in the normal way. A Coupling Coil (C-451, 452 or 453) is selected which will fit inside the coil unit being used. The coupling coil is then connected to Cord CD-1146 by means of the plug and socket provided and the coupling coil is inserted in the coil unit. Care should be taken to make sure that Cord CD-1146 does not come in contact with, or close to, the turns of the coil unit. The antenna should be cut to the proper length for the particular frequency to be used.

Tuning Procedure

The transmitter should then be tuned in the normal manner, except that minimum plate current as shown in tune-up position will not have the pronounced dip found when using the whip antenna, due to the fact that the antenna is already coupled and tuned. With the HIGH VOLTAGE PROTECT switch in HIGH VOLTAGE PROTECT position, plate current as indicated at the P.A. PLATE meter should be 100 ma. If the plate current is higher than 100 ma., the coupling coil should be drawn part way out of the coil unit; if less than 100 ma. it should be inserted nearer the center of coil unit. The PLATE TUNING wheel should be adjusted for minimum plate current as indicated at the P.A. PLATE meter. (Care should be taken not to make adjustments in coupling while plate power is applied. Plate power should be turned off, necessary adjustment made and then plate power reapplied.) This procedure should be followed until the proper coupling is obtained. When the HIGH VOLTAGE PROTECT switch is put in NORMAL position, the plate current should be 290 ma.

In order to change frequency of transmission the antenna should be lowered using Guy GY-24-A and the antenna cut to the required length. An insulator should be inserted at the points where the antenna is cut. The antenna may be divided into a number of sections to permit operation on several frequencies, jumpers across one or more of the insulators between sections being used when required for all but the highest frequency. For a change of only a few kilocycles from the fundamental frequency of the antenna no change in length is required.

SIGNAL CORPS ORGANIZATION POLICY

The following memorandum from the Chief Signal Officer is here reproduced for the information of all Signal Corps officers.

ARMY SERVICE FORCES
Office of the Chief Signal Officer
Washington 25, D. C.

SERIAL NO. 1 — 1 January 1944

MEMORANDUM FOR:

DIRECTORS OF STAFF DIVISIONS, CHIEFS OF OPERATING SERVICES AND DIRECTOR, OFFICE SERVICE DIVISION, OCSigO, AND COMMANDING OFFICERS OF FIELD ACTIVITIES UNDER CONTROL OF THE CHIEF SIGNAL OFFICER.

Subject: Signal Corps Organization Policy.

1. Office Memorandum No. 90, dated 15 August 1943, above subject, is rescinded.

2. Policies described in this memorandum are to be followed in the organization and operation of all activities.

3. Three types of authority and responsibility are assigned:

a. Command authority.
b. Staff responsibilities of operating services.
c. Staff responsibilities of staff division.

4. Command authority is the authority necessary for directing the activities of all personnel and the employment of all operating facilities. Command authority is accompanied by responsibility for providing the leadership essential to successful operations, for meeting established operating requirements in all respects, for compliance with policies, regulations and instructions of the Chief Signal Officer, for essential analysis and planning of assigned operations, and for development of satisfactory operations through full use of efficient procedures, elimination of unnecessary activities and personnel, proper placement and training of personnel, and maintenance of effective organization morale.

a. The Chief Signal Officer exercises command authority over all Signal Corps activities assigned to him by higher authority. He alone is responsible for performance to the Commanding General, Army Service Forces. The Chief Signal Officer is assisted in the exercise of command authority by the Assistant Chief Signal Officer, the Executive and the Staff Divisions.

b. The Assistant Chief Signal Officer acts as the principal assistant to the Chief Signal Officer and represents him during his absence. He acts for the Chief Signal Officer as the principal coordinating agency in a capacity comparable to that of a Chief of Staff.

c. The Executive, OCSigO, together with the Assistant Executives, constitute the Executive Office which is the focal point around which the Office of the Chief Signal Officer functions. It is designed to relieve the Chief Signal Officer of routine administrative burdens.

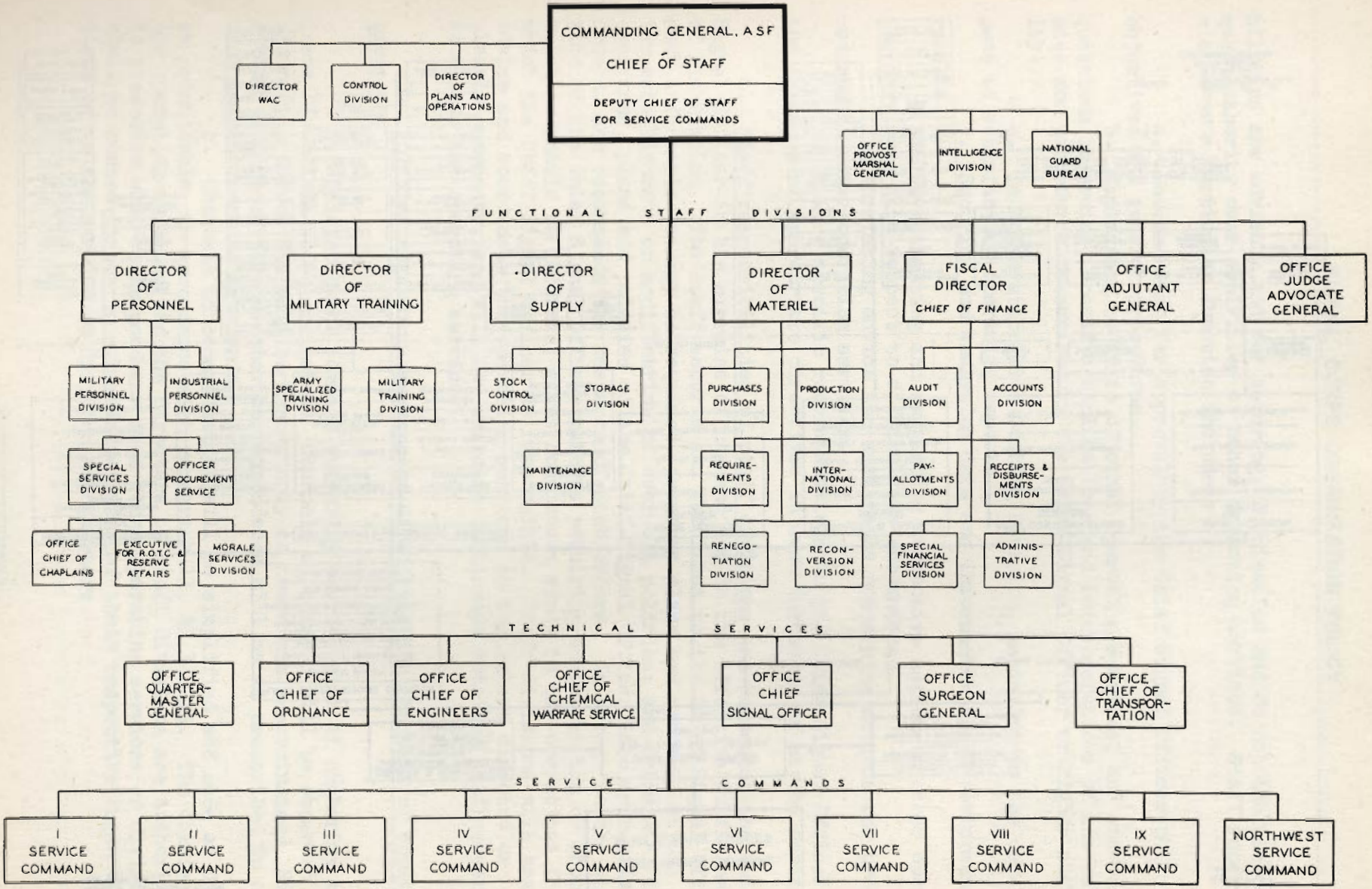
d. Command authority is delegated to the chiefs of operating services over all departmental and field activities assigned to them. The command authority of directors of staff divisions is limited to their own assigned organizations and activities except as further command authority may from time to time be specifically delegated to them by the Chief Signal Officer. The primary assignment of command authority by the Chief Signal Officer is shown on the organization chart by heavy solid lines.

e. The chief of each operating service will so administer all departmental and field activities under his command as to develop a unified organization. He has authority to effect changes in organization, personnel assignments, procedures, methods and location of activities within his command, subject to the policies and regulations of the Chief Signal Officer. Delegation and redelegation of command authority within each service and staff division will be clear and specific and will carry with it full responsibility for operating performance.

f. When two or more field activities under the same or different command are established at the same general location, housekeeping, administrative and special services will be consolidated as far as practicable. Unless otherwise directed by the Chief Signal Officer, the senior Commanding Officer at a given location will be responsible for providing such services for all Signal Corps activities at that general location to the extent requested by the chiefs of the respective operating services involved. No such arrangements will relieve the chief of an operating service from primary responsibility for the successful performance of the normal functions of any activities under his command. Before new or modified joint arrangements involving more than one operating service or involving fiscal, legal or personnel activities are made effective, the proposed arrangements will be referred through channels to Control Division for review and coordination.

5. Staff responsibilities of operating services are the responsibilities assigned to the chiefs of operating services (in addition to their command authority within their own services) for exercising staff supervision for the Chief Signal Officer over functions performed in other operating services. Such staff supervision will be the responsibility of the chief of the operating service having the major operating responsibility for the particular functions, and will extend to all activities relating to such functions for which the Chief Signal Officer is responsible. The responsi-

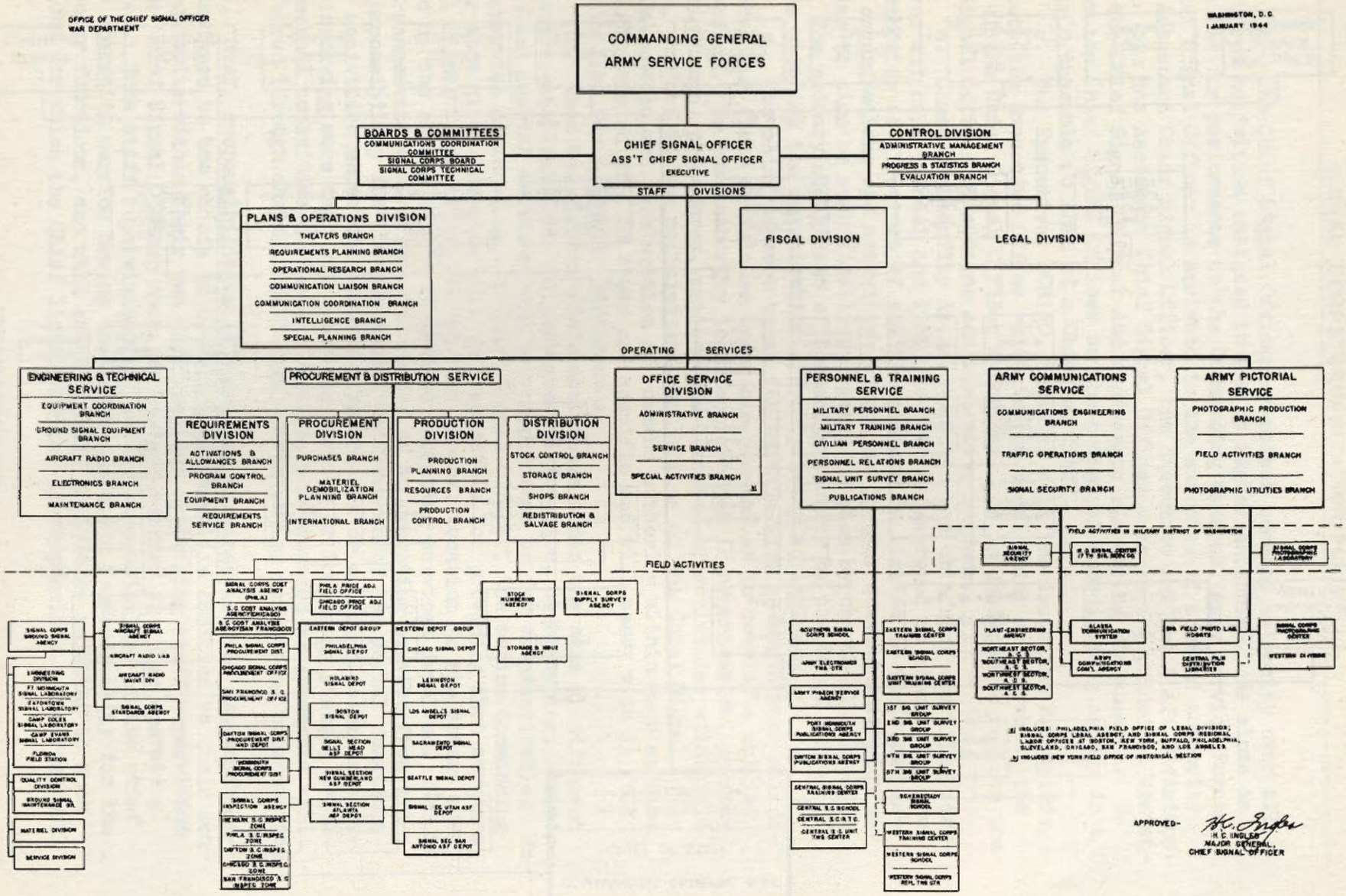
ORGANIZATION OF THE ARMY SERVICE FORCES



10 NOVEMBER 1943

OFFICE OF THE CHIEF SIGNAL OFFICER
WAR DEPARTMENT

WASHINGTON, D. C.
1 JANUARY 1944



APPROVED- H. C. Ingles
H. C. INGLES
MAJOR GENERAL,
CHIEF SIGNAL OFFICER

bilities are advisory and for securing coordination and do not include command authority over activities of other operating services. Staff supervision over a particular function includes:

a. Recommending for approval by the Chief Signal Officer policies, objectives and general procedures.

b. Explaining to units of other operating services, and answering questions regarding, specific applications and interpretations of the policies and procedures prescribed by the Chief Signal Officer or higher authority.

c. In cooperation with Control Division, assisting in the development of satisfactory operating reports.

d. Securing and analyzing data and information as to performance results.

e. Investigating and suggesting corrective action to other operating services, with respect to difficulties encountered.

f. Furnishing advice and assistance concerning methods and procedures to other operating services.

g. Making specific recommendations to the Chief Signal Officer for the issuance of appropriate directives in such instances as may be necessary.

6. Staff responsibilities of staff divisions are to assist the Chief Signal Officer in his exercise of command and in the effective fulfillment of his mission. The staff secures and furnishes to the Chief Signal Officer such information as may be required; prepares plans and recommendations for the establishment or modification of over-all policies; and translates the decisions, plans and policies of the Chief Signal Officer into appropriate orders, and recommends the issuance of such orders. It brings to the attention of the Chief Signal Officer matters requiring action by him or about which he should be informed; gives continuous study to the operations for which the Chief Signal Officer is responsible. Staff divisions will assist, advise and coordinate the operating services to the extent directed or clearly necessary, and will not exercise continuous detailed staff supervision over the operating services.

7. Policies regarding issuance of directives and channels of communication.

a. Delegation of command authority carries with it authority to issue directives to subordinates. Channels of command will be observed and ordinarily directives will be issued only to immediate subordinates. Signature of directives and other correspondence will be as prescribed in current regulations and memoranda.

b. Channels of communication will be simplified and made as direct as practicable, in accordance with paragraph 11, AR 340-15. The chiefs of the operating services and the directors of staff divisions are authorized to prescribe what correspondence from other operating services or divisions shall be routed direct to subordinate units of their respective organizations or to the service or division headquarters.

8. General

a. An operating service usually performs only a part of the total work required to complete a Signal Corps project or operation. Work must flow through and between the operating services smoothly and promptly. Every effort will be made in each echelon to expedite the flow of the work between services and to find solutions to all operating problems in accordance with the best independent judgment of the responsible officers involved. Prior to reference of memoranda and problems to higher authority, each echelon will complete all actions required on each assignment so far as possible, including completion of all essential coordination with others, obtaining of necessary concurrences, assembly of necessary facts and information and preparation of specific recommendations.

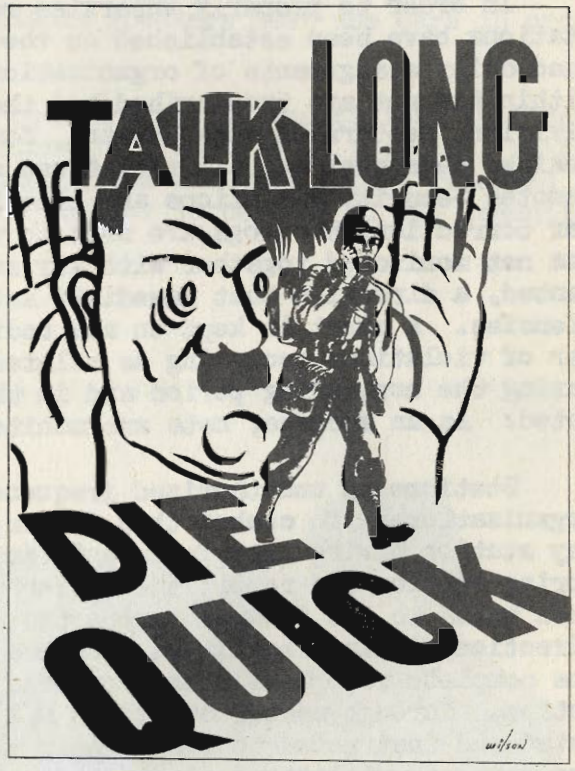
/s/ H. C. INGLES

Major General,
Chief Signal Officer.

THE ENEMY IS LISTENING

(AND WHAT THE WESTERN DEFENSE COMMAND IS DOING ABOUT IT)

Security of radio transmission has become a byword in the Western Defense Command. Less than one year ago little emphasis was placed upon the training of radio operators and their responsibility to the security of their organization. Such violations as "rag chewing," excessive transmissions, etc., were SOP, although had these organizations been in an active combat zone these violations would have spelled "disaster" in many instances.



Under the direction of the Signal Section of Headquarters Western Defense Command, rigid measures were instigated to train operators and to police the spectrum, thus insuring the security of radio transmissions.

Training radio operators to become "security conscious" has been developed by several means. To start the ball rolling, a conference was called in each sector and brigade. All communication officers and their ranking non-coms attended. At this conference, a representative of the Signal Intelligence Division explained the necessity of training in transmission security. Methods of instruction were discussed and monitoring activities and

facilities agreed upon. Each net is now responsible for monitoring all stations under its jurisdiction. All radio schools include a course in transmission security patterned after Training Circular #71 and additional aids furnished by Headquarters, Western Defense Command.

One of the more notable aids for use in radio schools is a set of six dramatized recordings, showing the results of violations in actual combat zones. These recordings were reproduced in sufficient numbers to make them available to all units. The records were accompanied by 15 to 20 minute lectures written for the benefit of radio instructors.

Posters, similar to the ever present G-2 placards, are distributed once a month to all radio stations and communication officers. The posters portray various violations of transmission security as a warning to the operator.

In order to properly supervise radio transmissions, four monitoring stations have been established on the Pacific Coast. These stations are issued daily assignments of organizational nets to cover. All transmissions within the net are transcribed and the copy sent to the Signal Intelligence Division, Western Defense Command, for correction. The logs are examined by trained personnel and all violations noted in red and blue pencil. The red denotes Security Violations and blue indicates Procedure Discrepancies. After correction, the logs are sent to the communication officer in charge of the net monitored together with any suggestions for improvement and, if warranted, a directive that immediate action be taken to correct serious deficiencies. A chart is kept on all radio nets. On this is recorded the number of violations occurring as related to the length of transmission time during the monitoring period and in this manner the progress of the nets are noted. As an average, nets are monitored for 24 hours of every 10 days.

Stations on unauthorized frequencies have been a major problem to all organizations. To combat this factor, a procedure has been set up whereby any station having interference is instructed to call the net control monitoring station and report the disturbance. The security monitoring operator then tunes to the frequency reported, copies all traffic and with the use of direction finding facilities attempts to locate the interfering station. The complete report is then forwarded to the Signal Intelligence Division for action. Through master SOI's and D/F bearings the interfering station is located and instructed to check their transmitting frequency. Many adjustments are made and violations eliminated with the consequence that most channels are now clear and workable.

The development of transmission security within the Western Defense Command has been of infinite value both to the security of radio transmission within the command and to the radio operators, many of whom are now overseas and in a position to judge for themselves as to the value of this training.

TRAINING IMPROVES VOICE COMMUNICATION

Recent studies on the use of Signal Corps radio-telephone and interphone equipment have shown that even brief periods of directed training in speaking, listening, and handling of equipment results in considerable improvement in message transmission.

Efforts to improve the quality of radio-telephone communication during the early stages of the war have been directed chiefly toward new equipment design. This has resulted in several superior instruments such as the non-resonant, flat-response headphones described in the December issue of SCTIL. The demand for improved technical designs has been persistent because of the very high levels of surrounding noise in many communication situations. Even with the best equipment now available speakers must use care in order to be intelligible in noise.

During the past year there have been increasing indications that much of the reported failure of communications is traceable to personnel rather than equipment. For example, in an operations analysis report released late last summer, it was stated that in one theater 50 percent of all communica-

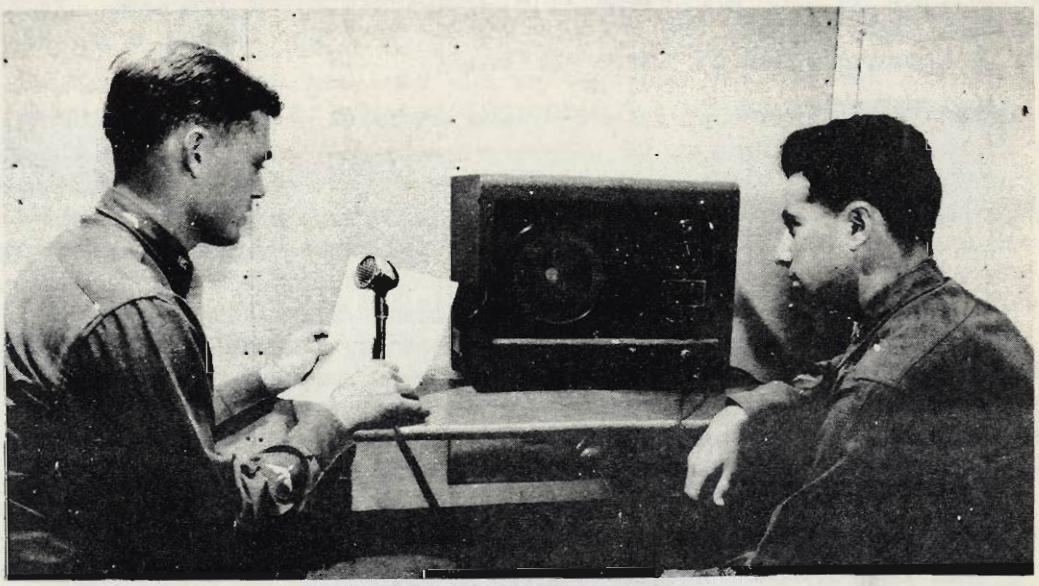


FIG. 2 - CADETS USING A MAGNETIC TAPE RECORDER (MIRROPHONE) FOR PRACTICE IN SPEAKING.

tion failures during tactical bombing operations were due to personnel. Many of these were the result of unintelligible speech and improper handling of equipment. Such reports have been confirmed frequently by combat pilots. In many instances it has been necessary to set up brief impromptu "courses" in voice training in overseas units.

At the request of Headquarters, Army Air Forces, the Chief Signal Officer initiated investigations of different methods of training in voice communication. These studies have been conducted at Waco Army Air Field and the School of Aviation Medicine, Randolph Field, under the auspices of the Operational Research Branch, OCSigO, and Headquarters, Army Air Forces. Standard Signal Corps equipment such as Headset HS-33 and HS-23 and Microphone T-17, T-30 and ANB-M-C1 has been used in low- and high-altitude conditions. Results are based on studies involving over 1500 AAF cadets.

An accompanying photograph, Figure 1, shows a portion of the experimental training room at Waco Army Air Field with a group of cadets in the listening booths. The speaker is using a noise level meter for monitoring his voice. Subjects are working here in noise of about 110 db with a spectrum closely approximating that of a plane in flight. This situation is very much like that of plane-to-plane or interphone communication, since both speaker and listener are in noise.

A similar experimental situation with other units of equipment is being used to determine the best procedures for high-altitude communication. It appears from recent laboratory and field studies that communication equipment failure at high altitudes is a relatively minor problem. Training of personnel thus becomes the most promising approach to the problems of improving communication at these altitudes.

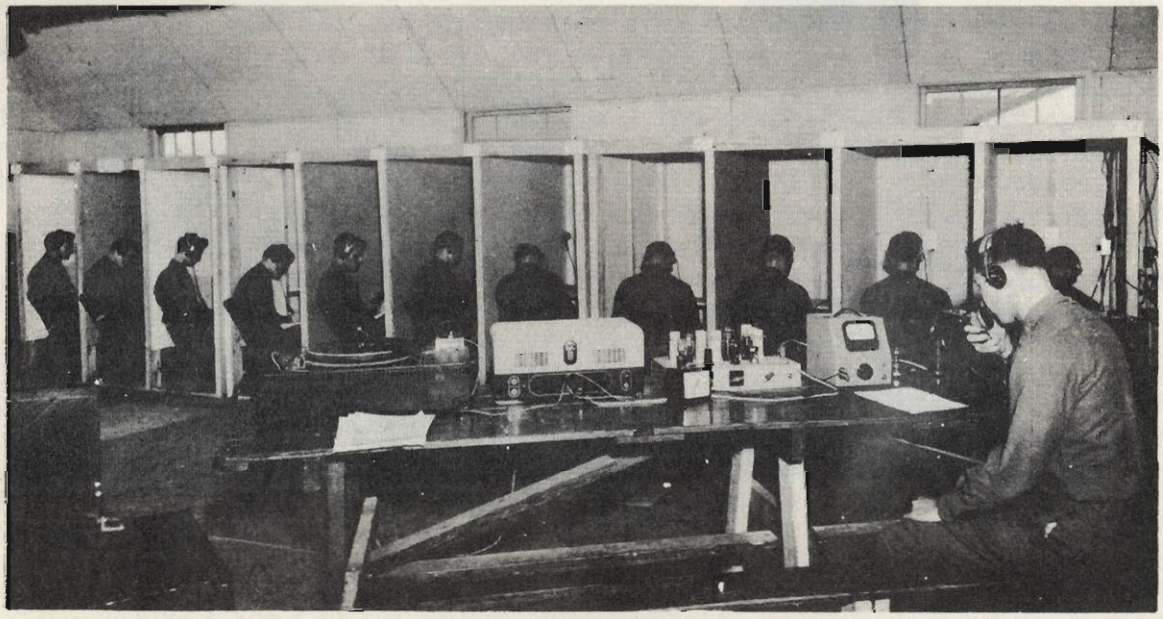


FIG. 1 - EXPERIMENTAL ROOM WHERE TRAINING METHODS IN SPEAKING AND LISTENING ARE TESTED.

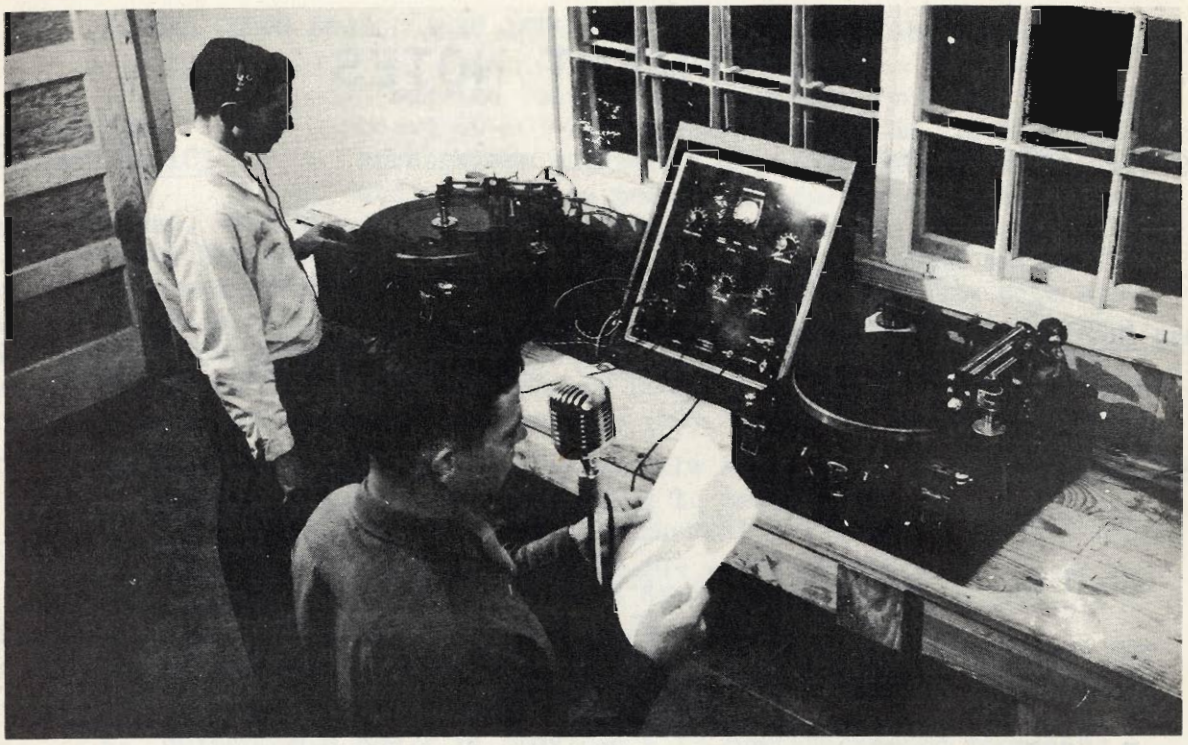


FIG. 3 - RECORDING APPARATUS FOR PRODUCING TRAINING MATERIALS.

The studies at Waco and Randolph Field do not involve the training of personnel but only the development of the most effective methods of training. These methods are to be put into use through the various central instructors' schools and operational training units.

Voice training units are now being established in several locations. Additional units are being planned for. Within a short time it is expected that extensive use will be made of recordings, manuals, and other training aids.

Figure 2 illustrates the use of a common type of training aid, the Mirrophone. This device is available in many training centers and has proved useful and convenient for short periods of practice. It enables the student to make immediate study of his own voice and to make comparisons between intelligible and unintelligible speech. A recorded sample may be "played back" as often as desired. Recordings may be made with or without noise. There is some evidence that frequent use of this instrument tends to overcome "mike fright."

Recorded materials used in the testing rooms and master records for teaching purposes are produced with the two recorders shown in Figure 3.

It is felt that the training activities initiated by the foregoing study will result in definitely improved voice communication. Speakers and listeners in Army Air Forces are to be taught to get the message through.

EQUIPMENT NOTES

SIGNAL CORPS BOARD

RECENTLY ESTABLISHED SIGNAL CORPS BOARD CASES

Case No. 545 — Very High Frequency Intercept Receivers. A service test of Radio Set SCR-607, SCR-613-T2, SCR-704, and Hallicrafters SX-28.

Case No. 546 — Field Wires with Overall Braid. The Board will test three types of field wire all having an over-all braid covering instead of a braid on each conductor. Two of these wires, one of which is twisted pair, the other, parallel twisted conductors, have stranded conductors identical with Wire W-110-B. The third type is composed of a parallel pair of .040 solid copper conductor with a lead foil paper shielding.

Case No. 547 — Winding Machinery for High Speed Coils for Light Assault Wire. In this case the Signal Corps Board will consider the need in depots and field organizations for machinery capable of winding special high speed coils of light assault wire suitable for laying lines from airplanes, from rapidly moving vehicles, or by personnel such as ski-troops.

Case No. 548 — Secret

Case No. 549 — Service Test of Synthetically Insulated Spiral-4 Cable.

Case No. 550 — Telegraph Terminal AN/TCC-1 and Filter F-2/GG. A service test of equipment developed by Eatontown Signal Laboratory for use in carrier telegraph circuits. Filter F-2/GG is a transfer filter for by-passing carrier telegraph transmissions provided by Telegraph Terminal Set AN/TCC-1 around the terminals of the telephone channels operated on the same pair of conductors.

Case No. 551 — Service Test of Cables WC-534 (5 pair) and WC-535 (10 pair) with Synthetic Insulation.

Case No. 552 — Service Test of Special 1-Ton, 2-Wheel Cargo Trailers with 7.50 x 20 Standard Tires, Solid Wood and Plywood Bodies. The Board will test two special trailers developed by the Ordnance Department as possible substitutes for standard Trailer 1-Ton, 2-Wheel Cargo.

SIGNAL CORPS BOARD CASES APPROVED BY THE CHIEF SIGNAL OFFICER

Case No. 540
Testboard BD-103

A service test of a development type 20 line Testboard BD-103-T1, designed along the lines of the arrangement suggested in paragraph 208 of FM 24-5 and also of the testboard improvised by the Second Signal Company. The Signal Corps Board found (as discussed in an article, "Testboard for Division or Corps," in SCTIL No. 26) that a need exists for a small testboard in corps, divisions, and units with comparable wire systems. With the exception of minor deficiencies, Testboard BD-103-T1 was found to meet the military characteristics under which it was developed. However, the Board considered Switchboard BD-72 (12 lines) more satisfactory for use at corps and division headquarters than Testboard BD-103-T1 for the following reasons:

1. Switchboard BD-72 is a standard item and is being supplied in quantity at the present time.
2. Switchboard BD-72 has been service tested, tried in the field and found satisfactory.
3. Switchboard BD-72 can be used as a provisional switchboard during the early construction stage of the command post and in an emergency as a supplement or substitute for other switchboards.
4. Switchboard BD-72 is provided with protectors and repeating coils.
5. Switchboard BD-72 may be used in multiple units to make up a testboard of the capacity required by a particular situation.
6. The addition of a small jack or switch panel will make the Switchboard BD-72 capable of very rapid and efficient operation as a testboard at either command post or construction center.

It was recommended that Switchboard BD-72 be utilized as a testboard at the headquarters of corps, divisions, and comparable units and that the standardization of a special testboard for such units await final consideration of the recommendations in this case by the Commanding General, Army Air Forces and Commanding General, Army Ground Forces.

Case No. 543
Service Test of Trailers, 1-Ton, 2-Wheel, with Wood Bodies, Solid and Dual Tires

Two trailers developed by the Ordnance Department using dual wheels with 6.00 x 16 tires, one with solid wood body and one with plywood body were tested by the Board. The equipment was found to be insufficiently rugged to stand normal tactical Signal Corps use and it was recommended that neither of the trailers tested be standardized and issued to Signal Corps units in lieu of standard Trailer, 1-Ton, 2-Wheel Cargo.

AIRCRAFT RADIO

HYDROGEN GENERATOR ML-303/TM

Hydrogen requirements for meteorological purposes prior to the war were easily met from established facilities, many of which manufactured the gas as a by-product from the manufacture of other materials. Storage and transportation were by means of government owned cylinders which were returned to the Depot for refilling, or in some cases, were refilled by local contracts with compressed-gas producing companies.

Wartime's vastly increased network of meteorological stations has naturally resulted in an increased demand for hydrogen gas. In addition, the fact that each hydrogen cylinder requires approximately 120 pounds of steel added a burden to an already overtaxed steel industry in general, and the demand for cylinders for compressed gases of all types has been far in excess of the capacity of cylinder manufacturing facilities.

But perhaps of more importance than the demand on the basic industries involved was the demand on transportation facilities. Each cylinder of hydrogen inflates approximately three radiosonde balloons; thus, each radiosonde station required approximately 20 cylinders each month. Each cylinder of the gas inflates approximately 10 "fast rising" pilot balloons, or approximately 35 smaller pilot balloons, and thus each pilot balloon station consumed, on an average, 7 to 10 cylinders of gas per month. These circumstances resulted in the transportation of many shiploads of compressed hydrogen overseas, and the return of an equal number of empty cylinders.

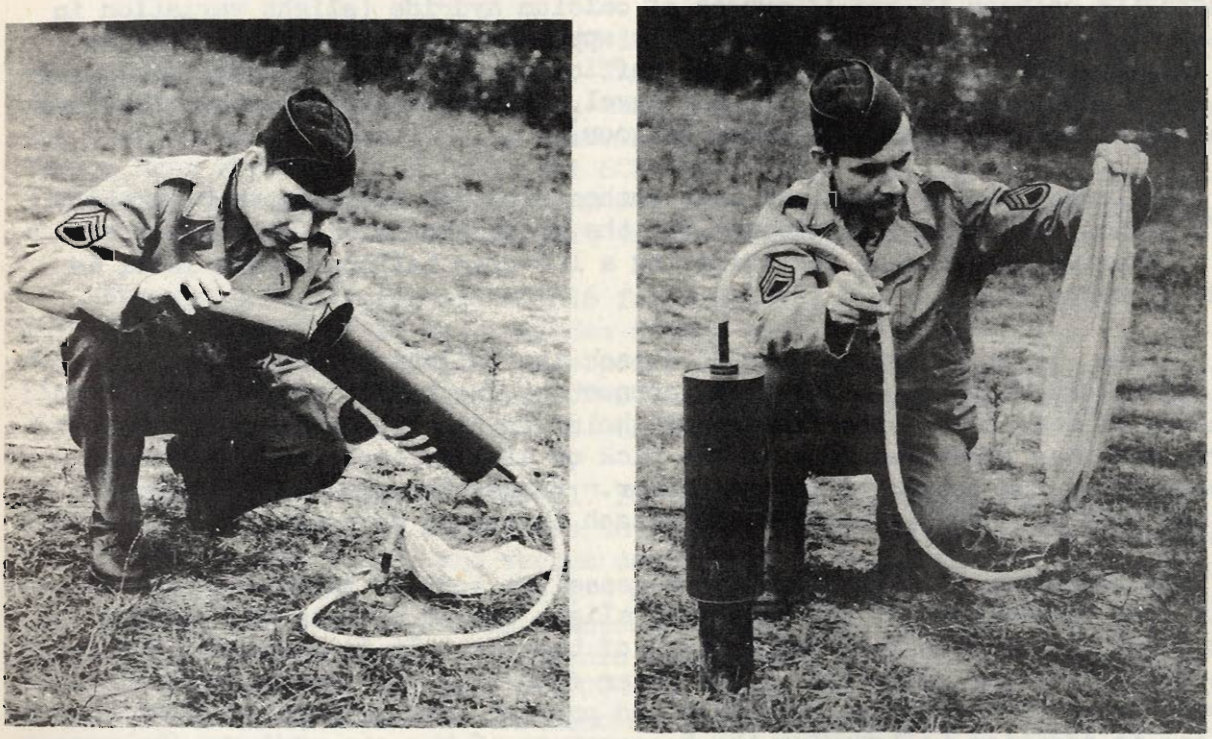
Generator ML-185-( ) was procured, partially with a view to relieving the cylinder industry and the transportation facilities, and is now used extensively on fixed or semi-mobile weather stations overseas. However, since it weighs somewhat over 500 pounds, military operations quickly demonstrated the need for a small, lightweight, extremely transportable piece of equipment for the production of hydrogen for meteorological purposes.

To some extent, advantage was taken of work accomplished by the Aircraft Radio Laboratory, in connection with the now widely publicized generator for use in sea-rescue sets. But the problem of production of hydrogen for meteorological purposes was somewhat different. Sea rescue balloons are used infrequently, while most meteorological stations make a pilot balloon observation every six hours and, in certain types of aircraft and artillery operations, the frequency is greater. Thus, the cost of the chemicals used in the generator for meteorological purposes becomes an important consideration as compared to the cost for sea-rescue purposes. Also, construction of the generator should be somewhat more substantial in view of its extended use and re-use.

The subject of hydrogen generation and chemicals therefore has been ex-

amined exhaustively by the Signal Corps Laboratories, the National Defense Research Council, and many universities and private producers of chemicals. Since no completely satisfactory material has been offered, investigations will continue. In the meantime calcium hydride has been found to answer a sufficient number of the requirements that it is being adopted, for the present, for hydrogen production in mobile meteorological units.

Hydrogen Generator ML-303/TM is being service-tested and preliminary reports indicate that it will be recommended for standardization shortly. At first glance this generator might be mistaken for the muffler off a jeep. It is a cylindrical tank or can, approximately 5 inches in diameter and 15



GENERATOR ML-185-( ) BEING PREPARED FOR USE.

inches long, constructed of 27 gauge sheet-iron, electro-galvanized, bonderized, and painted; its weight is 1 lb. 9 oz. A threaded opening 1-3/4 inches in diameter is formed in the top of the cylinder, to which a nozzle approximately four inches long is attached in use. The nozzle is of correct size to permit the attachment of Hose ML-81.

The bottom of the generator has a screw opening approximately 2½ inches in diameter, to which the charge is fitted in use. In a concentric circle outside the opening for the charge, there is a row of holes approximately 3/8 inch in diameter, which serve as vents, or ports, for the passage of water and gas.

Charges will be available in two sizes: Calcium Hydride Charge ML-304/TM which contains the correct amount of the chemical for inflation of one 30-gram pilot balloon (Balloon ML-50, ML-51, ML-64, ML-155 and ML-156), and Calcium Hydride Charge ML-305/TM which contains the correct amount for inflating 100-gram pilot balloons (Balloon ML-159, ML-160 and ML-161). Each charge is hermetically sealed in a metal can, the top of which incorporates a screw fitting by means of which the charge container is attached to the bottom of the generator. A group of "knock-out" holes is provided, for convenient puncturing just prior to use.

The charge containers are approximately 3-3/4 inches in diameter. The smaller charge is approximately 2½ inches high and weighs about 17 ounces. It contains between 13 and 14 ounces of calcium hydride (slight variation in purity of the chemical). The hydride is approximately 40 percent pure, and the smaller charge contains an amount sufficient for the production of approximately 6 cubic feet of gas. (At sea level, approximately 5.3 cubic feet are required to fully inflate a 30-gram balloon).

The larger charge container is 8 inches high and contains approximately 3-3/4 pounds of hydride, sufficient for the production of 24 cubic feet of gas. (Average requirement for inflating a 100-gram balloon at sea level is about 22 cubic feet).

In use, it is necessary only to attach the balloon to the appropriate inflation Cock ML-56 or ML-201-A and connect to the nozzle of the generator by means of Hose ML-81; the "knock-out" holes in the top of the appropriate charge are then punctured with an ice pick or similar tool, and the charge is screwed to the bottom of the generator. (Screw threads are interrupted, so that only 1/4 turn is required to attach charge to generator).

The generator is then dipped in a vessel or body of water -- fresh or salt. The temperature of the water has slight effect on rate of hydrogen production, but does affect temperature of the gas. It is advisable therefore to agitate the generator in the water from time to time, in order to remove the water inside the generator and present fresher supply to the reaction; in addition to lowering the temperature of the gas produced (by presenting cooler water), it serves to accelerate the reaction.

Reaction time for the smaller charge is approximately 5 minutes, and for the larger charge the time is from 17 to 20 minutes ordinarily. An ideal vessel for containing the water is a 50 gallon drum, but any vessel barely large enough to completely contain the generator will suffice.

End products are not caustic or otherwise injurious, other than the stain on clothing or skin such as is produced by whitewash. The container of water may be used several times. Charge cans, when removed, may be discarded without precautions other than those generally required in the disposition of metal cans.

GROUND SIGNAL

KITS EXTEND FREQUENCY RANGE OF RADIO SET SCR-299-( ), SCR-399-( ) AND SCR-499-( )

Frequency Conversion Kit MC-509 for extending the range of Radio Set SCR-299-( ), SCR-399-( ) and SCR-499-( ) from 2.0 to 1.0 megacycles and Frequency Conversion Kit MC-516 and MC-517 for extending the frequency range of Radio Set SCR-299-( ) from 8 to 12 megacycles and from 8 to 18 megacycles, respectively, have been standardized and are now under procurement.

Frequency Conversion Kit MC-509 includes coil units, tuning units and vacuum capacitors in Chest CH-251. This conversion kit also includes Antenna AN-168 and necessary mast sections, mast bases, stakes, and guys for supporting this antenna. Instructions describing necessary modification of Antenna Tuning Unit BC-729-( ) of Radio Set SCR-299-( ) and Antenna Tuning Unit BC-939-( ) of Radio Set SCR-399-( ) and SCR-499-( ), and giving operating procedures, are to be furnished as part of the conversion kit.

Frequency Conversion Kit MC-516 for extending the range of Radio Set SCR-299-( ) from 8 to 12 mc. includes tuning units, coil units and vacuum capacitors in Chest CH-252. Counterpoise CP-15-B is also included. Instructions for operation of Radio Set SCR-299-( ) in the range from 8 to 12 megacycles are to be included as part of this kit.

Frequency Conversion Kit MC-517 for extending the range of Radio Set SCR-299-( ) from 8 to 18 megacycles in fixed station installations, includes tuning units, coil units, and vacuum capacitors in Chest CH-253, and also includes Antenna Tuning Unit BC-939-( ) with co-axial feeder, Counterpoise CP-15-B and operating instructions. Antenna Tuning Unit BC-939-( ) with its co-axial feeder for connection with Radio Transmitter BC-610-( ) is furnished to replace Antenna Tuning Unit BC-729-( ), since the latter will not tune the whip or long wire antenna in frequencies above 12 megacycles. Frequency Conversion Kit MC-517 cannot be utilized with Radio Set SCR-299-( ) installed in Truck K-51-( ) primarily because sufficient space is not available for Antenna Tuning Unit BC-939-( ).

The above Frequency Conversion Kits will not be issued to all users of the Radio Sets to which they apply but will be issued as separate items.

RADIO DIRECTION FINDER CENTRAL TC-8 AND RADIO INTERCEPT CENTRAL TC-9

Radio Direction Finder Central TC-8 and Radio Intercept Central TC-9 will be ready for issue to troops in the near future. While many of the individual components of these equipments have already seen service in the field, the TC-8 and TC-9 offer for the first time completely coordinated and integrated assemblies, arranged for maximum efficiency of operation and

housed in shelters for transportability. In view of the complexity of the equipment and the number of inquiries received as to its make-up and functions, it is considered appropriate to summarize here pertinent factors pertaining to these equipments.

The components of the centrals are usually operated in Shelter HO-27, although they can be removed and operated in buildings or any other convenient shelters. The shelters HO-27 are transported on 2½-ton, 6x6, long wheel base, cargo trucks and the equipment is normally operable from the trucks at a halt, using portable antennas. Where commercial power is available, the Power Unit PE-95-( ) which is issued as part of each of the centrals need not be used. Twelve men can remove all the equipment from a Shelter HO-27 in approximately thirty minutes, can replace all the equipment in about forty-five minutes, and can mount an empty Shelter HO-27 on a 2½-ton truck in roughly three minutes.

The advantages which these assemblies offer are:

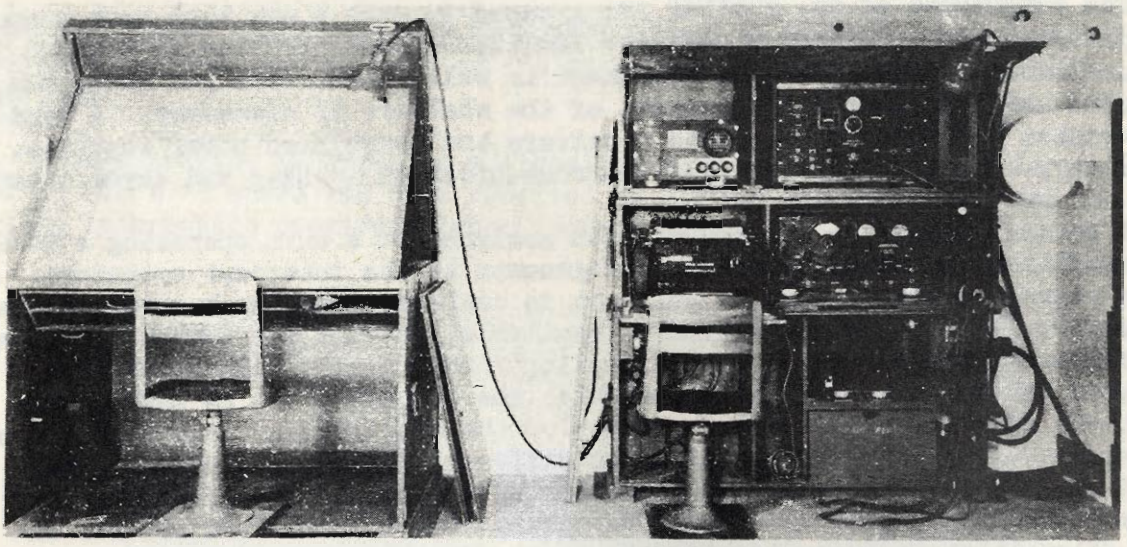
1. A unit can easily and readily transport its equipment and shelter when a change of location is necessary.
2. The time required to set up a station is decreased.
3. There is a decrease in the number of skilled technicians necessary to set up the equipment, for after several installations the work becomes routine.
4. Maximum efficiency of operation is attained in accomplishing the mission assigned a unit since the centrals facilitate the control and supervision of operation.

While the TC-8 and TC-9 are similar in construction, and use essentially the same components, their functions are quite different. They, therefore, will be described separately.

Radio Direction Finder Central TC-8

The TC-8 is used by Signal Radio Intelligence Companies. This equipment comprises a complete, self-contained, direction finder control central which is capable of supervising and coordinating radio direction finder net operation and of intercepting and recording radio signals. Plotting equipment is included to plot the bearings obtained from the individual direction finders in the net associated with the central. It should be noted that no direction finding equipment is furnished as part of Central TC-8. The d.f.'s which the TC-8 controls are separate items of equipment furnished on T/BA and listed on T/A, and T/O and E.

Radio Direction Finder Central TC-8 is housed in two Shelter HO-27's. The equipment consists of a total of six radio intercept receivers covering a combined frequency range of .015 to 145 mc, a telephone switchboard for communication with the radio direction finding stations, and intercommunication system within the central, and a plotting board on which to plot the data obtained from direction finder stations. Two types of recorders are furnished, a tape recorder unit, and a voice recorder (Telecord) which



TWO POSITIONS OF RADIO DIRECTION FINDER CENTRAL TC-8 MOUNTED IN SHELTER HO-27.

uses the new plastic belt record. A panoramic adaptor is also provided for visual scanning of the frequency spectrum over the 1.25 - 40 mc. range.

An elaborate antenna system is provided to obtain maximum efficiency of operation over the entire frequency range covered by the receivers. Included are a 33-foot mast antenna, a horizontal doublet antenna, and a VHF antenna consisting of a vertical mast and three sets of horizontal dipoles. These antennas are erected in the field and connected to the appropriate receivers through suitable r.f. cables and junction boxes.

Power Unit PE-95-( ), mounted in a 1-ton, 2-wheel trailer, supplies 120-volt, 60-cycle power for operation of all components of the central.

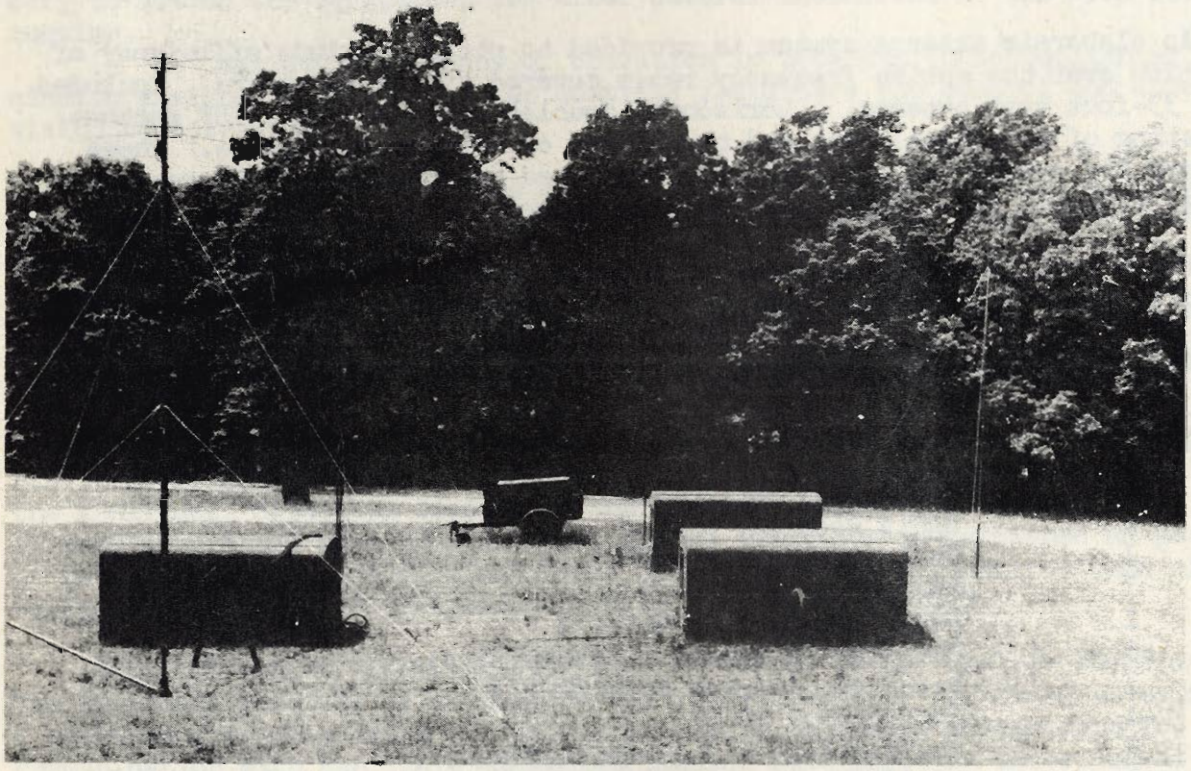
The major operating components of this radio direction finder central are:

Quantity	Item
2	Radio Receiver BC-342
1	Radio Receiver BC-344
1	Radio Receiver BC-787-( )
1	Radio Receiver BC-794-( )
1	Radio Receiver BC-969-( )
1	Recorder BC-1016-( ) (Inked-tape)
1	Panoramic Adaptor BC-1031-( )
1	Switchboard BD-72
1	Trailer K-52-( ) (Power Equipment)
1	RC-238 Intercommunication and Monitoring System
1	Voice Recorder A-2P (Dictaphone)
1	Voice Recorder Reproducer B-1PV (Dictaphone)

The components of the shelter are grouped in such a way that each group, called a position, performs a definite function. Each position is mounted in chests which serve to carry the equipment as well. Hence the positions may be packed and transported independent of the shelters if necessary. A typical position consists of two radio receivers and associated power supplies, a typewriter, a control box for the intercommunication system, and three chests.

A general direction finding mission assigned to a unit operating a TC-8 is accomplished by making specific assignments to the intercept operators. When a signal is intercepted on which it is desired to take a bearing, it is transmitted, if wire communication is available, through the switchboard over the telephone line to one or more direction finder stations to serve as a reference for matching the signal on which the bearing is to be taken. The signal can also be transmitted to either of the recorders or to a higher control agency. Two-way communications on different frequencies may be intercepted and combined for continuous monitoring and recording. It is readily apparent that the intercommunication and switchboard facilities provide extreme flexibility in communication within the central, between central and direction finders, and between central and higher control agencies.

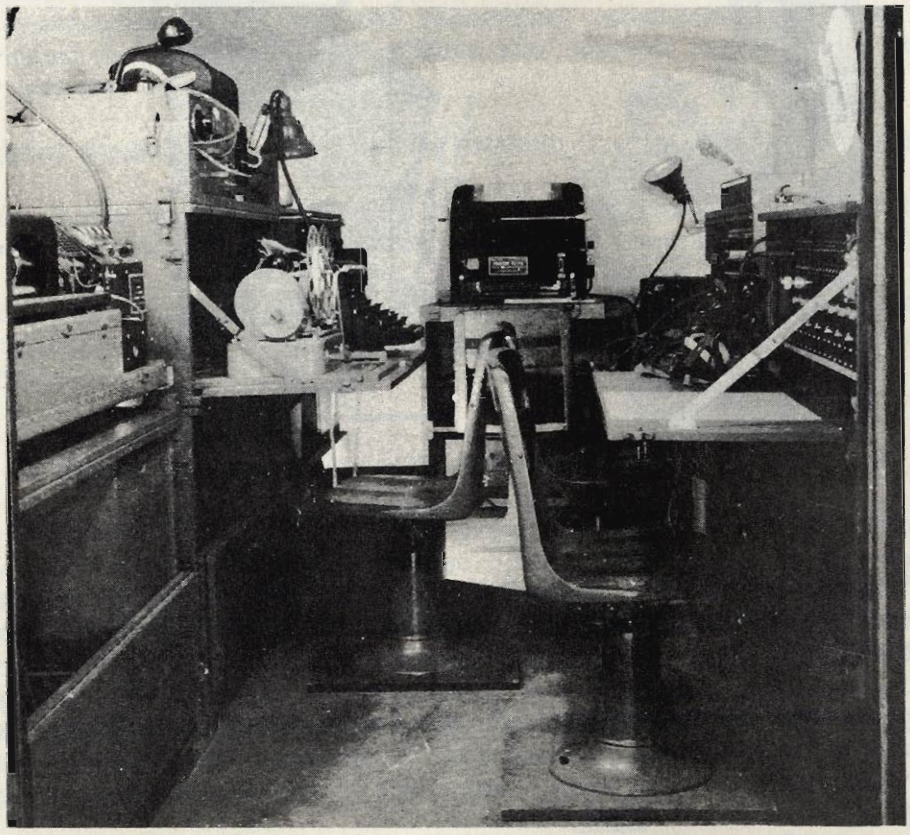
When the use of wire communications is undesirable or impractical, the



RADIO INTERCEPT CENTRAL TC-9 USUALLY IT IS OPERATED WITH THE SHELTERS MOUNTED ON THE VEHICLES THAT TRANSPORT THEM.

direction finder operations may be controlled by radio. No radio communication sets are included as part of the TC-8, but are furnished on separate T/BA basis.

When a bearing is taken on a signal by a direction finder it is sent back to the TC-8 where the data received is plotted and analyzed, and the resulting information provided higher control agencies.

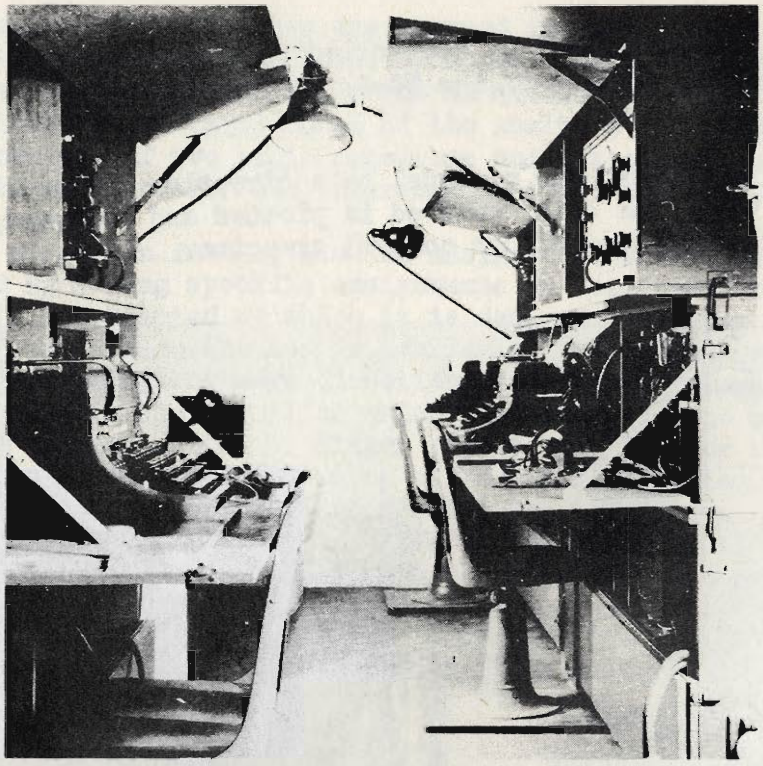


INTERIOR OF UNIT 1 OF RADIO INTERCEPT CENTRAL TC-9.

Radio Intercept Central TC-9

The TC-9 is used by Signal Radio Intelligence Companies and by Signal Companies, Aviation. This equipment comprises a complete radio intercept and recording station whose primary function is to intercept enemy traffic for the purpose of obtaining information as to the enemy's tactical disposition, plans, operations, etc.

The TC-9 is housed in a total of three Shelter HO-27's. The construction and operation are similar to those of the TC-8. Essentially the same components are used, but more of them. Thus, included are a total of twelve radio receivers (covering the range 15 kc - 145 mc), several panoramic adaptors (for operation with receivers covering the range 1.5 - 145 mc), record-



INTERIOR OF UNIT 2 OF RADIO INTERCEPT CENTRAL TC-9.

ers, and additional antennas. In addition, a teletypewriter is furnished which works through the telephone switchboard. No plotting facilities are included in the TC-9.

The major operating components of this radio intercept central are as follows:

Quantity	Item
5	Radio Receiver BC-342
3	Radio Receiver BC-344
2	Radio Receiver BC-787-( )
1	Radio Receiver BC-794-( )
1	Radio Receiver BC-969-( )
1	Recorder BC-1016-( ) (Inked Tape)
2	Panoramic Adaptor BC-1031-( )
1	Panoramic Adaptor BC-1032-( )
1	Switchboard BD-72
1	Trailer K-52-( ) (Power Equipment)
1	RC-239 Intercommunication and Monitoring System
1	Voice Recorder A-2P (Dictaphone)
1	Voice Recorder Reproducer (B-1PV) (Dictaphone)
1	Printer TG-7 (Page Telegraph)

An intercept mission assigned to a unit operating a TC-9 is accomplished by making specific assignments to each of the intercept operators. If the desired transmissions are not copied directly by the operator, facilities are instantly available for either tape or sound recording of the signals. By means of the intercommunication system a conference call can be made to all intercept operators, or individual instructions may be transmitted to any of the operators. A signal intercepted by any receiver may be transmitted to any destination connected to the switchboard by wire line. As in the TC-8, two-way communication on different frequencies may be intercepted and combined for continuous monitoring and recording. Similarly, extreme flexibility is provided for communication within the central and between the central and higher control agencies.

The chief functional differences between the TC-8 and TC-9 are:

1. Radio Direction Finder Central TC-8 supervises, controls and coordinates radio direction finder nets for the location of enemy transmitters.
2. Radio Intercept Central TC-9 is a complete intercept station whose principal function is the interception of enemy transmissions to obtain information.

CRYSTALS AVAILABLE TO COMPLETE COMPLEMENTS OF ALL SETS

The production of quartz crystal units has passed through several phases during the last one and one-half years. First, there was a shortage of everything: plants, machinery, personnel, equipment and raw material. However, the latter existed in greater quantities than the facilities to fabricate it. Through the efforts of the Signal Corps tremendous plant expansion took place. That, together with increase in equipment and in plant personnel, reversed the picture so that by the end of 1942 the bottleneck was raw quartz. Early in 1943 the Signal Corps discovered that great quantities of quartz, hitherto classed as unusable for radio purposes, could be satisfactorily employed.

During 1942, when there was a shortage of either facilities or raw material, it was necessary to issue several radio sets with either:

1. An incomplete complement of crystals to cover all frequencies on which the set could be employed, and no spares; or
2. A full complement of crystals, for those employing only a few frequencies, but no spare crystals for any of the frequencies.

Contacts with various of the using arms in AAF and AGF failed to indicate additional requirements consistent with the known shortage as outlined above. In most cases this was explained by the fact that there had been no requests from field organizations for additional crystals and, hence, it was assumed that their needs were adequately satisfied. This, however, is apparently not the case, as an observer on Tennessee maneuvers recently specifically investigated the matter of adequacy of crystal units. Organizations

invariably stated that they did not have sufficient crystals, particularly spare crystals, for assigned frequencies. They also stated that when a crystal became unserviceable it was impossible to secure a replacement for it at any point in the chain of supply within the Second Army and that it was necessary that a defective crystal be mailed to the Philadelphia Signal Depot in order to secure a replacement. This was investigated and found to be true. In response to an inquiry as to why crystals were not requisitioned, it was stated that current information indicated that crystals were controlled items and, hence, were deleted from the requisition at some point in the chain of supply.

In view of the foregoing, Supply Letter No. 204, Subject: "Quartz Crystals," dated 3 December 1943, has been issued to clarify this situation to the end that the using arms were provided with all crystals deemed necessary for the proper functioning of equipment. The contents of Supply Letter No. 204 is as follows:

"1. Quartz crystals will normally be stocked as indicated below:

a. Crystals for the following radio sets will be stocked in the Chicago Signal Depot:

Radio Set SCR-508, SCR-509, SCR-510, SCR-511, SCR-528, SCR-536, SCR-608, SCR-609, SCR-610, SCR-628.

b. All other types of crystals except those used in airborne radio sets will be stocked in the Philadelphia Signal Depot.

c. Crystals for airborne radio sets will be stocked in the Dayton Signal Depot.

"2. Crystals are now available to provide each radio set with its full complement of crystals as called for on approved component parts lists. Crystals required to equip any radio set with its full complement may be requisitioned directly through supply channels from the depots indicated in Paragraph 1 above. Requisitions for crystals should be submitted separately from requisitions for other equipment.

"3. Great care should be exercised to insure that requisitions for crystals contain sufficient information for identification, including:

a. Stock number.

b. Type of crystal unit or holder desired (Signal Corps nomenclature should be specified if possible).

c. Crystal frequency desired.

d. Equipment in which the crystal is to be used (Signal Corps nomenclature including SCR- or BC- type number should be specified if possible).

e. Operational frequency or channel number on which the radio set is to operate.

f. Specify transmitting or receiving crystal if applicable.

Example: Stock No. 2Z3531B-2030 Crystal Holder FT-171-B with crystal of 2030 kc for operation of Radio Set SCR-299-D on 4060 kc. transmitting.

"4. Crystals for use in Radio Set SCR-536-( ) should normally be requisitioned as a Crystal and Coil Set containing a transmitting crystal, a receiving crystal, a tank coil, and an antenna coil, for operation on the frequency desired.

Example: Stock No. 2Z3543.50-4035 Crystal and Coil Set for operation of Radio Set SCR-536-A on 4035 kc.

"5. Crystals for use in Radio Set SCR-511-( ) should normally be requisitioned as a Tuning Unit BC-746-( ) for operation on the frequency desired. The tuning unit contains all of the elements required to control the operating frequency of the radio set.

Example: Stock No. 2C8100-746A.5 Tuning Unit BC-746-A for operation of Radio Set SCR-511-A on 5500 kc.

"6. a. The normal complements of crystals for the radio sets listed below are as follows:

Radio Set SCR-508-( ) and SCR-528-( ) — One each Stock number 2Z3541A.1 Crystal Set consisting of 80 each Crystal Holder FT-241-A with crystals on Channels 0 to 79, inclusive, for operating Radio Receiver and Transmitter BC-620-( ) on frequencies 20.0 mc to 27.9 mc in steps of 100 kc.

Radio Set SCR-509-( ) and SCR-510-( ) — One each Stock number 2Z3543.1 Crystal Set consisting of 80 each Crystal Holder FT-243 with crystals on Channels 0 to 79, inclusive, for operating Radio Receiver and Transmitter BC-620-( ) on frequencies 20.0 mc to 27.9 mc in steps of 100 kc.

Radio Set SCR-608-( ) and SCR-628-( ) — One each Stock number 2Z3541A.4 Crystal Set consisting of 120 each Crystal Holder FT-241-A with crystals on Channels 270 to 389 inclusive, for operating Radio Transmitter BC-684-( ) on frequencies 27.0 mc to 38.9 mc in steps of 100 kc.

Radio Set SCR-609-( ) and SCR-610-( ) — One each Stock number 2Z3543.4 Crystal Set consisting of 120 each Crystal Holder FT-243 with crystals on Channels 270 to 389 inclusive, for operating Radio Receiver and Transmitter BC-659-( ) on frequencies 27.0 mc to 38.9 mc inclusive, in steps of 100 kc.

b. If some of the crystals included in the crystal sets listed above are already on hand, requisitions should be submitted for only such individual crystals as are needed to complete the set.

"7. Before a crystal unit is accepted by the Signal Corps, it is tested in the plant of the crystal manufacturer by a Signal Corps inspector and is known to be in good working order. However, a crystal is a rather delicate piece of equipment and requires much precision in its manufacture. In this respect, it might be compared to a fine watch. Although all precautions possible are taken in the packing of crystal units, it occasionally happens that a crystal unit may be so damaged by the time it reaches the theater of operation that it will not work satisfactorily.

"8. When a crystal unit fails to operate, it should be replaced by an equivalent good crystal unit. Under no circumstances should repairs be attempted by the using troops. Only expert hands provided with the proper tools are capable of repairing it. An apparently defective crystal should never be mutilated to prevent further use.

"9. No inoperative crystals should be discarded; all should be returned intact to appropriate facilities for repair or study. Overseas units should send inoperative crystals to the crystal grinding team serving the area or unit concerned. In the United States, inoperative crystals for airborne equipment should be sent through repair channels to the Dayton Signal Depot; crystals for other equipment, to the Philadelphia Signal Depot. All inoperative crystals returned to repair or issue facilities should be accompanied by a requisition for repair or replacement from stock, if such action is desired."

PRESERVATIVE TREATMENT FOR TACTICAL POLE LINE POLES

The following is an excerpt from a report from the African Theater of Operations:

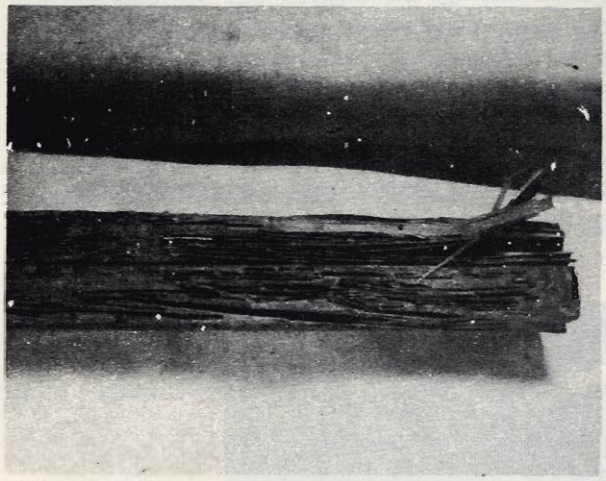
"It has been discovered in the course of routine maintenance on Rapid Pole Line construction installed in this theater that some RPL type poles have been attacked by insects which seem to be a species of termite. Attached hereto are exhibits showing damage to these poles.

"Out of a 17-mile section consisting of 587 poles, approximately 150 poles have been affected in the four months the poles have been in place. It has not been possible to draw any conclusions as to the relationship of the type of soil to the rate of deterioration of the poles. It has been noted, however, that very few affected poles were found in plowed ground as compared to the number found in North African yellow clay. The samples shown were removed from the yellow clay area."

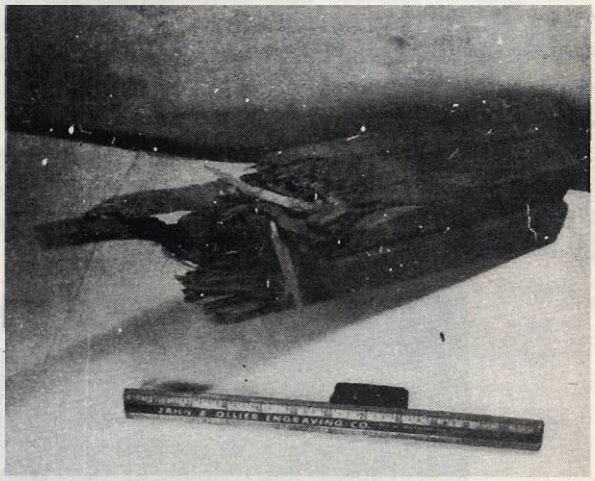
Since early shipments of tactical pole line did not call for treated lumber because of the short time interval allowed for delivery, the 4x4 poles referred to above had not been treated with a wood preservative. Some insect damage was therefore to be expected, although not to the extent reported. At the present time, all lumber for the construction of temporary tactical pole lines is pressure treated with either green salt or creosote and trouble from

insect damage to such poles is not anticipated during the period of probable use for this type of pole line.

If locally cut timber or untreated lumber is used for poles which are expected to stay in the line for more than several months, a preservative treatment should be applied. A preservative suited to this use is "Osmoplastic B," a mixture of coal tar, pentachlorphenol and sodium fluoride thinned with benzol. This preservative is issued in five-gallon containers and has been assigned Signal Corps Stock No. 6G1625. "Osmoplastic B" is applied with a paint brush to the portion of the pole to be buried and also up to a point at least two feet above the probable ground line. The preservative should be made to cover this area in a uniform layer 1/64 to 1/32 inch thick and the pole should not be handled until this has had time to set. Be-



DAMAGE TO UNDERGROUND PORTION OF A POLE.



DAMAGE AT THE GROUND LINE WHERE BREAK OCCURRED.

fore treating locally cut timber, the bark should first be removed from the area to be treated. Brush treatment with creosote is not recommended inasmuch as such treatment has been found to be relatively ineffective. No brush treatment is as effective as a pressure treatment.

The following precautions should be taken when handling "Osmoplastic B," since it is poisonous if taken internally:

1. Wear gloves when applying or handling.
2. Before meals, wash the hands with a moderately strong soap.
3. Do not use the empty can for water or food. Unless there is an urgent need for the can for other purposes, it should be destroyed beyond the possibility of reuse.

COMMENTS ON CAPTURED ENEMY CRYSTALS

Far less opportunity than would be expected has been afforded the Signal Corps to study enemy crystals. Neither the Germans nor the Japs employ crystals to anything like the extent they are used by the Allies. Even allowing for this fact, the number of enemy crystals shipped to this country for study and the number analyzed by the Enemy Equipment Intelligence Service Teams in the theaters overseas has been surprisingly small.

The primary reason for this is the all too common habit of "souvenir-ing" as practiced by our own troops. Not only crystals but many other small components are pilfered from abandoned enemy equipments with the result in some cases that a complete analysis of an equipment by Intelligence is prevented or at best delayed. In some instances such pilferage has been as effective in preventing the Allies from obtaining important information on enemy equipment as is the enemy's usually well carried out rules for demolition of endangered equipment.

It is urged that enemy communication equipment encountered in the field be left intact and, where practical, that the proper authorities be notified of its existence and location.

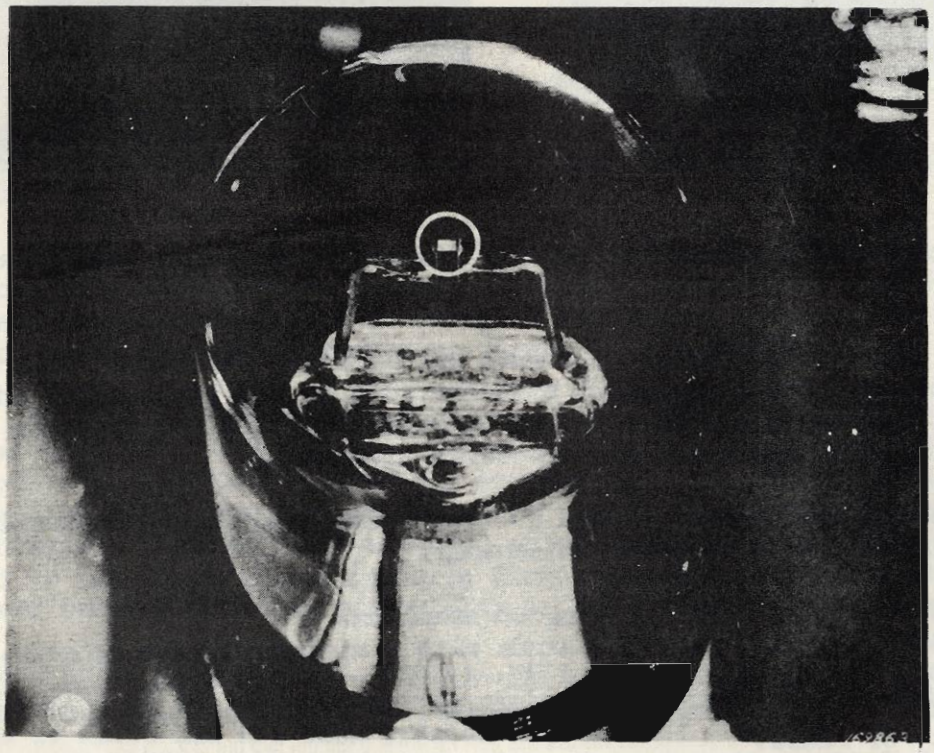


FIG. 1 - THE GLOW-TYPE RESONATOR IS SHOWN HERE AT TWICE NORMAL SIZE. CIRCLE INDICATES TINY QUARTZ BAR.

Following are brief descriptions of two unusual types of crystal equipment employed by the enemy.

German Glow Type Resonator. This crystal, manufactured by Loewe Radio, is contained in a standard glass envelope similar to that of a vacuum tube.

The crystal itself is unique in that it is a very tiny chip of quartz - in effect a minute rectangular bar - as shown in Figure 1. It is apparently not finished to any closely predetermined frequency but instead is calibrated after mounting (the one illustrated resonates at 4685.16 Kc.). It is then used to calibrate a set at multiples of this frequency, whatever it may happen to be.

Indication of resonance is visually obtained by observing the glow discharge resulting from ionization of the low pressure neon gas by which the crystal is surrounded in its glass envelope. The indication is sharp enough to permit setting the frequency of an associated transmitter with accuracy considerably better than 0.01 percent.

Such glow type resonators have been in common use in Germany for 10 or 15 years. There is evidently no Signal Corps item equivalent to the German chip. The closest approach is probably the DC-8 as used in Radio Set SCR-274-N to actuate an electric eye tube.

This aid for accurately adjusting the frequency of transmitters has the advantage that it requires little quartz and makes for the utmost simplicity in transmitter frequency adjustment.

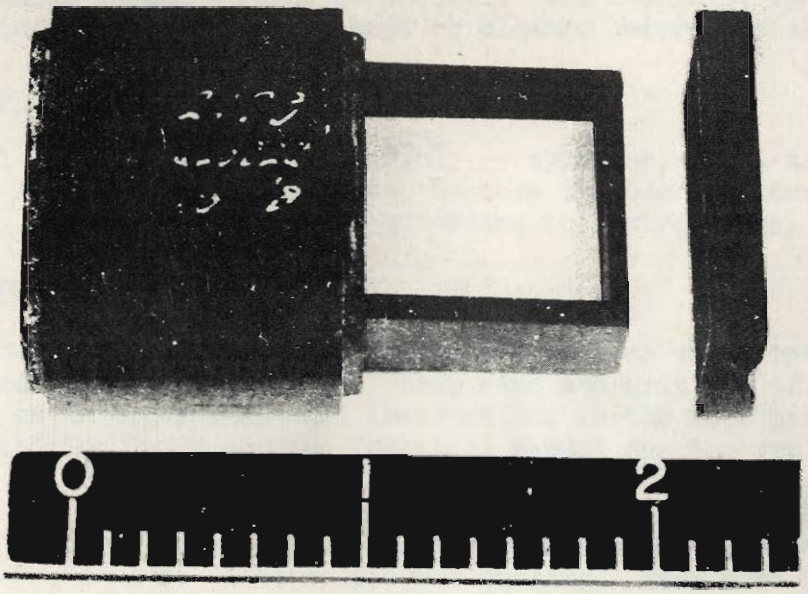


FIG. 2 - THIS JAP CRYSTAL UNIT IS SHOWN ABOUT 1-1/2 TIMES ACTUAL SIZE.

Japanese Low Frequency Crystal and Holder. Distinctive for the excellent molding job on the holder, which is superior to that used in this country, is the crystal unit shown in Figure 2. The quartz plate is of the AT-cut type and is oriented accurately by X-ray techniques commonly used in this country. It is mechanically excellent and of good design-activity and temperature coefficient, in both these respects indicating performance well up to our own standards. The contact plates are of aluminum but as soldering was not used it is suggested that soldering to aluminum may not be common in Japan.

As shown in Figure 2, the holder consists of an outer molded case with a drawer into which the crystal and aluminum contact plates fit snugly. The ends of the case take the form of molded caps with metal inserts which apparently play some part in bringing out connections. Just how this last is accomplished is not clear, as springs or other means for maintaining contact with the metal plates were missing.

The Jap crystal is probably the equivalent of our Crystal Holder FT-171, FT-249, FT-164 and other AT cuts, but is obviously very precisely oriented.

CARE FOR BEARINGS TO EASE SHORTAGE

The big air raid on Schweinfurt, Germany, which was made at such a heavy cost in Flying Fortresses and personnel, was considered worthwhile because it struck a devastating blow at Hitler's anti-friction bearing manufacturing facilities. Bearings of this type are a critical item in every army. Even though our bearing manufacturing facilities are not being bombed, we are no exception. Bearings are so scarce that it has become necessary to restrict the requisitioning of bearings to instances where equipment will become "deadlined" if the bearings are not made available.

Production of bearings cannot keep pace with bearing requirements. The only answer to this dilemma is that enlisted men and officers responsible for the care of bearings must follow authorized maintenance procedures religiously. Some of the things they can do to help improve the situation are:

Keep Bearings Clean

One speck of sand or grit can ruin a bearing. Watch out for dirty hands, tools, benches, rags, cleaners, and lubricants.

Clean Bearings Thoroughly

Always use a clean dry-cleaning solvent, and also a brush if necessary. Place the bearing on a clean surface, such as a sheet of paper, to drain and dry. Never use compressed air to dry a bearing. Keep new bearings in original wrappers until actually ready to install. All bearings, except prelubricated bearings that are sealed, must be cleaned before installation.

Install Bearings Properly

Be sure all parts of a bearing assembly — spindles, hubs, and cups — are cleaned and free from sand and grit. Be sure the bearing itself is clean. Install, adjust, and lubricate according to instructions.

Lubricate Bearings Correctly

Bearings that are going to be greasepacked, such as wheel bearings, must not be oiled before installation. Keep sand and grit out of lubricants. Lubricate bearings in accordance with instructions in the appropriate War Department Lubrication Guide and the Technical Manual for the vehicle.

Caution — Bearings that are not going to be reinstalled immediately after they are removed and cleaned should be oiled to prevent rusting. They must be cleaned again to remove oil and dirt before installation.

BEARINGS ARE SCARCE — PROTECT THEM.

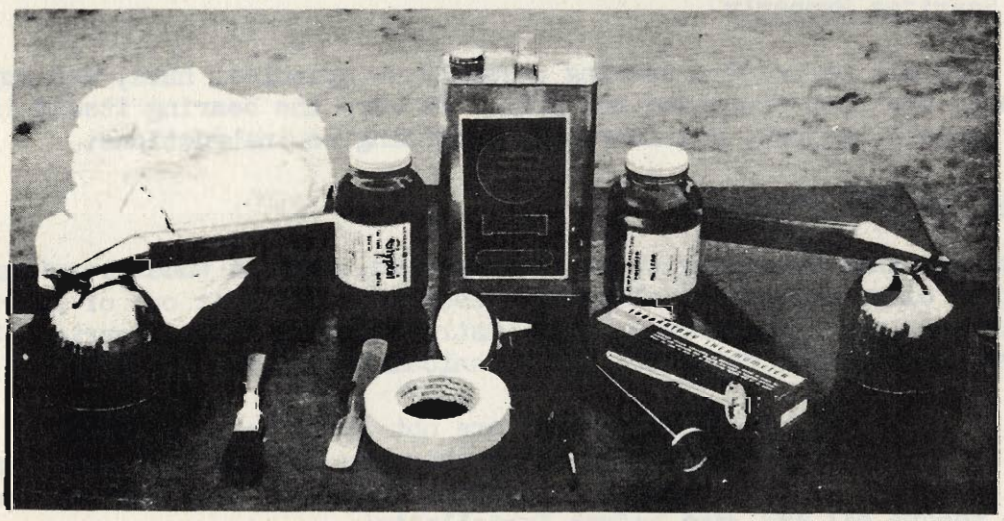
MAINTENANCE

MOISTURE AND FUNGUS PROOFING KIT MK-2/GSM

The Moisture and Fungus Proofing Equipment MK-2/GSM has been standardized and kits are under procurement. Each kit contains the following material:

Stock No.	
	4 brackets (for mounting lamps), Ajusco #264L
6Z1551	6 1" paint brushes
	6 Artist paint brushes 3/8" wide, Dietzen #2920
	10 Gallons moisture proofing varnish in 1 gal. cans, Glyptal #120Z-f or approved equal
	8 Infra-red lamps, 250 watt., G.E. Company
	2 Instruction books "Moisture and Fungus Proofing"
6G1801	5 Gallons paint and varnish remover in 1/2 Gal. cans
	2 Hand operated spray guns, continuous pressure, E.C. Brown Company
	6 Single pole toggle switches, Cutler Hammer #8245
	1 Thermo switch, Fenwal Inc., #832-JRB
	4 Rolls masking tape 1" by 60 yards, Scotch "Wetordry"
	2 Weston Thermometers 0 to 220° F. #15076 or equal
	5 Gallons thinner in 1/2 gallon cans.

It is estimated that the expendable materials contained in this kit will be sufficient for 240 average radio components such as the Radio Receiver BC-603-( ).



SOME OF THE COMPONENTS OF THE MOISTURE PROOFING KITS.

Pending delivery of kits MK-2/GSM moisture proofing materials may be obtained from stocks of Moisture and Fungus Proofing Kit MK-10/GSM. The MK-10/GSM Kit contains 60 gallons of moisture and fungus proof varnish with proportionate quantities of paint brushes, hand sprays, masking tape, thermometers, thinner, and instruction books. It will be seen that a MK-10/GSM Kit is essentially six times as large as an MK-2/GSM Kit. The MK-10/GSM Kit has been divided into six packages so that organizations not needing the full quantity of materials contained in this kit may conveniently obtain a smaller quantity. Smaller quantities may be obtained by requisitioning 1/6, 1/3, 1/2, etc., of Kit MK-10/GSM.

Moisture and Fungus Proofing Kit MK-10/GSM does not contain infra-red lamps and associated controls for drying. However, instructions are contained with the kit for drying methods using the equipment normally available within maintenance organizations.

PROCUREMENT

AN INCIDENT IN SIGNAL CORPS PROCUREMENT

One of the many duties of the Purchases Branch, Procurement Division, Procurement and Distribution Service, OCSigO, is locating and making immediate procurement of Signal Corps communication equipment vitally needed by the Army.

In this connection advice was received on 17 May 1943 that there was an anticipated deficiency in production schedules on teletype equipment necessary to meet military requirements. After several conferences, it was agreed that the American Telephone and Telegraph Company would supply the Signal Corps with five hundred fifty each of Model 15 and two hundred each of Model 19 teletype set, commercial type. The machines were to be collected from subsidiaries of the American Telephone and Telegraph Company and repaired and guaranteed by the Western Electric Company. A letter order was issued to the Western Electric Company to cover repaired and guaranteed equipment. It was later developed that not enough used machines could be found, which resulted in the Western Electric Company supplying from stocks on hand enough new machines to make up the deficiency. Due to the large number of components required in the repair of each machine, and to the unusually large number of code numbers used in the repair work, the Western Electric Company was unable to submit a formal quotation prior to 14 December 1943.

The work was not held up, however, and, prior to the formal contract which was issued 14 December 1943, approximately 95 percent of the equipment had already been accepted by the Signal Corps and is now in operation with troops, and, in many cases, in actual theaters of operation. The use of repaired and guaranteed equipment, together with the procedure of using the letter order, and the cooperation of the Inspection Agency, resulted in military requirements being met. This was accomplished only by the closest cooperation between the contractor, the Signal Corps Inspection Zone, and the contracting officer.

ELECTRONIC TUBE PRODUCTION

Modern warfare involves and depends to an amazing degree upon electronic equipment for communication, indication and control. The requirements for electronic tubes, the "heart" of such equipment, have more than tripled in comparison to the pre-war estimates, both as to quantities and types. Applications cover transmitting and receiving equipments for communications as well as more complicated adaptations, some of them of a highly secret nature.

Tremendously increased requirements have necessitated the establishment

of equally large expansion projects, many of which have not yet reached maximum fruition, although increased production is being obtained. Full production of the industrial expansion projects now under way will be obtained during the latter part of the calendar year 1944.

Approximately 20 percent of the total Signal Corps sponsored, privately-financed and government-financed plant expansions, in terms of cost, have pertained to the manufacture of electronic tubes. Part of the remaining Signal Corps expansions also pertain to this same item since they cover materials required in tube manufacture, such as tungsten, molybdenum, and tantalum. The scope of electronic tube expansions, excluding expansions for critical materials, is indicated by the following figures:

FY 1942	FY 1943	FY 1944	Total Cost Tube Exp. (Incl.Est. 1944)
$8,093,888	$14,592,454	$19,000,000	$41,686,342

The increase in availability of electronic tubes through expansion projects may be supplemented through the contributory effects of salvage. As the quantity of electronic tubes delivered to and consumed in the various theaters increases, it becomes important to salvage the critical materials from the used tubes. Some parts can be re-employed as fabricated items in new assemblages, others only as salvaged raw materials. While only certain types of electronic tubes contain materials in such quantities and kinds as to make salvage economical, the maximum return of these materials is of importance to the war effort due to the scarcity of such materials and of the fabricating capacity involved in production of new units. A procedure is being established in the Signal Corps to provide an effective electronic tube salvage program.

PROCUREMENT PROGRAM BEING PUSHED

As of 31 December 1943, procurement had been initiated for 72 percent of the production required by the 1944 Army Supply Program and 12 percent of the 1945 program. At the same time orders had been placed for 87 percent of this procurement in order to allow sufficient lead-time to permit the delivery of this equipment within the appropriate calendar year.

MILITARY TRAINING

UNIT TRAINING

Another Signal Corps unit training center was established on 1 January 1944. This new installation is located at Camp Kohler, California, and is designated as the Western Signal Corps Unit Training Center. The other Signal Corps Unit Training Centers are situated at Fort Monmouth, New Jersey, and Camp Crowder, Missouri. They are called the Eastern and Central Signal Corps Unit Training Center, respectively.

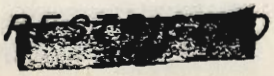
These centers are designed to train the inexperienced soldier to operate as a functional part of a team or unit destined for a particular mission in the theater of operation. Their ultimate objective is to produce a thoroughly trained signal unit capable of taking to the field and performing a combat job efficiently.

Two general types of units are trained. The first consists of certain standard signal companies and battalions that perform missions required in all combat areas. These include such units as signal construction battalions, signal depot companies, signal port service companies, signal construction companies, and signal repair companies. The second type is built up of cellular teams and tailored to perform special missions as may be required in a particular theater for some particular objective. These latter, the signal service type unit, are relatively new and designed especially to provide the field commander with a unit organized to meet his particular need and to perform the signal missions required in a fluid and changing situation in a modern war.

It is the job of the unit training center to provide both the standard signal units and the service type units in sufficient numbers to meet estimated needs of all theaters of operation.

The Signal Corps has been training standard units for many years. The service units, however, are an outgrowth of the demands of modern warfare. With the increased activity on our fighting fronts, the needs for signal communication of specialized types became increasingly greater. With the development of modern equipment and the exploitation of new ways of employing that equipment in a kind of combat before unheard of, the standard battalions and companies became inadequate to meet the varied and complex problem of providing the field commander with an efficient and flexible communication system.

The need is for specially organized units designed to perform particular missions to meet particular situations. In order to meet that need, it was necessary to devise a plan by which component parts could be trained and held in reserve for combination into the type of unit required upon demand. The Signal Corps further perfected its plan to meet this problem by



reorganizing three training battalions during the month of December. These training battalions are located one at each Unit Training Center. They are organized to take individuals from reception centers and to give them the necessary training required to produce teams based upon T/O&E 11-500 that are capable of performing a designated team mission. In scope, the plan includes the training of various types of administration and supply, motor transport, depot, radio, wire and cable, radio installation, radio intelligence, and security teams. All of these are being trained in sufficient number to form an adequate reserve that can be drawn upon for the formation of units of the particular type required in combat whenever they are needed.

Communication requirements for each theater of operation are anticipated and units of the type needed are activated on the cellular plan employing the necessary teams from the training battalions. For example, a service company destined to perform a radio communication mission would be composed of the required radio teams plus any necessary supporting teams. Before this new unit takes to the field, it is given additional training as a unit (providing sufficient time is available) under simulated combat conditions. During this polishing period, expert supervisors observe operations and make necessary adjustments and corrections. The men get the feel of working together to accomplish a particular mission. When the unit finally reaches its ultimate destination, it is thoroughly trained to perform its combat job.

The entire system is comparable to an assembly line in a modern automobile plant. The training battalion takes the raw material and constructs sub assembly units. During the unit training period, these perfected sub assemblies are combined into the finished unit.

In order that a unit reach and maintain the highest standard of operating efficiency, painstaking preliminary steps are necessary. As a general rule, the training of men for field operation follows a regular pattern. Individuals come into the unit training centers from reception centers. Here they undergo three distinct phases of training. First, they are given basic military training; second, they receive specialist training; third, they are combined into teams and given an opportunity to apply their basic and technical knowledge as a group toward accomplishing their team mission.

The first phase of training requires six weeks and is designed to convert the new soldier into a fighting man capable of enduring the rigors of combat service and of providing security for himself and his unit. During this period he is also interviewed, his potentialities are carefully considered and he is assigned to receive training that will qualify him to perform a particular job with the team. From this point on, all of his training is planned to prepare him for this one job. As a result, no time is spent in needless instruction.

The second phase of his training is accomplished in the unit or in a service school. In every case where it is practicable, the man receives his specialist training in the unit. There are certain long term specialty courses, however, that require facilities and time not available to the unit

commander. For such training, certain individuals are attached to a service school. During this phase of the training program, individuals are developed into highly skilled technicians capable of performing their particular part of the team mission in an efficient manner.

Training does not end here. The unit training centers are responsible for producing more than individual specialists who are capable of performing a particular job alone. Their ultimate objective is the production of teams and units that are capable of working together as hard hitting, efficient Signal Service Teams. These specialists are, therefore, given a third phase of training during which their knowledge and skills as soldiers and individuals are combined.

During this phase, which requires up to eleven weeks, the men are taught to work together smoothly and efficiently as a small group. When this is accomplished, the responsibility of the training battalions ends. Group members are then ready to become a part of a newly activated unit, training under the commander with whom they will serve in operation against the enemy.

Based upon anticipated needs, teams of every conceivable type are in training. In the future it is hoped that the Signal Corps will be in a position to supply, within a reasonable length of time, any type of signal service company or battalion requested from the field. (Also see article, "Cellular Unit Training Teams," in MILITARY PERSONNEL section of this issue.)

CODEZ AND CODE SPEED

At a conference on Testing Radio Operators, held by Military Training Branch, OCSigO, on 15 December 1943, and attended by representatives of Signal Corps Training Centers, Signal Unit Survey, Army Communications Branch, Army Air Forces and others, CODEZ was adopted as the standard length word for use in determining International Morse Code receiving and sending speeds. Using this standard, a code speed of 20 words per minute will mean the speed at which CODEZ can be sent 20 times in one minute using normal spacing of 3 dits between letters and 7 dits between groups (TM-11-459 Par.3). At this speed, 20 average 5-letter code groups can be sent in one minute.

In terms of Wheatstone perforated tape, CODEZ represents 30 center line feed holes (including the space at the end of the group) when punched with the normal spacing of one feed hole between letters and 3 feed holes between groups. Perforated tape should therefore be run at a speed of 600 feed holes per minute to produce the 20 words per minute speed. The tape is run at the same speed for lower code speeds, but the spaces punched between letters and groups are increased.

In determining code receiving speeds, five minute tests in message form were adopted as standard. A test consists of a single normal form plain-dress message with a five minute text consisting of 5 letter code groups. In order to pass a test, it is necessary to copy without error any three con-

secutive minutes of the message text. Thus the 20 words per minute test would be a message with 100 5-letter code groups of text. In order to pass the test, it would be necessary to copy any 60 consecutive groups of text without error.

A series of standard code receiving tests at qualifying speeds are now being prepared by the Chief Signal Officer for distribution to Signal Corps schools and will hereafter be used as the basis for rating code speed.

SQUANKUM-ALLAIRE FIXED RADIO STATION TRAINING AREA

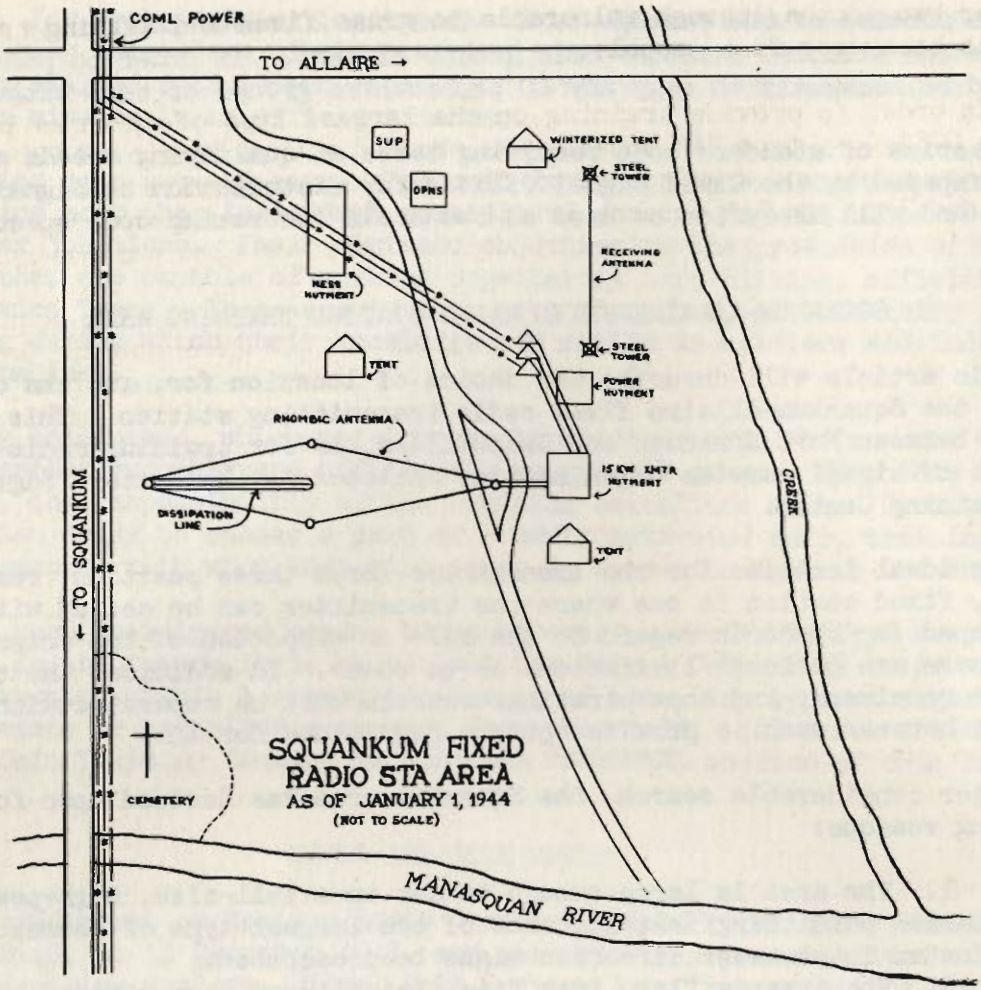
This article will describe the choice of location for, and the construction of the Squankum-Allaire fixed radio transmitting station. This station, located between Fort Monmouth and Camp Edison, is for training radio station sections of signal service organizations attached to the Eastern Signal Corps Unit Training Center.

The ideal location for the transmitter for a three position, remote controlled, fixed station is one where the transmitter can be set up without being cramped for space in regard to the size or direction of the antennas, and where there are no local limitations as to power. In addition, the transmitter, the receivers, and the operating controls must be separated with enough distance between each to provide optimum conditions for all.

After considerable search, the Squankum area was decided upon for the following reasons:

1. The area is large enough to set up a full-size, high-power fixed radio station permitting installations of the largest type of rhombic antennas, oriented in whatever direction might be prescribed.
2. The area is flat, free from obstructions, but bounded by a screening growth of trees.
3. There are no hills in front of the intended location of the antennas for several miles.
4. The area is close to a road which already carried three phase commercial power and commercial telephone lines.
5. The area is located out of the principal axis of the receiving rhombic antennas of the diversity receiving system at Wayside, the airline distance between Wayside and Squankum being nine miles.
6. The area is eight miles inland from the seacoast at Camp Edison and is a sufficient distance from the Signal Center located at Camp Edison to provide a good training problem in remote control and in the maintenance of keying lines for the three position fixed radio station.
7. The area is near the intersection of well-paved roads to permit efficient messenger or officer courier communication from principal highways, but sufficiently distant not to be a conspicuous target.

The receiving position already had been installed as a permanent space-diversity receiving system on the grounds of the former Asbury Air Port, between Wayside and Oakhurst. The receiving position at Wayside included three



receiving rhombic antennas oriented at Camp Crowder, Missouri, and connected into a diversity detector and amplifier as described in the Signal Corps Technical Information Letter No. 23, October 1943.

It was contemplated that the position of the operating controls, consisting of high speed Boehme recording and transmitting controls, and necessary cipher devices, would be in a building at Camp Edison, at which station the units to be trained were located.

Spiral-four cable was to be used for the remote receiving line approximately fourteen miles long from Wayside to Edison, and approximately eight miles of spiral four cable was to be used for the remote keying line from Edison to Squankum. While spiral four was being installed on pole line, field wire, partly on the ground and partly on poles, was used with success. It was found, however, that maintenance on the field wire was excessive, due to farmers frequently cutting the line by accident while mowing hay, etc., requiring daily policing of the line by a maintenance party in a jeep. The spiral four on poles, which has been in operation from Wayside to Camp Edi-

son for two months, though vulnerable to grass fires and falling trees, has to date been free from trouble.

In order to provide training on the largest type of antennas prescribed by the OCSigO, a type "A" antenna was erected with a length of 723 feet between end poles and a height of 65 feet to the center wire of the three-wire curtain. The type "A" antenna is suitable for extreme distances, but familiarization with its performance at medium distances also was desired.

Installation at Squankum was begun by fixed radio station sections of a signal training battalion, and by sections of a signal service company. For a time considerable difficulty was encountered because of heavy rains softening the ground. To prevent cave-ins, field expedients were required while digging holes for the long poles. The most successful of these was the use of salvaged 50-gallon steel drums with the heads cut out.

The gin pole method of erecting the long poles was used. Before erecting, steps, lightning protectors and hardware were installed.

The three-wire curtain of the rhombic transmitting antenna was fabricated from #6 copper wire, in accordance with the drawings issued by the OCSigO.

The principal axis of the antenna was oriented on the Great Circle Route to Camp Crowder, a distance of approximately 972 nautical miles or 1120 statute miles.

Concurrently with the rhombic transmitting antenna installation, two ninety-foot steel towers for a receiving antenna were installed for practice, and for use in the event it were necessary to operate as a one-position station. The towers were erected section by section, four sections of twenty feet and the fifth of ten feet, using a twenty foot gin pole made of $1\frac{1}{4}$ inch steel tubing. The gin pole, mounted on the first sections erected, lifts each successive section. After a section is bolted and guyed into position, the gin pole is placed on top of that section and the next section is then raised.

While the antenna and towers were being installed, standard 4-unit hutments, consisting of mess hall, transmitter hutment, power unit hutment, and signal center operations hutment were constructed. The hutments were located for cover, concealment, and dispersion resistant to attack. The mess hutment is 16' x 32', the others are 16' x 16' and are of wood construction throughout, using frames and floors from winterized tents. The hutments for the transmitter and power units are equipped with doors of double width and special overhead knockout sections to permit installation of transmitters up to 15 KW rating and power units up to 75 KVA, such as the Buda type provided for the 15 KW transmitter. In addition, foundations for these two hutments were reinforced by heavy timbers to carry the concentrated loads.

It is important that fixed radio station officers and EM be "three-phase

power" conscious, because transmitters of 1 KW and greater power output require three-phase power supply, instead of the single-phase supply that is adequate for smaller transmitters and for receivers, teletypewriters, etc.

Further, it is important that commercial power be supplied wherever available, as every hour of operation of the stand-by power units is an hour nearer to their eventual shutdown for repairs, and means an hour's consumption of reserve or emergency fuel supply that might be replenished only at great cost when in the theater of operations.

Three-phase commercial power lines at 4800 volts were brought into the area and a 25 KVA step down transformer was installed on each phase making a total bank of 75 KVA, 4800/240 volts. Concurrently, temporary installation of a 2½ KW Press Wireless transmitter and 25 KW three-phase stand-by Diesel engine-driven alternator was made.

At this time an additional transmitter installation was authorized upon receipt of equipment which had been on requisition. A four-wire, three-phase, open-wire 240-volt power line of #6 bare copper wire on poles was installed to a permanent location of the 2½ KW transmitter, and it was placed on the Squankum to Greenbank Circuit (at Greenbank State Forest, where a Signal Port Service Company was bivouaced in a CCC camp, and radio communication was maintained for administration and training) from a temporary remote control position at the Allaire Training Area. The 25 KW Diesel engine-driven alternator was installed near the 2½ KW transmitter for stand-by power. This transmitter is installed on a doublet transmitting antenna, using a 600-ohm feeder, the antenna and feeder being cut to suit the operating frequency.

Meantime, installation of the rhombic antenna dissipation line to absorb back-radiation of the directional rhombic antenna and the transmission line for the Type "A" rhombic antenna was completed, and a 15 KW Press Wireless transmitter was moved from Camp Edison where temporarily it had been used for instructional purposes. #1 Stranded copper feeders were used for the 240-volt power supply to the 15 KW transmitter from the 75 KVA transformer bank.

Initial communication with Camp Crowder was established from Camp Edison, using the rhombic antenna and 1-KW transmitter previously installed at Camp Edison by a Signal Fixed Radio Station Company.

At 1300, 29 December, the completed Squankum installation was officially opened, operation being conducted with the full scale, three position Wayside-Edison-Squankum set-up, with the Camp Edison installation available for stand-by or alternate operations, and also for training of one position and two position fixed radio station teams. Keying lines and remote controls also were connected from Camp Wood for operation from an alternate position there, to suit changes in training conditions.

MILITARY PERSONNEL

CELLULAR UNIT TRAINING TEAMS

With the expanding operations of the United Nations on all fronts, and the unexpected demands of the theaters for loss replacements and new units, the Signal Corps is placing emphasis on the inauguration of the system called the "cellular unit training plan" to make the theater commanders' tasks lighter when they are faced with the necessity for securing trained units to meet varying tactical problems.

Previously, units were made up from standard tables of organization which contained the amount of personnel and equipment considered necessary to perform specific tasks. In the early days of the war, the Signal Corps, as well as the other arms and services, was able to function adequately by using these standard T/O's. Gradually, however, as the missions changed and Signal Corps men were scattered all over the globe, it became necessary to make up special T/O's to cover the needs of the armed services. A standard T/O which might be ideal for North Africa, for example, where large scale operations were in process, would be bulky and unwieldy for the Southwest Pacific, where smaller units worked more effectively. The "Special T/O" soon came into such common use as to belie its name, and thus complicated the work of securing troops.

Early in the game, aircraft warning units were set up on what was called a "team plan," whereby flexible tables of organizations could be made up to fit specific needs of the theaters. A typical T/O of this type, instead of having an overall number of personnel required, could be of any size.

The success of this type of a T/O became evident and, based on the pioneering experience of the aircraft warning units, the "cellular unit" plan was put into operation. The Signal Corps is now using T/O 11-500, which is made up of approximately seventy-five different types of teams, from Administrative (AA, Platoon Headquarters) to Radio Intelligence (IJ, Wire Team) units. The number of personnel in each team ranges from three enlisted men to a team calling for six officers and eighty-one enlisted men.

The alphabetical designation of teams makes it possible to refer quickly to the type of team needed; for example, two "AA" teams and three "IJ" teams might under T/O 11-500 make up one composite unit which is needed for a special job.

Another feature of the cellular plan is the fact that each "team" is trained and assigned as a more or less independent unit. The men who make up a radio maintenance team are trained together and work together as a team wherever they are assigned, and the same procedure is adopted for the other teams called for on T/O's. The tangible result is that such cellular

units work together more effectively and, through increased efficiency and morale, the jobs are done better, faster, and, in many cases, with fewer personnel than was possible before this method was adopted.

Obviously, such a program called for a special type of training -- with which the Signal Corps had become familiar. Previous to the publication of T/O 11-500, special Crystal Grinding Teams, Installation and Maintenance Teams, and Inspection Teams were organized and trained to meet special requirements. Although the Signal Corps Unit Training Centers were established primarily for the purpose of training T/O organizations of the standard type, they did gain considerable experience in team training through these activities. However, until the publication of T/O 11-500, there was no predetermined and well-established pattern for making up such teams, a factor which was essential to the efficient and prompt organization of units so that they could be trained well in advance of required activation dates.

Before cellular unit training came into general use, enlisted personnel had gone through the cycle of induction center and reception center, and then were either assigned to replacement training centers, to units, or given further specialized training. A few were assigned directly from reception centers to receive their training at unit training centers or within their assigned units.

The Signal Corps training centers and schools, which were located at Camp Kohler, California; Camp Crowder, Missouri; Camp Murphy, Florida; and Fort Monmouth, New Jersey; conducted three types of training. These were: RTC training for individuals who were either to be assigned to units or sent overseas as loss replacements; unit training for teams and units which would be ready for shipment upon completion of training; and school training for specialists in communications duties, including personnel from the Army Air Forces, Army Ground Forces, and ASF organizations.

In November 1943, the War Department General Staff ordered that all replacement training center trainees be made available as loss replacements. This restriction imposed many difficulties upon the Signal Corps, because of the technical training required in practically all Signal service companies. It was decided that all loss replacements would be furnished from the Replacement Training Center at Camp Crowder, Missouri. Now this is the only Signal Corps Replacement Training Center in existence and it is limited to the training of loss replacements only.

An augmentation to the 1943 Troop Basis was received in October 1943, which called for a considerable number of men for composite units organized under T/O 11-500, as well as requirements for organizations which had been authorized under standard or special T/O's. To meet the requirements for the composite units, for which cellular unit training was necessary, a reorganization of the 840th, the 847th and 848th Signal Training Battalions was effected. The 840th Signal Training Battalion is now located at Camp Kohler, California; the 847th, at Camp Crowder, Missouri; and the 848th, at Fort Monmouth, New Jersey. These training battalions will conduct cellular

unit training for newly activated ASF units. The unit training centers at Fort Monmouth, Camp Crowder, and Camp Kohler will be used for training personnel required by the 1943 Troop Basis and will continue to train personnel for units which are still organized under standard T/O's, such as port service companies, construction companies, installation companies, etc., which are representative of organizations which would not lend themselves to reorganizations under the cellular unit plan. Personnel for these organizations can be drawn from reception centers, given training first as individuals and then as members of the unit to which they will ultimately be assigned.

The adoption of these plans enables the Signal Corps to meet its quota of loss replacements as well as to train the teams and specialists needed for newly activated units. Theater commanders, in turn, may now order tailor-made units to fit their needs under T/O 11-500, or may requisition the standardized organizations which have stood the test of time, knowing that a streamlined training program is geared up to meet contingencies. (Also see article "Unit Training" in MILITARY TRAINING section of this issue.)

ARMY SPECIALIZED TRAINING PERSONNEL FOR THE SIGNAL CORPS

The Signal Corps is one of the main users of Army Specialized Training Personnel for communications duty. A large proportion of ASTP students who are undergoing training in electrical engineering, area and language studies, and allied fields are scheduled for release to the Signal Corps in 1944 and 1945.

The first increments of personnel trained under the ASTP in communications duties and related subjects are beginning to filter into the Signal Corps and, in order to accelerate the availability of some of the trainees, special arrangements have been made to cut short the training of two-thirds of the students taking the advanced engineering curricula (EE-1). Only one-third will complete the entire seven terms (a "term" is of twelve weeks duration) which will qualify them for assignments as radio technicians. The reason for this is that requirements for personnel in this field have changed considerably since the original schedule was made up. The group which will be released to the Signal Corps upon completion of six terms will have had sufficient training for engineering assignments not involving advanced radio communications duties.

Because of the above-mentioned shift in emphasis on engineering courses, the quotas for the basic courses were reduced by the ASTP and approximately two hundred of the trainees rendered surplus by this change are being sent to the Signal Corps. These men will have received more than the basic ASTP course and less than the complete electrical engineering course, and are over and above the ASTP requirements formerly submitted by the Signal Corps.

In December 1943 the ASTP created an Army Specialized Training Reserve for seventeen-year olds. These young men may apply for enrollment, become reservists, and, upon reaching their eighteenth birthdays, if qualified, may

enter the regular ASTP schools and become trained according to their qualifications and the needs of the services.

In January 1944 the quotas for entering ASTP classes were reduced and fewer enlisted men were coming into training courses under this program.

JOB CLASSIFICATION TERMS

The abbreviations "MOS" (military occupational specialty) for designating officers' job titles, and "SSN" (specification serial number) to indicate enlisted men's jobs, have come into general usage as a convenient way of distinguishing between officers' and enlisted men's job specification numbers.

This practice is somewhat confusing, inasmuch as machine record strength reports from the field are also referred to frequently as "MOS" reports, even though they refer to enlisted men and their SSN's.

The correct method of referring to officers' job numbers is through the use of the term "Code designation," whereas enlisted men's job numbers should be referred to as "SSN's," or specification serial numbers.

The abbreviation "MOS" (military occupational specialty) may be used to designate both officers' and enlisted men's job descriptions -- the word pictures of the jobs to be performed under an officer's "Code designation" or enlisted man's "SSN." Thus, the "MOS" is the concise summary of the job to be done, whether it be an officer's or an enlisted man's job. The "MOS Code Designation" is the convenient number for referring to the corresponding officer's job, such as "MOS Code 0210," meaning "Signal Officer"; 0400, Telephone and Telegraph Officer; or 0220, Message Center Officer. In the case of an enlisted man, "SSN776" designates a "Radio Operator, Low Speed" (the job title), and the MOS describes the qualifications and duties entailed by the job itself.

Formerly, there was no possibility of confusing officers' or enlisted men's job numbers, as officers' MOS Codes contained four digits and enlisted men's SSN's contained three digits only. However, several SSN's have been adopted recently which contain four digits, thus making it more essential than ever that the correct terms be used in referring to job numbers, titles and descriptions. In the interests of clarity, the distinctions set forth above should be kept in mind, especially when official correspondence is carried on and job titles and numbers rather than job descriptions are under discussion, or vice versa.

In other words, the "MOS" describes both officers and enlisted men's jobs. "Codes" refer to officers' job numbers and titles; "SSN's" refer to enlisted men's job numbers and titles.

The use of "MOS" job descriptions enables the Chief Signal Officer to select the right man for the right job. It has been the aim of Military

Personnel Branch to avoid "putting square pegs in round holes." The correct use of "MOS" descriptions by those who are requisitioning officer and enlisted personnel makes this job easier and contributes toward the over-all efficiency of the Signal Corps.

NEW REQUISITIONING PROCEDURE FOR ENLISTED MEN

In connection with the article on requisitioning military personnel which appeared in the January issue of the Signal Corps Technical Information Letter, attention is invited to ASF Circular 160, dated 24 December 1943, Section III, which outlines a change in procedure for requisitioning enlisted men for replacements for ASF units in the continental United States. Under this directive, requisitioning form AGO 210 will no longer be submitted for enlisted personnel as fillers and/or replacements for Army Service Forces T/O units in continental United States. This directive is effective 1 February 1944 and as of 15 February 1944 all unfilled requisitions are to be cancelled.

MILITARY ORGANIZATION

ACTIVATIONS

The following units were activated during December 1943 or January 1944:

Unit	Authorized Strength OFF	WO	EM	Station of Activation	Assigned to
3121st Signal Port Service Company	12	1	152	Eastern Sig C Unit Training Center, Fort Monmouth, N.J.	Eastern Signal Corps Training Center, Fort Monmouth, New Jersey
3122d Signal Port Service Company	12	1	152	Eastern Sig C Unit Training Center, Fort Monmouth, N.J.	Eastern Signal Corps Training Center, Fort Monmouth, New Jersey
3123d Signal Port Service Company	12	1	152	Eastern Sig C Unit Training Center, Fort Monmouth, N.J.	Eastern Signal Corps Training Center, Fort Monmouth, New Jersey
276th Signal Construction Co.	6		255	Western Sig C Unit Training Center, Camp Kohler, Calif.	Ninth Service Command
580th Sig Depot Co	5	4	182	Fort Ord, Calif.	Fourth Army
581st Sig Depot Co	5	4	182	Camp Bowie, Tex.	Third Army
582nd Sig Depot Co	5	4	182	Camp Shelby, Miss.	Third Army
583rd Sig Depot Co	5	4	182	Camp Crowder, Mo.	Second Army
56th Sig Repair Co	6	1	181	Camp Maxey, Texas	Third Army

The 3103d Signal Service Battalion was activated on 20 December 1943 at the Eastern Signal Corps Training Center, Fort Monmouth, New Jersey, by the Commanding General thereof. The authorized strength of the unit is thirty-one officers and seven hundred eight enlisted men. The unit is assigned to the Eastern Signal Corps Training Center for preparation for extended field service.

The 3111th Signal Service Battalion was constituted on 27 December 1943 for activation on 20 January 1944 and assignment to the Eastern Signal Corps Training Center for preparation for extended field service. The authorized strength of the unit will be thirty-four officers and six hundred thirty enlisted men.

Effective as of 27 December 1943, the 622d Signal Aircraft Warning Company, Regional (Orlando Wing), with authorized strength of forty officers, ten warrant officers and five hundred enlisted men, and the 666th Signal Aircraft Warning Company with authorized strength of nine officers and three hundred fifty-three enlisted men, are constituted and assigned to the Army Air Forces Tactical Center for activation at Orlando, Florida.

PERMANENT CHANGES OF STATION

Unit	Present Station	New Station
90th Signal Company	C-AMA	Fort Dix, New Jersey
3rd Pn, 28lst Signal Pigeon Company	West Virginia Maneuver Area (Perm. Ft George G. Meade,Md.)	Fort Jackson, S.C.
35th Signal Company	Temp. Sta., TMA (Perm. Cp Rucker, Ala.)	Camp Butner, N.C.
87th Signal Company	Temp. Sta., TMA (Perm. Cp McCain, Miss.)	Fort Jackson, S.C.
86th Signal Company	LMA (Perm. Camp Howze, Texas)	Camp Livingston, La.
97th Signal Company	Temp. Sta., LMA (Perm. Camp Swift, Texas)	Ft Leonard Wood, Mo.
154th Signal Armored Company	Camp Chaffee, Ark.	Camp Campbell, Ky.
100th Signal Company	Ft Jackson, S.C.	Fort Bragg, N.C.

TEMPORARY CHANGES OF STATION

Unit	Present Station	New Station
78th Signal Company	Camp Butner, N.C.	TMA (detraining point, Carthage Junction, Tenn.)
39th Signal Company	Camp Campbell, Ky.	TMA
106th Signal Company	Fort Jackson, S.C.	TMA (detraining points, (Lebanon & Nashville, Tenn.)
517th Airborne Signal Company	Camp Mackall, N.C.	TMA (detraining point, Watertown, Tenn.)
92nd Signal Company	Fort Huachuca, Ariz.	LMA (detraining point, Merryville, La.)
44th Signal Company	Fort Lewis, Wash.	LMA (detraining point, Camp Polk, La.)
575th Signal Company	Ft. Leonard Wood, Mo.	LMA

MISCELLANEOUS

The 998th Signal Service Company was disbanded on 20 December 1943 at the Eastern Signal Corps Unit Training Center, Fort Monmouth, New Jersey, by the Commanding General, Eastern Signal Corps Training Center.

Effective 18 December 1943, the following units were relieved from assignments shown below and assigned to the Second Army:

Unit	Present Assignment	Station
310th Signal Operation Bn	XX Corps	Camp Campbell, Kentucky
Co C, 95th Signal Bn	III Corps	Camp Forrest, Tennessee

The Western Signal Corps Replacement Training Center, Camp Kohler, California, was discontinued, effective 31 December 1943.

Effective 1 January 1944, the Western Signal Corps Unit Training Center was established at Camp Kohler as a Class I installation under the command of the Commanding General, Ninth Service Command.

The Western Signal Corps Unit Training Center will coordinate and supervise the training of such units as may be assigned thereto in preparation for extended field service.

Reorganization of the following units has been authorized, each with an authorized strength of eleven officers, three warrant officers, and one hundred eighty-four enlisted men, including six enlisted men, attached medical:

680th Signal Aircraft Warning Company
746th Signal Aircraft Warning Company
748th Signal Aircraft Warning Company

The 1183d Signal Company, Service Group, is assigned to the 55th Service Group without change of station.

The *427th and 441st Signal Construction Battalions, Aviation, were disbanded by the Commanding General, First Air Force and Fourth Air Force, respectively, on 1 January 1944.

The 136th Signal Radio Intelligence Company, Aviation, was reorganized on 1 January 1944 with an authorized strength of twelve officers and three hundred thirty-six enlisted men.

The 859th Signal Service Company, Aviation, was disbanded on 10 January 1944.

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* Negro enlisted personnel

GPO 83-040561