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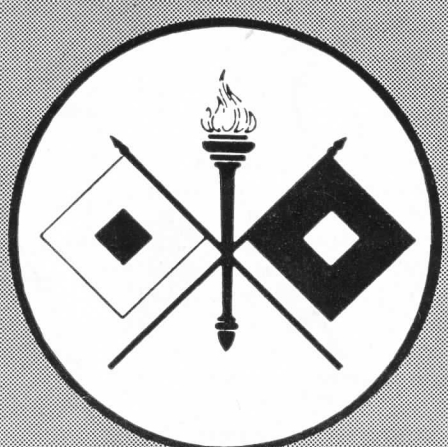
SIGNAL CORPS
Technical Information Letter

NOVEMBER · 1944

ARMY SERVICE FORCES · OFFICE OF THE CHIEF SIGNAL OFFICER



SIGNAL CORPS

TECHNICAL INFORMATION LETTER

PURPOSE THE SIGNAL CORPS Technical Information Letter is a monthly publication designed to keep Signal Corps personnel and other military personnel using Signal Corps equipment informed on Signal Corps matters. It provides means for the dissemination and interchange of information of a widely-varied nature, both technical and tactical.

SOURCE THE LETTER is compiled mainly from information available in the divisions and branches of the Office of the Chief Signal Officer. Signal Corps and other communications personnel are invited to submit, through channels, material of general interest. Information on problems encountered and overcome by combat and service communications troops is desired. Such items should reach the Chief Signal Officer (SPSAY) not later than the 15th of each month for inclusion in the letter for the following month.

DISTRIBUTION DISTRIBUTION overseas is made by The Adjutant General on the following basis: Theaters of Operations (25); Armies, Corps, Departments, Island Commands, Air Forces and Base Commands (10); Divisions and AAF Commands (7); AAF Wings and Groups (4); AAF Squadrons (2); Signal Battalions (6); Signal Companies and separate Signal units (2).

Within the continental limits of the United States the Letter is distributed to Signal and other Ground and Service Forces units and installations by the Chief Signal Officer (SPSAY), Washington 25, D. C. Distribution to Army Air Forces units and installations in the continental United States is made by the Commanding General, Army Air Forces (AFMPB), Gravelly Point, Virginia.

Correspondence relative to distribution overseas and to all addresses, except AAF units, in the continental United States should be directed through channels to the Chief Signal Officer (SPSAY), Washington 25, D. C. Air Force units in the continental United States should write to the Commanding General, Army Air Forces (AFMPB), Gravelly Point, Virginia, on this subject.

WARNING THIS publication is issued solely to give proper and speedy dissemination to timely, useful information concerning pertinent trends and developments. Nothing herein is to be construed as necessarily coinciding with United States Army doctrine. Changes in official doctrine, as they become necessary, will be officially published as such by the War Department.

by Bureau of the Budget, Executive Office of the President

CONTENTS

WESTWARD TO BATAAN

The Hollandia Campaign Is an Example of the Operations That Brought Us Back

WITH THE landing of American troops on the Island of Leyte, in the Philippines, late in October, the strategy that has been followed in the Southwest Pacific Area during World War II is "paying off." This strategy has followed three major premises: control of the air means control of the sea; control of the sea cuts off Jap supply lines and permits sea movement of United States forces to strategic land areas; control of strategic land areas enables air, sea, and land bases to be set up. This process has been repeated right up the coast of New Guinea and has resulted in the cutting off of thousands of Japs in the jungles of New Guinea.

The tactics that have made this strategy so successful are exemplified in "Operation Reckless," the landings at Hollandia and Aitape last April. This was the largest amphibious operation in SWPA up to that time.

The following is an account of the Hollandia landings and the part Signal Corps men and equipment played in that operation. It is based on such material as is currently available in the War Department.

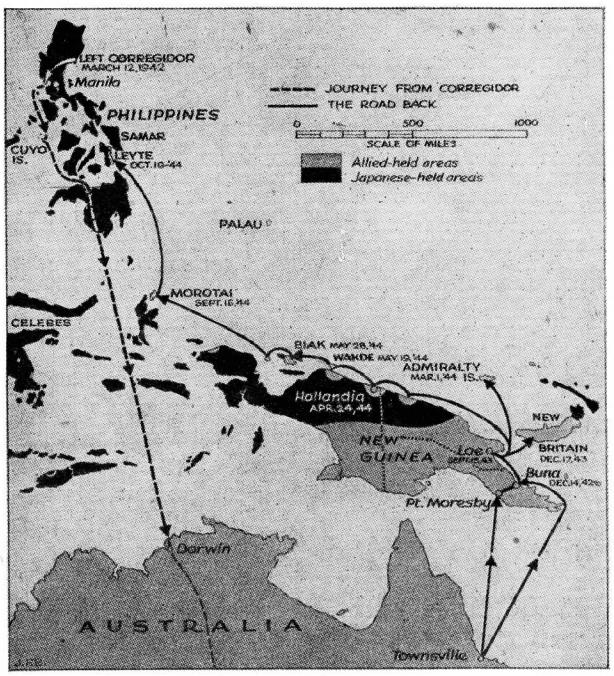
Objectives for the Hollandia task force were the three Lake Sentani airfields. Upon the wresting of these airfields from the Japs, a major air and navy base was to be established. The plan called for a landing at Tanahmerah Bay in the north and at Humboldt Bay, south, 35 miles apart, and a rapid pincers movement inland to destroy the enemy.

D-Day was 22 April 1944; H-Hour 0700.

Complete surprise was achieved. Landings were made with light casualties and by D plus 4, the airfields at Hollandia were in United States hands. Fighter planes began operating from the airfields next day.

The Hollandia Task Force was the I Corps, Sixth Army. I Corps was composed of the 24th and 41st Infantry Divisions in addition to Corps troops. A high proportion of engineer and service troops for the building of a large base was attached. In addition there were a large number of engineer aviation units for the reconditioning of the three airfields.

Prior to the operation, the 5th Air Force maintained neutralization of the Hansa Bay and Wewak airfields. Attacks by heavy bombers on the Hollandia Area was begun as early as D minus 10. Night bombing of



N. Y. Times

COAST HOPPIN' UP NEW GUINEA—31 MONTHS IN THE PACIFIC

these areas continued until D minus 1. Long range operations were carried out against other Jap airfields north of Hollandia. Attacks from carrier aircraft of the naval force were made on the Hollandia airfields and also against Sarmi and Wakde Island from which air attacks could be staged against the landing forces.

The landing by the 24th division at the Tanahmerah Bay beaches was unopposed; at the Humboldt Bay beaches (White I, II, and III) the enemy fled to the hills during the air and naval preparation, and the close air and sea support enjoyed by United States troops of the 41st division in the landing kept him from counterattacking.

The major landing in Humboldt Bay was made at White Beach I. White Beach III was the lower end of the prong aimed at the encirclement of the Humboldt Bay area. White Beach II was subsidiary and only necessary to cover the exploitation of the landing at Pim where a motor road connected that point with airfields north of Lake Sentani. A track connected Pim with Hollandia.

Red Beaches I and II at Tanahmerah Bay and White Beaches I and III at Humboldt Bay were backed by swamp and wet clay, short, steep gradients, mud, and all the other obstacles to quick dispersal of men and supplies.

White Beaches I and III were already congested with Jap dumps when U. S. troops landed. The air

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bombardment on D minus 1 had started fires in these dumps, and efforts by U. S. Army men to extinguish them had been unsuccessful. Only one beach exit was found when the landings were made, and because of the nature of the terrain back of the beach, vehicles only had been dispersed northward by the night of D plus 1. Most stores were still on the beach. During that evening, a single enemy plane, using the blazing Jap dumps as a guide, dropped bombs and caused a series of conflagrations which spread to U. S. dumps, destroying a quantity of bulk supplies and ammunition. These fires continued for 2 days, preventing the beaching of other LST's with supplies. It had been planned to land 20,000 tons of supplies at Humboldt Bay during the first 3 days of the operation; to this was added the shipping diverted from Tanahmerah Bay which was found to be entirely unsuited for landing supplies. However, once the danger from exploding ammunition and fire had disappeared, debarkation of men and supplies continued at an accelerated rate.

On D plus 3, the task force command post came ashore and was set up at Brinkman's Plantation. The 41st Division CP was established at Joka.

On D plus 10, the 41st Division moved to Hollekang in preparation for the Wakde operation, and the 24th Division moved down from the Tanahmerah Bay area and established its CP at Joka. The task force CP opened at Joka on D plus 20, removing from Brinkman's Plantation.

Advance Section, Sixth Army, set up at Hollekang on D plus 21. Base G, USASOS, was scheduled for Brinkman's Plantation by D plus 45.

This operation (including the Aitape landing) isolated an estimated 50,000 Jap troops in the Wewak–Madang area.

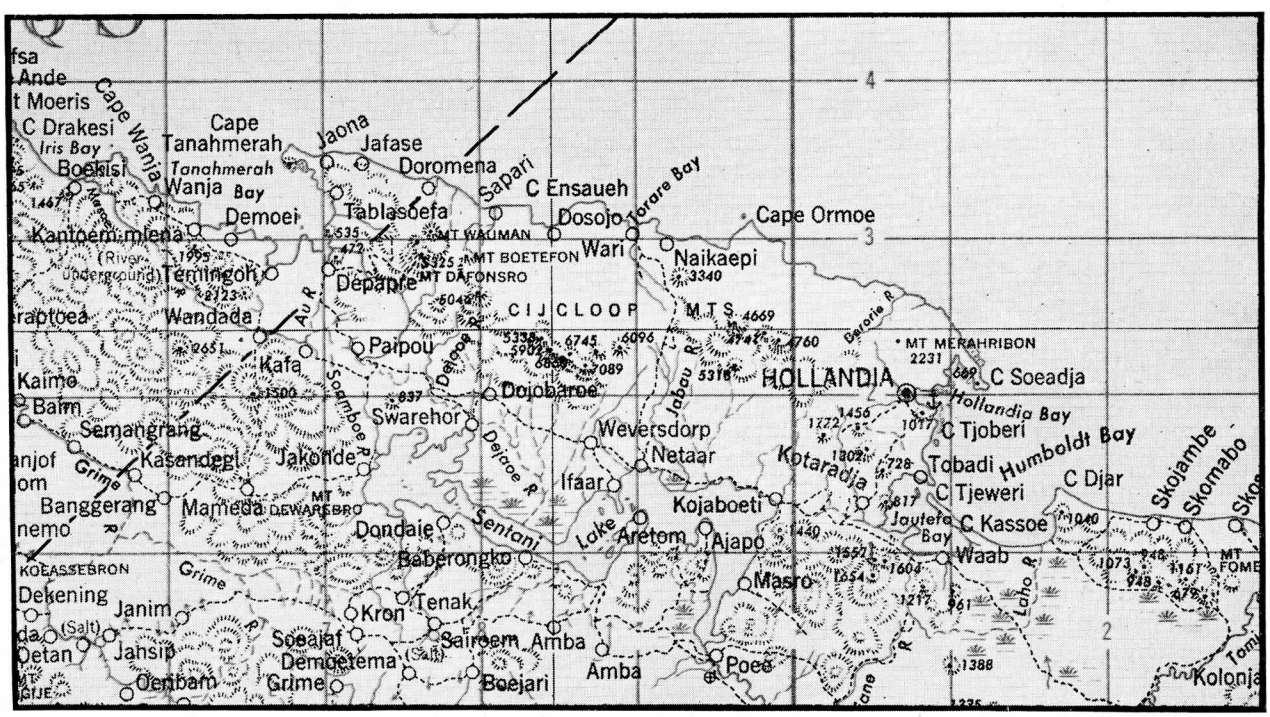
Communications from all accounts were satisfactory.

TASK FORCE COMMUNICATIONS

Attached to I Corps was the 58th Signal Battalion. This battalion was the first to function as an organic corps signal unit in the Southwest Pacific Area in an operation against the enemy.

Composition of the signal units, in addition to operational sections of the 58th, included one-half of a reinforced platoon from Co. B, — Signal Construction Battalion (Aviation), a 1-kw. radio team, which arrived on D plus 2; a provisional storage and issue section, which arrived on D plus 8; a signal repair detachment, which also arrived on D plus 8; a detachment forming a second operational battalion, which arrived on D plus 16.

To a limited degree, a detachment from a signal service company, which arrived on D plus 12, as well as one company of a second signal construction battalion (aviation), which arrived on D plus 16, were utilized by the task force.



OVER-ALL VIEW OF HOLLANDIA, SHOWING TANAHMERA BAY, HUMBOLDT BAY AND LAKE SENTANI, TARGETS FOR THE OPERATION

MOVING UP TO THE AIRFIELDS ARE THESE MEN OF THE HOLLANDIA TASK FORCE—NOTE MAN WITH SCR–536 FOREGROUND

D-Day

Essential battalion personnel and equipment were divided among four LSTs which beached at Tanahmerah Bay at 0815. Due to lack of roads and the unsuitability of the terrain for rapid road construction, congestion on the beach took place and unloading proceeded slowly. One battalion vehicle only reached the task force command post. The others were scattered on the beach unable to move. All signal personnel proceeded on foot down the beach to the site of the proposed task force command post. After the message center was set up, radio contact with the 24th Division command post afloat was established at 1130 using a Radio Set SCR–299–( ) set up on the top deck of a LST.

At 1430, the 24th Division command post was set up ashore near that of the task force and wire circuits were installed and in operation between the two command posts by 1530. The radio net was closed at 1800 since the two command posts ashore were so close to each other.

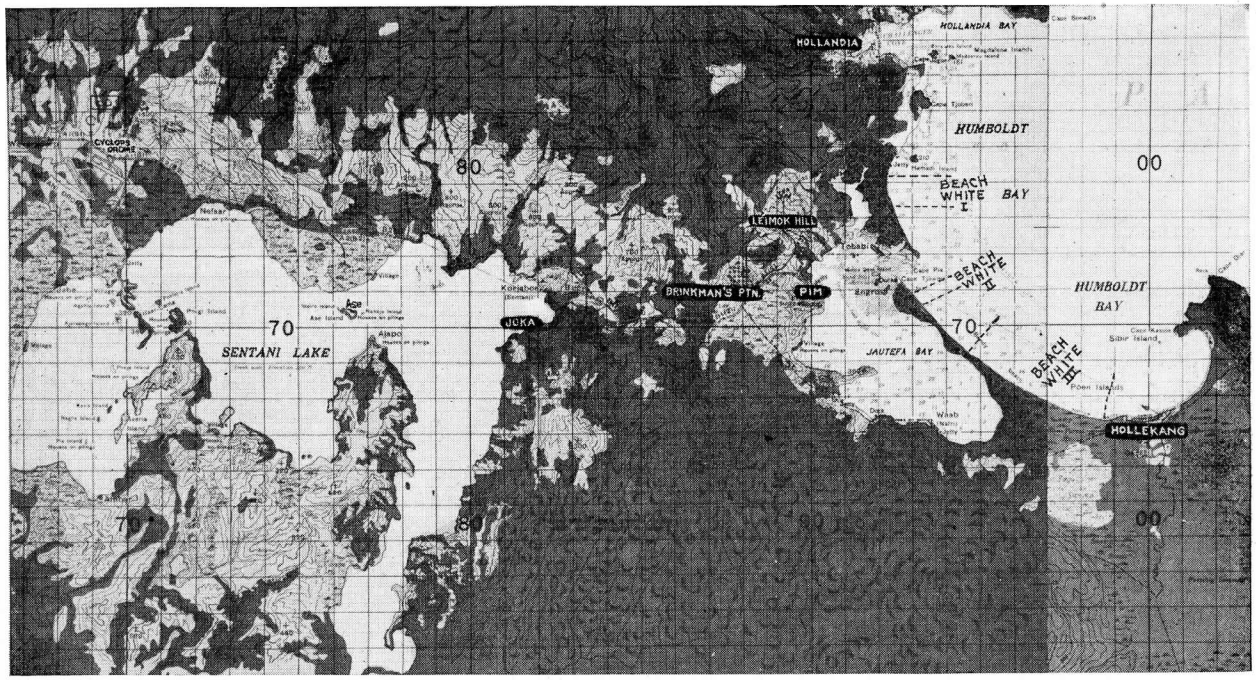
During the day, a net of five Radio Set SCR–300–( ) kept a 15-minute schedule. Stations in the net were: task force signal officer, on the headquarters ship; task force assistant signal officer, ashore; a liaison officer of the 58th Signal Battalion, ashore; task force assistant G–3, ashore; and task force G–3 on the 24th Division headquarters ship. Some difficulty was experienced in delivering messages as the majority of the staff had not yet located at the command post ashore.

About 1730 an AT–20 radio transmitter mounted in a 2½-ton truck was landed (the AT–20 is an Australian transmitter with a power output of 500 watts, covering the 2 to 20 megacycle band). Using this set an attempt was made to establish radio contact with task forces at the Admiralty Islands and at Aitape without success. About the same time another AT–20 transmitter, mounted in a van, entered the Sixth Army net. Intermittent contact was maintained throughout the night.

D Plus 1

Radio contact with both divisions and the task force headquarters ship was established early. Using an AT–20 transmitter, contact was maintained with Sixth Army at Finschhafen. At 1000 radio contact was established with task forces at the Admiralty Islands and at Aitape using a Radio Set SCR–299–( ).

Toward the end of the day, the task force commander decided to move his command post to the Humboldt Bay area. This was due to continued congestion on the beaches of Tanahmerah Bay. All stations closed at 1530 and all equipment and personnel were aboard LSTs by 2330, although loading was twice interrupted by air alerts. At 2330 water movement to Humboldt Bay was begun. The D-Day detachment



AIR MOSAIC OF HUMBOLDT BAY AREA AND SURROUNDING TERRITORY. RADIO CIRCUITS AND WIRE LINES HELPED MAINTAIN COMMAND OVER UNITS SCATTERED THROUGHOUT THIS REGION

of the construction platoon remained at Tanahmerah Bay to extend spiral-four cable, which was used by the 24th Division to extend its field wire line.

D Plus 2

On arrival at Humboldt Bay landing was prevented by the gasoline fires and exploding ammunition dumps on the beaches. All personnel remained aboard the LSTs until the morning of D plus 3. While the task force command post was still afloat, the Navy monitored the task force radio channels and copied messages addressed to the task force.

D Plus 3

By 1000 a task force command net and one radio circuit to Sixth Army were in operation ashore. At 1500 two radio teams, the message center section, and small detachments of the other sections left for the new task force command post location at Brinkman's Plantation. Radio nets were established, switchboard and other essential locals installed, and a wire circuit laid to the 41st Division command post near Joka. During the night battalion personnel manned a part of the command post defense line. Radio and message center installations were blacked out but continued to operate throughout the night. The installation and maintenance section of the wire operation company started installation of trunks to attached corps units, a radar station and to Pim. A traffic control line was installed along the Pim–Joka Road. The reinforced platoon, Company B, — Signal Construction Battalion (Aviation), installed field wire trunks to the 41st Division command post (Joka). Trouble crews were kept busy throughout the day repairing circuits destroyed by tractors, bulldozers, friendly troops, and natives clearing bivouac areas.

D Plus 4

Installation of a Telephone Central Office Set TC–12 and a second Switchboard BD–91 was begun at task force CP (Brinkman's Plantation). The switchboard installation was dug in and well sandbagged.

Initial plans for teletype operation called for the installation of one Teletypewriter Set EE–97–A at the message center connected to 41st Division (Joka) by a simplex circuit. Due to leakage and unbalance the simplex circuit had to be abandoned. A phantom circuit was substituted but engineers working on the Pim–Joka Road continually tore out the field wire lines necessitating the abandonment of teletype operation until a third field wire circuit to the 41st Division had been installed over an alternate route.

D Plus 5 to D Plus 9

A temporary battalion bivouac area was established by D plus 5 when the remaining signal personnel arrived at the command post. During the nights of D

plus 4, 5, and 6, there was considerable firing outside and within the perimeter by guards. One battalion radio operator was killed by gunshot on the morning of D plus 6.

By D plus 9 the following radio facilities were in operation:

Two point-to-point circuits to Sixth Army at Finschhafen using two AT–20 radio transmitters, one of which was later replaced by Radio Transmitter BC–339–G.

One circuit linking the task force with those at the Admiralty Islands and Aitape, using first a Radio Set SCR–299 and later a TW–12 radio transmitter (the TW–12 is a 50-watt Australian set which covers the frequency of 1.5 to 15 megacycles).

Two command nets, one using a Radio Set SCR–299 to the 24th Division only, and the other using a Radio Set SCR–177 to all units.

An aircraft warning net using Radio Set SCR–193.

An intercept station on the Navy "Dog" circuit.

D Plus 10

Ten days after Hollandia landing, the 41st Division moved its command post to Hollekang in preparation for the Wakde operation. The 24th Division established its command post near the old location of the 41st Division (Joka). To establish wire communications to the new 41st Division CP, about half the platoon of the — Signal Construction Battalion (Aviation) started installation of a spiral-four cable from the task force command post (Brinkman's Plantation) around the south side of Jautefa Bay, to the division post at Hollekang, a distance of approximately ten miles. There were no roads through the area and most of the route was through swamp and heavily timbered forest. Dumps of spiral-four cable had to be established along the beaches and the cable hand-carried to the route, about one-half mile inland. Due to trouble developing on this line, a supplemental spiral-four cable was laid under water from Pim to White Beach No. III. This proved to be the more reliable circuit.

Another detachment of the — Signal Construction Battalion (Aviation) put in two signal circuits from the task force command post (Brinkman's Plantation) to the site of a proposed new task force command post at Joka on Lake Sentani.

Installation and construction of temporary buildings to house communications facilities at the new task force location was begun. In the command post area, 10-pair cables were fanned out to various office sites so that only short runs of field wire would be needed. Two Telephone Central Office Set TC–2 were installed. Ten-pair and five-pair cables were run to a test station at Joka-Airdromes Road junction. Another 10-pair cable to be used for keying lines was run to a transmitter station.

D Plus 12

Adequate messenger service was difficult to maintain due to the fact that units were distributed over a number of beaches and along congested tracks. Messengers carried all personal equipment and rations as in many instances they were out for 2 or 3 days. Liaison airplanes were used to carry messages to isolated areas. In order to facilitate message delivery, subcenters were set up. All messages to units on the beaches were delivered to a message subcenter at Pim. From there messengers hitch-hiked by boat from beach to beach. A message subcenter was established in the airdrome area. Personnel of this subcenter had the duty of receiving, collecting and guarding signal supplies arriving by air transport, in addition to local message delivery. Scheduled messenger service became possible on this day when a DUKW was made available to the message center. This helped greatly to improve message delivery.

D Plus 13 to D Plus 20

A spiral-four cable circuit was laid across Lake Sentani from Joka to a point near Cyclops Drome, with a test station on Ase Island. An LVT was used to make the submarine installation. Within the next week two more circuits to the same air field were provided over the same route. The only interruption of service was caused by a seaplane anchor breaking one cable.

Switchboards BD–72 and locals were installed at Pim and at Pie Beach on D plus 16. A telephone Central Office Set TC–12 was substituted at Pie Beach the following day. At this stage, field wire installed initially was being replaced gradually by spiral-four cable or new field wire.

On D plus 17 a Telegraph Central Office Set TC–3 and Teletypewriter Set EE–97–A were installed at Joka and two spiral-four cables phantomed to give two teletype circuits to Brinkman's Plantation which was to remain as the task force rear echelon command post and later to be occupied by Base "G," USASOS.

The task force command post at Joka opened on D plus 20. Cut over was very successful, no interruption to communications resulting. There were few men available to clear the battalion area, erect mess halls, supply buildings, etc. This work proceeded slowly and was further hampered by battalion having to furnish daily four to ten 2½-ton trucks for hauling signal supplies and for corps details.

D Plus 21 to D Plus 23

Up to this date the message center section was handicapped greatly by the lack of sufficient personnel and sheltered operating space. Except during inclement weather and at night, several men had to work outside. During air alerts the message center continued to operate but blackout and overcrowding reduced its efficiency. Up to D plus 16 the message center had 40 men available exclusive of messengers. Only 20 men were from the battalion message center section; the balance was made up of 7 teletype operators from the battalion, 10 men from one of the radio teams and 3 men borrowed from the — Signal Service Company. On D plus 16, 9 men from another radio team arrived but they left on D plus 21. On that date 11 message center and cryptographic clerks from the — Signal Operation Battalion were attached. On D plus 23, 9 additional cryptographic clerks were borrowed from the — Signal Service Company and 9 men from Co. I. — Infantry were attached. The latter were used as message center guards and local messengers. This additional personnel was sufficient to operate the task force and 3 message subcenters. Some confusion existed as the attached personnel was from 5 units, one of which joined just prior to, and the other 4 during the operation. No joint training prior to the operation was possible as the units were dispersed over a large area. Because of the minor differences of procedure smooth functioning was not obtained. About this date the advance section, Sixth Army, arrived. Pending establishment of the Army command post near Hollekang, a separate message center group was set up to handle exclusively Sixth Army traffic. Traffic of Base Section "G" had to be handled also until base facilities were installed about D plus 45.

A HUMBOLDT BAY BEACH IS BEHIND THESE MEN OF THE 41ST

FITTING TRIBUTE

Southwest Pacific—Adm. Kiichi Endo, commander of a Jap fleet routed recently at New Guinea, is believed to have fled his sinking ship and perished in the Cyclops jungles.

An American staff officer, with a flair for sign-posts, erected one in Endo's memory at a plantation bordering the jungle where the Admiral died. It read: "Admiral Endo Slept Here."

On Pim Beach near Hollandia is another sign: "Admiral Endo Fled Here."

And deep in the jungle is the American officer's final tribute to the Jap: "Admiral Endo Died Here—End o' Endo."

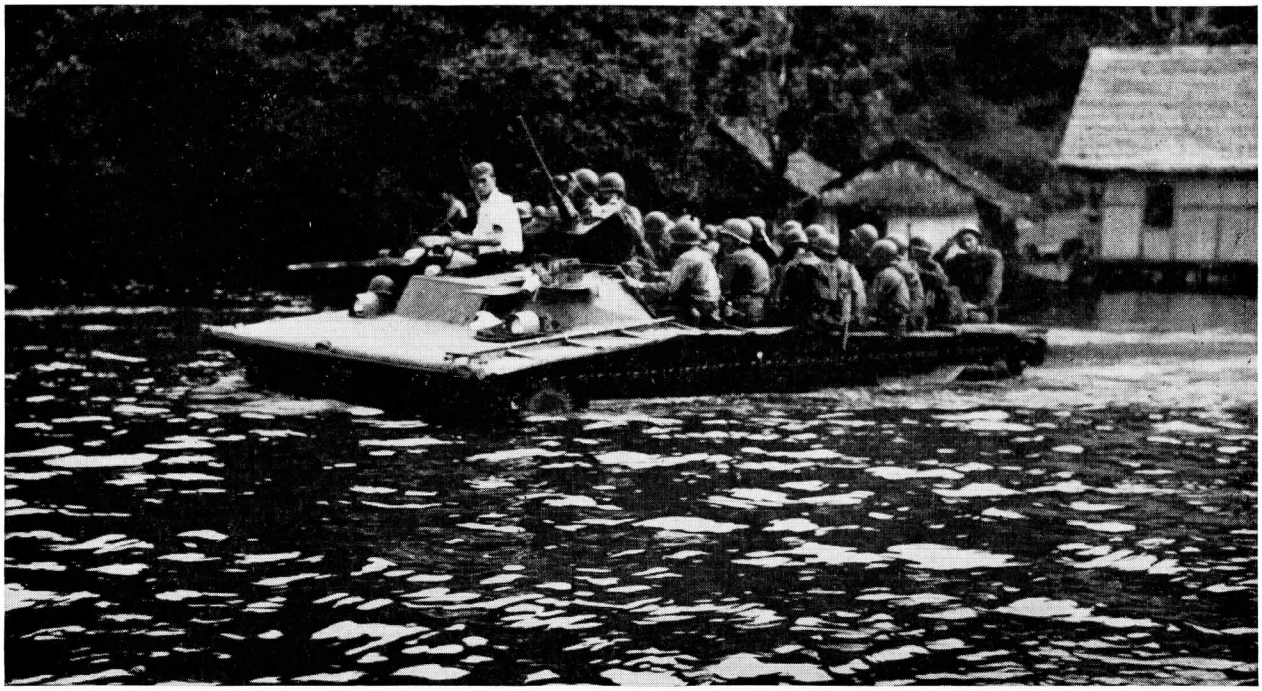
The Lukomunique

D Plus 25 to D Plus 33

On D plus 25 battalion personnel began handling Sixth Army traffic for the Wakde operation. The following additional radio circuits were established: one to Sixth Army and Advance GHQ using a Radio Set SCR–299; one to Wakde and Sixth Army using an AT–20 radio transmitter; and two to Wakde using one Radio Set SCR–299 and one TW–12 radio transmitter.

Four Telephone Terminal Set TC–21 and eight Telegraph Terminal Set TC–22 were received. All had to be completely overhauled and it was not until D plus 33 that two carrier circuits were in operation to the command post of the Advance Section, Sixth Army, near Hollekang. Teletype operation was satisfactory, but failure of Ringing Equipment EE–101–A prevented the use of the channels for voice transmission. Defective varistors in Ringing Equipment EE–101–A had to be replaced by a vacuum tube rectifier assembly.

During the period D plus 25 to D plus 30, five field wire circuits were installed across Lake Sentani to various units. The reinforced platoon, Co. B, — Signal Construction Battalion (Aviation), put in a 2-mile pole line from Brinkman's Plantation to Leimok Hill using 35-foot poles logged locally. This line was for later use by Base "G." Assisted by 20 natives to clear a right of way this unit also installed a spiral-four cable around the north side of Lake Sentani from the test station to the — Bombardment Wing. Co. B, — Signal Contruction Battalion (Aviation), cleared a right of way and set poles for a permanent pole line from the test station to Joka, installed 8 miles of spiral-four cable from Brinkman's Plantation to the town of



WATER BUFFALOES CARRYING MEN OF THE 41ST DIVISION FOR A BEACH LANDING ALONG THE SHORES OF LAKE SENTANI

Hollandia where the command post of the —infantry and the Navy Base were located, and installed spiral-four cable over a water and land route from Pim to Pie Beach. Teletype to the Naval Liaison Party at Hollandia was in operation by D plus 33.

GENERAL COMMENTS

Signal supply was the responsibility of the task force. The battalion S–4 was designated as the task force signal supply officer. A signal dump was established on D plus 9 at Pie Beach and was operated by the — Provisional Storage and Issue Section and a detachment of 1 officer and 33 men from Co. I, — Infantry. Construction of shelter and location of signal supplies dumped at random along the beaches was given first consideration. Stock levels were low, so only emergency issues were made. Transfer of the stock from Pie Beach to the permanent base signal depot at Brinkman's Plantation was difficult. Water transportation was furnished by LCM and LCT to Pim but transfer was slow until a road from Pie Beach to Pim was opened. A large gasoline and ammunition fire of unknown origin started on Pie Beach resulting in minor loss of signal equipment. The dump closed on D plus 30.

As soon as the airdromes were serviceable, large quantities of all kinds of supplies were sent in by air transport. The road to the airdromes was not opened until D plus 23. Supplies unloaded from the air transports were dumped at random in the drome area. To rectify this, personnel was assigned to receive and guard signal supplies pending transfer to the signal depot.

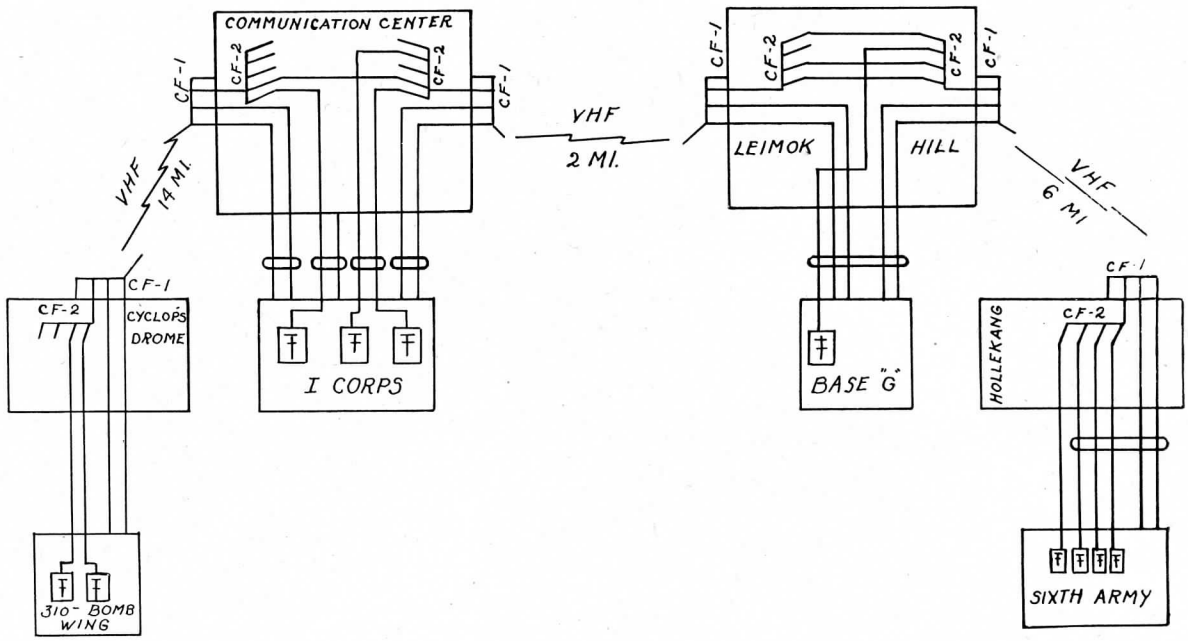
Signal communication was not interrupted to any great extent by enemy activity. There were indications that some line troubles were caused by the enemy.

Personnel leaving the command post was always armed. Although messengers and linemen were often near Japanese patrols, they were never attacked.

The tactical situation was ideal for the use of pigeons. Australian birds and equipment had been furnished the battalion while in Australia; birds arrived in Hollandia area on D plus 2. They were settled at Brinkman's Plantation but not used. Initial use was on D plus 21 after they had been moved to Joka and settled. Starting on D plus 33 they were furnished daily to patrols. The pigeons brought back many important operational messages. Troops gained confidence in and liked to use the homing pigeon.

Japanese gasoline was used to supplement our own limited supply, but proved detrimental to power units as it caused excessive carbon deposits.

Wire W–110 laid in salt water lasted only from three to four days, but spiral-four cable stood up well. Wire W–110 gave satisfactory service when laid in fresh water. Previous training of messengers in map reading and during maneuvers and command post exercises paid dividends. Predicted radio propagation conditions had to be considered in the selection and assignment of radio channels to ensure reliable radio communication.



TELETYPE AND VOICE CIRCUITS ESTABLISHED WITH RADIO RELAY EQUIPMENT PENDING COMPLETION OF POLE LINE

RADIO RELAY AT HOLLANDIA

IN ORDER to facilitate the construction of the Hollandia Base, an open wire pole line was needed to link Sixth Army headquarters at Hollekang with Base G at Leimok Hill, I Corps CP at Joka and—Bomb. Wing at Cyclops Drome. In the operational area at Hollandia, the terrain is quite rugged except for a few sandy beaches which are invariably backed by swampland. Roads at best were tracks and extensive roadbuilding was continually interrupting field wire and spiral-four circuits. However, construction of a pole line required a separate right of way through heavy jungle growth and swamp, logging of pole locally, and it was clear that even using all personnel and equipment available, the circuit could not be in as soon as needed.

Radio relay was the answer to the problem of getting stable intercommunicating circuits among the various areas capable of providing as many individual circuits as a pole line would. The following are excerpts from a report on this phase of the Hollandia campaign:

Radio Teams A, B, and C of a Signal Service Company arrived in the Hollandia Area on D plus 30 (22 May 1944). The original mission of these teams was to provide remote keying facilities for the base radio-teletype installation, scheduled for operation sometime after D plus 30.

Each team was organized under T/O and E 11–500 (Team EF), and was equipped with two Radio Terminal Sets AN/TRC–3, two Telephone Terminal Sets TC–21 (carrier), two Telegraph Terminal Sets TC–22 (carrier), and associated cable ringing and power equipment.

One section of Team C set up at Hollekang, the other at Cyclops Drome; both sections of Team A set up at Leimok Hill; and both sections of Team B at "Communications Center" at Joka. At Leimok Hill and "Communications Center," terminal as well as relay facilities were required. This prevented the elimination of terminal carrier equipment at these points.

Circuits set up were: two voice circuits, Sixth Army to Base G; two voice circuits, Base G to I Corps; two voice circuits, I Corps to — Bomb. Wing; one teletype circuit, Sixth Army to Base G; two teletype circuits, Sixth Army to I Corps; one teletype circuit, Sixth Army to — Bomb. Wing; one teletype circuit I Corps to — Bomb. Wing.

Installation was begun on D plus 34. The links between Hollekang, Leimok Hill, and "Communication Center" were completed and in operation on D plus 35. The link between "Communication Center" and Cyclops Drome was completed and in operation on D plus 36. No major installation difficulties were encountered.

No major failures of equipment occurred during their operation. The only difficulty was interference from nearby VHF radar stations, and this only when a radar antenna was pointing at the VHF antenna and the directions of propagation of both were parallel. The interference introduced a high noise level in the telephone and extraneous marking pulses which caused typing errors in the teletype channels. No objectional interference occurred when the directions of propagation were perpendicular. Relocation of the sets was not feasible as of the writing of the report.

NEW AIRBORNE TRANSMITTER

AN/ART–13A to Replace BC–375—Provides Automatic Selection on 11 Channels

RADIO TRANSMITTING Set AN/ART–13A is an improved version of the Navy Type ATC transmitter. The set is designed to provide a multichannel airborne liaison transmitter for use by the Army and the Navy and will supersede Radio Transmitter BC–375–( ) in Army bombardment and transport aircraft.

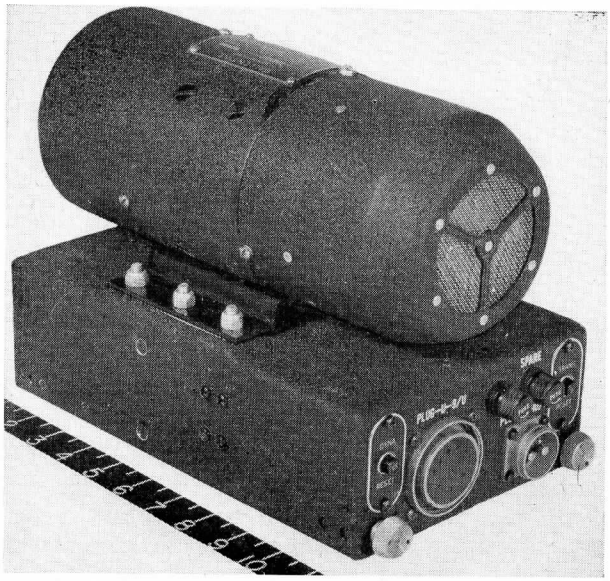
The transmitter is of the master oscillator type and incorporates an automatic tuning system which permits transmission on any one of 11 preset frequencies. Frequency selection is obtained automatically by use of a rotary switch operated either locally at the transmitter or by means of a remote control box. The transmitter provides cw, mcw, and voice modulated types of emission. The audio system is capable of modulating the carrier (100 watts normal) at least 90 percent for mcw or voice emission. Provision is made for the use of either a standard carbon microphone or magnetic microphone. Power output varies from 5.5 watts at 200 kc to approximately 90 watts at 13,500 kc. The equipment is designed to operate from the 28-volt direct current power supply used in aircraft.

This transmitter has several outstanding features which were not provided by the BC–375 transmitter. Frequency range of 200 to 600 kc and 2,000 to 18,100 kc is self-contained in the transmitter, i. e. no plug-in tuning units are required. Eleven preset channels are provided—one in the 200 to 600 kc band and 10 in the 2,000 to 18,100 kc band, any one of which is capable of being placed in operation in approximately 20 seconds (provided the channels have been previously tuned). Provision is also made for selecting these channels from a remote position if desired.

The transmitting equipment, including the power unit, loading coil (for low frequency operation) etc., weighs approximately 110 pounds as compared to the BC–375 which has a weight of approximately 215 pounds (including tuning units). Approximately one-third the cubic space used for installation of the BC–375 is required for installation of the AN/ART–13A. The transmitter contains a calibrated frequency indicator (cfi unit) which eliminates the necessity of using Frequency Meter Set SCR–211–( ) for setting up the transmitting channels.

Operation is provided for altitudes up to 40,000 feet as compared to the BC–375 which was designed to operate up to 25,000 feet. Operation to 40,000 feet

RADIO TRANSMITTER T–47A/ART–13 SHOWING OSCILLATOR O–16/ART–13 AND MOUNTING BASE MT–284/ART–13



DYNAMOTOR UNIT DY–17/ART–13A OF NEW TRANSMITTER

is accomplished by means of an automatic pressure switch, which switches the transmitter to approximately one-half power at altitudes above 25,000 feet.

The original ATC equipment was not designed to meet Signal Corps specifications for airborne equipment and, due to the newness of the design and to the mechanical and electrical complexities of the equipment, it was not considered advisable to replace the BC–375 with this equipment. Despite all the operational disadvantages of the BC–375 transmitter, it had proved to be a reliable instrument. Therefore substitution of the ATC transmitter could not be made until a program of improvement of the ATC equipment had been completed. Based upon experience obtained by the Navy, the ATC equipment was re-engineered to provide equipment which would approach the reliability of the BC–375 transmitter. It was realized from the start that because of the automatic features provided in this new transmitter, maintenance and training requirements would be more severe. However, it was felt the operational advantages and weight saving which would result from the use of the new transmitter would more than compensate for the increase in training and skill required by new maintenance personnel.

When the decision was made by the Army to utilize the ATC transmitter in place of the BC–375, the equipment was assigned an "AN" nomenclature—Radio Transmitting Set AN/ART–13. All major components also received an "AN" nomenclature.

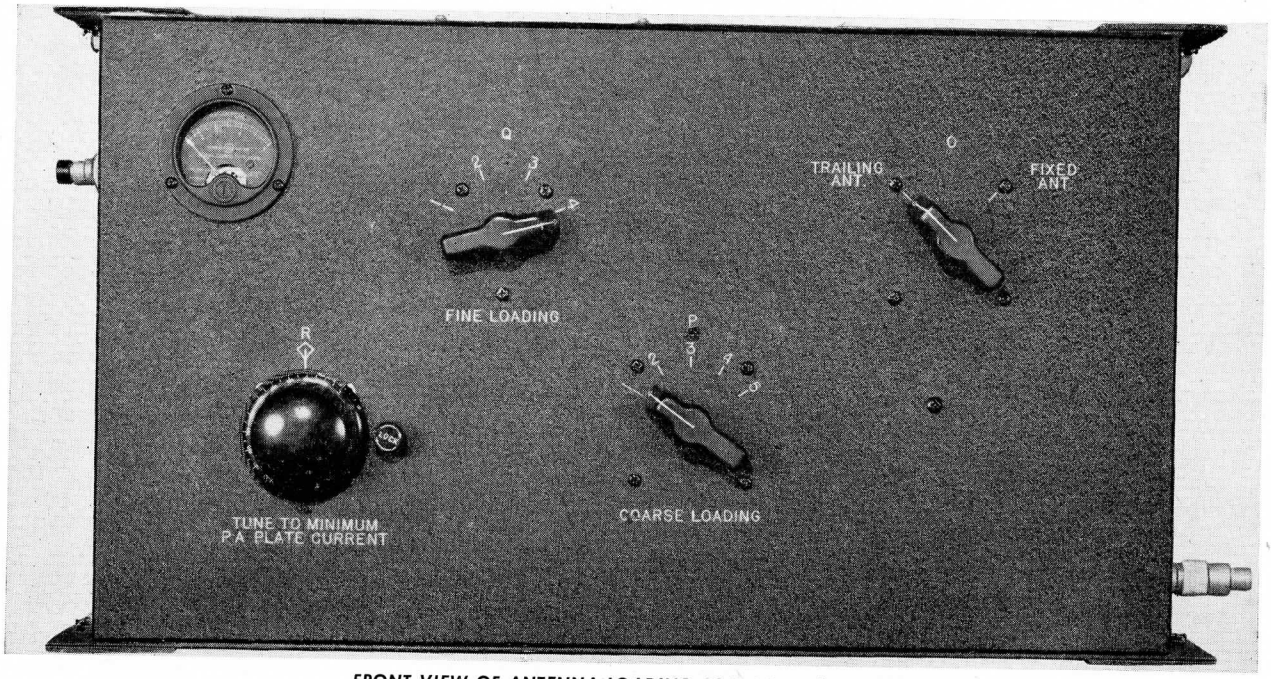
The AN/ART–13 contains several improvements over the ATC equipment, based on Navy experience with the original set. However, inasmuch as the equipment used by the Army contains several different components and some changes in components, the nomenclature AN/ART–13A was given to this later model. The dynamotor unit is a good example of the changes in nomenclature necessary to distinguish between components of the various models of this transmitter. The AN/ART–13 is delivered with either one of two dynamotors made by different manufacturers. One is known as Dynamotor Unit DY–11/ART–13 and the other, as Dynamotor Unit DY–12/ART–13. For the Army, the dynamotor unit was re-engineered to provide a lighter dynamotor, facilitate its removal from the filter section and also to simplify the filter unit. The new dynamotor unit, which will be a component of the set delivered on Army contracts, is known as Dynamotor Unit DY–17/ART–13A.

The original ATC transmitter had a low frequency coverage of 200 to 1,500 kc. The unit which provides this range is known as Oscillator O–16/ART–13. The AN/ART–13A has a new design of low frequency oscillator which covers a range of 200 to 600 kc known as Oscillator O–17/ART–13A, effecting a simplification and higher degree of frequency stability.

In designing the low frequency oscillator it was found desirable to consider it as a separate unit, since in operations not requiring use of low frequencies, the low frequency oscillator and the antenna loading coils can be removed, resulting in a saving of space and weight. The low frequency Oscillators O–16/ART–13 and O–17/ART–13A covering the band 200 to 1,500 kc and 200–600 kc, respectively, are designated as insertion units to provide an additional channel for low frequency operation. When low frequency operation is not desired, Panel MX–128/ART–13 is inserted in the transmitter in place of the oscillator.

A recent decision by the Army Air Forces to use low frequencies for special operational requirements only has proved the wisdom of the decision to consider the low frequency oscillator as a spare unit. Transmitters are to be issued in the field without the low frequency oscillator and antenna loading coils.

The original ATC transmitter was provided with two antenna loading coils: one covering 200 to 600 kc known as Antenna Loading Coil CU–25/ART–13, and the other covering 500 to 1,500 kc known as Antenna Loading Coil CU–26/ART–13. For installation in Army aircraft an antenna switching unit had to be designed which would provide operation on fixed and trailing wire antennas. This Antenna Switching Unit SA–22/ART–13 was installed in conjunction with the



FRONT VIEW OF ANTENNA LOADING COIL CU–32/ART–13A

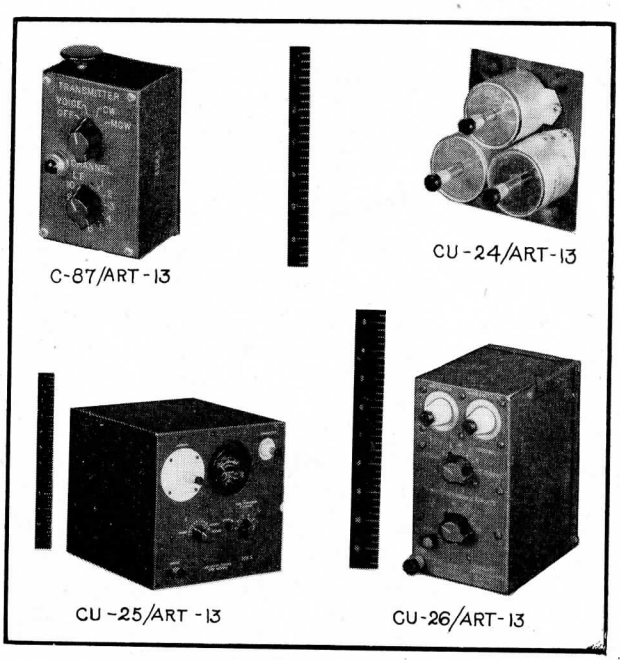
Antenna Loading Coil CU–25/ART–13 to provide operation over the 200 to 600 kc band. In order to provide proper loading into short fixed antennas at 200 kc it was necessary to redesign the Antenna Loading Coil CU–25/ART–13, and in accomplishing this it was found desirable to incorporate the Antenna Switching Unit SA–22/ART–13. This resulted in a combined antenna loading coil and switching unit known as Antenna Loading Coil CU–32/ART–13A.

In addition to the above mentioned improvements, both the Army and Navy sets now incorporate an improved cfi unit which provides a more accurate and uniform signal for lining up the channels of the transmitter over the entire frequency range.

To date Radio Transmitting Set AN/ART–13 has been received from Navy production and these equipments have been installed in particular Army aircraft until such time as production lines for the Army can provide the Radio Transmitting Set AN/ART–13A in sufficient quantities for installation in all medium and heavy bombardment and transport aircraft. Every attempt is being made to maintain standardization of this equipment with the Navy with respect to component interchangeability, in order that spare parts now issued for Navy equipment will be satisfactory for use on Army sets and vice versa. The transmitters delivered by Army contractors will be the AN/ART–13A and will incorporate the latest techniques of tropical treatment. The Navy is also incorporating this tropical treatment as quickly as possible in production equipment.

The main components for Radio Transmitting Set AN/ART–13A are:

Radio Transmitter T–47A/ART–13
Dynamotor Unit DY–17/ART–13A
Mounting Plate MT–283/ART–13
Mounting Base MT–284/ART–13
Panel MX–128/ART–13



COMPONENTS OF RADIO TRANSMITTING SET AN/ART–13

For low frequency operation, Panel MX–128/ART–13 is removed and replaced by Oscillator O–17/ART–13A, and Antenna Loading Coil CU–32/ART–13A is provided. For remote control operation Control Unit C–87/ART–13 is provided. An Antenna Shunt Capacitor CU–24/ART–13 is provided for operation on short fixed antennas in the range of 2,000 to approximately 2,500 kc where insufficient capacitance for loading the transmitter is available. This shunt capacitor is an arrangement of three 25 mmf capacitors rated at 10,000 volts mounted on a single plate. This arrangement is used in order that the minimum amount of capacitance necessary may be utilized.

The transmitter is compactly constructed but in order to faciltate maintenance, several units within the transmitter are of the plug-in type and may be removed and serviced separately. The low frequency oscillator, the mcw-cfi unit, and the audio amplifier unit are the units which can be removed to facilitate servicing. Standard test equipment available in the services and a few special tools provided with the transmitter is all the test equipment needed for servicing this set.

THREE YEARS OF SCTIL

THIS ISSUE marks the third anniversary of the publication in World War II of the Signal Corps Technical Information Letter.

Shortly before Pearl Harbor, the first mimeographed copies of the Information Letter found their way to Signal Corps personnel in Washington and in the field. There were less than 2,000 copies of this first issue published; circulation is now 21,500.

While the circulation has increased enormously and the scope has been greatly enlarged, the original objective "to keep Signal Corps personnel and other military personnel using Signal Corps equipment informed on Signal Corps matters . . . (and) . . . to provide means for the dissemination and interchange of information of a widely-varied nature, both technical and tactical" has remained the same.

It is hoped that this objective is being accomplished.

MULTIPLE ADDRESS TELETYPE MESSAGES

A MESSAGE file rack in use in the signal center, headquarters, European Theater of Operations, is described in the ETOUSA Current Information Letter. The rack is designed to provide for the handling and transmission of multiple address messages for teletype where only one copy of the message is received by the signal center.

The rack consists of a series of slots numbered from 1 to 100 and a row of filing pockets each labeled with a call sign for one of the switchboards through which the signal center routes traffic. Outgoing message numbers are assigned from a series beginning with No. 1 for the first message after midnight each Sunday. As the message is received in the signal center the next number of this series is assigned to it.

The message is then processed as follows. For each addressee a separate slip is made out showing the message number, priority of the message and the switchboard serving the addressee's station. These slips are clipped to the message which is then delivered to the teletype room. In the teletype room the message is separated from the routing slips and placed in the slot in the message rack corresponding to the last two numbers of the message number. Each of the slips is placed in the pocket labeled with the call sign of the station through which the message must be routed.

As each switchboard is contacted the operator obtains the slips from the pocket labeled with the call sign of that particular switchboard. The messages for which slips are found in the pocket are then located in the rack by the last two digits of the serial number.

When transmission has been completed the teletype copy is attached to the original of the message which is then returned to the same slot in the file rack. The routing slip having served its purpose is forthwith destroyed. This procedure is repeated for each addressee.

When transmission has been completed to all addressees the original message has one file copy for each addressee attached to it, and the routing slips have all been destroyed.

Although this system was designed to provide particularly for multiple address messages it is used for all teletype messages, since the number of single address messages originating at the headquarters represents a relatively small percentage of the total traffic.

RADIO CONTROL CENTER

Centralizing Operation of Dispersed Radio Stations Can Make for Efficiency

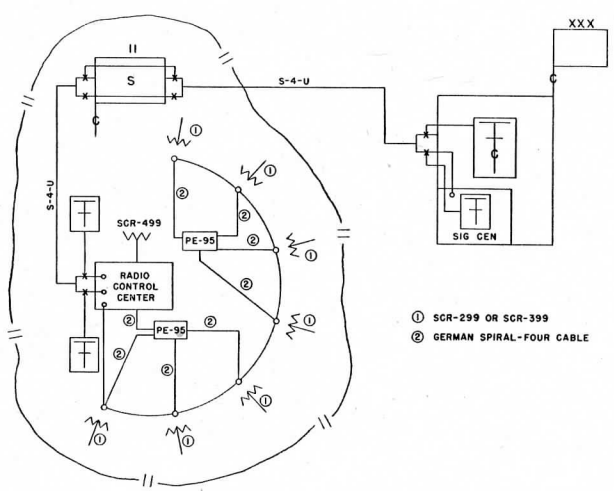
THE POSSIBLE use of enemy radio direction finding equipment during combat makes it imperative that radio sets be operated by remote control from the command post of the unit which they serve. This is especially true in units the size of a division and larger, since the presence of several radio sets in the vicinity of a command post would reveal its location, thereby making it a likely target for enemy shelling and bombing.

The operation by remote control of Radio Set SCR–299–( ), 399–( ), and 499–( ) may be accomplished by using the equipment normally issued with these sets. In this set-up, two operators are on duty at all times. One operates at the transmitter, and the other at the remote control position usually located at the signal or message center. This type of operation requires a separate field wire circuit for each radio station. The methods of operating other types of radio stations by remote control depend on the type of equipment available for such operation.

The operation of several sets by use of telephone and teletype equipment installed in a radio control center, using a minimum of personnel, is described in the following paragraphs. This system was an actual installation of a corps signal battalion, in support of a reinforced corps, having radio as a primary means of communication to the next higher headquarters. The amount of traffic passed over eight sets during one month's operation exceeded 350,000 groups. The radio control center was in the vicinity of the signal battalion bivouac area which was located approximately 1 mile from the corps command post.

The radio control center was sheltered in an improvised Shelter HO–17 mounted on a 2½-ton truck. Space was provided inside the radio control center for operating personnel, an SCR–499, and two Telegraph Printer Set EE–98. Three telephones were available to the radio control chief. One phone was connected in a series circuit to all outlying stations, another for a direct circuit to the signal center chief, and a third on a circuit to the signal battalion switchboard which, in turn, had wire communication to the corps command post. A spiral-four cable circuit was installed underground from the radio control center to the frame room of the telephone central. One pair of this cable was used by the signal battalion for a telephone circuit to the corps command post, and the other pair was used by the radio control center as a direct line to the corps signal center. Both pairs were simplexed for the use of teletype, with one of the simplexed lines running from the radio control center to a teletype machine in the signal center, and the other running from the control center to the Switchboard BD–100 at the teletype central.

A message received in the signal center for transmission by radio was cryptographed and given to one of the teletype operators at the signal center for transmission to the radio control center. Upon receipt of the message by the radio control sergeant, pertinent information about the message was entered on the radio control center log, and the message was then dispatched by runner to the radio station designated to handle the transmission. Upon clearance by the transmitting operator, a call by telephone was initiated to the control center giving time of clearance, number of the message, and any other information desired by the radio control chief. The radio control chief then entered this information on the log and sent a teletype message to the signal center chief, giving the information received from the transmitting operator.



LAY-OUT OF A RADIO CONTROL CENTER USED BY A CORPS SIGNAL BATTALION

ANTON, BERTA, CÄSAR

As a matter of interest and of possible value, the following comparison between American and German phonetic alphabets is listed:

PHONETIC ALPHABET

Alphabet	U. S.	German
A	Able	Anton
		Ärger
B	Baker	Berta
C	Charlie	Cäsar
		Charlotte
D	Dog	Dora
E	Easy	Emil
F	Fox	Friederich
G	George	Gustav
H	How	Heinrich
I	Item	Ida
J	Jig	Julius
K	King	Konrad
L	Love	Ludwig
M	Mike	Martha
N	Nan	Nordpol
O	Oboe	Otto
		Ödipus
P	Peter	Paula
Q	Queen	Quelle
R	Roger	Richard
S	Sugar	Schule
		Siegfried
T	Tare	Theodor
U	Uncle	Ulrich
		Übel
V	Victor	Viktor
W	William	Wilhelm
X	Xray	Xantippe
Y	Yoke	Ypsilon
Z	Zebra	Zeppelin

A message received at a radio station was copied by the radio operator who, in turn, called the radio control chief for a runner. The message was delivered to the radio control chief who made the necessary entries on his log and sent it by teletype to the signal center chief.

Centralized power for receivers, lights, and auxiliary equipment of the outlying stations was accomplished by using two Power Unit PE–95–( ) in the center of an area surrounded by the outlying stations. All radio stations were placed in a circle approximately 200 yards in diameter. German spiral-four cable was used for the power leads from the source to each individual station.

This centralization of power effected a saving in equipment and gasoline even though the outlying stations found it necessary to use their individual power units while transmitting. The interference caused by locating several stations closely together was kept to a minimum by proper frequency allocation and proper location of stations within the area. It is admitted that some interference was caused to stations placed in this small area, but strength of signals and abilities of the operating personnel overcame this obstacle.

Personnel of the radio control center consisted of a radio officer, either on duty or available for call at all times, and three teams of enlisted personnel consisting of one control sergeant, two teletype operators, and two runners. The runners were drivers of radio vehicles. Outlying stations were manned by a three-man team changing shifts every eight hours.

The only disadvantage of the system found during several months of operation was that messages over 250 groups long could not always be cleared as quickly as they should have been. It was SOP for the message center to dispatch a special messenger on messages of this type.

Advantages of the system in addition to those previously mentioned were:

The signal center chief had knowledge of the status of each message sent by radio.

Reporting in or out of any radio set by teletype kept telephone calls to a minimum.

Fewer operators were used than if each individual station had been operated by remote control.

The signal center had a direct line to the radio control center.

Proper supervision of all radio sets by the radio officer was more easily permitted.

FIRST ARMY LOCATOR SYSTEM

Daily Reports From Corps and Army Staffs Help Message Center Keep up With CP Moves

NEW SOLUTIONS to two old problems are presented in a report on the locator section, command echelon message center, First U. S. Army. The problems are: keeping messenger dispatchers informed as to the location of unit CPs and providing adequate messenger service to all units with the vehicles and personnel provided for the purpose.

The report states: "New arrivals poured onto the continent and units already on the continent were constantly changing CPs . . . No one source in the entire First Army was in a position to give map coordinates of CPs of all subordinate units . . . We were compelled, by sheer necessity, to set up a locator section in the First U. S. Army command message center, the function of which would be the knowledge at all times of the following:

The exact map coordinate location of every unit in the First U. S. Army.

The attachment or assignment status of every one of the above units so that the command message center would at all times be able to service their official dispatches.

The status of units of other armies, the communication zone, air force and air command as they arrived in France so that dispatches from First Army command and those sent in error to the First Army could be delivered.

To discharge this responsibility, the locator section made arrangements for reports from each corps under First Army, and from each staff section of First Army headquarters. Initial reports from corps included a complete list of the units under corps and the assignment or attachment status of each. Initial reports from each staff section included a list of the army units with which the staff section was concerned and the map coordinates of the units. Subsequent daily reports from both sources included changes and additions to data previously submitted.

To guard against the possibility of a unit arriving without the knowledge of the staff sections or the corps, and to provide for the servicing of messages addressed to units not belonging to First Army the locator cards were checked weekly against the APO list. When a unit of which no record existed in the locator section appeared on the APO lists, a form was forwarded by registered mail through APO channels, requesting complete information on the assignment and attachment status of the unit, its code name and the coordinates of its CP.

The second problem—providing messenger service to all units, was solved by dividing the First Army sector into five subsectors, each served by a message center already established, or by a message center team from the First Army's signal operation battalion. Nonprecedence messages are delivered by the command echelon message center to the subsector message center, where pickup is made twice daily by the units. Delivery of precedence messages is accomplished by special messenger, relayed at the submessage center. Registered messages only are covered by a receipt system, and all precedence messages are registered. The command echelon message center enters on the envelope of precedence messages the coordinates of the addressee.

To insure smooth and efficient functioning of this system various forms were devised to notify each unit of the name and location of the submessage center which would handle their message traffic, to indicate

HEADQUARTERS FIRST U. S. ARMY SIGNAL SERVICE
APO —— U. S. ARMY

LOCATOR SECTION—MESSAGE CENTER

SCHEDULE B 21 JULY 1944
(Date)

SUBJECT: Addition to Message Center Service.
TO :

First U. S. Army Submessage Center.

The following units have moved into your Dispatch Boundary. These units have been notified to pick up their First U. S. Army dispatches at your Message Center twice daily.

— TD BN
— CHEMICAL SG CO
— ORDNANCE AMM BN
C A DET ——
—— AAA AW BN
—— MED COLL CO
——— SIG SERVICE CO

For the Signal Officer:

This Form is:

1. Sent to submessage centers notifying them of additional units which they will service.
2. Dispatched on scheduled messenger runs to the submessage centers.

HEADQUARTERS FIRST U. S. ARMY SIGNAL SERVICE

APO —— U. S. ARMY

LOCATOR SECTION—MESSAGE CENTER

SCHEDULE C 21 JULY 1944 (Date)

SUBJECT: Official Dispatch Service.

TO : —TD BN (Army Unit)

Notice of your new location of Command Post has reached this office. Our records indicate you are now at XXXXX (Coordinates). Your official dispatches from First U. S. Army will now be forwarded to —ENGR SP (Unit)

BRIG XXXXX (Code Name) XXXXX (Coordinates).

Our service to you at this new submessage center begins 220001B (date-time group).

For the Signal Officer:

This Form is:

1. Sent to Army units who have moved their CP.
2. Sent whether change of CP moves unit into a new submessage center area, or whether change of CP takes place within same submessage center boundary. If move is one within same area, form serves as a check of map coordinates. If move is in a different submessage center area, it serves to notify unit that it will pick up its dispatches at a different submessage center.
3. Dispatched on scheduled messenger runs to the submessage center formerly servicing the unit. It is presumed that units will pick up their dispatches there until notified of change.

to submessage centers lists of the units in their respective areas, to notify corps headquarters, when a unit passed from army to corps control, that dispatches would be routed to corps by the Army message center and to notify each agency concerned of any change in information previously furnished.

Communications have been very poor during a barrage. Never send just one message. Due to artillery, our line communications have been cut most of the time. We must, therefore, employ radio instead, which has been impossible owing to lack of radios. There are far too few messages. The junior officers never place themselves in the position of the higher echelons. These are mostly so far to the rear that they cannot contact them. Every man from the private up must make it a habit to report as often as possible.

[A German battalion commander's comment on his own communications, captured by the Allies in Italy.]

COMBINED TRAINING NETWORK

On-the-Job Experience is Gained by Signal Corps Trainees in Theater Net Operations

"COMMUNICATIONS PERSONNEL being received are well trained technically, but lack the experience in processing messages and operating equipment required by overseas operations." "Send us communications personnel experienced in handling messages on a large scale." "Message center specialists fail to click as a team; they lack seasoning in net operations." These comments and many similar observations flowing back from active overseas theaters last year indicated a definite need for the establishment of a communications training net as part of Signal Corps communications center training operations.

Such training nets were established at Eastern Signal Corps Training Center and Central Signal Corps Training Center in December 1943, and at Western Signal Corps Training Center later, to provide "on-the-job" training to overcome deficiencies reported from overseas. This, "on-the-job" training as originally set up consisted of a local net for each training center, composed of simulated theater headquarters, port of embarkation, command posts, and subordinate stations. To lend realism to operations all the known means of communication were employed in the local nets, with emphasis placed on radio, teletype, telephone, telegraph, Boehme recorder, pigeons, scheduled messenger, and air messenger service.

In the spring of 1944, these three local nets were expanded into the Nation-wide training net illustrated by the combined training network chart. Through the installation of high powered transmitters and receivers radio and radio-teletype communications were provided between theater headquarters and in turn through relay equipment between lower echelons within each theater. Transmitters and receivers are usually located a considerable distance from the message center and are remotely keyed.

Radio call letters were assigned to theater headquarters as follows: WTW, Eastern Signal Corps Training Center, Fort Monmouth (net control station); WVCM, Central Signal Corps Training Center, Camp Crowder; WVCK, Western Signal Corps Training Center, Camp Kohler. When tape relay proce-

(*Continued on page 22*)

MESSAGE BOOK M-210-B

Procurement and Issue of Revised Form Becomes Responsibility of Chief Signal Officer

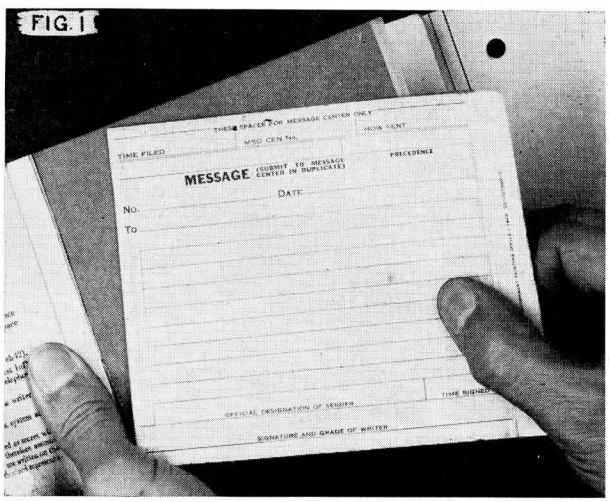
AS A result of a recent War Department decision, responsibility for the procurement, storage and distribution of Signal Corps Message Book M–210–( ) has been returned to the Chief Signal Officer. Henceforth, the Message Book M–210–( ) will be considered an expendable item of Signal Corps equipment. A basis of issue will be prescribed in Signal Corps Catalogs SIG 4–1 and 4–2 and requisitions will be made on Signal Corps depots.

This action rescinds the portion of War Department Circular No. 272, 1943, and War Department Pamphlet 12–3 under which responsibility for procurement and distribution of the M–210–A was transferred to The Adjutant General as a blank form.

Based upon revised military characteristics Message Books procured under future contracts will have the nomenclature Message Book M–210–B. In appearance the M–210–B will differ only slightly from the present M–210–A. However, modifications have been made to simplify the mechanics of operation and increase its utility for combat. The most often criticized features of the present Message Book have been the difficulty experienced in removing two copies of the message without also removing the retained (writer's) copy, and the necessity for destroying one-time used carbons which are removed with each message.

It is believed that the improved format of the M–210–B will not only eliminate these criticisms but will also reduce the time required to remove prepared messages from the book.

FIG. 1



This has been accomplished by providing a securely bound, double-faced carbon for each set of message blanks in lieu of the two separate carbons now used, and by substituting for the retained (writer's) copy a transparent sheet which is also firmly bound in the book. The retained copy is thus made by impression on the back of this transparent sheet. (See figure 1).

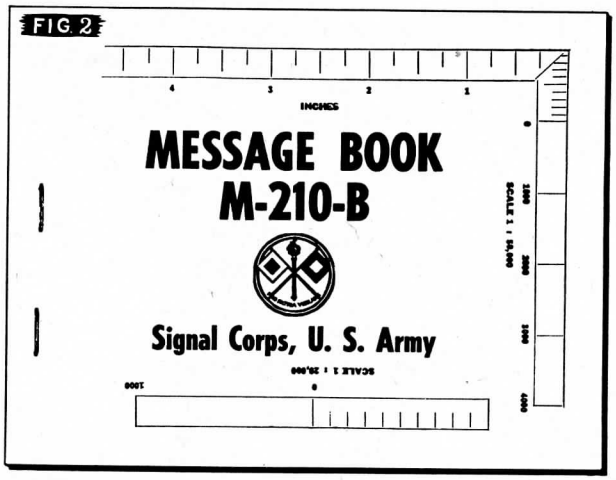
In addition to the above, the following changes have also been made:

Special forms for sending messages by pigeon have been eliminated.

Map overlay sheets have been eliminated.

Abbreviations on cover have been revised to conform to those now authorized in FM 21–30.

FIG. 2



Instructions for writer contained on inside front cover have been revised in accordance with existing policies as follows:

"10. 'Time Signed'—Must always be stated in terms of the 24-hour clock system and must be followed by the proper suffix for the time zone used."

"11. In tactical operations, simulated or actual, all messages not classified as SECRET will be regarded as CONFIDENTIAL but need not be so marked. Writers should therefore assume that their messages will be cryptographed unless the words 'Send in clear' are written on the face of the blank over the signature of the commanding officer or his authorized representative."

Instructions No. 13 and 14 have been eliminated.

Most commonly used map coordinate scales, an inch scale and a protractor have been placed along edges of book. (See figure 2).

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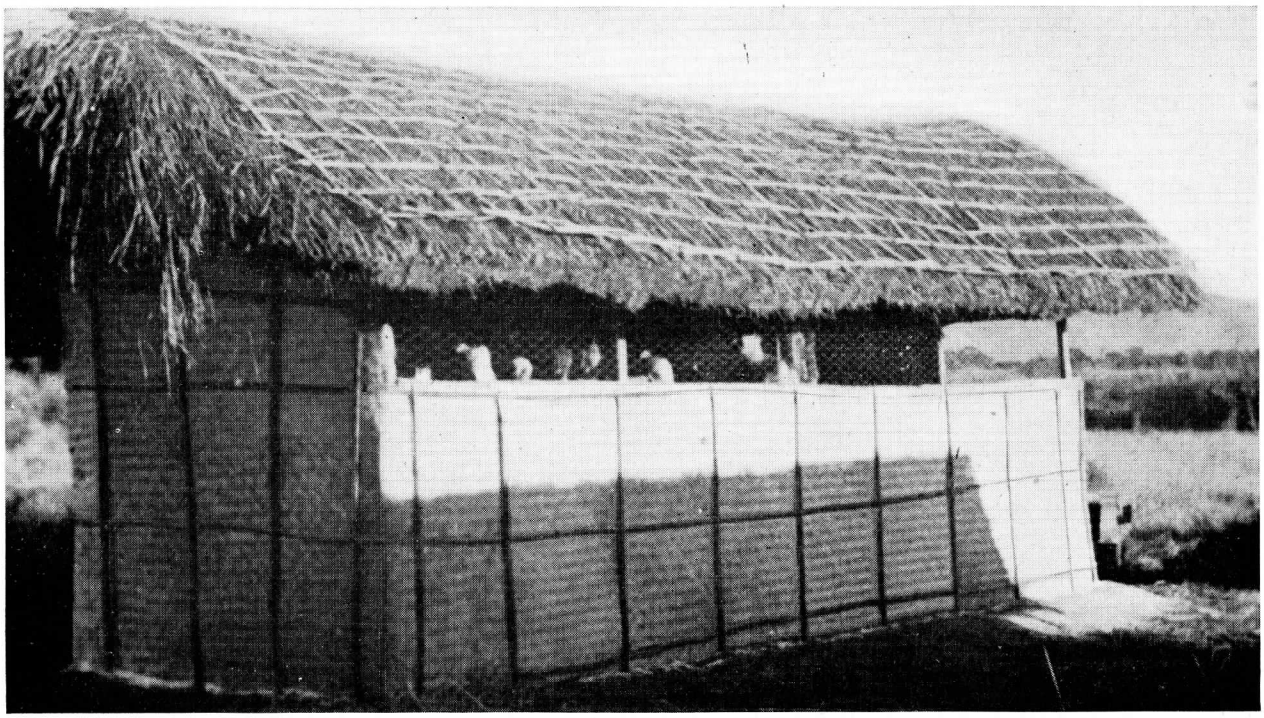


LIMITED TRANSPORTATION FACILITIES MADE IT NECESSARY TO BUILD THIS BAMBOO AND THATCH PIGEON LOFT

PIGEONS IN THE ORIENT

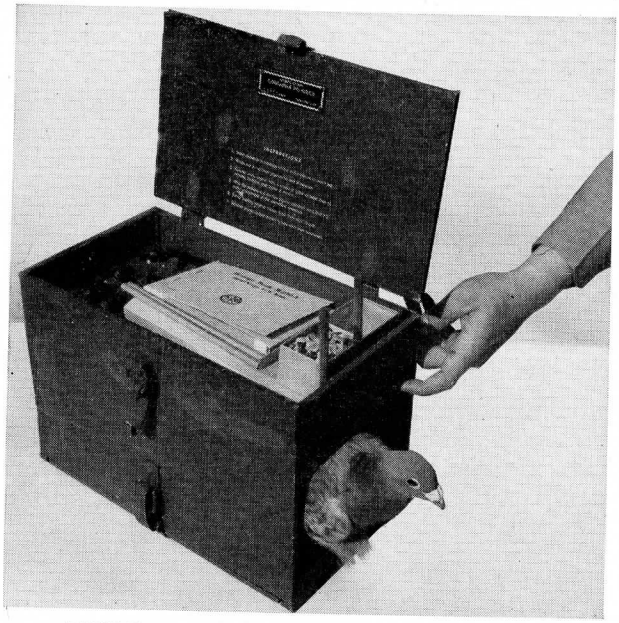
Birds Are Used to Advantage in the Far East Although They Must Be Guarded Against the Damp

PHYSICAL FEATURES of the terrain present numerous problems in establishing pigeon communication in the Far East. Mountain ranges with extremely high elevations are common and lay directly in the line of flight, beginning in the immediate vicinity of the base. Recognition of landmarks is particularly difficult because of dense vegetation and the monotony of outstanding mountain peaks. Unpredictable air currents cause sudden and unexpected rain storms of an intensity never before experienced. These rains are followed by the sun, thus creating steam and humidity. Clouds caused by low atmospheric pressure lay directly on mountain tops, imposing a barrier extending for many miles. Scattered showers compel pigeons to deviate from their normal line of flight in returning to their base.

Numerous native hawks are a definite hazard in settling pigeons; the most common being the native Kite, which is similar to the Coopers Hawk of the United States. Although not particularly aggressive or responsible for mortality among pigeons in this theater, they frequently attack flocks of pigeons in the process of being settled. Pigeons in excellent condition are not forced down by hawks; however, the presence of hawks in the immediate vicinity of the loft often delays the birds in returning and alighting promptly.

Extra precautions must be taken to guard against the perpetual dampness that prevails during the monsoon season. Rain storms, aggregating two inches or more in extreme cases, produces a surface drainage that results in miniature floods. Deep ditches are dug around all breeding lofts to carry away the excess water, and leakage is prevented by placing canvas strips over the section joints on both roof and sides. Hinged shutters over the windows are adequate in preventing the entrance of rain, but are not feasible during daylight hours as they prohibit proper ventilation and lighting. It is necessary, therefore, to construct fourteen-inch eaves above all window tops to prevent the entrance of water during severe storms.

Extreme heat is encountered prior to the monsoons. Most activities cease during the midday hours throughout this period. All lofts are placed beneath shade trees to avoid the direct and intense rays of the sun



PIGEON CONTAINER PG–107/PB HOLDS TWO BIRDS

and corresponding humidity which retards breeding activities. The heavy foliage gives protection from both sun and rain to some extent.

SANITATION MEASURES RIGID

Strict adherence to rigid sanitation is habitual as a result of ready contamination caused by dampness. Lofts are scrupulously cleaned three times daily. Dry sand is used on the floors of the lofts and aviaries, and is replaced twice each week, at which time the lofts are thoroughly disinfected. Sawdust, being very absorbent in nature, is used in all nest boxes. Cedar shavings are most commonly used for nesting material. The birds are fed from hoppers to prevent contamination of the feed.

The number of insects is greatly increased by the heat and dampness. The most annoying pest to the birds is a specie of small black ant that colonize in the cracks of the lofts and under the nest bowls. Their diet apparently consists of feather debris. Termites are a constant menace and in a matter of hours will destroy any wood contacting the ground. The lofts are raised twelve inches from the earth on a foundation of creosote bricks to prevent infestation. Mud is often splashed on the bricks during tropical rains. The termites then build a tunnel through the mud and attack the lofts. Aviaries are also elevated, to prevent direct contact with the termite-infested ground, the floor being a layer of treated bricks to discourage destruction by these pests.

Feed is placed in the sun at regular periods to reduce the possibility of contamination by grain pests. Cod liver oil is added approximately every third day. Grit is mixed and fed in accordance with instructions contained in memorandum from the Army Pigeon Service Agency, and is much relished by the birds.

A high percentage of lost vigor was expected among the birds as a result of the several climatic changes that were encountered and the long period of confinement while en route from the States. However, the vitality of the young birds is very satisfactory and the fertility of eggs was unusualy high. In one unit alone, approximately 1,000 youngsters were produced from the first round of eggs, and are as fine as any raised in the States. The rate of growth was more rapid than normal as a result of the hot climate. This was evidenced by the necessity for banding young birds at five rather than eight days of age. The body structure, feather and general appearance of the youngsters were exceptional.

Pigeons are inspected frequently, particularly for diseases of the throat and respiratory system. Diseased specimens are removed immediately from the loft. Only a small percentage of birds had to be destroyed since common diseases prevalent in tropical countries were almost entirely absent.

TRAINING IS DIFFICULT

The pigeon training program is conducted under adverse conditions. All birds not used in the breeding program are undergoing training, regardless of age. Losses during training are much higher than normal. The endurance required to fly 150 miles in

GOOD FOR JUNGLE TERRAIN IS THE COMBAT LOFT PG–68/TB

this theater is equivalent to that required for a 300-mile flight in the States, therefore, only young birds which are above the average can be utilized for messenger service.

Demonstrations are conducted down to and including front line infantry units and signal officers are encouraged to use pigeons in their training programs. Pigeon personnel visit each unit message center to instruct personnel in the proper method of handling, feeding and releasing pigeons. Directions are also placed in each pigeon container instructing using personnel in the watering, feeding and care of the birds.

A unit was operating, independently of any other means of communication, over a circuitous route extending 67 miles, which required travel to be accomplished with mule pack. Twenty-eight pigeons delivered messages successfully from a distance of 15 miles, air line, over densely wooded terrain during continuous rains. The average time involved during these flights was less than 40 minutes.

Two-bird container, Pigeon Equipment PG–103/CB, is used in transporting birds and is excellent because of its lightness and small size, and its adaptability for use with mule pack. The self-cleaning feature of the container is especially helpful in keeping the feathers from becoming soiled and wet.

The combat Loft, PG–68/TB, is particularly adapaable for use in this theater. The compactness and light weight of the loft makes it possible for it to be transported in jungle terrain.

Signal and communication officers in lower units must be thoroughly familiar with the capabilities and limitations of pigeons to insure the maximum and proper use of this agency of signal communication.

The pigeon officer should be notified when moves of command posts are contemplated, in order that lofts may be established in the new location in sufficient time to allow the birds to settle.

Pigeon officers should take full advantage of every opportunity to instruct, demonstrate and particularly to establish liaison with officers of other units to familiarize them with the many uses of pigeon communication.

TRAINING NETWORK

(*Continued from page 16*)

dure was added, call letters MO, CO, and KO were assigned to Fort Monmouth, Camp Crowder, and Camp Kohler theater headquarters respectively. Until the closing of Camp Kohler last month, communications were maintained on a 24-hour basis among the three headquarters. Field installations at each center were also on the air, day and night, when personnel was available. This training continues at the present time between Crowder and Monmouth.

This constant operation has resulted in a realistic situation with many of the problems found in overseas theaters closely duplicated. Since the number of frequencies available for assignment by Army Communications Service to each training theater headquarters has been limited by War Department requirements, personnel have had valuable training in selection and changing of frequencies in their effort to keep on the air without interfering with vital communications.

The care and maintenance of equipment while it is in use is another phase of net operation training constantly being stressed both in theater headquarters and subordinate stations. Speed and accuracy are developed in performing operational adjustments, minor repairs, and substitutions of components whenever required.

The volume of traffic has been sufficiently heavy and varied to give operating personnel the feeling of being on the job. Approximately 1,200 messages, averaging 70 groups, have been handled daily by headquarters stations. Messages handled simulate traffic handled in an actual theater headquarters station, as to length, content, priority, addresses, and classification. Until a standard procedure for large signal centers is approved, tentative signal center procedure for large headquarters is used for instructional purposes in conjunction with AR 105–25, AR 380–5, CCBP's and FM 24–5 in processing messages in the message center.

Personnel manning the nets are teams from units undergoing training in the unit training centers. Each specialist takes over that part of the net for which he has been trained. This affords much desired practice in net operation procedures, as well as cooperation and coordination of effort as a team. Officers and men manning a command post are often required to move their station at a moment's notice. Speed in moving command posts, reestablishing and maintaining communications contact, necessary to meet the needs of the fluid tactics of today's warfare, is stressed in all field exercises.

EQUIPMENT TROPICALIZATION

Lacquer Spray Treatment Still Best Method of Combating Effects of Moisture and Fungi

THE NEED for protecting electrical equipment against the effects of high humidity and dampness has been recognized by the Signal Corps for many years. However, prior to the present war the amount of trouble caused by variations in climatic conditions was not of serious proportions, since only a small amount of signal equipment was in use outside of the temperate zone and most of this was of fairly simple design, usually operated in protected locations.

In the present war United States troops are operating in all parts of the world and in every type of climate. With the enormous expansion of the armed forces that has taken place it has been necessary to procure an immense quantity and variety of signal equipment, much of which is of entirely new and complex design. Many of the designers had very little experience with the effects of high humidity. In some localities troubles soon developed even in equipment designed for use in damp places, and equipment in which no special precautions were taken against dampness often failed after a few hours of operation. In many instances equipment was even found to be inoperative when received by the using organization, due to the moisture absorbed in transit and during storage. Under conditions of high humidity fungus growths, which usually manifest themselves in the form of mold or mildew, often appear within two or three days on such materials as leather, cloth, insulation, and even metal. Such fungus growth has a very destructive effect on most materials, and also results in electrical leakage when it occurs on wiring or insulation. Fungi are especially prevalent in tropical climates but they are found wherever dampness is present although their growth is comparatively slow at low temperatures.

The principal effects of moisture are electrolysis, corrosion and electrical leakage. These are increased if salt is also present, as is usually the case near the sea. The growth of fungus aggravates these conditions, as well as forming conducting films on insulating materials and across air spaces between conductors. Fungus growths also produce chemical products which have a corrosive action. Moisture may enter equipment in the form of rain or spray, but it is more likely to be carried into the equipment in the form of vapor.

Increases in temperature cause the air within the case of a set to expand and flow out. When the temperature decreases a partial vacuum is created within the case, causing air to flow in. The lowered temperature of the parts within the case causes the water vapor in the air to condense, forming a film of moisture on all surfaces.

A pool of water may also collect in the bottom of the case if there is no drainage. This action occurs also in components such as transformers and capacitors unless they are hermetically sealed. In these components a very small amount of moisture can do a great amount of damage. A large number of equipment failures have been traced to the effects of moisture and the fungi which flourish in damp places.

PROTECTIVE MEASURES

The most satisfactory way to prevent damage caused by moisture and fungi would be to design the equipment and components so that they will be practically unaffected by these agents. This, of course, can be done only in the case of equipment which is still in the design stage. For equipment already on hand it has been necessary to develop a protective process. At the present time the Signal Corps laboratories are engaged in an extensive research program with the object of developing equipment and components which will be moistureproof and fungiproof.

Since improved design is of no benefit to equipment already manufactured or in use the greatest immediate problem is the protection of existing equipment. The most obvious, although usually not the most practical, preventive measure is to keep the equipment dry. One method of accomplishing this, in the case of permanent fixed installations, is the use of air-conditioning to reduce the humidity of the air in the room housing the equipment. This solution is usually not practical except for large telephone exchanges or radio stations. A simpler method is based on the fact that moisture will not condense on a surface which is always at a higher temperature than the surrounding atmosphere. In radio equipment this can often be accomplished by keeping the tube filaments heated during standby periods. This, of course, is undesirable for battery-operated equipment because of the excessive consumption of batteries. Some large pieces of equipment have been equipped with heaters to prevent the accumulation moisture during standby periods. This has

FIELD WIRES AND CABLES

The accompanying chart outlines information on the electrical and mechanical characteristics of the present types of Signal Corps tactical field wires and cables as currently produced. It

Description				Construction					
Nomenclature	Use	Classification	Specification	Conductor material	Number of strands	Diameter of strands (in)	Equiv. AWG (all strands)	Insulation	Outer co
Wire W-110-B	Field wire	Standard	71-478	Steel Copper Copper	4 2 1	0.013 0.013 0.014	19	Buna S	Impregnated cott
Wire W-130	Assault wire	Substitute standard.	71-925	Steel Copper	6 1	0.0095 0.010	22	Rubber laytex	None
Wire W-130-A	Assault wire	Standard	71-925	Steel Copper	6 1	0.0095 0.010	22	Vinylite	None
Wire W-130-C	Assault wire	Standard	71-925	Steel Copper	6 1	0.0095 0.010	22	Polyethylene	None
Wire W-143	Long range voice frequency field wire.	Standard	71-3012	Copper	7	0.0216	15	Buna S	Stabilizing tape impregnated co
Cable WC-534	Field cable (5-pair)	Standard	71-983	Copper	Solid	0.036	19	Rubber	Neoprene or Bun
Cable WC-535	Field cable (10-pair)	Standard	71-983	Copper	Solid	0.036	19	Rubber	Neoprene or Bun
Cable assembly CC-358 (spiral-four)	Field cable (carrier frequencies 0-12000 cps).	Standard	71-1501	Copper	7	0.0152	18	Buna S	Neoprene or Bun
Wire WD-3/TT	Assault wire	Substitute standard.	71-925	Steel Copper	6 1	0.0095 0.010	22	Rubber laytex	Impregnated cott

*Talking range between two Telephones EE-8-( ) based on a 30 db circuit, nonre

not proved entirely successful because most of this equipment is supplied from its own independent power unit, which is usually of such size that it is not economical to operate it merely to supply the heaters. Also, the heaters do not provide any protection when the equipment is in transit or storage.

At the present time the best known method of protecting finished equipment from the effects of moisture and fungi consists of thoroughly drying the equipment and then applying two or three coats of a special fungi-resistant lacquer developed for the purpose. This lacquer reduces the absorption of moisture to a negligible amount, and at the same time practically prevents the growth of fungi.

The lacquer treatment has proved very satisfactory in actual operations. Numerous reports on its effectiveness have been received from the various theaters of operation.

It is to be expected that the treatment will gradually lose its effectiveness after the initial application. However, at the present date there has not been sufficient experience with the treatment to determine how long it remains effective. Also, it is not known at this time whether equipment to be reprocessed will require a repetition of the complete treatment or merely drying. A survey is being made to obtain answers to these questions, based on the experience of troops in the theaters of operations.

New processes for field treatment of equipment are being developed. These will probably supplement the present process rather than replace it, as it is probable that no single process will be most suitable for all types of equipment.

PLANS FOR TREATMENT

Plans have been prepared for treating all signal equipment that has been delivered to the Army. This has been divided as follows: equipment in the hands of troops; equipment being repaired or in storage.

Tentative plans have been written covering the treatment of equipment in storage and in the hands of troops, both in the continental United States and in the theaters of operations. Equipment is now being treated according to the procedure outlined in these plans. Treatment of equipment in storage is being accomplished by contract and by treating facilities established at some depots. All signal equipment sent in to fourth and fifth echelon repair shops in States is being treated by the present time about 6 ice command repair s equipment sent in for re ing shops will start this are equipped to do so the hands of Army G being treated in accord tive. Specially trained to expedite this program

The following procedu treatment of the equipn troops in the continental

The units with the hi issuance of "controlled will receive first consider determine first priority f following factors will b order of their importa known), approximate signal equipment.

One of the most im moisture and fungi proof the training of personnel the process. The first c given in the latter part officers and enlisted me

trical ignal . It will be noted that most of these wires and cables now employ synthetic insulations and jackets and that some of their characteristics differ somewhat from those previously published. A variety of types of assault wire is being produced to fully utilize all available facilities and materials. When conditions permit, Wire W–130–C will be the only standard assault wire.

		Electrical Characteristics					Physical Characteristics				
Outer covering	Diameter over all single cond. (in)	Talking range, miles. *See note	Attenuation db/loop mile (68° F. 1000 cps)	DC Res ohms/loop mile (68° F. max.)	Impedance ohms/loop mile (68° F. 1000 cps):	Equiv. AWG copper, based on resist.	Weight lbs./mile max.	Total breaking strength (lbs.) min.	Packaged on	Length in packing	Weight wire and reel (lbs.)
ıated cotton braid	0.147	Dry 18.0 Wet 11.0	Dry 1.7 Wet 2.7	192.7	653	22	140 (avg. 135).	290	Reel DR–4 Reel DR–5	½ mile 1 mile	92 174
	0.063	Dry 9.6 Wet 5.6	Dry 3.1 Wet 5.3	702		28	31.68 (avg. 29).	110	Reel DR–8 Reel DR–4 Commercial reel	½ mile 2 miles ½ mile	18 86
	0.063	Dry 8.3 Wet 4.5	Dry 3.61 Wet 6.67	702		28	39.6 (avg. 37).	110	Reel DR–8 Reel DR–4 Commercial reel	½ mile 2 miles ½ mile	22 101
	0.063	Dry 10.2 Wet 6.1	Dry 2.94 Wet 4.92	702		28	31.68 (avg. 27).	110	Reel DR–8 Reel DR–4 Commercial reel	½ mile 2 miles ½ mile	16 78
ing tape and over-all gnated cotton braid.	0.0335, maj. axis, 0.225, min. axis (finished wire).	Dry 27.0 Wet 27.0	Dry 1.11 Wet 1.11	35.9	178	15	(Avg.) 280	200	DR–5	⅝ mile	232
ıe or Buna S Jacket	0.5	Dry 21.4 Wet 20.0	Dry 1.4 Wet 1.5	91	309	19	660	425	DR–5 DR–7	1,000 ft ½ mile	159 370
ıe or Buna S Jacket	0.7	Dry 21.4 Wet 20.0	Dry 1.4 Wet 1.5	91	309	19	1320	750	DR–7	1,000 ft	290
ıe or Buna S Jacket	0.43	Dry 40 Wet 40	Dry 0.75 Wet 0.75	76.56	316	19	(Avg.) 528	500 steel braid	DR–15	¼ mile	173
ıated cotton braid	0.078 to 0.093	Dry 10.0 Wet 5.5	Dry 3.00 Wet 5.45	702		28	49.63 (avg.) 43.	140	DR–8 DR–4 Commercial reel.	¼ mile 1 mile	14.4 72

uit, nonrepeatered and nonloaded, except CC–358 which contains built-in oading coils.

ıops in continental United ated by shop personnel. At ıbout 60 percent of the serv- epair shops are processing ı for repairs and the remain- rt this work as soon as they do sc. Signal equipment in ny Ground Forces troops is accordance with AGF direc- rained teams are being used rogram.

procedure has been set up for equipment in the hands of inental United States:

ı the highest priority for the trolled items" of equipment consideration as a group. To riority for a specific unit the will be considered in the mportance: destination (if imate time before packing

ıost important parts of the gi proofing program has been ersonnel in the application of e first course of training was r part of 1943 to a group of ted men at the Camp Coles Signal Laboratory. The officers were sent to various theaters of operations to provide technical assistance in treating the equipment of combat units and to train additional personnel. In December 1943 a similar course was given to two civilian repairmen from each of the following training centers: Atlanta, Philadelphia, Chicago, San Antonio, and San Francisco.

Training courses for military personnel have been established at Camp Crowder, Fort Monmouth and Holabird Signal Depot. In May of this year 15 teams, each consisting of 1 officer and 6 enlisted men, were trained at the Holabird Signal Depot for the purpose of treating the equipment in the hands of tactical organizations in the continental United States and at the same time instructing personnel of these organizations in the moisture and fungi proofing process. These teams are now engaged in processing the equipment of organizations stationed in their respective service commands. Each team is equipped with transportation and a set of portable treating equipment which can be set up in any convenient location, and can operate as a self-contained unit.

A technical bulletin, TB Sig 13, entitled, "Moistureproofing and Fungiproofing Signal Corps Equipment," has been printed. This is a general description of the lacquer spray process and its application. In addition several technical bulletins containing detailed instructions for treating specific equipment have been published. Supply Bulletin SB 11–10, entitled "Signal Corps Kit and Materials for Moisture and Fungi Resistant Treatment" contains ordering information on fungus resistant lacquer and equipment for applying it. All new technical manuals on the maintenance of specific items of equipment will contain detailed information on moistureproofing and fungiproofing of the equipment covered by the manual, if such information is available at the time of publication. A film bulletin showing details of the process, including expedients to adopt the procedure for various field conditions, is now being distributed.

Technical assistance and additional information on the application of the moisture and fungus proofing process may be obtained upon request to: Commanding Officer, Signal Corps Ground Signal Agency, Shark River Hills Hotel, Bradley Beach, N. J.

ANTIJAMMING TRAINING

Records and Other Material Available for Simulating Realism in Program for Operators

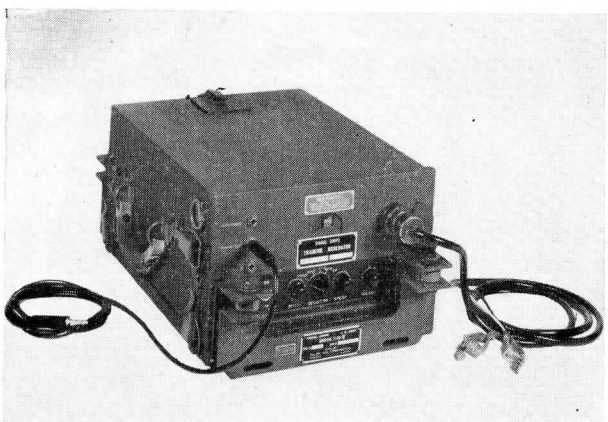
LATEST AID for the training of radio operators to help them get through enemy jamming is a series of phonograph recordings currently available in most theaters of operations or through normal Signal supply channels to The Office of the Chief Signal Officer, Attention: SPSAP. These records are also useful in helping train radio operators to get through other forms of interference, manmade or natural.

The records are of the 12-inch, 78 revolutions-per-minute type which are the same as those used in ordinary phonographs. Three different groups of recordings have been prepared, each group consisting of 3 records. Packed for air shipment the weight and space will be approximately 1.75 pounds and 0.1 cubic feet per group.

The record groups are entitled and described as follows:

Group A: Interference Signals—These records include 6 types of interference signals and may be used for applying interference to code table training and for possible use in modulating test oscillators and transmitters. The interference signals are bagpipes, noise, sweep through, howl, spark and random keying.

Group B: CW signals masked by interference—These records are composed of CW signals masked by high, medium and low level interference. The CW is in the form of coded groups taken from TM 11–432, 2 February 1942.



TRAINING GENERATOR AN/URA–T1 ON MOUNTING FT–250

Group C: Auditory Test No. 2—These records are composed of spoken words masked by interference. Complete instructions, test blanks and answers are included with this group.

Group C is also useful in determining which men have an aural acuteness above the ordinary run of radio operators.

Makeshift sources of jamming for training can also be made from materials available in the field. One suggestion utilizes a spark coil (T model Ford type), any ignition coil (with homemade breaker points) or magneto. If any of these coils are run near the radio set it is desired to jam, interference will ensue. It will also be helpful to add some sort of antenna. An electric razor is also an effective means of producing interference.

A second makeshift method utilizes any standard Signal Corps transmitter. For unmodulated interference, the transmitter should operate cw; for tone modulation, on mcw. A microphone can be used in four ways to produce interference: to interpose another voice in a voice circuit; to pick up music from a phonograph record (this can be improved by scratching the record so that discordant noises occur, or a recording of interference can be the subject of a platter); to pick up odd noises, such as from the exhaust of a motor, noise-makers, gasoline engines, etc.; or to pick up sounds from a receiver that is tuned to another station, not well-tuned to another station (gain should be up for this one), or tuned to jamming.

Available also for training purposes is Training Generator AN/URA–T1, an electronic device which supplies an audio output of jamming noises. The AN/URA–T1, can be used to modulate any Signal Corps transmitter with bagpipes, random noise (hiss or rush of sound), random keyed cw or random keyed mcw. When used to modulate a transmitter it can be operated off 6 or 12 volts dc or 110 volts, 50 or 60 cycles, ac. When used with a 110-volt ac power supply, the AN/URA–T1 can be set to supply a high power audio output to feed into a code table, earphones or loudspeakers for antijamming instruction purposes.

Other training aids include:

TB Sig 5. This is a War Department publication called "Defense Against Radio Jamming." It is divided into three sections which give antijamming

instructions to commanders and their staffs, Signal officers, and radio operators respectively.

TB Sig 54. This is a War Department publication called "Working Through Jamming With Frequency Modulated Radio Sets" which details receiver adjustments that are used in combating jamming of FM radio sets.

TF 11–2068. This is a War Department training film entitled "Defense Against Radio Jamming" and is a dramatic presentation of antijamming techniques to be performed by radio operators. The film is also extremely useful in providing orientation of all personnel in the principles of antijamming techniques for radio operators.

AJ TRAINING EXERCISE

Purpose: To train radio operators in antijamming techniques and the recognition of jamming types by the use of ordinary radio equipment.

Time required: Approximately 12 hours (three separate periods).

Personnel required: Efficient officers and noncommissioned officers to serve as instructors, and sufficient operators to operate one radio set as a training jammer for each net set up in the field exercise.

Equipment required: One radio set, of the same type as is used to set up the nets of a field exercise, to serve as a jamming station, for each net set up, plus modification, if any, needed to make the radio set a makeshift jammer. Additional monitoring equipment is highly desirable but not absolutely necessary.

Outline of teaching program

General: The training program is divided into three parts which present jamming signals of increasing difficulty. Operators undergoing training first learn the simple and most important countermeasures against jamming, then, the more difficult countermeasures. A general lecture and demonstration precedes the entire exercise and a brief demonstration precedes each three hour field exercise. The detachment selected to operate radios as jamming transmitters should include as many experienced operators as possible. These operators must be given some special instruction and practice in the operating of their sets so as not to interfere with frequencies not used in the exercise. It is essential that means be taken to confine the jamming to the frequencies allotted to the exercise.

First day

One hour—Arrangements for jamming detachment, instructions and practice.

Thirty minutes—Lecture and demonstration; antijamming techniques.

Fifteen minutes—Demonstration and review; combating cw jamming, use of tuning control, crystal filter (if available), beat frequency oscillator and volume control.

Three hours—Radio exercise with jamming detachment supplying cw jamming, continuous and keyed; and radio operators organized into nets and transmitting traffic. Instructors circulate among operators and demonstrate antijamming techniques.

Second day

Fifteen minutes—Critique and review of antijamming techniques and demonstration of combating mcw, voice, and music jamming.

Three hours—Radio exercise with jamming detachment supplying bagpipes, keyed mcw, voice and music jamming with some cw jamming. Instructors teaching antijamming techniques.

Third day

Fifteen minutes—Critique and review of antijamming techniques—demonstration of combating intense and wideband noise jamming, demonstration of limiting, both electrical and aural.

Three hours—Radio exercise, jamming detachment supplying jamming signals such as spark jamming or ordinary radio transmissions modulated with random noise from Training Generator AN/URA–T1 or any rough intense sound such as gasoline exhaust, electric motor noise, or special phonograph record sounds, also some cw, mcw, voice and music.

TROPICALIZATION TREATMENT PROBLEMS

One of the difficulties found due to the processing has been the effect on the alignment of radio sets caused by slight change in circuit constants due to the application of the lacquer and which are discernible only by electrical tests and measurements. The most immediate change is noted in the alignment of the set after the application of the lacquer. The only correction that can be made is to realign the set in accordance with instructions. Another important item in regard to alignment is the fact that the lacquer evidently goes through an aging process up to a maximum period of ten days. A set may be realigned immediately after treatment and brought up to peak performance and after a period of a day or two, the output will gradually drop until it becomes noticeable to the ear. The set must be then realigned to its maximum performance and if the aging period has been a week to ten days, no further changes in alignment occur. This has caused considerable difficulty in the field, and it has been recommended that wherever possible, the sets be allowed to dry for a period of at least three or four days before alignment is attempted.

One of the most common troubles is that lacquer is sprayed or brushed on the trimmer capacitors causing the plates to stick together. At times, when the capacitors are forced to move during the alignment process, the plates are broken off which necessitates replacement of the capacitor. If the lacquer is just applied to a single plate or to part of one of the plates, the operation of the capacitor is very erratic and makes alignment most difficult. The one solution to this is to clean the lacquer from the plate affected. In order to get away from this difficulty, all trimmer condensers should be thoroughly masked so that lacquer cannot reach any part of them.

Another difficulty found is that trimmer adjustment screws are not properly masked and many of them are broken because the lacquer has dried and attempts are made to force the screws to turn. These screws should be masked thoroughly.

Tuning slugs are a ready source of trouble. This is due mainly to the mechanical operations necessary to remove the slugs from the coils and many of them are broken or damaged. In some cases, lacquer was applied by accident and had to be cleaned off before replacing the slugs. Extreme care must be exercised in removing and replacing these tuning slugs.

The adjustment of discriminator circuits after treatment is very critical on fm receivers. The lacquer seems to have more effect on this circuit than any other part of the radio set. Field repairmen have been cautioned to use extreme care in making adjustments on all discriminator circuits.

Caution should be used in masking so that wires associated with tuned circuits are not moved during the process. The movement of these wires will cause slight change in capacity and, in some cases, will necessitate retracking of the set.

In all cases it is essential that the equipment be tested before processing so that when final tests are being made after processing, the repairman can be certain that the only difficulty he may encounter with the equipment is realignment and/or troubles that may have been introduced due to the processing procedure.

Other difficulties not directly related to alignment are as follows:

Relay armatures sticking due to lacquer binding the armature. Many relays have been sprayed in the past and due to the extreme difficulty in masking some relays so that no lacquer will contact the armature, it is recommended that the lacquer be brushed on or that the relay be completely covered by masking.

Bearings on some dynamotors were found to be dry after treatment. It was determined that in some cases, the proper grease had not been used for these bearings. During the heating process, the grease had melted and ran out causing the bearings to run dry. All bearings should be checked after treatment to determine if they are properly greased.

The application of the lacquer to some dynamotor armatures has caused some difficulty, due to the lacquer not being compatible with the impregnating varnish used by the manufacturers on these armatures. After application the dynamotors would run for two or three hours and burn out. It was determined that this was due to the dissolving action of the lacquer on the varnish causing the armature to throw out the varnish and short some of the turns. This did not happen to all dynamotors treated however, and since it cannot be determined which varnish used by the manufacturers is affected by this lacquer, it was recommended that the armatures of all dynamotors be left untreated.

On sets that are inclosed in waterproof cases, it is recommended that the sets be left to dry out of the cases for a period of at least 24 hours. If the sets are placed in their waterproof cases before completely dry, the accumulation of fumes within the case may cause an explosion upon putting the set into operation. Several explosions have occurred due to this factor.

Some meters have been affected by the treatment process. The exact cause has not been determined, but is probably due to one of the following conditions: heat may have some effect upon the meter, but this is doubtful; the heat elements in the drying ovens may have an electrical field existing around them and when the meters are placed within this field, changes may occur in the meter magnet. This is the most probable cause of the difficulties encountered with the meters.

TANK-FIGHTER COMMUNICATIONS

Signals Between Planes Aloft and Tanks Below Make a Hardhitting Fighting Team

THE FIGHTER-TANK team that spearheaded the breakthrough west of St. Lo during the latter part of July worked "with all the smoothness and precision of a well-oiled watch," according to a report received in the War Department from a representative of the office of the Secretary of War. "The crux of the matter, naturally, was communications," the report pointed out. "This was solved by putting SCR–522's in tanks, half-tracks, and jeeps." The following are extracts from the report:

Tactics centered around the armored divisions. Each division had one or more tank columns moving across the country with artillery and infantry backing it up. The spearhead of the advance was a large detachment of tanks, moving down one or more parallel roads. In the forefront, usually right with the armored column commander, was an Air Corps "air support control officer" with an SCR–522.

The breakthrough was touched off with an intense bombardment of the German front . . . by the 8th and 9th Air Forces. Then when the armored divisions started moving, the fighter-tank team came into action. The tanks were literally led by the fighters. Each move they made was scouted by pilots aloft. It was fascinating to listen in to the interplay between air and ground. All conversation was in the clear, and there was no restriction on geographical information because the forces were moving so fast that the Germans were unable to move their dispositions to meet developing thrusts.

Needless to say; the VHF band was jammed with traffic, but not by Jerry.

Here are some examples:

The first was an early morning mission, and the German tanks and artillery had withdrawn from contact as we started off. The tank column was just coming up within range of the brow of a hill as fighters appeared on the scene.

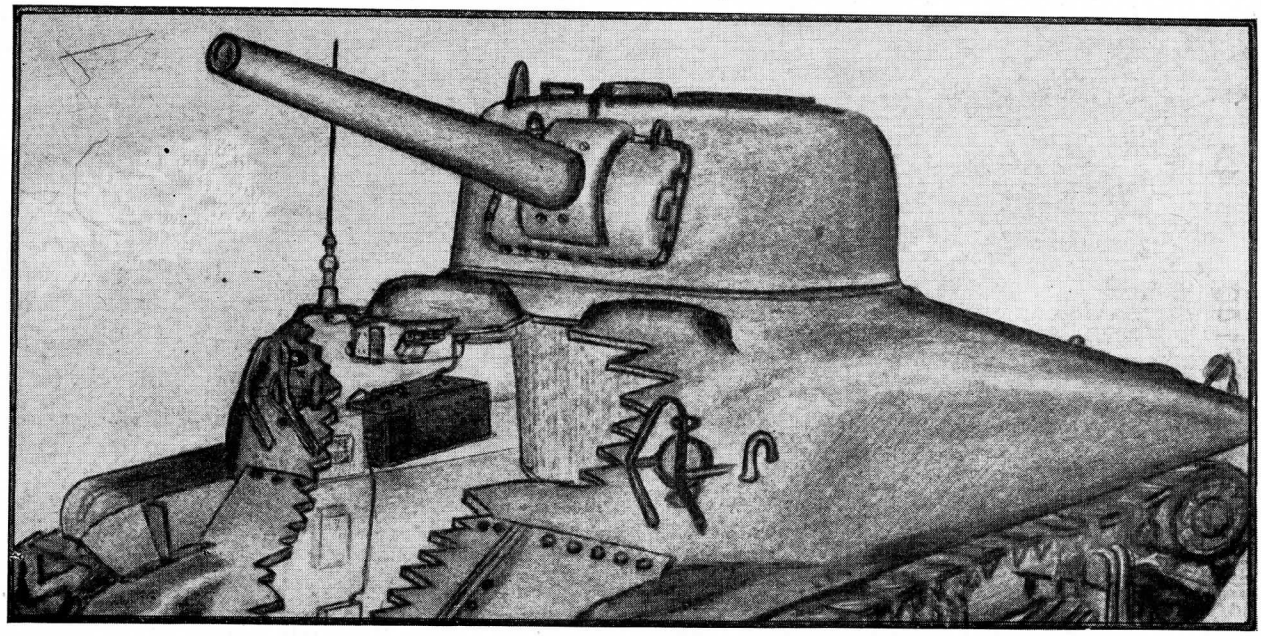
"Hello, Kismet Red, this is Bronco. Have you in sight overhead. We have no targets now. Is there anything in the woods off to the left or over the brow of the hill ahead?"

Five minutes later the answer came back.

"Bronco, this is Kismet Red. Don't see anything in the woods and there is nothing over the brow of the hill. There are twelve Tiger tanks about four miles down the road retreating. Shall we bomb them?"

"Kismet Red from Bronco: Yes, go ahead and bomb them. Save some of your bombs if you can."

So the P–47's went down and caught the enemy tanks in a ravine. They blasted the leading tank in the first pass and stalled it. The others couldn't turn



CUTAWAY VIEW OF MEDIUM TANK M4 WITH RADIO SET SCR–522–( ) INSTALLED FOR PLANE-TANK COMMUNICATIONS

around and they were caught like eggs in a nest. Systematically the P–47's worked them over from very low altitude and destroyed them all.

In another mission, a tank detachment was catching shell fire from a woods a couple of miles to the left. The airplanes couldn't identify the target, so the tank artillery laid a red smoke shell on the aiming point. The fighter squadron dropped all its bombs on this wood and the firing stopped. The tanks moved on. The P–47's continued to fly cover, though without their bombs.

A couple of miles further along eight tanks were spotted coming down a road at right angles to our force, which would bring them head on into the flank of the column. The pilots called this down to the unit commander, who had had no previous warning. The planes went down and strafed the tanks again and again until their ammunition was nearly gone. Then they observed a peculiar thing. A jeep detached itself from our tanks and drove gingerly down the road toward the Hun tanks. It drove in and out among them in a hesitant uncertain fashion. After a while Germans started to pile out of the tanks.

The whole column had surrendered to the fear of those little Hornets.

Radio Set SCR–522–( ) is a 6-watt, 4-channel voice set in the 100 to 156 mcs range. It is crystal tuned and has a range of 130 miles at 10,000 feet altitude when used in aircraft. It is powered by a 24-volt storage battery and Dynamotor Unit PE–94–( ).

The need for air-tank communication became evident during the Tunisian campaign late in 1942, and tests by the Signal Corps, Air Corps, and Armored command began early in 1943.

The SCR–522, installed in a tank, is supplemented with brackets for mounting and cording for connections. Microphone Adapter M–299 was added in order to match the single-button carbon tank microphone to the input circuit of the SCR–522 circuit which is designed to use a magnetic type microphone. The antenna system is made up of Mast Base MP–48 and one Mast Section MS–53. The median range of the SCR–522 installed in a tank is 60 miles, with aircraft at altitudes from 5,000 to 20,000 feet.

ROTATION OF REGULAR ARMY OFFICERS

Many officers, assigned to staff and overhead positions in Washington at the outbreak of the war, were faced with the prospect of remaining in those positions for the duration of the war. At the same time, officers in the field, desirous of securing experience in a staff assignment, found this difficult to accomplish, because of the tendency to keep men in positions at which they have become adept and well trained.

Heretofore transition from one type of job to another has not been as freely accomplished as might be desired. The length of World War I did not permit much rotation of officers, but this war has already been of such duration as to make it not only possible, but advisable, to carry out a well developed rotation policy.

The publication of War Department Circular No. 356, dated 2 September 1944, is one step in this direction. The circular makes provisions for the rotation of Regular Army officers, to permit those assigned to staff positions in Washington for a long period of time without overseas experience to secure reassignments to other major commands or overseas theaters. Officers in the field, needing staff experience, may then be used as replacements, making it possible for all Regular Army officers to get whatever type of experience they need.

It is only natural that there should be concern about the experience of men who have chosen, or who may be expected to choose, the Army as a career. The Signal Corps has drawn up a rather well defined rotation policy in its headquarters, and it is the policy of the Chief Signal Officer to rotate men as much as practicable. Consideration is also being given to the officer positions which must be filled at the conclusion of the war, and, in the interest of the Signal Corps, it is advisable to have the best qualified officers available for those positions.

MAINTENANCE OF EQUIPMENT

The Five Echelon System Ranges From Preventive Maintenance to Complete Rebuilding

THE PROBLEMS encountered in the maintenance of signal equipment present a major difficulty during all phases of combat operations. Communication is a function of command and therefore the tactical commander is responsible for the installation, operation, and maintenance of all agencies of signal communication which comprise the signal system of his unit. The importance of the maintenance responsibility cannot be overemphasized and the success or failure of any military operation depends to a large extent on the availability of efficient communication facilities. It is fundamental that such facilities can be assured only if proper maintenance and repair have been provided.

The general plan through which maintenance is effected for the Army as a whole is the five-echelon system of maintenance. Due to special considerations which are necessary for certain types of equipment, deviations from this system are sometimes required, but these deviations are an exception rather than the rule. In effect, these echelons are successive steps beginning with preventive maintenance and ending with rebuilding processes. The basic policy underlying the plan requires that each organization shall make such repairs to Signal Corps equipment used by it, or sent to it for repair, as can be satisfactorily accomplished by its personnel using the repair and maintenance equipment authorized by its tables of organization and equipment.

The classes of echelons in the present maintenance plan are as follows:

First echelon maintenance is performed by the operators of the equipment. It includes the care, operation, cleaning, lubrication, inspection and the making of minor adjustments.

Second echelon maintenance is performed by the using unit regardless of arm, within the limitations imposed by the basic policy. This includes supervision, technical advice and inspection of the equipment.

Third echelon maintenance is performed by Signal Corps units in close support of the using troops. This includes repair by exchange of component parts and the correction of deficiencies in equipment either by repair or replacement.

Fourth echelon maintenance is accomplished by repair personnel of semimobile Signal Corps organizations serving a geographical area. The primary functions are repair of major items and replacement of unserviceable assemblies received from third and lower echelon repair units.

Fifth echelon maintenance is performed by fixed signal depots in the Zone of Interior and base maintenance companies overseas and reconditions completely all repairable equipment. This includes the rebuilding of assemblies which cannot be accomplished by the lower echelons. Many types of repair equipment not available to the field installations are at the disposal of fifth echelon signal depots.

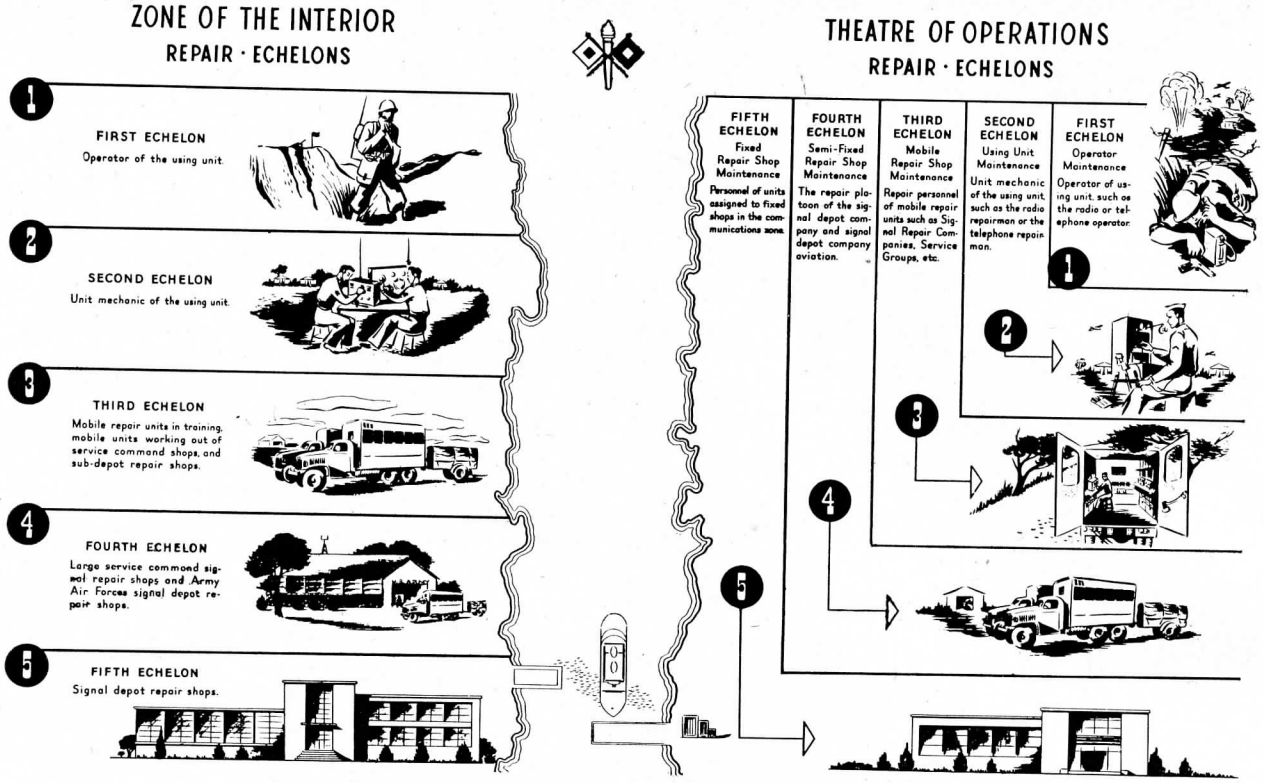
The echelon system is applicable to the Zone of Interior as well as to the theater of operations, and provides a means of allocating various maintenance operations to specific organizations. This system assures that provisions are made for all repair operations with the proper tools, instruments and trained personnel.

In order that all organizations using Signal Corps items of equipment will have available to them the proper supply of spare parts, the spare parts portion of the Signal Supply Catalog is published in two separate series of pamphlets, Sig 7 and Sig 8. (See Signal Corps Technical Information Letter No. 34, September 1944.)

The preparation of the spare parts catalogs establishes a basis for an efficient maintenance plan and its success depends upon organizations having the necessary pamphlets. It must be remembered that field repair organizations are not intended to replace the regular supply system between using units and supply depots. In the field replacement is preferable to repair and defective items are repaired and held in stock for replacement in equipment repaired by the maintenance organizations.

The organizations established for the repair and maintenance of ground signal equipment in the five-echelon plan are listed:

ECHELONS OF SIGNAL REPAIR



Echelon of maintenance	*T/O&E*	*Organization responsible for signal maintenance*
1st_____	All	Operators.
2d_____	All	Repairmen of using unit.
3d_____	11–7	*Division Signal Co.* for Infantry Division Troops.
	11–15	*Signal Battalion* for Nondivisional Corps Troops.
	11–47	*Signal Troops, Cavalry Div.* for Cavalry Division Troops.
	11–57	*Armored Signal Co.* for Armored Troops.
	11–147	*Joint Assault Signal Co* for own equipment.
	11–127	*Signal Repair Co.* for Army Troops.
	11–357	*Signal Radio Maintenance Teams (Aviation)*—3d & 4th echelon repairs of Radar and VHF Ground equipment for AAF.
	11–500	*Signal Service Organization*—dependent on team organization.
	11–537	*Signal Co. Engineer Special Brigade for* Brigade equipment.
3d_____	11–617	*Signal Radar Maintenance Units* for Ground Radar equipment used by other than AAF units.
4th_____	11–107	*Signal Depot Co.*
	11–500	*Signal Service Organization* — when teams EC, EG, and GQ are included.
5th_____	11–587	*Signal Base Maintenance Co.*

Those units performing third and higher echelon of repair do not relieve using organizations of the responsibilities for the maintenance of their signal equipment when it is within the capabilities of their authorized personnel and repair facilities.

It is expected that the employment of the five-echelon maintenance system and the use of the new spare parts catalogs will result in more efficient communication facilities, a very important factor in every successful military operation.

NOTES ON COMBAT SIGNALS

Vehicles Stocked for Wire-Laying Operations Help Maintain Circuits During Movements

The following comments on signal communications are based on information from the two European combat areas: ETOUSA and NATOUSA. The ETO notes are based on the experiences of an infantry division signal officer, and the Mediterranean Area remarks are from a War Department observer's report.

FRANCE

THERE ARE usually many circuits along the roads and their proper identification becomes difficult because the wire lines invariably become tangled. Experience gained during the construction of field wire lines has emphasized the use of plenty of tags with a color scheme and a system of notching the tags. This is important especially when clearing troubles either at night or during the day. The tags are placed at least every 100 yards along the lines and also at the ends of dead lines when they are cut out from the circuit.

This company had a need for a great deal of hand-carrying equipment during wire laying operations and all vehicles of the construction platoon are now equipped for laying wire. The jeeps, weapon carriers, and cargo trucks always carry a number of Reel Unit RL–31, Axle RL–27, pike poles, tape, seizing wire and two Telephone EE–8–( ). A wire dump is maintained for the construction platoon well forward in the bivouac area. It is standing procedure to have tape, pike poles, lance poles, and test clips on hand at all times.

Wire discipline is stressed due to the changing conditions. Surface lines are laid well forward, off the road in the forward area of the division command post, and strung overhead in the rear areas and along alternate routes.

Camouflage nets are rigged so that the vehicles can drive without interference. This saves considerable time for the trouble clearing crews, especially at night, when entering or leaving the command post area.

It was found desirable to set up a radio office in a 1½-ton truck located with the radio section, approximately ½-mile from the command post. It served as a clearing point for all radio traffic. The operating radio cars were connected to this point by wire using a remote control unit in each car and a field telephone in the office. The clearing point provided a center for messages to and from the radio officer as well as for relaying radio traffic to the division message center, directed the sending of timing signals, kept a traffic chart of the various nets and a complete log, had charge of panels for air-ground liaison and identification, provided for drop and pick-up of messages, monitored friendly radio transmitters. In addition the whereabouts of the radio officer and key NCO's was known at all times.

All of the Radio Set SCR–193–( ) have been provided with remote control equipment to be operated from a foxhole when necessary. The report also states that it is important that communication personnel in the line companies be instructed and trained to pick up radio equipment from casualties and continue to operate them.

The above practices undoubtedly differ in details from those of similar organizations but may contain some hints for units about to enter combat.

ITALY

Our communication doctrine is sound and sufficiently detailed in training manuals to cover all combat conditions. There is no substitute for communication combat experience.

The concentrated communication training at the Infantry, Artillery, Signal Corps and Armored Schools is excellent. More of it is the only point to be desired. Much credit is due these service schools for their excellence in "leading the way."

Over 90 percent of the communication traffic load in infantry units is carried by the wire net. Too much

"CIRCUITS CRISSCROSSED SPIDER WEB-LIKE"

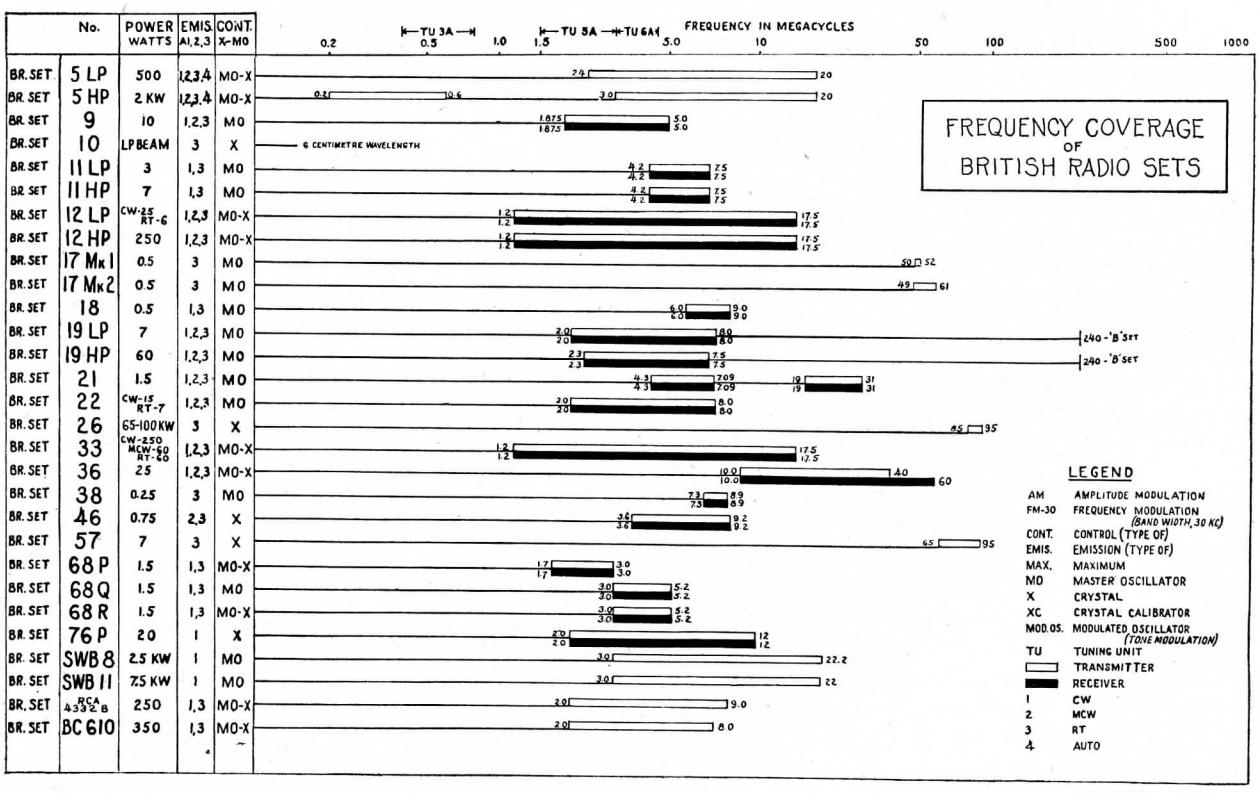
emphasis in training cannot be placed on the installation of a sound wire system.

In combat, on a single secondary road, it is not uncommon to see from one to sixty odd circuits of Wire W–130, W–110 and spiral-four cable crisscrossed in a spider web-like formation, lying on the ground and hanging on bushes along the sides of the road. The reason is that roads and trails are the first avenues of approach to be cleared of mines and they afford the quickest route to extension of the communication system. In addition, there is insufficient personnel and time to install and maintain a neat wire system. In fast moving situations these conditions prevail even after the army has moved on and the area passes into communication zone.

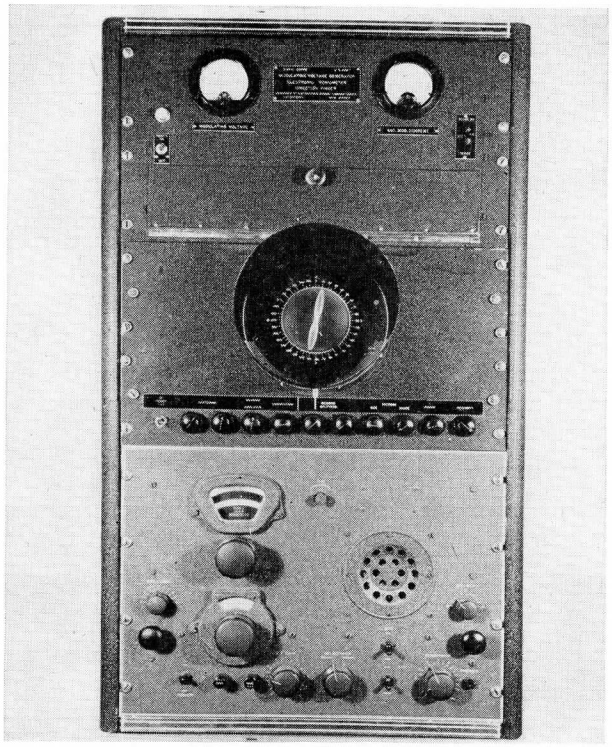
Some exceptions do occur but figures in this theater show that the average infantry unit in combat recovers about one to 25 percent of the wire it lays. Reasons for minimum recovery are attributable to situation, time, personnel and equipment. Unrecovered wire left by infantry units is in some cases recovered later by army signal corps personnel.

Telegraph plays an important part in the communication system of infantry units. More and extensive use should be made of telegraph as an additional means of communication by units in training.

Radio is an important link in the communication system of infantry units but due to extended periods of radio silence, preceding and during combat, the wire systems must take the major portion of the traffic load.



EQUIPMENT NOTES



RADIO SET AN/CRD–2 IS READILY TRANSPORTABLE

SIGNAL CORPS BOARD

CASES APPROVED BY THE CHIEF SIGNAL OFFICER

Case No. 564—Service Test of Radio Set AN/CRD–2

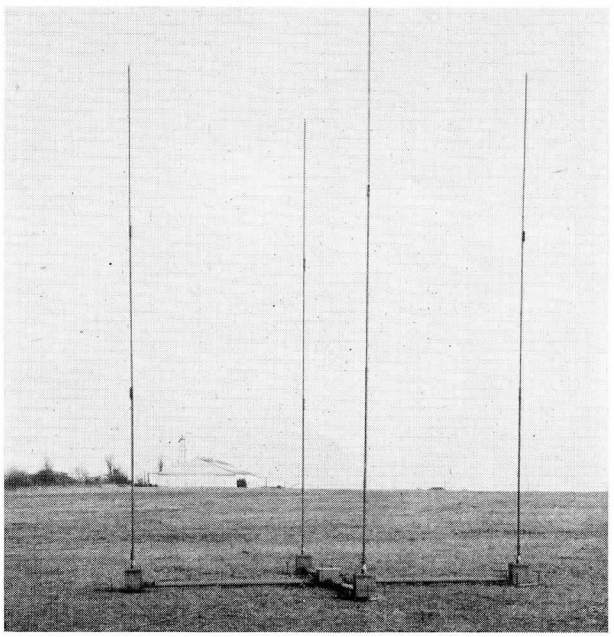
THE SIGNAL Corps Board was directed to service test Radio Set AN/CRD–2–( ) to determine whether it meets the military characteristics of Radio Set SCR–502–( ) and its suitability for use as a substitute for Radio Sets SCR–291–( ) and SCR–551–( ).

Radio Set AN/CRD–2–( ) was developed by Eatontown Signal Laboratory in an endeavor to secure the advantages of the SCR–291–( ) and SCR–502–( ) type of direction finder in an equipment of smaller size and less weight. This set is of the instantaneously indicating type. The bearing is indicated as a propeller-shaped pattern on the screen of a cathode ray tube. In the AN/CRD–2–( ) the use of all rotating elements has been avoided by means of simple electronic circuits. The set has been especially designed for transportability and rapid installation. The service test models submitted to the Signal Corps Board cover a frequency range of 1.5 to 30 mcs. However, as a result of the recommendations of the Board and subsequent laboratory tests the production models will cover a range of .54 to 30 mcs.

Comparative tests were made on Radio Set AN/CRD–2, SCR–291–A and SCR–551–A. The tests for accuracy were conducted by taking bearings on commercial stations, Signal Corps tactical radio transmitters and tranmissions from a B–24D airplane made available for the service test. Tests were also made on the installation, operation, packing and transportation of the three sets. Aerial photographs were taken to determine the degree to which they could be observed from the air. The three direction finders were also studied to ascertain to what extent they could be camouflaged and the operating positions concealed and protected.

As a result of the service and laboratory tests the Signal Corps Board found that Radio Set AN/CRD–2 was equal in sensitivity and accuracy to Radio Set SCR–291–A, a much larger and heavier set. It was found to be superior to both Radio Set SCR–291–A and SCR–551–A in frequency range, space occupied and portability. It was also found to be less subject to air observation, less affected by high operating noise levels, to require less time for installation and removal, and to give better reception on swinging signals than either of the other sets.

The Board concluded that Radio Set AN/CRD–2 is superior to Radio Set SCR–291–A and SCR–551–A from both technical and tactical points of view, that



AN/CRD–2 ANTENNA SYSTEM PREPARED FOR OPERATION

it meets the military characteristics for Radio Set SCR–502–( ) and that it is a satisfactory direction finder for either fixed or semifixed installation. The Board also reached the conclusion that the need for replacement of Radio Set SCR–551–( ) by the AN/CRD–2 is urgent, and that the replacement of the SCR–291–( ) by the AN/CRD–2 is desirable

The Signal Corps Board, therefore, recommended that Radio Set AN/CRD–2 be referred to the Signal Corps Technical Committee for classification as a required type, adopted type, standard article, that the SCR–291–( ) be reclassified as substitute standard and the SCR–551–( ) as limited standard articles. Minor modifications to the service test models of Radio Set AN/CRD–2 were also recommended for inclusion in the production specifications.

GROUND SIGNAL

TELEGRAPH SWITCHBOARD SB–6/GG

Telegraph Switchboard SB–6( )/GG, recently standardized, is intended for use at locations where two or more teletypewriter circuits terminate and where interconnection of various instruments and lines may be required.

The SB–6/GG is a jack-patching switchboard used for interconnecting local direct current lines, loops or extensions and teletypewriter sets or equipments. This switchboard is used in case of failure of either

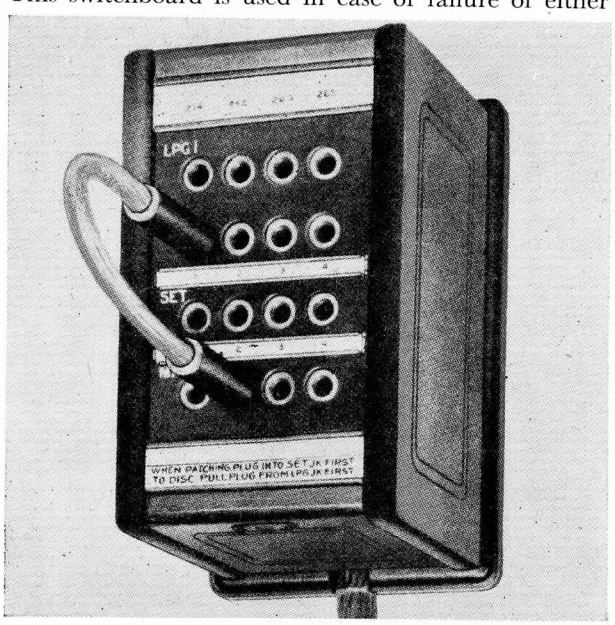


FIG. 1.—TELEGRAPH SWITCHBOARD SB–6/GG

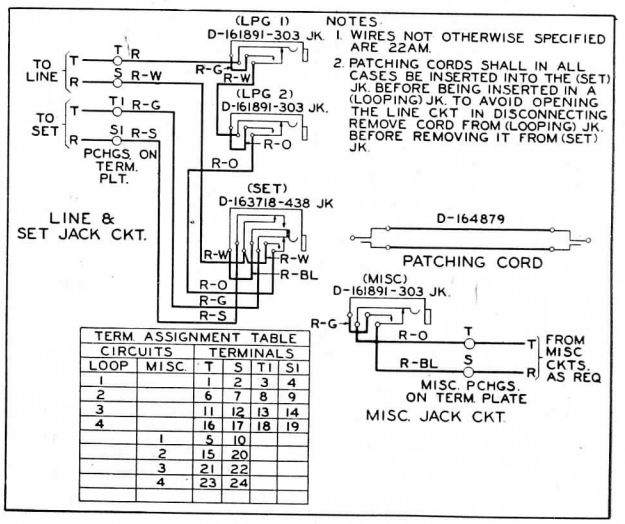


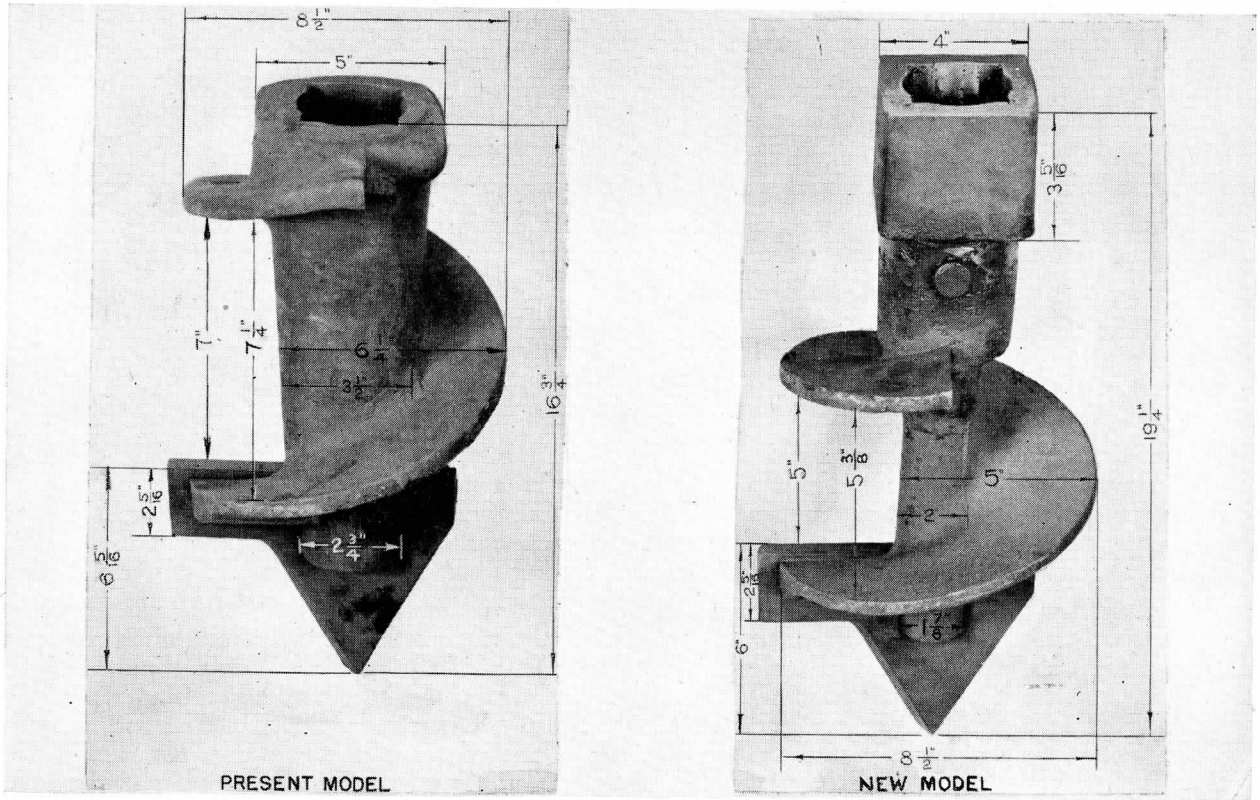
FIG. 2.—CIRCUIT DIAGRAM OF THE SB–6/GG

the circuits or the station equipment, or when it is desired to rearrange the circuits or equipment for any reason. It also provides means to assist in making simple tests of associated line facilities.

Telegraph Switchboard SB–6/GG, a front view of which is shown in figure 1, consists of a 4-line circuit jack cabinet for mounting on a wall or other suitable flat surface. With a patching cord of suitable length, interconnection can be made between as many as four adjacent cabinets. The switchboard is designed with a fiber-faced jack panel mounting the apparatus for 4-line circuits. The components for each line circuit consist of two looping jacks and one set jack. The latter is provided for connection to the teletypewriter set or equipment. Mounted below each set jack is a miscellaneous jack which may be used to terminate either extra sets or line circuits. Figure 2 shows the circuit label.

This switchboard requires no power, since it provides no supervisory features and furnishes no line current. It is equipped with two 24-inch patching cords, plug ended, and two dummy plugs. Its dimensions are $7\frac{5}{16}$ x $4\frac{3}{4}$ x $4\frac{5}{8}$ inches, and the net weight is 4 pounds. For detailed information, see Technical Manual TM 11–2035 which is now available.

Telegraph Switchboard SB–6/GG is now in production and being delivered. Its stock number is 4A2596–6, and it may be requisitioned in the usual manner. This item replaces Switchboard BD–50, BD–51, BD–52 and BD–53 which have been reclassified to "obsolete."



CHANGE OF PITCH OF THE AUGER REDUCES THE CLOGGING EXPERIENCED WHEN OPERATING IN MOIST, STICKY SOIL

IMPROVED AUGER FOR TRUCK K–44

When used in moist, sticky soils, the standard 9-inch blade type auger furnished with Truck K–44–( ) (Earthborer) sometimes becomes packed with the claylike earth, according to reports from the field. This clogging by soil can be prevented by withdrawing the auger and rotating it above the ground for a period sufficient for the earth to be thrown off by centrifugal action. If this is not done, certain types of soil will pack in the auger and digging operations must be suspended while the packed soil is removed.

In order to reduce the tendency of sticky soil to pack in the auger, the standard 9-inch bit has been redesigned to have less pitch than the present model.

As tests have shown that the new design marks a definite improvement, action is being taken to provide the improved auger in future procurements of Truck K–44 (Earthborer) and its maintenance parts. Replacement of 9-inch augers now in service with the improved design is not contemplated at present.

REPAIRING BROKEN AN–130'S

By retaining the base of a broken Antenna AN–130–A [Radio Set SCR–300–( )] and replacing the damaged mast portion with No. 10 or heavier gage wire, a satisfactory solution to the problem of repairing broken antennas for this radio set until replacements can be secured has been found by a unit in ETO.

Use of the original base of the antenna was found to be important, because it contains a coil and condenser comprising a tuned circuit designed for maximum efficiency. This base was first examined to assure that no damage had been sustained to either the coil, condenser or the braided wire lead connection. The cavity, which had formerly contained the mast portion, was then thoroughly cleaned so as to remove all dirt, paint and grease. This was done with a fine file and some No. 00 sandpaper. After cleaning, the cavity was thoroughly tinned; some of solder being allowed to flow into the cavity. Care had to be taken not to apply too much heat, as that might have damaged the tuned circuit.

A piece of wire, in this case damaged French transmission lines found along the road, was then cut to the exact length of the original mast portion which it was to replace, and one end was thoroughly cleaned and tinned. This end was then inserted into the cavity of the mast base and the braided wire lead wrapped around it. More solder was then applied until a good connection was formed and the wire was firmly imbedded in the cavity.

In order to give added strength and support, some seizing wire was wrapped around the outside of the connection and a few inches up the wire, and firmly soldered into place.

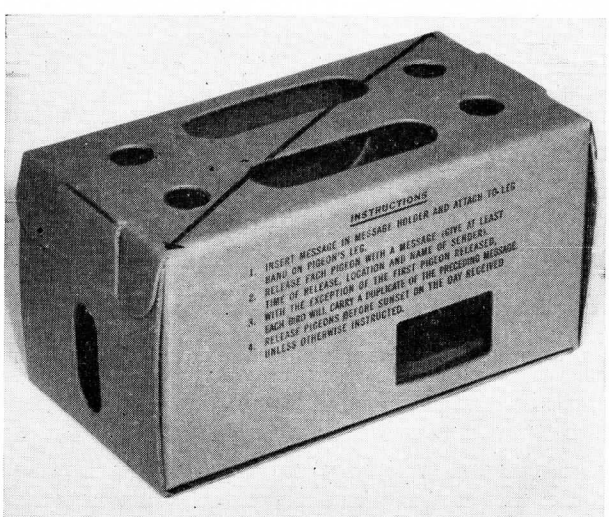
An ohmmeter was used to check the continuity of the finished job.

This improvised method of temporary repair proved satisfactory for Antenna AN–130–A; a similar repair method was worked out also for the antenna of Radio Set SCR–536–( ).

ARMY PIGEON

NEW PIGEON CONTAINER

A new item of pigeon equipment has been developed because of the numerous requests from pigeon units overseas disclosing a decided need for a 2-bird expendable container. Containers presently in use, Pigeon Equipment PG–60, PG–103/CB and PG–105/CB, are non-expendable items and are often found to be too cumbersome and heavy for combat use. For this reason, many of the using organizations fail to return the empty containers after the pigeons have been released. As a result, considerable difficulty is being experienced by pigeon units in maintaining an adequate supply to meet all requirements for pigeons.



PIGEON CONTAINER PG–107/PB HOLDS TWO BIRDS

Field and service tests indicate that the new item of issue, known as Container PG–107/PB, 2-bird fibre board container, Stock Number 9A837, is a great improvement over other containers inasmuch as this container is an expendable item and is approximately one-half the size and about one-tenth the weight of other containers.

Apparently a much greater requirement exists for this item than was anticipated. Additional procurements, therefore, have been made to meet this increasing demand. The basis of issue has been approved with an allowance of 3600 each per signal pigeon company, 300 each per combat section or 50 each per combat loft. The following nomenclature has been assigned:

> CONTAINER PG–107/PB, pigeon, 2-bird capacity, .080 fibre board; inside measurements when assembled 11½ inches by 6 inches by 6 inches; dismantled (folded flat) approximately 15 inches by 12 inches; net weight, 1 pound.

MAINTENANCE

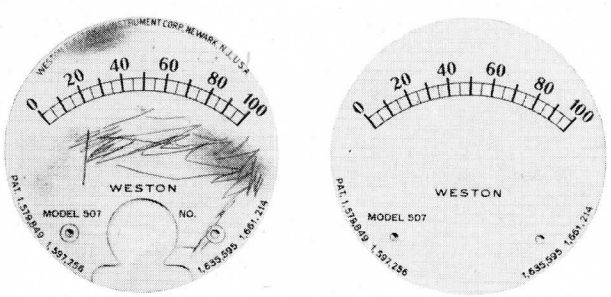
SHOP KINKS

Photo Dials

Photograph a good dial in the conventional manner, and after the negative dries, paint a border around the entire dial with Kodak opaque paint. Also touch up all scratches and flaws on negative with opaque paint. Then print and develop in the usual manner. Figure 1a shows a print of the unretouched negative; figure 1b, a print of the retouched negative.

To mount this print, first rough up the back of dial with coarse sandpaper or emery cloth and apply a liberal coat of sodium silicate to the roughed-up surface. Also apply a thin coat of sodium silicate to the back of the photo dial print and now work fast.

Stick the dial to the print and hold up to a strong light and line up the screw holes in the dial with the



A B

FIG. 1.—PHOTOGRAPHING METER DIALS

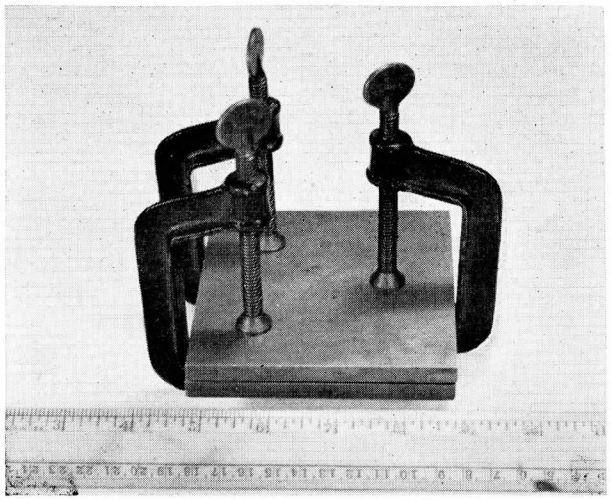


FIG. 2.—PRESS MADE OF FIELD MATERIALS

photographed holes on the print, and place the dial and print between two or three thicknesses of waxed paper; and place between steel plates of press and clamp same together with "C" clamps. Leave in press for about 10 or 15 minutes. Remove dial from press and place face down on clean piece of paper and let dry for about one-half to one hour. After dial is dry, cut off excess paper with scissors, leaving a 1/8" border around the entire dial, and then with a small half-round file, file off the remaining 1/8" of paper. Punch out holes and dial is ready to mount in meter.

Naturally a photo enlarging machine capable of scaling the photograph must be used.

The press (figure 2) consists of 2 flat, polished steel plates 1/4" thick and 5" square, held together with 3 or 4 clamps.

Jig for Mounting Pivot Bases on Moving Coils

This jig makes it possible to replace pivot bases to any type of moving coil accurately the first time.

Construction of this jig (figure 3) is simple; however, the pegs and pivot holes in the pegs must be within $^{2}/_{10000}$ inch, as any looseness or sloppy fits will throw the moving coil off balance and cause the meter to track improperly. The pivot holes in the pegs must be in the exact center of the peg, and about $^{2}/_{10000}$ inch larger than the pivot. The coil block must be milled to the exact shape of the moving coil and not more than $^{1}/_{1000}$ inch smaller.

The pegs must be turned to within $^{2}/_{10000}$ inch, and the holes in which they fit must be line-reamed together in one operation. If a separate jig cannot

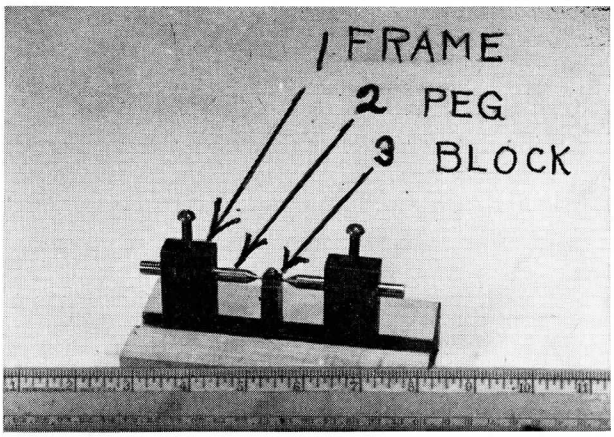


FIG. 3.—JIG AIDS IN REPLACING PIVOT BASES

be made for each type of meter, different pegs can be made to accommodate different size pivots, and different size blocks, for different moving coils. Mounting blocks must be made to accurately fit each coil to which pivot bases are to be attached.

By interchanging the pegs and blocks, different pivot bases can be used on a moving coil when the proper base is missing or unobtainable. This works out very well, and as yet no ill effects have developed.

Repairing Switch Levers on I–56–C

Remove all old worn rubber handles and set tester on bench, face down, with the switch levers hanging over the edge. Next, into a can or tray about 5 inches long, 1 inch wide and 1 inch deep, pour some Insul-X No. 67. Now bring this tray up against the tester panel, dipping all the levers into the Insul-X. Allow about ten or fifteen minutes to dry and dip again. Repeat this process until the levers are built up to the proper size (see figure 4). One tester after being treated turned up for repair six

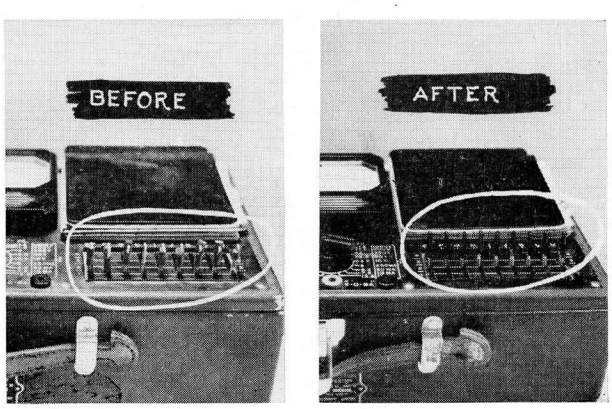


FIG. 4.—SWITCH LEVER HANDLES REMADE WITH INSUL–X

months later and the switch levers showed no sign of wear.

PACKAGING OF EQUIPMENT

Numerous instances have been reported in which teletypewriter and typewriter equipment has been received in a damaged condition by Signal Corps repair shops in all echelons as a result of improper packaging and loading.

Basically, the same care should be exercised in packing Class "C" equipment as is used in packing equipment at the factory or the signal Corps depots Specific rules to follow are:

Place not more than one piece of equipment in any one packing case or chest.

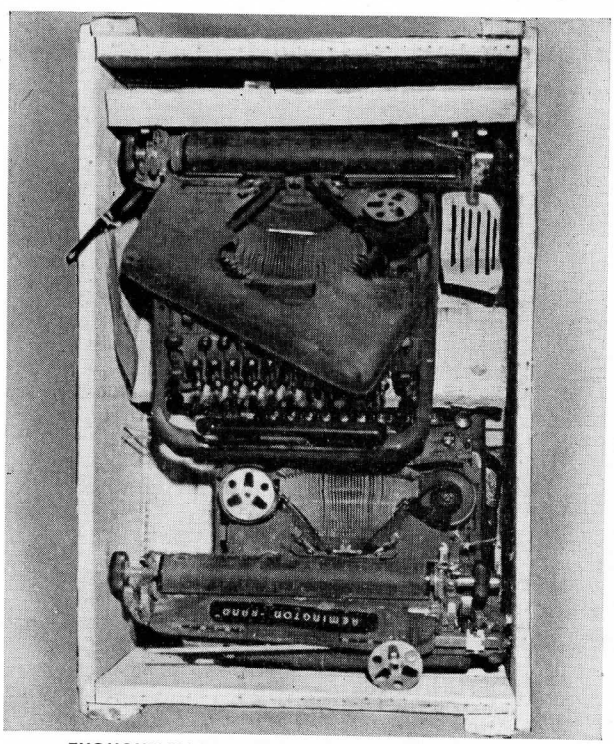
Firmly secure all movable or loose parts such as carriages, type bars, ribbon spools or other components, if separated for packing purposes.

Use standard or approved packing cases, or Signal Corps carrying chests similar to Chest CH–62–A, B and F when applicable and available.

If it is found necessary to construct a packing case, it should be sufficiently rugged and large enough to permit the equipment to be floated in excelsior, for a distance of not less than four inches from each side.

The equipment should be protected against possible water damage by placing in moisture or waterproof bags. If no better means are available, it may be protected by waxed paper, preferably of 60 pound basic weight.

When shipping or transporting packing cases in freight cars or trucks, special attention should be paid to prevention of possible shifting by anchoring securely with other cases and constructing barriers and braces when necessary.



THOUGHTLESS PACKAGING RESULTS IN THE ABOVE

Attention to these fundamental rules by responsible personnel will prevent needless destruction of valuable equipment. Also the number of times that repair shop personnel are presented with a basketful of broken and damaged parts, with a request that they reassemble a Class "B" machine out of such a miscellaneous mess, should be considerably reduced.

USE OF HAND GENERATOR GN–45

Hand Generator GN–45–( ) used with Radio Set SCR–284–( ) is not intended to furnish high power over long periods of time. Such operation is injurious and will lead to damaged generators. The high power output of this generator is intended for use only in emergencies and for short periods of time. Generator GN–45–( ) is limited in its output. For this reason, the transmitter of Radio Set SCR–284–( ) includes a STANDBY SWITCH 1–S–3 which permits either LOW or HIGH power operation. This switch also has an OFF Position.

When the STANDBY SWITCH is to the left or LOW position, it disables one of the two parallel RF power output amplifiers by breaking its filament circuit, thus reducing the drain on the power supply. The screen voltage for the single operative amplifier is lowered. When the STANDBY SWITCH is in its center or OFF position, all power is removed from the transmitter. When the STANDBY SWITCH is to the right or HIGH position, both RF power amplifiers operate, the screen voltage is also increased, and consequently, the plate current drain is higher.

When the generator is operated on high power, heat resulting from long overload may alter the magnetic qualities of the core materials and can interfere with commutation if the brushes overheat. Therefore, care must be observed when using Generator GN–45–( ) to operate on LOW power whenever possible. It should be remembered that the misuse of the HIGH power capabilities of the SCR–284–( ) may result in a useless generator just when perfect operation is imperative. Reference should be made, if possible, to instructions covering the use of generator GN–45–( ) as given in TM 11–275 for Radio Set SCR–284–A.

RAISING RESPONSE OF TS–15

Unsatisfactory field reports indicate that the overall response of transmitter units used in Handset TS–15–A is low. No field modification can be made to remedy the low response of transmitters except by the installation of new transmitters with satisfactory response. Transmitter units of Handsets TS–9–J, TS–11–D, TS–11–M, TS–13–A, TS–13–C and TS–15–C may be used in Handset TS–15–A providing the center contact in the transmitter cavity of the handset is slightly bent by hand to insure contact with the shallower transmitter unit of the replacement transmitter units.

SILICA GEL

IN THE early days of the war, a considerable amount of Signal Corps equipment was manufactured, packed, and stored awaiting final shipping instructions to theaters of operations. Many times, instructions to ship read "at once" and, in such cases, no time was available to repack and moisture-proof the item. Many an item, upon arrival at its destination, was found to be unfit for immediate service since it had absorbed large quantities of moisture, either from exposure to rains or temporary immersion in the surf while unloading on exposed beachheads.

Today the Signal Corps is extremely conscious of the necessity for proper packaging of its equipment during transportation and storage to assure its receipt in good condition. From experience gained in the various theaters of operations, there have been several positive steps taken in recent months to accomplish this purpose. Specifications for packaging overseas shipment have been revised for the majority of components and end items. This provides for the use of sufficient amounts of a desiccant in each package together with moisture-proof wrapping. Soon all overseas shipments of communications equipment will be so packed.

"Silica gel," the usual desiccant, is made by dehydrating gelatinous silicic acid. First produced commercially for use in gas masks, it also has numerous industrial uses as a dehydrator and catalyst. The gel has the appearance of crushed or granulated quartz. It is so porous that a cubic inch has more than 50,000 square feet of absorbing surface; it can, by adsorption (adherence of moisture to these surfaces) take up and hold approximately half of its own weight in water without swelling, caking, or becoming appreciably wet to the touch.

In the packaging of Signal Corps equipment, one or more bags of silica gel are inclosed with the packed item within a moisture and vapor-proof sealed wrapping made of plastic or a laminated wrapping composed of paper, metal foil, and plastic.

The bags in which the gel is contained range in size from 5 grams to 5 pounds each and for the majority of uses are of cotton cloth although some are of tough paper construction. Where a dust-tight bag is necessary, a combination cloth and paper bag is used, thus preventing any gel dust from finding its way into delicate communications equipment.

Provision can be made to tell the condition of equipment protected with silica gel by inserting an indicator card into each package. Indicators are small quantities of silica gel treated with cobalt chloride contained in a manila envelope equipped with an acetate window. A deep blue color when fully activated, the absorption of moisture causes the blue to become violet, then pink, and finally when the maximum amount of water has been taken up the indicator will show a flesh color.

In an emergency silica gel that has been in use and become "spent" can be reactivated and used again. Reactivation is accomplished by:

Removing the gel from the package, being careful to salvage the bags for reuse.

Drying out the gel by placing in an oven, using metal pans, at approximately 300° to 350° for 2 hours. Vent the oven so that moisture can escape.

Rebagging the material, duplicating the original method of closing the packages.

Repacking the end items of equipment at once since silica gel will expend itself within 24 hours unless packed in airtight containers.

It is evident that the packaging of Signal Corps equipment in a water-proof and vapor-proof package including a desiccant is an expensive and time-consuming operation, but it is much to be preferred over previous methods which required dipping in heavy oils and waxes. The removal of the coatings and reassembly, frequently done under battle conditions, often consumed more time than the present method of packaging. The present method not only gets the equipment to its destination in good condition but saves man-hours of labor.

SPARE PARTS CATALOG INDEX

THE FOLLOWING is a partial index of Army Service Forces Signal Supply Catalog, Sections SIG 7 and SIG 8, published and distributed by The Adjutant General as of 1 November 1944. These sections consist of individual pamphlets covering complete equipments. SIG 7 is for 1st and 2nd echelons; SIG 8, for 3rd and higher echelons. The purpose and use of these spare parts pamphlets is described in SCTIL No. 34, September 1944.

The pamphlets may be requisitioned through AG channels by all organizations using, maintaining or issuing the equipment. The stock number of each pamphlet for requisitioning purposes is determined by placing SIG 7 or SIG 8, whichever is appropriate, before each item desired, e. g. SIG 8 BC–625. Additional pamphlets are being published as rapidly as possible.

ASF CATALOG SECTION SIG 7
(1st and 2d Echelon)

AN/PRS–1
AN/TPS–1/1A
BC–312
CE–11
CF–7
EE–80
EE–84
ML–110
PE–84–C
PH–91
PH–239
PH–330–G
PH–358
PH–358–A
RC–127–A
RC–133
RC–145
RC–148–A, B
RC–150/151
RC–182
RC–184
SCR–169
SCR–188
SCR–194
SCR–244
SCR–245
SCR–268
SCR–296
SCR–300
SCR–503
SCR–504
SCR–527–A
SCR–536
SCR–551
SCR–584–B
SCR–602–T6/A
SCR–588
SCR–607
SCR–609
SCR–682
SCR–828
SE–11

ASF CATALOG SECTION SIG 8
(3d and Higher Echelon)

AN/PRC–5
AN/PRS–1
AN/TPS–1/1A
AN/TRA–1
AN/TRC–1
AN/TRC–3
AN/TRC–4
AN/VRC–1
AN–78
AN–105
BC–148, 151
BC–186
BC–187
BC–188
BC–191
BC–197
BC–222
BC–223
BC–306
BC–312, 342
BC–314, 344
BC–321
BC–367, 667
BC–474
BC–499
BC–602
BC–603
BC–604
BC–605
BC–606
BC–610
BC–614
BC–620
BC–625
BC–641
BC–652
BC–653
BC–654
BC–658
BC–659
BC–669
BC–683
BC–684
BC–686
BC–728
BC–729
BC–731
BC–739
BC–745
BC–746
BC–792
BC–904
BC–923
BC–924
BC–939–A
BC–969
BC–973
BC–976
BC–978
BC–991
BC–1000
BC–1004
BC–1016
BC–1031, 1032
BC–1140
BC–1141
BC–1147
BC–1149
BC–1159
BC–1163 to 1165
BC–1189
BC–1304
BC–1305
BD–57
BD–61
BD–62
BD–70
BD–71
BD–72
BD–77
BD–85
BD–89
BD–90
BD–91
BD–92
BD–96
BD–97
BD–98
BD–110
BD–129
BE–65
BE–70
BE–72
BE–75
BE–77
BE–79
BK–9
BK–27
BX–13
C–21
Cable Equip. (Power)
CE–11
CF–1
CF–2
CF–3
CF–7
CS–79
CV–2/TX
DM–34
DM–35, 37
EE–2
EE–8
EE–65
EE–80
EE–84
EE–85
EE–87
EE–89
EE–91
EE–97, 98, 102
EE–99
EE–100, 101
FL–10
FM–19
FT–244
FT–250
FT–253
GN–35
GN–37
GN–38
GN–41
GN–44
GN–45
GR–3
GR–4
GY–40
HIC–312
HS–25
HS–30
HS–34
I–72
I–107
I–181
I–193
I–199
I–209
I–210
I–234
IE–9
IE–10
IE–14
IE–17
JB–49
JB–69
JB–70
JB–84, 93, 104–109
KIM–21
LC–4
LC–5, 6
LC–40
LC–60
LC–61
LS–6
M–132
M–209
M–222
M–356
M–407, 408
MC–1
MC–123
MC–153
MC–265
MC–269
MC–411–A
MC–412
MC–413
MC–472
MC–473
ME–13
ME–40
MG–37
ML–3
ML–77
ML–110
ML–121
ML–138
ML–185
MP–22
MP–48
MP–57
MP–67
MS–119
PA–1, PA–2
PA–4
PA–5
PE–49
PE–55
PE–75
PE–77
PE–94, PE–98
PE–95
PE–97
PE–103
PE–104
PE–108
PE–110
PE–117
PE–125
PE–128
PE–133
PE–135
PE–140
PE–151
PE–162
PE–185
PE–194
PE–204
PE–214
PE–237
PH–29
PH–110–A
PH–114
PH–239
PH–239–A
PH–355
PN–2
PN–15
PN–21
PN–26
PN–31
PP–13/TRA–1
PP–39/TRC–2
RA–20
RA–34
RA–36
RA–37
RA–42
RA–43
RA–61
RA–83
RA–87
RA–94
RC–58
RC–81
RC–99
RC–133
RC–148–A, B
RC–148–C
RC–150/151
RC–154
RC–161
RC–163
RC–173
RC–184
RC–219
RCA–165
RL–16
RL–17
RL–26
RL–26 (Engine)
RL–31
RL–35
RM–12
RM–13
RM–29
RM–35
RM–44
SCR–169
SCR–177
SCR–188
SCR–193
SCR–194
SCR–195
SCR–197
SCR–206
SCR–211
SCR–244
SCR–245
SCR–255
SCR–268
SCR–284
SCR–288
SCR–293, SCR–294
SCR–296
SCR–299, 399, 499
SCR–300
SCR–502
SCR–503
SCR–504
SCR–506
SCR–508, SCR–528
SCR–509
SCR–511
SCR–522
SCR–527
SCR–536
SCR–538
SCR–542
SCR–543
SCR–551
SCR–555
SCR–584–A
SCR–588
SCR–593
SCR–602–T6/A
SCR–607
SCR–608, SCR–628
SCR–609
SCR–614
SCR–625
SCR–682
SCR–694
SCR–808
SCR–828
SE–11
T–14/TRC–1
T–21
T–24
T–17
T–26
T–30
T–35
T–36
T–45
T–39
TC–2
TC–3
TC–4
TC–5
TC–10
TC–12
TC–16, TC–17
TC–18
TC–21
TC–22
TC–23
TC–24
TC–29
TD–1
TD–2
TD–3
TG–5
TG–7, TG–37, TG–15, TG–22
TG–13, TG–14
TG–19
TG–23, TG–24
TG–25
TL–122
TM–188
TM–190
TR–25
TRO–27793
TS–2/TG
TS–9
TS–10
TS–11
TS–12
TS–13
TS–15
TS–32/TRC–1
Telering H
TT4MU
TT10REC
TT11REC
TT13REC, TT14–REC
TT–14PF
TT–14RPFN
TT–14RPFT
TT–14TD
TT–15PP
TT–19PFP
TT–27MU
TU–3 thru TU–10, TU–22
TU–17, 18, 25
TU–47 thru TU–54
VO–4
VO–6
WECOH&C
WECO–84

MILITARY PERSONNEL

CONTRACT TERMINATION PERSONNEL

THE PRESENT trend of the war has created a demand for hundreds of officers, enlisted men and civilians to engage in contract termination. Since contracts placed by the Signal Corps are broken down into a large number of subcontracts, Signal Corps participation in this program appears to be more active than many of the other Arms or Services.

Implementing this need, the War Department has directed that Army Ground Forces, all defense commands, overseas theaters and departments conduct a survey and report officers and enlisted men who possess CPA degrees, or college graduates with accounting degrees who have experience in cost accounting and contract termination. Quotas have been established and the Military Personnel Division, Army Service Forces, has been designated as the agency to receive the reports and to make allocations of available personnel between Army Service Forces and Army Air Forces.

The Signal Corps has been authorized officer, enlisted, and civilian personnel of this type. Preference for assignment will be given to men over 35, limited service, returned from overseas under the rotation plan, or who are recovered from battle casualties. However, physically qualified men will be used if sufficient men in other categories are not available and military necessity dictates their use.

To be selected, officers must possess qualifications of the type listed below:

Senior Accountant—Minimum age 30 years. May be up to and including Lieutenant Colonel in grade. Recognized accounting degree, and a thorough knowledge of accounting practices acquired through association with public accounting firms or large industrial organizations. Seven years professional or industrial cost accounting experience.

Junior Accountants—Company grade. No age restrictions. Recognized accounting degrees preferred. Three years professional or industrial cost accounting experience.

Legal—May be up to and including Lieutenant Colonel in grade. No age restrictions. Bachelor of Law or membership in a state, territory or district bar. Five years general legal experience with some experience in contract and corporate work or substantial experience in administrative law.

Property Disposal—May be up to and including Lieutenant Colonel in grade. No age restrictions. Four years college or equivalent in added years of experience. Five years experience as purchasing agent in moderate size industrial organization or equivalent industrial experience as operator of recovery plant, or experience in operating an industrial salvage organization, or 10 years experience as dealer in manufacturing scrap or surpluses.

Administrative—May be up to and including Lieutenant Colonel in grade. No age restrictions. Two years college or equivalent business experience, and at least five years experience in a moderate size industrial or business organization, possessing familiarity in management of personnel and in the handling of administrative details.

Negotiators—May be up to and including Lieutenant Colonel in grade. Minimum age 35 years. Two years college or equivalent business experience. Ten years experience as a junior or senior executive of an established business or organization, or 10 years experience as a lawyer engaged in general commercial practice in which the compromise and adjustment of disputed matters was a substantial part, or with commercial experience with substantial claims involving contractor liability.

Following are the requirements for enlisted men:

Senior Accountants—Must have recognized accounting degree or equivalent. A thorough knowledge of accounting practices acquired through association with public accounting firms or large industrial organizations. Five years professional or industrial cost accounting experience.

Junior Accountants—Two years college or equivalent business experience. Two years professional or industrial cost accounting experience.

Legal—Bachelor of Law or membership in a state, territory or district bar preferred. Three years general legal experience with some experience in contract and corporate work or in lieu thereof substantial experience in administrative law.

Property Disposal—Two years college or equivalent in added years of experience. Three years experience as a purchasing agent in a moderate size industrial organization or equivalent industrial experience as the operator of recovery plant, or experience in operating an industrial salvage organization or 5 years experience as a dealer in manufacturing scrap or surpluses.

Administrative—High School Graduate. At least 3 years experience in a moderate size industrial or business organization, possessing familiarity in management of personnel and in the handling of administrative details.

Negotiators—High School graduate. At least 5 years experience as a junior or senior executive of an established business or industrial organization or 5 years experience as a lawyer engaged in general commercial practice in which the compromise and adjustment of disputed matters was a substantial part or with commercial experience with substantial claims involving contractor liability.

It is also contemplated that a group of enlisted men, qualified for attendance at the Army Finance School under the provisions contained in AR–610–15, Section 4, as amended by War Department Circular No. 385, dated 25 September 1944, will be appointed as Warrant Officers.

MILITARY TRAINING

DUTIES OF SIGNAL CENTER OFFICERS

INCREASED TRAINING emphasis on signal centers for large headquarters has necessitated the establishment of a tentative procedure for these installations. The duties of key officer personnel in signal centers, outlined below, form the basis for current instruction in the Message Center Specialist Course, Officers' School, Eastern Signal Corps Schools.

OFFICER-IN-CHARGE

Exercises general supervision and is responsible for operations as a whole.

Coordinates the various shifts and communication watch officers (duty officers).

Insures that all personnel have at their disposal all necessary routing data, SOI, signal instructions and policies, operational forms and equipment, and other materials essential for successful operation.

Schedules, selects, and trains personnel.

Inspects the various sections to observe security features, operating efficiency, and condition of equipment.

Conducts necessary analyses and studies of traffic conditions and effects intelligent action as a result of such studies.

Establishes and directs the procedure and policies of all personnel and activities in the signal center.

Maintains close liaison and friendly relations with the staff and especially with the Adjutant General cable section or distribution center.

Interprets directives and policies of higher headquarters and insures proper compliance with them on the part of all concerned.

Maintains friendly relations with distant signal centers and assists subordinate signal centers or message centers in the area.

Trains personnel in their own specialty and in other specialties to insure continuous improvement of operations.

Adjusts complaints and procedure difficulties with other signal centers as well as any internal difficulties.

Prepares and submits through channels necessary memorandums or directives required to acquaint the staff with instructions on preparation of messages, messenger schedules, and similar data.

Plans messenger routes and time schedules to conserve time and distance and at the same time to afford adequate coverage.

CRYPTOGRAPHIC SECURITY OFFICER

Inspects and establishes physical security features such as properly locked doors for the code room, easily accessible destruction material, and arms for protective action.

Prepares evacuation and defense plans pertaining to the safeguarding of cryptographic material.

Insures that all cryptographic personnel have been properly cleared and are thoroughly familiar with the systems that they employ.

Effects proper steps to prevent crytographic material from being lost, or otherwise compromised, including the close inspection of all material leaving the code room.

Takes immediate corrective action upon receipt of any cryptographic violation reports from other headquarters.

Submits to other headquarters through channels all violations that may have occurred on cryptographed messages originating at their signal centers.

Establishes proper measures to prevent the unauthorized sending of messages in the clear.

Trains all personnel to be watchful of any suspicious persons, insisting upon the definite recognition of all incoming messengers or staff representatives.

Prepares cryptographic traffic load reports and complies with current policies of higher headquarters concerning excessive use of any particular system.

Trains personnel in the efficient use of emergency systems.

Insures that crytographic personnel are kept informed of all systems that are available to their own and to other headquarters.

Establishes and supervises an approved system of handling top secret and other special messages, being certain that AR 380–5 and other authoritative instructions are properly complied with.

Maintains an approved record system to insure all cryptographic material is placed in effect and destroyed at the designated time.

Effects strict compliance with AR 380–5 on the part of all personnel in the signal center.

COMMUNICATION WATCH OFFICER

Effects proper action on all policies and procedure established by his officer-in-charge and by higher headquarters.

Insures accurate, secure, and fast processing and routing of all cryptographed, clear, and service traffic.

Keeps all personnel on his shift informed on the current availability of the various means.

Supervises and spot checks the activities of all personnel on duty.

Reports any unusual activities and all operational changes to the officer in charge.

Supervises the distribution of the work load throughout the signal center.

Discusses with his various supervisors all traffic of unusual importance that must be given special attention.

Cooperates with his relief at the change of shifts, advises his relief of all matters pending in the signal center and passes on any other information that may be required by his relief.

Gives personal attention to the procedure of all traffic and assists where there are delays, difficulties, or unusual circumstances.

Effects intelligent action to prevent delays in cases of emergencies, equipment failures, or other difficulties.

SECTION OR SUBSECTION SUPERVISOR

Supervises all personnel and activities within his section during his tour of duty.

Distributes the traffic within his section so that the most expeditious results are obtained.

Assists his personnel when deemed advisable.

Arranges traffic in order of its precedence.

Reports availability of the various means and circuits out of order to the outgoing routing clerks and the communication watch officer.

Contacts the maintenance section for repairs of his equipment.

Compiles information pertaining to his section for the traffic studies required by the officer in charge.

Arranges for the relief of his personnel.

Arranges the physical positions of his equipment, desks, and work tables in a manner most suitable to efficient operation.

Informs personnel in his section of all changes in SOI, SOP, and other instructions.

Maintains a constant check on security measures pertaining to his section.

Orients his relief supervisor with all pending or special matters before leaving the signal center.

REGIMENTAL TRAINING

"From experience gained in nearly 2 years' of fighting, we have found that casualties are heavy amongst wiremen and R/T radio operators. . ." In order to provide a communications pool, the regimental communication officer whose words are quoted above tells something of the training carried on in his organization. The article was published in the September issue of the Current Information Letter, issued by the Chief Signal Officer, ETOUSA.

Every month, two or three men from each lettered company of the regiment are placed on special duty with headquarters company for about 30 days' training in the fundamentals of wire communications. During this time, the men receive detailed instruction in the field under veteran instructors. Students and instructors live together, and the effectiveness of this program has been evidenced by the fact that the students learn in one month what normally would take three months.

After the course is completed and the men are returned to their own organizations, their names and a record of their technical ability is furnished battalion communication officers, so that information of men qualified to act as wiremen when an emergency arises is on hand. At the same time, these men are used to train other men in the company in wire communication techniques, such as the use of Reel Equipment CE–11, etc.

While this training in wire is being carried out, other men, numbering 8 to 10 per lettered company, and including the communication sergeant of each company, are being trained in the fundamentals of voice radio communications. This course includes the phonetic alphabet, radio-telephone procedures, field expedients, capabilities and limitations of Radio Set SCR–536–( ) and SCR–300–( ), etc. Field nets are operated and training continues until each man obtains satisfactory results. From time to time, after they have completed their studies, refresher courses are given these men to bring them up to date on changes in procedure and practice field nets are operated.

Thus, when the men are returned to their own units, they are experienced in radio-telephone operation and procedure and can be drawn upon when needed. The author of the article points out, however, that care must be taken not to allow these men to be transferred from their company, since this would destroy the whole purpose of this training. He also points out that the radio-telephone school can be conducted by the battalion radio section while the regimental radio section is conducting a course for cw operators.

AID FOR TELETYPEWRITER MECHANICS

The Enlisted Men's School, Eastern Signal Corps Schools has recently put into operation a new teaching aid for training teletypewriter mechanics. It is an instruction manual known as the "Sequence of Operation of the Model 15 Teletypewriter." Because of the success of this teaching aid, similar manuals for other types of teletypewriter equipment are in preparation.

Prior to the adoption of this manual considerable difficulty was experienced by students in locating mechanical troubles. In the training of teletypewriter machanics, the primary mission is to train them as trouble shooting and maintenance men. This manual has been designed to simplify the training by providing the students with an exact procedure for locating mechanical troubles and clearing them in a minimum of time.

Each lesson of the subcourse, Teletypewriter Maintenance, M–15, is laid out so that it covers one part of the mechanism of the teletypewriter. For example, lesson one covers the operation and adjustments of the keyboard. During the instruction, the instructor operates the keyboard of a teletypewriter by hand and points out each operation in the proper order with the aid of the "Sequence of Operation." The manual contains the sequence of operations for transmitting, receiving (including both pulling and holding magnet types of selecting mechanisms), and printing; it also contains all the functions, namely,

spacing, motor stop, figures shift, letters shift, line-feed, carriage return, signal bell, and blank. The manual explains, step by step, every movement of a part or parts through the entire train of operation for each of the above-named mechanisms. It is so designed that when it is opened to one of the operations, the left hand page contains the operations arranged in a family tree. A reference letter and number is assigned to each movement on the family tree which is thus keyed to a written description of the same operation which is found on the right hand page.

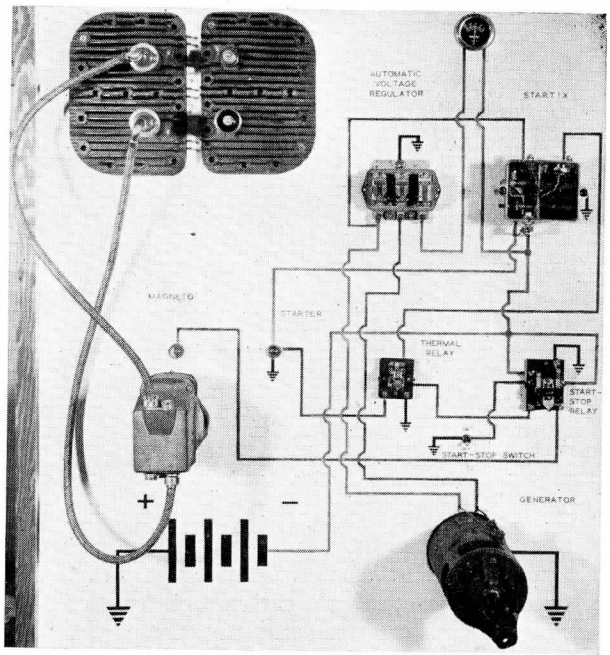
As a student advances through each lesson the instructor demonstrates the sequence of operations pertaining to that lesson. This manual gives a detailed description of the movement of the various parts and mechanisms while the textbook contains specifications to be followed when readjustment becomes necessary.

In practice a student completes a series of mechanical demonstrations supported by the "Sequence of Operation" before he starts his trouble shooting or performance test phase of this subcourse. When he starts his performance test he uses the instruction manual for isolating mechanical troubles, and the textbook for reference in readjusting the part which caused the trouble according to specifications. When a student notes a deviation from the normal sequence of operation, he checks the key number and reads the complete description of what the operation should be. If necessary he can refer to the textbook for the correct specification.

By this method he can locate and clear his troubles in a quick and orderly manner. This method has been in operation for four months, and has proven highly successful.

It was a common complaint of the students that, while they could make the adjustments, they could not remember the names of the parts. This necessitated constant reference to the textbook, not alone for specifications, but for nomenclature as well: It has been found that the constant use of both the subcourse textbook and the "Sequence of Operation" manual throughout the subcourse develops the student's ability to remember standard nomenclature, and at the same time clarifies the normal sequence of operations for the various mechanisms.

The use of this manual enables a student to learn thoroughly the mechanical operations of a teletypewriter in a logical order with a minimum expenditure of time.



DEMONSTRATOR BOARD OF POWER UNIT PE–99–A

PE–99–A DEMONSTRATOR BOARD

The Power Unit PE–99–A is a compact unit the electrical circuits of which are difficult to study first hand because some of the components are hidden from view, and because some of its operations are hard to visualize.

The PE–99–A demonstrator board was built to solve these problems. All of the components of the starting and ignition circuits were removed from this unit and mounted on a panel. Colored lines are painted on the front of the panel to indicate circuit wiring. The actual wiring is behind the panel.

The demonstrator board exhibits the starting and ignition circuits of the power unit, showing the ON–OFF switch and the sequence of relay operation. Also indicated on the board is the safety overload relay.

Among the advantages of the PE–99–A demonstrator board is the fact that troubles can be introduced in the circuit for discussion during lectures and for actual trouble-shooting of circuits.

For convenience, the gasoline motor which drives the generator has been replaced by a small electric motor.

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ARMY SERVICE FORCES
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON 25, D. C.

16 November 1944

To All Officers, Enlisted Men, and Civilian Employees of the Signal Corps:

On this, the third successive Thanksgiving Day since our country was drawn into the present gigantic conflict, we Americans have much to be thankful for.

Our valiant soldiers, sailors, and marines, with the help of our superbly battling Allies, have scored many brilliant victories in every quarter of the globe. Villages, towns, and cities have been liberated, and their inhabitants, long the victims of oppression and darkness, again know the joys of freedom and light.

After this long, hard, and perhaps at times disheartening struggle, our armed forces, now on the offensive both in Europe and in the Pacific, are girding themselves for the supreme effort. The final joyous victory, though perhaps still distant, is now in sight.

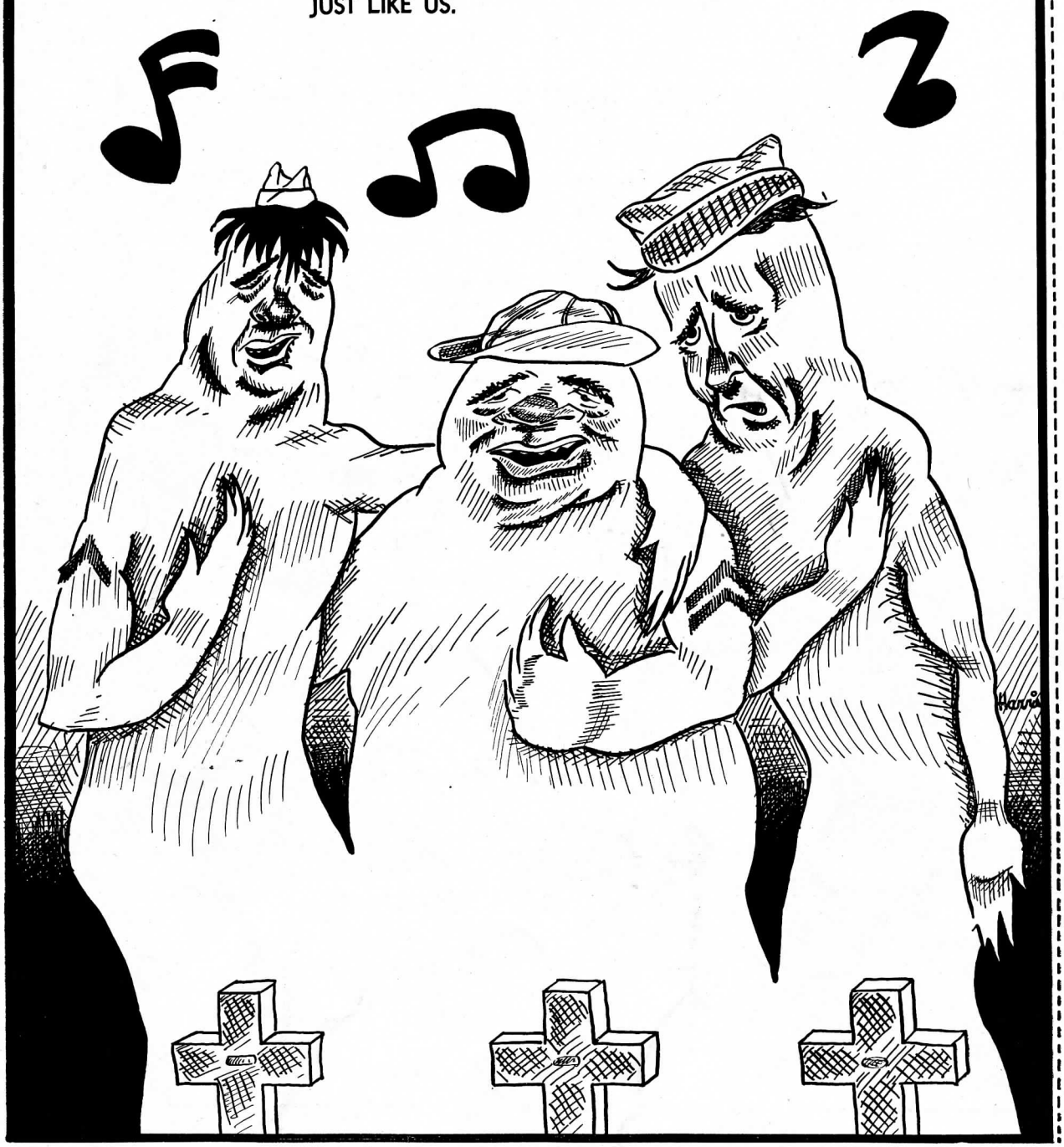
Therefore, in acknowledging our many blessings on this traditional American holiday, let us all, no matter where we are stationed, rededicate ourselves to the American way of living, and to the cause of freedom and liberty for all peoples.

H. C. Ingles

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

CODE CLERKS' LAMENT

CHOOSE A RANDOM LETTER GROUP
FOR YOUR MESSAGE INDICATOR
OR YOUR CIPHER WILL BE BROKEN
AND YOU MAY BE SORRY LATER—
JUST LIKE US.



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