No. 20

RESTRICTED

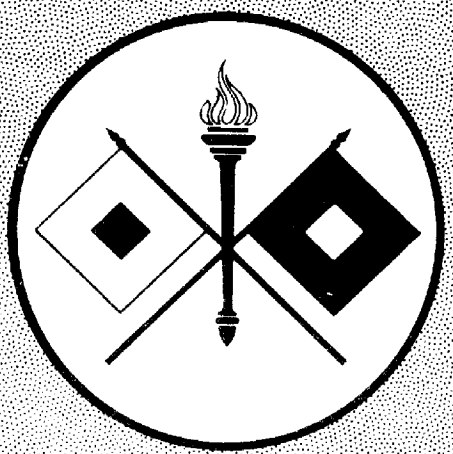
SIGNAL CORPS

TECHNICAL

INFORMATION LETTER

JULY · 1943

ARMY SERVICE FORCES · OFFICE OF THE CHIEF SIGNAL OFFICER



A MESSAGE FROM GENERAL INGLES

SPSMP 201.22 Gen.

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

SPSMP-1B

10 July 1943

MEMORANDUM for All Signal Corps Officers.

SUBJECT: Officers Detailed in Signal Corps.

1. I wish to express my appreciation for the loyal and efficient service, both past and present, rendered by officers of other arms and services who have been detailed in the Signal Corps.

2. In so far as possible, it is my intention to retain all such officers on their present duties. Individual applications from officers under my control who wish to return to their basic branches will, however, receive sympathetic consideration to the extent that the exigencies of the military situation warrant.

H. C. Ingles

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

SIGNAL CORPS TECHNICAL

INFORMATION LETTER

Number 20 July 1943

RESTRICTED

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WAR DEPARTMENT · ARMY SERVICE FORCES

OFFICE OF THE CHIEF SIGNAL OFFICER

EXECUTIVE OFFICE · SPECIAL ACTIVITIES BRANCH

S.C.T.I.L.

PURPOSE

Signal Corps Technical Information Letter (SCTIL) is issued monthly for the purpose of keeping officers in charge of field activities informed on the newest training methods, operational procedures, equipment under development, standardization or procurement, and other pertinent information as coordinated in the Office of the Chief Signal Officer.

SOURCE OF MATERIAL

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

DISTRIBUTION

Distribution of the Letter is made to army, corps, and division signal officers; commanding officers of signal companies and battalions; service command and department signal officers; post, camp, and depot signal officers; the signal officers of bases and task forces; Signal Corps inspection zones, procurement districts, training centers and laboratories; directors of Signal Corps ROTC units; signal officers of Army Air Forces and Army Ground Forces headquarters and major commands; overseas headquarters; units of the Office of the Chief Signal Officer and of Headquarters, Army Service Forces.

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This Letter is for information only. Requisitions for new types of equipment will not be submitted on the basis of data contained in this Letter.

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MAJOR GENERAL HARRY C. INGLES

THE NEW CHIEF SIGNAL OFFICER

The Senate confirmed Major General Harry C. Ingles as Chief Signal Officer on June 29, effective as of July 1, 1943.

Harry Clyde Ingles was born in Pleasant Hill, Nebraska, on March 12, 1888. Following graduation from the United States Military Academy, he was appointed a second lieutenant of Infantry on June 12, 1914. He served on the Mexican Border in 1916. In 1917 he entered signal work with the Second Telegraph Battalion of the Signal Corps at El Paso, Texas. Shortly thereafter he was assigned as an instructor at the Signal Officers' Training School, Leon Springs, Texas; then at the Signal Officers' Training School at Camp Meade, Maryland, where he assumed command of the 22nd Field Signal Battalion in December 1918.

In 1921 General Ingles, then major, became Signal Officer of the Philipine Division at Manila. In this position he served for two years, after which he became Director at the Signal School at Fort Monmouth where he remained until June 1926. In July 1927 he graduated with honors from the Command and General Staff School, Fort Leavenworth, Kansas. He there remained as an instructor until August 1931, when he enrolled in the Army War College, graduating in June 1932. This was followed by his appointment as Director of the Department of Applied Communication and as instructor at the Signal School, Fort Monmouth, N. J. He assumed command of the 51st Signal Battalion at that post in July 1933.

His promotion to lieutenant colonel in August 1935 was followed shortly by his appointment to the Operations and Training Division of the War Department General Staff, Washington, D. C. In 1939 he became a member of the Signal Corps Board and inspector of training and transportation of tactical organizations with headquarters at Fort Monmouth and at Camp Beauregard, La. In November 1940 he was assigned to Headquarters of the Third Army at Fort Sam Houston, Texas.

During 1941 General Ingles was promoted to brigadier general (temporary) and was appointed Chief of Staff of the Caribbean Defense Command. He then became Commander of the Mobile Ground Forces in the Panama Canal Department. December 1942 saw his promotion to Major General (temporary). In February 1943 he was assigned to Headquarters, European Theater of Operations, London, and the following month was named Deputy Commander, United States Forces in the European Theater of Operations.

Major General Dawson Olmstead, who is succeeded by General Ingles, retired at his own request on June 30, 1943. He is to remain on active duty, however, in a responsible communications job.

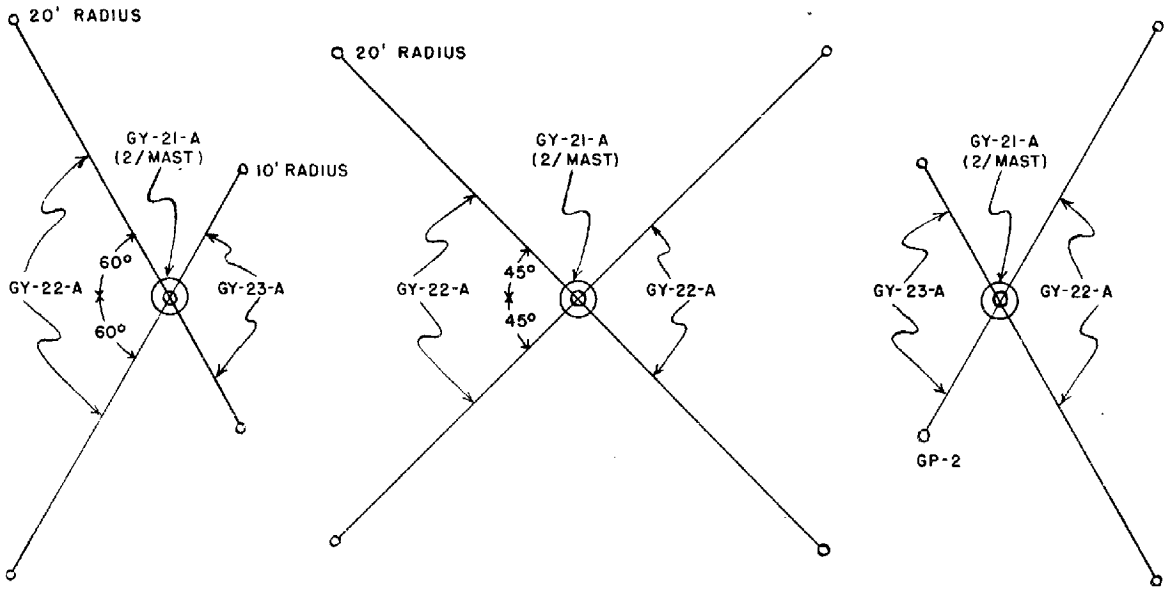
HALF-WAVE DOUBLET ANTENNA FOR SCR-299-( )

Radio Set SCR-299-( ) has received the unstinted praise not only of our own forces overseas, but of our allies. It was singled out by General Olmstead, upon his return from a tour of overseas theaters, for special comment based on the opinions of both U. S. and British signal officers who paid high tribute to it as equipment "which stood up to an unprecedented degree under the conditions of desert warfare." Because of its combination of relatively high power, flexibility of application, sturdiness, and mobility, the SCR-299-( ) is being used for various purposes beyond the scope of early plans. In order to adapt the set more particularly for such uses, provision of special antenna equipment has been studied. The Camp Coles Signal Laboratory has conducted tests of various arrangements and has evolved a combination of standard items and prepared instructions for their use.

Pending determination of ways and means for making the equipment available to troops through normal channels of procurement, storage and issue, parts data and instructions are here being given for the guidance of all concerned.

Twenty-one mast sections are employed, seven to a mast. The guying of each mast is accomplished by means of Guys GY-21-A, GY-22-A and GY-23-A. Each end mast employs one guy, GY-22-A, two guys GY-21-A and one guy GY-23-A. The center mast employs two Guys, GY-21-A and two Guys GY-22-A. The antenna is raised and lowered by means of Guy GY-24-A at each mast. Three Mast Bases MP-19 are used, one for each mast. These mast bases are anchored to the ground by means of Stakes GP-2. The distance between the two outer masts is governed by the length of antenna in use and should be at least six feet greater than the antenna length. The center mast is erected at the midpoint in line with the two outer masts and is used to support the weight of the feed line. Refer to Figure 1 for layout details.

The antenna wire W-28 is cut to the proper length for the frequency desired, using the formula "468 divided by Frequency (MC)= length in feet." The frequency should not be changed more than 100 KC above or below the frequency for which the antenna is cut, without changing the length of the antenna. For operation on frequencies of from 6-8 MC the antenna can be $1\frac{1}{2}$ wavelengths long. For instance, an antenna cut for 2 MC will operate on 6 MC as well as 2 MC. When operation on more than one frequency is contemplated, if the frequencies to be used are not in harmonic relationship as noted above, the antenna is broken up with insulators IN-86 and jumpers are used when working on the lower frequencies. The inner conductor of one end of the coaxial cable is soldered to one leg of the antenna and the outer shield is soldered to the other leg as indicated in Figure 1. The other end of the coaxial cable is connected to Mast Base MP-47, the inner conductor being connected to the part in which mast section, MS-53 is inserted. A short $\frac{1}{2}$" bolt is furnished with each MP-47 and this is used to secure the inner conductor of the coaxial cable to the mast base. The shield is connected to one



SPACING BETWEEN MASTS IS DETERMINED BY THE LENGTH OF ANTENNA IN USE.

$$\text{ANTENNA LENGTH IN FEET} = \frac{468}{\text{FREQ. (MC)}}$$

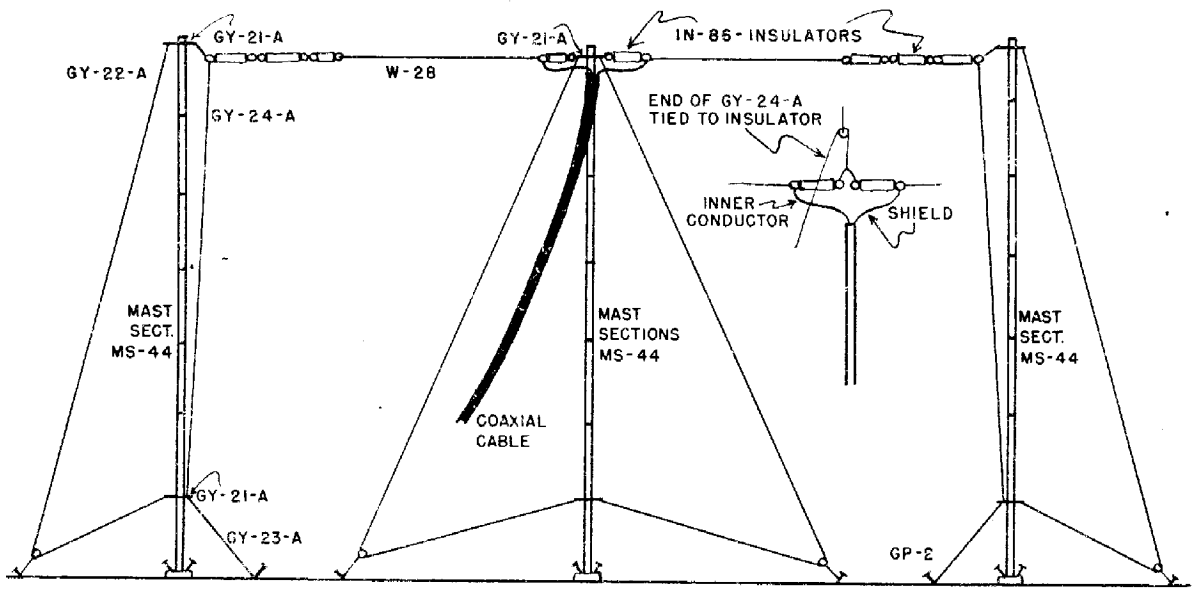


FIG. 1- HALF WAVE ANTENNA SYSTEM FOR USE WITH RADIO SET SCR-299

of the bolts which holds Mast Base MP-47 to the vehicle. On the inside of the vehicle a bond is made between the bolt to which the shield of the coaxial cable is connected and one of the bolts which holds Antenna Tuning Unit BC-729-( ) to the top of Radio Transmitter BC-610-( ).

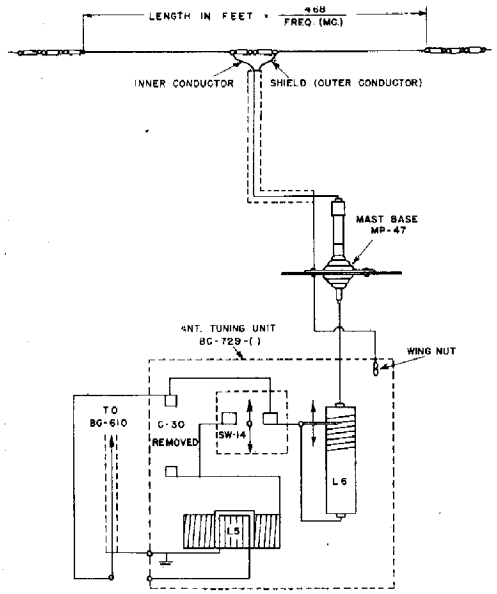


FIG. 2

Place switch SW-14 of Antenna Tuning Unit BC-729-( ) in "6-8 MC" position and also remove vacuum condenser C-30.

Open the coaxial line between Radio Transmitter BC-610-( ) and Antenna Tuning Unit BC-729-( ) by removing center wire of coaxial cable from Antenna Tuning Unit BC-729-( ). A jumper is attached between this center wire and slider on Coil L-6. Refer to Figure 2.

Only a few turns of Coil L-6 are utilized for loading the antenna to the proper value. With Coil L-6 completely shorted out (dial reading 60), the loading is usually too high. Enough turns are used from Coil L-6 to bring the loading down to the proper level. Between 0 to seven turns are used (dial reading 53-60).

Parts List for Half Wave Doublet Antenna for Use with Radio Set SCR-299-( )

Quantity	Article	Use
250 ft.	Wire W-28	Antenna wire
50 ft.	Coaxial Cable (500 watt)	Antenna feeder
12 ea.	Insulator IN-86	Antenna Insulators
21 ea.	Mast Section MS-44	Masts
6 ea.	Guy 21-A	Mast Guy
4 ea.	Guy 22-A	Mast Guy
2 ea.	Guy 23-A	Mast Guy
3 ea.	Guy 24-A	Antenna Halyard
18 ea.	Stake GP-2	Guy and Mast Base Stakes
3 ea.	Mast Base MP-19	Mast Bases
1 ea.	Solder lug 1/2" hole	To make necessary connections to Mast Base MP-47 and Antenna Tuning Unit BC-729-( )
2 ea.	Solder lug 3/8" hole	
1 ea.	Solder lug 1/4" hole	
2 ea.	Solder lug #8 screw hole	
3 ft.	1/2" copper braid	
3 ft.	Wire W-128	To make new connection between BC-610-( ) and BC-729-( ).

AUXILIARY ANTENNA FOR RADIO SETS

Various inquiries have been made of "The Chief's Office" relative to operation of Radio Set SCR-193 with a long wire antenna instead of the vehicular whip antenna. This matter has been made the subject of Appendix 1 to TM 11-273 published in Changes No. 2 dated October 8, 1942, and is reprinted below for the information and guidance of all concerned.

Similar arrangements may be employed in conjunction with Radio Sets SCR-245-( ) and SCR-506-( ). Specific instructions for use with the former have not been published, but those for the latter will be found in TM 11-630, the Technical Manual for Radio Set SCR-506-A, and are also quoted below.

USING WITH RADIO SET SCR-193-(*)

Auxiliary antenna AN-24-A will permit operation in concealment or under other circumstances wherein the use of the vehicular mast type of antenna may be impracticable. The auxiliary antenna consists of the following parts which have been added to the parts list of radio set SCR-193-(*).

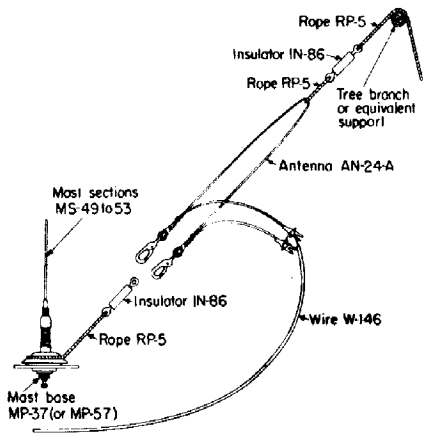
Quantity	Stock No.	Article	Unit Weight
			Pounds
1	(2A224A)	Antenna AN-24-A	1.25
3	(3G586)	Insulator IN-86	.19
50 feet	(6Z7926)	Rope RP-5	7

This antenna is intended to replace the regular 15-foot whip antenna when the vehicle is run under trees, for purposes of concealment, and the whip antenna is partially or intermittently short-circuited to ground as it touches low-hanging branches, especially in damp weather. Under most circumstances this long antenna (45 ft.) also provides greater transmission distance than the whip antenna. The use of Antenna AN-24-A is practicable only when temporary immobilization of the vehicle is permissible. The choice of the best spot in which to park the vehicle depends on the height, number, and thickness of the trees. Best results are obtained when the antenna is completely in the clear.

Unroll the Antenna AN-24-A carefully, smoothing out all kinks. Attach

NOTE:--Radio Set SCR-193-(*) refers to Radio Sets SCR-193-A, SCR-193-B, SCR-193-C, SCR-193-D, SCR-193-E, SCR-193-F, SCR-193-FX, SCR-193-G, and SCR-193-H.

an Insulator IN-86 to each end, using the snap fasteners provided. Fasten a short piece RP-5 (2 or 3 ft.) to the free eye of one insulator. Fasten the remaining length of rope to the free eye of the other insulator. Tie the short rope to the Mast Base MP-37. Weight the other end of the long rope with a small rock or other object and throw it over a convenient limb of the tree. Haul up the antenna and fasten the rope to the base of the tree. Do not pull the antenna taut, as movement of the tree with the wind may cause the wire to snap. It may be necessary to shift the vehicle slightly to keep the antenna from touching branches of the tree. Unfasten the antenna lead-in wire from the binding post on the Mast Base MP-37, and connect it instead to the thumbscrew on the near end of the Antenna AN-24-A. It is not necessary to remove the whip antenna.



Auxiliary Antenna AN-24-A, Typical Installation

Tune Radio Transmitter BC-191-(*) as usual. Typical settings and meter readings for various frequencies, with the transmitter set for c-w, using Antenna AN-24-A follow:

Tuning Unit	TU-5-B			TU-6-B			
Frequency, kilocycles	1500	2000	3000	3000	3500	4000	4500
ANT. COUPLING SWITCH D	4	3	3	3	3	4	4
ANT. IND. M	27	34.75	18	18	13	9	6
ANT. CIRCUIT SWITCH N	4	1	3	3	3	3	3
ANT. CAP. TUNING O	x	75	x	x	x	x	x
ANT. IND. SWITCH P	3	x	x	x	x	x	x
TOTAL PL. CURRENT (ma)	230	230	230	240	220	240	240
ANT. CURRENT (amp)	2.4	4.4	4.4	4.4	4.2	3.8	2.2

x=Control not in circuit.

USING WITH RADIO SET SCR-506-( )

Auxiliary Antenna AN-24-A will permit radio operation in concealment or under other circumstances wherein the use of the vehicular mast-type of antenna may be impracticable. It consists of a 45-foot length of wire (doubled back to 22½ feet) with appropriate fittings to permit one end of the antenna to be supported by a section of Rope RP-5 and a tree limb. Do not attempt to use a straight 45-foot length of wire as an antenna. Refer to Figure 12 for aid in installation. In order to use the auxiliary antenna, observe the following instructions.

Unroll auxiliary Antenna AN-24-A carefully, smoothing out all "kinks." Double it back on itself, thus making it 22½ feet long. Connect the two ends by means of the thumb screws provided, and attach both snap fasteners to one eye bolt of an Insulator IN-86. Fasten a short piece of Rope RP-5 (2 or 3 feet) to the other eye bolt of this insulator, and tie it to Mast Base MP-37 or MP-57. Fasten the doubled end of the antenna to one eye bolt of another. Insulator IN-86 by means of a piece of rope or wire. Fasten one end of the remaining long piece of rope to the other end of the remaining long piece of rope to the other eye bolt of this insulator. Weight the free end of the long rope with a small rock or other object and throw it over a convenient limb of a tree. Haul up the antenna and fasten the rope to the base of the tree. Do not pull the antenna taut, as movement of the tree with the wind may cause the wire to snap. It may be necessary to shift the vehicle slightly to keep the antenna from touching branches of the tree. Unfasten antenna lead-in Wire W-146 from the binding post on Mast Base MP-37 or MP-57, and connect it instead to the thumb screws on the end of the antenna. It is not necessary to remove the whip antenna.

It is preferable that no branches or other objects come within a yard or so of the antenna wire, and under no circumstances must they touch the wire.

Radio Set SCR-506-A may now be operated in the usual manner, except that the p-a coil and ANTENNA COUPLING adjustments will differ slightly from those obtained with the regular whip antenna.

CORRECTION---RHOMBIC ANTENNA ARTICLE, MAY ISSUE

In the article "Vertical Rhombic Antennas for VHF Operation" in the May 1943 issue of the Signal Corps Technical Information Letter, an error appeared in the legend on the Polar diagram, Figure 4, page 6. The length L was given as 48 feet whereas it should have been 40 feet. This does not alter the polar patterns as they appear in this illustration, nor will it change the wavelength ratios listed in the legend.

VISUAL TRAINING AIDS

RECTIFIER DEMONSTRATOR

Many beginner students understand the behavior of the two-element vacuum tube (diode) when it is explained by application of a d-c voltage between plate and electron emitter, yet find it difficult to comprehend its action when it is used as the rectifier in a conventional a-c operated power supply. The visual aid Rectifier Demonstrator described in this article, developed and used at the Southern Signal Corps School, Camp Murphy, Florida, has been found to be of tremendous aid in making rectifier action clear in the minds of many students.

Essentially, the demonstrator is a simple, unfiltered full-wave rectifying system with provision for change-over to a half-wave arrangement. Included are means for observing the plate current flowing through each tube during the rectifying half cycles, the voltage developed across the load, and visual observation by means of a cathode-ray oscillograph of input a-c and rectified output voltage wave-forms.

The highlight of the Rectifier Demonstrator is the inclusion, in addition to the conventional 60 c/s input supply, of a simple battery system so

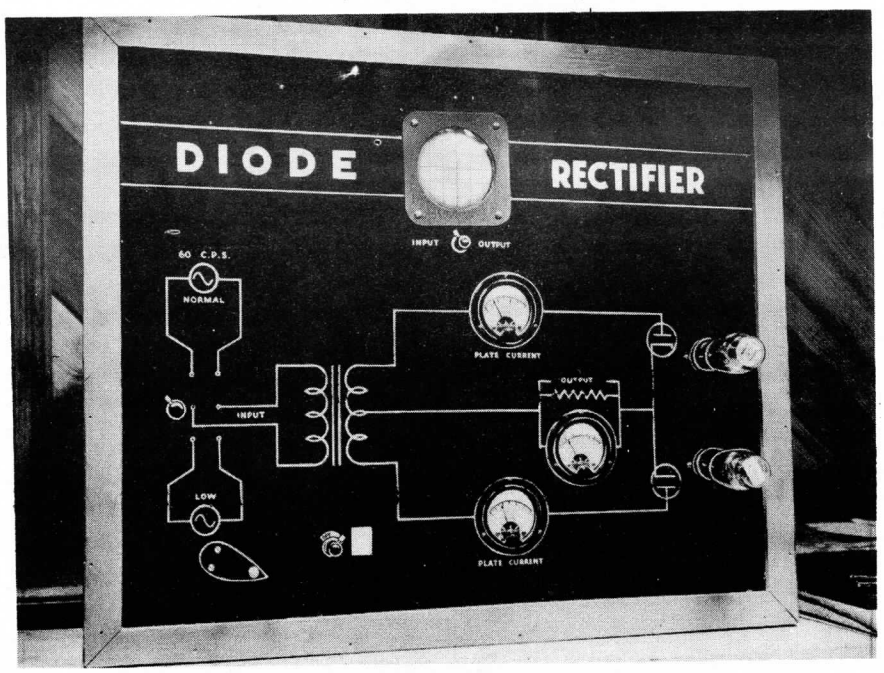


FIG. I - FRONT VIEW OF RECTIFIER DEMONSTRATOR

arranged as to simulate an a-c primary voltage source of such low frequency that the eye can readily follow its alternations in detail.

Not the least of the advantages of this demonstrator is the fact that all components are likely to be readily available in every radio school and "local purchase" requisitions are not needed.

Construction

The front view of the demonstrator is shown in Figure 1 and the rear view in Figure 2. The cathode-ray oscillograph is a commercial RCA 155-A, with the CR tube removed and mounted upon the demonstrator, with its screen visible at the front and the connections to the tube base accessible at the rear. A tube socket electrically connected to the CR socket inside the oscillograph serves as the extension whereby operating and control voltages are applied to the CR tube. All of the controls upon the panel of the oscillograph are operative in a normal manner, but once adjusted for this use require no further attention. The vertical deflection plates are connected to the demonstrator by means of the lower pair of wires joining the two binding posts accessible at the rear of the demonstrator, as seen in Figure 2.

Since the controls of the oscillograph are not a part of the demonstration apparatus, the oscillograph unit is concealed behind the demonstrator in Figure 1. It appears in Figure 2 only to show the interconnections.

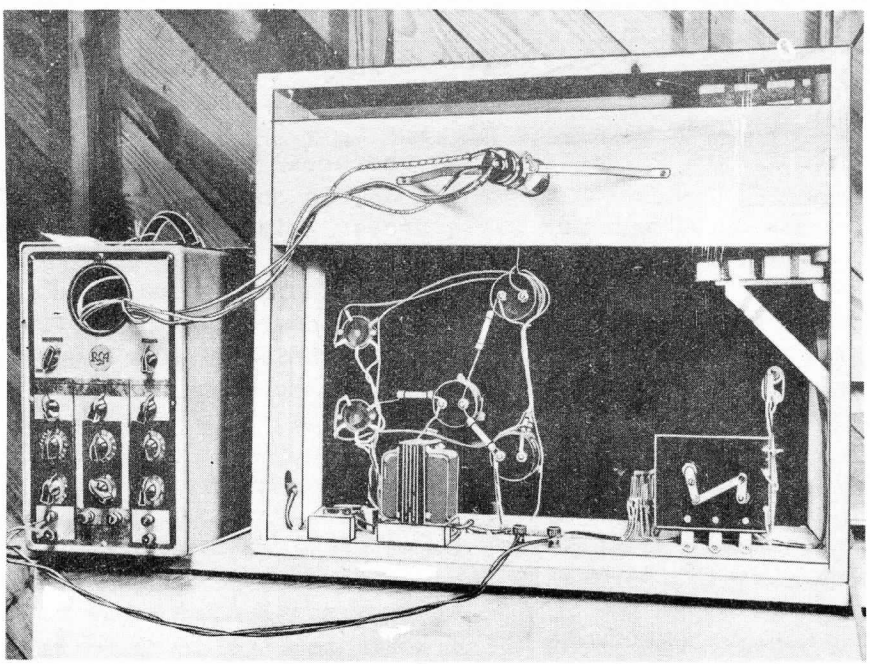


FIG. 2- C.R. TUBE OBTAINS VOLTAGE SUPPLY THROUGH EXTENSION LEADS

Referring to Figure 1, the schematic diagram engraved upon the panel is self-explanatory, being a simple full-wave rectifier, with two primary voltage sources and meters in each rectifier leg and across the rectifier load. The oscillograph tube screen appears in the upper center of the panel. The two rectifier tubes, indicated by diode symbols, are triodes (type 76) with the grid and plate of each tube joined to form a single element. Instantaneous change-over from full-wave to half-wave rectification is possible by simply removing one of the two tubes.

The incorporation upon the panel of both the circuit and the different instruments provides the utmost correlation between the circuit symbols and equipment location in the circuit. With reference to Figure 1, the main "on-off" switch is located below the power transformer symbol. The switch adjacent to the transformer primary leads controls the primary voltage source, which is either the 60-c/s supply or the pseudo "low-frequency generator." The crank handle below the low-frequency generator symbol is rotated to produce the low-frequency voltage, the slower the speed of rotation the more easily can the circuit action be followed. The switch beneath the scope screen controls the connections of the vertical deflection plates of the CR tube to either the input circuit of the power transformer or across the load resistance. In other words, it permits the wave-form of the applied voltage to be viewed before and after rectification.

Concerning the meters upon the panel, very little description is necessary. A current meter is located in each rectifier leg and indicates the flow of plate current during each half cycles. The location and function of the load voltmeter also are self-explanatory. The sockets, transformer, and switches need no explanation.

The Schematic Diagram

Referring to Figure 2, the shelf at the upper right accommodates the batteries, and the gadget below the shelf is, in conjunction with the batteries, the fictitious low-frequency a-c source. This brings us to the schematic circuit diagram (Figure 3) of the entire assembly.

The demonstrator schematic, less the cathode-ray oscillograph system, in effect represents two assemblies. Whereas the schematic upon the demonstrator panel gives the impression that the complete unit is one circuit, actually it is not.

For example, when the voltage input selector switch is set for 60-c/s operation, all the items below and to the right of the dotted line are in use. And while there is some resemblance between the actual circuit (Figure 3) and the apparent circuit (Figure 1), there are some significant differences.

In the first place the power transformer is a filament transformer with a 6.3-and a 7.5-volt winding. The former is used to heat the rectifier heaters and at the same time it is connected in series with the 7.5-volt winding so as to supply a total of 13.8 volts to the rectifier plate-cathode circuit.

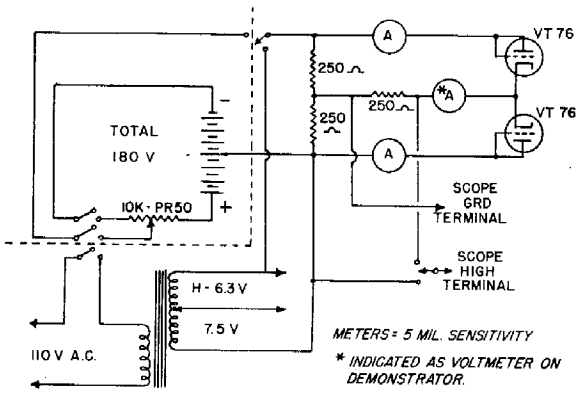


FIG. 3

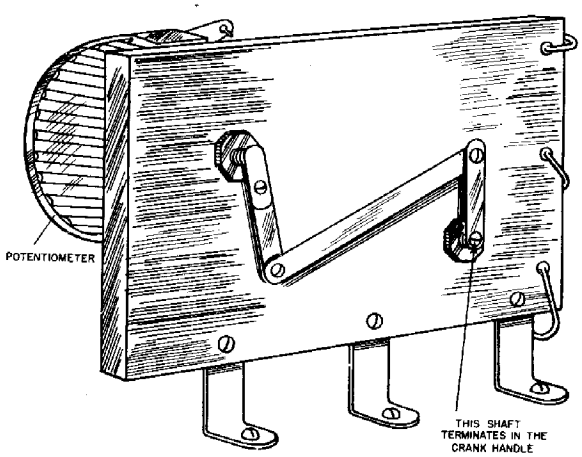


FIG. 4

The center tap is provided by means of two 250-ohm resistors which parallel the series-connected transformer windings.

The load voltmeter in the panel circuit really is a current meter used as a part of the load, in series with a series multiplier resistance (not shown in Figure 3). The "Volts" scale was specially drawn so as to create the proper illusion.

Action of the Circuit

Now, as far as explanation of the action of this full-wave rectifier is concerned, the position of the current and voltmeters in Figure 1 shows why some students find it difficult to understand the alternate action of each rectifier when 60-c/s input is employed. Although only one tube is working at any one instant, both current meters are indicating almost like values of current. (The slight discrepancy in indication is due to an unbalanced condition.) As said before, the student must imagine individual tube action since the inertia of the meters does not allow the pointer to follow the rise and fall of the plate current when commercial frequencies are used. This brings us to the reason for incorporating the low-frequency generator and that portion of the schematic in Figure 3, which is above and to the left of the dotted line, also to the gadget which is shown in detailed form in Figure 4.

This "generator" is a potentiometer connected across a battery and so

operated by a link arrangement (Figure 4) that continuous rotation of the crank in the extreme lower left-hand corner of the front panel will cause the slider arm to move back and forth across the resistor element, creating one a-c cycle per revolution. This simulates the action taking place when the 60-c/s input is used, except that now it is possible for the student to follow the rise and fall of plate current in each plate circuit, thus showing the alternate operation of each rectifier tube.

The slower the speed of rotation of the "low-frequency" crank handle, the more easily can the action be followed. In fact it is easy to see the voltage pulse for each "half cycle" of voltage applied to the rectifier tubes, thus simplifying the discussion of the ripple frequency later on in the course.

Obviously the cathode-ray tube cannot be employed with the hand-generated a-c; however, the correlation between the action of the current and voltmeters with low-frequency input and the scope patterns obtained with the 60-c/s supply input, is greatly simplified. In general, the demonstrator lends itself conveniently to such explanations as the (a) uni-directional flow of current through the load; (b) difference in polarity of the voltage at the two tube plates at any one instant; (c) why a full-wave rectifier supplies twice as much current as a half-wave system; almost everything else which may arise in connection with rectifying devices.

LOW-FREQUENCY TRANSMITTER SOLVES INSTRUCTIONAL PROBLEMS

A low-frequency radio transmitter has been constructed at the Enlisted School, Eastern Signal Corps Schools, Fort Monmouth, N. J., and is being used to overcome certain difficulties which have appeared in classroom instruction in this field.

While the teaching of radio presents problems as each new phase is entered, transmitters involve a special difficulty in that they lie entirely outside the experience of the average student. Everyone has had at least listening contact with receivers, and, to the extent that various conditions may be expressed in terms of the audio output of a loudspeaker, the student has a certain basic familiarity with the subject. The average student, however, has no such background in regard to transmitters. It is necessary not only to explain the functioning of the transmitter, but also to convince him of the reality of the explanation. Every such attempt inevitably leads to a discussion of waveform. The plate current pulses in a Class "C" amplifier, harmonic distortion and frequency multiplication, and particularly modulation all involve operations on the r-f wave itself. Although these phenomena may be expressed in a number of ways -- in terms of instantaneous voltage, or current, or power -- the summation of all such expressions is the shape of the wave.

The usual answer to this problem is the blackboard drawing, accompanied by a good many words. While this teaching method is probably indispensable,

it is none the less inadequate, for two major reasons. First, a picture or verbal description of a sound wave, by its very nature, cannot carry one-tenth as much conviction as a single audible note emitted by a loudspeaker. Similarly, no blackboard drawing can equal an actual tracing drawn by the varying voltage itself on the screen of an oscilloscope. Second, blackboard pictures don't move. But the very essence of the developing waveform is motion. Since modulation involves motion, it is necessary to picture the variations of current and voltage in motion.

The obvious answer to these problems is the cathode ray oscilloscope. But the application of the oscilloscope at the outset presents two problems of its own. First, since it is desirable to show the r-f wave itself, it is necessary to use a frequency low enough to be within the range of the sweep frequency oscillator of the scope. With equipment available to the ESCS, this means not more than 30,000 cycles. Second, it is desirable, in demonstrating the modulation, to show not only the r-f wave, but also at least one complete audio envelope. This requires a ratio of r-f to a-f of not more than 15 or 20 to 1. For these reasons, it was decided to build a transmitter using conventional (and simplified) circuits, but operating on a frequency of about 18,000 cycles. It was considered desirable to include a receiver capable of receiving this signal, so that the transmitter might be studied from the listener's point of view.

Figure 1 shows the front of the board. The oscilloscope is centrally mounted so that it may be easily seen and accessible from all sections of the

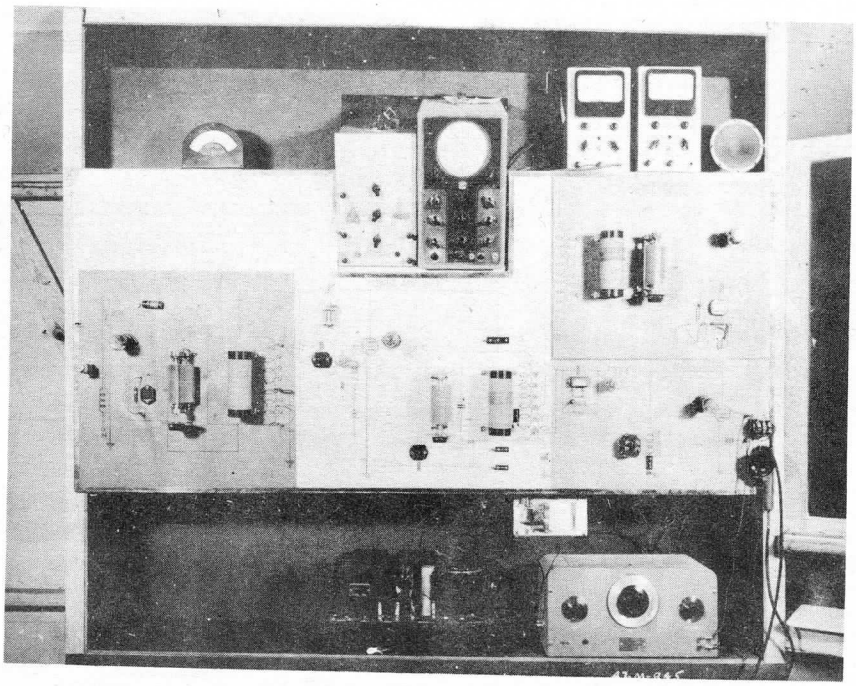


FIG. 1- FRONT VIEW OF LOW-FREQUENCY TRANSMITTER DEMONSTRATOR

board. The transmitter section consists of a Hartley, shunt-fed oscillator, a series-fed power amplifier, and a Heising Class "A" modulator. In addition, there is a simple diode detector. Each section is distinctively colored. Most of the parts mounted on the front are actually used in the circuit. Some of the parts, notably the tank coils in all sections and the r-f chokes, are mere "window dressing."

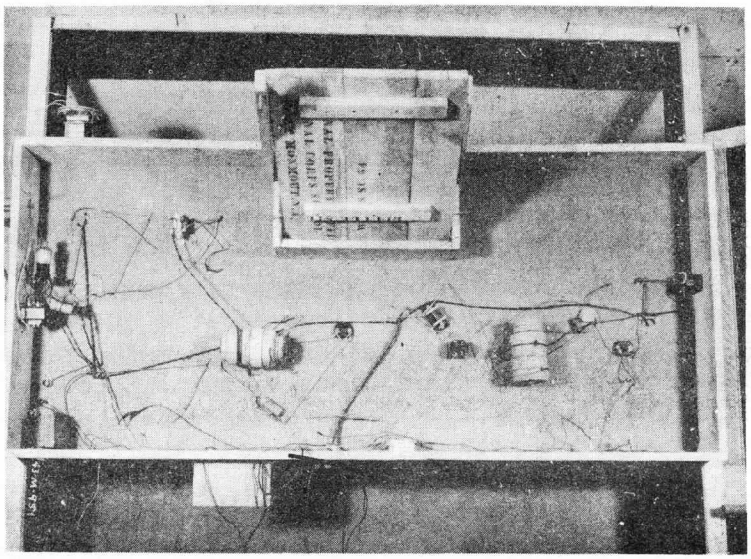


FIG. 2-REAR VIEW SHOWING SLOPING SHELF FOR ELECTRONIC SWITCH AND OSCILLOSCOPE

Figure 2 is a view of the rear of the board (showing some of the parts actually used.) The tank coils consist of a series of pies mounted on a common form. (It was considered desirable from an esthetic as well as an educational point of view, not to show these coils.) The actual chokes used are the secondaries of ordinary audio transformers. These, too, are mounted on the back. (Great pains were taken to give a completely realistic effect. For example, the dummy tank coils were tapped at six points, and the leads were brought behind the board. Here they are tied in a knot.)

While the circuit shown on the face is basically the circuit used, several changes were made in the actual circuit, in accordance with educational needs. All elements whose values are critical were made variable. In other instances, provision was made for shorting out a particular part to demonstrate its effectiveness in the circuit.

The actual circuit is shown in Figure 3. This may be summarized under four headings -- oscillator, power amplifier, modulator, and detector.

Oscillator

Grid bypass capacitor C_2 may be increased by switching in C_1 in parallel. Grid resistor R_2 is variable. The resistor R_1 is used to develop the

pulsating voltage characteristic of Class "C" operation. It should be noted that the cathode (ground) tap on the tank coil is variable. Note, also, that the plate lead is brought not to the top of the tank coil but a little further down. The reason for this will be shown below.

In operation the scope leads may be placed across the tank. A sine wave appears on the scope. By varying the position of the cathode tap, the excitation is varied, as is the amplitude of the output wave.

If the scope is placed across R_1, the familiar picture of Class "C" plate current pulses is seen. If the grid resistor R_2 is then decreased, the relative duration of the current flow increases, and these pulses broaden. If R_2 is given a high value and the grid capacitor increased by switching in C_1, the oscillator quenches and the quench pattern may be seen.

By means of an electronic switch the patterns given by R_1 and the tank coil may be thrown on the scope at the same time to show the plate current flow at the peak of the tank voltage (grid excitation). In order to give the conventional picture, it was necessary to invert the relative phase of the tank voltage; and this was done by tapping the plate down on the tank coil and taking the voltage from there to the tap.

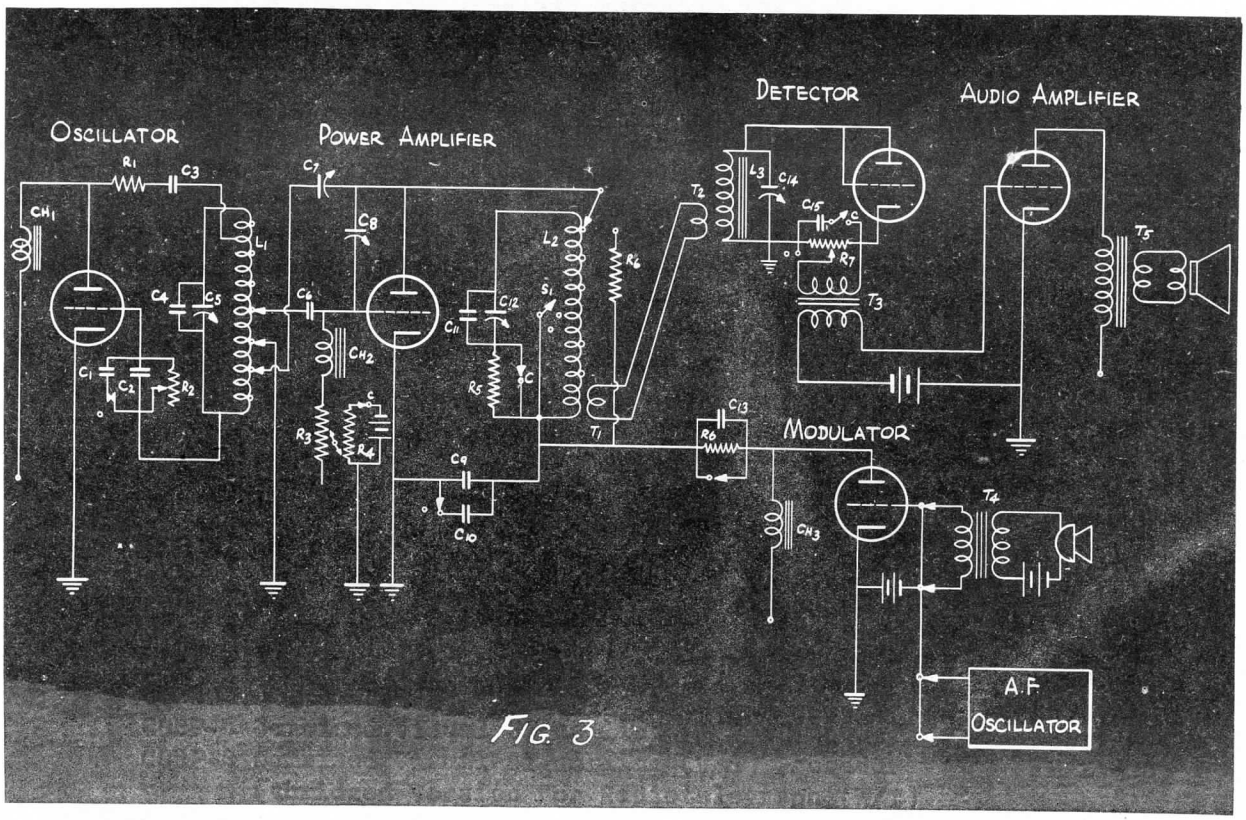


FIG. 3

Power Amplifier

Excitation feeds through blocking capacitor C_6. The power amplifier grid tap can be varied, thus varying the excitation and the load on the oscillator. Resistor R_3 is the variable grid resistor, while R_4 controls the fixed bias. Thus, the advantages and disadvantages of fixed and resistor bias may be shown. C_7 is the neutralizing capacitor. C_8 is the same size as C_7, and represents the grid plate capacitance of the tube.

In the tank, R_5 is a loading resistor which lowers the Q of the circuit. Even harmonic distortion resulting from rapid decay of the oscillation current, as well as the change in selectivity, can be shown.

R_6 is a load resistor which may be substituted for the tank circuit to show the plate current pulses. S_1 is a switch which shorts out half the tank inductance, and by thus tuning to the second harmonic shows frequency doubling. Capacitor C_{10} merely increases the size of bypass C_9, where it is desired to feed lower frequency signals directly to the grid of the power amplifier.

Modulator

R_6 and C_{13} are the voltage dropping resistor and audio bypass, respectively. These may be shorted out to show the distortion which results from their absence. On the input side, the mike input transformer T_4 may be disconnected to allow feeding the output of an audio oscillator directly to the grid.

Detector

The tuned inductance L_3 is the secondary of an audio transformer. Varying the tuning of L_3 - C_{14} changes the amplitude of the wave and is indicated by the scope when placed directly across the tank. The picture given by load resistor R_7 alone is that of the rectified signal pulses. Throwing in C_{15} filters out the r-f component, leaving the original audio signal.

The output of the detector feeds through transformer T_3 to the power amplifier. From there the signal passes through output transformer T_5 to the speaker.

SATURABLE REACTOR DEMONSTRATION

A demonstration to clarify the theory and operation of saturable reactors, as used in the Radio Compass SCR-269-( ), has been worked out by the Radio Division of the Air Equipment Course at the Enlisted School, Eastern Signal Corps School, Fort Monmouth, N. J.

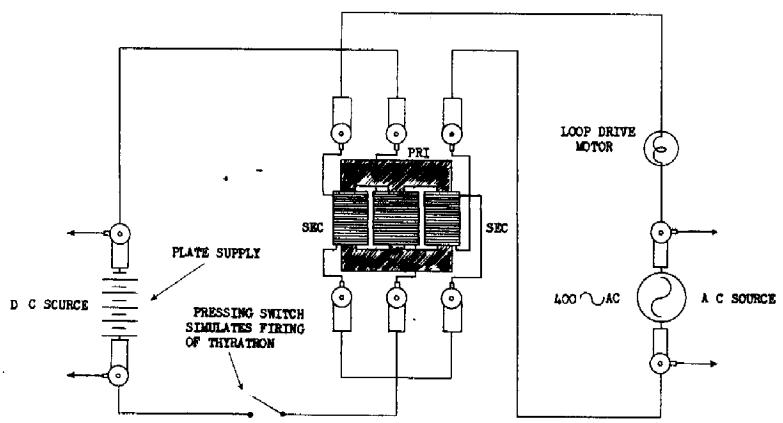
In this demonstration, the reactor functions as a variable impedance, either permitting or blocking the passage of a.c. to the loop antenna drive motor. It consists of an iron core with a primary and two secondary wind-

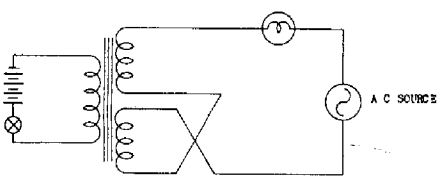
ings. The secondary windings are identical, but are connected in such a way as to cause a cancellation of their respective magnetic fields. (This is done to prevent transformer action in the reactor.) When the primary is not saturated, there is a very high impedance a.c. By saturating the primary with d.c., (while the magnetic field is held in one position), the impedance to a.c. becomes a minimum, allowing the loop drive motor to be energized.

On the demonstration board, a battery represents the voltage that would be applied through the primary to a thyratron in the SCR-269-( ). Closing of a switch in the primary circuit simulates firing of the thyratron, and a lamp represents the loop drive motor. The a-c voltage is stepped down to 10 volts. Closing the switch allows the lamp to light, proving that the inductance has been overcome by core saturation. When the switch is opened, the lamp goes out, showing that inductance is again present in the circuit.

Another step in the demonstration is to disconnect the primary winding and connect an a-c voltmeter across its terminals. There is no a.c. present, but, by reversing the connections on one of the secondary windings so that the fields are no longer bucking each other, the reactor acts as a transformer and a large amount of a.c. is present in the primary. This voltage is not desired, as it would appear on the plate of the thyratron, causing erratic operation. Thus it is shown why two secondary windings are necessary. Nu-Way snap connectors provide rapid interchange of connections.

The accompanying diagrams show the layout of the demonstration board and the schematic circuit diagram.





SC WANTS "HAM" RADIO EQUIPMENT & CAMERAS

Some months ago there was an accumulation of demands for radio and camera equipment piled up within the Signal Corps. Not the usual demand involving Signal Corps equipment, but rather one for standard commercial types, the supply of which had been cut off as plants were converted to exclusively military production.

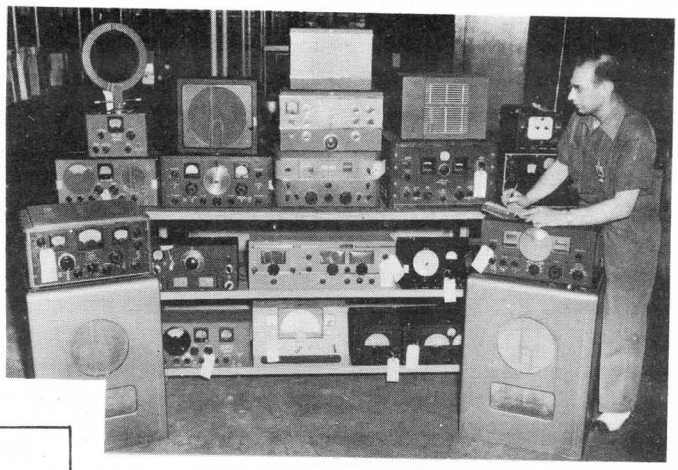
Realizing that there were many thousands of the desired equipments available in the homes of radio amateurs and camera enthusiasts, an appeal was made through the papers and magazines to the owners of such equipment to sell it to the Signal Corps. As a result, close to a quarter million dollars worth of radio communications receivers and transmitters, radio test equipment, and cameras and accessories had been purchased from individual owners up to May 31.

As these various items are purchased, they are carefully checked and adjusted, then shipped for active service. Much of the equipment has gone overseas while a sizable portion is employed in various training centers in this country. Then, too, appreciable amounts of the radio equipment have been allotted to meet urgent needs of the FBI and Military Intelligence for jobs which could not have been done without this emergency source of equipment supply, or at least would have been delayed. The importance attached by the FBI to this service which the Signal Corps has been able to render is indicated in the letter from Mr. Hoover which is reproduced herewith.

Almost in a matter of days after a piece of communications equipment or camera is shipped by its owner to the Signal Corps in Philadelphia, that unit has been inspected, overhauled if necessary, and is on its way for some important service. Moreover, the necessary procurement papers have started through with the result that within 30 days of shipment the owner receives a check in payment. Such is the machinery that has been set up to handle this emergency procurement program.

Today there is an increasingly pressing need for these types of equipment and it is felt that much of it can be supplied from within the Signal Corps. There are any number of former radio "Hams" and photo hobbyists who naturally gravitated into the Signal Corps when entering war service, either as military or civilians. Probably a large proportion of these have equipment gathering dust at home now which the Army could use to advantage, in return for cash which would be welcome to the owners of this idle equipment.

To publicize this need on the part of the Signal Corps, and the opportunity for owners to convert their equipment into cash, it is urged that the information sheets inserted loosely in this issue be posted on bulletin boards for the attention of all Signal Corps personnel. These sheets provide all information on the makes and types of equipment needed; also complete information as to the steps necessary in initiating the sale.



JOHN EDGAR HOOVER
DIRECTOR

Federal Bureau of Investigation
United States Department of Justice
Washington, D. C.

June 23, 1943

Special Activities Branch
Office of the Chief Signal Officer
War Department
Washington, D. C.

Gentlemen:

As your records will reflect, a few months ago the Office of the Chief Signal Officer was requested to obtain for the Federal Bureau of Investigation certain needed radio equipment. It was understood that an effort would be made to purchase the equipment from the amateur radio operators located throughout the United States.

Since the placing of the above request, I have noticed that the untiring efforts of the Signal Corps' Amateur Equipment Group have been most successful. The equipment made available to this Bureau has been of considerable assistance in making it possible for the Federal Bureau of Investigation to augment its efforts looking toward the internal security of our nation and to accelerate the successful termination of the present world conflict. However, since there still is an acute need for this type of equipment, it would appear as though further contacts with the civilian population in the United States should be made.

Your whole-hearted cooperation and assistance in obtaining this equipment for the Federal Bureau of Investigation are indeed appreciated.

Sincerely,

J. Edgar Hoover

The equipment shown above and below, purchased by the Signal Corps from private owners, awaits final adjustment at the Philadelphia Depot before going into active service.

A portion of the radio equipment procured under this plan has been made available to the F.B.I., filling a critical need. More is needed, as indicated by the letter at the left.

"HANDBOOK FOR RIGGER-ELECTRICIANS"

Prepared and published at the Southern Signal Corps School, Camp Murphy, Florida, the book of the above title is a thorough-going treatise of 195 pages and is aptly described by its title. Its scope and thoroughness are indicated by the following list of section titles:

I Cordage
II Knots and Splices
III Wire Rope
- General
- Care and Use
- Attachments
- Splicing

IV Chains and Hooks
V Slings and Guy Lines
VI Hoisting Equipment
- Blocks and Tackle
- Miscellaneous

VII Installations and Methods of Handling Heavy Loads
- Anchorages
- Practical Installations
- Handling Heavy Loads

VIII Tools
- Care of Tools
- Wood Tools
- Driving Tools
- Measuring and Laying-out Tools
- Sharpening and Metal-cutting Tools
- Miscellaneous Tools and Equipment

IX Splicing and Taping
X Wire
XI Soldering
- Solder and Soldering Irons
- Other Soldering Devices
- Soldering Procedure

XII Conduit Wiring and Installation
- Conduit
- Working with Conduit
- Installing Conduit and Equipment

This handbook is copiously illustrated. Included in the section on Cordage, for instance, are 44 illustrations of knots and splices. Also included are numerous tables covering drills, wire, safe loads, etc. The Commandant of the School has expressed willingness to send an individual copy to any organization down to battalions which has a real need for this book for reference purposes.

TOO FEW COPIES OF SCTIL ?

In one Signal Corps installation it was found that so few copies of the Signal Corps Technical Information Letter were received each month it took four to five weeks for each copy to filter down to the last individual scheduled to receive it. In the meantime this meant that the current issue was never available for reference during the long interval of going the rounds.

While it is desirable, because of the shortage of paper, that the number of copies of the SCTIL distributed be held to the minimum dictated by actual need, the purpose and objective of the publication are fully attained only if it reaches all who it is intended to serve. It is, therefore, suggested that each Signal Corps unit review its requirements in this connection and check these against the number of copies received monthly. If the number received is insufficient, a communication to the Chief Signal Officer (SPSAY) will rectify the condition. If, on the other hand, more than enough copies are received, notice should be forwarded through these same avenues.

It might be well to point out here that although the SCTIL is security classified as "Restricted," it is entirely permissible for an officer to route it to any member of the military personnel under his command and to civilians in the service of the government if, in his opinion, such routing is desirable and the usual safeguards are provided (AR 380-5(d)).

In some units it has been the practice to confine the routing of the SCTIL to officers, but it is believed that in many instances further routing, particularly to key non-commissioned officers and civilians, will prove beneficial and is justified even though it may be necessary to request more copies to take care of this additional distribution.

EQUIPMENT NOTES

EQUIPMENT COORDINATION

NEW SIGNAL CORPS BOARD CASES ESTABLISHED

Case No. 529 - Cable Assemblies CC-345 and CC-355-A.

Case No. 530 - Voice Frequency Repeater Equipment.

This case covers tests of two-wire 22 type repeater TP-14-T1 and T2, and also Telephone TP-9-( ), including terminal amplifiers. All of these items are to be compared in performance with standard repeaters EE-89-( ) and EE-99-( ) in order to determine the most desirable characteristics for a combination two-wire and four-wire repeater.

Case No. 531 - Two-wire Operation of Field Carrier Equipment.

Carrier Hybrid CF-7-( ) and converter Set TC-33-( ), with its associated intermediate repeater set TC-37-( ) are alternate means of providing two-wire operation of field carrier equipment.

Telephone unit EE-105-( ) is a lineman's telephone for use on two-wire carrier systems. This equipment is being service tested with a view to making recommendations in regard to its tactical employment.

Case No. 533 - Improvised Reel Mounts for Vehicles Used in Cross-Country Wire Laying.

Case No. 534 - Raincoat, Experimental, One-Piece Shoulder, Sleeve and Yoke.

Case No. 535 - Mounting of Central Office Set TC-2 in Shelter HO-17.

Under this case the Signal Corps Board is requested to prepare plans for mounting central office set TC-2 in shelter HO-17 for mobile operation.

SIGNAL CORPS BOARD REPORTS APPROVED BY THE CHIEF SIGNAL OFFICER

Signal Corps Board Case No. 459 - Brass Studded Barbed-Wire Gloves for Linemen. Approved 12 June 1943.

Pad LC-80 is an oval piece of leather used in the hand of a lineman, to guide and control field wire when effecting its recovery. The heat and friction generated by the wire in passing through the pad to the reel causes a rapid wearing of the pad. It was thought possible that the brass studded

gauntlet gloves used in handling barbed wire might prove to be less expensive and safer.

The Signal Corps Board tested the gloves and found them unsatisfactory because:

1. The gloves are too warm, causing excessive perspiration in warm weather;
2. Rivets may injure the wire;
3. The rivets become very hot and conduct the heat to the hand;
4. The gloves are very expensive and their life approximately equals that of the leather pads.

Modified Pads LC-80, constructed of canvas and canvas reinforced with leather, were also tested in an attempt to reduce the amount of leather required. However, the substitutes are found to be unsatisfactory because of rapid wear. It was determined that Pads LC-80, made of leather of a less critical quality than the present specification, would be satisfactory in use.

It was recommended that:

1. The brass studded barbed wire gloves be not adopted for Signal Corps use.
2. The specifications for future procurement of Pad LC-80 be changed to KK-L-271, Grade A, Class 2.

Signal Corps Board Case No. 465 Supplement II - Study of Linemen Shoes. Approved 14 June 1943.

This study was undertaken for the purpose of determining the need by Signal Corps Linemen for special repairs on service shoes. It was alleged that the common method of half soling linemen's shoes resulted in short life of such repairs due to the climbers used by the linemen tearing loose the half sole. The use of three quarter or full soles in the repairing of linemen's shoes were viewed as alternatives.

Ninety-one pairs of service shoes, divided into four approximately equal groups, each group with a different type of repaired sole, were tested under the supervision of the Signal Corps Board. These shoes were issued to the enlisted personnel of the Lineman's Section, Signal Communication Division, Eastern Signal Corps Replacement Training Center, Camp Wood, New Jersey.

The shoes were worn during the school course in pole climbing instruction. At the end of the test, each pair of shoes was examined for wear and a survey of the reactions of officers and men of the Lineman's Section made to determine the relative merits of each type of repair.

The Signal Corps Board concluded:

1. That under average conditions, leather and rubber half soles,

or taps, are adequate for the repair of linemen's shoes.

2. If linemen follow their training instructions carefully regarding the proper method of wearing the linemen's climbers, there will be less damage to the soles of the shoes and fewer heels torn off.

It was recommended that no change be made in present regulations for repair of linemen's shoes.

Signal Corps Board Case No. 515 - Universal Line Pole. Approved 14 June 1943.

Many of the structures used in supporting military rapidly constructed communication lines do not permit climbing by the maintenance lineman because of their fragility. Pole climbing in the combat zone also places the lineman in a dangerous position.

The Universal Line Pole is a jointed pole device, designed to permit a lineman on the ground to attach connectors to a pair of conductors of an open line. The connectors are attached to long conductors capable of reaching the test instruments of the lineman.

The Signal Corps Board was directed to study and test the equipment, to determine the use for such a device, and if such a need exists, the suitability of the Universal Line Pole for adoption as a standard article.

The Universal Line Pole was found to be too heavy and unwieldy. The sections did not fit properly, permitting the pole to sway and buckle. The head of the pole was too large to permit it to be readily used on lines spaced 8 inches apart. The clip and hook for attaching to wires did not grip sufficiently tight.

The Signal Corps Board concluded that there is a need for test points on military open wire lines, but that the Universal Line Pole is unsatisfactory for the purpose intended.

It was recommended that no further consideration be given at this time to the Universal Line Pole.

Recognizing the military need for testing open wire lines from the ground without additional construction or alteration of the pole line, it was recommended that training literature be included in TM-368 describing the construction of a line test pole from Lance Poles or Tree Trimmers, and other material available to troops in the field.

ITEMS ON WHICH STANDARDIZATION WORK HAS BEEN COMPLETED

Carrier Hybrid CF-7-( )

Carrier Hybrid CF-7-( ) was presented to Signal Corps Technical Committee and recommended for standardization by Meeting No. 267, 14 June 1943.

Two each Carrier Hybrid CF-7-( ), when used with carrier Repeater Set TC-23-( ) or one each Carrier Hybrid CF-7-( ), when used with carrier Telephone Terminal Set TC-21-( ), provide for two wire operation of the field carrier equipment. The two directions of transmission are separated by the principle of hybrid balance.

Rectifier RA-91-( )

Rectifier RA-91-( ) was presented to Signal Corps Technical Committee Meeting No. 267, 14 June 1943 and recommended for standardization. This is a dry disk rectifier which supersedes Rectifier RA-36-( ), a tungar type. The later rectifier was recommended for reclassification from standard to limited standard.

Indicator I-191

Information has been completed for the standardization of Indicator I-191 which is a relay adjusting test set. This item will be presented to Signal Corps Technical Committee for consideration.

GROUND SIGNAL

MOISTURE PROTECTION FOR POWER UNIT OF SCR-284-( )

Reports from North Africa indicate that trouble is still being encountered in the field with the Power Unit PE-103-A of the Radio Set SCR-284, due to collection of moisture within the case. A corrective measure recommended by Maintenance Engineering Branch, OCSigO, is to drill a 1/8-inch hole in each of the four corners of the bottom of the case to let out any water that may collect. These holes should be far enough from the corners to allow for the future insertion of plugging bolts if deemed necessary.

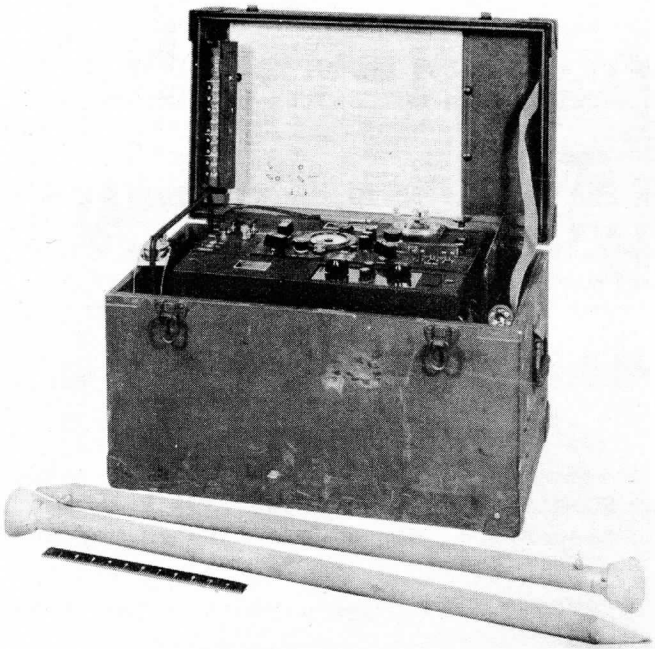
It is further suggested that protection from the weather will prevent this trouble. Bag BG-129, designed to protect this Power Unit PE-103-A when in operation, is now under procurement and should be used when available. This cover can be requisitioned by Stock No. 2Z529. Where it is not available, reasonable protection is afforded the PE-103-A unit by wrapping it in canvas. It is expected that this cover will be available for limited distribution in August and in increased quantities beginning in September.

TWO NEW TELEGRAPH REPEATERS AVAILABLE SOON

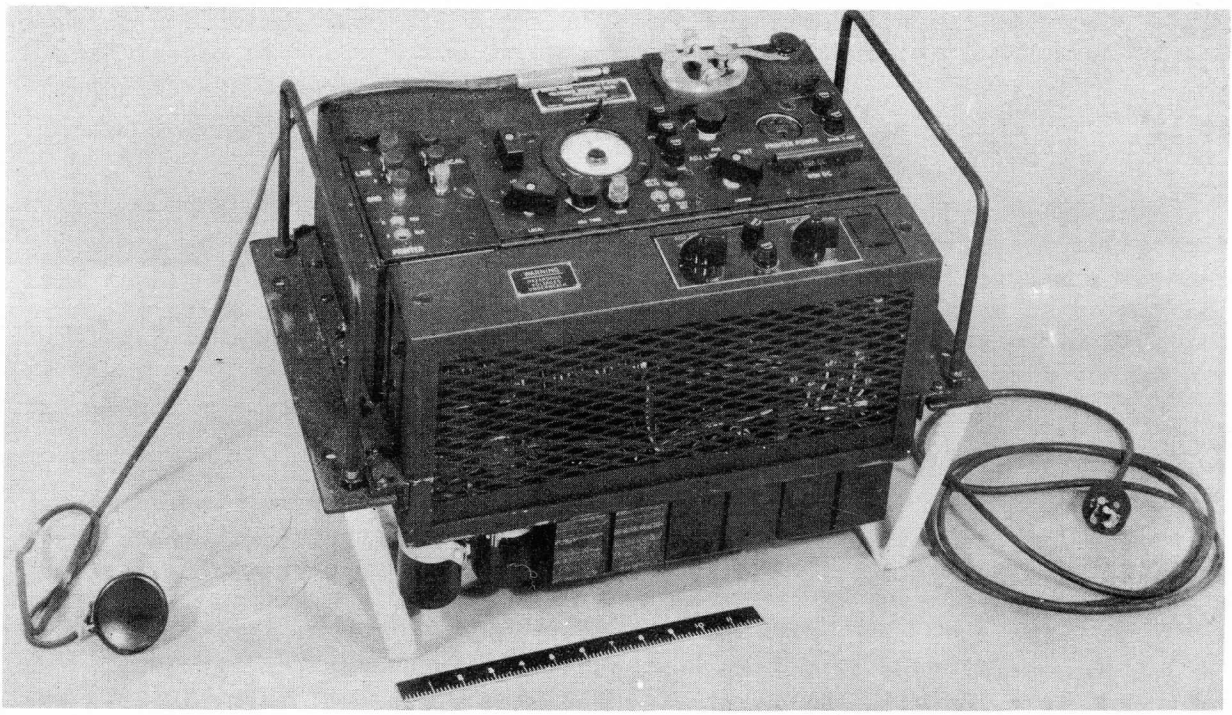
Repeater Sets TC-18 (Terminal) and TC-19 (Intermediate) have been standardized for tactical use and are expected to be available for issue about 1 September 1943. These sets consist of Repeaters TG-30 (Terminal) and TG-31 (Intermediate) respectively, together with two Ground Rod GP-29 each, and are intended primarily for extending the ranges of teletypewriter sets (such as Telegraph Printer Sets EE-97 and EE-98, and Teletypewriter Sets EE-97-A and EE-98-A) over field wire, cable, and open wire circuits.

Repeater Set TC-18 (Terminal) is a DC telegraph repeater set capable of transmitting to and receiving from another TC-18 or a telegraph carrier terminal (such as Telegraph Terminal CF-2-A or CF-2-B) on a half duplex basis, either with or without a TC-19 at an intermediate point. Operation in this application is polarential on the line side and neutral on the local or loop side. Provision is made for optional two-path polar operation on the line side to permit inter-operation with British teleprinter or other British terminal equipment. The change from polarential to two-path polar line operation is accomplished by the setting of a rotary switch on the panel. A built-in rectifier is provided, permitting operation on either 115 or 230 volt 50-60 cycle power sources. A suitably tapped power transformer provides a 115 volt AC supply for the teletypewriter motor when operating at 230 volts. Means for operating the repeater from 115 volt DC power supply (such as Power Unit PE-77-( ) is also provided, the change from AC to DC and from 115 AC to 230 AC being made by convenient panel switches. Provision is made for connecting Printer TG-7-A or Teletypewriter TG-7-B by means of the cords and plugs supplied with these instruments, as the teletypewriter set must be located near the Repeater. A commercial teletypewriter such as Model 15 may also be connected to this repeater in a local loop circuit up to two miles in length. Dimensions of Repeater TG-30 are 25 x 16 x 14½ inches, and the weight, with spare equipment, is 130 pounds.

Repeater Set TC-19 (Intermediate) is a DC telegraph repeater set capable of receiving from one line section and retransmitting to another. The distant terminal repeater set associated with each line section should be TC-18 or its equivalent. TC-19 permits unattended operation insofar as service adjustments are concerned. Half duplex operation is provided. A monitoring feature is included, permitting the connection of a teletypewriter for sending and receiving. A "cut key" is provided, enabling open line sections in either direction to be cut out to permit operation in the other direction. A built-in rectifier and vibrator unit provides for operation on 115 or 230 volts 50-60 cycle, 115 volts DC, or 12 volts DC. Operation is therefore feasible in isolated locations by using either three Battery BA-26 or a 12-volt storage battery. Batteries are not included in the parts list. When using three BA-26, the life of the batteries will be 15 days at 70° F., provided there is no monitoring at the repeater. When dry batteries are used, there is no battery drain except when signals are passing through the repeater. When a 12-volt storage battery is used, the drain will be 22 ampere hours per day without monitoring. Dimensions of Repeater TG-31 are 25 x 16 x 14½ inches, and the weight including spare parts is 130 pounds. Both TG-30 and TG-31 in-



REPEATER SET TC-18 (TERMINAL) AND CHASSIS VIEW OF ITS COMPONENT REPEATER TG-30 (TERMINAL).



clude a built-in manual telegraph set to provide manual communication over teletypewriter circuits in the event teletypewriters are disabled or not available.

Both TC-18 and TC-19 will operate at either 368 or 404 operations per minute and are designed for use in connection with composited or simplexed open wire, or simplexed cable facilities.

Ranges of Repeater Set TC-18 with and without TC-19, or with Telegraph Terminal CF-2 on various wire circuits are as follows:

Range in Miles

	Simplexed Cable	Simplexed Field Wire(Wet)		Composited Open Wire		
	Spiral-Four	W-110-B	W-143-T5 W-143-T6	80 Mil 40% Copperweld	104 Mil 40% Copperweld	104 Mil Solid Copper
TC-18 to TC-18	75	50	75	95	135	200
TC-18 to TC-19* to TC-18	100	80	80	100	200	400
TC-18 to CF-2	50	25	X	X	X	X

X--Tests not completed.
*--TC-19 in center of line.

IMPROVEMENTS MADE IN FLASHLIGHT TL-122

Four improvements are being made in Flashlight TL-122-( ). These are a new bulb, a new lens, the addition of a filter, and the development of a blackout adapter.

A commercial type PR-9 lamp has been substituted for Lamp LM-35-A. Lamp PR-9 is a 150-milliampere pre-focused base flashlight bulb; LM-35-A was a 300-ma bulb, otherwise similar. Somewhat lower initial output will be had

from the PR-9 when a fresh battery is installed in the flashlight, but the battery drain will be half that of the older bulb. The brilliance of the old lamp fell off rapidly as the battery became discharged; the lumen output of the new bulb decreases much more slowly. For the greater part of a battery's life, the output of the PR-9 will be relatively uniform. When the terminal voltage of the battery is reached, the brightness of the new bulb will be the same or greater than that of the old bulb. Bulb life of the PR-9 is approximately twice that of the LM-35-A. Battery life of the BA-30 is approximately trebled when the PR-9 is used. As approximately 40 percent of all BA-30's produced are used in TL-122-A's, the use of the new bulb will greatly simplify the procurement and transportation of BA-30.

A plastic lens replaces the glass lens formerly used in the TL-122-A. This step was taken to simplify production.

Flashlight Filter M-384 is a white plastic filter which may be mounted under the lens of TL-122-A to decrease and diffuse the emitted light. This is of especial value in forward areas, where an unfiltered beam from a flashlight might serve to attract the attention of the enemy. Filter M-384 will be issued as part of TL-122-A. The basis of issue will be one per Flashlight TL-122-A already issued or in stock. A Supply Letter is in preparation.

Development is nearing completion on Blackout Adapter M-374. This is a device which will attach to the butt end of a Flashlight TL-122-A to act as a storage space for various filters. It will also permit the desired filter to be retained in front of the flashlight lens without need for removing the lens or reflector. It will contain Filter M-384 and other filters may be included in the future. Issue is expected to begin in a few months, after service tests have been made.

STANDARDIZATION STEPS

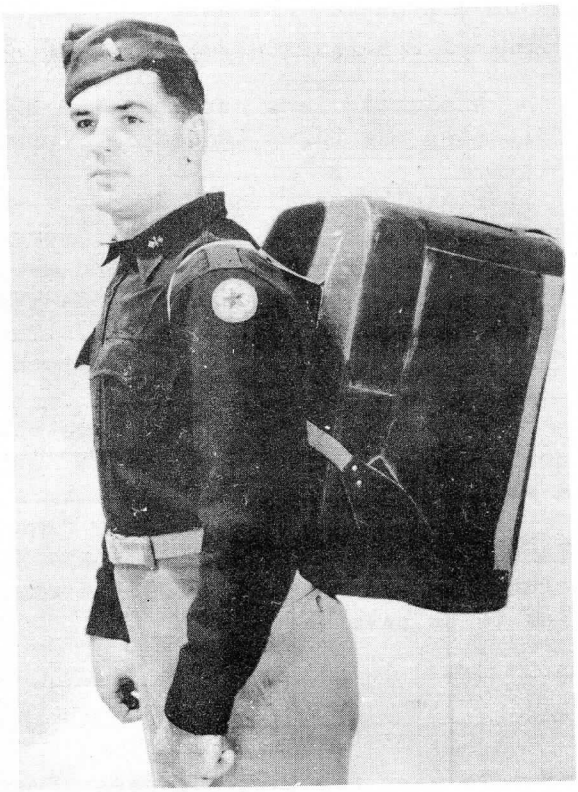
To meet new tactical uses of existing Signal Corps equipment and permit fast repair of apparatus in the field, a series of standardization moves have been initiated by the Fort Monmouth Signal Laboratory by which parts may be interchanged and put to a number of uses. This follows closely the efforts of the WPB to coordinate a series of "War Standards" for use by both the armed forces and commercial industry.

First of these moves has been preparation of a loose-leaf Meter Handbook, indexed according to component nomenclature and cross-indexed to show each meter contained in various Signal Corps equipments. Descriptions of each meter or meters originally supplied with each component and how to install and adapt other meters are given. Thus a wide number of American Standard indicators can at once be put to a large variety of uses.

This Meter Handbook is to be the first of a series of which the objective is maximum use of U. S. Signal Corps Equipment. It is available through the Philadelphia Signal Corps Procurement District.

WATERPROOF BAGS FOR SIGNAL EQUIPMENT

The Fort Monmouth Signal Corps Laboratories in connection with the U.S. Rubber Company have developed five new types of waterproof bags which are to be used specifically for the protection of signal equipment used in amphibious landing operations.



AT LEFT IS SHOWN THE BEGINNING OF THE FOLDING OPERATION. USE OF THE CONTAINER AS A SHOULDER PACK IS SHOWN AT RIGHT.

These bags are designed to protect the equipment under the most adverse conditions of sea and weather and will withstand handling occasioned by Army field use. They are simple to open and close and have no gadgets to get out of order. They are waterproof to the extent that when submerged they will protect the equipment for a reasonable length of time without leaking and, in

fact, bags with the equipment inclosed are buoyant and will support a soldier in the water.

The bags are constructed of 8-ounce duck, rubberized on both sides and bottom and corners are doubly reinforced. The closure comprises a throat of pliable rubberized sateen with rubberized lips that interlock to form the seal and then are rolled up in the throat and lashed tight against the pack with the ends of the roll bent down along the side of the pack and held in place by a top flap which is buckled down. Webbing is attached by means of vulcanized strips which form a loop and extend in both directions at the fastening so that there will be no tendency for the fastening to be peeled off.

At the present time the bags designed will protect the following Signal equipment:

Nomenclature	Dimensions	Used With
Bag BG-159	20½" x 16½" x 11"	SCR-284, SCR-610, SCR-510, BD-71
Bag BG-160	12" x 9" x 18"	SCR-194, SCR-195, SCR-284, acc., SCR-211, EE-84, EE-8A, TU-8-B, SCR-625 back pack
Bag BG-161	16½" x 15½" x 27"	BD-72, SCR-206, SCR-244, BD-100
Bag BG-164	7½" x 7½" x 12"	GN-45 (SCR-284), also M-209, TG-5
Bag BG-169	12" x 7" x 16"	SCR-536 plus batteries, T-39, SCR-593

Two small procurements of the bags have been made and a third procurement has been initiated to take care of requirements for the remaining part of this year. Slight modifications in design will be incorporated in the latest procurement as the result of tests performed by the Amphibious Forces.

MOISTURE, ARCH ENEMY OF SIGNAL CORPS EQUIPMENT

Moisture is the chief trouble maker so far as Signal Corps equipments are concerned. Moisture, seeping into electrical and radio communication apparatus, may quickly render it inoperative. This condition occurs in temperate climates, but is particularly severe in tropical and semi-tropical theaters of operation. In certain areas of India and South America, for example, some 200 inches of rainfall have been encountered.

In these tropical areas, the relative humidity remains continually high while temperature may soar through a wide daily range. This two-fold condition causes moisture to be forced through small cracks or pinholes in the protective covering of the component parts, with breakdown almost inevitably resulting.

To prevent the loss of important Signal Corps equipments in these tropical and semi-tropical climates, the whole question of moisture-proofing has been under intense study at the Fort Monmouth Signal Laboratory where equipments have been sprayed with different moisture-resisting insulated varnishes and their effectiveness studied. This over-all equipment spraying is calculated to be an effective stop-gap until complete moisture-proofing can be incorporated as a production-line function in conjunction with individual component moisture-proofing. Incorporated in the various spraying varnishes are fungicides, acting on the 2000 odd varieties of fungus which Signal Corps equipment may be called on to resist.

An interesting side light on the Signal Corps' concerted attack on fungus is the fact that these plants, with strong self-preservation traits, will, in the third and fourth generation, develop an immunity to a given fungicide and thrive in its presence. Rotation of fungicides is therefore necessary to insure final death of the plants.

100-MILE CARRIER SYSTEM TO BE SHIPPED AS UNIT

As a means of facilitating the requisitioning, issuing, and shipping of complete systems as units and supply-coordination of carrier equipment and spiral-four cable, it has been decided to ship complete 100-mile carrier systems to the theaters of operation. These systems will go into theater pools to build up a stock of carrier system components which can be issued to using organizations at the discretion of the theater commander to fill requirements for various system lengths. Accordingly, carrier components and spiral-four cable are not authorized for issue on Tables of Basic Allowances and henceforth will be handled only on a pool issue, or special issue basis.

A Pool Issue Parts List has been prepared for the 100-mile carrier system. The items on this list are divided into four classifications as follows: basic equipment, linemen's test equipment and maintenance supplies, unit replacements, and depot spares.

The "basic equipment" classification covers sufficient carrier equipment sets, spiral-four cable and accessories to set up a 100-mile carrier system in an operating condition. Included are one Telephone Terminal Set TC-21-( ), one Telegraph Terminal Set TC-22-( ), and two Ringer Sets TC-24-( ) required at each end of a 100-mile system, with three Repeater Sets TC-23-( ) interspersed at 25-mile intervals within the 100 miles of spiral-four cable which is made up of 400 spiral-four Cable Assemblies CC-358. Cable accessories include drive hooks, cable hangers and dead end clamps which are used for installing spiral-four cable, whether suspended above ground, lying on the ground, or buried underground, as covered in TM 11-369. Tool Equipment TE-123 which contains such items as Voltohmmeter I-166, Soldering Iron TL-117, contact burnishing tools, etc., for use in maintaining any of the terminal or repeater sets, are a part of TC-21-( ) and TC-23-( ).

First and second echelon repair parts are included in maintenance equip-

ments which, in turn, are on the parts lists of "TC" sets. The "linemen's test equipment and maintenance supplies" classification covers equipment to be divided among the two terminal stations and three repeater stations for use of cable patrol and maintenance crews in maintaining spiral-four cable. This equipment consists of 13 field Telephones EE-8, complete with Battery BA-30 (three telephones for each repeater station and two for each terminal station); five Test Sets TS-26-/TSM (a linemen's voltohmmeter for cable testing - one for each station); two Test Set TS-27/TSM (a bridge for locating cable faults - 1 for each alternate repeater station); twenty Cable Stubs CC-356 (for repairing damaged connectors on CC-358 and making test connections to CC-358 - four per station); twenty Cable Assemblies CC-368 (for filling gaps due to variable lengths when CC-358 is replaced or repaired - four per station); ten Cable Assemblies CC-358 (for replacement purposes - two per station); fifty each Drive Hooks, Cable Hangers, and Dead End Clamps (for reinstallation of cable - ten each per station); fifteen each friction Tape TL-83 and rubber Tape TL-192 (for cable repair - three each per station); it is assumed that used field wire will be generally available to all using organizations for tying cable. Until such time as carrier system teams are organized, cable patrol and maintenance crews should be supplied Linemen's Equipment TE-21, Tool Equipment TE-33 and Tool Equipment TE-27, through TB/A issue.

The "unit replacements" classification covers spare replacement units to be substituted for major components of the system, when major repair or salvage is required. These items include one Telephone Terminal CF-1-( ), one Telegraph Terminal CF-2-( ), one Repeater CF-3-( ), one Ringing Equipment EE-101-( ), two Power Units PE-201-( ), two Power Units PE-214, and one Rectifier RA-83-( ).

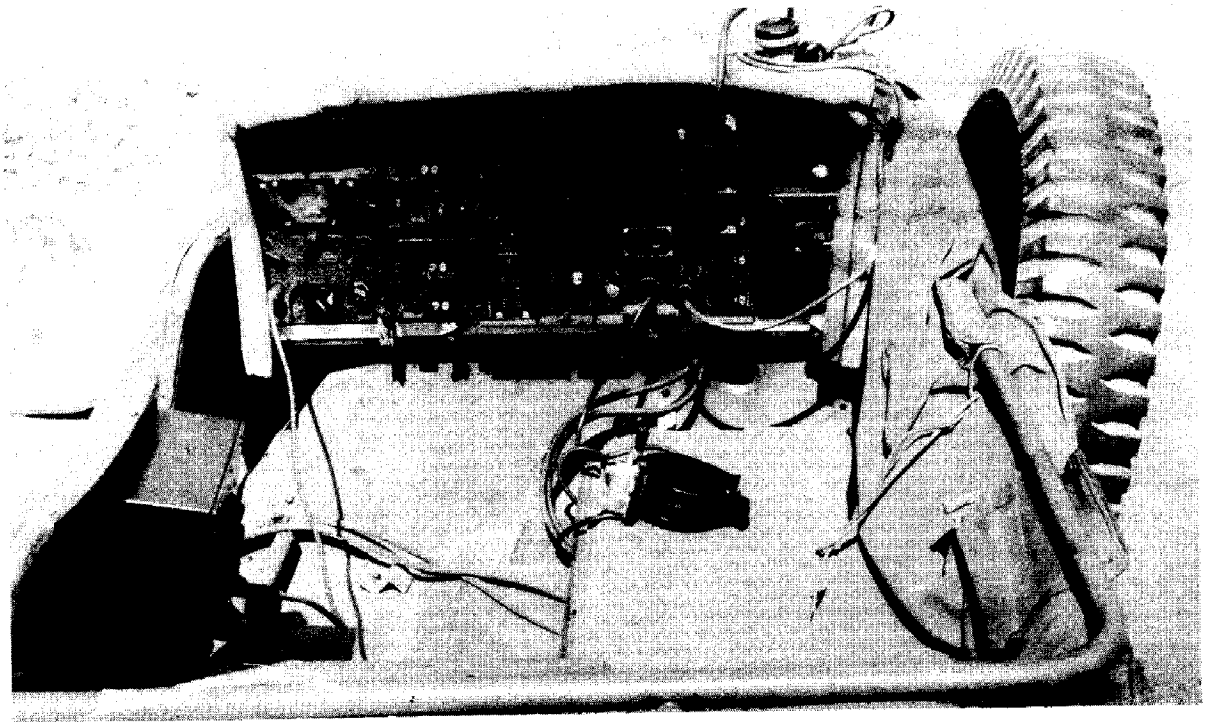
The "depot spares" classification covers quantities of spare and replacement parts required for depot stock. These items consist of 390 Cable Assemblies CC-358, sixty Cable Assemblies CC-368, forty-four Cable Stubs CC-356, 2,150 Hooks PP-81, 1,710 Cable Hangers, 1,830 Dead End Clamps, one Maintenance Parts Group "B" and one Maintenance Parts Group "C" (one for ten systems). Maintenance Parts Group "B" contains sufficient quantities of frequently required spare and replacement parts to maintain all of the "TC" sets on four systems for 90 days or one system for one year. The "B" group should be issued in the theater to the signal depot company. Maintenance Parts Group "C" contains sufficient quantities of infrequently required spare and maintenance parts to maintain all of the "TC" sets on ten systems for one year. The "C" group should be held at the theater supply base for issuance of individual parts as requisitioned by the signal depot company.

REEL TAGS

The responsibility for issue and assignment of Signal Corps Reel Tags has been transferred from the Signal Corps procurement districts to the Signal Corps inspection zones, effective July 1, 1943. The issue of reel tags is closely allied with the shipment of reels of wire and cable and it is contemplated that the transfer will result in expediting the shipment of the equipment

DELIVERIES INCREASING ON RADIO SET SCR-506-( )

Radio Set SCR-506-A is an amplitude-modulated, medium frequency, medium range Command Set for higher echelons, designed to replace Radio Set SCR-193. It is installed in tanks, amphibian cars, half tracks, etc., to provide CW and voice communication between these vehicles and airplanes or base stations. Its average range is 25 miles on voice and 50 miles on CW, depending on operating conditions, terrain, and the type of station contacted, but greater ranges than these have been obtained in demonstration tests.



RADIO SET SCR-506-A INSTALLED IN 1/4-TON 4 X 4 TRUCK

The radio transmitter (BC-653-A) provides five quickly selectable channels and the radio receiver (BC-652-A) provides reception of CW and voice signals. In the transmitting band, provision is made for 126 channels spaced 20 kilocyles apart. Features provided include a master oscillator in the radio transmitter and crystal frequency calibrator in the receiver, and a noise limiter in the receiver to reduce static and ignition interference. (Continued on page 39.)

CROSS INDEX OF SIGNAL CORPS VT TUBES

AND

COMPARABLE COMMERCIAL TUBES

JUNE 1, 1943

RESEARCH AND DEVELOPMENT DIVISION
OFFICE OF THE CHIEF SIGNAL OFFICER

SPECIAL INSERT FOR DISTRIBUTION WITH
THE SIGNAL CORPS TECHNICAL INFORMATION LETTER

UNCLASSIFIED

24-30905

CROSS INDEX OF SIGNAL CORPS VT TUBES

1. The following is a listing of all Signal Corps VT designations assigned to date with the comparable commercial tube for each VT designation. In some instances where no comparable commercial tube exists, the VT designation has been indicated as "Special Tube". The assignment of new VT numbers has been discontinued due to the fact that the Joint Army-Navy JAN-1 Specification tube designation system now in use utilizes commercial tube type numbers as explained below.

2. Vacuum Tubes procured under the JAN-1 Specification are designated in the following manner:

a. Tubes having type approval under the JAN-1 Specification are designated as "JAN-Mfgrs. Code - Type No." For example: JAN - CYZ - 6SN7GT is the Army-Navy designation for a Type Approved tube having the commercial type number 6SN7GT and procured under the JAN-1 Specification from a manufacturer having the Type Approval code number CYZ. This code designation signifies that type approval has been granted to this tube type as produced by that manufacturer. In the case of minature, acorn, and

LISTING BY VT NUMBERS

VT NUMBER	COMMERCIAL NUMBER
VT-1	WE-203A (Obsolete)
VT-2	WE-205B
VT-3	Obsolete
VT-4A	Obsolete
VT-4F	211
VT-4C	211 Special
VT-5	WE-215A
VT-6	212A (Obsolete)
VT-7	WX-12 (Obsolete)
VT-8	UV-204 (Obsolete)
VT-10	Obsolete
VT-11	Obsolete
VT-12	Obsolete
VT-13	Obsolete
VT-14	Obsolete
VT-16	Obsolete
VT-17	860
VT-18	Obsolete
VT-19	861
VT-20	Obsolete
VT-21	Obsolete
VT-22	204A
VT-23	Obsolete
VT-24	864
VT-25	10
VT-25A	10 Special
VT-26	22
VT-27	30
VT-28	24, 24A
VT-29	27
VT-30	01-A
VT-31	31
VT-32	Obsolete
VT-33	33
VT-34	207
VT-35	35/51
VT-36	36
VT-37	37
VT-38	38
VT-39	869
VT-39A	869A
VT-40	40
VT-41	851
VT-42	872
VT-42A	872A(Special Fil.)
VT-43	845
VT-44	32
VT-45	45
VT-46	866
VT-46A	866A
VT-47	47
VT-48	41
VT-49	39/44
VT-50	50
VT-51	841
VT-52	48 Special
VT-53	Cancelled
	Superseded By VT-42-A
VT-54	34
VT-55	865
VT-56	56
VT-57	57
VT-58	58
VT-60	850
VT-62	801, 801A
VT-63	46
VT-64	800
VT-65	805

VT NUMBER	COMMERCIAL NUMBER
VT-65A	6C5G
VT-66	6F6
VT-66A	6F6G
VT-67	30 Special
VT-68	6B7
VT-69	6D6
VT-70	6F7
VT-72	842
VT-73	843
VT-74	5Z4
VT-75	75
VT-76	76
VT-77	77
VT-78	78
VT-80	80
VT-83	83
VT-84	84/6Z4
VT-86	6K7
VT-86A	6K7G
VT-86B	6K7GT
VT-87	6L7
VT-87A	6L7G
VT-88	6R7
VT-88A	6R7G
VT-88B	6R7GT
VT-89	89
VT-90	6H6
VT-90A	6H6GT
VT-91	6J7
VT-91A	6J7GT
VT-92	6D7
VT-92A•	6Q7G
VT-93	6B8
VT-93A	6B8G
VT-94	6J5
VT-94A	6J5G
VT-94B	6J5 Special Selec.
VT-94C	6J5G Special Selec.
VT-94D	6J5GT
VT-95	2A3
VT-96	6N7
VT-96B	6N7 Special Selec.
VT-97	5W4
VT-98	6U5/6G5
VT-99	6F8G
VT-100	807
VT-100A	807 Modified
VT-101	837
VT-102	Cancelled
VT-103	6S07
VT-104	12SQ7
VT-105	6SC7
VT-106	303
VT-107	6V6
VT-107A	6V6GT
VT-107B	6V6G
VT-108	450TH
VT-109	2051
VT-111	5EP4/1802P4
VT-112	6AC7/1852
VT-114	5T4
VT-115	6L6
VT-115A	6L6G
VT-116	6SJ7
VT-116A	6SJ7GT
VT-116B	6SJ7Y
VT-117	6SK7
VT-117A	6SK7GT

VT NUMBER	COMMERCIAL NUMBER
VT-118	832
VT-119	2X2/879
VT-120	954
VT-121	955
VT-122	530
VT-123	RCA A-5586
	(Superseded By VT-128)
VT-124	1A5GT
VT-125	1C5GT
VT-126	6X5
VT-126A	6X5G
VT-126B	6X5GT
VT-127	Special Tube
VT-127A	Special Tube
VT-128	1630 (A-5588)
VT-129	304TL
VT-130	250TL
VT-131	12SK7
VT-132	12K8 Special
VT-133	12SR7
VT-134	12A6
VT-135	12J5GT
VT-135A	12J5
VT-136	1625
VT-137	1626
VT-138	1629
VT-139	VR150-30
VT-140•	1628
VT-141	531
VT-142	WE-390Y1
VT-143	805
VT-144	813
VT-145	5Z3
VT-146	1N5GT
VT-147	1A7GT
VT-148	1D8GT
VT-149	3A8GT
VT-150	6SA7
VT-150A	6SA7GT
VT-151	6A8G
VT-151B	6A8GT
VT-152	6K6GT
VT-152A	6K6G
VT-153	12C8 Special
VT-154	814
VT-155	Special Tube
VT-156	Special Tube
VT-157	Special Tube
VT-158	Special Tube
VT-159	Special Tube
VT-160	Special Tube
VT-161	12SA7
VT-162	12SJ7
VT-163	6C8G
VT-164	1619
VT-165	1624
VT-166	371A
VT-167	6K8
VT-167A	6K8G
VT-168A	6Y6G
VT-169	12C8
VT-170	1S5-GP
VT-171	1R5
VT-171A	Loctal Equiv. of 1R5
VT-172	1S5
VT-173	1T4
VT-174	3S4
VT-175	1613

VT NUMBER	COMMERCIAL NUMBER
VT-176	6AB7/1853
VT-177	1LH4
VT-178	1LC6
VT-179	1LN5
VT-180•	3LF4
VT-181	7Z4
VT-182	3B7/1291
VT-183	1R4/1294
VT-184	VR90-30
VT-185	3D6/1299
VT-186	Special Tube
VT-187	575A
VT-188	7E6
VT-189	7F7
VT-190	7H7
VT-191	316A
VT-192	7A4
VT-193	7C7
VT-194	7J7
VT-195	1005
VT-196	6W5G
VT-197A	5Y3GT/G
VT-198A	6G6G
VT-199	6SS7
VT-200	VR-105-30
VT-201	25L6
VT-201C	25L6GT
VT-202	9002
VT-203	9003
VT-204	HK24G
VT-205	6ST7
VT-206A	5V4G
VT-207	12AH7GT
VT-208	788
VT-209	12SG7
VT-210	1S4
VT-211	6SG7
VT-212	958
VT-213A	6L5G
VT-214	12H6
VT-215	6E5
VT-216	816
VT-217	811
VT-218	100TH
VT-219	Cancelled
VT-220	250TH
VT-221	3Q5GT
VT-222	884
VT-223	1H5GT
VT-224	RK-34
VT-225	307A
VT-226	3EP1/1806P1
VT-227	7184
VT-228	8012
VT-229	6SL7GT
VT-230	350A
VT-231	6SN7GT
VT-232	E-1148
VT-233	6SR7
VT-234	HY-114B
VT-235	HY-615
VT-236	836
VT-237	957
VT-238	956
VT-239	1LE3
VT-240	710A
VT-241	7E5/1201
VT-243	7C4/1203A

VT NUMBER	COMMERCIAL NUMBER
VT-244	5U4G
VT-245	2050
VT-246	918
VT-247	6AG7
VT-248	1808P1
VT-249	1006
VT-250	EF50
VT-251	441
VT-252	923
VT-254	304TH
VT-255	705A
VT-256	ZP486
VT-257	K-7
VT-258	829
VT-260	VR75-30
VT-264	304
VT-266	1616
VT-267	57B
VT-268	12SC7
VT-269	717A
VT-277	417
VT-279	GY-2
VT-280•	C7063
VT-281•	HY-145ZT
VT-282	ZG489
VT-283•	QF-206
VT-284•	QF-197
VT-285•	QF-200C
VT-286	832A
VT-287	815
VT-288	12SH7
VT-289	12SL7GT

• Indicates VT number has been cancelled

CROSS INDEX OF SIGNAL CORPS VT TUBES

(Continued) other small tubes, having type approvals, the marking will be abbreviated as follows: "JXY-Type No." Example: JXY - 9002.

b. All tubes procured from manufacturers not having type approval on that specific type of tube, but otherwise meeting all requirements of the JAN-1 Specification are designated as follows: "JAN - Type No." Example: JAN - 6SN7GT.

3. For the time being, all tube types having Signal Corps VT numbers will be marked with both the JAN number AND the VT number when procured under the JAN-1 Specification.

4. Reproduction of this list in whole or in part, outside of the Armed Services, is not permitted, except by authority of the Office of the Chief Signal Officer.

LISTING BY COMMERCIAL NUMBERS

COMMERCIAL NUMBER	VT NUMBER
01A	VT-30
1A5GT	VT-124
1A7GT	VT-147
1C5GT	VT-125
1D8GT	VT-148
1E5GP	VT-170
1H5GT	VT-223
1LC6	VT-178
1LE3	VT-239
1LH4	VT-177
1LN5	VT-179
1N5GT	VT-146
1R4/1294	VT-183
1R5	VT-171
1R5 Loc. Equiv.	VT-171A
1S4	VT-210
1S5	VT-172
1T4	VT-173
2A3	VT-95
GY-2	VT-279
2X2/879	VT-119
3A8GT	VT-149
3B7/1291	VT-182
3D6/1299	VT-185
3EP1/1806P1	VT-226
3LF4	VT-180 (Cancelled)
3Q4	VT-264
3Q5GT	VT-221
3S4	VT-174
5BP4/1802P4	VT-111
5T4	VT-114
5U4G	VT-244
5V4G	VT-206A
5W4	VT-97
5Y3GT/G	VT-197A
5Z3	VT-145
5Z4	VT-74
6A8G	VT-151
6A8GT	VT-151B
6AB7/1853	VT-176
6AC7/1852	VT-112
6AG7	VT-247
6B7	VT-68
6B8	VT-93
6B8G	VT-93A
6C5	VT-65
6C5G	VT-65A
6C8G	VT-163
6D6	VT-69
6E5	VT-215
6F6	VT-66
6F6G	VT-66A
6F7	VT-70
6F8G	VT-99
6G6G	VT-198A
6H6	VT-90
6H6GT	VT-90A
6J5	VT-94
6J5G	VT-94A
6J5GT	VT-94D
6J7	VT-91
6J7GT	VT-91A
6K6GT	VT-152
6K6G	VT-152A
6K7	VT-86
6K7G	VT-86A
6K7GT	VT-86B
6K8	VT-167
6K8G	VT-167A
6L5G	VT-213A
6L6	VT-115
6L6G	VT-115A
6L7	VT-87
6L7G	VT-87A
6N7	VT-96
6Q7	VT-92
6Q7G	VT-92A (Cancelled)
6R7	VT-88
6R7G	VT-88A
6R7GT	VT-88B
6SA7	VT-150
6SA7GT	VT-150A
6SC7	VT-105
6SG7	VT-211
6SJ7	VT-116
6SJ7GT	VT-116A
6SJ7Y	VT-116B
6SK7	VT-117
6SK7GT	VT-117A
6SL7GT	VT-229
6SN7GT	VT-231
6SQ7	VT-103
6SR7	VT-233
6SS7	VT-199
6ST7	VT-205
6U5/6G5	VT-98
6V6	VT-107
6V6GT	VT-107A
6V6G	VT-107B
6W5G	VT-196
6X5	VT-126
6X5G	VT-126A
6X5GT	VT-126B
6Y6G	VT-168A
7A4	VT-192
7B8	VT-208
7C4/1203A	VT-243
7C7	VT-193
7E5/1201	VT-241
7E6	VT-188
7F7	VT-189
7H7	VT-190
7J7	VT-194
K-7	VT-257
7Z4	VT-181
10	VT-25
10 Special	VT-25A
12A6	VT-134
12AH7GT	VT-207
12C8 Special	VT-153
12C8	VT-169
12H6	VT-214
12J5GT	VT-135
12J5	VT-135A
12KB Special	VT-132
12SA7	VT-161
12SC7	VT-268
12SG7	VT-209
12SH7	VT-288
12SJ7	VT-162
12SK7	VT-131
12SL7GT	VT-289
12SQ7	VT-104
12SR7	VT-133
WX-12 (Obsolete)	VT-7
22	VT-26
24, 24A	VT-28
HK-24G	VT-204
25L6	VT-201
25L6GT	VT-201C
27	VT-29
30	VT-27
30 Special	VT-67
31	VT-31
32	VT-44
33	VT-33
34	VT-54
RK-34	VT-224
35/51	VT-35
36	VT-36
37	VT-37
38	VT-38
39/44	VT-49
WE-39DY1	VT-142
40	VT-40
41	VT-48
45	VT-45
45 Special	VT-52
46	VT-63
47	VT-47
50	VT-50
EF-50	VT-250
51(35/51)	VT-35
56	VT-56
57	VT-57
58	VT-58
75	VT-75
VR75-30	VT-260
76	VT-76
77	VT-77
78	VT-78
80	VT-80
83	VT-83
84/6Z4	VT-84
89	VT-89
VR90-30	VT-184
100TH	VT-218
VR105-30	VT-200
HY-114B	VT-234
HY145ZT	VT-281 (Cancelled)
VR150-30	VT-139
QF-197	VT-284 (Cancelled)
QF-200C	VT-285 (Cancelled)
WE203A (Obsolete)	VT-1
UV-204 (Obsolete)	VT-8
204A	VT-22
WE-205B	VT-2
QF-206	VT-283 (Cancelled)
207	VT-34
211	VT-48
211 Special	VT-4C
212A (Obsolete)	VT-6
WE-215A	VT-5
250TH	VT-220
250TL	VT-130
304TH	VT-254
304TL	VT-129
307A	VT-225
316A	VT-191
350A	VT-230
371A	VT-166
417	VT-277
441	VT-251
450TH	VT-108
ZP486	VT-256
ZG489	VT-282
530	VT-122
531	VT-141
575A	VT-187
578	VT-267
HY615	VT-235
705A	VT-255
710A	VT-240
717A	VT-269
800	VT-64
801A, 801	VT-62
803	VT-106
805	VT-143
807	VT-100
807 Modified	VT-100A
811	VT-217
813	VT-144
814	VT-154
815	VT-287
816	VT-216
829	VT-259
832	VT-118
832A	VT-286
836	VT-236
837	VT-101
841	VT-51
842	VT-72
843	VT-73
845	VT-43
850	VT-60
851	VT-41
860	VT-17
861	VT-19
864	VT-24
865	VT-55
866	VT-46
866A	VT-46A
869	VT-39
869A	VT-39A
872	VT-42
872A (Special Fil.)	VT-42A
884	VT-222
918	VT-246
923	VT-252
954	VT-120
955	VT-121
956	VT-238
957	VT-237
958	VT-212
1005	VT-195
1006	VT-249
E-1148	VT-232
1201, 7E5/1201	VT-241
1203A, 7C4/1203A	VT-243
1291, 3B7/1291	VT-182
1294, 1R4/1294	VT-183
1299, 3D6/1299	VT-185
1613	VT-175
1616	VT-266
1619	VT-164
1624	VT-165
1625	VT-136
1626	VT-137
1629	VT-138
1630 (A-5588)	VT-128
1808P1	VT-248
2050	VT-245
2051	VT-109
RCA-A5586 (Superseded by VT-128)	VT-123
C-7063	VT-280 (Cancelled)
7184	VT-227
8012	VT-228
9002	VT-202
9003	VT-203

Power is supplied from the 12 volt or 24 volt battery of the vehicle in which the set is installed, through dynamotors, to the radio transmitter and radio receiver. The transmitter and receiver are mounted side by side on the same mounting and the power supply leads and interconnections to the radio transmitter are automatically connected when the radio receiver is slid into place. Both transmitter and receiver are ventilated by forced ventilation through the use of fans forming part of the radio set.

A welded steel Cabinet CH-74-A houses the major components of the set when it is installed in vehicles other than tanks, and serves as a support for the mast base and the usual vertical whip fifteen-foot antenna. Additional mast sections are available to extend the vertical antenna to twenty-five feet by the use of guy ropes and ground stakes when the set is operated at a semi-fixed location. An auxiliary antenna permits operation in concealment or under other circumstances where the vertical antenna cannot be used. When the vehicle is run under trees for concealment purposes, the low-hanging branches are likely to touch the whip antenna, short-circuiting it to ground. Under these circumstances the auxiliary antenna can be set up by doubling back on itself a 45-foot length of wire to form a 22½-foot antenna, and fastening the antenna by ropes and insulators between the mast base and a tree branch.

Development of the set was begun in September 1940 for CW operation only, and the first service test model, providing CW only, was completed in July 1941. The set was standardized in December 1941. It has been service tested by the Armored Force and the Tank Destroyer Command. Recently demonstration tests have been made before the Field Artillery, Antiaircraft Artillery, and Cavalry. Radio Set SCR-506-A is now in production and issues have been made to schools and certain field organizations.

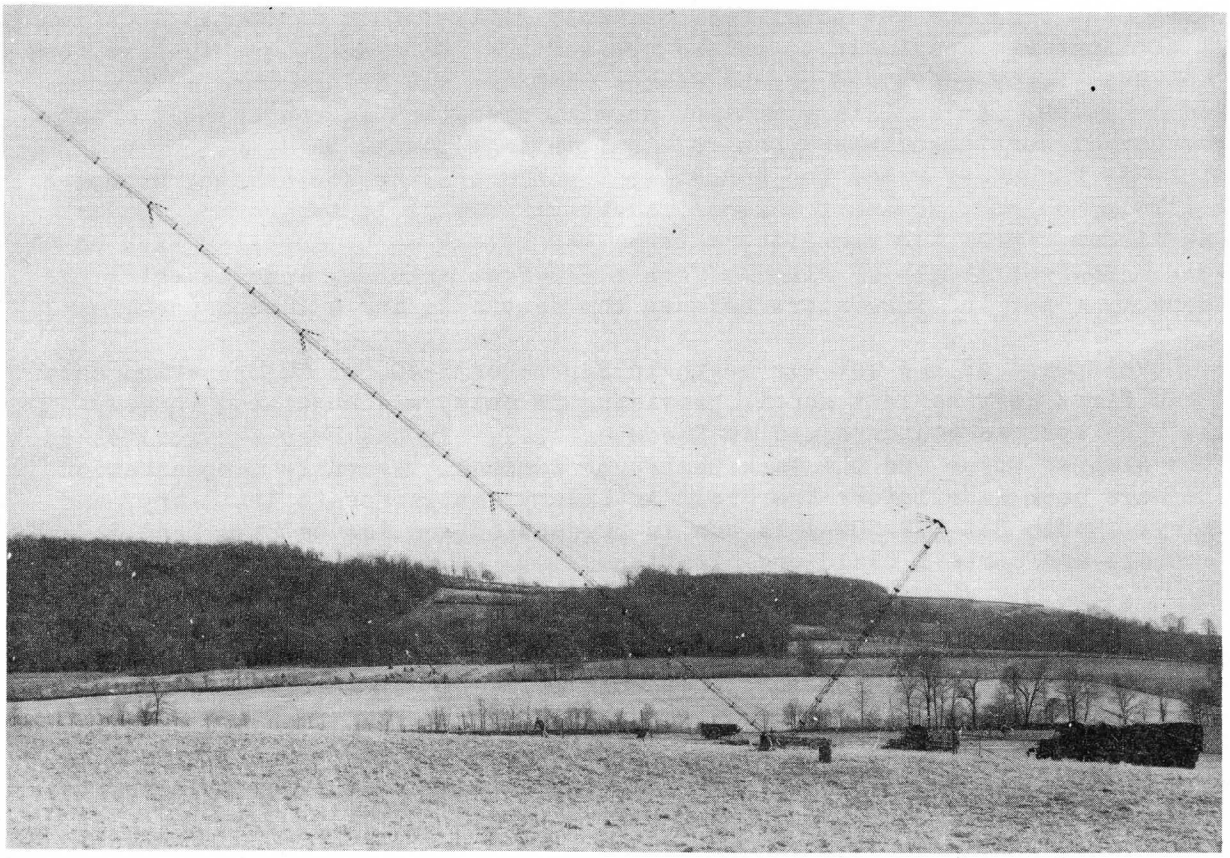
Antenna A-27 (Phantom) was developed by Camp Coles Signal Laboratory for use in testing and servicing the radio transmitters of Radio Set SCR-506 and the set which it is intended to replace, Radio Set SCR-193. It consists of a variable capacitor and two fixed resistors housed in a metal case. When in use, phantom Antenna A-27 is substituted at the transmitter terminal for the real antenna, mast base and lead-in, and permits tuning the transmitter without any substantial radiation of power.

This phantom Antenna will appear on the Parts Lists of Radio Set SCR-506-( ) and SCR-193, but is not yet in production and can probably not be requisitioned before the end of this year.

ANTENNA AN-158 NOW IN PRODUCTION

Antenna AN-158 is now in production, a limited quantity having been ordered to fill existing needs. Though this item is a major component, being 200 feet high and weighing 3,000 pounds, it is relatively little known, for its application is limited to certain larger equipments. Therefore, a complete description follows:

Antenna AN-158 is a lattice tower, made of steel. The maximum weight of any component part is approximately 200 pounds. It will withstand wind velocities up to 115 miles per hour and will stand severe icing conditions.



ANTENNA AN-158 DURING ERECTION

The tower is composed of twenty-one twelve-foot segments triangular in cross section and constructed of steel rods welded in a lattice design. The segments may be bolted together to form the tower and also the 60-foot gin-pole which is used as a lever in erecting the tower. Disassembly of the tower makes it flexible for transport. It can easily be carried in a $2\frac{1}{2}$-ton general cargo truck.

The tower is erected by the use of a 60-foot gin-pole which consists of five segments of the type of which the tower is composed, bolted together and used as a lever. By the use of a truck winch, the gin-pole is first erected to a vertical position, the tower remaining prone on the ground. Then the gin-pole is attached to the tower proper with guys, which are of steel cable. A truck winch serves to pull the gin-pole down to a horizontal position (see illustration) and thus simultaneously erect the tower to which the gin-pole is attached.

The gin-pole is now fastened to a deadman-type anchor, composed of a railroad tie buried in a horizontal position, and thus serves as a stay on one side of the tower.

Several types of tower bases are used. If a wooden base is used, the installation can only be considered temporary, but, in this case, erection can be very rapid. When this type base is used, as little as two hours are required for the whole operation, if ten men and a 2½-ton cargo truck, equipped with winch, are available. Concrete bases are used for permanent and semi-permanent types of installation. In this case, the time required for erection depends on the size of the base, the soil conditions, and the time needed for the base to set. In temperate climates the setting time is about seven days.

Although the initial erection at a particular site requires two hours for ten men, once the anchors have been positioned and the tower erected, only 3½ minutes are required for three men to raise or lower the tower.

The advantages of this equipment are:

1. Rapidity of erection. The tower can be erected in two hours initially and raised or lowered in a matter of minutes.

2. Flexibility of transport. The tower can be broken up into the number of loads best suited to fit the transportation facilities on hand.

3. Simplicity of erection: can be erected by untrained personnel. No steeple-jacks or professional tower climbers are necessary to erect the tower. All personnel stay on the ground.

Indicated uses of this equipment are:

1. As a radiator. The tower is insulated at the base, has guy wires broken up with insulators and will handle up to 50 kilowatts of power.

2. As a support for VHF elements. The tower can be simultaneously used as a radiator when employed as a mast.

3. As an observation tower. The inherent ruggedness of the tower makes it possible to accommodate the observer by the addition of a small crow's nest at the top of the tower. The ability to raise and lower the tower in a few minutes is a marked advantage for this use.

TELETYPEWRITER SET EE-97-A NOW BEING ISSUED

Teletypewriter Set EE-97-A (successor to Telegraph Printer Set EE-97) is being produced in constantly increasing quantities and June deliveries are expected to be substantially greater than in any preceding month. This new teletypewriter set differs from the previous EE-97 in several respects. The necessity for separate voltmeters (IS-170) and bias meters (I-97-( )) is eliminated and provision is made for operation on either 115 or 230 volts, 50-60 cycles, as well as on 115 volts DC.

The optional power supply feature is provided by Rectifier RA-87 which is equipped with a multi-tap power transformer, designed for operation on either 115 or 230 volts (plus or minus 15%) and for supplying printer motor current at 115 volts AC when operating at a line potential of 230 volts.

The elimination of separate bias and voltmeters is accomplished by the use of a multi-scale meter in Line Unit BE-77-A which provides for indication of signal line current value, DC signal voltage and signal bias. A self-restoring cam type key is provided for selecting the desired scale, the normal position of which leaves the meter in the circuit and on the line current scale.

Teletypewriter TG-7-B is a simplified version of Printer TG-7-A. In the TG-7-B, the motor relay and associated wiring, as well as the line relay mounting block and associated wiring, have been eliminated, resulting in the saving of large quantities of critical material and a reduction in weight of approximately 10 pounds. Elimination of the line relay mounting block precludes the use of a commercial polar relay in the teletypewriter which, therefore, requires that Line Unit BE-77-A be used in every installation of this set.

Below are shown in tabular form the component differences between Telegraph Printer Set EE-97 and Teletypewriter Set EE-97-A:

Components Affected	Telegraph Printer Sets EE-97 or EE-98	Teletypewriter Sets EE-97-A or EE-98-A
Teletypewriter	Printer TG-7-A	Teletypewriter TG-7-B
Rectifier	Rectifier RA-37	Rectifier RA-87
Line Unit	Line Unit BE-77	Line Unit BE-77-A
Voltmeter	Voltmeter IS-170	None (Incorporated in BE-77-A)
Bias Meter	Bias Meter I-97	None (Incorporated in BE-77-A)

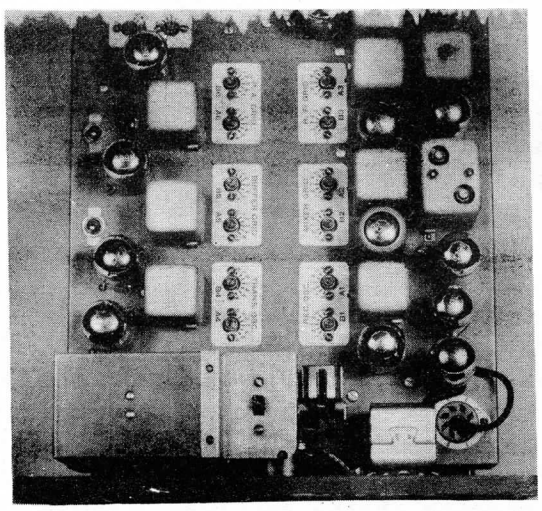
Speed indicators (tuning forks) are not supplied with Teletypewriter TG-7-B, but will be included in separate maintenance kits now being issued for teletypewriter maintenance.

No change has been made in Chest CH-53-A, which formerly contained Voltmeter IS-170, Line Unit BE-77, and other accessory and expendable items. This chest now contains Line Unit BE-77-A, together with cords, spare fuses, Teletypewriter paper and spare ink ribbons

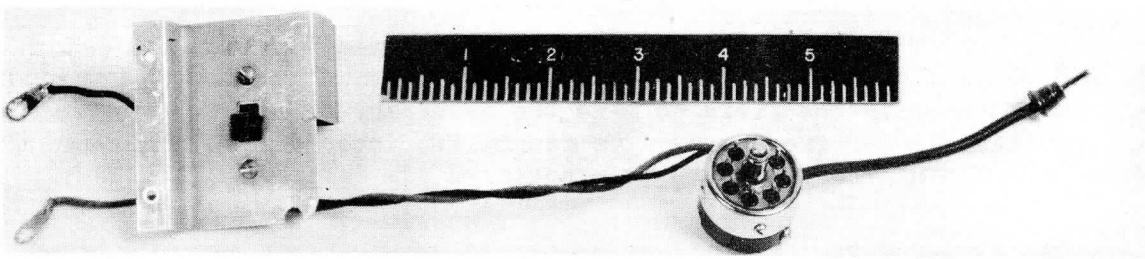
Specifications have been changed on the gasoline engine driven DC generator unit (Power Unit PE-77-( )) supplied with this set. Current production of this power unit includes a mechanical governor, instead of the air vane formerly employed, resulting in better voltage regulation and improved teletypewriter operating margins.

RADIO ALIGNMENT EQUIPMENT

Maintenance Equipment ME-13-( ), which is used for tuning and aligning Radio Sets SCR-509-( ), SCR-510-( ), SCR-609-( ) and SCR-610-( ), includes a Voltohmmeter I-107-( ) which is difficult to procure. The parts list of the ME-13-( ) has recently been revised to permit the use of Alignment Indicator I-210-( ) in place of Voltohmmeter I-107-( ), when the latter is not available. A limited quantity of the ME-13-( ) including the I-210-( ) will be issued pending the availability of Alignment Equipment ME-73-( ), which has been developed as a replacement for the ME-13-( ).



The ME-73-( ) is much lighter and more compact than the ME-13-( ), but it can only be used in connection with Radio Sets SCR-509-( ) and SCR-510-( ) in which Adapters M-394 have been installed or with Radio Sets SCR-609-( ) and SCR-610-( ) in which Adapters M-399 have been installed. These adapters are designed for permanent installation in the respective radio sets and will be included in sets manufactured in the future. A maintenance letter will be issued containing instructions for installing adapters, which are now being procured, in radio sets which are in the field.



A DEVELOPMENT MODEL OF ADAPTER M-399. IN THE CHASSIS VIEW OF RADIO RECEIVER AND TRANSMITTER BC-659-( ) THE ADAPTER PLUG IS INSERTED BETWEEN THE POWER TUBE AND ITS SOCKET.

Adapters M-394 and M-399 each include a double pole, double throw switch mounted on a phenolic base, which, in turn, is mounted on a metal bracket. Two lead wires are attached to the switch for connection to the meter in the

set. Two other wires terminate in a loctal male and female plug for insertion between the power amplifier tube and its socket in the radio set. The loctal plug in turn has a single lead which plugs into any desired terminal hole of the socket of the set which is designated as the "metering socket." When not being used for measuring the voltage in the various circuits, thi cord should be placed in the large center hole of the metering socket.

When the adapter switch is in its "off" position, the meter and tube of the radio set perform their normal functions, and when the switch is in the "tune" position, they are connected together to form a vacuum tube voltmeter.

The adapter units can be simply and easily installed as an integral part of Radio Receiver and Transmitter BC-620-( ) and BC-659-( ) using Screwdriver TL-15 and a 5/16" spin type wrench, which are components of both ME-13-( ) and ME-73-( ). No soldering is required in the installation.

The installation of the adapter units in Radio Receiver and Transmitter BC-620-( ) and BC-659-( ) permits the power amplifier Tube VT-185 and the panel meter to be converted into a vacuum tube voltmeter for use in conjunction with Maintenance Equipment ME-73-( ) for the alignment of the radio sets. The volume control of the receiver is used as a sensitivity control for this vacuum tube voltmeter. The volume control is also used to calibrate the vacuum tube voltmeter in order to adjust the reactance tube bias accurately when aligning the radio sets. The normal function of the power amplifier circuit is not disturbed during the alignment procedure.

The components of Alignment Equipment ME-73-( ) are essentially the same as those of ME-13-( ) except that the voltohmmeter and oscillator are omitted and crystal holders with the necessary crystals for intermediate frequency circuit alignment are added. One of these crystal holders, depending upon whether SCR-509-( ) and SCR-610-( ) or SCR-609-( ) and SCR-610-( ) are being aligned, is temporarily inserted in the radio set in place of regular crystals so that the set oscillator will operate at the required intermediate frequency for alignment purposes.

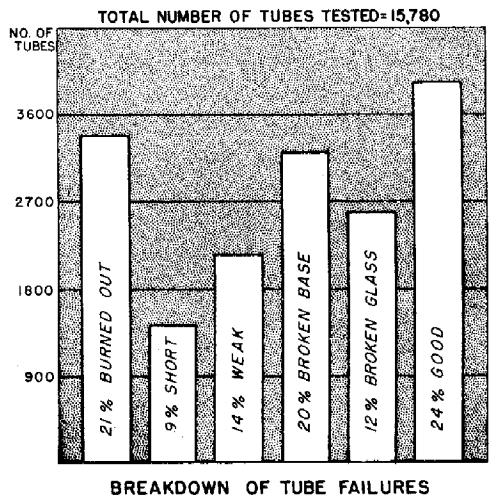
The use of the proper adapter and the Alignment Tool TL-150 (which is furnished as a part of all of the above sets) without the ME-73-( ) will permit an operator in the field to make the necessary alignment adjustments to change channels (or frequency). To accomplish intermediate-frequency alignment, the use of the ME-73-( ) is necessary.

Since the ME-73-( ) will not be issued on the basis of one per each of the above radio sets, the nearest available ME-73-( ) should be used. The results in either case are satisfactorily comparable to results obtained by adjusting the radio sets using Maintenance Equipment ME-13-( ).

DEFECTIVE TUBES

A recent survey conducted by Test and Maintenance Equipment Branch, Camp Coles Signal Laboratory, of receiving tubes sent in as defective to the New Cumberland General Depot from all parts of the United States and its territories showed that over twenty-four percent of the tubes were in good condition. In view of the difficulties presented in the procurement and production of sufficient quantities of radio tubes, this condition is worthy of closer investigation.

One of the causes discovered for this waste is the fact that the emission type tube checkers, which comprise the majority of the checkers now used in the field, do not give completely accurate indications of the condition of the tubes. Another cause is that the operators do not handle their instruments with as much care as they should.



BREAKDOWN OF TUBE FAILURES

15,780 receiving tubes comprising 318 types were retested at the depot, using a precision 912-P mutual conductance checker, a pre-heater and a Headset HS-22. Of the 15,780, a total of 3,845 proved to be good tubes. The accompanying chart shows the results obtained in terms of number and percentage of tubes failures.

In connection with the testing of battery operated, filament type 1.4 volt tubes, particularly miniature types, the most common difficulty encountered is the rejection of many good tubes which had been classified "shorted." These tubes appear to be shorted because the neon indicator in the tube checker glows intermittently and, in accordance with operating instructions supplied with tube checkers, a tube which causes this effect is to be rejected as shorted.

Voltages applied to the grids and filaments of these tube types by emission-type tube checkers during the short-checks may be as high as 100 to 300 volts. Under this condition there is sufficient electrostatic attraction between the two elements to pull the filament over to the grid with the resultant short indications. Under actual operating conditions in radio equipment, the maximum voltage applied between the grid and filament is well under 25 volts. Therefore, if the tube checker applies more than 50 volts across the grid and filament in short-checking, the short indication should be disregarded. Real grid-filament shorts occur when there is a break in the filament causing it to come in contact with the grid. This can readily be determined by tube-checker filament continuity tests or by a continuity meter. If any doubt still exists, these tubes should be tested in the equipment for which they are to be used.

Investigations prove that the mutual conductance type tube checkers give more reliable indications than the emission type testers commonly used. The foregoing procedures when adopted by field units resulted in decreases in rejections of up to 50 percent.

To reduce the waste resulting from the discard of good tubes, it is recommended that more care be exercised in the testing, and that, where possible, tests be made with a dynamic or mutual conductance type checker before final rejection of receiving tubes. Among such tube checkers employed in the Army are the following:

Tube Tester I-119
Test Set I-131
Test Set I-157 (Part of Test Equipment IE-47-A)
Test Set I-171 (Part of Test Equipment IE-9-C)
Tube Tester I-177 (Part of Test Set I-56-K)
Test Set I-180 (Part of Test Equipment RC-70-A)
Tube Tester Hickok No. 530-B
Tube Tester Hickok No. 540 (Part of Test Equipment IE-9-B and RC-70-A)
Tube Tester Hickok No. 560 (Part of Test Equipment IE-9-C)
Tube Tester Precision No. 912-P
Tube Tester Precision No. 920 (Part of Test Equipment IE-9-B)
Tube Tester Precision No. 920-P (Part of Test Equipment IE-47-A)

The following are emission type:

Test Set I-56 (All types other than I-56-K)
Test Set Supreme No. 504.

A suggestion might well be made here that the practice of intentionally bending or breaking off prongs to indicate defective tubes should be discontinued. According to the foregoing study, there seems to be a likelihood that one out of four rejected tubes are actually still good, but these can not be salvaged if mutilitated.

The examination of transmitting tubes turned in to this depot showed that in many instances these tubes were damaged by improper wrapping and shipping in returning to the depot. Many of the tubes ruined in this manner could have been reconditioned by commercial concerns, thus saving time and materials. Of the group of non-repairable transmitting tubes, a representative sum of 13,839 of 117 types were evaluated as to the amount of copper, aluminum, block-tin, brass, molybdenum, tungsten, and tantalum. This larger group was divided into two groups for methods of determination. Copper, aluminum, block-tin, and brass comprised the first group; and molybdenum, tungsten, and tantalum the second group. Representative sample tubes were broken open and the salvageable components were weighed. Of these tubes it was estimated that the following materials could be recovered: 61.86 lbs. of tungsten, 1.97 lbs. of tantalum, 70.90 lbs. of molybdenum, 69.69 lbs. of aluminum, 525.13 lbs. of brass, 2,027.88 lbs. of copper, and 18.78 lbs. of block-tin.

DEHYDRATOR CABINET CH-169-( )

Signal equipment is being subjected to the worst of climatic and weather conditions in this war. First from Guadalcanal came reports of the serious effects of "steamy" jungle atmosphere on the operation of signal equipment, both from condensation of moisture in and on the equipment and, in reference to radio sets, from the blanketing of radio waves by the dense, moisture-laden jungle growth.

The latter effect, which curtails the range which might otherwise be obtained with the radio set, is a natural phenomenon. Some improvement could be made by elevating the antenna above the jungle growth, but it is obvious that such is not always feasible.

The former effect reduces the usefulness of equipment by introducing electrical losses and possible causes of failure, and might be overcome by periodically drying the equipment near the scene of use. Stories are told of how equipment has been dried in a pup-tent heated by lanterns.

In order to provide specific apparatus for the purpose of drying equipment, military characteristics for a Dehydrator Cabinet CH-169-( ) were approved and the Fort Monmouth Signal Laboratory initiated development. A model was demonstrated at FMSL on April 26, 1943.

The CH-169 has a drying space approximately 36 x 36 x 24 inches, large enough to accommodate a BC-191 or a BD-71 or a BC-654, or a number of smaller items of signal equipment. It has a gasoline burning heater, and also has electric heating elements for use where adequate electric power is available.

Questions of basis of issue, standardization, and procurement are now being considered. Some modifications in the present model are expected to be made in the production job.

When it has been produced and furnished to our troops, the CH-169-( ) should prove useful in maintaining signal equipment in operation in regions of high humidity.

PRODUCTION CHANGES IN SIGNAL CORPS EQUIPMENTS

In spite of gruelling field and laboratory tests, with realistic conditions simulated, faults crop up in radio equipment when it goes into use on a large scale in various sectors. Production change engineers (Inspection Administration Branch, FMSL) tackle knotty radio equipment problems calling for ingenuity and initiative. Here are a few such problems and solutions either now in effect or being recommended.

Radio Set SCR-511. This little staff-mounted portable radio set can now defend itself effectively against the rain. The trouble: existing gaskets and washers had been found inadequate. And from now on, shock mount-

ing in this set will be steel springs instead of the rubber cushions which tend to deteriorate.

Radio Set SCR-288. This set had been failing when the going got humid. Solution lay in water-proofing its transformers.

Radio Set SCR-284. Shaft breakage has been resulting on the antenna tuning coil when the friction clutch failed to operate at end points of rotation and when excessive torque was applied to tuning knob. The addition of a simple lock nut removed the trouble.

Radio Sets SCR-509, SCR-510, SCR-609, and SCR-610. These sets will now be able to "take it" when the big guns are fired near-by. A protective speaker cover will be added to prevent concussion from damaging the speaker cones.

These sets are also being made completely immersion-proof. Accomplished by using closed end bushings for the panel supporting screws in the housings -- double-lipped moulded rubber gaskets -- gaskets or seals between meter glasses and panels -- plugs to seal meter zero adjusting holes in panels -- microphone and earphone jack covers -- sealing compound under all external rivets and screws -- waterproof material in speaker cones -- solder-sealing of all external spot-welded joints.

Short circuiting of adjusting screws, when a metal tool is used for aligning these sets, has been circumvented by covering the trimmer capacitor mounting screws with insulating paint.

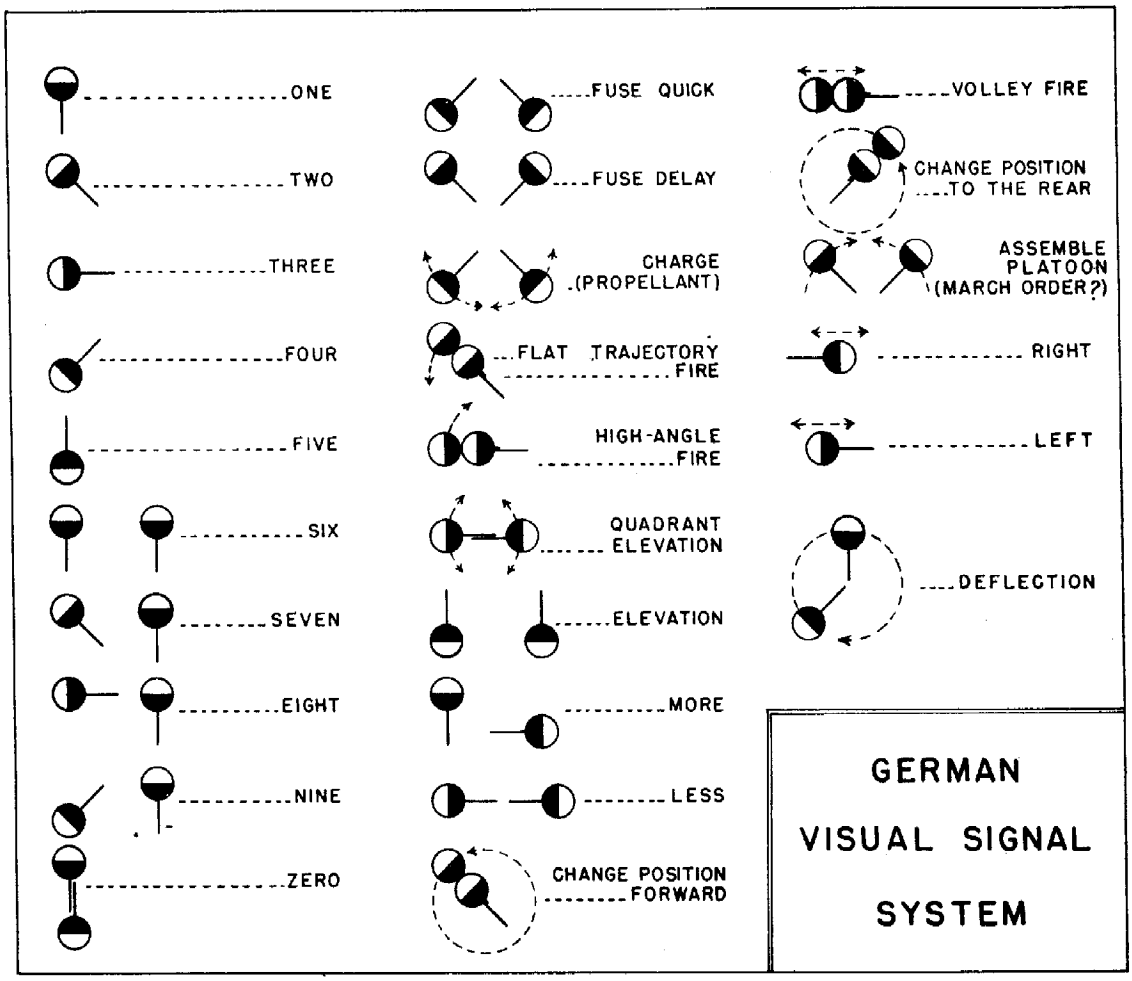
Instances are known where sections of antenna were removed when a low antenna silhouette was required, thus detuning the transmitter and overloading output tubes and shortening tube life. The issuance of 15 feet of Rope RP-5 and fittings for tying down the antenna, instead of removing sections, is planned.

CONCERNING INSTRUCTION BOOKS

Complaints have been received relative to the lack and inadequacy of instruction books accompanying Signal Corps equipment. Information is requested as to the types of equipment which arrived without instruction books and on instruction books which were inadequate for field use. Sufficiently detailed explanations are requested as to inadequacy in order that proper steps may be immediately instituted to prevent recurrence. All matters of this sort can be referred to the Planning Director, SPSEO, OCSigO, Washington, D. C.

GERMAN SIGNAL SYSTEM FOR ARTILLERY

Recently information has come in from German sources of what seems to be a simple visual signal system for artillery fire control in the event of failure of other means of communication. Apparently, it is employed between OP and gun position. Also it may possibly be used between a forward observer and his communications detachment, when for one reason or another, it is necessary for the latter to remain at a distance from the observer.



No knowledge of any general signal code is required, and the apparatus can be nailed together and painted in half an hour. Two disks or panels (see sketches) are required, attached to short rods or handles -- such as a barrelhead nailed to a broomstick. The disk is possibly painted half red, half white or other colors that may be more suitable to the background. These disks are used as shown in the accompanying sketches. At night lights are used.----- From MILITARY INTELLIGENCE.

O.C. SIG. O. LIBRARY

Following are a few of the books added to the collection in the Signal Corps Reference Library, 4C340, Pentagon Building, during the last month:

A Guide to Cathode Ray Patterns by M.C. Bly. Wiley, 1943. 39p. QC544.C3B55.

Power Rectifiers, with Notes on Converting Machinery by J. Rosslyn. Chemical Publishing Co., 1941. 199p. TK2795.R6.

Alternating-Current Circuits by K.Y. Tang. International Textbook, 1940. 438p. TK3141.T3.

M.K.S. Units and Dimensions and Proposed M.K.O.S. System by G.E.M. Jauncey and A.S. Langsdorf. Macmillan, 1940. 62p. QC536.J3.

Electricity for Everyone by J.R. Lunt and W.T. Wyman. Macmillan, 1943. 649p. QC527.L79.

Fundamentals of Electricity for Those Preparing for War Service by W.L. McDougal and others. American Technical Society, 1943. 388p. QC523.M25.

Electrical Engineering Fundamentals by G.F. Corcoran and E.B. Kurtz. Wiley, 1941. 450p. QC518.C64.

American Standard Code for Electricity Meters, 4th ed. Edison Electric Institute, 1941. 128p. TK301.A8.

The Engineers' Manual by R.G. Hudson. 2d ed. Wiley, 1939. 340p. REF TA151.H8.

Engineer's Pocket Book of Tables, Formulae and Memoranda by F.J. Camm. Chemical Publishing Co., 1942. 492p. TA151.C3.

The Construction of Nomographic Charts by F.T. Mavis. International Textbook, 1939. 132p. QA90.M35.

The Mathematics of Wireless. Completely Rev. and Enl. 1st American ed., by Ralph Stranger, pseud. Chemical Publishing Co., 1942. 215p. TK6553.S67.

Reading Engineering Drawings by G.F. Bush. Wiley, 1942. 60p. T379.B8.

The Drama of Weather by W.N. Shaw. Cambridge, Eng. University Press, 1940. 307p. QC861.S48.

The Theory of the Photographic Process by C.E.K. Mees. Macmillan, 1942. 1124p. TR200.M4.

Fundamentals of Photography by P.E. Boucher. Van Nostrand, 1940. 304p. TR145.B63.

Plastics in Engineering, 2d ed. by Jack Delmonte. Penton, 1943. 601p. TP986.A2D45.

Plastic Molding by D.A. Dearle. Chemical Pub. Co., 1941. 131p. TP986.A2D35.

The Radio Manual by G.E. Sterling. 3d ed. Van Nostrand, 1940. 1120p. TK6550.S83.

Learning the Radiotelegraph Code by John Huntoon. American Radio Relay League, 1942. 34p. TK5743.H8.

A Course in Radio Fundamentals by George Grammer. American Radio Relay League, 1942. 103p. TK6554.G7.

Two Hundred Meters and Down; The Story of Amateur Radio by C.B. DeSoto. American Radio Relay League, 1936. 184p. TK6547.D4.

Radio from Start to Finish by F.M. Reck. Crowell, 1942. 160p. TK6547.R4.

The Theory of Sound, 2d ed., Rev. and Enl. by J.W.S. Rayleigh. London, Macmillan, 1937-40. 2v. QC223.R26.

Mechanics of Materials by S.G. George and others. 2d ed. McGraw, 1943. 491p. TA405.G4.

MILITARY TRAINING

NEW OCS CURRICULUM EMPHASIZES FIELD LEADERSHIP

By direction of the Commanding General of the Army Service Forces, the course of instruction at the Signal Corps Officer Candidate School, Fort Monmouth, N. J., has been increased from three months to four months. Plans are now being formulated for the fourth month period and will be announced as soon as they have been approved.

The primary purpose of adding a month to the course is to provide a more adequate program for developing leadership in the prospective second lieutenants. One effective way of accomplishing this, it is believed, is to place a candidate in charge of a group of men while living under actual field conditions. Accordingly, under the extended curriculum, each candidate will have an opportunity to lead a team in the operation of the various means of signal communication and, at the same time, will be experiencing field conditions.

The field exercise, which will last for one month, will give the candidates a chance to apply in practice the information they learned in the classrooms. They will actually install, operate, and maintain a large field signal communication system. In the past, faculty as well as student ratings of the candidates have been based primarily on classroom performance, but the additional month will give all concerned an opportunity to observe each candidate under field conditions and to get a more accurate idea of his fitness to be an officer.

It is proposed to move the officer candidates to a maneuver area in the southern part of New Jersey, where an abandoned CCC camp will be used as a base for the field exercise. The candidates will return to the base for short rest periods only. The greater part of their time will be spent working and living in the field. There will be no classroom instruction in the maneuver area. "Leadership by leading" is the keynote of the new program.

GROUND-AIR SIGNAL INSTRUCTION

Proven effectiveness of panel display and airplane pickup of messages has caused that training to be worked into the curriculum of the Signal Communications Branch at Camp Kohler, Sacramento, California.

Classes are held once each week for radio operator trainees who have completed their first week's study. The scene is a wide expanse near camp, where trees are spaced sufficiently to allow a plane to fly at low altitude.

About twelve of the trainees are designated to handle the panels, while the others are kept on the sidelines to observe the technique. While waiting for the plane, a basic trainer from McClellan Field, trainees are instructed

in the use of panels.

Someone notes the plane coming and the men scurry to their proper stations, under the direct supervision of non-commissioned officers of the Signal Communications Branch. The pilot circles around so his observer can prove identification, then dips the plane's wings to indicate that all is in readiness for the message.

The men are told the code numbers, rush up to arrange the panels, then dash back about 15 or 20 feet and drop prone, face downward, to avoid possible interference with the message. This is repeated time and again until the message is finished and the pilot acknowledges its satisfactory reception

Then comes the climax of this training, the airplane pickup. Two poles are erected, each containing a nail tilting upward at a 45-degree angle. Sixty feet of cord is obtained, usually 1/16 of an inch in diameter and is looped across the nails, the whole resembling football posts with a sagging crossbar. The ends of the cord are then drawn back, with a message bag tied to each. One bag contains the message, the other contains a weight to counterbalance.

Meanwhile, the observer draws out 50 feet of braided cord, with a leaded weight of about two pounds, containing four hooks, on the pickup end. Everything is in readiness. The pilot must approach on a headwind and must have at least 300 feet clearance on each side. He swoops down to within 15 feet of the ground, the observer drops his "fish line" and the cord is caught. The observer pulls it into the plane and, once again, the "message has gone thru."

SWIMMANDO TRAINING

Basic trainees at the Eastern Signal Corps Replacement Training Center will receive instruction in the fundamentals of keeping alive when forced into water.

The new "Swimmando" course, instituted by the Plans and Training Section, is directed at the following objectives:

1. To instruct the soldier in the proper methods of abandoning a sinking ship;

2. To show the soldier numerous ways to keep afloat, should he be without a lifeboat or raft;

3. To impress upon the soldier that ships which sink suddenly and rapidly are a rarity, and that many casualties are caused by men who become panic stricken and hasten to abandon ship;

4. To show the soldier that a cool head, calm thinking and the use of proper safety measures will insure him a good chance of survival.

Included in the course is instruction in the technique of swimming with a variety of strokes while fully clothed. How to climb and descend cargo nets, how to jump into the water from a large vessel, and how to swim through oil will be demonstrated. The soldier will learn the trick of keeping afloat by inflating his own shirt, a barracks bag or a pair of pants. Ship-to-shore operations cover the use of assault boats, rubber rafts and riding wave crests.

Throughout the course, water discipline is emphasized. It is pointed out, for example, that if the soldier's own lifeboat should be smashed, there is a better chance of survival for all if he relies upon a life preserver rather than crowding into another boat and swamping it. A minimum knowledge of life-saving is also included to teach men not only how to save a buddy, but also how to protect themselves in the water from others who may become panicky.

RADIO PROCEDURE TESTS

In a program designed to provide uniform measures of radio operators' abilities, a series of standard tests is being prepared by the Military Training Branch, Office of the Chief Signal Officer.

The Radio Procedure Test TPAC-1 is the first of the series. This test is designed to measure the student radio operator's working knowledge of the new Combined Radiotelegraph and Radiotelephone Procedure used in the United States-British services. The test consists of 65 multiple choice questions and has a 40-minute time limit. Since the answers are marked on separate answer sheets, the test booklet can be used repeatedly.

Copies of the Radio Procedure Test TPAC-1 may be secured from the Military Training Branch, SPSMT-4, Office of the Chief Signal Officer.

PUBLICATIONS

The following new field manuals and technical manuals of particular interest to the Signal Corps have been published and may be obtained through regular Adjutant General channels:

TM 11-401. Training Film and Film Strip Projection, March 22, 1943

TM 11-403, Identification Equipment PH-385, May 12, 1943

TM 11-405, Photographic Darkroom Equipment Processing Equipment PH-406, May 12, 1943

FM 24-8, Combined Teletypewriter (Teleprinter) Procedure, March 17, 1943

FM 24-11, Combined Operating Signals, January 17, 1943.

TRAINING FIXED RADIO STATION TEAMS

Since the first of this year, the 822d and 824th Fixed Radio Station Companies produced 30 Fixed Radio Station Teams. These teams have been given instruction in the following:

1. Orientation by compass and transit.
2. Pole climbing.
3. Pole erection (both short and long poles).
4. Staking out rhombic antennas.
5. Construction of rhombic antennas.
6. Maintenance of rhombic antennas.
7. Installation of fixed radio stations (which includes crating and uncrating of fixed radio station equipment).
8. Actual fixed radio station net operation.

In addition to the above, the teams are being given continued instruction in code practice and net procedure, in order to maintain the skills they had acquired prior to joining these teams.

There are at present available for the training of the above-mentioned teams 300-watt stations, 1-KW stations, 2½-KW stations, and 15-KW stations with Bohme high-speed equipment.

TRAINING FILM UTILIZATION GUIDES

To insure the use of the training film as a visual aid to training, rather than as a complete lesson in itself, the Eastern Signal Corps Replacement Training Center has developed a series of film training guides.

Issued as annexes to a conference on "How to Get the Most from Training Films," the guides provide for the instructor complete information on how to present each film in the course he is teaching. Each training guide specifies the name and number of the film and the equipment necessary for its presentation, the training objective, the running time of the film, a brief synopsis, special points the men should watch, appropriate questions for reviewing and clarifying the film, and a true-false test of eight questions.

Thus the instructor, whether novice or old-timer, knows precisely what he must do to prepare for his lesson. He is told what to include in the "preparation" step, the film provides the "explanation," "demonstration" or "illustration," and the instructor is prepared for the "discussion" and "examination."

These film training guides provide the additional advantage, as do the regular training guides for all ESCRTC courses, that Plans and Training officers know in advance the exact manner in which the classes are to be instructed as well as the material to be covered.

LOOP RADIATOR USED IN RADIO COMPASS SENSITIVITY TESTS

To measure the loop sensitivity of radio compasses, it is necessary to radiate a signal whose intensity in microvolts per meter is known. A common method of accomplishing this is by the use of a standard transmission line in a screened room. This method is accurate, but has the disadvantage of being costly, inflexible, and immobile. To overcome these disadvantages, a standard loop antenna has been used as the radiator with great success in the Enlisted School of the Eastern Signal Corps School at Fort Monmouth, N. J.

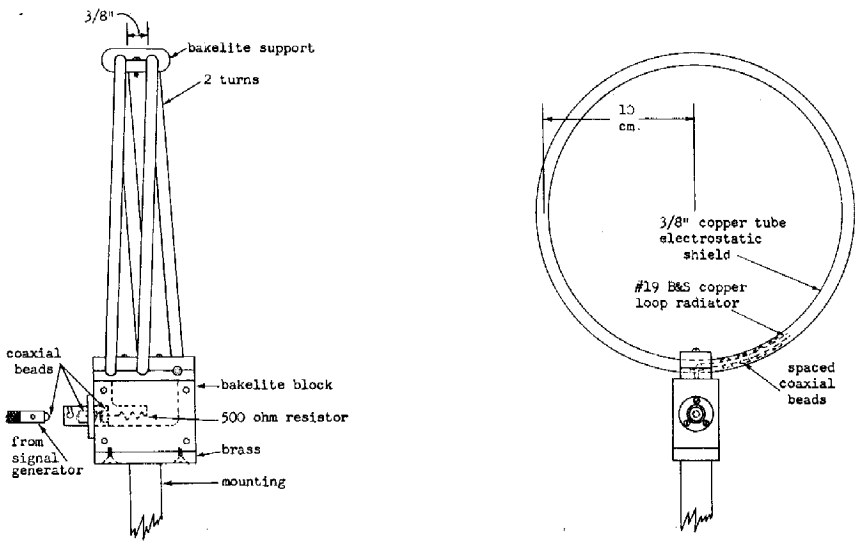


FIG. 1 - STANDARD LOOP RADIATOR

The standard loop radiator is an electrostatically shielded loop with suitable mounting, co-axial input cable, and resistive load. Mathematical data for the design of the standard loop radiator were taken from the Report of the Standards Committee of the Institute of Radio Engineers, 1933. The loop and its shield are co-axial. The radiating loop is inductively coupled to the receiving loop.

The choice of specifications for the standard radiating loop depends upon several factors:

1. The distance between the radiating and receiving loops, which must be greater than twice the largest dimension of either loop;
2. The dimensions of the loop, which must be such that its capacitance is low and its resonant frequency is high, compared to the operating frequency;
3. The series resistor, which must be as high as possible to avoid shunting the signal-generator output;
4. The desired ratio between signal-generator output in microvolts and field strength in microvolts per meter;
5. The number of turns in the loop, which must be as low as possible, consistent with the second requirement stated above.

To satisfy all these requirements, a loop having the constants shown in Figure 1 was constructed. When the radiating and receiving loops are spaced 16-5/8 inches apart, center to center, the ratio of field strength to signal-generator output is 1 to 10; that is, a signal-generator output of 1000 microvolts will produce a field strength of 100 microvolts per meter at the receiving loop. The accuracy of the field strength is adequate for compass loop-sensitivity measurements up to 2 megacycles.

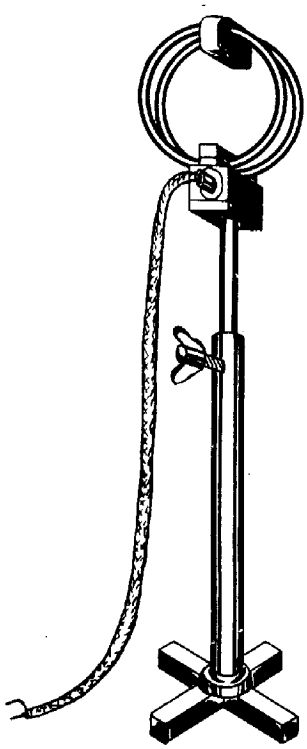


FIG. 2

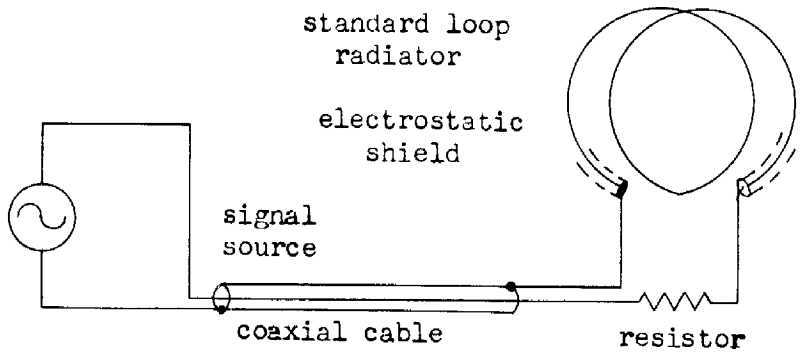


FIG. 3

The advantages of the standard loop radiator over the standard transmission line are:

1. Absence of restrictions on the dimensions of the screen room, provided at least a 2-foot clearance between loops and screen is available in all directions;
2. Portability;
3. Absence of restrictions on the number of radiating loops in operation in a given locality, or in a given screen room;
4. Possibility of operation without a screen room;
5. Economy of standard loop calibrator, as compared with a screen room.

Figure 2 gives an overall picture of the standard loop radiator, its mounting, and its cable. Figure 3 is a circuit diagram of the standard loop radiator.

LONG LINES TRAINING FILM

"Newfoundland Long Lines," Film Bulletin #69, recently approved for release, is a 16mm color film showing the many problems encountered in constructing a telephone cable line in Newfoundland.

The line was built along 500 miles of single railway track, which had the heaviest traffic in the history of the line, sometimes as many as 16 trains a day.

Black spruce and juniper were cut down to supply the required 30,000 poles. Fifteen thousand reels of cable were shipped from the United States and used in this construction. Due to the heavy sleet area in Newfoundland, it was necessary to storm guy every fifth pole.

This film bulletin will be distributed to each of the central film libraries and the film sub-libraries at Fort Monmouth, New Jersey, and Camp Crowder, Missouri.

KOHLER'S RIFLE RANGE RECORD AT NEW HIGH

The Western Signal Corps Replacement Training Center rifle range record soared to a near-perfect mark last week when Captain E. L. Eggiman's Company F-1 chalked up an enviable 97.7 percent and gave other companies in future training cycles something really tough to overcome.

Lt. R. H. Borus' first platoon walked away with perfect top honors by qualifying 51 men out of 51 for a 100 percent record.

Company F's second platoon, commanded by Lt. J. H. MacDonald, qualified 58 out of 59 for 98.3 percent, and Lt. C. R. Wood's fourth platoon recorded 55 out of 56 for a 98.2 percentage.

Lt. J. F. Kuster's third platoon turned out a heretofore high-bracket percentage of 95 by qualifying all but three men out of 60.

PROCEDURES COORDINATION

LESSONS FROM OVERSEAS OPERATIONS

A report received from British sources outlining lessons from recent operations has been summarized and the principal points pertaining to signal communication are presented below. It is interesting to note the close parallel between these lessons and the comments of our observers at maneuvers and overseas regarding our own operations.

Too much emphasis cannot be placed on the fact that efficient communication is based on cooperation between and the combined training of users and communication personnel. Widespread use of radio, for example, necessitates more practice on the part of more officers than ever before. The writing of messages still leaves much to be desired. The necessity for all users to appreciate the capabilities and limitations of the various means of communication still exists, particularly the relative merits of radio and wire.

There still is a tendency automatically to place the blame for the absence of information on the failure of communications, whereas frequently that absence arose from the simple fact that no information had been provided. In some cases where staff and regimental officers had become used to radiotelephone, they considered that communications had failed when speech had become impossible, although telegraphy was still practicable.

Signal officers require early and accurate information on which to organize the communication system and staff officers must always recognize this fact and act accordingly. There is still a need for more consultation with signal officers regarding moves, the siting of headquarters and the location of administrative establishments and echelons with a view to the best possible communication system.

With the large concentration of units in a relatively small area, frequency congestion was inevitable. This was kept to a minimum by careful pre-allotment, but there still is a tendency for frequency "piracy." The practice of searching for a blank space in the frequency band and not keeping to the assigned frequency is dangerous and must be avoided. The frequency so found may be one which is being specifically reserved for some important operational link of which the "pirates" are unaware.

Additional radio communication are continually demanded. Every service tries to get its own system. More attention must be given to the organization of radio facilities on a pool basis where special services do not exist.

At certain stages, particularly when movement is rapid, radio becomes the primary means of communication, but wire must be established wherever possible. This applies to armored units as well as others. Duplicate lines by alternate routes must be provided.

Visual communication was little used but it is important that every available alternate means of communication be provided for use in case of necessity.

The proper employment of radiotelephone codes and the intelligent mixture of plain language, jargon and code still requires more attention. There is a tendency in some quarters to doubt the danger of indiscretion and subsequent interception of radio traffic.

Signal personnel, especially those employed on line work, must be trained in mine finding and mine clearing.

COMBINED ALLIED OPERATING PROCEDURE

At the outset of active participation by United States forces in this war, one of the greatest needs in the field of communications was that of satisfactory operating procedures. Communication between units of our own forces was difficult, due to the differences which existed in joint Army-Navy and intra-Army procedures. Prospective operations with the British foretold the necessity for procedures which could be used on a combined basis. This matter was brought before the Combined Communications Board which included representatives of the Office of the Chief Signal Officer.

At this date, the achievements of that body can be measured by the existence of a procedure for each of the principal means of communication between the United States and British services. Formulation of these procedures was laborious and time consuming, since the needs of each service required careful consideration and attention. Moreover, preparation of procedures satisfactory to all necessitated many concessions and considerable compromise in order to bring about general agreement. As a whole, from the standpoint of the United States forces, it is felt that the adopted procedures are at least as good, if not better, than those which our services were required to use prior to the advent of combined communications.

Listed below is a summary of the procedures adopted by the Combined Communications Board. Without exception, all the combined procedures have been adopted for joint United States Army-Navy and intra-United States Army use. This is particularly advantageous in that training is required in a single procedure for all three uses. Each of the publications has a short title which is CCBP followed by a number. These short titles, together with the Army field manual numbers which have been assigned are as follows:

CCBP-1	Combined Radiotelegraph (W/T) Procedure	FM 24-10
CCBP-2	Combined Operating Signals	FM 24-11
CCBP-3	Combined Radiotelephone (R/T) Procedure	FM 24-9
CCBP-4	Combined Teletypewriter (Teleprinter) Procedure	FM 24-8
CCBP-5	Combined Visual Signalling (V/S) Procedure	FM 24-22
CCBP-6	Combined Visual Signalling (V/S) Procedure (Abridged Version for Radiotelegraph (W/T) Operators)	FM 24-23

Combined Operating Signals, CCBP-2, FM 24-11, authorize Army and Air extracts. These are FM 24-12, Army Extract, and FM 24-13, Air Extract. The latter is expected to be available shortly.

At present FM 24-9 is entitled "Combined United States-British Radiotelephone (R/T) Procedure" and does not have a C.C.B. short title. When reprinted, however, its title will be changed to "Combined Radiotelephone (R/T) Procedure" and the short title "CCBP-3" will be added.

The schedule of effective dates for intra-Army and joint United States Army-Navy use of the various procedures is as follows:

1. Combined Radiotelegraph (W/T) Procedure, FM 24-10 - effective as of 1 May 1943.
2. Combined Operating Signals, FM 24-11, FM 24-12 and FM 24-13 - worldwide on 1 September 1943 except, however, that when the Combined Operating Signals are prescribed for combined use within a particular area prior to such date, they shall become effective also for joint and intra-Army use within the same area on the same date.
3. Combined Radiotelephone (R/T) Procedure, FM 24-9 - in effect as of 15 April 1943.
4. Combined Teletypewriter Procedure, FM 24-8 - within the continental United States (excluding Alaska) on 15 July 1943; elsewhere at the discretion of the senior United States officer concerned, but not later than 1 January 1944.
5. Combined Visual Signalling (V/S) Procedure, FM 24-22 and FM 24-23 - as determined by area commanders. It shall become effective worldwide, however, on 1 January 1944.

It is expected that the effective date schedule of the various procedures for combined use will be announced soon.

The following definitions, prescribed by the Combined Communications Board, may be of assistance in explaining the terms used above:

1. INTRA-SERVICE:--Within, and only within, a particular service of one nation.
2. JOINT:--Between all of the services of one nation, but not necessarily within the services of that nation.
3. COMBINED:--Between all of the services of one nation and all of the services of another nation, but not necessarily within a particular service of either nation or between the services of either nation.
4. LIMITED COMBINED:--Between one or more of the services of one nation and one or more of the services of another nation, but not between all of the services of one nation and all of the services of another nation, and not necessarily within a particular service of either nation or between the services of either nation.
5. UNIVERSAL:--Both between and within each and every service of the United States and the British Commonwealth, wherever located.

CONTROL UNITS IN SC FIELD INSTALLATIONS

Modern mechanized war with its gigantic problem of supply places a heavy strain upon the commander of a Technical Service in the Army Service Forces. More than ever before he is concerned with the mobilization of the nation's economic, industrial and human resources and their speedy conversion into an effective military machine for waging total war. Faced with the necessity of continuously making sound decisions and acting quickly on the basis of information at hand, he seeks every available means to extend his capacity to direct and control the activities of his command. He relies heavily on a trained and capable staff to which he delegates many important duties. The responsibility of command cannot be delegated; they rest with the commander alone.

He must determine the basic policy and organizational structure, must exercise staff supervision, must evaluate the effectiveness with which his plans and orders are being executed and must be fully informed as to the progress and status of activities under his command. He is responsible for the use of simple and direct, but effective, procedures throughout his organization and must determine potential sources of difficulties and corrective action. He must be prepared to do all of these things, continuously and simultaneously, and at the same time maintain a constant followup to see that his policies and directives are carried out. Finally he must accept complete responsibility for the success or failure of his organization.

Thus, even in a small and compact organization, the task of the commander is not easy, and as the organization grows in size and complexity the burden becomes increasingly great until it finally becomes necessary for the commander to enlarge his capacity by adopting the principle of "Control," i.e., the principle of using specialists, working closely with him and reflecting his attitude and policies, to do what he wishes and what he himself would do if time permitted.

Needless to say, it is to the self interest of all concerned to cooperate with the control officers to the end that the commander may be fully informed and that his policies will be reflected promptly throughout the organization. Actually, a Control Unit does not control anything in the sense that the word "control" is ordinarily used. Control officers have no command authority. Their influence is obtained through knowledge of policies and over-all requirements gained as a result of their position in the organization.

If properly used, the mechanism of control acts as a communication system through which the wisdom and judgment of the commander is made available to subordinate units, while in turn their suggestions, experience and difficulties are made known to him. The mechanism of control strives to keep a spotlight focused on each of the various organizations and activities under the control of the commanding officer; to provide an illuminated relief map of a constantly changing, complex situation, with the progress and deficiencies clearly depicted.

It acts as a lubricant to keep operations working smoothly with a minimum of friction. It expedites, coordinates, unifies -- strives for maximum efficiency. It tries to become a part of the commander himself to increase his capacity and effectiveness.

The Control Division in the Office of the Chief Signal Officer was formally established during the latter half of 1941. In addition to performing its own functions of control, it has encouraged the use of control units, or officers, in the larger and more complex organization units of the OCSigO and of field installations under the command and control of the Chief Signal Officer. There are at present three Control Units in the Signal Supply Services, OCSigO, and twenty-three control units in the various field installations under the control of the Chief Signal Officer. These control units are usually called either "Control Units," "Control Officer" or "Control Branch," but various other names are used, such as Coordination Branch or Section, Development and Planning Section, etc.

NEW YORK OFFICE FOR COMMUNICATIONS SECURITY BRANCH

The New York Field Office of the Communications Security Branch, Army Communications Section , was activated 7 June 1943. It is a Class IV Installation, located at 50 Broadway, New York City. The Officer in Charge reports to the Chief Signal Officer, through the Chief, Communications Security Branch, Army Communications Section. The administrative functions of the office are performed by the Army Communications Commercial Agency.

This office was established to perform communications security measures charged to the Chief Signal Officer by the Commanding General, Army Service Forces, and the security functions promulgated by the War Department Traffic Security Board which pertain to commercial communication carriers.

MILITARY ORGANIZATION

Under authority contained in War Department letter dated 22 May 1943, Fort Dix was discontinued as a staging area, effective 1 June 1943 and placed under the control of the Commanding General, Second Service Command.

The 289th Signal Company, signal element of the 4th Engineer Special Brigade, Camp Edwards, Mass., is being reorganized with an authorized strength of six officers, one warrant officer and 122 enlisted men. Extended field service with the Engineer Amphibian Command is scheduled.

The 136th Signal Radio Intelligence Company at Bolling Field, D. C., is being reorganized on the basis of one headquarters platoon and six operating platoons.

The 705th Signal Aircraft Warning Company is being reorganized by the Commanding General, Third Air Force, with an authorized strength of eight officers, three warrant officers, and 131 enlisted men, including two officers and 11 enlisted men, attached medical.

The 671st Signal Aircraft Warning Company was reorganized 10 June 1943 with an authorized strength of 23 officers, five warrant officers and 359 enlisted men, including two officers and 11 enlisted men, attached medical.

The Commanding General, Third Air Force, is reorganizing the 583rd Signal Aircraft Warning Battalion (less all reporting companies), under a War Department directive dated 27 May 1943. The same authority is organizing Signal Aircraft Warning Detachment No. 25, with an authorized strength of four officers, one warrant officer and 66 enlisted men.

Assigned to the I Troop Carrier Command, Headquarters and Headquarters Squads have been activated for the 60th Troop Carrier Wing, Sedalia Army Air Field, Warrensburg, Mo., and the 61st Troop Carrier Wing, Pope Field, Fort Bragg, N. C.

ACTIVATIONS

Organization	Place	Date
990th Signal Port Service Company	Ft. Dix, N. J.	15 July
987th Signal Operation Co. (Special)	Camp Crowder, Mo.	1 June
1104th Signal Company, Service Group	Columbia (S.C.) Army Air Base	15 May
767th Signal Aircraft Warning Co.	Drew Field, Fla.	20 May
349th Signal Co., Wing	Pinedale, Calif.	1 June
350th Signal Co., Wing	Pinedale, Calif.	1 June
1351st Signal Co., Wing	Pinedale, Calif.	1 June

Cont'd Organization	Place	Date
1352nd Signal Co., Wing	Pinedale, Calif.	1 June
1353rd Signal Co., Wing	Pinedale, Calif.	1 June
1354th Signal Co., Wing	Pinedale, Calif.	1 June
1355th Signal Co., Wing	Pinedale, Calif.	1 June
1356th Signal Co., Wing	Pinedale, Calif.	1 June
1357th Signal Co., Wing	Pinedale, Calif.	1 July
1358th Signal Co., Wing	Pinedale, Calif.	1 July
1359th Signal Co., Wing	Pinedale, Calif.	1 July
1360th Signal Co., Wing	Pinedale, Calif.	1 July
39th Army Air Forces Signal Storage Depot	Philadelphia, Pa.	5 June
934th Signal Battalion (Air Support Command)	Birmingham (Ala.) Army Air Base	15 June

PERMANENT CHANGES OF STATION

Organization	From	To
145th Signal Armored Co.	Camp Cooke, Calif.	Pine Camp, N. Y.
85th Signal Co.	Camp Shelby, Miss.	Camp Young, Calif.
28th Signal Co.	Camp Gordon Johnston, Florida	Camp Pickett, Va.
93rd Signal Co.	Fort Huachuca, Ariz.	Camp Young, Calif.
79th Signal Co.	Camp Blanding, Fla.	Camp Forrest, Tenn.
81st Signal Co.	Camp Rucker, Ala.	Camp Atterbury, Ind.
219th Signal Depot Co.	Camp McCain, Miss.	Camp Young, Calif.
93rd Signal Battalion	Camp Crowder, Mo.	Camp Young, Calif.
294th Signal Co. (Special)	Fort Pierce, Fla.	Camp Pickett, Va.
420th Signal Co., Avn. (Less Rad. Int. Plat.)	Fort George Wright, Washington	Colorado Springs, Colo.

TEMPORARY CHANGES OF STATION

Organization	From	To
80th Signal Co.	Camp Forrest, Tenn.	Tennessee Maneuver Area
83rd Signal Co.	Camp Atterbury, Ind.	Tennessee Maneuver Area
150th Signal Armored Co.	Fort Benning, Ga.	Tennessee Maneuver Area
*31st Signal Co.	Camp Shelby, Miss.	Louisiana Maneuver Area
*88th Signal Co.	Camp Gruber, Okla.	Louisiana Maneuver Area
*95th Signal Co.	Fort Sam Houston, Tex.	Louisiana Maneuver Area
1st Prov.Sig.Serv. Det.	Fort Monmouth, N. J.	Lebanon, Tenn.
2d Prov.Sig.Serv. Det.	Fort Monmouth, N. J.	Camp Polk, La.

*NOTE:--Upon conclusion of maneuvers, these units will be ordered to new permanent stations.

ARMY PICTORIAL

TRAINING FILM DISTRIBUTION CONFERENCE

A conference concerning training film distribution was recently conducted at Toledo, Ohio, by the Chief of the Army Pictorial Service. Representatives of training and signal branches of each service command were present to discuss recommendations presented.

Recommendations presented by Brig. Gen. W. H. Harrison were:

1. That the Film Distribution and Utilization Branch, Army Pictorial Service, be re-designated as the Film Distribution Branch. (Since accomplished.)

2. That the Film Distribution Branch develop operating procedures for the distribution and maintenance of finished films and projection equipment and exercise staff supervision of the performance of operations involved.

3. That a film distribution agency be activated in the Signal Corps Photographic Center. (The agency will be in operation July 1, 1943.)

4. That a digest of one hundred and fifty to two hundred and fifty words be made of each usable training film and that in the future when a scenario is submitted, it be accompanied by a like digest.

5. That authority to establish and abolish film libraries be decentralized to Service Commands.

6. That each central and sub-library have sufficient building space to properly house all necessary equipment and functions.

7. That all film libraries be located convenient to using units.

8. That provision be made at each film library for the storage and projection of all confidential and secret films.

9. That initial distribution of training films and film bulletins be handled through requisition.

10. That each central library use the master and the monthly booking sheets and related forms in the interest of efficiency and that those sub-libraries servicing an appreciable number of off-the-post groups also use this system.

11. That each sub-library doing hourly booking adopt a simplified version of the booking system.

12. That service commands obtain information called for on the monthly film library report form from central and sub-libraries covering films, equipment and library personnel.

13. That there be only one sub-library on each post, unless circumstances dictate that the distribution and use of training films can be handled more efficiently through the establishment of auxiliaries.

14. That the operation of sub-libraries be supervised and assisted by the central libraries.

15. That distribution of film strips be handled by central libraries through requisitions.

16. That a program of preventive maintenance and repair be established by which projection equipment will be operated and handled correctly, inspected thoroughly and serviced promptly.

All recommendations were approved, a number have already been carried out and the rest are in process.

REVISION OF FIELD MANUAL FM 21-7

The Film Distribution Branch of the Army Pictorial Service is in the process of revising this manual which is a discourse on available films and effective measures of distribution and utilization of film visual aids.

The manual is being completely rewritten and it will conform to the suggestions which were sent in by G-3 and S-3 officers of each service command.

This manual will be dated July 1, 1943, and it will contain all material which is approved as of this date.

FIELD WIRE BOOM EQUIPMENT SUBJECT OF NEW FILM

The Signal Corps has again taken time out from the task of preparing Training Films for other arms and services to produce another film for its own use, which is an outstanding contribution to the present list of training films and one which demonstrates a new technique in teaching through the medium of film.

The film is TF 11-1159, "Field Wire Boom Equipment," and has been recently approved for release. It shows the functioning of a boom operated by ropes and pulleys, from the end of which field wire is paid out either directly behind the truck or to one side of it, as the wire laying truck proceeds at a rapid rate of speed. Through the use of this boom, it is possible not only to lay the wire some distance off the side of the road, but it is also possible to clear obstacles along the road, such as fences, vehicles, and other obstruc-

tions. Further, this device makes it possible to pick up the wire after it has served its purpose without making it necessary for the two men to run behind the truck with pike poles to manipulate the wire.

The teaching technique used in this film is that of a sergeant, who has taken his squad through a complete course of instruction in the operation of this device. He has proceeded with his crew from his camp to some point along the road and then stopped the truck and ordered his students to proceed with the erection and operation of the boom equipment without any assistance from him and with the direction that they explain to him each step in its erection and operation.

SELECTED TRAINING FILMS DISTRIBUTED DURING APRIL, MAY, AND JUNE

The following is a list of films particularly applicable to Signal Corps training, which were distributed during April, May and June:

T.F. No.	Title	Running Time
1-717	The Squadron Communications Officer	22 min.
1-771	Preflight Radio Inspection of Fighter Aircraft	15 min.
9-1001	Hydramatic Transmission - Part I - Theory and Principles of Operation, Fluid Coupling and Gear Train	26 min.
10-1134	The Army Cook - Part II - Cutting a Hindquarter of Beef	14 min.
10-1135	The Army Cook - Part III - Cutting a Forequarter of Beef	17 min.
10-1136	The Army Cook - Part IV - Cutting Lamb	14 min.
10-1138	The Army Cook - Part VI - Cooking and Carving of Meat	20 min.
11-1069	Pole Line Construction - Part IV - Fundamentals of Guying	10 min.
11-1071	Pole Line Construction - Part VI - Installation of Guys	10 min.
55-1119	Military Stevedoring - Part VI - Vehicle Loading and Stowing	16 min.
7-1100	Rifle Marksmanship with the M1 Rifle, Preparatory Training, Part V - Elevation and Windage	32 min.

T.F. No.	Title	Running Time
11-1082	Oscilloscope Target Interpretation	13 min.
11-1088	Pole Line Construction - Part VII - Stringing Open Wires	18 min.
21-1019	Crack that Tank	14 min.
21-1029	On Your Own	16 min.

ROOKIE LINEMEN MADE POLE CONSCIOUS

Telephone line construction men, civil and military, are tough and they don't knock off for the storm or battle. The film series "Pole Line Construction" speeds up the training of these very essential specialists in the Signal Corps. These seven films, which are Signal Corps productions, will be effective in teaching the proper method of erecting poles, installing cross-arms, anchoring, guying and stringing open wire. A brief resume of the subject matter in each film follows:

TF 11-951 Part I - Erecting Telephone Poles - Illustrates methods and equipment used in loading poles on vehicles, staking pole locations, digging holes and setting poles.

TF 11-952 Part II - Installation of Crossarms - Portrays the Operations involved in the installation of cross-arms by the lineman.

TF 11-968 Part III - Installation of Special Crossarms - Conveys a clear impression to the student of the use and function of special crossarms.

TF 11-1069 Part IV - Fundamentals of Guying - Demonstrates the chart methods of determining the side pull on a pole and the correct method of guying to take care of this pull.

TF 11-1070 Part V - Installation of Anchors - Shows procedure of buoying anchors, including the expanding plate and log type of anchor.

TF 11-1071 Part VI - Installation of Guys - Demonstrates the correct method of installing guy wire between the attachment on the pole and the anchor in the ground.

TF 11-1088 Part VII - Stringing Open Wire - Illustrates procedure in pulling, sagging, tying and splicing open wire.

MILITARY PERSONNEL

WEARING OF CAMPAIGN MEDALS

Many inquiries have been received by Military Personnel Branch, Office of the Chief Signal Officer, on this subject. The Special Studies Sub-Section of Military Personnel Branch, according to information secured from the Decorations and Awards Branch, Personnel Division, The Adjutant General's Office, has compiled all of the available data concerning the authorization for the wearing of campaign medals and service ribbons for the current war and furnishes the following interpretation of the various War Department Circulars and regulations for the benefit of Signal Corps military personnel:

American Defense Service Medal

Information pertinent to the American Defense Service Medal will be found in War Department Circular 44, dated 13 February 1943 and War Department Circular 123, dated 25 April 1943. Paragraph 1-3 of War Department Circular 44 reads: "Service Required - The Secretary of War has authorized the issuance of American Defense Service Medals to military personnel for honorable service by those who entered upon a period of active Federal Service of twelve months or longer and who in the discharge of such service served at any time between 8 September 1939 and 7 December 1941, both dates inclusive." The interpretation of this Circular has produced a great deal of controversy. However, if any officer entered upon active duty, with the intention of serving twelve months or longer, between 8 September 1939 and 7 December 1941, he is eligible for the American Defense Service Medal. If, on the other hand, his active duty orders were for less than twelve months and he intended to revert to civilian status at the end of such temporary duty, he is not entitled to wear this medal. At present, no bronze stars have been authorized to be worn on the American Defense Service Medal. Paragraph II-1 of War Department Circular 123, dated 25 April 1942, rescinds that portion of Circular 44 which authorized the award of bronze stars to be worn on the suspension ribbon of the American Defense Service Medal.

Campaign Medals

Location of Theaters: War Department Circular 1, dated 1 January 1943, describes the extent of the boundaries and also has a map showing these boundaries which divide the world into three theaters for which the War Department issues campaign medals for the current war. These three theaters are: American, European-African-Middle Eastern, and Asiatic-Pacific.

Eligibility for Campaign Medals: War Department Circular 68, dated 8 March 1943, is interpreted as follows regarding eligibility for campaign medals of the current war: An individual is entitled to wear the pertinent service ribbon upon his arrival in a theater under competent orders. No person

who is en route in a passenger status will be eligible for an appropriate service ribbon unless, while in this status, he or she is involved in an operation with the enemy which is later designated in War Department general orders as a campaign or engagement entitling participants to wear a bronze star. In other words, you can not get a campaign medal for merely travelling over any of the theater boundaries.

Number of Service Ribbons Authorized: No more than one service ribbon representing service in any theater will be worn regardless of the number of periods of duty therein.

Service Chevrons and Wound Stripes: No service chevrons or wound stripes have been authorized to date for the current war. Additional information on the separate Campaign Medals is as follows:

American Campaign Medal

This medal is not authorized for any duty within the continental limits of the United States at the present time, but can be worn by individuals under orders in any other stations within the area specified as the American Theater in War Department Circular 1, dated 1 January 1943. According to the provisions of the Executive Order, only personnel who have served outside the continental limits of the United States may wear the American Theater ribbon. Official duty in vessels or aircraft in or above ocean waters, except while in a passenger status, or on a training flight, trip, voyage, or maneuvers, is considered as service outside the continental United States, even though such vessels or aircraft may have been based within the continental United States. No bronze stars have been authorized for the American Campaign Medal, as no major engagements in this theater have as yet been designated by the War Department.

European-African-Middle Eastern Campaign Medal

No bronze stars have been authorized to be worn on the European-African-Middle Eastern Campaign Medal for major engagements in that theater, up to the present time.

Asiatic-Pacific Campaign Medal

A bronze star can be worn on the Asiatic-Pacific Campaign Medal for engagements in the Philippine Islands, only, according to present regulations.

How to Secure Authorizations for Wearing Service Ribbons

A letter similar to the following will be prepared by the Commanding Officer concerned for each officer in the Office of the Chief Signal Officer authorized to wear a campaign medal for the current war and like letters will continue to be issued when any military personnel in the Office of the Chief Signal Officer qualifies.

(Sample Form)

To: Captain John C. Doe, Military Personnel Branch, Office of the Chief Signal Officer.

Subject: Authorization to _____.

John C. Doe, Captain, O-000000, is authorized under War Department Circular _____, dated _____, and Special Orders _____ dated _____ to wear the _____ _____.

For the Chief Signal Officer:

The original letter will be given to the officer concerned and a certified true copy will be forwarded to the Military Personnel Branch, Office of the Chief Signal Officer, attention: Placement and Promotions Section, for inclusion in the officer's 201 file and entry on WD-AGO-Form 66-1. Commanding officers in the field should authorize, preferably by a letter similar in form to the above, eligible officers when they are entitled to wear a particular service ribbon. A copy of this letter should be placed in the official files after the authorization has been entered upon WD-AGO-Form 66-1. The Adjutant General does not require a copy of this letter at this time, since an official check of all officers eligible to wear campaign medals will be made at the end of the war. However, there is no objection on the part of The Adjutant General to receiving copies of these letters and it is believed that having such letters on file would facilitate the work to be done in checking records after the war is over.

METHOD OF AUTHORIZING, REPORTING AND CONTROLLING PERSONNEL

War Department Circular No. 39 on this subject, dated 11 June 1943, from the Chief of Staff, establishes within the ASF a uniform system for authorizing, controlling, and reporting personnel strengths in summary and by categories. It covers both military and civilian personnel and will be placed in effect at once by the ASF within the continental United States. This directive presents a uniform system for issuing allotments in bulk to the Services. The ultimate result will be to allow the chiefs of services to sub-allot as they see fit.

A standard form, known as the Army Service Forces Personnel Control form, has been established to check the strength of units and to determine whether or not authorizations have been exceeded. These reports are to be submitted by the commanding generals concerned. The principles for the employment of both civilian and military personnel are set forth, the main point being that

no person with military status is to occupy a position which can be filled by an available civilian, limited service personnel, or WAAC personnel. Also that utilization of personnel to the greatest degree of effectiveness will be the rule to be followed.

The use of military and civilian personnel and methods of securing authorizations for additional personnel, or making available whatever personnel can be dispensed with, are noted, along with definitions of operating and non-operating personnel. Use of officer pools in the ASF for providing a source to certain chiefs of service from which to withdraw officers for the activation of new units and for overseas assignments is lined up. This fourteen-page Circular is the new handbook for War Department personnel regarding matters of authorizations and utilization of military and civilian personnel.

POLICY ON GRADES FOR ENLISTED STUDENTS

A directive was received from The Adjutant General setting forth the policy in regard to grades for enlisted students attending special service and technical schools. Enlisted men ordered as students in basic courses of instruction at special service schools of the Army Ground Forces and Army Service Forces, and technical schools of the Army Air Forces, will be ordered to pursue such instruction in the grade held and will not be promoted to a higher grade by reason thereof. Enlisted men ordered to pursue more advanced courses will be promoted to the grade of private, first class, unless a higher grade is currently held, in which case the higher grade will be retained. An enlisted man who has been promoted to PFC under this provision and fails an advanced course will be demoted to the grade of private. This policy becomes effective 1 July 1943 for the AGF and ASF, and 1 September 1943 for the AAF.

WAAC PERSONNEL WITH THE SIGNAL CORPS

A total of eighteen hundred and ninety-two WAAC's have been allotted for installations under the jurisdiction of the Chief Signal Officer. WAAC Headquarters is in favor of making this personnel available to the Signal Corps as soon as possible, in view of the fact that the technical duties as cryptographers, code clerks, radio operators and radio repairmen offer sufficient novelty to appeal to the auxiliaries and officers of the WAAC.

The girls who are to be on duty in Washington to replace enlisted men now performing duties of a secret and confidential nature are to be administered by a Service Group at the South Post, Fort Myer, where they will be housed and fed. This arrangement makes it possible for WAAC's on Signal Corps duty to be free from administrative work and is advantageous to the Signal Corps in that their special qualifications will be utilized to the fullest extent on the technical duties to which they are, or will be, assigned. Favorable reports have been received from Signal Corps installations where WAAC's are on duty, pointing to their efficiency, application to duty, and loyalty.

WAAC SIGNAL CORPS TRAINING PROGRAM

The Signal Corps needs ten hundred eighty enrollees in the WAAC Signal Corps Training Program so that these girls can replace enlisted men who are now performing technical Signal Corps duties of a non-tactical nature. All recruiting offices are cooperating in the drive and it is urged that Signal Corps personnel within the continental limits of the United States give as much word of mouth publicity and encouragement to the program as possible.

It is not the policy to divert Civil Service employees from their present duties or to recruit personnel employed by the telephone and telegraph companies. Women who are not now employed, who have just left school, who have the aptitude for Signal Corps work, and who can pass the WAAC physical test and the Army General Classification Test (with a score of 110) are the ones wanted. On the other hand, if certain Signal Corps Civil Service employees are bound to leave anyway to join one of the existing women's auxiliaries, they should be encouraged to join the WAAC's through this training program, so that their experience and knowledge of Signal Corps procedures and objectives can be utilized in their new assignments.

These girls are to take the places of radio operators, radio repairmen, teletypewriter operators, and switchboard installers. They will earn from $1020 to $1440 per annum during the training period of three to six months. When they have completed the training, they will be called to active duty with the WAAC, receive their basic military training, and be placed on communications duty according to their qualifications. Their chances for promotion in the WAAC are good. The opportunity to do unusual and exciting work is excellent. The service they will render their country in making available technically trained men for combat service will be of great value in the winning of the war.

TERMINATION OF APPOINTMENTS OF OCS GRADUATES

A means of terminating the appointments of those OCS graduates who show undesirable traits of character subsequent to their being commissioned has been required for some time. Negotiations with The Adjutant General have resulted in the establishment of a War Department policy whereby such appointments may be terminated under AR 605-10. An outline of this policy has been forwarded to the Commandant, Eastern Signal Corps School, and it is believed that this will assure a continuing outstanding performance on the part of OCS graduates, who will not be allowed tc deviate from the high standards set up by the Signal Corps.

PROCUREMENT OF SIGNAL CORPS OFFICERS FROM CIVILIAN LIFE

From now on, when the Signal Corps needs an officer with particular qualifications, the effort will be made to obtain him from among those already commissioned, or from some source other than civilian life, such as the

Army Specialized Training Program, R.O.T.C. graduates, and Officer Candidate School. The procurement objective from civil life has been reduced to fifty officers a month and may be cut down even more in the future. The emphasis now is on maximum utilization of present personnel, more effective classification and placement of officers now on duty, replacement of combat eligible officers by limited service personnel, WAAC's, or civilians, and training courses to qualify Signal Corps men for specific assignments.

OFFICER PROMOTIONS

The following promotions have occurred among Signal Corps personnel during the period from May 14, 1943, to June 17, 1943, inclusive:

Colonel to Brigadier General (Temporary)

Gardner, John H.
Reeder, William O.

Lieutenant Colonel to Colonel (Temporary)

Anderson, Pierson Anthony
Baker, Stuart Knight
Bicher, George Anthony
Cochran, Walter Bingham
Conlisk, Raimon Francis
Fitzgerald, Eugene Joseph
Haswell, Claude Eugene
Hill, Boyd Bradford
Sawyer, John Archibald
Stice, Kenneth S.
Susse, John Elton
Tatom, Louis J.
Thomas, Samuel M.

Major to Lieutenant Colonel (Temporary)

Atkinson, Robert Morris
Bayers, Donald Ries
Breeding, Charles Shannon
Brooke, Royal George
Brown, Carolus Adams
Carlock, Henry Arthur
Carter, George W.
Curtis, Clarence Edmund, Jr.
Daugherty, Cary Schemmel
Edwards, William Hopple
Evans, Charles William, Jr.
Feyereisen, Paul Alfred
Franzoni, Fred Royce, Jr.
Frederick, L. M.
Galbraith, William Jones
Hancock, Everett Adrian
Hertzberg, Robert Edward
Jacobson, Carl Arnold
Jarvis, George
Kelly, Burnis Mayo
Klingler, Charles David
Lefevre, Rex W.
Martin, George Lincoln
McCarthy, John Francis
McKermott, Thomas Charles
McKie, Robert Brenner
McKinney, Ralph D.
McRae, James Wilson
Miller, Harold Chester
Murray, Thomas John
Prout, Harry Willis
Riggs, Homer
Scofield, Herbert Lucian
Smith, George Ellsworth
Stephan, Audley Hobson Frederick
Taylor, Richard Lee, Jr.
Turner, Albert Burnton, Jr.
Warren, Victor Charles
Welsh, Stuart Marvin
Zak, Frederick Joseph

Captain to Major (Temporary)

Abramowitz, Reuben
Achard, Francis Hermann
Archer, Winthrop Downs, Jr.
Basinger, Charles Spurgeon
Batstone, John Kenneth
Beach, Arthur Raymond
Berendt, Elmore Frederick
Berhalter, Joseph John
Blank, Harold C.
Booth, George Henry
Boyd, Jesse Bernell
Boyd, Paul Wilmont
Boyer, Earl Eugene
Brearty, Charles Ross
Bridge, Robert Charles
Brubaker, Donald Gordon
Bruton, Carrol Turner
Bundy, Everett Oscar
Burglund, Wilfred Paul
Burrell, Matthew J.
Burt, John Butler
Cabrera, Charles Taylor, Jr.
Calkins, Delos Samuel
Carlisle, John Sloan
Caron, Bruce Wendell
Carroll, Horace Allen
Cash, Harvey, Jr.
Cera, John Carmel
Chamberlain, Clarence Newton
Chilton, Frank
Cline, Louis William
Congdon, William Holmes
Corsa, Lawrence Jerome
Crossman, Gilbert Cunningham
Damme, William Henry
Dansby, Robert Elliotte
Davis, Duane David
DeSonier, Harold Leo
Dillinger, Alphons Michael
Eckert, Clarence Carpenter
Ehrenburg, Otto
Fenn, Fred Hadley
Ferguson, Ernest Eugene
Foley, William John
Framme, Richard Joseph
Freeland, Herbert Augustus Thornton
Gardner, Felix
Garvey, Hewitt Blocksom
Gerken, William Fasolt
Gordon, Donald Roberts
Gorman, David Henry
Graham, Riley Alexander
Grant, Stuart
Graves, C. W., Jr.
Greer, Dewitt
Hall, William Henry
Howard, Chester Bernarr
Hudgins, James Willis
Jacks, Samuel T.
James, William Lyionel
Johnson, Luther Elman
Jones, Samuel Everett
Kent, Eugene Elihu
Kimball, Robert Elwood
King, Tommy E.
Kirby, William Milton
Knox, Harold Edwin
Kolman, Albert Julius
Kurth, Edward Harry
Leahy, William Aloysius
Lewin, Theodore Everett
Lines, Charles William
Little, Richard Roy
Livingston, Donald Benjamin
Lokey, Girard Alexander
Mathews, Frank Henry
Mauborgne, Benjamin Poore
McCarville, Andrew Joseph
McDonald, Earl
McKee, John Collins
Medbery, Edward Winslow
Melvin, George Edwin
Merle, Leo Vasserot, Jr.
Miller, Joseph
Montgomery, John Robert
Mullican, John Alfred
Murphy, Adrian Massey
Murray, Philip Freeman
Mussler, Louis Henry
Nelson, Vernon Jerome
Newton, Floyd Childs, Jr.
Niemann, Louis Hartmann
Ottinger, John Weikel
Perkins, Walter Edward
Pleasants, Joe Leonard
Post, Edgar August

Cont'd

Captain to Major (Temporary)

Pouzar, Emil James
Ramer, Luther Grimm
Raynor, Kenneth Cox
Reilly, William Clarence
Rhudy, James Tedd
Riley, Thomas Wise, Jr.
Rosenzweig, Jacob
Scace, William Buell
Schenck, Herbert Holtzclaw
Scott, Roy John
Scroggs, John Putnam
Seay, Homer Hoston, Jr.
Shelley, Sidney
Shuder, Russell Marshall
Sibert, Harold Wesley
Sloss, Allan Bradley
Smith, James Bradley
Snowden, Robert Fort
Stewart, James David
Stone, Charles Alby
Stout, John Bruce
Sullo, Erwin Edward
Tanner, Royal Kendrick
Taylor, Alfred Lindsay
Taylor, David Frank
Tebow, Eric T.
Thomas, Lewis Henry
Thomason, James Claude, Jr.
Thompson, John Curtis
Thorne, Robert William
Timberlake, John Jay
Treseder, Donald William
Tune, Cecil Loren
Van Dyck, James Brinson
Verner, Edward
Wade, Warren
Wallace, Edward Frederick
Walsh, Gregory James
Warren, James Alexander
West, Dan Claude
White, Lyman Gerard
Winkelman, George
Wittmus, Waldemar Albert
Wood, James Henry
Wright, Frank Harlow
Wright, Hozmer