No. 18

SIGNAL CORPS

TECHNICAL

INFORMATION LETTER

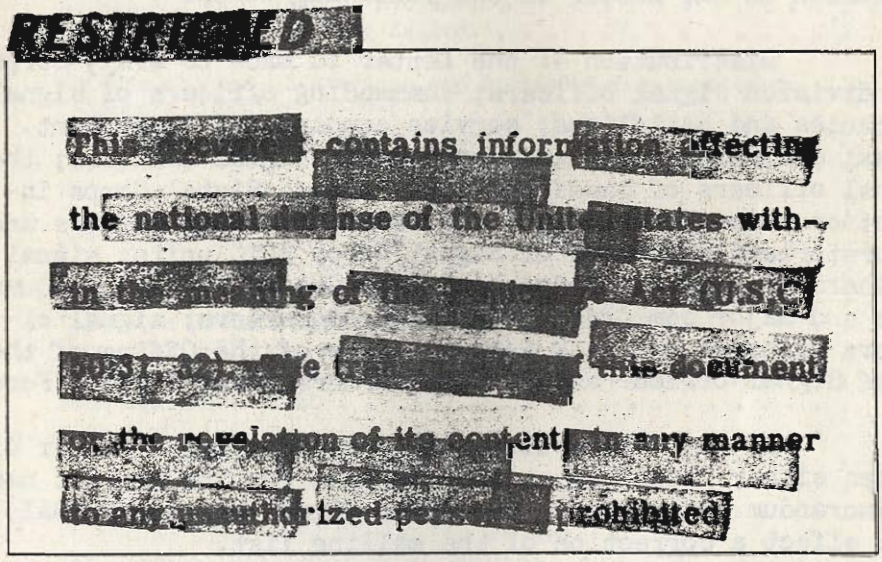
MAY · 1943

ARMY SERVICE FORCES · OFFICE OF THE CHIEF SIGNAL OFFICER

SIGNAL CORPS TECHNICAL

INFORMATION LETTER

Number 18 . . . May 1943



Classification canceled

by authority of The Chief Signal Officer

by W. M. Young
W. M. Young, Capt., S.C.

Date 15 Sept 43

WAR DEPARTMENT • ARMY SERVICE FORCES

OFFICE OF THE CHIEF SIGNAL OFFICER

EXECUTIVE OFFICE • SPECIAL ACTIVITIES BRANCH

SIGNAL CORPS TECHNICAL INFORMATION LETTER

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.

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 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; signal officers of bases and task forces; units of the Office of the Chief Signal Officer and of Headquarters, Army Service Forces.

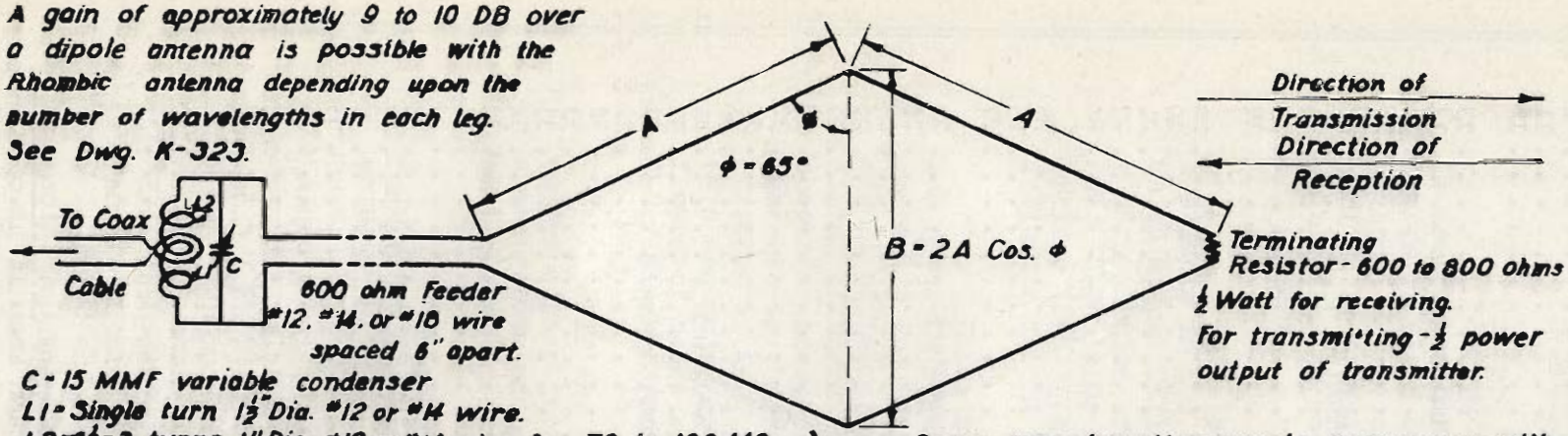
If any such activity is now receiving a number of copies either insufficient or excessive for its present needs, a memorandum addressed to the Chief Signal Officer (SPSAY) will effect a correction of the mailing list.

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.

24-27592

TABLE OF CONTENTS

A gain of approximately 9 to 10 DB over a dipole antenna is possible with the Rhombic antenna depending upon the number of wavelengths in each leg. See Dwg. K-323.



C - 15 MMF variable condenser
L1 - Single turn 1½" Dia. #12 or #14 wire.
L2 - 4½-3 turns 1" Dia. #12 or #14 wire for 70 to 100 MC.
L2 - 1½-2 turns 1" Dia. #12 or #14 wire for 100 to 156 MC.

Some experimenting may be necessary with L2 to provide a proper match at various frequences.

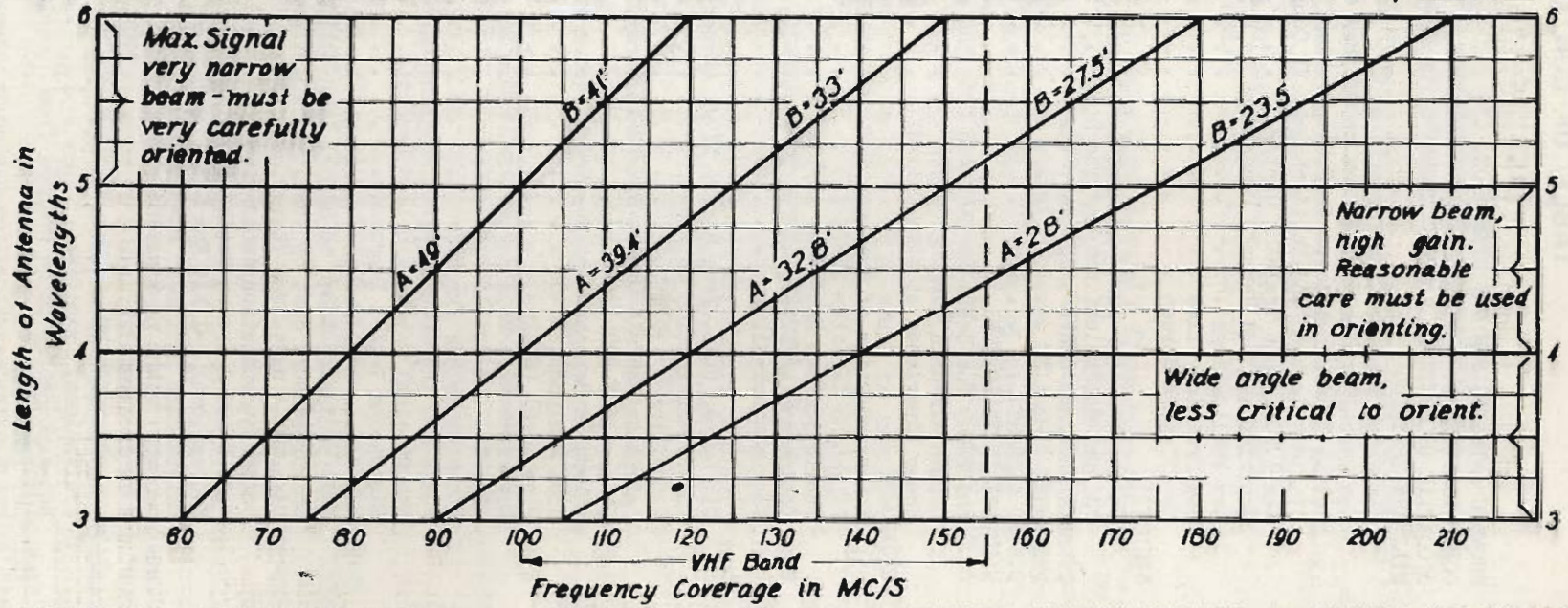


Fig. 3

VERTICAL RHOMBIC ANTENNA DESIGN CHART FOR VARIOUS FREQUENCIES & WIDTH OF BEAM

24-27592

VERTICAL RHOMBIC ANTENNAS FOR VHF OPERATION

Application - The use of directional antennas for V.H.F. point-to-point radio communication should be considered when one or more of the following conditions exist:

1. Transmission is along one axis only;
2. Increased range is required in one direction;
3. Back radiation is to be suppressed for security or interference elimination.

Military Requirements - The rhombic type of directional antenna, practical examples of which are illustrated in Figures 5 and 6, appears to be the most practical type of directional antenna satisfying the military requirements of:

1. High power gain and directivity;
2. Simple design for assembly;
3. Non-critical as to adjustment;
4. Extremely light in weight.

Characteristics - The rhombic, as generally used, is one of several types of directive antenna systems based upon non-resonant radiating elements. Such elements have the advantage of operating over a wide band of frequencies without readjustment and are, therefore, particularly desirable under conditions where numerous frequencies are to be employed. The rhombic antenna is made up of four non-resonant wires arranged in the form of a diamond or rhomboid. Radio frequency energy is fed into one end of the diamond by means of a balanced transmission line. The radiating wires are terminated at the other end by a non-inductive resistor equal to the characteristic impedance (600 to 800 ohms). This terminating resistor should be capable of dissipating approximately one half of the transmitter power output. For receiving, a 1/2 watt resistance is ample. The directional characteristic of the radiation from each leg is as shown in Figure 1. When the tilt angle has the optimum value (Figure 2), all

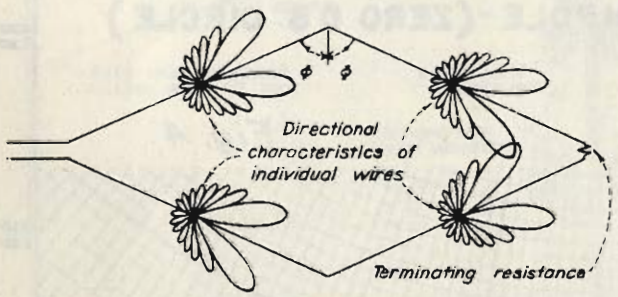


Fig. 1 - RHOMBIC ANTENNA

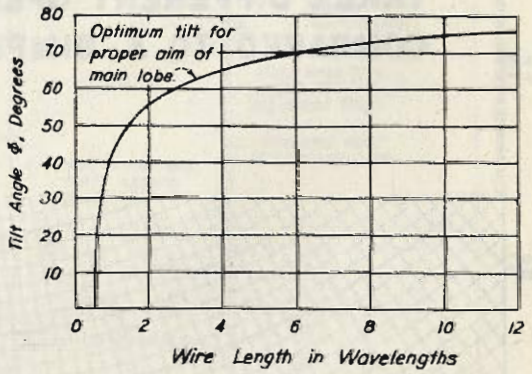
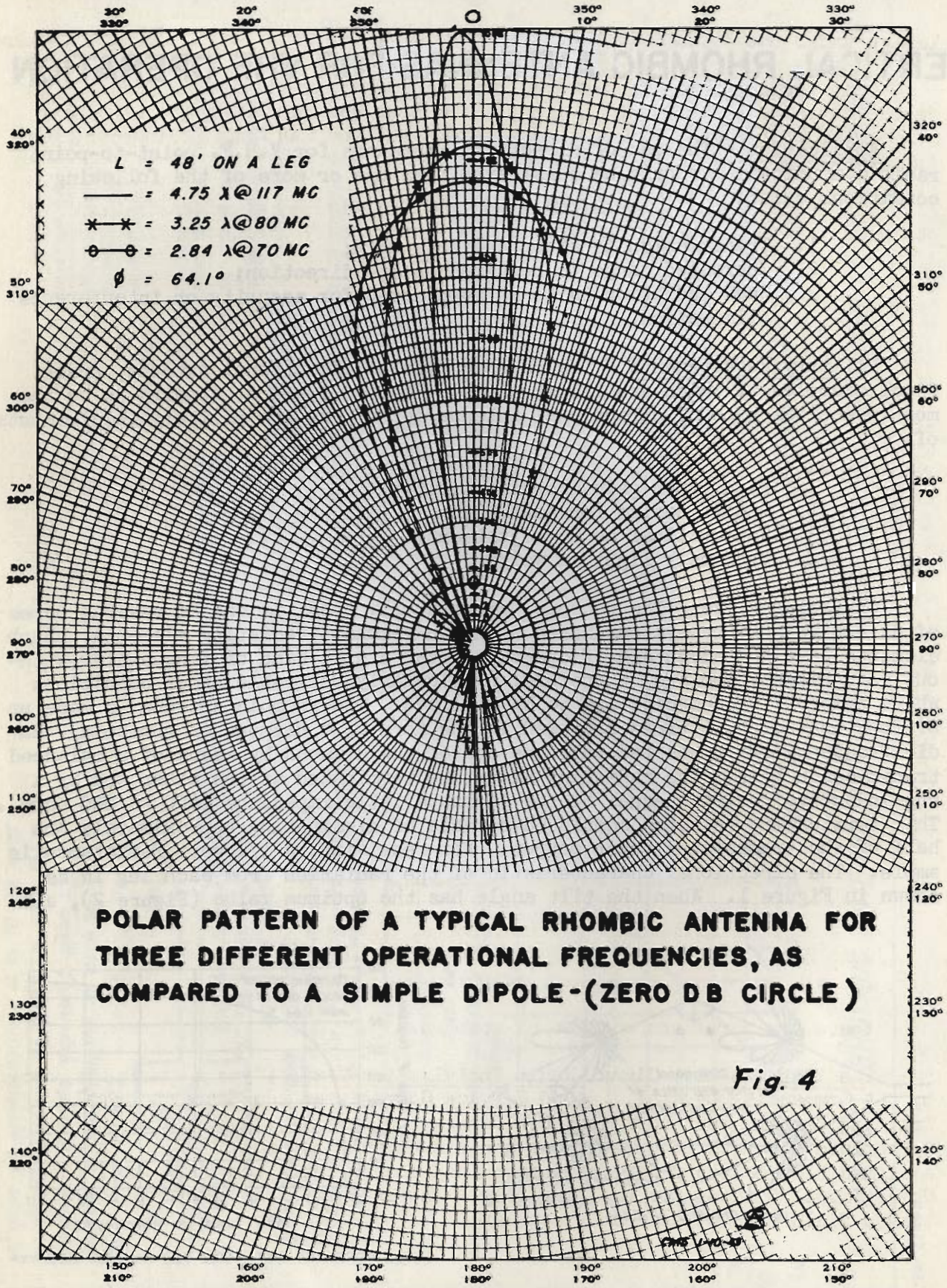


Fig. 2 - OPTIMUM TILT ANGLE FOR RHOMBIC ANTENNA



POLAR PATTERN OF A TYPICAL RHOMBIC ANTENNA FOR THREE DIFFERENT OPERATIONAL FREQUENCIES, AS COMPARED TO A SIMPLE DIPOLE-(ZERO DB CIRCLE)

Fig. 4

four legs have major lobes which add up in the direction of a line drawn through the apexes and the side lobes cancel out.

The directional characteristics of a rhombic antenna are not very greatly affected by a small deviation of tilt angle from that shown as optimum, provided each leg is longer than three wave lengths. The tilt angle is the angle made by the wires at the center with respect to the vertical. Consequently the rhombic can be used to great advantage over a considerable frequency range without adjustment. The dimensions given for the four rhombic antennas recommended (Figure 3) were designed for A=3 wavelengths at the minimum frequency of a particular band and a leg length of 4 wavelengths was used in determining the angle (65°), from which B=2 A (cos of the angle) = .84 A.

Construction and Installation - Figure 3 is very useful in selecting a rhombic antenna design for a particular frequency having the desired directivity and signal strength. The dimensions A and B for each of the four antennas are given and the number of wavelengths in each leg corresponding to a particular frequency can immediately be determined. The directivity and gain to be expected can then be determined by reference to the curves of Figure 4.

The polar patterns of Figure 4 represent the power gain measured on a typical rhombic antenna at various azimuths, and three different frequencies.

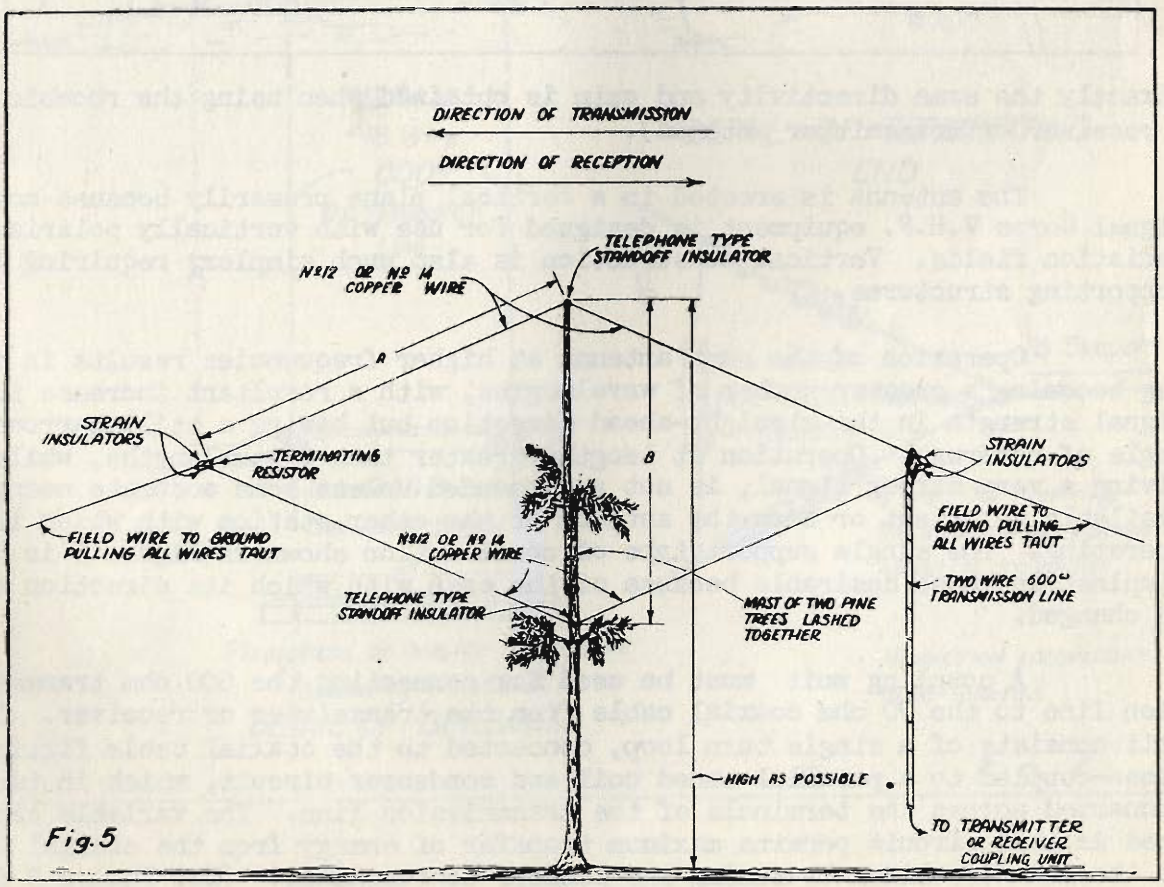


Fig.5

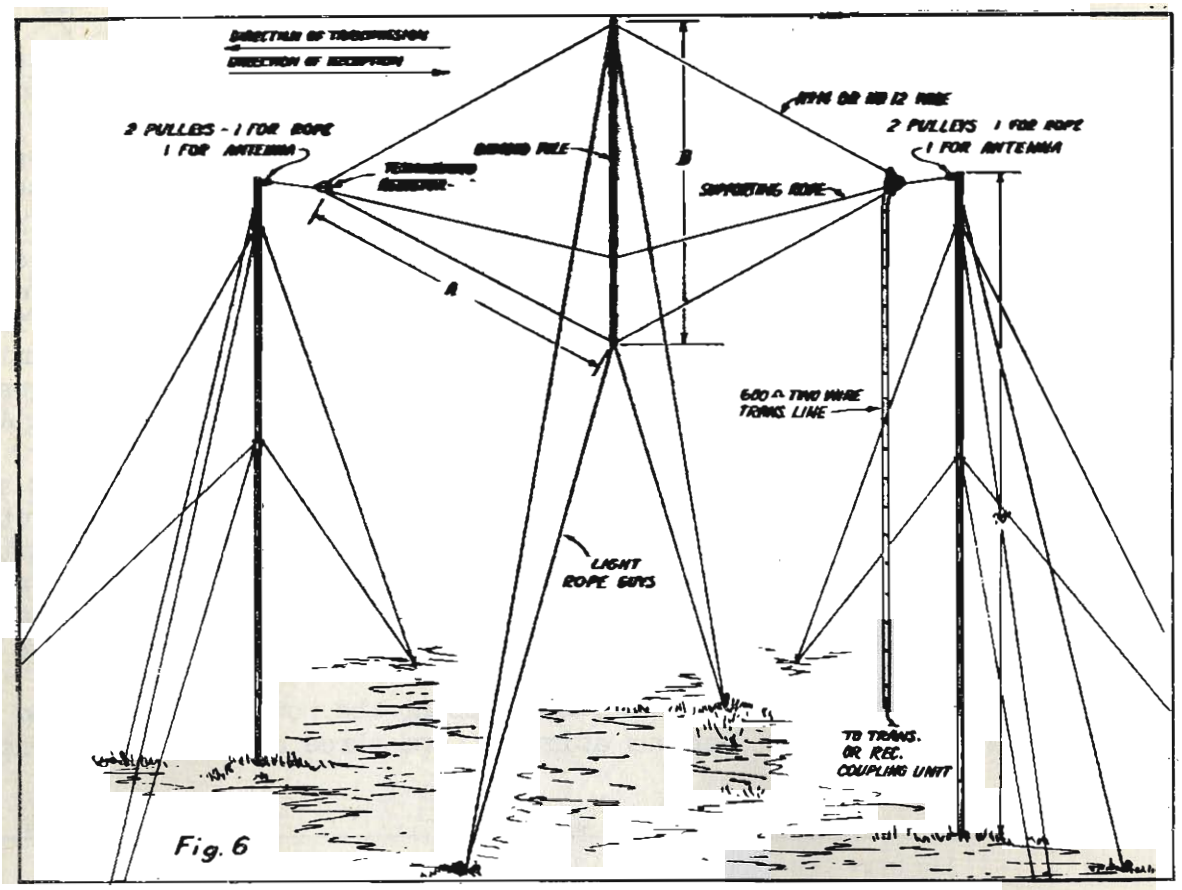


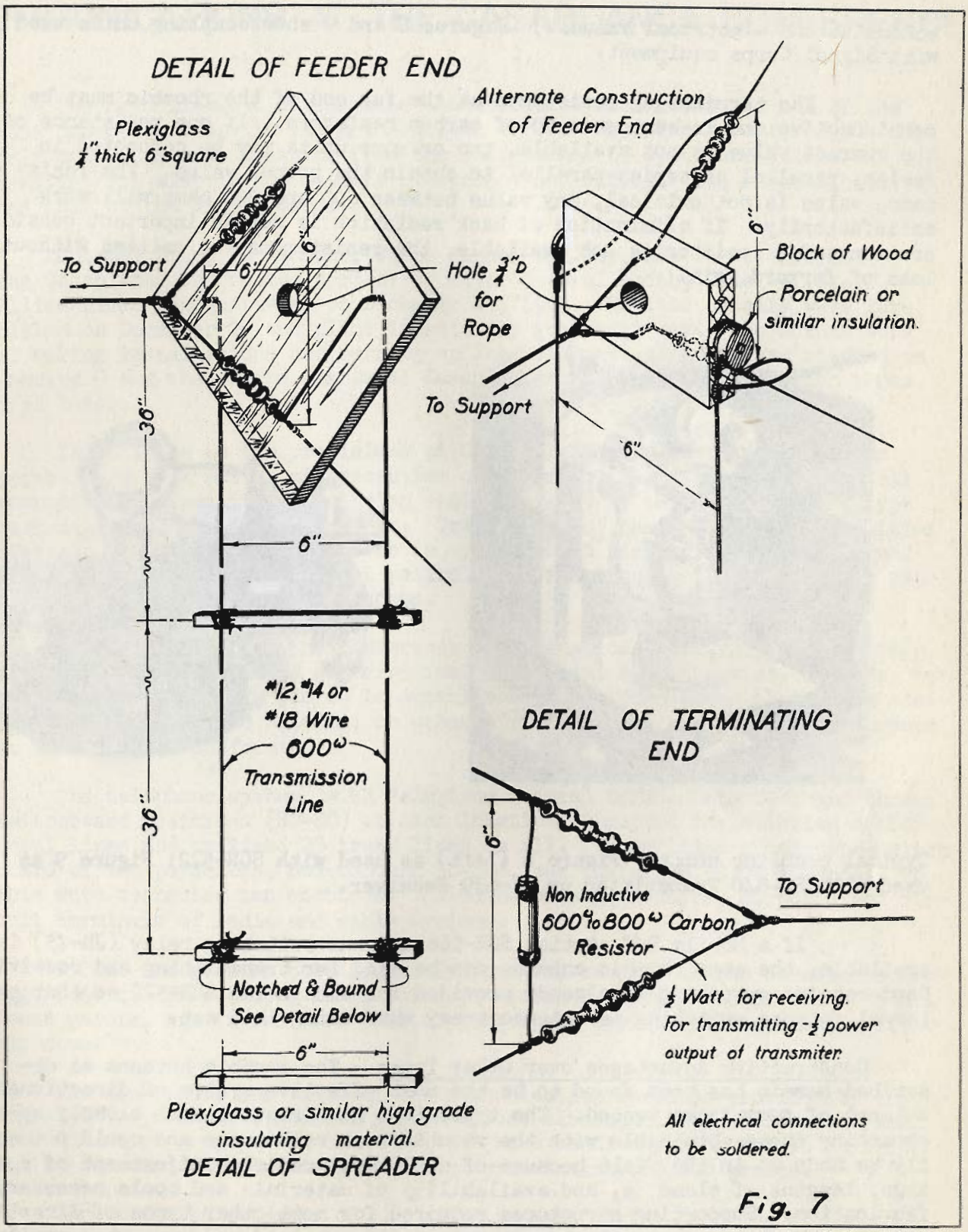
Fig. 6

(Exactly the same directivity and gain is obtained when using the rhombic as a receiver or transmitter antenna).

The antenna is erected in a vertical plane primarily because most Signal Corps V.H.F. equipment is designed for use with vertically polarized radiation fields. Vertical construction is also much simpler, requiring fewer supporting structures.

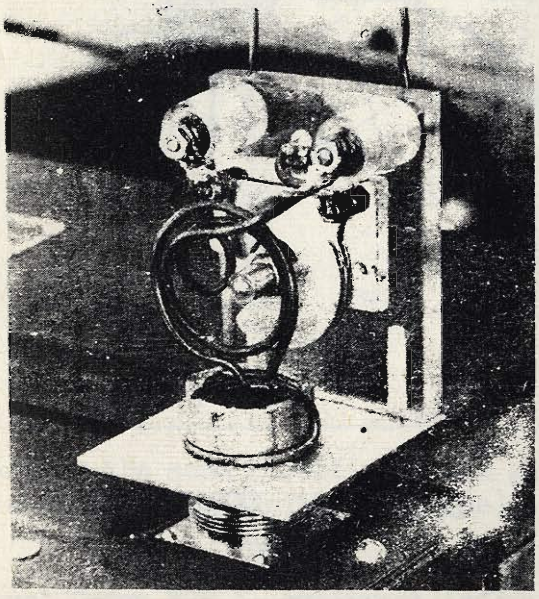
Operation of the same antenna at higher frequencies results in each leg becoming a greater number of wavelengths, with a resultant increase in signal strength in the straight-ahead direction but having a still narrower angle of coverage. Operation at lengths greater than 6 wavelengths, while giving a very strong signal, is not recommended unless some accurate means are available to orient or beam the antenna at the other station with which it is operating. The single support type of construction shown in Figure 5 is the simplest and most desirable because of the ease with which its direction can be changed.

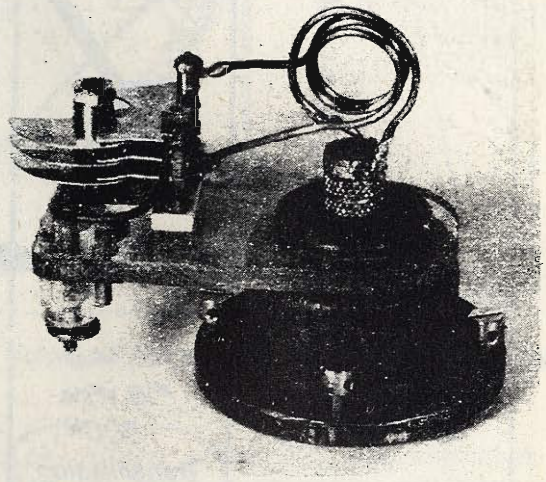
A coupling unit must be used for connecting the 600 ohm transmission line to the 70 ohm coaxial cable from the transmitter or receiver. This unit consists of a single turn loop, connected to the coaxial cable fitting close-coupled to a parallel tuned coil and condenser circuit, which in turn is connected across the terminals of the transmission line. The variable capacitor used in this circuit permits maximum transfer of energy from the coaxial line to the two-wire lines by tuning the feeders to resonance. (See Figure 3 for


DETAIL OF FEEDER END
Plexiglass
¼" thick 6" square
To Support
6"
6"
Hole ¼" D
for
Rope
Alternate Construction
of Feeder End
6"
Block of Wood
Porcelain or
similar insulation.
To Support
6"
30"
6"
#12, #14 or
#18 Wire
600Ω
Transmission
Line
30"
Notched & Bound
See Detail Below
6"
Plexiglass or similar high grade
insulating material.
DETAIL OF SPREADER
DETAIL OF TERMINATING
END
6"
Non Inductive
600Ω to 800Ω Carbon
Resistor
To Support
½ Watt for receiving.
For transmitting - ½ power
output of transmiter.
All electrical connections
to be soldered.
Fig. 7

schematic and electrical values.) Figures 8 and 9 show coupling units used with Signal Corps equipment.

The terminating resistance at the far end of the rhombic must be non-inductive and is best made up of carbon resistors. If one resistance of the correct value is not available, two or more units may be connected in series, parallel or series-parallel to obtain the proper value. The resistance value is not critical, any value between 600 and 800 ohms will work satisfactorily. If elimination of back radiation is not an important consideration and a resistor is not available, the resistor may be omitted without loss of forward gain.





Typical coupling units. Figure 8 (left) as used with SCR-522; Figure 9 as used with BC-640 Transmitter or BC-639 Receiver.

If a Mobile D/F station SCR-566 antenna switching relay (JB-45) is available, the same rhombic antenna can be used for transmitting and receiving. Send-receive switching is already provided for within the SCR-522 so that external antenna switching is not necessary when using this set.

Construction Advantages over Other Types - The rhombic antenna as described herein has been found to be the most effective system of directional antenna of many types tested. The types that gave results most closely approaching those obtainable with the rhombic were cumbersome and could not easily be made up in the field because of necessary precision adjustment of spacings, lengths of elements, and availability of materials and tools necessary for fabrication. Supporting structures required for most other types of directional arrays were also necessarily heavy, not easily obtained and even when available, the problems of mounting the arrays presented difficult mechanical problems.

COMMUNICATIONS AT THE CASABLANCA CONFERENCE

The establishment of adequate communication facilities was one of the most important steps in the preparations for the Casablanca Conference. Not only does this mean adequate from the standpoints of speed and volume of traffic, but also in the matters of secrecy and safety. The responsibility was that of the Signal Corps.

Colonel Elton F. Hammond, Corps Signal Officer, was first informed of the Casablanca Conference project by Major General Smith, Chief of Staff, Allied Field Headquarters, on December 27, 1942. Outline details were furnished on December 29 and plans immediately got under way. The actual work of making installations and setting up long distance circuits was started on January 7 and the entire system at Casablanca was ready for operation three days later.

In addition to the provisions at Casablanca, an alternate center was established as a matter of precaution at a remote inland point so that full communication facilities including radio, telephone, telegraph and teletype were available at either location. Preparation of these alternate facilities started January 10, and they were in operation on January 12. As it turned out, activities centered almost entirely in Casablanca and the alternate center served only incidental purposes.

The facilities for the Conference communications took fullest advantage of existing installations and circuits, commercial and otherwise, but many new or additional circuits had to be established. Included among these were additional radio links to Britain, to other African points and to parties enroute to and from the conference.

The telephone system, with Telephone Central Office Sets TC-1 and three switchboard positions (BD-80) at each location, included installation of 148 local lines and utilized 23 trunk lines in all. In addition a teletype switch board of two positions, Switchboard BD-100, was installed at Casablanca. To this were connected ten stations, including message centers, airports and circuit terminals of radio and cable systems.

By far the greater part of all traffic was handled at the Casablanca Message Center. Here, among other things, messenger service was provided to all local points, and it was here that cryptographic work on all American traffic was done.

The importance and value of the communication services provided by the Signal Corps cannot be judged by statistics, although it is of interest that some 450 cryptographed American messages were handled during the 16 days the facilities were in operation, totaling approximately 60,000 groups.

More definite evidence of the effectiveness of the handling of the communications problem is provided by the following quotation from a memorandum circulated by command of Major General Patton:

"The Commanding General desires to express his gratification to the personnel concerned, for the excellent manner in which signal communications were handled during the (Casablanca) conference.

"The President stated he thought communications had been handled in an excellent manner, and repeated expressions of satisfaction from other members attending the conference have resulted in letters of congratulations being received at this headquarters from Lieutenant General DWIGHT D. EISENHOWER and The Honorable ROBERT D. MURPHY, Chief Administrator."

It was also directed by General Patton that 34 individual commissioned and non-commissioned officers be commended for the invaluable services they rendered, and that this commendation be made a matter of official record.

STOCKPILE OF CRITICAL RADIO COMPONENTS FOR RESEARCH

Laboratories working on radio research for the Army or Navy hereafter will be able to get from a central stockpile, administered by the government, critical electronic components not quickly available in commercial channels, the WPB has announced. Administration of this central source of supply will be vested in the Electronic Research Supply Agency which was set up at the urgent request of the armed services, the Office of Scientific Research and Development, and WPB.

Laboratory orders are usually for small amounts which can be fitted only with difficulty into the schedules of manufacturers. Laboratories are therefore often forced to canvass many manufacturers and dealers to obtain swift delivery of small amounts of equipment which are holding up vital research projects. In addition, the Electronic Research Supply Agency will make it unnecessary for labs to build up their own complete stockpiles of components. Formerly many components used in research laboratories did not meet Army or Navy standards.

The new ERSA, operating without profit, is already established at 460 Fourth Avenue, New York City. Laboratories will, of course, not be compelled to place their purchase orders through the ERSA and should continue to use available sources to the fullest extent reserving the agency for the last resort, the WPB stressed. Approved laboratory orders which may be filled by ERSA can be placed directly with the agency or can be channeled to the agency through commercial distributors, it was pointed out.

A directive to the Agency issued by WPB Vice Chairman C. E. Wilson, provided that ERSA will not be required to accept orders for components on the basis of their ratings. Based on directions to be given by the Army, Navy, Office of Scientific Research and Development and WPB, the Agency itself will work out the sequence in which it will fill orders. In dealing with its own suppliers, ERSA will be assigned ratings by WPB or will extend the ratings to its customers. It is authorized to apply for priorities assistance or allotments on approved forms.

MILITARY TRAINING

EMERGENCY PONTONS FROM TARPAULINS

Officers taking the Motor Transport Course at Fort Monmouth, N. J., are trained to cope with the many tough problems which they are bound to encounter under actual field conditions. Typical of these difficult operations are stream-crossings, which call for resourcefulness and swift, decisive action.

FRAMEWORK BEING CONSTRUCTED FOR A ½-TON 4 X 4 TRUCK

One method of stream-crossing involves the use of pontons which are constructed only from material available in the field. In the case illustrated, the materials are rope, wood saplings, logs, and tarpaulins from the standard 2½-ton, 6 x 6 trucks.

This procedure takes much more time than is required when stream-crossing material used by the Corps of Engineers is available. However, it does serve to illustrate the basic principles of flotation, thus acquainting Signal Corps personnel with the problems of the Corps of Engineers and developing further cooperation between the two arms.

As a preliminary to this problem, the class receives instruction in the

use of knots and rigging. Such knowledge is of benefit to anyone engaged in motor transport activities, particularly in the handling of cargoes.

In the case of lighter vehicles and equipment, such as the ¼-ton, 4 x 4 truck, it is much easier and more practicable to wrap the vehicles in tarpaulins of suitable size and float them as a unit. This method is also used and demonstrated in the training of motor transport officers in this school.

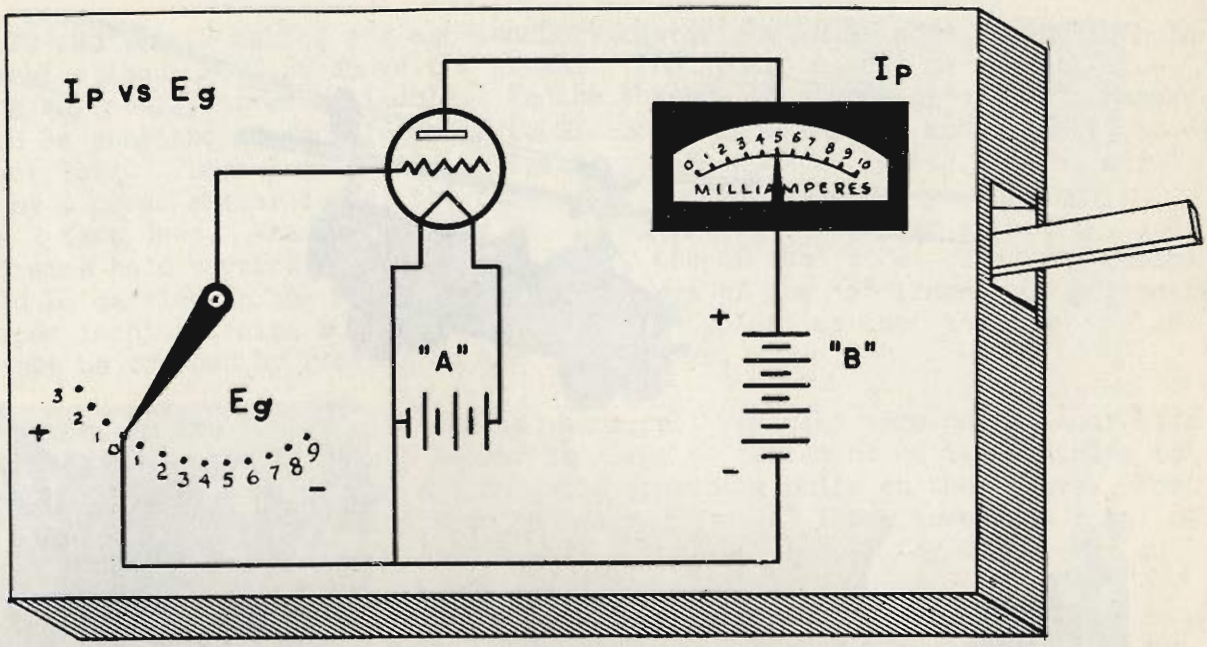
ACTUAL FERRYING OF VEHICLE ACROSS STREAM

NEW VISUAL TRAINING AIDS USED BY OFFICER CANDIDATE SCHOOL

The Signal Corps Officer Candidate School at Fort Monmouth, N. J., has in the past four months considerably expanded the use of visual training aids. The duty of preparing such aids has been consolidated in the Reference Section of the school. In this work, extensive use is made of various processes, including photostating, photographing, hand drawing, and handicrafting with wood and other materials.

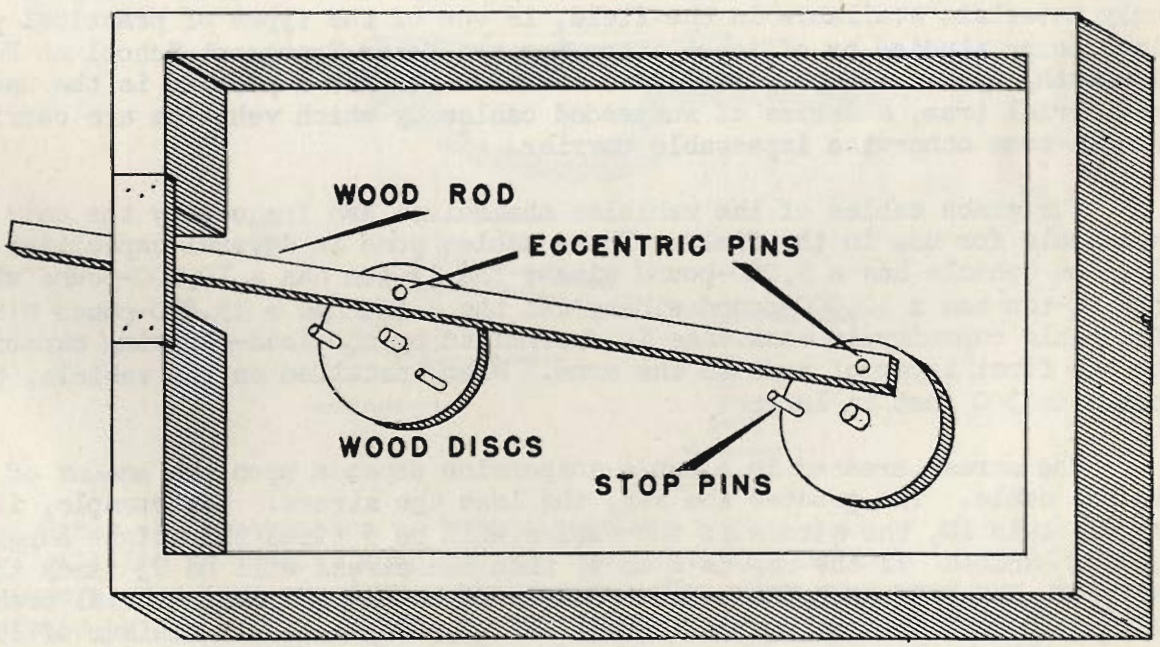
Experience has proved that large photographic prints of small mechanisms (such as the Vernier) can be used very effectively for classroom demonstrations. For example, in teaching the technique of the Converter M209-A, photographs of the open device, 30 by 40 inches in size, are utilized. The instructor thus can point out pertinent features which the candidates then examine on the converters themselves.

One of the most effective aids is the one illustrated here, which is used to demonstrate the relationship between plate current and the grid voltage in the triode vacuum-tube circuit. This unit consists of a board on the front side of which appear the various symbols representing batteries, meter, vacuum tube, and grid-voltage divider, as shown in the accompanying front view drawing. The grid-voltage indicator and the pointer on the meter are actually arms on pivots which extend through to the two disks shown in the rear view drawing.

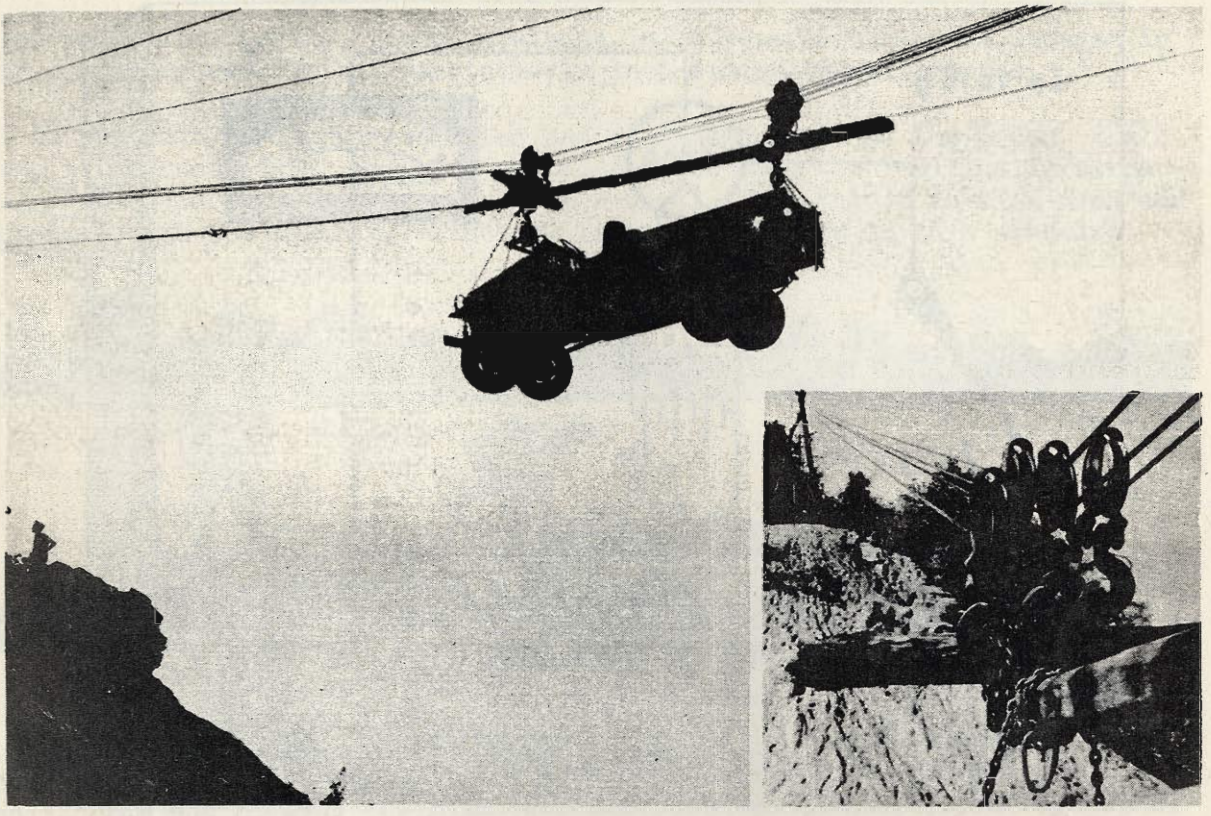


FRONT VIEW

This rear view drawing shows the mechanical assembly which consists of the disks which actuate the grid-voltage indicator and meter pointer. These, in turn, are actuated by the wood rod extending out through one end of the assembly. As the rod is pushed in as far as it will go, the grid-voltage indicator swings in a negative direction and, at the same time, the pointer on the milliammeter moves toward zero. Then as the wood rod is pulled out as far as possible, both indicators swing in unison to the opposite extremes of their scales.



REAR VIEW



AERIAL TRAM CONSTRUCTED AS FIELD PROBLEM

The transportation of vehicles across canyons or swift streams, using only materials available in the field, is one of the types of practical problems being studied by officers attending the Motor Transport School at Fort Monmouth, N. J. The only effective solution to such a problem is the use of the aerial tram, a series of suspended cables by which vehicles are carried across some otherwise impassable barrier.

The winch cables of the vehicles themselves are frequently the only ones available for use in the field. These cables come in several capacities. The 3/4-ton vehicle has a 5,000-pound winch; the 1½-ton has a 10,000-pound winch; the 2½-ton has a 10,000-pound winch; and the 4-ton has a 15,000-pound winch. The cable capacity in each case is determined by the load-carrying capacity of the first layer of rope on the drum. When installed on the vehicle, the cable is 300 feet in length.

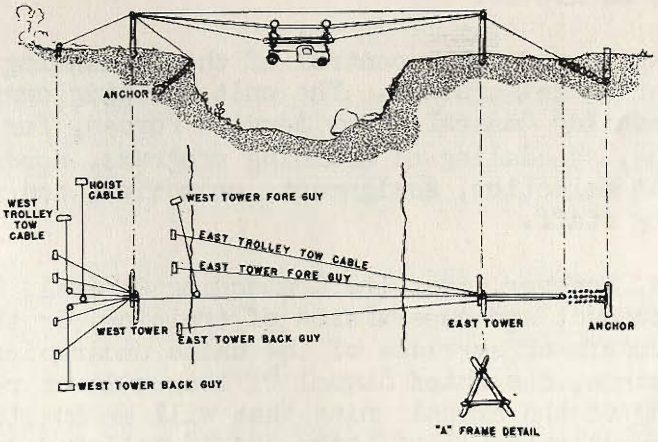
The stress created in a cable suspension depends upon the amount of sag in the cable. The greater the sag, the less the stress. For example, if the sag is 1 in 10, the stress in the cables will be 5 times the weight hanging on the cables. If the sag is 1 in 5, then the stress will be 2½ times the weight. Thus, if an 8,500-pound truck is to be carried on an aerial tram on a 1 to 10 sag, the cable stresses will be 42,500 pounds. A minimum of 15,000-pound cables must be used in such a case; it is advisable, however, to use three 15,000-pound cables.

To facilitate taking off and landing, towers should be constructed to hold the cables about 20 feet above the ground. The towers should be simple, utilizing any sturdy trees available. In the absence of sturdy trees, "A" frames should be constructed from logs, 18 to 24 inches in diameter, and about 25 to 30 feet long. These logs should be lashed at the apex by towing chains, and tied by a cross member log at the base. The ends should rest on footings in holes 2 feet deep. The base should be spread 15 to 20 feet for stability, and the frames held vertical by two winch lines, one on each side. The tram cables should be carried in the saddle made by the apex of the "A" frame. Consequently the apex lashing chains must be tied around the poles, so that the tram cables will not be crushed by resting on the chain links.

Since, in the project illustrated here, all vehicles were on the near side of the canyon, careful thought had to be given to placement of the vehicles to insure the proper cable loads and to avoid upsetting pulls on the towers. For a normal set-up involving four tram cables and two "A" frame towers, a total of 11 winch trucks are required as follows: 4 for the tram, 2 for each tower as guys, 2 for the towing trolley, and 1 for the hoist.

Tram cables are anchored by winch trucks on the near side and by a strong deadman on the far side. The stress on the deadman can be computed by the methods described above. The strength of the deadman is dependent upon the holding power of the earth, the depth of the holes, and the bending strength of the anchor.

The trolley may be constructed by attaching four snatch blocks at each end of a sturdy log slightly larger than the lifting locations on the vehicles to be carried. The trolley is held in any position on the tram cables by means of two winch lines, one attached to each end. A snatch block is placed at each end of the trolley for hoisting the vehicle up to the trolley.



Since the contruction of towers requires a good deal of time and labor, they will not be used to supplant the equipment or functions of the Corps of Engineers, who have standard aerial trams. The procedure, however, does demonstrate to the officers that, through initiative and resourcefulness, such jobs can be done with the limited equipment normally available to them in the field; and, in addition, it demonstrates another use of the winch.

SINGLE SIDE-BAND AND MULTI-CHANNEL VF COURSE

In March 1943, several Signal Corps officers were selected to attend the radio teletype single side-band course at the American Telephone and Telegraph Company, New York City. This class is to be of six weeks' duration and is the third of its kind to which Signal Corps officers are being assigned. A continuing program is in progress which calls for assignment of a limited number of officers per month to this course, which deals with the utilization of a single radio side-band for transmitting teletype messages -- a method especially useful in overseas communication. At present, these trained officers are being used in the Plant Engineering Agency in connection with the Army Airways Communication System. There are too few officers available in the Signal Corps who have been trained in this type of work, and it is essential that men be carefully chosen to undergo this specialized training. Officers who are high-grade radio engineers are being procured from the radio industry for this purpose, and in line with its progressive policy of utilizing effective and advanced scientific channels of communication, the Signal Corps is making this training available to officers whose background qualifies them for this technical line of activity.

NEW A.S.F. UNIT TRAINING CENTER

The Army Service Forces Unit Training Center is to open soon at Camp Ellis, Lewiston, Illinois. The Signal Corps allotment has been set at 2,000 men. It is expected that actual unit training will begin on May 25, 1943. The main purpose of the Center is to produce trained Army Service Force Units capable of performing their primary missions in overseas theaters with a minimum loss of life and material. It is to be activated under the provision of paragraph A (1) (U) AR 170-10.

The entire camp is under the control of the Commanding General, Sixth Service Command, for administration. The unit training center is under the control of the Commanding General, Army Service Forces, for the promulgation of training doctrine, scheduling of training programs, conduct and supervision of training, and the selection, assignment, promotion, and relief of personnel assigned as training staff.

It is expected, however, that the Commanding General, Army Service Forces, will delegate the conduct and supervision of training, or the responsibility, therefore, to the chiefs of services of the units undergoing training at this center. In other words, the Chief Signal Officer will be responsible for the conduct and training of the signal units that will be located there. The Signal section has been allotted 13 officers and 38 enlisted men to carry out this program.

DISTRIBUTION AND RECORDS DEPARTMENT TO FORT MONMOUTH

The Chief Signal Officer has always maintained a Distribution and Records Section within his office for filling urgent requests for publications.

However, with the expansion of the Army the quantity of material handled has multiplied many times. As a part of the movement to decentralize and relieve the congestion on facilities in Washington, it has become necessary to arrange for the transfer of this activity to Fort Monmouth, New Jersey. It is recommended that future requests for literature be directed to the Eastern Signal Corps School, Distribution and Records Department, Fort Monmouth, New Jersey.

NEW PUBLICATIONS

The following technical manuals have been published and may be obtained through regular Adjutant General channels:

TM 11-336, Telephone Central Office Set TC-12, January 18, 1943
TM 11-361, Test Sets EE-65-A through E, February 2, 1943
TM 11-452, Signal Supply, March 4, 1943
C1 to TM 11-344, Converter M-222, March 23, 1943.

NEW TRAINING FILMS

The latest Signal Corps training films to be approved for release to the service include:

TF 11-1070, Pole Line Construction, Part V, Installation of Anchors
TF 11-1071, Pole Line Construction, Part VI, Installation of Guys
TF 11-1088, Pole Line Construction, Part VII, Stringing Open Wire.

NEW PICTURE SCREEN

A comparatively inexpensive yet more effective motion picture screen (for 16 mm. projection machines) has been worked out in the CSCRTC projection subsection, and is now being used in eleven of the Camp Crowder Replacement Center training buildings in connection with training films.

The regularly used motion picture screen proved too small for a several hundred man audience in the modified RB-1 training buildings, so steps were initiated to improvise a screen which would be inexpensive and yet meet all needs.

First, all seams on the rear wall of the building were filled with patching plaster; then two coats of calcimine were added. Size eight by ten feet proved best, since there is that much unobstructed space in the modified RB-1 buildings. As a finishing touch, a black border was painted around the edges.

The screen has proven entirely satisfactory for use with the 16 mm. projection machine equipped with a three-inch lens and 750 watt bulb, operated from the projection booth.

SECURITY

DANGER IN CLEAR TEXT AND OPERATORS' CHAT

The following rules have been issued from Allied Force Headquarters in North Africa to insure more complete security of communications. Clear service messages and operators' chat have been found a very prolific source of enemy intelligence, according to a recent report, and the rules quoted here were formulated to clarify what is permissible:

Procedure signs and signals are the only authorized means other than regular messages for conversations between operators. The meaning of some of these signals has to be completed by the addition of appropriate call signs, time-groups, numeral-groups, indicating frequency, etc. It is permissible to use an occasional plain text word when no appropriate procedure signal exists.

It is strictly forbidden to use procedure signals as mere skeletons for unofficial plain-text service messages. When procedure signals are inadequate, the chief operator or Chief of a station may authorize the transmission of a message relating to the conduct of communications.

Service messages must be cryptographed except when nothing in their content gives any indication of the subject matter, precedence, originator, or addresses of other messages. The transmitted text of all such messages will be recorded in the message center files.

Operators' "chat" is strictly forbidden. This includes not only obviously personal conversation, but any comment on the traffic or condition of communications. With the exception noted in paragraph one above, the operator will send absolutely nothing but properly authorized messages. Even the use of procedure signals will be held to the minimum necessary for efficient communication.

SIGNAL COMMUNICATIONS AND THE STAFF

"Signal Communications and the Staff," secret publication distributed by The Adjutant General's Office, is available on application through channels.

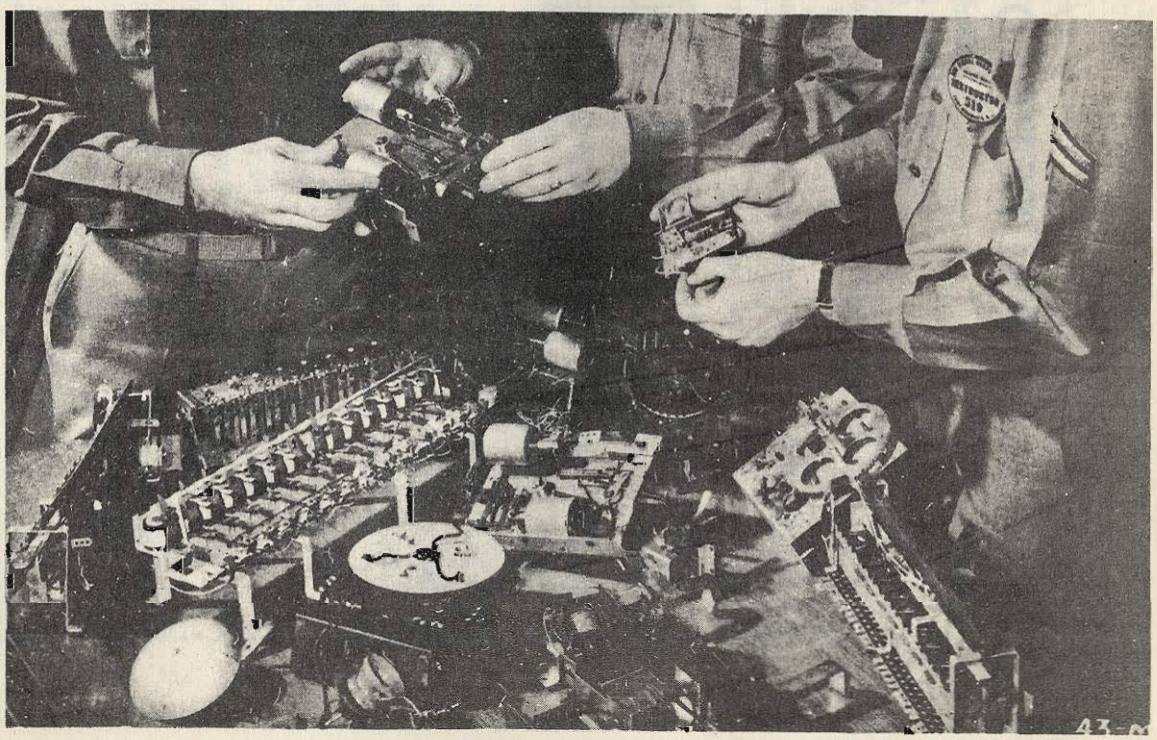
PINBALL MACHINES SERVE UNCLE SAM

When the police of Monmouth County (N.J.) confiscated a number of pinball machines, they turned them over to the Signal Corps at Fort Monmouth for such use as might be made of the relays and other electrical components which these intricate machines contain.

The technicians of the Signal Corps found many uses for these components, particularly in connection with alterations or improvements of existing plant equipment and facilities. Thus the relay which controlled a "tilt" light in a pinball machine found itself installed as a part of the control mechanism of the air-raid warning system at Fort Monmouth. Selector relays from the game board made it possible to dispense with the old patch-cord system by means of which selected groups of loudspeakers had been switched in on the Fort Monmouth sound system. Instead, any or all of the groups of loudspeakers are now relay selected by means of a mechanism like that of a dial telephone.

Thus these components were withdrawn from their formal illegal applications and converted to functions which serve a really important purpose for Uncle Sam, but for which it would have been difficult to purchase components.

This may prove suggestive to Signal Corps men at other stations who have difficulty in obtaining components needed in such projects as the development of visual training models of electrical and radio circuits, repairs or improvements in camp or "rec" hall sound systems, construction of intercommunication systems in headquarters buildings and so on.



PREFERRED TUBE LIST

MARCH 1, 1943

NOTE:- THIS PREFERRED LIST SUPERSEDES THE ARMY-NAVY PREFERRED LIST OF VACUUM TUBES, DATED SEPTEMBER 28, 1942

TO THOSE CONCERNED WITH THE DESIGN AND MANUFACTURE OF ARMY OR NAVY EQUIPMENT UTILIZING VACUUM TUBES:

1. The following Army-Navy Preferred List of Vacuum Tubes sets up a group of unclassified general purpose tubes selected jointly by the Signal Corps and the Bureau of Ships. The purpose of this list is to effect an eventual reduction in the variety of tubes used in Service Equipment.

2. IT IS MANDATORY THAT ALL UNCLASSIFIED TUBES TO BE USED IN ALL FUTURE DESIGNS OF NEW EQUIPMENTS UNDER THE JURISDICTION OF THE SIGNAL CORPS LABORATORIES OR THE RADIO AND SOUND BRANCH OF THE BUREAU OF SHIPS BE CHOSEN FROM THIS LIST. EXCEPTIONS TO THIS RULE ARE HEREINAFTER NOTED.

3. The term "new equipments", as mentioned in Paragraph 2 above, is taken to include:

   a. Equipments basically new in electrical design, with no similar prototypes.
   b. Equipments having a similar prototype but completely redesigned as to electrical characteristics.
   c. New test equipment for operational field use.

4. The term "new equipments", as mentioned in Paragraph 2 above, does not include:

   a. Equipments either basically new or redesigned, that are likely to be manufactured in very small quantity, such as laboratory measuring instruments.
   b. Equipments that are solely mechanical redesigns of existing prototypes.
   c. Equipments that are reorders without change of existing models.
   d. Equipments in the design stage before the effective date of adoption of this Preferred List.

   Note: The foregoing statements in Paragraphs 3 and 4 above are explanatory in nature and are not intended to be all-inclusive.

5. In the event that it is believed that a tube other than one of those included in this Preferred List should be used in the design of new equipments for either the Signal Corps or Navy, specific approval of the Service concerned must be obtained. Such approval, when Signal Corps equipment is concerned, is to be requested from the Signal Corps Laboratory concerned with such equipment; the said Laboratory will then make known its recommendations in the matter to the Office of the Chief Signal Officer where the final decision will be made and returned to the laboratory for transmittal to the party requesting the exception. When Navy equipment is concerned, the request for exception shall be addressed to the Bureau of Ships, Navy Department.

6. The publication of this list is in no way intended to hamper or restrict development work in the field of vacuum tubes or vacuum tube applications.

7. This list is to take effect immediately.

Office of the Chief Signal Officer,
Headquarters, Services of Supply,
War Department.

Office of the Chief Signal Officer,
Headquarters, Services of Supply,
War Department.

Chief of the Bureau of Ships,
Navy Department.

ARMY-NAVY PREFERRED LIST OF VACUUM TUBES

MARCH 1, 1943

RECEIVING

FILAMENT VOLTS	DIODES	DIODE TRIODES	TRIODES	TWIN TRIODES	PENTODES		RECTIFIERS	CONVERTERS	POWER	INDICATORS
					REMOTE	SHARP				
1.4	1A3	1LH4	1G4GT	3A5 1291	1T4	1L4 1LN5 1S5		1LC6 1R5	3A4 3Q4 3Q5GT 1299	991
5.0							5U4G 5Y3-GT			
6.3	6H6✱ 9006	6SQ7✱ 6SR7✱	2C22 2C26 6C4 6J5✱ 1201 9002	6J6 6SL7GT 6SN7GT	6AG5 6AK5 6SG7✱ 6SK7✱ 9003	6AC7✱ 6AG7✱ 6SH7✱ 6SJ7✱ 9001	6X5GT 1005	6SA7✱	6B4G 6G6G 6L6G 6N7GT 6V6GT 6Y6G	6E5
12.6	12H6✱	12SQ7✱ 12SR7✱	12J5-GT	12SL7GT 12SN7GT	12SG7✱ 12SK7✱	12SH7✱ 12SJ7✱		12SA7✱	12A6✱	1629

TRANSMITTING

TRIODES	TETRODES	TWIN TETRODES	PENTODES	RECTIFIERS	
				VACUUM	GAS
304TH 801-A 811 826 833-A 838 1626 8005 8025	807 813 814 1625	815 829 832	2E22 803 837	2X2 3B24 5R4GY 73R 371A 705A 836 1616 8020	4B25 83 866A 872A

MISCELLANEOUS

GRID CONT. RECTIFIERS	VOLTAGE REG.	PHOTOTUBES	CATHODE RAY
394-A 884 2050 C1B C5B	VR-90-30 VR-105-30 VR-150-30	918 927	2API 3BPI 5CPI 9EPI

✱ Where direct interchangeability is assured "GT" and "L" counterparts of the preferred metal tubes may be used.

24-27592

Form No. ANPL-2

O. C. SIG. O. LIBRARY

REFERENCE BOOKS AVAILABLE IN THE FIELD

It is perhaps not generally recognized that technical reference books in the collection of the Signal Corps Reference Library, OCSigO, are available to Signal Corps officers anywhere within the limits of the United States. This library has a collection of more than 5,000 volumes, all of which were especially selected to meet the requirements of Signal Corps personnel.

Officers (and civilians) located in the Pentagon Building have only to phone the library to have desired books delivered, or they can go to the library to make their selection. Personnel stationed elsewhere can draw books from this library through the media of their own local post libraries, or direct if their stations do not afford local library facilities.

Further than this, the Signal Corps Reference Library invites suggestions for the acquisition of books and periodicals needed in the performance of Signal Corps work, but not now on its shelves. New books are being added to the collection at the rate of nearly 1,000 per month. Each week a list of books selected from among the new acquisitions of that week goes out to officers desiring it. Anyone wishing to have his name placed on the mailing list to receive these bulletins can do so by telephoning Extension 72019, or by addressing a request to the library, Room 4C340, Pentagon Building, Washington.

Following are a few of the books recently added to the collection:

Codes and Ciphers. D'Agapeyeff, Alexander. London, Oxford, 1939. 160p. Z104.D3.

The Electrical Fundamentals of Communication. Albert, A.L., McGraw. 1942. 554p. QC523.A39.

Communication Circuits. Ware, L.A. and Reed, H.R. Wiley, 1942. 287p. TK3226.W35.

Electric Circuits. Massachusetts Institute of Technology. Wiley, 1940. 782p. TK3001.M3.

Principles of Electronics. Kloeffler, R.G. Wiley, 1942. 175p. TK6565.V3K6.

Theory and Practice of Electron Diffraction. Thomson, G.P. and Cochrane, W. London, Macmillan, 1939. 334p. QC721.T44.

Introduction to Meteorology. Petterssen, Sverre. McGraw, 1941. 236p. QC861.P4.

Photography by Infrared. Clark, Walter. Wiley, 1941. 397p. TR755.C55

Short-wave Radio. Reyner, J.H. 3d ed. London, Pitman, 1942. 186p. TK6553.R39.

Aeroplane Radio Equipment. Molloy, Edward, ed. Chemical Pub. Co., 1941. 132p. TL693.M64.

Experimental Radio Engineering. Rapson, E.T.A. London, Pitman, 1940. 143p. TK6554.R3.

A Textbook of Sound. Wood, A.B. Macmillan, 1941. 578p. QC225.W6.

Ultrasonics. Bergmann, Ludwig. Tr. by H.S. Hatfield. London, G. Bell, 1938. 264p. QC243.B42.

MILITARY INTELLIGENCE

THE ENEMY TOO SEEKS SUGGESTIONS FROM THE RANKS

The following order, issued by the German High Command on April 7, 1942, provides interesting evidence of the encouragement given by the enemy to suggestions from the field, and particularly from the front lines:

TO: ARMY GROUPS, ARMIES, CORPS, AND DIVISIONS FOR DISTRIBUTION DOWN TO BATTALIONS.

War demands continual improvements in weapons and equipment. New ultramodern weapons are now being produced. These will show the world our superiority to the enemy in armament also.

To hold this advantage, and if possible even to increase it, is an important condition for final victory.

The basis for the creation of new weapons and for every improvement in existing equipment must be the practical experience of the front-line soldier. He actually realizes the advantages and disadvantages of his weapons and equipment, and knows best the requirements of battle. The quickest possible interpretation of this front-line experience and its immediate utilization in armaments production must be insured. The Minister for Armaments and Munitions has set up a special board to test immediately all practical suggestions and proposals from the front for the improvement of our weapons and the invention of new ones, and to pass them on to the actual manufacturers.

Any soldier who thinks that he can make any useful suggestions or proposals in regard to weapons and equipment on the strength of his experiences in battle is authorized and ordered to communicate them direct, and not through the usual channels, to: Headquarters of the Armed Forces, Army Branch.

This order is to be repeated to all front-line troops.

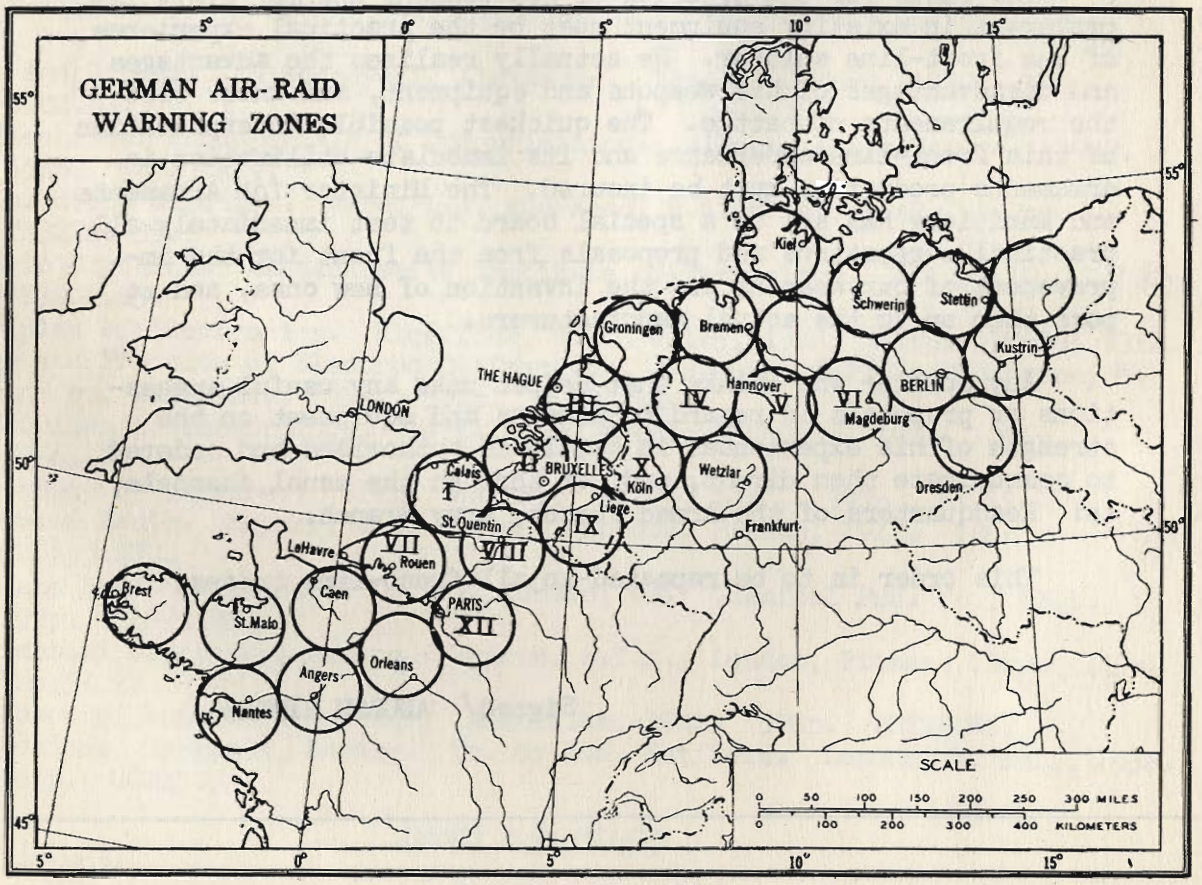
Signed/ ADOLPH HITLER

GERMAN AIR-RAID WARNING SYSTEM

Recent reports from German sources indicate that all of Germany and German-occupied countries are divided into air districts numbered I, II, III, etc. Listening devices on the coast or frontier detect the approach of enemy planes while they are still at a considerable distance from any German air district. These listening devices, it is said, can detect the motor noise of an enemy plane as far away as 175 miles. When the sound of the motor is picked up, those districts toward which the planes are flying are alerted first. In this preliminary alarm, all factory lights which are noticeable are extinguished, radio stations go off the air, and the crews of antiaircraft guns prepare for action.

As the planes approach the coast or frontier, it becomes evident toward which district the planes are flying. That district is then put in the second state of alarm, which means that the sirens are sounded and everybody goes to the air-raid shelters. All factory lights -- including emergency lights -- are extinguished, and everything is put into readiness by the antiaircraft crews.

In the case of a typical example, it may be assumed that hostile planes are approaching air district I (see accompanying map), which is then put in



the second state of alarm, while all districts bordering on No. I (districts II, VII and VIII) are automatically put in the first state of alarm.

As soon as the attacking planes enter district I, it is put in the third state of alarm (Hochstalarm, or maximum alarm), meaning "the enemy is attacking." The antiaircraft guns begin to fire and pursuit planes take off.

At the same time, the bordering districts II, VII and VIII are automatically put in the second state of alarm, and all districts bordering these (in this case IX, X, XII, and III) are automatically put in the first state of alarm.

If the attackers fly on toward the district II, that district is put in the third state of alarm. As soon as the planes cross its border, all bordering districts, including district I, are automatically put in the second state of alarm. If the planes continue further inland, e.g., toward Berlin, all the districts in the line of flight, and over which the planes have passed, remain in the first state of alarm until the planes have entirely left Germany and German-occupied territory, and the attack can be considered terminated.

ENEMY EXPERIENCE AT WAKE ISLAND

The following excerpt from an enemy document covers one of the lessons he learned during the amphibious attack on Wake Island:

> When landing, it is necessary to devise measures to keep communication equipment from getting wet. In the Wake operation, communication between ships and the shore was impossible because the radios and telephones either got wet or received severe shocks. The rockets and signal pistols also got wet and, although fired, they were difficult to distinguish from the enemy's machine-gun tracer bullets.
>
> The methods of communication must be simple. In a landing operation carried out by a number of cooperating units, it is necessary to perfect communications so as to maintain close liaison. It is most important to have several simple, sure means of communications so that they will function regardless of the situation.

EQUIPMENT

EQUIPMENT COORDINATION

INTERCONNECTION OF AMERICAN AND BRITISH TELETYPEWRITERS

When it is desired to interconnect American Teletypewriters and British Creed Teleprinters 7-B for combined operations or other purposes, it is necessary to change the speed of the American machine from its normal 368 operations per minute to 404 operations per minute in order to match the British machine. In some cases it is also necessary to provide interconnecting repeaters to work between the American neutral telegraph loop circuits and the British 2-path polar loop circuits, which are used on their telegraph transmission systems and teleprinters.

A special tuning fork, Signal Corps Stock No. 4T104984 or Teletype Corporation Model No. 104984, having a frequency of 96.19 instead of the 87.6 vibrations per second of the standard tuning fork, has been made available. By means of this new tuning fork, the governors of teletypewriter motors can be readjusted so as to bring the operating speed of the machine to 404 operations per minute.

Repeater X-63638 is capable of providing the 2-path polar to neutral conversion. These repeaters are made from an existing stock procured for other purposes. When this stock is exhausted Repeater TC-30-(Terminal), which is a component part of Repeater Set TC-18-(Terminal), can be used for the 2-path polar to neutral conversion.

When American Teletypewriter systems are operated at 404 speed, there will be a loss in margin as compared to 368 speed. This loss, including the effect of the increased speed on both machines and transmission systems, will vary from a negligible amount to several percent, depending on conditions. Minor modifications in operating practices will be required to provide for differences in the keyboards and control features of the British and American machines.

TELEPHONE REPEATER EE-89-( )

Service tests of 2-Wire Telephone Repeater EE-89, which was described and illustrated in previous issues of the Information Letter, have been made by signal organizations associated with the Army Air Forces and Army Ground Forces. The repeater has been found to equal or exceed the anticipated performance. A single repeater in the middle of a twenty mile line of Field Wire W-110-B, or two repeaters at the one-quarter and three-quarter points, respectively, of a twenty-five mile line, provide satisfactory "all weather" voice transmission. The repeater is being standardized for issue to Division and Corps Signal Companies and is scheduled to become available about November 1, 1943.

PUBLIC ADDRESS EQUIPMENT AN/TIQ-2

Military characteristics were recommended to the Signal Corps Technical Committee for this equipment which is being developed for Special Service Divi-

sion, Army Service Forces, for issue in the field for maintenance of morale. The equipment is to include an all-wave radio tuner, public address amplifier, record playing unit, and suitable loudspeakers to provide entertainment for audiences of up to 1,000 men.

OPTIPHONE AN/TVC-1

Military characteristics were recommended to the Signal Corps Technical Committee for this equipment which is intended to provide a transmitter-receiver unit for voice communication on a modulated light beam for point-to-point operation. The range of this equipment is to be 5,000 yards in bright sunlight and should be considerably greater at night. The equipment is to be adaptable for transmission in visible or invisible light by use of suitable filters and is arranged to extend a wire telephone circuit when required.

OPTIPHONE AN/TVC-2

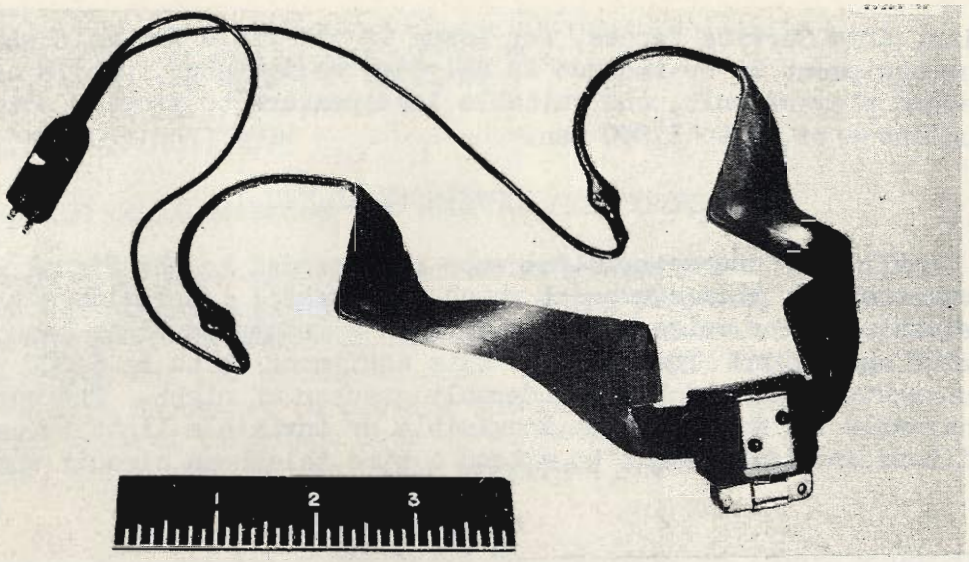
Military characteristics were recommended to the Signal Corps Technical Committee covering this equipment which is functionally similar to AN/TVC-1 except that the range is to be 1,000 yards and is to be a one-manpack load weighing less than 40 pounds. It is intended primarily for Infantry use.

OPTIPHONE AN/UVC-1

Military characteristics were recommended to the Signal Corps Technical Committee for equipment to provide means for voice communication over a minimum point-to-point ground range 20,000 yards or a minimum ship-to-ship or ship-to-shore range of 10,000 yards in bright sunlight on visible light of beam width as narrow as is consistent with quick establishment and maintenance of communication. This equipment is intended primarily for Coast Artillery use as a supplementary communication facility.

MICROPHONE T-45

The Commanding General, Army Service Forces, has approved recommendations by the Signal Corps Technical Committee for adoption of military characteristics and standardization of the Microphone T-45. The Microphone T-45 is head supported and has a noise cancelling feature for use in high noise levels. Action has been initiated by this Branch to revise the parts list of radio and interphone equipment used by the Army Ground Forces to substitute Microphone T-45 for Microphone T-30. The Army Air Forces have been requested to test Microphone T-45 to determine whether it would be acceptable for airborne use. (See page 35 for further information.)



MICROPHONE T-45-( ), STRAP ST-53-( )

CLOTHING

The Signal Corps Board has been requested to service test Quartermaster equipment consisting of raincoats with parka hoods; ponchos; rainshirts, knee length; raincoats; tent ponchos, sectional, to determine whether these will be suitable for Signal Corps personnel in cold climates.

OIL BURNER UNIT, TENT STOVE, M1941 (Experimental)

The Signal Corps Board has been requested to test this item of Quartermaster equipment to determine whether it is suitable for use with Signal Corps installations in cold climates.

INTERCOMMUNICATION SET PA-8

Two development models of Intercommunication Set PA-8 have been shipped to the Field Artillery Board for service test. This set was developed after consideration of similar British equipment. The equipment is used for intercommunication between gun position and the Battery Commander, when it is necessary for the firing battery to operate while dispersed for security against hostile fire.

CAMOUFLAGE

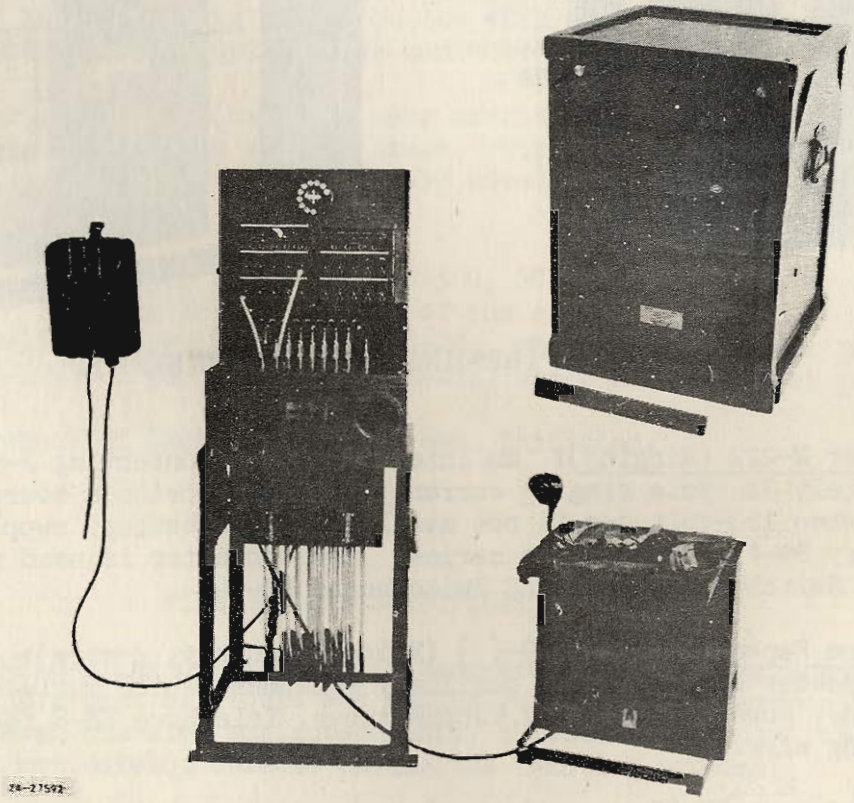
Signal Corps Board Case No. 455 was the subject of a conference on March 30, with representatives of the various divisions of the Office of the Chief Signal Officer. A study was made to determine what had been accomplished to date and what should be done to provide camouflage for Signal Corps equipment. Certain recommendations as to policy were agreed to at the conference and were approved by the Chief Signal Officer.

GROUND SIGNAL

STANDARDIZED EQUIPMENT

Several items of equipment, described at some length in previous issues of the Signal Corps Technical Information Letter at the time of their standardization are expected to be available for issue before July 15, 1943. These items include Telephone Central Office Set TC-10 (Army), Telephone Central Office Set TC-12, Telephone Repeater Set TC-29, Boom Equipment LC-60, Plow LC-61, and Converter M-222 (Ringing). A brief description of each follows.

Telephone Central Office Set TC-10 (Army): same as Telephone Central Office Set TC-1, except that Switchboard BD-80-( ) is replaced by Switchboard BD-110-( ). Switchboard BD-110-( ) is the same as Switchboard BD-80-( ) except that it is smaller, with a 30-inch high keyshelf and an integral packing case.



24-27592

Switchboard BD-91-T1, a part of Telephone Central Office Set TC-12, is here shown in operating position. It is a 20-line magneto board with integral distributing frame. The inset, upper right, shows the same unit packed for transportation.

Telephone Central Office Set TC-12-( ): includes Switchboard BD-91, two Chest Set TD-1, two Headset HS-30-( ), twelve Battery BA-30 (six in use, six spare), one Converter M-222 (Ringing), one Ground Rod GP-29, four Battery BA-23 (two in use, two spare), one Cord CD-258, one Cord CD-452, one Maintenance Equipment ME-30, one Telering, and instructions.

CONVERTER M-222 (RINGING) WITH COVERS REMOVED

Converter M-222 (Ringing): an interrupter for converting 3-volt d-c to approximately 24 cycle ringing current; used to provide a source of ringing current when 110-volt a-c is not available. The battery supply consists of two Battery BA-23 connected in series. The converter is used with, but is not part of, Switchboard BD-91 and Switchboard BD-96.

Telephone Repeater Set TC-29-( ) (Voice Frequency, 4-wire): consists of Telephone Repeater EE-99-( ) and auxiliary equipment which includes suitable grounding rods, power pack, spare vacuum tubes, Telephone EE-8 for monitoring, and connecting wire.

Boom Equipment LC-60: consists of such additional items of material or equipment as are required to make up a boom rig for wire laying and recovery, and to attach it suitably to a vehicle. It is used with, but not part of, Reel Unit RL-26-A or Reel Unit RL-31 on construction trucks used by the Signal Corps.

Plow LC-61 (Cable): capable of being pulled by a $2\frac{1}{2}$-ton 6 x 6 truck, a tractor or a winch line, and of burying either cable or insulated wire in one operation. The burying can be accomplished either directly from reels or after the facilities are on the ground surface and in service.

NEW PROTECTIVE BAGS FOR SEVERAL RADIO SETS

Protective covers will soon be available for use with certain radio sets not already provided with covers. These are:

Bag BG-153, a cover for Radio Set SCR-610, SCR-609, SCR-510, SCR-509, SCR-710 and SCR-810. This is a water repellent canvas cover measuring 12 by 14 by 20½ inches. It is equipped with two flap openings for antenna and control panel, and is not to be removed during operation of the set.

Bag BG-154, a cover for Radio Receiver and Transmitter BC-654, which is part of Radio Set SCR-284. This is a water repellent canvas cover measuring 10 by 14 by 18 inches. It is equipped with two flap openings for antenna and control panel, and is not to be removed during operation of the set.

Bag BG-129, a cover for Power Unit PE-103, which is part of Radio Set SCR-284. This is a water repellent canvas cover measuring 13 by 8 by 16 inches. It has an opening on the bottom with a strap across, and has a side flap through which the equipment is connected for operation.

The parts lists of the radio sets mentioned have been amended to include the requisite bags, which will be issued with the sets hereafter. In the case of sets which were issued without these covers, the basis of issue will be as follows:

Bag BG-153: 1 per Radio Set SCR-509, SCR-510, SCR-609, or SCR-610, where not issued as part of the set.
Bag BG-154: 1 per Radio Set SCR-284, where not issued as part of the set.
Bag BG-129: 1 per Radio Set SCR-284, where not issued as part of the set.

Procurement of these covers has been initiated.

WIRE W-110-B SPECIFICATION REVISED

Wire W-110-B has until recently been tested by running a single strand of it through a tank of liquid and making resistance measurements of the insulation. When the wire was subsequently twisted into pairs, the insulation would sometimes develop defects during the twisting process.

The revised specification for Wire W-110-B includes a requirement for the tank test to take place on the twisted pair instead of on the single conductor. This is intended to insure against shipments of the wire containing insulation faults not detectable by the tank test on single conductor.

Purchase Branch has been requested by Ground Signal Equipment Branch to make the revised specification applicable to all present and future orders for Wire W-110-B.

STURDIER RELAYS FOR SCR-299

Tests on two relays, reference numbers RY-1 and RY-3 in Radio Set SCR-299, have been completed by Fort Monmouth Signal Laboratory. As a result, both relays will be replaced by sturdier models in the field as well as in production. However, until relay RY-3 can be replaced in the field, a plate will be placed over the PHONE-CW switch on Radio Set SCR-299, cautioning the operator to shut off the plate power supply before changing from Phone to CW.

FUELS AND LUBRICANTS CHARTS PROGRESSING

Work on the Fuels and Lubricants Recommendation Charts, being prepared by the Automotive and Power Branch, FMSL, has progressed to the point where thirty-one items of equipment have been broken down into their component parts. Instruction sheets applicable to these charts have also been prepared. These charts and sheets will be available for general issue when they have been reviewed by the Maintenance Engineering Branch, OCSigO.

NEW CHEMICAL MAY RETARD LEAD DEPOSITS

A chemical (Fuel Soluble Catalytic Compounds Physical & Chemical Corp. No. PD-11-32-B) is reported by the Automotive and Power Branch, FMSL. It is claimed by the manufacturers that when used in the ratio of 4cc. per gallon of gasoline, this compound will prevent lead deposits in variable speed and load engines. It is said that this chemical has little effect in constant speed and load engines. Another claim is that it will produce 80-octane gasoline when mixed with 72-octane gasoline containing less than 1cc of TEL per gallon, and that the fuel thus produced will have little tendency to form lead deposits. Tests of this chemical are being conducted by the Ordnance Department.

MICROPHONE T-21-B IMPROVED

The investigation of Microphone T-21-B for redesign of mechanical factors has been completed by the Materials and Test Section, FMSL. The new design will not only save critical materials, but will expedite production. The major changes include the substitution of malleable iron for bronze with a saving of 25,000 pounds of bronze per 1000 units, and the use of domestic mica in place of the imported clear India mica previously employed. The housing head and handles are now one casting, as are the body and bottom. In the old design, the handles were riveted and soldered to the head, and the bottom plate was soldered to the condenser tube housing.

MICROPHONE T-45 PROVES SUPERIORITY IN NOISE

Demonstrations comparing Microphone T-45, T-17 and T-30 were held at the Fort Monmouth Signal Laboratory and Washington, D. C., for liaison officers of Field Artillery, Infantry, and Armored Forces. A trailer equipped for demonstrating the performance of microphones and receivers under high ambient noise conditions was provided. According to the Special Equipment Branch, FMSL, improved communications were apparent when Microphone T-45 was used under such noise conditions.

Microphone T-45 is a lip microphone which has many attractive features, such as its ability to cancel out ambient noise, and its design, which permits it to be worn under a gas mask.

The T-45 was originally developed for the Armored Forces by the Signal Corps, and, although its production has not yet commenced, the Navy (Marine Corps) has already ordered a quantity through OCSigO as a result of demonstrations. (See page 29 for further information.)

SAFETY HOUSING ADDED TO SIGNAL LAMP EQUIPMENT EE-80-A

Signal Lamp Equipment EE-80-A is being modified to include a housing over the key in order to protect the operator from electrical shock from a 110-volt circuit, according to the Inspection Administration Branch, FMSL.

LR SUPPRESSORS BEST BY TEST

Many tests have been carried out by the Detroit Field Section of the Toms River Signal Laboratory to determine the effectiveness of commercial inductive type interference-suppressors and of experimental models incorporating hand wound, low distributed capacity inductance coils. Measurements made of each type of inductive suppressor tested indicate that the most successful consists of a combination of inductance and resistance. The combination type is several times as effective as a standard 10,000-ohm resistor type suppressor. An attempt is now being made to obtain the same results with models more suitable for manufacture.

MANUALS ON RADIO FOR TANKS

Manuals for the inspection of provisions for radio installation and suppression for Medium Tank M4A1 (Pacific Car & Foundry Co., Renton, Wash.) and Light Tank M5A1 (Massey-Harris Company, Racine, Wisconsin) have been completed by the Detroit Field Section, Toms River Signal Laboratory, and are now being checked. When this is finished, they will be forwarded to the various Ordnance offices concerned.

SOLDER SUBSTITUTION AUTHORIZED

The Philadelphia Signal Corps Procurement District has been authorized by the Ground Signal Equipment Branch, OCSigO, to substitute Solder M-33 for Solder M-30 for general applications, in order to conserve critical material.

Both are pound bars of solder, but M-30 is half lead and half tin, while M-33 is 60 parts lead to 40 parts tin. The latter, known as wiping solder for use on joints in lead cable, is Grade C on Specification QS-571; the former is Grade A on the same specification.

WIRE W-130-A PROVES SATISFACTORY

Satisfactory reports of tests of Wire W-130-A by the Infantry Board, the Field Artillery Board and the Mountain and Winter Warfare Board, have lead the Ground Signal Equipment Branch to recommend the procurement of Wire W-130-A (Vinylite) in order that manufacturers may gain experience in the manufacture of this type of wire, thus facilitating changeover from the use of latex to Vinylite or other suitable substitute insulations in future procurements of Wire W-130.

RECREATIONAL B-1 KIT NOW CALLED PUBLIC ADDRESS SET AN/TIQ-2

The apparatus formerly known as the Recreational B-1 Kit has been assigned nomenclature Public Address Set AN/TIQ-2, according to the Special Equipment Branch, FMSL. The outfit is a transportable public address system used to present programs by radio, from records, or picked up locally by microphones, to indoor or outdoor audiences consisting of as many as 1000 men. The set includes an amplifier with an input circuit for two microphones, directional loudspeaker equipment, two microphones with stands, a phonograph pick-up equipment for operating with 10-inch, 12-inch and 16-inch records at speeds of 78 and 33 1/3 r.p.m., a radio tuner for operation on several frequency ranges and an auxiliary power unit. The equipment operates from a 115-volt or 230-volt 50-60 cycle a-c supply.

MAINTENANCE EQUIPMENT ME-34

Maintenance Equipment ME-34 was developed to provide spare accessories and miscellaneous items for use with Radio Set SCR-609 and SCR-610. All components of Maintenance Equipment ME-34 are housed in a suitable weatherproof chest of such size that it will contain, in addition, three each Box BX-40, as issued on the parts list of SCR-609 and SCR-610. The components contained will provide adequate replacement parts for three each Radio Set SCR-609 or SCR-610.

NEW FREQUENCY RANGE DESIGNATIONS

For purposes of uniformity, the United Nations have adapted the following terminology in designating the various bands or ranges of the radio frequency spectrum:

FREQUENCY IN KC.		DESIGNATION	ABBREVIATION
10	30	Very low Frequency	VLF
30	300	Low "	LF
300	3,000	Medium "	MF
3,000	30,000	High "	HF
30,000	300,000	Very High "	VHF
300,000	3,000,000	Ultra High "	UHF
3,000,000	- 30,000,000	Super High "	SHF

ELOQUENCE IS EXPENSIVE

IT MAY COST A BATTLE. . .THE ENEMY'S CHANCES OF SOLVING OUR SYSTEMS ARE PROPORTIONATE TO THE AMOUNT OF TRAFFIC THEY INTERCEPT.

BE BRIEF! "By 1916, over 2,000 coded messages were coming into '40 O.B.' (British Cryptographic Service) daily, and not one failed to be decoded. Relying upon the secrecy of their codes, the Germans were amazingly loquacious. They filled the air with the most secret information concerning their army, navy, and diplomatic service, and all this '40 O.B.' grasped out of the ether. In addition, most of the German messages sent over neutral cables were also intercepted. The result was that the British had as accurate information about German affairs as the Germans themselves. - - - From "The Enemy Within" By Captain Henry Landau.

MILITARY ORGANIZATION

The 837th Signal Service Company was activated (less Platoons C and D) on April 1, 1943, at Fort George G. Meade, Maryland, by the Commanding General, Third Service Command, with an authorized strength of seventeen officers and three hundred three enlisted men. The unit will be prepared for functional duty and movement on orders to follow. Prior to movement the unit is assigned to the Third Service Command for preparation for extended field service.

The 66th Signal Battalion, affiliated with the New York Telephone Company, has been ordered into active military service by the Commanding General, Second Service Command, and will be organized by the Commanding General, Second Army, at Camp Crowder, Missouri, as early in May as practicable. The unit will be assigned to the Second Army.

The 67th Signal Battalion, affiliated with the New Jersey Bell Telephone Company, has been ordered into active military service by the Commanding General, Second Service Command, and will be organized by the Commanding General, Third Army, at Camp Van Dorn, Mississippi, as early in May as practicable. The unit will be assigned to the Third Army.

The 283d Signal Pigeon Company, affiliated with the International Federation of American Pigeon Fanciers, has been ordered into active military service by the Commanding General, Second Service Command, and will be organized by the Commanding General, Third Army, at Camp Claiborne, Louisiana, as early in May as practicable. The unit will be assigned to the Third Army.

Instructions have been issued to transfer the 74th Signal Company (Special) from its present temporary station, Camp Bradford, Virginia (permament station, Little Creek, Virginia), to Camp Pickett, Virginia, for permament change of station.

The 979th Signal Motor Messenger Company was activated on April 1, 1943, by the Commanding General, Seventh Service Command, at Fort Snelling, Minnesota, with an authorized strength of sixteen officers and two hundred eighty-two enlisted men. The unit has been assigned to the Seventh Service Command for preparation for extended field service.

The 981st Signal Fixed Radio Station Detachment has been activated as a 2½-Kilowatt radio station unit by the Commanding General, Seventh Service Command, at the Central Signal Corps Training Center, Camp Crowder, Missouri, with an authorized strength of two officers and twenty-one enlisted men. The detachment is assigned to the Seventh Service Command and placed under the control of the Chief Signal Officer for training only. The unit will be prepared for extended and early movement.

The establishment of a post photographic laboratory at Camp Van Dorn, Mississippi, is authorized. This laboratory is classified as a Class I instal-

lation under the jurisdiction of the Commanding General, Fourth Service Command.

Camp Gordon Johnston, Florida, present temporary station of the 28th Infantry Division (28th Signal Company), has been designated as the permanent station of this unit. The former permanent station was Camp Livingston, Louisiana.

The 294th Signal Company (Special) was constituted as of March 24, 1943, assigned to the Second Army, and will be activated by the Commanding General of the Second Army at Camp Bradford, Norfolk, Virginia, at the earliest practicable date with an authorized strength of eleven officers and two hundred fourteen enlisted men. On call of the Commander, Amphibious Force, Atlantic Fleet, the Commanding General, Second Army, will make this unit available to the Commander, Amphibious Fleet for amphibious training.

The 295th Signal Company (Special) was constituted as of March 26, 1943, assigned to the Second Army and will be activated by the Commanding General of the Second Army, at the earliest practicable date at Camp Bradford, Norfolk, Virginia, with an authorized strength of eleven officers and two hundred fourteen enlisted men. On call of the Commander, Amphibious Force, Atlantic Fleet, the Commanding General, Second Army, will make this unit available to the Commander, Amphibious Force, Atlantic Fleet, for amphibious training. Every effort will be made to bring this unit to the necessary state of training, for the initiation of the amphibious training, by May 22, 1943.

The Commanding General, Third Army, will issue the necessary instructions to transfer the 85th Infantry Division (85th Signal Company) from Camp Shelby, Mississippi, to Furthwood, Louisiana, for temporary change of station. The unit will not return to Camp Shelby, Mississippi, but will be ordered to a new station.

The Commanding General XIII Corps, has been instructed to issue the necessary orders to transfer the units listed below from their present stations to Fort Dupont, Delaware, movement to be made on or about the dates indicated:

Unit	Present Station	Date
Hq & Hq Co., XIII Corps	Providence, R. I.	May 1, 1943
94th Signal Battalion	Camp Edwards, Mass. (temp. in Va. Manuever areas)	June 1, 1943

These are permanent changes of station.

The 20th and 21st Signal Radio Installation Teams (Type A) were activated by the Commanding General, Second Service Command, at the Eastern Signal Corps Training Center, Fort Monmouth, New Jersey, on April 1, 1943, each with an authorized strength of one officer and eleven enlisted men. These teams are assigned to the Second Service Command and placed under the control of the Chief Signal Officer for training only. The units will be prepared for extended field service and early movement.

The 822d Signal Fixed Radio Station Company is relieved from its present assignment to the Eastern Signal Corps Training Center, Fort Monmouth, New Jersey, reassigned to the Second Service Command and placed under the control of the Chief Signal Officer for training only.

The 304th Signal Operation Battalion, affiliated with the Northwest Bell Telephone Company, and the 213th Signal Depot Company, affiliated with the Western Electric Company, are ordered into the active military service of the United States as directed by the Commanding Generals, Seventh and Second Service Commands, respectively. These units are assigned to the Third Army and will be organized by the Commanding General of the Third Army at the earliest practicable date in June 1943, at the following stations, and with authorized strengths as shown:

Unit	Station	Authorized Strength OFF	WO	EM
304th Signal Operation Battalion	Camp Swift, Texas	28	3	631
213th Signal Depot Company	Camp Shelby, Miss.	5	4	182

The 236th Signal Operation Company was constituted as of April 9, 1943, assigned to the Eastern Defense Command, and will be activated at the earliest practicable date at a station to be selected by the Commanding General, Eastern Defense Command, with an authorized strength of nine officers, one warrant officer and two hundred eighty-seven enlisted men.

Effective April 10, 1943, the 12th and 20th Armored Divisions (152d Signal Armored Company and the 160th Signal Armored Company) and the 5th Armored Signal Battalion, with station at Camp Campbell, Kentucky, are relieved from their present assignment to the Armored Force and are assigned to the IV Armored Corps.

Non-expendables to be Dropped from Circular 10-1

A recent directive from Army Service Forces requires the elimination of all items not considered expendable from OCSigO Circular 10-1. The non-expendable items will be eliminated from Circular 10-1 by including them in appropriate parts lists or organizational tables of equipment. It is anticipated that the deletion of non-expendable items from Circular 10-1 will be accomplished by July 1, 1943, after which time a revised circular 10-1 will be published. Until such time as a new circular 10-1 or published changes are made, the allowance of non-expendable items now published in the circular dated March 1, 1943, will continue to be the basis of issue and authority for requisition.

MILITARY PERSONNEL

JOB SPECIFICATIONS FOR SIGNAL CORPS OFFICER POSITIONS

Now that the spade work has been completed on the preparation of up-to-date job specifications for Signal Corps officer positions, Classification Section, Military Personnel Branch, has outlined several basic fundamentals on the use of the revised Army Regulation 605-95, Tentative.

The word "Tentative" on this Army Regulation is to be taken literally, insofar as revisions are in order. AR 605-95 is official — but officers in the field should not feel that this is the "last word" in job specifications. On the contrary, such specifications, to be effective, must be flexible enough to fall in line with the rapidly changing conditions of this fast-moving war. Fundamentally, to be of use, job specifications must be "living documents," subject to change and modifications when necessary to meet conditions, rather than forcing conditions to meet the job specification. Interpretations of today are not necessarily the same as those of tomorrow. In other words, the jobs outlined and described in AR 605-95, Tentative, must be used and interpreted according to the needs of the times.

As a matter of fact, Classification Section, Military Personnel Branch, is at the present moment preparing revisions and consolidations on those jobs which fall in the category of "not filling the bill" since the revised version of AR 605-95 was submitted to The Adjutant General on March 15, 1943.

All this need not be confusing, nor lead those who are dealing with job specifications to underestimate the value of AR 605-95, Tentative. On the contrary, it should lead to a more constructive use of approved specifications, and helpful suggestions as to revisions from those who are closest to the problems in the field. The following outline may be helpful in working with job specifications, and adjusting them to the needs of the moment. These are not "official" groupings, but represent the natural nuclei around which job specifications cluster, and are listed for convenience in securing a broad pattern of Signal Corps job specifications in general.

The first class comprises what might be called Executive and Administrative positions, including planning, coordination of plans, and logistics. Training, personnel, and such functions also fall within the broad boundaries of this group. Secondly, there is the Research and Development grouping, in which the officer who is essentially a research man and a scientist represents one specific classification within this group, with, however, an officer whose duties comprise the application and adapting of Signal Corps equipment to practical problems representing another type. The third class can be called Procurement and Supply, around which are grouped officers who deal with all kinds of material (including the products of the Research and Development men) and convert and distribute them according to the needs of the Service. The fourth classification centers around what might be called the Operation and Maintenance officers who actually put equipment to use and keep it in operation.

In this age of specialization, it is important to realize that there has been a great change from the point of view which maintained that any officer could operate effectively in all fields. Today there are distinct branches and kinds of activity, and the most flagrant errors can occur when an officer is classified in a category of jobs which centers around one of the above groups, when his abilities are closer to the requirements of another such category.

There are, of course, jobs which serve as links, or which hover around the brinks of such broad groups, and there are some which overlap. There are no fixed boundaries or divisions, but these points may serve as guide posts in using and interpreting AR 605-95, Tentative.

As a final word on the use of Signal Corps job specifications, they must be internally flexible. They can't be written up in such detailed fashion that there is only one man in the world who can fill the job. The main objective of job analysis and specifications is to convert the fundamental principles of job distinctions into something that is practical, so that when a man is brought into the Army, his abilities and interests can be weighed in such a manner that he may be placed where he is most useful. It is a means of "personnel shorthand," of being able to tell the kind of a man that is wanted in a particular niche, in such terms that the man available can be placed into the job, which will neither go beyond, nor fall short of, his qualifications.

There are still possible consolidations -- there are still jobs which may have to be broken into several different parts. It is hoped that a fuller understanding of the underlying principles of job specifications and personnel classification will assist Signal Corps officers in making the most effective use of available manpower. The objective has been, and always will be, to place the right man in the right job.

APPOINTMENT AND ASSIGNMENT OF AFFILIATED OFFICERS

On March 22, 1943, the Procurement Section received informal advice regarding that part of AR 605-10 which pertains to the appointment and assignment of affiliated officers. A revision was being made which would prevent the assignment of a civilian who has been appointed to an affiliated position until the unit to which he is assigned has been activated. Inasmuch as this procedure, if authorized, would be at complete variance with the present methods of training affiliated personnel, action was taken by a letter to the Military Personnel Division, Army Service Forces, requesting a clarification. In a letter dated March 24, 1943, advice was received from the Office of the Assistant Chief of Staff, G-1, indicating that action is being initiated to permit affiliated officers to be assigned prior to activation of their units in order to undergo basic military training. In this manner, action which might have jeopardized the future of the affiliated plan was averted by means of prompt action.

OFFICER PROMOTIONS

The following promotions have occurred among Signal Corps personnel during the period from March 26, 1943, to April 23, 1943, inclusive:

Lieutenant Colonel to Colonel (Temporary)

Graul, Donald Philip
Hayes, Harold George
Serig, Howard William
Totten, James Elmer

Major to Lieutenant Colonel (Temporary)

Atkinson, Earl John
Brown, Harold McDonald
Cruickshank, John Pownall
Eaton, Wayne Gordon
Everett, Oscar Ellis
Gibbs, David Parker
Griffin, Robert William
Herrman, Charles Stephan
Humbert, Locke Rayner
Julian, Erle Harris
Kern, Gordon
Koon, Kenneth
Lewis, Harry James
Lynskey, Joseph Philip
McDonald, William John
Millard, Willard Barrows, Jr.
Montgomery, William L.
Musgrave, Maurice Wuchter
Nystrom, Raymond Axel
Pollock, Charles McGinnes
Price, Glenn A.
Ross, Winfred Alban
Thomas, Lewis Walter, Jr.
Tustison, Joseph George
Wright, Harry Alexander

Captain to Major (Temporary)

Almond, Vance Delma
Archibald, Herbert Rolfe
Barbee, James Edward
Bassett, John Jewett
Bennett, Ernest LaFayette
Bergman, Paul Richard
Bohn, John Thomas
Bregnard, Adrian Laney
Breitenbucher, Philip M.
Carlson, McKinley Steen
Carter, Arthur Paul
Cary, Louis Andrew
Chamberlain, Newton Lawrence
Chance, Joseph Stong
Chandler, Urey Elgin
Clapper, John, Jr.
Cole, Burton Reece
Cooper, John Bradley
Cooper, John Robert Royal
Craven, Claude Lincoln
Damidovich, Joseph Frank
Dart, Thomas Parker
Decker, Frank Warren
Dennie, Louis White
Devendorf, Curtis Leon
Drummond, Charles Linton
Duck, Howard Arthur
DuMond, Kenneth Stephen
Felix, Edgar Herbert
Ferguson, Edward Francis
Fertig, Norman
Flynn, Edmund Paul
Greenway, Edward William
Groce, Josh Halbert
Heltzel, William Edward
Hiler, J. Kenneth
Hiser, Charles Henry
Kammerer, Otto Walter

Cont'd

Captain to Major (Temporary)

Kerr, William Albert
Kilgo, Marvin Moses
LaBaw, Edwin Marques
Lambert, Sam Francis
Lawrence, Clarence David
Lindegren, George, Jr.
Linsley, Scott E.
Lovgren, Clarence Leroy
Ludden, Charles Franklin
Martin, Edward William
Mathews, Harry Ferdinand
McClintock, Donald Wilbur
McDonald, Walter Franklin
McDowell, Samuel L.
Miller, Mason Hobart
Muston, Thomas William
Naylor, Hugh Edward, Jr.
Nichols, Eldon
Osborne, Nathaniel Montgomery, Jr.
Patterson, Charles Philip
Perry, Valentine Marlow
Potter, Weston Merritt
Richman, Milton Herbert
Rizner, Andrew
Rouse, Russell Francis
Roush, George Edgar
Sayler, William V.
Schroeder, Cloyde Paul
Schweitzer, William Peter
Scott, Philip Beecher
Seigler, Thomas Jennings, Jr.
Snow, Edson Bly
Spears, Joseph Faulconer
Stevenson, Edward Ford
Stone, Albert Joseph
Storm, Eric Foster
Sundermeyer, Harry James
Thorpe, John
Van Harlingen, William Mulford, Jr.
Whalen, Thomas J.
White, Kendall Crittenden
Wildes, Gordon Weber
Williams, Charles Edward
Williams, Robert Erskine, Jr.
Wright, John L., Jr.
Zimmerman, Carl Paul

REASSIGNMENT AND ROTATION OF OFFICERS

RETURNING FROM OVERSEAS COMMANDS

A letter was prepared for the signature of the Director, Signal Troops Division, setting forth the policies of the Chief Signal Officer in the reassignment and rotation of officers returning from overseas commands. These policies provided for the assignment to the Signal Corps Replacement Pool of officers returned from overseas commands either because of a long period of service overseas, or unsatisfactory performance of duty. These officers are to be interviewed by the Commanding General of the Eastern Signal Corps Replacement Training Center, who notifies Military Personnel Branch, OCSigO, of his findings. Reassignment is then recommended by Military Personnel Branch. Replacement of returned officers is made from the Signal Corps Replacement Training Center.

GPO 83-040570