

CONTROL APPROVAL
SYMBOL SPSAM - 170
W42.40:
29

MAY 78 1944
sub cat

~~locked case~~

No. 29

RESTRICTED

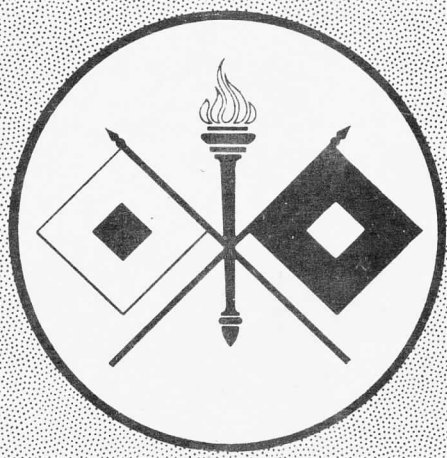
SIGNAL CORPS

TECHNICAL

INFORMATION LETTER

APRIL • 1944

ARMY SERVICE FORCES • OFFICE OF THE CHIEF SIGNAL OFFICER



DECLASSIFIED
Authority ED 10501
By CB NARA Date 1-20-11

SIGNAL CORPS TECHNICAL INFORMATION LETTER

Number 29

April 1944

RESTRICTED

This document contains information affecting the national defense of the United States within the meaning of the Espionage Act (U.S.C. 50:31, 32). The transmission of this document or the revelation of its contents in any manner to any unauthorized person is prohibited.

WAR DEPARTMENT · ARMY SERVICE FORCES

OFFICE OF THE CHIEF SIGNAL OFFICER

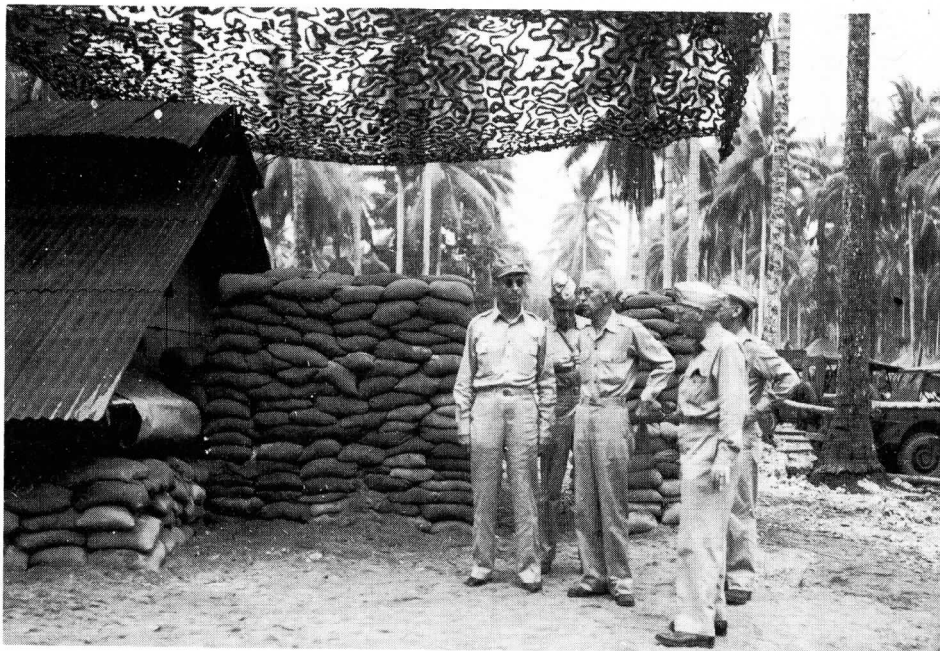
SERVICE DIVISION · SPECIAL ACTIVITIES BRANCH

DECLASSIFIED

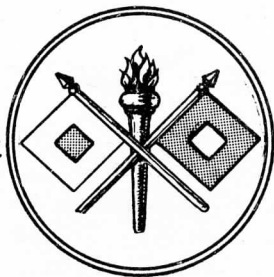
Authority EO 10501
By CP NARA Date 1-20-11

TABLE OF CONTENTS

PRESS MEETS CHIEF SIGNAL OFFICER.	5
THE MARKHAM RIVER VALLEY POLE LINE.	11
"GETTING THROUGH" THE GAS MASK.	21
THE DUKW-MOUNTED RADIO SET SCR-299-().	25
UNDERWATER TELEPHONE LINES.	29
INSTALLING THE SYNTHETIC RUBBER TIRE.	32
SHIPMENT OF EQUIPMENT MINUS COMPONENTS.	34
SIGNAL CORPS MANUAL OF STANDARD DESCRIPTIONS.	35
LEATHER SUBSTITUTIONS	37
ENEMY EQUIPMENT BULLETINS	38
EQUIPMENT NOTES	
SIGNAL CORPS BOARD	
Recently Established Cases.	39
Cases Approved by the Chief Signal Officer.	39
GROUND SIGNAL	
Jungle Trail Reel Unit.	43
Aluminum Caps for Radio Set SCR-536-()	44
AIRCRAFT RADIO	
Radio Set SCR-624-A	44
The Improved Radiosonde	48
ARMY PICTORIAL	
Using Fungicides with Photographic Equipment.	50
The New Double Film System Recorder	52
TELETYPEWRITER EQUIPMENT CHARTS	
Parts List.	54
Tactical Teletypewriter System.	55
Physical, Operational and Power Characteristics	56
Accessory or Associated Items	57
MILITARY TRAINING	
VISUAL AIDS	
Amphibious Communications Pegboard.	58
Audio-Visual Beat Frequency Indicator	59
A-C Voltage and Current Demonstration Board	60
MILITARY PERSONNEL	
Effect of ASF Circular 26 upon the Signal Corps	62
1943 Signal Corps Awards.	63
Reclassification Board Established at Fort Monmouth	63
Chief Signal Officer Honored by Venezuela	63
Assignment of Wac Officers to Overhead Positions.	64
Recruiting Wacs for Signal Corps Duties	64



ABOVE - MAJOR GENERAL HARRY C. INGLES AND PARTY ARE SHOWN INSPECTING "X" FORCE MESSAGE CENTER IN NEW GUINEA. FROM LEFT TO RIGHT ARE MAJOR GENERAL SPENCER B. AKIN, CHIEF SIGNAL OFFICER, SOUTHWEST PACIFIC AREA; MAJOR J. M. ERNST, AIDE TO GENERAL AKIN; COLONEL HARRY REICHELDERFER, SIGNAL OFFICER, "X" FORCE; THE CHIEF SIGNAL OFFICER, AND MAJOR W. E. FOLTZ, AIDE TO GENERAL INGLES. BELOW - GENERAL INGLES AND GENERAL AKIN ARE PICTURED LEAVING A BATTERY COLD STORAGE SECTION OF A SIGNAL DEPOT AT MILNE BAY, NEW GUINEA



PRESS MEETS CHIEF SIGNAL OFFICER

On the word of three commanders in the Pacific -- Admiral Nimitz, Admiral Halsey, and General MacArthur -- operations have never been delayed because of insufficient communication equipment, according to a statement made by Major General Harry C. Ingles to newsmen at a press conference on March 21 upon his return from a five-week tour through the Pacific areas.

"So far as the Pacific area is concerned," he said, "and that was one thing I went into from A to Z, there is no critical shortage of signal equipment."

Disclaiming responsibility as an expert on operations in the Pacific and pointing out that his mission was to "check on signal equipment and supplies, and communications systems," General Ingles emphasized communications problems in that theater by citing the vast distances encountered.

"I think that you will be most impressed with -- as I was impressed -- the enormous distances with which those people have to contend. A thousand miles is normal. This, of course, throws a great burden on the communications system.

"Our signal communications system for years -- and there is nothing to indicate that it is wrong -- was based on the principle that the primary means of communication is wire.

"We have regarded radio as an auxiliary means of communication -- very valuable, but auxiliary to wire. Now, when you get into the Pacific area, radio becomes not only the primary means of communication, but the only means. Therefore, there is a great burden on the radio system and it requires the installation of a much more extensive radio net than would be necessary in locations where fighting is confined to one land area."

ARMY - NAVY COOPERATION

Because the Pacific Theater is predominantly a water area, General Ingles stressed the necessity for close working cooperation between the serv-

PRESS CONFERENCE

ices. That this is an established procedure was evident, he said.

"The relationship between the Army and Navy over there is splendid," he pointed out. "Signal centers are combined in every case. Navy facilities are manned by Army men and Army channels, by sailors. The whole relationship between the Army and Navy is excellent. The Army throughout the Central Pacific has the highest regard for Admiral Nimitz; and in the South Pacific, you will find like regard for Admiral Halsey.

"Another thing which impressed me, and has impressed everyone else, is the ingenuity displayed by Signal Corps soldiers. There is scarcely any situation they encounter which can be done according to the books. They are confronted with one unusual situation after another, and they display an enormous amount of energy and ingenuity, and also a good deal of humor, in meeting these problems.

"For example, at one place in New Guinea I visited the power plant which furnishes power for the radio stations. Most of the men in that particular area come from Texas and Oklahoma, and over the shack where the generators are housed they have a big sign which reads: 'Texas-Oklahoma Power and Light Company'.

"PENTAGON" IN NEW GUINEA

"At another place farther up in New Guinea is an airfield. There they have a little shack and a big sign above it, as big as the shack itself, reads: 'Pentagon Building'.

"There was a young lieutenant up on Bougainville who with his gang had put up low telephone poles with crossarms that were notched. He just laid the wire in the notches and tied it in with a basket-weave tie. It looks just like a telephone wire along a highway, except that the crossarms have no insulators. I had never seen field wire put up that way before.

"That is just one example. There are many others. I have been in the Signal Corps for 25-years and I thought I had seen all the methods, but I saw some that I had never seen before — some that individual sergeants and enlisted men had worked out. No matter what system they use, if the construction stands and the wire does not break down, we let them go ahead with their own methods. The men will exercise a great deal more care in maintaining something that they worked out themselves than if they were forced to learn from a book.

"Signal Corps soldiers are combat soldiers, too. They have done a lot of fighting already, and are well trained in the use of their weapons. Actually they are engaged in combat to a much greater extent than in the last war.

PRESS CONFERENCE

"As a matter of fact, this applies to all service troops. There was one incident, which you may recall, during the Battle of Milne Bay. When the Japs landed and were driving the Australians back, a battalion of engineers building an airfield ran their bulldozers off into the woods, got their combat equipment, machine guns and rifles, and took up positions on the far side of a clearing they had already made.

"The Japs very foolishly came right on across the clearing and it was just slaughter. The battalion of engineers broke up the Japanese attack entirely. As a matter of fact, the engineers dug a huge grave, ran bulldozers over the clearing and buried the enemy dead, so the airfield is made on a clearing over the bodies of more than 500 Japs."

Asked about the amount and quality of enemy equipment we are getting, and the uses to which it is put, General Ingles told of a Jap radio tower that survived our bombing and artillery attack on one of the Pacific atolls. It was put into use by American signalmen as soon as they had established themselves.

In answer to a question about the value of such equipment, he said: "If the tower had not been there, we would have put up 90-foot poles."

After mentioning the height of the tower -- 125 feet -- General Ingles was asked whether it compared favorably with some of our bigger stations in the Pacific.

"Well, yes, it does," he answered. "Here is the situation in radio: We do not use those big towers any more -- because of improvements in radio science. We can do the same thing with 70- or 90-foot telephone poles.

"There is an interesting little story illustrating the imitativeness of the Japanese," the General continued. "We were very much surprised to find among the captured equipment radio tubes with the R.C.A. trademark. In our laboratories it was found that they were not made by R.C.A. at all. They were copies of R.C.A. tubes, and so well had the Japs duplicated them that they had included the trademark.

"Much of the Japanese equipment is a copy of German apparatus. Some of it is pretty good. Their radios and field telephones are fine, and their field switchboard is sturdy and heavier than ours."

JUNGLE CUTS RANGE

The General was asked the relative use of radio and wire after troops are ashore, and whether radio worked well in the jungle.

"Radio does not work nearly so well in the jungle," he replied. "The

PRESS CONFERENCE

dampening effect of jungle growth and trees on the radio waves cuts down the range of a set. The communications troops get to work laying wire as soon as they get on shore."

"How far can you talk in the jungle with a walkie-talkie -- about four miles?" he was asked.

"Yes, we figure about four or five miles. We are conservative about such statements. If we say five miles and the soldier gets ten, he never objects; but if we say ten and he gets only five, that is bad. If there is an extra margin of two or three miles in a walkie talkie set it would easily give service over a distance of five miles. It depends on how wet the weather is in the jungle on the day the set is being used.

"The jungles in the Pacific are beastly. I have seen jungles in South and Central America, and in the Philippines, but those in the Pacific are the worst I ever saw. Some of the trees grow 250 feet high, making operations very difficult.

JUNGLE BAD FOR BATTERIES

"At the same time, jungle climate is rough on radio equipment. Plans must be made for a considerable loss in equipment through deterioration. It is bad country for dry batteries. In that constantly high, humid temperature, dry batteries deteriorate rapidly, much more so than in the United States. To maintain them in good condition, they are kept in cold storage.

"Refrigerator boxes are built by troops. The outer space is filled with sawdust from portable sawmills which we send over to them, and then an ordinary commercial refrigerator unit is installed. Those refrigerator boxes give good service and the batteries are kept in optimum condition until they are issued to troops. We are now trying to develop special batteries for that particular climate, and thus far have had some success."

"Radio sets are specially treated against moisture and fungus. There are several types of fungus growths in tropical countries which ruin contacts in a surprisingly short time. Our chemists know of a fungus-resisting chemical which defers fungus growth for a long time.

"Waterproofing is important. A waterproof container fitted with rubber gaskets has been adopted. The antenna, for instance, comes out through a rubber collar, so that the set will operate in the rain. Of course, with heavy station equipment it is not necessary to do that. Such equipment is placed under some kind of a shelter which is erected before the equipment is installed.

"How is waterproofing applied? We waterproof it by spraying and brushing over all the separate leads and connections. This is done with a spray gun and in many cases with a brush. So long as the waterproofing is done

PRESS CONFERENCE

effectively we allow a man to use the method he likes best. One mechanic may prefer to use a spray gun; another man uses a small brush.

"Incidentally, communication equipment takes an awful beating in unloading. There are no piers or docks at any of those places. The equipment comes in on a ship and is taken off on a net, run to shore on a barge, picked up on a net again in the driving rain, and landed on the beach. There is no shelter. It lays on the beach in the rain sometimes for a month or so."

General Ingles was reminded of the prosecution of the Anaconda Wire and Cable Company for the sale of defective wire and was asked if any of it went overseas.

"No, none of that was shipped overseas. It is used here for training purposes.

"The same thing happened during the last war. There was no prosecution for it. As a matter of fact it was no one's fault; there was no criminality involved. Sometime after we had entered the war, the method of insulating field wire was changed. The resulting wire tested through perfectly, but when it got to France it was found that there were patches, about a foot long, that were not covered. The wire functioned perfectly as long as it was dry, but when it was rained upon, it would go out. The soldiers called it 'sunshine wire'.

"Our field wire formerly weighed about 185 pounds to the mile, and now it averages 125 pounds to the mile. We'd be pretty poor in the United States if in a period of 25 years we could not make better wire," General Ingles replied in answer to a question.

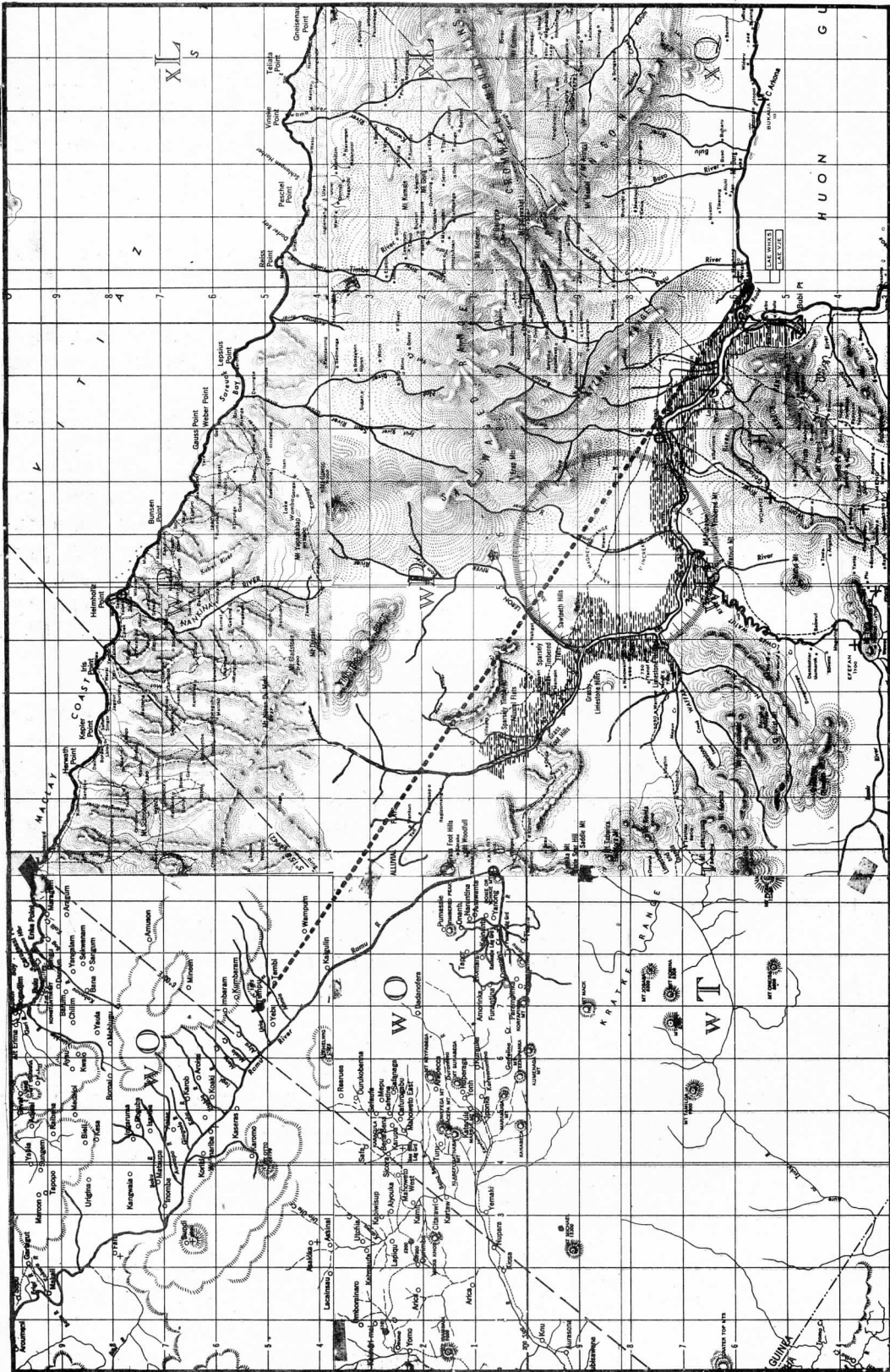
CAMERAMEN DOING FINE JOB

"There is one other thing I might mention to you," he continued, "and that concerns pictures and films from the theaters of operation. We have secured a sizable amount of good combat footage from the Pacific Theater. I was very much pleased with the attitude of the cameramen. Believe me, I take off my hat to them. They go ashore with the first wave, and they have, I think, a job that takes more courage than an infantryman going ashore with an automatic rifle in his hand. In addition to a camera, they carry a carbine across their backs.

"They are doing a fine job of getting good combat films. Some of these are made available to the public, and others are kept as historical records of war.

"Of course, they have a situation there which lends itself to photography. On the beach everything is visible. When you get on shore-inland fighting -- the remarkable thing is the emptiness of the modern battlefield. I have seen pictures that have come back from the Italian front, for exam-

MARKHAM POLE LINE



THE MARKHAM RIVER VALLEY

MARKHAM POLE LINE

Most of it is the Markham River Valley country, stretching up the southern edge of the Huon Peninsula in virginal splendor, challenging and untamed. In a report of a Signal Construction Officer on an aerial survey, is found this remark, sheltered by parentheses from the military specifications surrounding it:

"(From a picturesque viewpoint, the Valley is the prettiest spot I have seen in New Guinea or Australia.)"

Four to ten miles wide, it winds through the steaming jungles of New



A MANGROVE SWAMP IN NEW GUINEA

Guinea, but only in the lower part, near the coast from Nadzab to Lae, does the jungle encroach.

Neither had any trace of civilization encroached much on the Valley until the Signal Corps came along.

Although the Australian New Guinea Forces had taken Dumpu only four days before Company C arrived in Lae to build the line to it, the fighting along the route had been spotty rather than a mile by mile advance, and most of the territory had never harbored troops of either side. Conquest of the country had been a game of aerial leap frog. For instance, to capture

Kaiapit, the Australians and their supplies were flown in by planes. They were prepared to tackle the Japs, but not the trackless terrain.

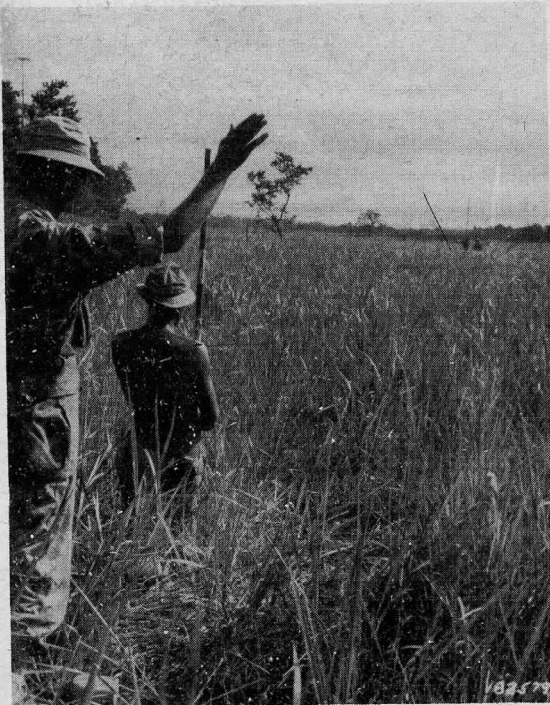
Enemy Still Present

Scattered patrols had wandered here and there through the country. In fact some of the infiltrating Jap patrols were still in there, as security guards of Company C were to find out.

Engineer units had cut through here and there along the route to build air strips, and it was to supply these places with communication as well as to eventually establish longer lines to bases not then captured, that the project was designed.

There were a few fast disappearing traces of trails cut by rescue parties to crashed planes, and there were many native villages.

So far as is known, only one through route had ever been pioneered, and that was by another Signal Corps outfit, but the pole line was to follow it only in part. Units of the ___ Signal Construction Battalion (Aviation) had been laying Spiral Four the full way, within a few days, sometimes within a few hours, after the territory was captured by the Australians. Strung along the ground, it was already in operation and Company C is keeping it open whenever vehicles or bullets sever it somewhere along its tortuous length.



LINE SURVEYING THROUGH KUNA GRASS

But a pole line was something else again. A pole line needed from eight to twenty tons of material to the mile. Its builders needed a ton of food and other expendables per day. Every ounce of it had to be brought from Lae over an ever-lengthening line. Engineers had built, and were still working on, a road from Lae to Nadzab, and from there on it was, "Write your own ticket."

On October 11, less than 36 hours after arrival, Company C started its line survey.

There were no poles for the first leg of the line from Lae to Nadzab, so the following day, as the outfit began clearing its right of way, it started cutting its own poles at the same time.

It took until January 17 to push the pole line 25 miles to Nadzab, and the worst trials still lay

MARKHAM POLE LINE

ahead. But officers and men were undismayed by the prospect. They had been unduly delayed by high priority materials moving over the road, and from here on the road was to be entirely their own, even if they did have to make it themselves.

It isn't strictly speaking a road that the Signal Corps has built west of Nadzab. In the United States it wouldn't even rate a dotted line on a highway map.

Across the kuna grass country it wavers from day to day. The heavy kuna grass will mat down and support a half dozen trucks when it doesn't tangle in the axles, but then it ruts and the next six trucks have to make a new track.

Through the swamps, they've cut ditches to drain the water and let the natural sand and mud harden into a highway. It doesn't stay hard when the rains come, but the trucks go through anyway.

"Moonlight"
Requisitions

Work such as this calls for a bulldozer, and a bulldozer isn't provided for in the Table of Organization for a Signal Construction Company, but in New Guinea a company's T/O is generally what it can get its hands on, and Company C got its hands on a bulldozer that's hardly stopped working since.

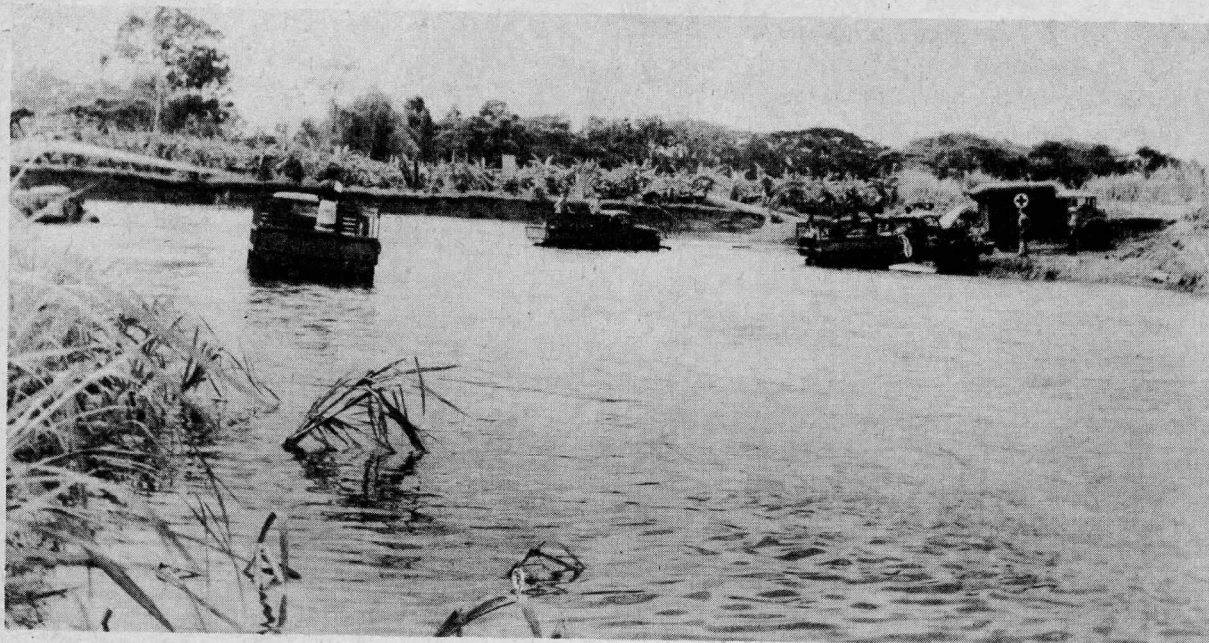
Supreme obstacles of the Markham River Valley project are the rivers. Officers and men of Company C had had no training in river crossings of this type. The wire line crosses four of them, The Erap, Leron, Ramu and Markham, as well as several smaller streams. The Erap is 1380 feet wide at the crossing point, and the Leron 1190.

Of course, there are no bridges. The rivers must be swum and forded.

Most treacherous of them is the Leron. The Erap has an island in the



MOWING THE KUNA GRASS



GI TRUCKS FORDING RIVER

center of the crossing point, and a pole can be placed midway to support the line, but the wire must span the 1190-foot gap of the Leron in a single jump.

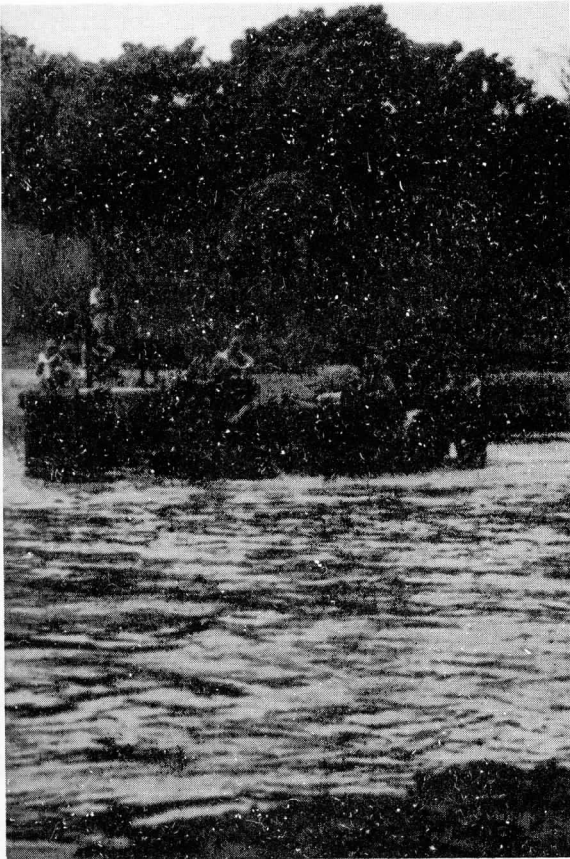
The channels of the Leron change as often as every hour. Fifteen minutes after a safe crossing at one point, it may become a tearing torrent. Already it has claimed two two-and-a-half ton trucks and one tractor of the pole line crews. In midstream the waters have suddenly risen around the vehicles, turned them over and swept them away. With them went their personnel, tumbled about like corks, swimming frantically, struggling for footholds in shallow water.

Little could be done to help them. Sometimes soldiers on shore would toss ropes to them, but they were swept away too quickly and the river banks were too impenetrable for rescuers to keep up with the surging current.

Yet not one man has been lost. Some never reached safety until they were a half day's march away, but every one has come back. The trucks sank from sight, and neither wading parties, river bank patrols nor airplanes were able to discover them.

Some clue as to their fate may be gained from the experience of one of the Signal Corps soldiers fording the Leron. In a shallow portion he perceived an automobile radiator cap lying in the mud. He stooped to pick it up, but he couldn't budge it, because attached to the cap was a tractor, completely buried in mud. It was believed to have been lost by an Engineer unit that had tried to get through previously. Efforts to dig it up were futile.

MARKHAM POLE LINE



TRACTOR HAULING TRAILER ACROSS A STREAM

Fording the Leron, a truck would sometimes travel five miles up and down the river along sand bars with a wader in front searching out shallow places, to traverse a straight line distance of 2,000 feet. That would consume as much as two hours.

Following the loss of the three vehicles and the recovery of several others that had been overturned or inundated, a system was worked out that insured their safety and greatly accelerated transportation. After an initial crossing, one vehicle was stationed on each river bank. Cables were fastened from the winches of the two stationary vehicles to the front and back of the one going across, then it was pulled straight through. If it bogged down, it was hauled back to the nearer bank. Usually it can be pulled all the way across, even through the deeper places, and if it is not immersed too long, it will operate when it reaches land.

But when a truck has lain in the river, perhaps on its side, for half a day or more, the engine has to be torn down on the river bank, and the water removed.

Punishment like this is gruelling on vehicles, and it has become necessary to work each one 24 hours a day, seven days a week, due to the lengthening supply lines and the tying up of two at each river crossing, for even after the wire has been strung, the trucks must still ply back and forth with supplies.

The four-ton, six-by-six truck has proved best for this work. It sits high enough that much of the water washes under its body, building up no pressure that might overturn its greater bulk, and its power enables it to pull out of most difficulties. But with only two allowed to Company C by the Table of Organization, the company makes the crossings with even its lightest vehicles.

To span the wide river jumps with wire, an "H" fixture is installed on each river bank, of sufficient height to allow for sag without the water touching the wire even in flood stage.

The "H" fixture is a modified type of the common A frame, consisting of

two poles anchored by two guy wires each and connected by two cross arms at the top.

The double guy wires have been necessitated by the fact that none bigger than 6,000 pounds can be used since the only anchors available are five-foot rods, five-eighths inches in diameter. Thus, for each extra 6,000 pounds of anchorage required, or portion thereof, an extra guy wire must be used.

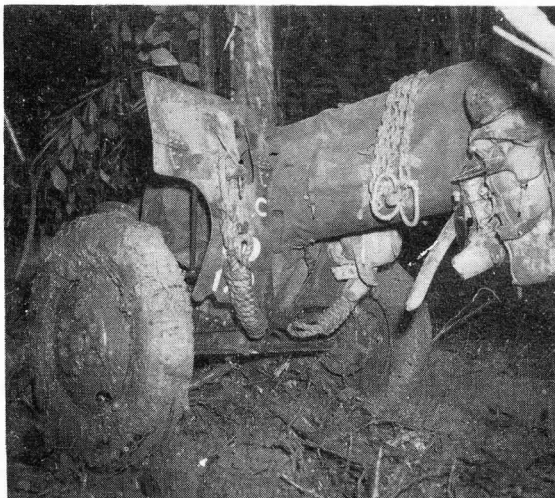
The circuit lines feed from the single pole line onto the cross arms of the double poles in the "H" fixture, cross the river and are attached similarly to the other "H" fixture, then feed back onto the single pole line to continue overland.

After the "H" fixtures have been built, a soldier climbs down the bank (they are usually at high points to allow for sag) and swims and fords the river with one end of a rope tied around his waist. When he reaches the opposite shore the wire is tied to the other end of the rope and pulled across. No boats are used.

Not even the winch cables at the truck crossings can do the lone soldier's job of getting the wire across, because these are usually located too far away from the wire crossings, at the best fording points.



AUSSIES FORDING ONE OF THE SWIFT FLOWING RIVERS



"THE FIGHT AGAINST --- ENVELOPING MUD"

Since that first night at Lae, the men of Company C have experienced one more bombing and there have been shots fired during the night at enemy patrols, but not a soldier has been scratched by enemy action. To these Signal Corps troops the worst enemies in warfare have not worn uniforms. The fight has been against raging rivers, clinging grass, enveloping mud, stubborn jungle, towering mountains, tiny insects and tinier germs.

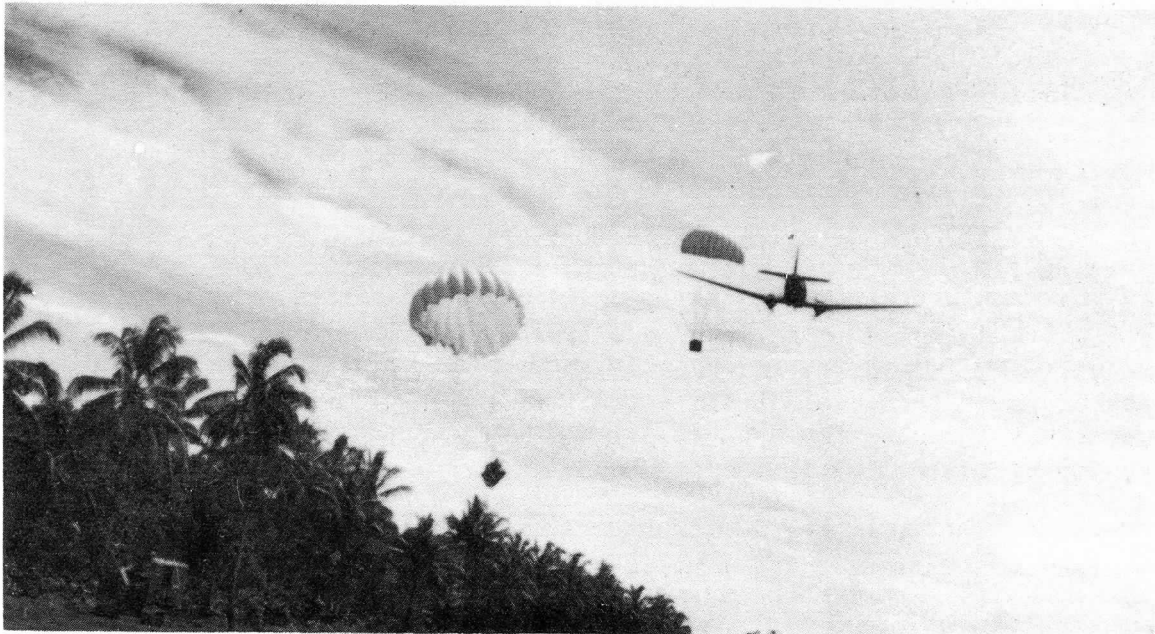
Besides the usual malaria and dengue fever, the Markham River Valley is typhus country, and painstaking care has been exercised to protect the health of the men. The wearing of leggings or high boots

MARKHAM POLE LINE

and full length trousers is mandatory, as protection from mosquitoes and other insects. Sickness has been kept to a minimum and there have been no deaths from any cause.

Aussies Help

With Company C through it all, unflagging in their stamina and courage, have been the Australian _____ and _____ Line Sections, with a total of 120 officers and men. Like the Americans, they had had no combat zone experience when the job started. Headquarters Company personnel of the _____ have kept their comrades supplied over the longer and longer truck route. Detachments of 40 and



TO SIGNAL CONSTRUCTION MEN THESE ARE "BISCUIT BOMBERS"

50 men from the construction platoons of the _____ B Company, Operations, have been sent out to assist wherever possible. All the talents of all the Battalion's officers and all its motor, mess and supply facilities have been tapped for the job. The veteran _____ Signal Construction Battalion, which laid its first pole lines through Australia itself in the early days when General MacArthur was digging in, has lent a platoon from its Company B to help string wire on the second two arms of the Lae-Nadzab line. Ordnance, Engineers, Air Force, Quartermaster, all have helped in their own ways.

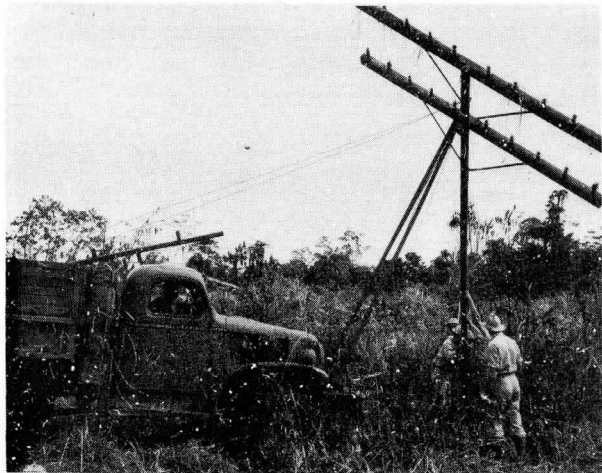
In New Guinea there isn't much wrangling over credit for a job. Everybody helps where he can and takes help where he can get it.

The Air Force has supplied the "biscuit bomber" planes that regularly drop rations and supplies to the advance party which is laying out the route about 80 miles ahead of the construction teams.

MARKHAM POLE LINE



CLUMPING THROUGH A JUNGLE TRAIL



RAISING POLES WITH AN IMPROVISED BOOM

No matter how desolate the country about them, the Signal Corps troops can always see ample signs of military life overhead. Since Gusap, at the far end of the line near Dumpu, must be supplied entirely by air, the route of the wire project is as busy as a trolley car line with Army air transports flying at all levels. Mostly, they stick pretty close to the tree-tops as protection against any Zeros that might try to get at them. The fast enemy pursuit planes can't get much of a crack at the slow-moving transports that close to the ground.

Project 1201-A uses 200-pound, hard-drawn copper line wire, which corresponds to 104 in the United States. Sixteen physical circuits (32 wires) are installed from Lae to Nadzab, and from Nadzab west, eight circuits (16 wires) to Gusap.

Tubular steel poles, welded together in sections and mostly 25 feet overall, support the wires west of Nadzab, except for the "H" fixtures which have been cut from the forests. These poles have two cross-arms, while from Nadzab back to Lae there are four cross-arms.

Virtually all the materials in the entire line were manufactured in Australia and obtained by local purchase.

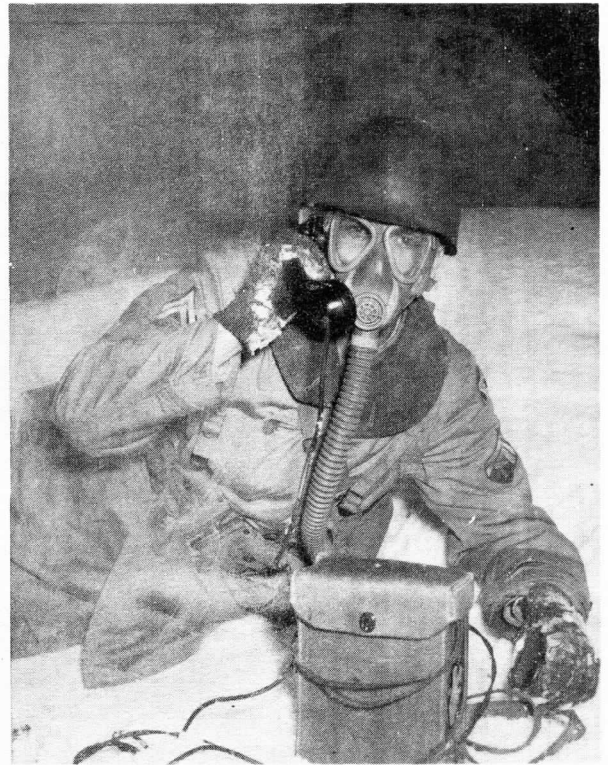
At this writing, the ___ Battalion and their Australian comrades are still at work on their first job in the combat zone. Each day the job gets harder. There are more and more miles of supply lines between the job and base, more and more rivers to ford with the supply trucks, telling wear and tear on vehicles, machinery and men, and more and more determination that Project 1201-A will soon be just another job for Signal Corps telephone and telegraph operators and a few maintenance men.

"GETTING THROUGH" THE GAS MASK

There is a general belief that neither handsets nor microphones can be used successfully while the operator is wearing a gas mask. Some troops may even cite personal experience to prove this. But in all cases their experience is based upon either of two factors: the attempt to use a handset with an old type gas mask, or the incorrect use of a handset with the modern type gas mask as now issued.



NORMAL USAGE OF TELEPHONE HANDSET



GAS! REGULAR POSITION WON'T DO

Microphone T-45-(), the lip microphone, or Microphone T-30-(), the throat microphone used when the T-45 is not available, will afford satisfactory communication under any gas mask when suitably connected to a radio transmitter or wire line. However, the number of Microphone T-45 being provided for this purpose is only one for each two Telephone EE-8 in use. Therefore, some users of the field telephone will not have Microphone T-45. Also, some overseas units may not have their full complements of these microphones at first, as full production has not yet been reached.

In the event of gas warfare it is thus possible that using personnel may find communications seriously handicapped unless they have received instructions as to the correct employment of handsets when used with gas masks.

"GETTING THROUGH" THE GAS MASK

Such instruction is now given to signal troops being trained in the United States. Personnel who have completed their training will require instruction and practice in order that they may learn to use the handset in the required manner, for if it is held in the normal position, the gas mask will greatly hamper communication.

The handset must be held in one position (the normal one) to listen, and in another (with the transmitter or mouthpiece held directly over, and in close contact with, the outlet vent or "flutter valve" of the present type of gas mask) in order for the user to make himself understood clearly. In the case of gas masks provided with a speech diaphragm, the transmitter is, of course, placed over that part of the mask.

Practice is definitely necessary, for in normal use the receiver is pressed to the ear, while the transmitter is naturally positioned at the lips of the user. The gas mask prevents this. The position of the handset must be changed; the user must hold the receiver at his ear for reception, and the transmitter at the speech diaphragm or the outlet vent of his gas mask for transmission. The change of position takes time, and it is therefore necessary for him to signify in some definite manner when he has done speaking; the word "over" or some other simple code to indicate this is suggested to



TRANSMIT YOUR MESSAGE THIS WAY

"GETTING THROUGH" THE GAS MASK



RECEIVE YOUR MESSAGE THIS WAY

indicate to the other end of the line that he is shifting his handset to the listening position.

While this requires more effort than simply holding the handset in one position, tests recently completed at Harvard University and at the Fort Monmouth Signal Laboratory prove the procedure to be well worthwhile.

The results of these tests indicated, among other things, that speech transmitted through the speech diaphragm type gas mask was as easily understood as when no gas mask was worn, if the transmitter was held at the speech diaphragm, but if the handset was held in the ordinary (or listening) position, the speech was only about 1/4 as intelligible. Similar tests made with modern gas masks having no speech diaphragm showed that when the transmitter was held over the outlet vent, speech was approximately 2/3 as understandable as when no mask was used, but that it fell off to about 1/3 when the operator spoke while holding the handset in the listening position. These tests were conducted with 60 to 80 db of ambient noise at both the transmitting and receiving positions (see Figure 1).

Other tests made with both types of gas masks and a dummy telephone line showed even more graphically the importance of correct positioning of the

"GETTING THROUGH" THE GAS MASK

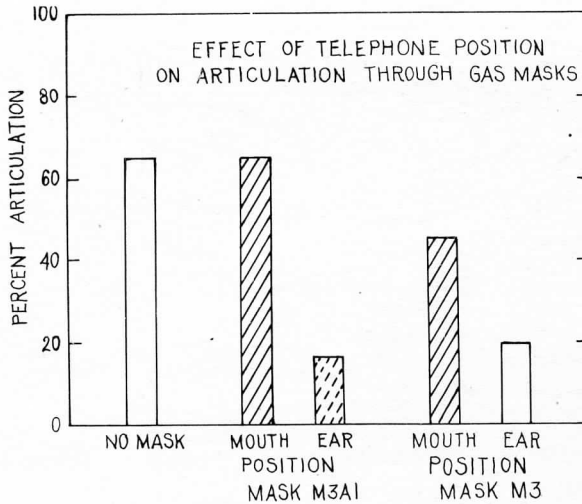


FIG. 1

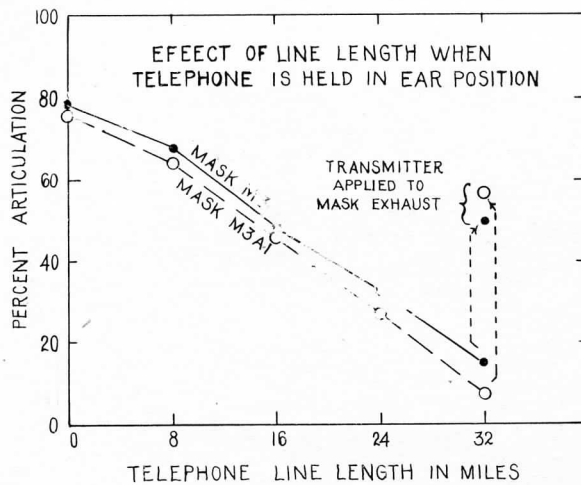


FIG. 2

handset. With the handset held in the listening position, the percent articulation, with 0 miles telephone line length, was between 75 percent and 80 percent for both types of mask. This fell to slightly below 50 percent at 16 miles and to below 20 percent at 32 miles. But when the handset was held in the correct speaking position, at the speech diaphragm or outlet vent, the articulation percentage at 32 miles rose to about 58 percent (the equivalent of some 10 miles) with the speech diaphragm type of gas mask, and to 50 percent for the standard mask (the equivalent of about 15 miles). In these tests, too, similar ambient noise was introduced, to simulate field conditions (see Figure 2).

The above mentioned tests, and others not cited here, have definitely proven that communications conducted while wearing a gas mask are appreciably improved when the correct technique is followed. Best, of course, is the use of a Microphone T-45 or a Microphone T-30. When these are not available, and the handset must be employed, the operator will find it necessary to hold the receiver at his ear while listening, and to shift the handset so that the transmitter is

pressed closely over the speech diaphragm or, if none is provided, the outlet vent of the gas mask while he is speaking. This technique requires practice. Therefore it is strongly recommended that all using troops be given instruction and practice in the correct method of using a handset with a gas mask, as described above. This applies equally well to Handset TS-10-() of Telephone TP-3 (sound powered), and this method will have to be employed as Microphone T-45 or T-30 cannot be used with sound powered equipment.

THE DUKW-MOUNTED RADIO SET SCR-299-()

The following article describes the employment of the DUKW-mounted Radio Set SCR-299-() which was used so successfully in the Sicilian campaign. The article illustrates the method of mounting the radio and shelter in the DUKW and lists some of the advantages, disadvantages, and possible developments of such installations.

FIG. 1



Employment

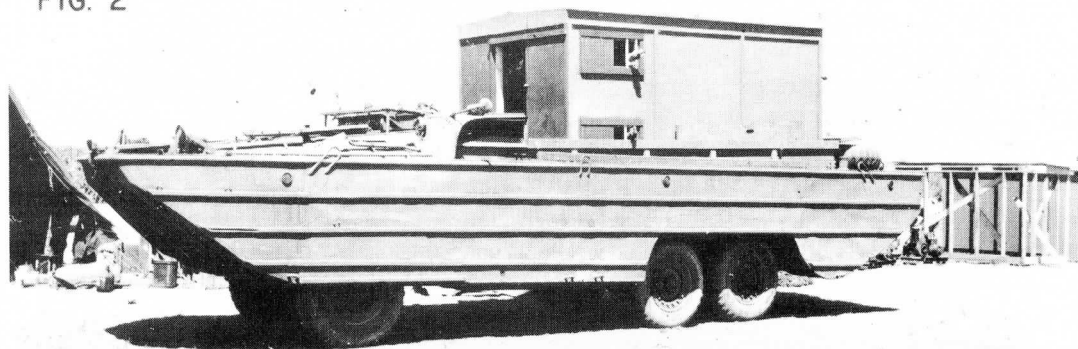
The amphibious SCR-299-() was employed in the initial landing phase (10-12 July) by five of the sub-task forces in nets similar to Army Command and Warning nets. This was the first known instance of a high power vehicular set being used in this manner and, from all reports, it "provided the most reliable high power radio communication during the landing phase."

When elements of the 3rd Infantry Division made a flanking attack in the vicinity of S. Agata (8 August) a DUKW-mounted 299 was again employed.

Installation

The radio set components removed from the 1½-ton panel trucks were installed in specially constructed, waterproof shelters which had been built locally (see Figure 1). Although the dimensions of the special shelter are not stated, it appears to be about the same size as the Shelter HO-17.

FIG. 2



Figures 2 and 3 show the entrance hatch, ventilation windows, antenna locations and the general exterior appearance of the mounted unit.

The assembly of the two Power Units PE-75-(), which were used while afloat and replaced by the component, 1-ton trailer-mounted Power Unit PE-95-() ashore is shown in Figure 4.

Figure 5 shows the transmitter units, a full view of the receiver table.

For a full view of the interior, readers are referred to SCTIL #28, "Over-seas Evaluation of the Radio Set SCR-299-()."

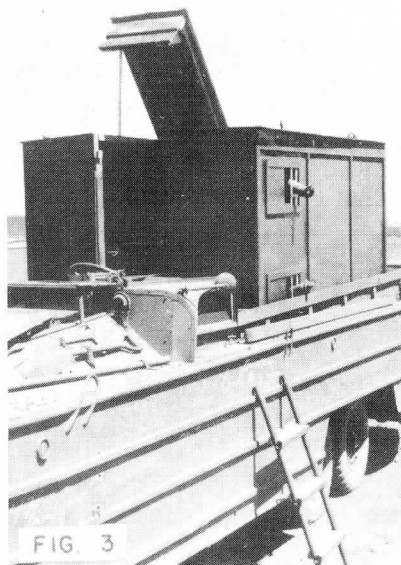
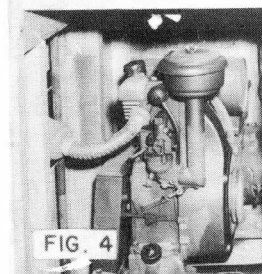
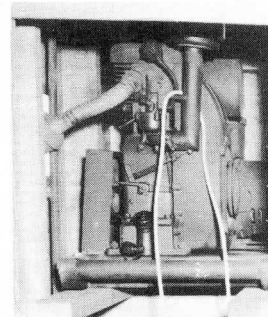


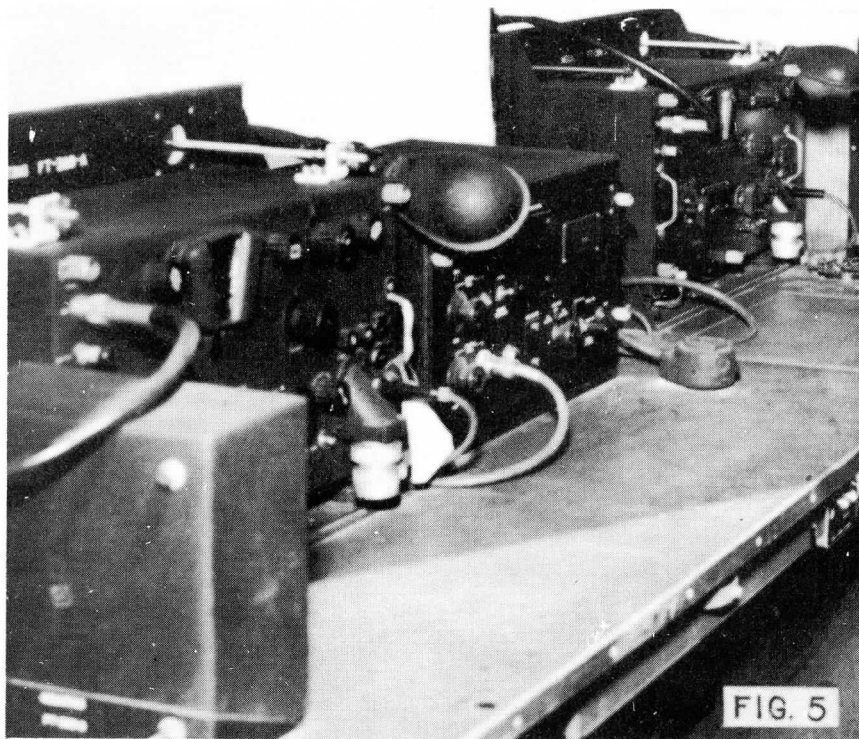
FIG. 3

No mention was made of the use of a tarpaulin to disguise the special shelter, while afloat or ashore, in the Sicilian operations.

Advantages

Amphibious Operation: The DUKW is capable of being unloaded from landing vessels some distance off-shore and of following tactical landing units ashore; thus providing continuous high power radio circuits while afloat and immediately upon landing. The space normally required in landing barges to transport the SCR-299 (or 399) ashore is freed for troop and materiel transportation.

FIG. 4



Beachhead Operation: Once the DUKW-mounted radio has landed, radio circuits are available immediately to headquarters afloat or to adjacent or lower units ashore. After it has landed, the DUKW can be moved to inland CP'S or can return to amphibious operation, as required by the tactical situation.

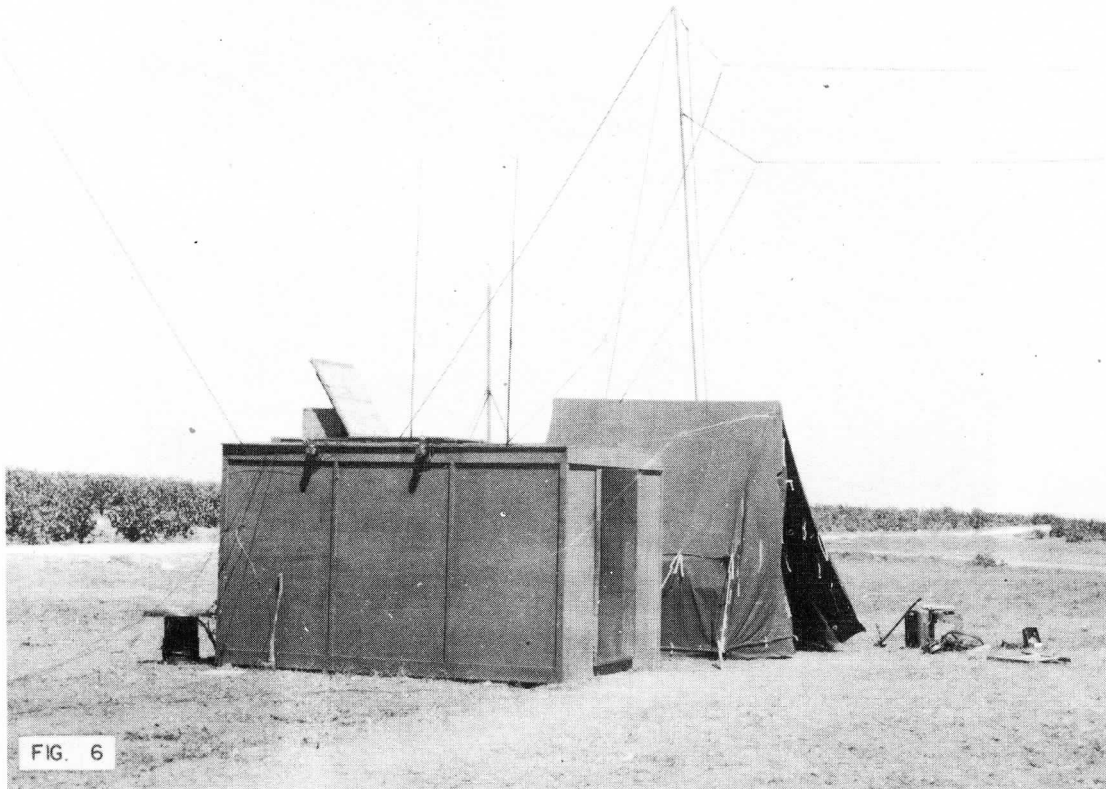
Inland Operation: When it is not possible to replace the DUKW-mounted set with a vehicular set or to transfer the shelter to a $2\frac{1}{2}$ -ton cargo truck as tactical troops move forward, the DUKW is capable of carrying the set inland. As indicated in Figure 6, the improvised shelter could be removed from the DUKW and the SCR-299 operated as a fixed station.

Disadvantages **Amphibious Operation:** The DUKW, with any type of shelter extending well above the coaming, would form an easily distinguishable target for enemy bombing, straffing or land based gunfire - both while afloat and after landing.

Land Operation: Operation of the DUKW on roads or cross-country has disadvantages common to all amphibious vehicles, in that land operation tends to open the water-tight seams. The vehicle is wider than the $2\frac{1}{2}$ -ton cargo truck and could jam narrow roads or village streets.

Possible Developments

Although the only installations of this type that have been noted used component parts of the SCR-299, it would seem entirely practicable to install



the SCR-399 in the DUKW, provided space could be found for two Power Units PE-75-().

Future operations may indicate that there is a military requirement for a special shelter having a lower profile than the HO-17 for housing amphibious-vehicular (or mobile) signal communication equipment.

It may be found that a DUKW-mounted shelter can be sufficiently disguised by use of the truck tarpaulin provided with the DUKW.

UNDERWATER TELEPHONE LINES

Several reports have been received in the Office of the Chief Signal Officer describing the use of Spiral-4 Cable for underwater telephone communications in various theaters of operations. The Signal Corps Board is currently studying this technique and a report of its findings is expected in the near future.

However, since this method has been used in some combat areas, a description of a typical improvisation along these lines might be of interest to communications personnel.

The following extract is from a report by Colonel Francis L. Ankenbrandt, Signal Officer, U. S. Army Forces in the South Pacific Area, made last year.

With Corps headquarters located on Rendova, it was requested that normal channels be installed to two division headquarters located on the New Georgia mainland. It was decided to provide two metallic circuits to each division headquarters.

The mission required spanning a distance of approximately nine miles, subdivided as follows:

- 1.25 miles — muddy plantation
- 2.2 miles — channel depth 1,700 feet
- 2.4 miles — impassable jungle
- 2.2 miles — channel
- 1 mile — jungle (mainland)

A construction section was made up of 30 men from a signal operations company, plus 21 men from a signal construction battalion. Simultaneously with this project the normal Corps CP installation was started.

The material used was Spiral-4 Cable and it was estimated that four days would be necessary for the completion of this line. This time estimate proved adequate.

Much care was given to the sealing of the connectors so as to assure maximum waterproofing. Rubber tape and friction tape, the only materials available, were used. Connectors, after being joined and waterproofed, were looped to relieve strain. All the work was done on the shore and, as completed and tested, laid in landing boats in figure eight loops. Paying out over the first channel route was completed in 1 hour and 45 minutes. Nothing

UNDERWATER TELEPHONE LINES



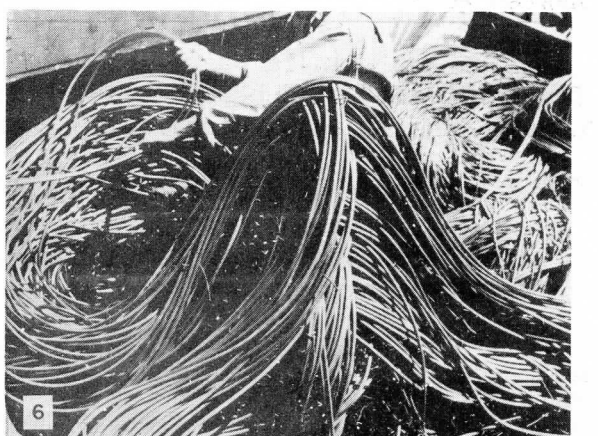
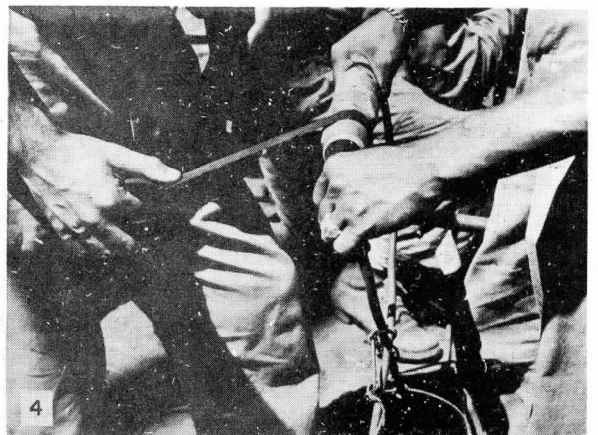
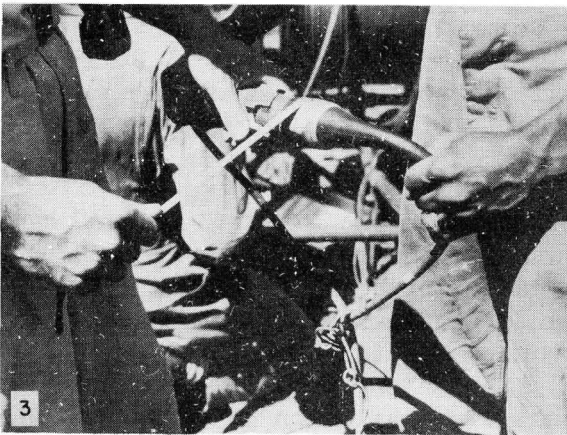
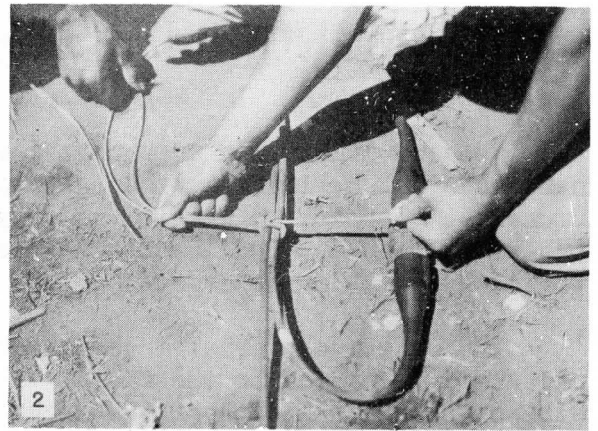
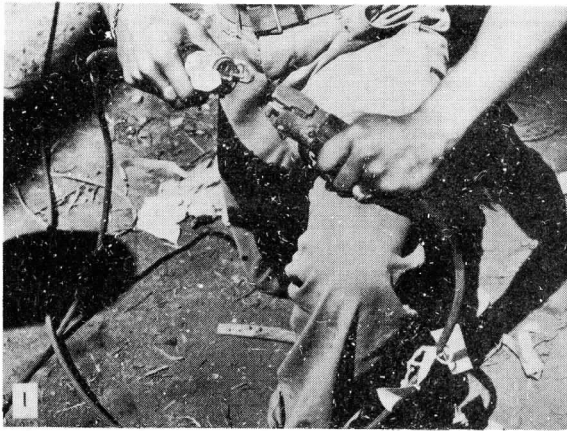
unusual was noted, except that extreme care was used so as not to bruise the cable or shear the connections. All along the route cable was payed out generously and reached a floating level at an estimated depth of 25 to 50 feet. Barbed wire spikes were used as anchors and placed about every 1/8 of a mile.

A survey of Roviana Island disclosed that the center was impassable and the wire route selected followed the shore. Field wire as well as Spiral-4 was used. Because of the low tide, it was necessary to carry by hand all wire reels from the boats to the shore over sharp coral at distances varying from 50 to 100 feet and sometimes farther. Men working on this project wore out brand new shoes in a single day. Midway along the route, the boat was so far from the shore that it was fired upon by Japs located on the mainland of New Georgia. It was necessary to circumnavigate the island and work back. The tools on hand were adequate, although more W-110-B on DR-4 could have been used. DR-5 was rather heavy except when conditions allowed a large number of men to be used, which was seldom.

The route from Roviana Island to New Georgia was but a repetition of the first stage except that there was no great depth of water.

Nothing unusual was noted on New Georgia except jungle land. The only difficulty was in completing circuits in operation in spite of narrow trails overburdened with traffic including bull dozers that were found working closely behind the advance elements.

Out of the four circuits thus obtained, three are still operative although the reading to ground increases daily. This cable has, to date, been submerged two months and fifteen days. The other circuit went out one month following installation. No efforts have been made to determine the cause. When this cable becomes inoperative, it is proposed to return it to the United States.



Steps in the preparation of Spiral-4 Cable for underwater laying: joining the cable (1), first step in looping (2), taping connectors with rubber tape (3) and friction tape (4) to insure waterproof connections, final step in looping to relieve strain on connectors (5), and finally laying the cable in figure eight loops in landing boat (6).

INSTALLING THE SYNTHETIC RUBBER TIRE

New and critically important installation procedures characterize the new Technical Bulletin now being published by the Office of the Chief of Ordnance, Detroit, to inform the Army on its new synthetic rubber tires, tubes and tracks. Publication of the bulletin was initiated by Maintenance Division, Army Service Forces.

The relatively brief Technical Bulletin, TB 31-200-1, disseminates immediate information to the field. Later the Office of the Chief of Ordnance will publish a revision of the Technical Manual on tires, TM 31-200, embodying the extensive data accumulated thus far on the new "Government Rubber."

Practically all new tires, tubes and tracks now going into service are manufactured wholly or in part of synthetic rubber. The Technical Bulletin will stress the fact that they have special characteristics and that methods of installation have been revised, particularly with respect to synthetic tubes.

The bulletin will call particular attention to the extra care that must be given to maintaining correct tire pressures. Under-inflation is more harmful to synthetic rubber than it is to natural rubber. The flexing action in the side walls that results from under-inflation sets up a relatively higher temperature in the synthetic product, and the higher temperature causes damage. A synthetic tire, however, if kept properly inflated, will flex normally. It is equally important that over-inflation be avoided, too, since excessive pressures make the tire more susceptible to bruises and hasten wear.

The bulletin is based on a statement which has the concurrence of S.P. Thacher, Chief of Rubber Branch, Production Division, Army Services, and covers "Installation" in these paragraphs:

"The procedure for installing synthetic tires is somewhat different from the procedure for installing natural rubber tires. The installation of synthetic tubes, especially, involves a critical change in procedure.

"Rims must be thoroughly cleaned before installation. All grease and grit, scale and rust must be removed. Scale and rust, especially, can seriously damage a synthetic rubber tube.

"Inspect casing inside and outside carefully for nails, glass, cuts, breaks and rough spots. Even small breaks, cuts or rough spots will chafe a synthetic tube. Clean the inside of the casing thoroughly before installation.

"Dual tires especially and all 'driven' tires on a vehicle

INSTALLING THE SYNTHETIC RUBBER TIRE

must be matched as closely as possible for size. They must never under any circumstances vary more than $3/4$ " in circumference or $1/4$ " in diameter.

"Directional tires must be mounted so that the tread designs are in the proper direction.

"When inflating tube before inserting it in the casing, do not inflate beyond a point where it rounds out. Synthetic tubes are not as elastic as natural rubber tubes and will be weakened, or even will rupture, if care is not exercised.

"Synthetic tubes do not slip into position as readily as natural rubber tubes. For this reason it is imperative that the tube be completely dusted with talc or soapstone before installation.

"When inserting a synthetic tube, care should be exercised to have the tube as evenly and correctly placed inside the casing as possible.

"When flaps are used, they must be dusted with talc or soapstone and they must be installed so that they are well centered and free from wrinkles.

"When tires are mounted on a drop-center rim, be sure the tire beads are out of the rim well before inflating. If they aren't, the tube may pinch and tear.

"Inflate tube partially to pull tube and casing into approximate position. Then inflate to proper pressure. This new two-step inflation procedure is of vital importance."

While it is known that the Army's new synthetic rubber tires and tubes will give long and dependable service if installed and maintained properly, certain familiar driver instructions must now be given a new emphasis. It happens that synthetic rubber cuts and chafes somewhat more readily than natural rubber. So drivers will be cautioned to be more careful than ever in avoiding rocks, ruts, stumps, bumps and curbs. Added stress will also be given the cautions against quick starts, sudden stops, skidding, overloading, speeding and other abuses that cut down the life of any tire.

The new synthetic products are easily identified. The casings bear a circular red spot on which appear the letter "S" and a number. Inner tubes carry a red or blue stripe completely around their base. A red spot identifies synthetic rubber tracks.

SHIPMENT OF EQUIPMENT MINUS COMPONENTS

In numerous instances occasioned by an urgent need for material, contracting officers have been authorizing shipment of equipments minus components. To accomplish Receiving Reports and effect payment for these incomplete equipments, it became necessary to obtain a complete price and item breakdown from the contractor so that a Supplemental Agreement could be issued itemizing and pricing each component.

Because of the complexity of the equipments involved, the breakdowns generally resolved themselves into voluminous documents which required a great expenditure of time by the contractor in their compilation, and by the contracting office in their conversion into a Supplemental Agreement. In the interim, the Inspection Zone accumulated hundreds of pending Receiving Reports, the Finance Office corresponding numbers of pending invoices and contractors remained unpaid for equipment already furnished the Government.

In the interest of alleviating this condition the following alternate optional method for acceptance and payment for part of unit items in supply contracts was authorized for use in appropriate instances when deemed advisable by the contracting officer:

Immediately upon authorizing the Signal Corps Inspection Zone involved to accept an end item minus one or more of its components, the contracting officer will establish prices for the omitted components by requesting the contractor to furnish by letter a price for each omitted component. Upon inspection and acceptance of the end items minus the components by the Inspection Zone concerned, the Inspection Zone will notify the contracting officer by letter that the end items have been shipped minus components. The contracting officer upon receipt of this notice and upon receipt of certification from the contractor as to the value of the omitted components will prepare a letter to the appropriate Finance Officer authorizing payment for end items, less prices established for missing components by the contracting officer in protecting the best interest of the Government.

The above procedure expedites delivery of equipment to the Government without obtaining price and item breakdowns of complicated end items in order that Supplemental Agreements may be entered into. It further results in immediate payment to the contractor for equipment supplied by him, thereby releasing his capital for use with other war contracts.

SIGNAL CORPS MANUAL

OF

STANDARD DESCRIPTIONS

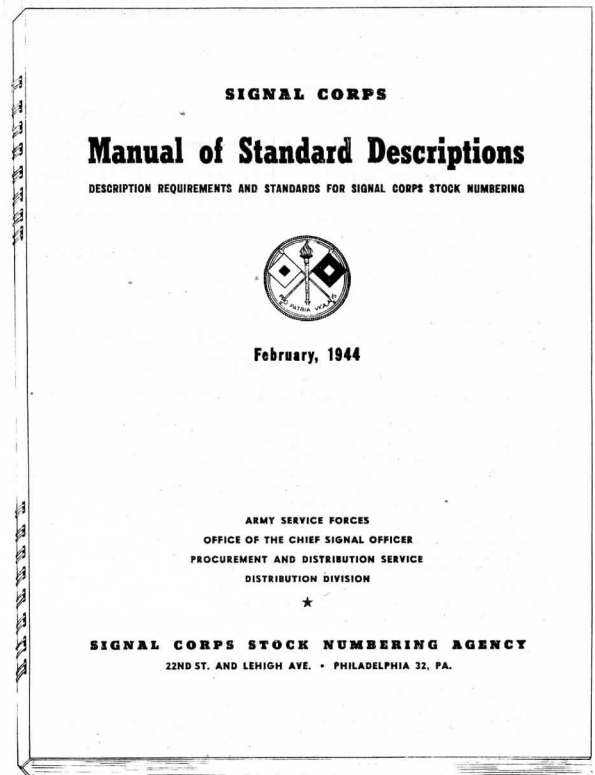
Not the least important consideration in Signal supply is the stock numbers and descriptions by which Signal Corps items are identified. More than any other single factor, the rapid and accurate assignment of Signal Corps stock numbers helps expedite the flow of signal equipment from factories to depots and ports of embarkation and thence overseas to their ultimate destinations.

Stock numbers can be assigned only after positive identification has been established, and this can be accomplished only through the medium of accurate, standard descriptions. The description is the key to accurate stock numbering and cataloging, for it is only by means of the description that previous assignments can be checked to determine if stock numbers exist and hence avoid duplication of assignments.

To assist manufacturers, warehouse men and requisitioning agencies prepare standard descriptions, the Stock Numbering Agency has published the "Signal Corps Manual of Standard Descriptions." It is a 120-page book which explains in detail the type and quantity of information required before various types of signal equipment can be positively identified and given stock numbers.

For cataloging purposes, all signal equipment is divided into three groups. The type and amount of information required for any given item depends upon the group into which it falls. After the proper group is determined, it becomes a relatively simple matter, with the aid of this manual, to write a description in the proper sequence and style which will permit positive identification, stock numbering, and cataloging in the shortest possible time.

In addition to lists establishing standard abbreviations for general terms, units of measure, and Signal Corps manufacturers and contractors, the manual gives specific description requirements for 73 classes of Signal Corps equipment. Some of these classes are resistors, capacitors, relays, power



SIGNAL CORPS MANUAL OF STANDARD DESCRIPTIONS

MANUAL OF STANDARD DESCRIPTIONS
SIGNAL CORPS STOCK NUMBERING AGENCY

DESCRIPTION REQUIREMENTS FOR
RADIO SET

NOTE: A RADIO SET is defined as a complete one- or two-way radio communications system comprising all transmitting, receiving and accessory components necessary for operation.

For stock numbering purposes the following information must be supplied in the sequence listed and in the style shown in sample description:

1. Signal Corps or Army-Navy type number, if assigned, such as **RADIO SET SCR-299-D**.
2. If No. 1 does not apply give name, "**RADIO SET**."
3. Type service for which primarily designed (airborne, vehicular, ground, portable, fixed station, etc.).
4. Type of signal (AM, FM, CW).
5. Rated power output of transmitting component (10 W, 5 kw, etc.).
6. Contractor's name, type or style number, and specification.
7. Signal Corps specification, if any.
8. Frequency range and number of channels, or fixed operating frequencies of transmitting and receiving components.
9. Voltage, frequency and power requirements of external power service, if any.
10. Operating and accessory components. The following data is required only for commercial radio sets, i.e., sets which do not have Signal Corps or Army-Navy type numbers:
 - a. Manufacturers' names and part numbers of all major operating components, such as transmitters, receivers, antennas, power units, modulator units, speech amplifiers, etc.
 - b. Manufacturers' names and part numbers of all accessory components, such as, frequency meters, equipment for remote control, extension cords, operating spares, storage chests, etc.

NOTE: If questions 10a and 10b involve long lists of items, incorporate into the description only the first five in the order of their importance, and submit the balance on a separate sheet of paper.
11. In what is it mounted, installed and/or operated (installed and operated in 1½ ton 4x4 panel body truck; mounted in 18" x 36" x 5 ft wooden case; etc.).
12. Shipping data (total net weight and volume in cubic feet, of all components, price of complete radio set).
13. Signal Corps purchase order number.

EXAMPLE:

RADIO SET SCR-299-D: vehicular; AM and CW; 400 W on CW, 300 W on voice; (Sig C spec 271-1060; freq range of both receivers 1.5 to 18 mc in 5 bands; freq range of trans 2 to 8 mc in 1 continuous band; operates from a 115 v ac 60 cyc 5 kw source of power; mounted and operated in Truck K-51-() combined with Trailer K-52-(); net wt 9320 lb, cu ft 640, \$12,000.00 ea).

Order 0000-Ph-44

* Asterisk (*) indicates the data to be placed within the common parenthesis as indicated in the sample description.

FIG. 1

This latter requirement is a safeguard against the destruction of manufacturing records due to air raids. As a result, the British have accumulated a file of approximately eight and one half million such drawings.

Since the speed with which stock numbering can be accomplished is directly proportional to the type and amount of information submitted to the Stock Numbering Agency, it is felt that this manual, which is a guide to the establishment of standard descriptions, will considerably speed up the entire process of stock numbering and cataloging, and hence the flow of signal supplies. The manual measures 10-3/4 x 8-1/4", has flexible cardboard covers and spiral ring binding so that when in use it opens and lies flat on the desk. This manual will be given wide distribution, not only to Army installations, but to contractors and manufacturers of Signal Corps equipment and to all other persons charged with the preparation of stock number descriptions.

Supplements containing additional description requirement sheets and other essential data will be issued from time to time. Comments and suggestions relative to the purpose, contents, and scope of this manual will be appreciated. Address all communications to Commanding Officer, Signal Corps Stock Numbering Agency, 22nd Street and Lehigh Avenue, Philadelphia 32, Pa.

units, radio sets, motors, generators, radio transmitters and receivers, motion picture projectors, telephones, transformers, vibrators, etc.

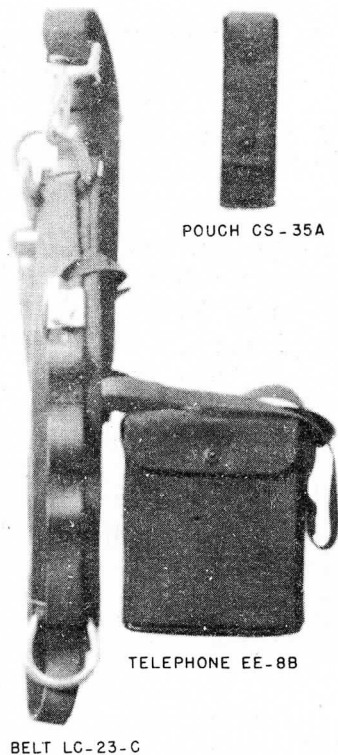
The requirements for a given class are listed on individual sheets called "DR" meaning Description Requirements. A typical example of a "DR" sheet is shown in Figure 1.

Not all the information requested will necessarily appear in the published description. However, all of it is necessary for the establishment of the stock numbers and for the maintenance of the master records and files of the Stock Numbering Agency. Further, the additional information facilitates the determination of interchangeability between items. In this connection, it is interesting to know that, for stock numbering purposes, SIGNALS of the British Army require information of such detailed character as to be practically design data. In addition, stock numbers are not assigned unless manufacturers' drawings are submitted with the requests.

LEATHER SUBSTITUTIONS

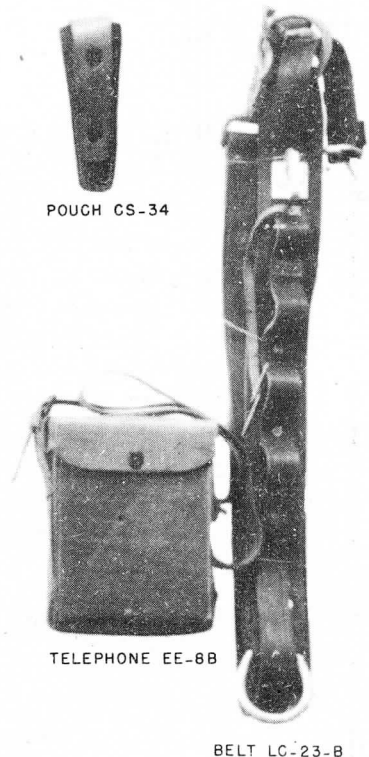
Out of the great dearth of materials which adversely affected many essential items of military procurement was the scarcity of heavy cattle hides and cattle-hide leather. The tempo of shortage, as it passed from the critical to the hyper-critical stage, made the continuing use of leather in Signal Corps equipments a problem to which the Signal Corps Conservation Unit, Resources Branch, directed its every talent. In response to the first advices from the Army Service Forces, that leather was "critical," the Signal Corps

answered with a conservation program effectuating a substitution for this material.



THE NEW

The Conservation Section, through collaboration with Engineering and Technical Service and Signal Corps laboratories, determined that a suitable substitute should be developed from some material, such as cotton, wood, synthetic rubber, or plastics, for every possible application where leather was being used in equipments. The increasing needs however for plastics, plywood, synthetic rubber, and other materials, as they were developed from day to day, made the requirements of a suitable substitute for the cattle-hide leather in sufficient quantities a problem of magnitude.



THE OLD

After much study a cotton fabric was developed for production on looms sized to the widths required for fabricating the end item, and a method of treating the material was perfected, rendering it both mildew-proofed and water-proof. This eliminated the necessity of harness dressing necessary to leather to keep it in good condition.

From this new fabric were first produced field telephone cases and line-man's belts; less absorbent, more fungus proof, lighter in weight and with definitely improved military characteristics over the leather historically used.

With cattle-hide leather even more critical than ever, there now comes

from Signal Corps development engineers approval of tool Pouch CS-35-A, a revised model of tool Pouch CS-34, made from the same impregnated fabric.

Thus again does the Signal Corps contribute to the general military economy and the more essential requirement of other services. In this instance the use of approximately two and one-half million square feet of critical cowhide leather was abated (more than enough to cover a 30-foot highway 16 miles long, with 1/8-inch thickness of critical cowhide leather) in order that the Quartermaster might have a greater supply of cattle-hide leather for Army shoe requirements.

ENEMY EQUIPMENT BULLETINS

A series of technical bulletins on enemy communications equipment is being published by the Fort Monmouth Signal Corps Publications Agency from material prepared by the Enemy Equipment Identification Service Section, Intelligence Branch, Office of the Chief Signal Officer. The first seven of this series, which will total about twenty, have been published as of this writing (27 March 1944). Copies may be secured through normal channels as provided in FM 21-6.

The numbers and subjects of the TB's already issued are as follows:

- TB SIG E1 - GERMAN RADIO SETS Torn. Fu. bl. and Torn. Fu. f.
- TB SIG E2 - GERMAN RADIO SET Torn. Fu. d2.
- TB SIG E3 - GERMAN RADIO SET Torn. E. b.
- TB SIG E4 - GERMAN RADIO RECEIVER Spez. 445b Bs
- TB SIG E5 - GERMAN RADIO TRANSMITTERS 10 W.S.c and 10 W.S.h and GERMAN RADIO RECEIVERS Ukw. E. e and Ukw. E. h
- TB SIG E6 - GERMAN RADIO TRANSMITTER 5 W.S./24b - 104.
- TB SIG E7 - GERMAN RADIO SET Fusprech. a

EQUIPMENT NOTES

SIGNAL CORPS BOARD

RECENTLY ESTABLISHED CASES

Case No. 553, Service Test of Cargo Carrier M 29C

A service test of a modified Cargo Carrier M 29 capable of transversing calm water. The Board will investigate possible uses of a small amphibious cargo carrier as a signal communication vehicle.

Case No. 554, Glove-Inserts, Lightweight

The Signal Corps Board will investigate possible Signal Corps uses for a lightweight Nylon glove which may be used as a glove-insert or as a lightweight flexible glove capable of giving protection from low temperatures to the hands of personnel handling small articles, controls for equipment, etc., which cannot be readily accomplished using standard gloves.

Case No. 555, Service Test of Radio Set AN/TRC-8

A service test of recently developed equipment for use on radio relay circuits.

CASES APPROVED BY THE CHIEF SIGNAL OFFICER

Case No. 511, Part C - Standard Splices for Field Cables

In Part C of Signal Corps Board Case No. 511, a study was made of standard or depot splices for Cables WC-534, 5-pair, WC-535, 10-pair, and WC-548, spiral-four. "Standard" splices, as distinguished from the "expedient" type made by the field lineman, are the best splices capable of being made outside the factory using the tools, equipment and materials ordinarily available to signal depot personnel or mobile construction repair and salvage units.

Vulcanizing equipment is required for making standard splices in the field cables covered by this report. If it becomes expedient to employ this type of splice in the field, such as in the installation of buried cable, suitable sources of electrical power and Vulcanizing Equipment TE-55 will be required.

The Signal Corps Board procured and tested a Vulcanizing Equipment TE-55-B of the latest type, vulcanizing molds designed by the Eatontown Signal

Laboratory and the manufacturers of vulcanizing equipments. The Board also studied training literature relating to standard splices in Cables WC-534, WC-535 and WC-548. Various types of latex and pre-vulcanized rubber tubing were also tested for use as insulating sleeves in constructing splices in these cables.

As a result of the tests, the Signal Corps Board developed a new type of splice for the field cables. Figures 1, 2 and 3 illustrate the various steps in making these splices in each cable. Pre-vulcanized rubber sleeves

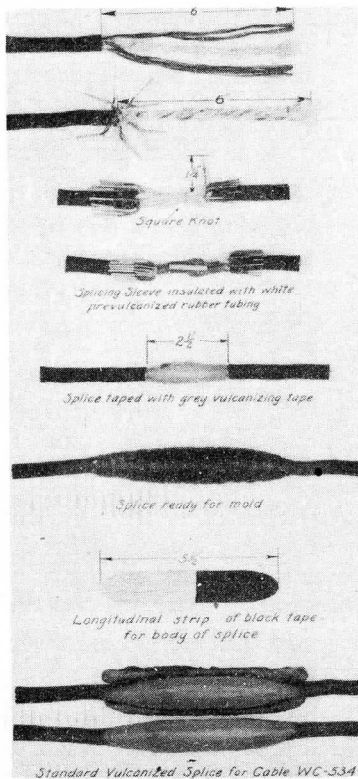


FIG. 1

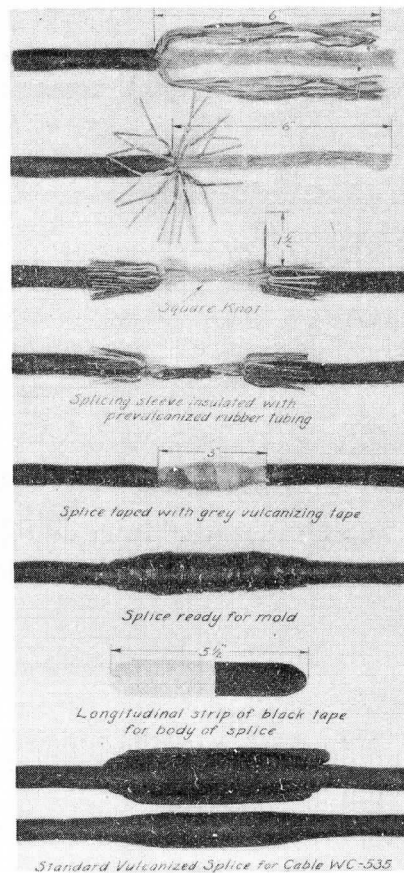


FIG. 2

are recommended as separators of the individual conductor splices instead of the grooved rubber "spiders" and separators presently used in the standard splices illustrated and described in TM 11-371, "Cable Assemblies CC-345, CC-355-A, and Associated Equipment."

The Board found that the use of pre-vulcanized rubber tubing eliminated many faults in splices due to conductors failing to remain in place when the heat of the vulcanizing process softens the tape confining the individual conductor splices within the grooves of the "spider."

EQUIPMENT

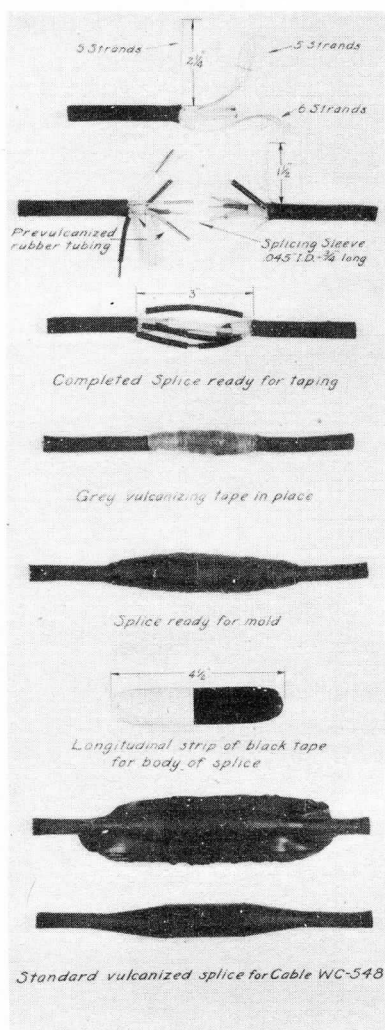


FIG. 3

The Signal Corps Board was requested to examine and report on small switchboards of this type under development at Eatontown Signal Laboratory. The available models were examined, brief service tests made, and representatives of manufacturers of this type of equipment interviewed by the Board. Modifications were recommended for one of the most promising of the available models. These modifications were incorporated by the manufacturer in the Switchboard SB-5-()/PT (XO-1).

SWITCHBOARD SB-5-()/PT PREPARED FOR
TRANSPORTATION



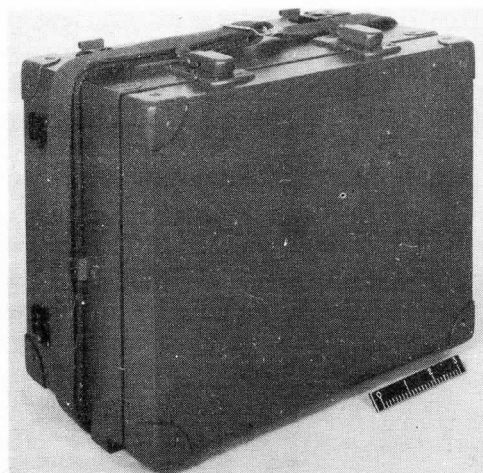
The Signal Corps Board recommended that the phenolic (Bakelite) molds used in Vulcanizing Equipments TE-54 and TE-55 be replaced by molds of aluminum which are not subject to blistering, warping and uneven distribution of heat.

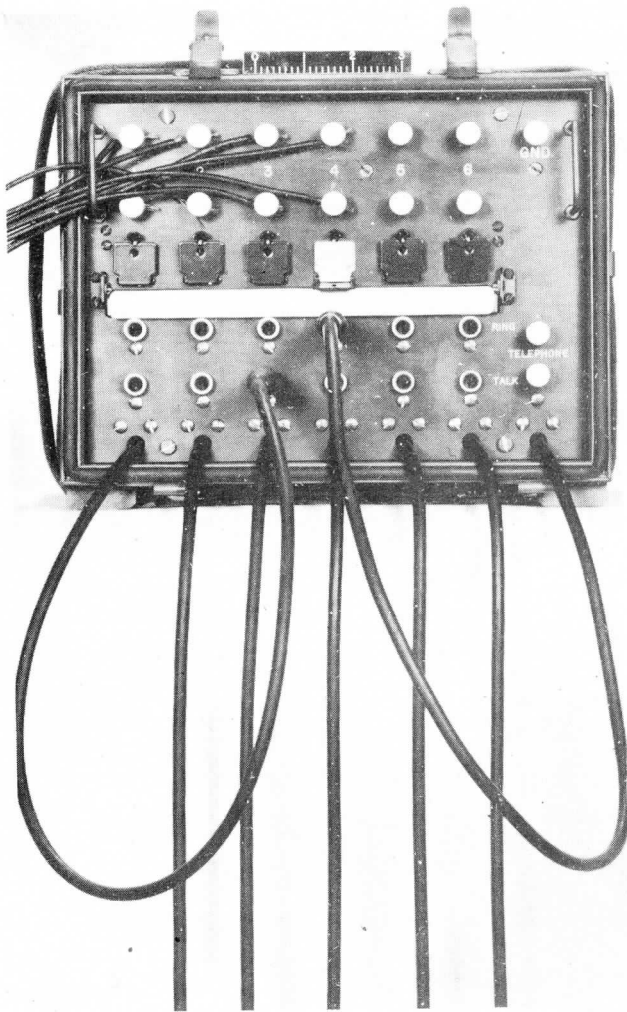
Changes were also recommended in the design of the molds now under procurement for Vulcanizing Equipment TE-55-B. Interchangeability with previous issues, greater regularity in dimensions, and proper provision for the escape of surplus material during the vulcanizing process are among the more important improvements recommended.

Tests made by the Board indicate that the recommended changes in the design of the vulcanizing molds and in the insulation of the individual conductors result in smooth flexible splices which are uniformly satisfactory electrically and mechanically when made by personnel with only a moderate amount of training.

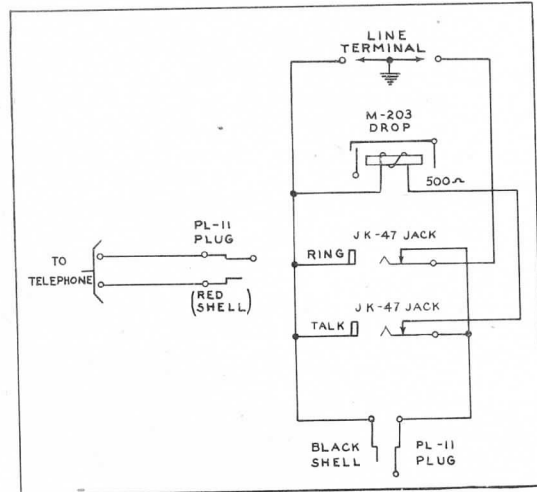
Investigation No. 1 - Lightweight Telephone Switchboard for Use by Tactical Units.

Urgent requests have been received from active theaters of operations for a switchboard of such weight that it can if necessary be easily carried by one man over the difficult terrain often encountered in amphibious, mountainous or jungle operations.





FRONT VIEW OF SWITCHBOARD SB-5-()/PT



SWITCHBOARD SB-5-()/PT SCHEMATIC DIAGRAM

Switchboard SB-5-() /PT (XO-1) is a 6-line board constructed of standard switchboard units and is intended for use with Telephone EE-8 as an operators set. Its dimensions are $6\frac{1}{2}$ " x $9\frac{1}{2}$ " x $11\frac{1}{2}$ " and its weight complete with cover and carrying strap is $11\frac{1}{2}$ pounds. It may be used in a maximum of 4 multiples or a total capacity of 24 lines.

A limited procurement of Switchboard SB-5-() /PT (XO-1) has been authorized for dis-

tribution to theater equipment pools. As furnished on this initial procurement, the board is not waterproof in the sense that it will withstand long immersion in water. When such conditions are likely to be encountered, the switchboard should be packed in a waterproof bag. However, the equipment is treated against moisture and fungi, is weatherproof and practically immune to damage resulting from short periods of immersion.

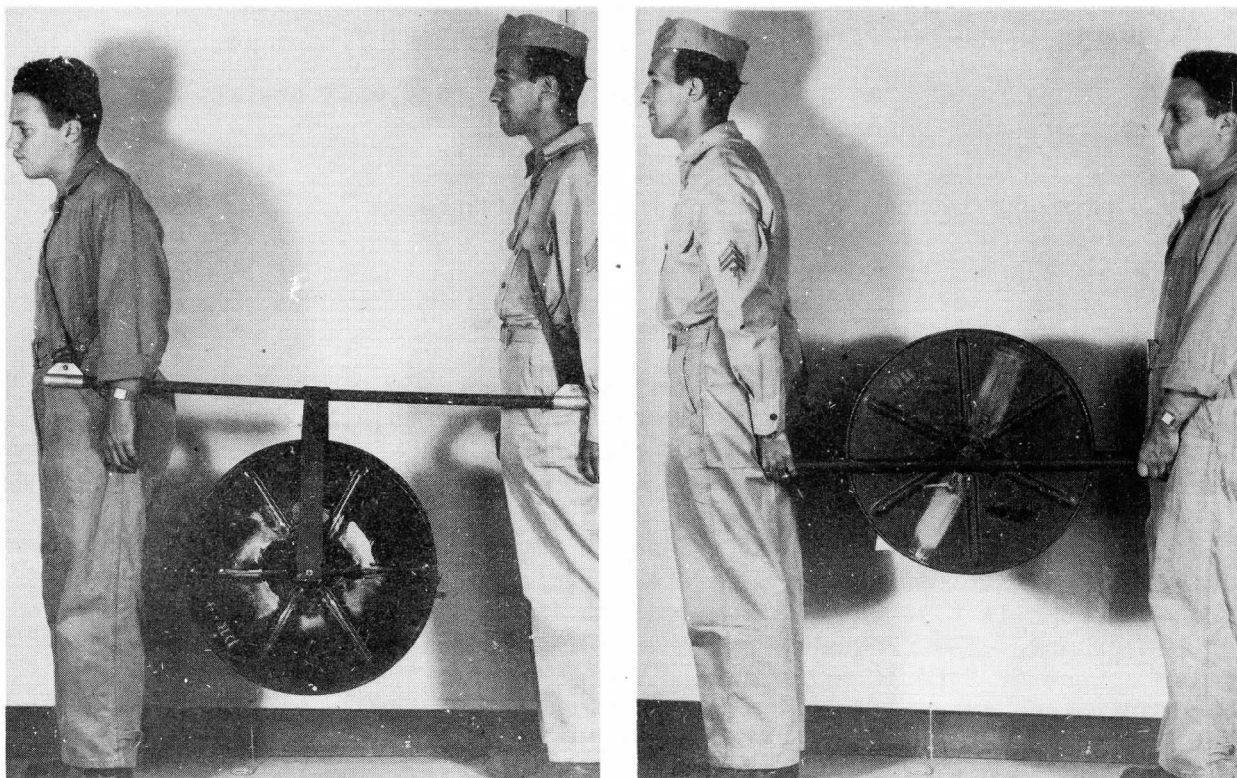
Action has been initiated implementing the approved recommendations in this report which include the development of a waterproof metal case as a replacement for the wooden case used in the initial procurement and the standardization of the equipment as Switchboard SB-5-() /PT.

EQUIPMENT

GROUND SIGNAL

JUNGLE TRAIL REEL UNIT

The following information concerning an expedient means for handling field wire under jungle conditions was submitted by a Signal Corps organization located in the Central Pacific Area. It is reproduced here for the information of other Signal organizations operating under similar conditions.



The belt-type reel unit shown on the left was fabricated at a Signal Depot repair shop from available material. It is made of 1" pipe, 2" x 3/16" strap iron, 1" square steel stock, scrap sheet metal and a carrying strap. It can be carried by two men with their hands free, as illustrated, or by grasping the pipe with the hands. The hand-type reel unit, shown on the right, was constructed in a similar manner. However, it is not as practical as the belt-type reel as the men's hands cannot be freed to meet obstructions on the jungle trail.

ALUMINUM CAPS FOR RADIO SET SCR-536-()

Breakage, stripping of threads, and loosening due to expansion of the phenolic microphone and earphone caps of Radio Set SCR-536-() have been mentioned in several reports received recently by the Ground Signal Equipment Branch of the OCSigO.

Since about 1 December 1943, Radio Set SCR-536-() has been produced with microphone and earphone caps made of black anodized aluminum alloy instead of phenolic material. The new caps, which are interchangeable with the phenolic caps, bear the Signal Corps stock number 2B475/1.1; their Galvin part number is 15B60233.

It is believed that the new aluminum alloy caps will obviate the difficulties previously reported.

AIRCRAFT RADIO

RADIO SET SCR-624-A

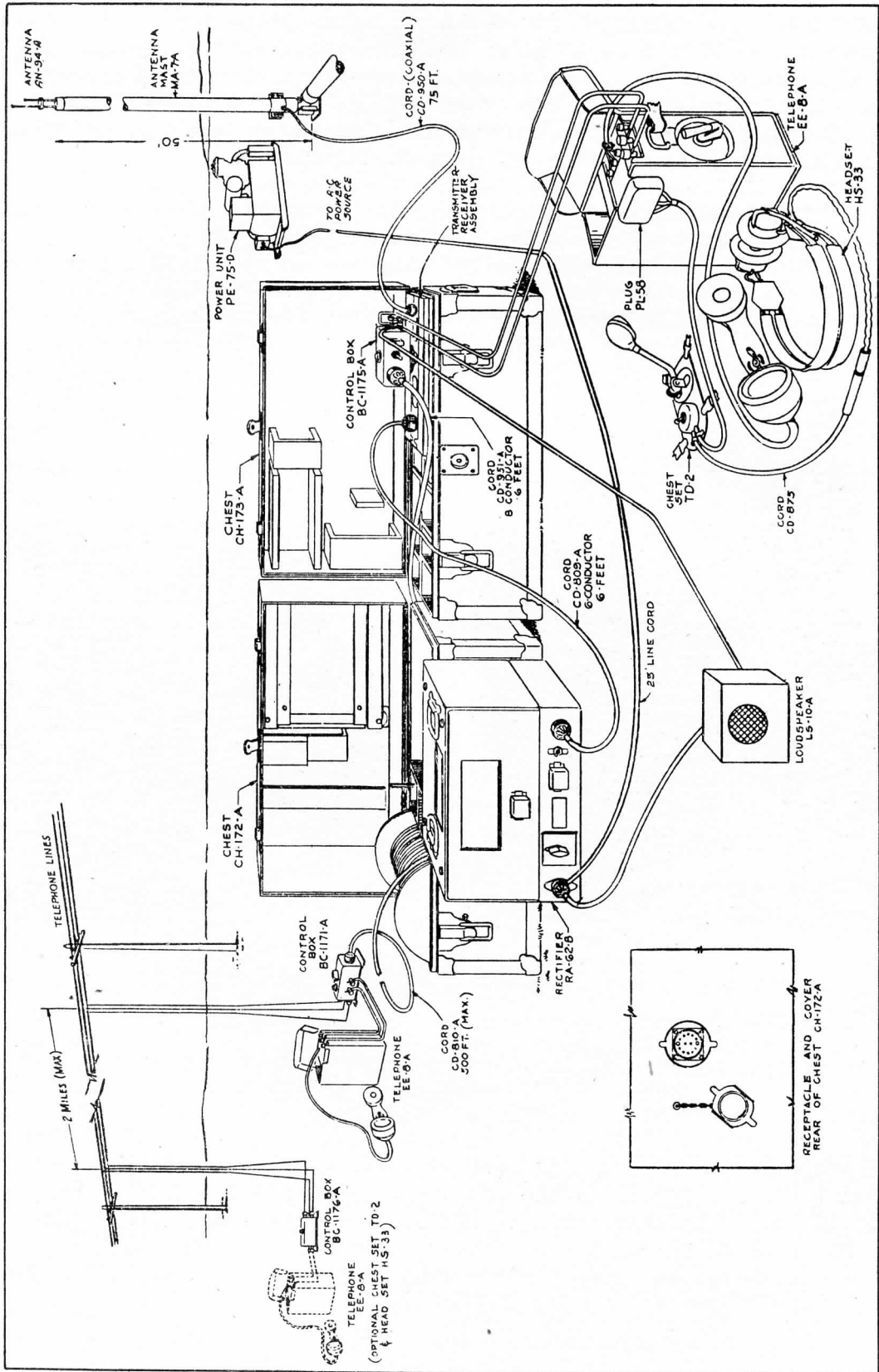
This radio set is a complete very high frequency radio ground station used principally by the Army Air Forces. It is especially designed for transportation by air with the major components contained in foot-locker type chests.

The radio set is intended for use at advance landing fields to provide air-ground communications with aircraft equipped with Radio Set SCR-522-A. The equipment is also used to some extent for point-to-point communication on the ground. The frequency range is 100 to 156 megacycles with a maximum power output of 8 to 10 watts at the transmitter. The same 4 channel crystal controlled transmitter and receiver combination as in the airborne SCR-522-A command set is used in this equipment with the d.c. dynamotor unit replaced by a special a.c. Rectifier RA-62-B operating from the gasoline engine-driven Power Unit PE-75-(). When available, a commercial power source of 100 to 130 volts or 230 to 260 volts, 40 to 60 cycles, single phase, can be used. The use of this rectifier overcomes difficulties experienced in early versions of the equipment where the airborne type dynamotor unit and storage batteries were provided.

Remote control facilities except "on-off" switching are provided for operation up to a maximum of 500 feet. Remote send-receive operation is possible up to two miles where field or open wire lines are available. Channel selection is accomplished at the transmitter-receiver chest or at the remote control station up to 500 feet away.

Standard field Telephones EE-8-A are used to modulate the transmitter, as well as to enable monitoring at the transmitter site. Intercommunication between remote control points and the station site can be carried on by this

EQUIPMENT

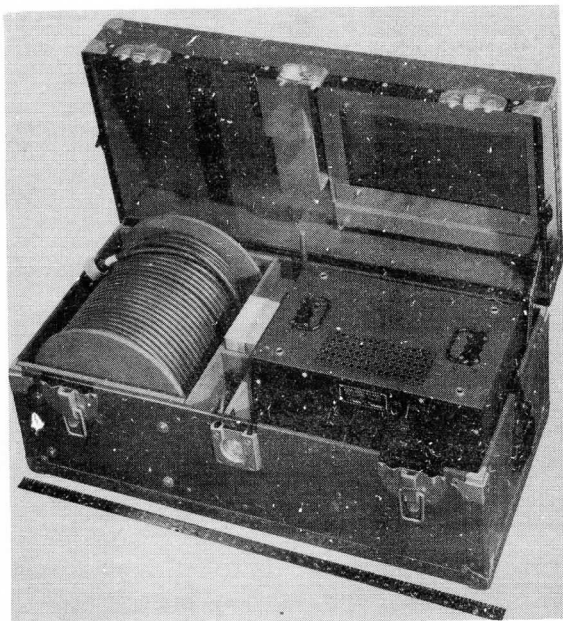


SCHEMATIC INSTALLATION OF RADIO SET 624-A

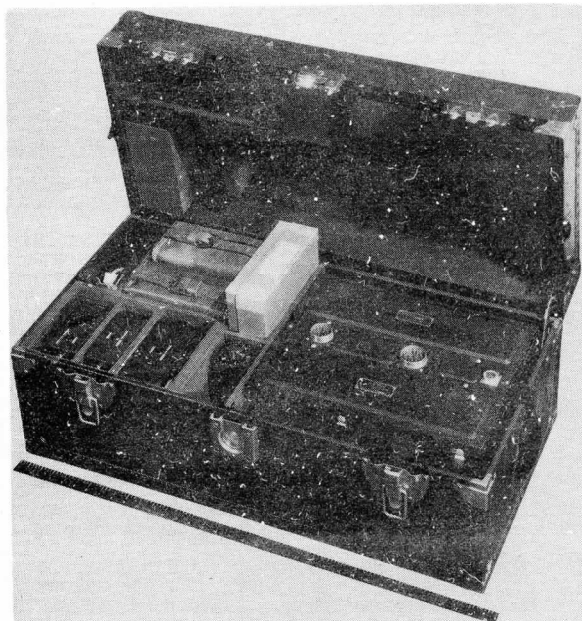
EQUIPMENT

same telephone facility. A chest-held microphone with headset are included for alternate operation in place of the regular telephone type handset with the EE-8-A where the location is noisy or where operationally convenient. This microphone is Chest Set TD-2 which plugs into the three contact socket on the EE-8-A telephone. The Headset HS-33 is connected to the TD-2 microphone by means of a short cord and Jack JK-26.

Because of difficulties encountered in the supply of TD-2 microphones some SCR-624-A equipments were issued without this microphone. At the present time the radio set is being issued with one Chest Set TD-1 microphone with HS-33 headset. The TD-1 is the same as the TD-2 except for the length of cord which is six feet in place of nine feet for connection to the EE-8-A



CHEST CH-172-A -COMPLETELY PACKED



CHEST CH-173-A COMPLETELY PACKED

field telephone. Also, only one chest microphone TD-1 is presently supplied in place of the intended two TD-2 units. It is expected that this situation will be corrected about the middle of 1944.

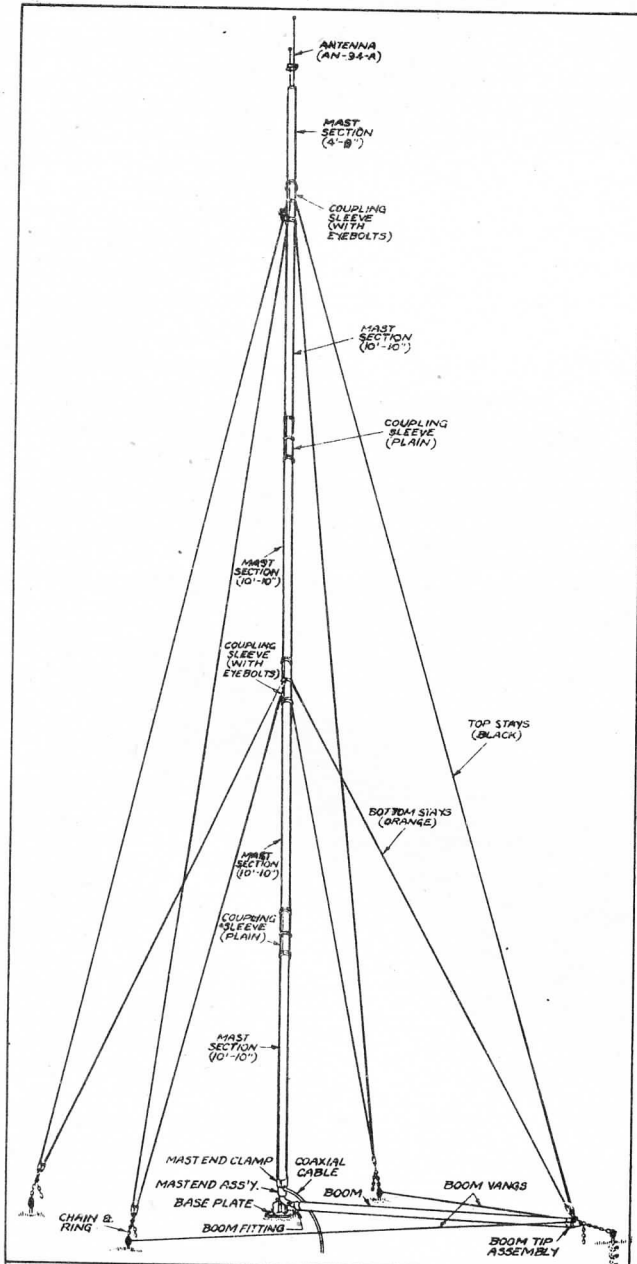
Loudspeaker IS-10-() is a part of this radio set. Although not supplied with the first sets issued because of supply difficulties, the production of IS-10-() speakers is now sufficient to take care of all requirements. While the loudspeaker may not be required under certain conditions, it is particularly useful in tower control work since a booster amplifier with volume control is a part of the IS-10-().

EQUIPMENT

Test Equipment

Since the SCR-624-A is issued in most cases to units which are using an airborne SCR-522-A radio set and therefore have available an appropriate test equipment, this ground set is adjusted and tuned with the same Test Equipment IE-19-A. Where this IE-19-A test set is not available it is possible to perform routine adjustments and channel tuning by use of Test Set I-139-A (normally part of the IE-19-A) which can be used separately if conditions warrant.

This unit is an 0-1 ma. d-c milliammeter in series with a 49 ohm resistor and with a special plug to match the meter sockets on the transmitter and receiver. This meter is used for tuning the transmitter circuits while the receiver can be tuned against "noise" by using reasonable care.



ANTENNA MAST MA-7-A ERECTED

Siting The instructions for mechanical siting and erection of the antenna mast and equipment are sufficiently detailed as given in the instruction handbook. However, there are certain additional factors which should be considered when siting this equipment. Because of the very high frequency of the carrier wave the precautions to be observed in selecting the location of the antenna have to do with maintaining a line-of-sight electrical path between the communicating station antennae. Also, select the site so as to have the minimum possibilities of reflection from objects in the vicinity of the antenna. The antenna should be above surrounding objects for maximum range capabilities. In cases where surrounding hills are likely to restrict the line-of-sight propagation, consideration should be given to utilizing the remote operation feature of the equipment and installing the transmitter-receiver on high ground.

In order to provide a means for homing aircraft equipped with the VHF Radio Set SCR-522-A, and

in particular fighter aircraft, arrangements have been made in the VHF direction finder Radio Set SCR-634-A to inter-connect the transmitter-receiver portion of the SCR-624-A so as to provide communication with the plane. It is possible to accomplish this in either of two ways. One, as covered in the instruction handbook of the SCR-634-A, is to place the transmitter-receiver of the SCR-624-A in the D.F. shelter and interconnect the components of both equipments so that alternate direction finding and transmission is carried on over the antenna of the SCR-634-A. The necessary controls and cabling for this are provided as a part of the SCR-634-A. The second method is to install the two equipments as far apart as possible in order to minimize possible errors in taking bearings and up to the limit of the 500 foot remote control cable in the SCR-624-A. The remote control box of the SCR-624-A is placed in the shelter hut of the SCR-634-A so that the D.F. operator has control of both equipments.

Planned Changes in the Equipment

Beginning on certain current production orders it is planned to make several minor changes in this equipment. From an operating standpoint the most important is the addition of a volume control as a part of each of three new control boxes. Also the use of a different push-to-talk control on these boxes which has three positions as follows: (1) momentary transmit, (2) lock transmit, and (3) lock receive. The small chest now containing the "J" antenna and coaxial transmission line will be eliminated. These two components will be contained in the transmitter-receiver chest which will be enlarged accordingly.

Tests are also being conducted on several types of antenna masts for possible replacement of the present Antenna Mast MA-7-A. This work is being done with the aim of providing a lighter, stronger and more easily erected mast.

Rectifier RA-62-B

While this unit is a rugged and dependable rectifier there are several points to be observed which will insure the maximum of service. One is the proper setting of the voltage selector switch to correspond with the actual a-c line voltage. Failure to observe this may result in damage or failure of the rectifier unit as well as unstable operation of the transmitter-receiver.

Since the rectifier is designed to be operated with adequate ventilation, its operation in the carrying chest, or any confined space, should not be attempted.

THE IMPROVED RADIOSONDE

In the article on radiosondes in Information Letter No. 26 for January 1944, which chiefly concerns Radiosonde ML-141-(), it was stated that certain improvements were being incorporated in the existing radiosondes. Improved radiosondes are now being delivered to the Signal Corps Depot. Radio-

EQUIPMENT

sonde AN/AMQ-1-() is being procured from two sources at the present time. The major changes incorporated are as listed below:

Radiosonde ML-141-()

Uses $1\frac{1}{2}$ volt, direct current
for filament (BA-57)

Liquid-filled temperature tube

Human hair as humidity element

Low reference 160 cps.
(80 recorder units)

Humidity record restricted to
half the range covered by
temperature record

Radiosonde AN/AMQ-1-()

Uses 3 volt, direct current
for filament (BA-67)

Ceramic Resistor as tempera-
ture element

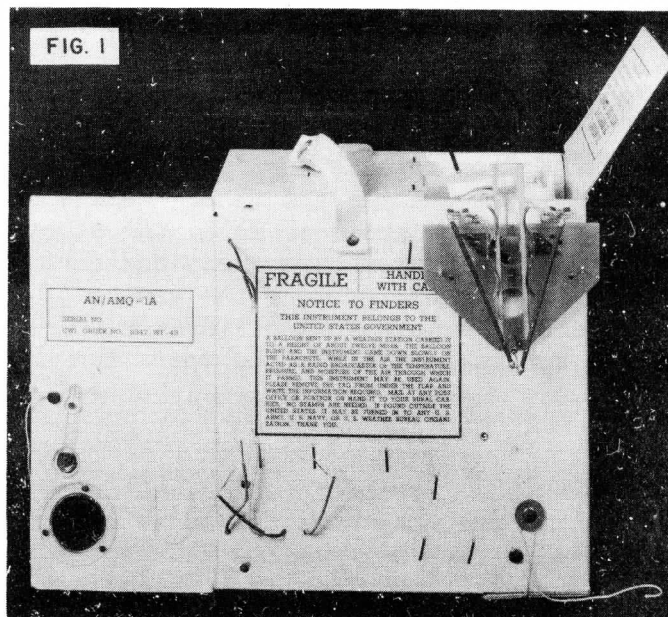
Electric Hygrometer as humid-
ity element

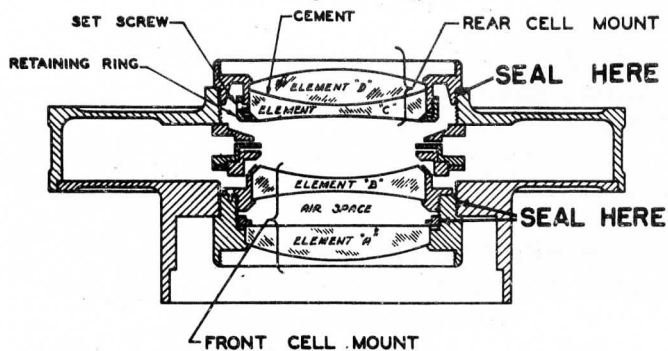
Low reference 190 cps.
(95 recorder units)

Has relay designed to switch
temperature and humidity
element into circuit so
that humidity record covers
the same range on the rec-
ord as temperature.

The same tubes are used in
the transmitters; however,
model AN/AMQ-1A uses a
dropping resistor from 3
down to 1.9 volts.

The attached photographs
show the installation of the
ceramic resistor temperature
units and the electrolytic
hygrometer. The basic elec-
trical diagram for Radiosonde
AN/AMQ-1-() is similar to that
of Radiosonde ML-141-(). The
ceramic resistor consists of a
cylindrical section of material
which has a varying electric re-
sistance with variations in tem-
perature. Radiosonde AN/AMQ-1
employs a single straight res-
istor. Radiosonde AN/AMQ-1A
employs two straight resistors
connected in series and arranged
in V shape (see Figure 1). The
cross section of these resistors
is larger than that of the sin-



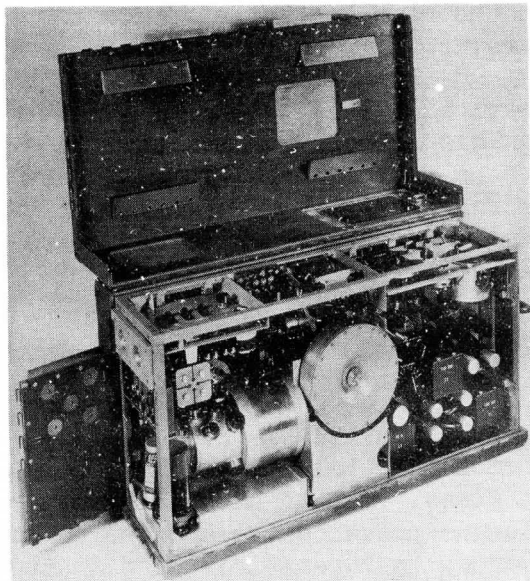


SEALING POINTS FOR LENSES TO PROTECT AGAINST FUNGUS GROWTH.

Some items of photographic equipment adapt themselves to treatment with the standard Signal Corps "Moisture and Fungus Proofing Kit," having the nomenclature MK-(10)/GSM. This applies particularly to recording amplifiers. It is generally obtainable at division supply depots. Procedure with this kit involves disassembly, the masking of delicate switch blades and potentiometer contacts, spray guns and heating or baking lamps, but is effective over long periods of time.

THE NEW DOUBLE FILM SYSTEM RECORDER

This new recorder, Sound Recording Equipment PH-346-A, fills a gap long felt in the complement of Signal Corps motion picture equipment. It embraces a number of new features, among them its unusual portability. The recorder, including amplifier with all controls, recorder motor and film magazines, weighs less than 93 pounds and is easily carried and maneuvered by a single individual.



REAR VIEW OF THE RECORDER UNIT WITH CASE OPEN.

The amplifier embraces many of the features of a high quality studio recorder. Among these features are volume limiting, enabling unusual ease in mixing. Six db of noise reduction is obtained by a very simple electronic circuit which induces a biasing current in the galvanometer ribbons.

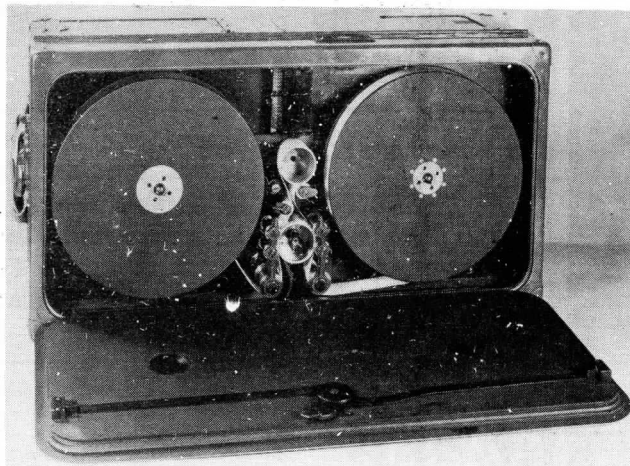
The galvanometer records a standard unilateral variable-area track. This track can be played back on reproducing machines found in the field. The recorder motor and the camera motor are of the dc inter-lock type. These motors effect "electrical gearing" for synchronizing. Another unusual feature of this machine is the magazine. The magazine is an integral part of the recorder as can be seen from the illustration. Part of the magazine consists of two light-tight reels and covers which are pre-loaded in darkness. They may be changed in day-

EQUIPMENT

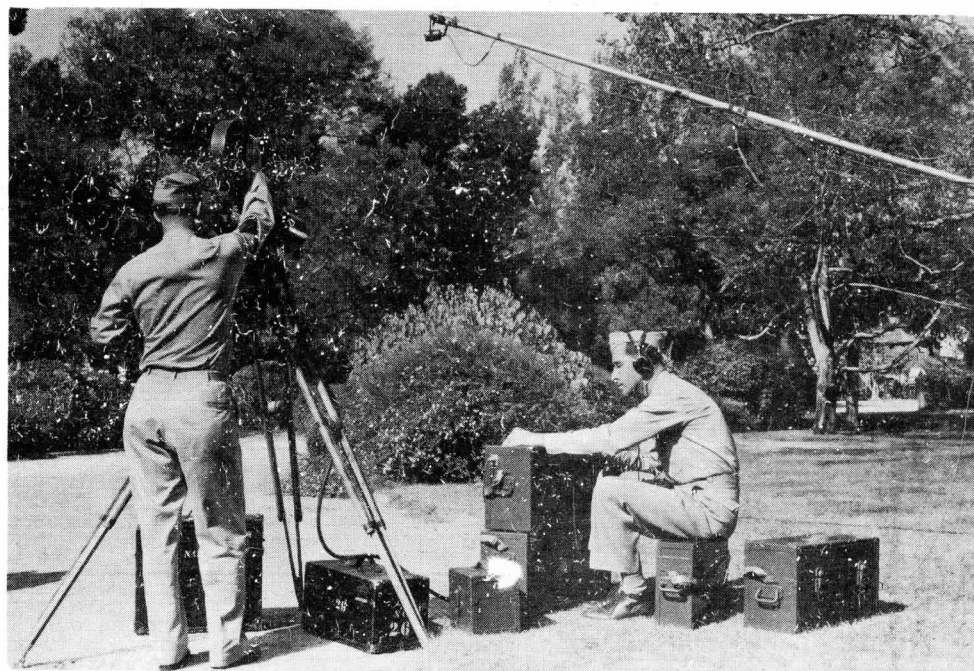
light by removing the cover after the machine is threaded up. Thus only a very few feet of film are fogged. Seven thousand feet of film may be carried and loaded in this manner without returning to the darkroom.

The recorder is provided with many of the other features found only on studio equipment, namely, dialogue equalization, two channel mixing, film motion of such steadiness that music may be satisfactorily recorded, a buckle indicator, and metering for all currents and voltages.

At variance with the sound systems of ordinary newsreel cameras of the single film system type, the PH-346-A recorder enables production shooting. The sound track, of course, is processed separately from the picture track. This enables optimum printing for highest picture quality, a condition not always attained where provision must be made for compromising between sound printing density and picture density.



FILM COMPARTMENT OF THE RECORDER UNIT.



THE NEW SOUND RECORDER EQUIPMENT IS COMPLETE IN THE TWO CASES BEFORE THE SEATED OPERATOR, THE BOTTOM ONE OF WHICH HOUSES THE POWER SUPPLY.

TELETYPEWRITER EQUIPMENT CHARTS

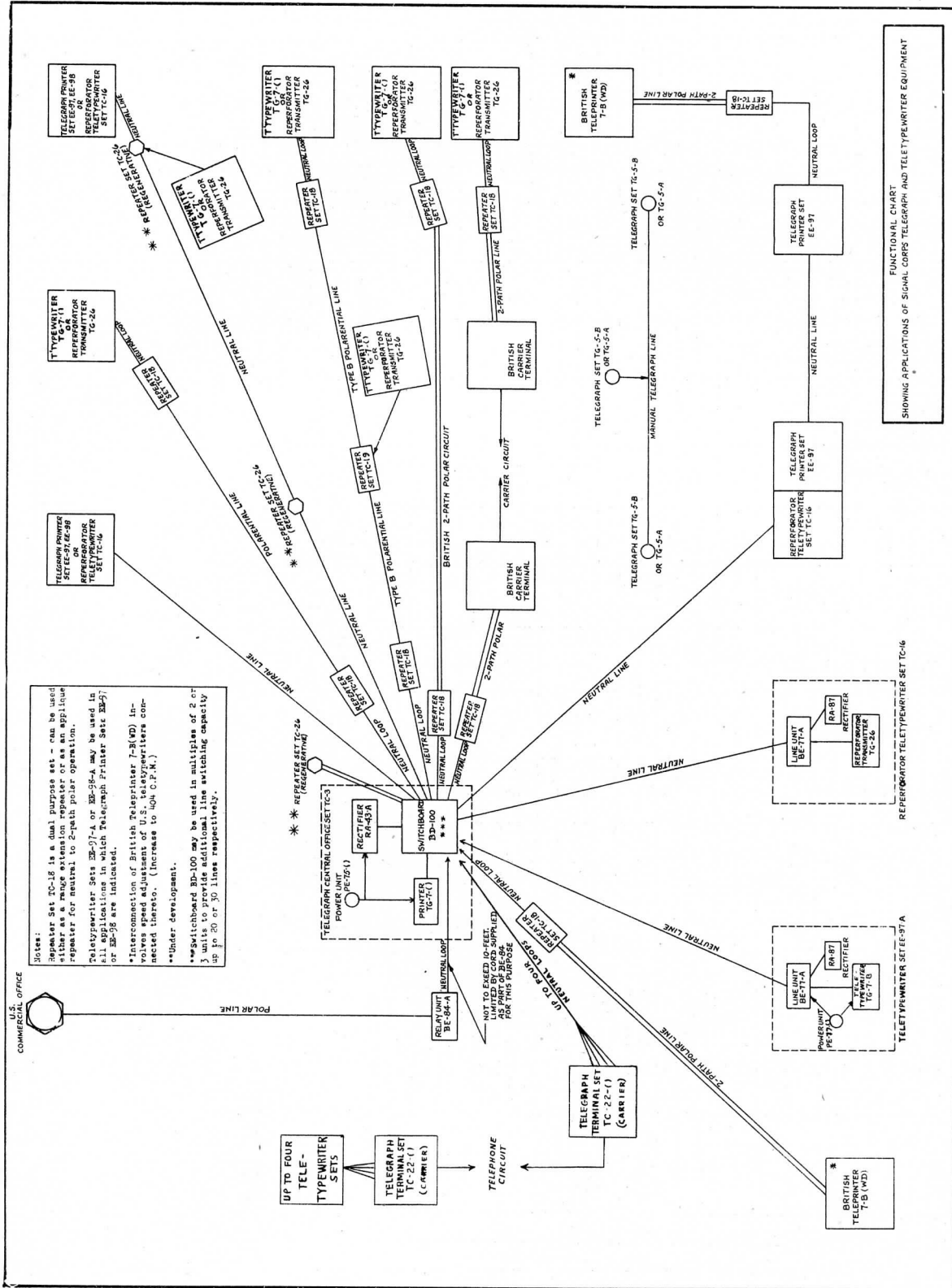
Because of frequent requests from the field for detailed technical and operational characteristics of Signal Corps tactical telegraph and teletypewriter apparatus, the charts on this and three following pages are published as a matter of general information.

SIGNAL CORPS TELETYPEWRITER EQUIPMENT (TACTICAL SETS)													
NOMENCLATURE		EE-9T	EE-9B	EE-37-A	EE-98-A	EE-102	TC-16	TC-17	TC-3	TG-23*	TG-25*	TG-11	REMARKS
TELETYPEWRITERS	TG-7-A	1	1	TG-7-B	TG-7-B				1**				
	TG-37					1							
REPERFORATOR TRANSMITTER	TG-26						1						
	TG-27							1					
PERFORATOR	MODEL 14									1		1	COMMERCIAL
REPERFORATOR	MODEL 14										1		COMMERCIAL
RECTIFIERS	RA-37	1	1										
	RA-87			1	1	1	1	1					
	RA-43								1				
	STOCK NO. 4TREC-12 STOCK NO. 4TREC-13										1	STOCK NO. 4TREC-11	COMMERCIAL
LINE UNITS	BE-77	1	1							1			COMMERCIAL
	BE-77-A			1	1	1	1	1					
CHESTS	CH-50-(1)	1	1	1	1	1	1	1	1				FOR TG-7-A
	CH-51	1	1										FOR RA-37
	CH-53	1	1	1	1	1	1	1	1				FOR BE-77&AC'S
	CH-62-(1)	1	1	1	1	1	1	1	1				FOR TG-7
	CH-70								1				FOR TOOLS AND ACC'S - BD-100
	CS-82-A								1				FOR RA-43
	CH-158			1	1	1	1	1					FOR RA-87
POWER UNITS	PE-77	1	1										
	PE-75								1				
SWITCHBOARD	BD-100								1				
STEEL TABLES	STOCK NO. 4TXRT-98										1	STOCK NO. 4TPET-2	COMMERCIAL
	STOCK NO. 4TXT-40										1		COMMERCIAL
VOLTMETER	IS-170	1	1										
BIAS METER	I-97	1	1										
GROUND ROD	GP-29	2	2	2	2	2	2	2	2	1	1		
EXPORT	WEIGHT	683	547	698	562	562	587	587	1362	290	332	200	
	CU.FT.DISPL.	37.9	31.9	37.9	31.9	31.9	32.8	32.8	61.5	23	33	29	

* INCLUDES COMMERCIAL MODEL 14 TRANSMITTER DISTRIBUTOR ** LATE ISSUES INCLUDE TG-7-B INSTEAD OF TG-7-A

This chart constitutes a tabulated parts list of major components included in each of the complete tactical sets.

TELETYPEWRITER CHARTS



Illustrates a hypothetical teletypewriter system in which all tactical sets are used in their ordinary applications. This chart is intended only to portray, in block diagram form, the normal functions of each type of standard tactical equipment.

TELETYPEWRITER CHARTS

TELETYPEWRITER EQUIPMENT														
TYPE	TELETYPEWRITER			PERFORMERS AND REPERFORATORS WITH TRANSMITTER-DISTRIBUTORS					REMARKS					
	NOMENCLATURE	MODEL 15 (W)	MODEL 19 (W)	TG-19(I)	TG-11	TG-23	TG-25	TG-26	TG-27	(W)=WEATHER KEYBOARD	(E)=ESTIMATED.	(T)=NET WT INCLUDING TABLE		
PHYSICAL	UN-PAKED	TG-37 NOT ASSIGNED 128 #	TG-7-T-3 NOT ASSIGNED 33	TG-7A-1 15 1/2	2.10A-1 216	2.9A-1 216	4.5A-1 413	4.8A-1 413	8.3A-1 170	6.6A-1 168	7.2-1 196	12.1A-1 195(E)	13 1/4	
		15 1/2	9	42 1/2 (T)	42 1/2 (T)	42 1/2 (T)	42 1/2 (T)	23 1/2	13 1/2	16 1/2	18	27 1/2	27 1/2	
		18	10 1/2	18	21 1/2	21 1/2	37	37	13 1/2	14 1/2	24	31 1/2	31 1/2	
		21 1/2	13	21 1/2	32 1/2	32 1/2	660	660	149	232	260	350(E)	350(E)	
		400	43	400	27	27	24.9	24.9	46.7	19.7	18.8	21(E)	21(E)	
		400	1.9	400	410	410	810	810	200	290	318	350(E)	350(E)	
		400	27	27	35	35	59	59	29	23	33	21(E)	21(E)	
		FROM KEYBOARD	X	X	X	X	X	X	X	X	X	X	X	X
		FROM PERF. TAPE	X	X	X	X	X	X	X	X	X	X	X	X
		ON PAGE	X	X	X	X	X	X	X	X	X	X	X	X
OPERATIONAL	HOME COPY													
POWER	RECEIVED COPY													
FEATURES	MOTOR CONTROL	X	X	X	X	X	X	X	X	X	X	X	X	
CLASSIFICATION AS OF 1-22-44	KEYBOARD	X	X	X	X	X	X	X	X	X	X	X	X	

NOTE:1 FURNISHED WITH 60 CYCLE SYNCHRONOUS MOTORS WITH KITS CONTAINING SERIES GOVERNED MOTORS AND GEARS FOR 50-60 CYCLE OPERATION. TELETYPE CODE FOR THIS MODEL WITH SYNCHRONOUS MOTORS ONLY IS 4-4A-1, AND WITH SERIES GOVERNED MOTORS ONLY IS 4-7A-1.

NOTE:2 OPERABLE ON THIS POWER SUPPLY WHEN SERIES GOVERNED MOTOR, SUPPLIED IN KIT, IS USED.

This chart indicates the physical, operational and power characteristics of all tactical teletype-writers and such commercial models as have been issued in considerable quantity for tactical use, pending availability of standard tactical items.

TELETYPEWRITER CHARTS

ASSOCIATED SIGNAL CORPS ITEMS (TELETYPEWRITER)																	
ITEMS	RECTIFIERS			POWER UNITS			LINE UNITS		RELAY UNITS	SWITCH BOARD	REPEATERS		TEST SETS				
	RA-43-A	RA-53-A	RA-37	RA-87	RA-89	PE-77	PE-75	PE-201			BE-77	BE-77-A		BE-84-A	TC-18(SET) (TERMINAL) TC-30 & #	TC-19(SET) (ELECTRONIC) (INTEGRAL) TC-26(SET) REGENERATIVE TC-21 & #	TS-2/TC
NOMENCLATURE	RA-43-A	RA-53-A	RA-37	RA-87	RA-89	PE-77	PE-75	PE-201	BE-77	BE-77-A	BE-84-A	TC-18(SET) (TERMINAL) TC-30 & #	TC-19(SET) (ELECTRONIC) (INTEGRAL) TC-26(SET) REGENERATIVE TC-21 & #	TS-2/TC	I-193		
USED WITH	SWITCH BOARD BD-100	SWITCH BOARD BD-100	TELETYPEWRITER TC-7-A	TELETYPEWRITERS TC-7-A TC-24, TC-27	TELETYPEWRITERS TC-24, TC-27	TELETYPEWRITER GROUPS	TELETYPEWRITER GROUPS	TELETYPEWRITER GROUPS	TELETYPEWRITER TC-7-A	TELETYPEWRITER TRANSMITTER TC-24, TC-27	TELETYPEWRITER SYSTEMS	TELETYPEWRITER SYSTEMS	TELETYPEWRITER SYSTEMS	ANY OR ALL TELETYPEWRITERS POLAR RELAYS MAINTENANCE	ANY OR ALL TELETYPEWRITERS POLAR RELAYS MAINTENANCE		
PART OF	TELEGRAPH CENTRAL OFFICE SET TC-3	TELETYPEWRITERS TC-7-A TC-24, TC-27	TELETYPEWRITERS TC-7-A TC-24, TC-27	TELETYPEWRITERS TC-7-A TC-24, TC-27	TELETYPEWRITERS TC-7-A TC-24, TC-27	TELETYPEWRITER GROUPS	TELETYPEWRITER GROUPS	TELETYPEWRITER GROUPS	TELETYPEWRITER TC-7-A	TELETYPEWRITER TRANSMITTER TC-24, TC-27	TELETYPEWRITER SYSTEMS	TELETYPEWRITER SYSTEMS	TELETYPEWRITER SYSTEMS	ANY OR ALL TELETYPEWRITERS POLAR RELAYS MAINTENANCE	ANY OR ALL TELETYPEWRITERS POLAR RELAYS MAINTENANCE		
115V D-C																	
115V 50-60~																	
115/230V 50-60~ (WITH ZERO A-C OUTPUT)																	
115/230V 25-60~																	
WATTS	525	525 D-C 115V D-C 115V A-C 25-60~	46	46 D-C 500 A-C	46 D-C 500 A-C	95 WATTS (WITH ZERO A-C OUTPUT)	95 WATTS (WITH ZERO A-C OUTPUT)	95 WATTS (WITH ZERO A-C OUTPUT)	46 D-C 500 A-C	46 D-C 500 A-C	90 WATTS	90 WATTS	250 WATTS (MAX) 15 AMPERE	150 WATTS			
VOLTS	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V D-C 115V A-C 25-60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	115V A-C 60~	
ASSOCIATED CHEST	CS-82-A	CS-87-A	CH-51	CH-58	CH-59	INTEGRAL	SKIDS	PIPERING CASE	CH-53	CH-53	CH-70 *	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL	
WEIGHT (WITH CHEST)	186	265	40	52	75	53	290	300	6 (NET)	9 1/2 (NET)	105	180	130	130	130	130	63
DIMENSIONS (PACKED)	30X16X19	30X18X20	15 1/2 X 10 1/2 X 10 1/2	17 1/2 X 10 1/2 X 10 1/2	18 1/2 X 10 1/2 X 10 1/2	24 X 18 X 22	36 X 19 X 26	36 X 20 X 24	10 1/2 X 18 X 10 1/2	10 1/2 X 18 X 10 1/2	16 X 16 X 26	14 1/2 X 16 X 25	14 1/2 X 16 X 25	14 1/2 X 16 X 25	14 1/2 X 16 X 25	14 1/2 X 16 X 25	14 1/2 X 16 X 25
CLASSIFICATION	STANDARD	NON STANDARD	STANDARD	STANDARD	NON STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	CARRYING CASE	CH-70 *	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL
REMARKS		AVAILABLE ONLY ON SPECIAL ORDER FOR LOCATIONS WHICH REQUIRE 25~ OPERATION.	NO FURTHER PROCUREMENT IS ANTICIPATED (REPLACED BY RA-87)		AVAILABLE ONLY ON SPECIAL ORDER FOR LOCATIONS WHICH REQUIRE 25~ OPERATION.	WILL OPERATE 1 TG-27 SIMULTANEOUSLY & 1 TG-26 OR TG-27	RECOMMENDED FOR GROUPS OF TELETYPEWRITERS UP TO TWELVE IN NUMBER	RECOMMENDED FOR GROUPS OF TELETYPEWRITERS UP TO FIVE IN NUMBER WHERE P 75 IS NOT AVAILABLE	NO FURTHER PROCUREMENT IS ANTICIPATED (REPLACED BY BE-77-A)	USES MULTI-METER MEASURING LINE CURRENT D-C VOLTAGE & BIAS.	NOT FOR USE OUTSIDE THE CONTINENTAL U.S.A.	10-LINE NEUTRAL SWITCHBOARD FOR HEADQUARTERS.	NEUTRAL LOOP TO POLAR NEUTRAL LINE OPERATION. OPTIONAL NEUTRAL 2-PATH POLAR FEATURE FOR INTER-OPERATION WITH BRITISH APPARATUS.	FOR OPERATION AT MIDPOINT OF LINES HAVING TC-18 AT EITHER END.	LONG RANGE REPEATER CAPABLE OF TANDEM OPERATION FOR RESTORING SIGNALS TO ORIGINAL STRENGTH AND WAVE FORM.	USED FOR TESTING MARGINAL TOLERANCES OF SELECTOR MAGNETS OF ALL TELETYPEWRITERS.	USED FOR TESTING 2 OR 3-WINDING LARGE OR SMALL BASE POLAR RELAYS

* CHEST CH-70 CONTAINS SPARE PARTS AND TOOLS. DIMENSIONS 21 1/2 X 12 1/2 X 6 1/2 INCHES. SWITCHBOARD BD-100 REQUIRES NO CHEST.
 ** MAJOR COMPONENTS OF COMPLETE REPEATER SET.
 @ SEE "TELEGRAPH SWITCHBOARDS - COMPARATIVE DATA CHART" FOR INFORMATION COVERING PATCHING. SWITCHBOARD SB-6 (1)/66

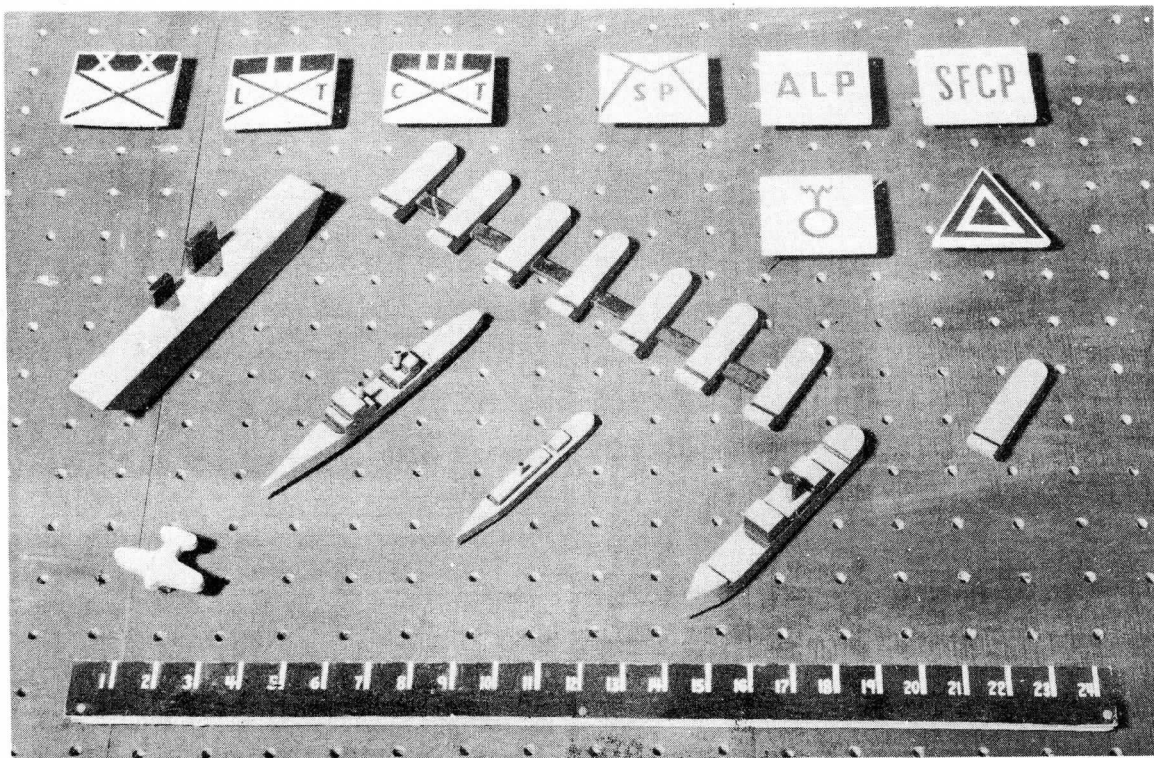
On this chart are listed the various accessory or associated items which are part of or used with complete tactical teletypewriter sets.

MILITARY TRAINING

VISUAL AIDS

AMPHIBIOUS COMMUNICATIONS PEGBOARD

With the increased emphasis on amphibious operations common throughout the Army at this time, this tactical pegboard developed as a training aid at the Eastern Signal Corps Schools at Fort Monmouth should be of interest to all instructors dealing with this subject.

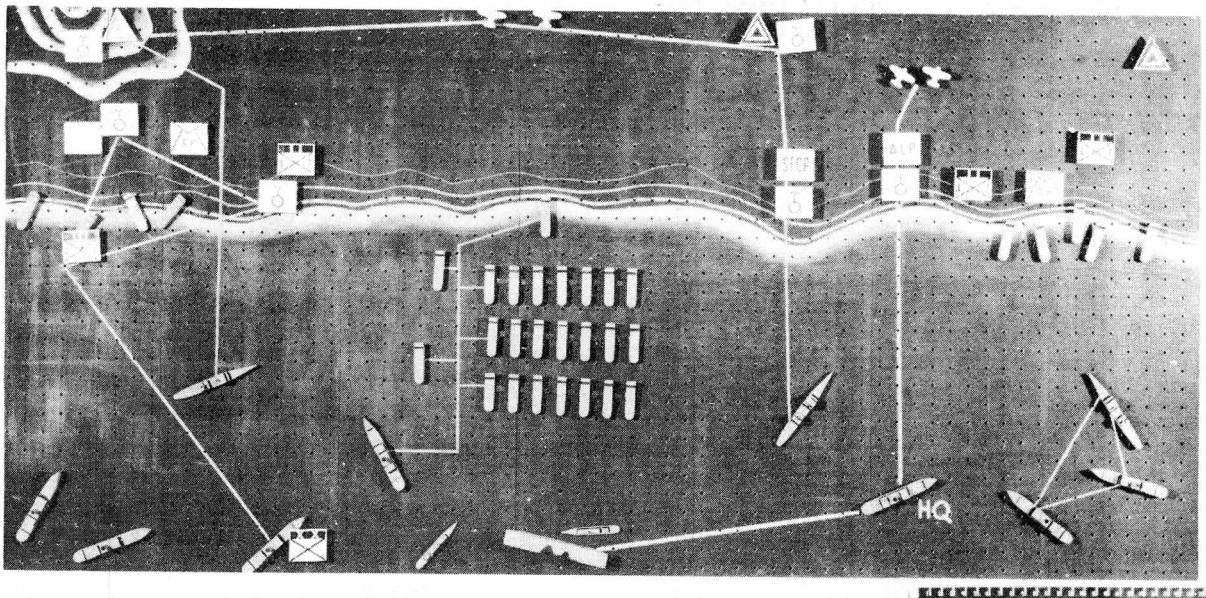


MODELS AND PEGBOARD FOR AMPHIBIOUS COMMUNICATIONS TRAINING

The board is four feet high and eight feet long with $\frac{1}{4}$ " holes, spaced $1\frac{1}{2}$ " apart, drilled through $\frac{1}{2}$ " plywood. Both sides of the board are coated with special blackboard slating paint which takes chalk readily.

The models and symbols are made from scrap wood and have a peg of $\frac{1}{4}$ " dowel affixed to the underside of each. No effort was made to make the models to any scale because the resulting proportions would make for poor visibility.

MILITARY TRAINING



A HYPOTHETICAL PROBLEM WORKED OUT ON THE PEGBOARD (FOR SECURITY THIS SITUATION IS PURPOSELY INCORRECT)

This board can be used to show tactics and radio and wire nets. The instructor plays the problem in front of the students by moving the models and symbols step-by-step and can use chalk to illustrate the communication nets. Terrain features, such as hills, shore line, streams, road, etc., can be effectively drawn on the board by the use of colored chalk.

AUDIO-VISUAL BEAT FREQUENCY INDICATOR

This training aid is used in the elements of radio class, radio communications course at the Enlisted School, Eastern Signal Corps Training Center, Fort Monmouth.

It is used to illustrate (1) zero bearing, (2) that radio frequencies cannot be heard, (3) the upper and lower limits of audio frequencies and (4) that "mixing" or "blending" two radio frequencies produces several frequencies, the difference of the two being audible providing it falls in the audio range.

The audio part consists of two oscillators, one fixed frequency (approximately 375 kc), the other variable from 350 to 400 kc. They are constructed from juke box parts and use the conventional Hartley circuit. The output is fed into an audio stage which in turn is used as a driver for a pair of 45's working in push-pull in the last audio stage. An old RCA-Victor amplifier with attached speaker was used in this unit. The audio stage can be built to suit the needs of the individual user.

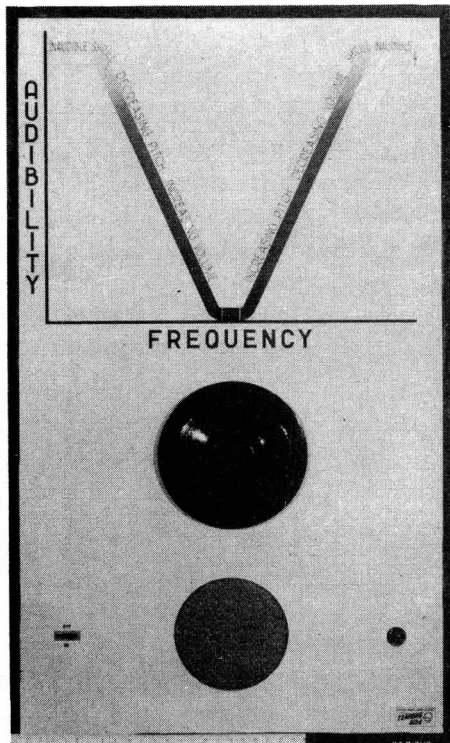


FIG. 1

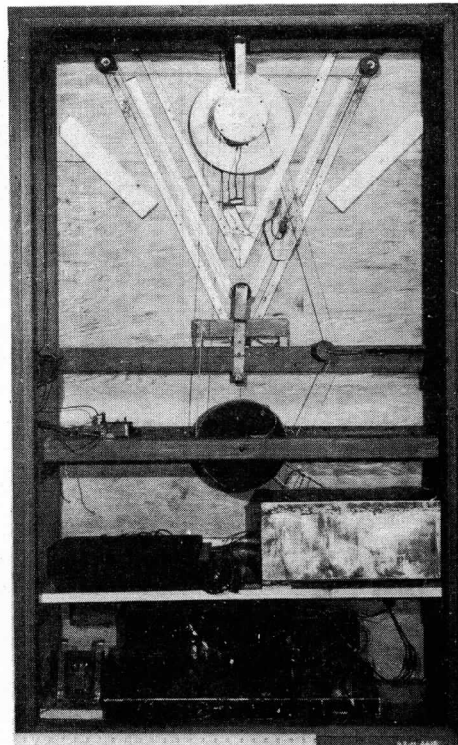


FIG. 2

The visual part is emphasized in two ways, one by the depth of color on the curve drawn on the face of the demonstrator. This was applied with an air brush giving a continual increase in color. The printing along the curve illustrates what the ear is hearing and the printing is further emphasized by a travelling light which increases in intensity as the tone decreases in pitch and the volume increases, goes out as the zero point is reached and reverses the procedure on the other slope of the curve.

The entire unit is driven from the large dial and is synchronized after approximately a twenty-minute warm-up period.

Figures 1 and 2 show the face and rear of this indicator.

A-C VOLTAGE AND CURRENT DEMONSTRATION BOARD

A training aid designed to show the voltage induced in a conductor when rotated through a steady magnetic field.

Designed to be used by an instructor, the aid can be controlled manually for step-by-step development or can be motor driven.

The face of this aid is covered with cloth-backed paper. In ink on the

MILITARY TRAINING

face is shown the poles, the magnetic field, direction of rotation, the ordinate showing maximum positive and negative values, the abscissa showing the function of time and the sine wave portraying the voltage. It was found necessary to draw the curve showing the voltage as the eye could not develop two patterns simultaneously (Figure 1).

The position of the conductor at any instant and the resultant voltage is shown in natural light. Three current positions are available, in phase,

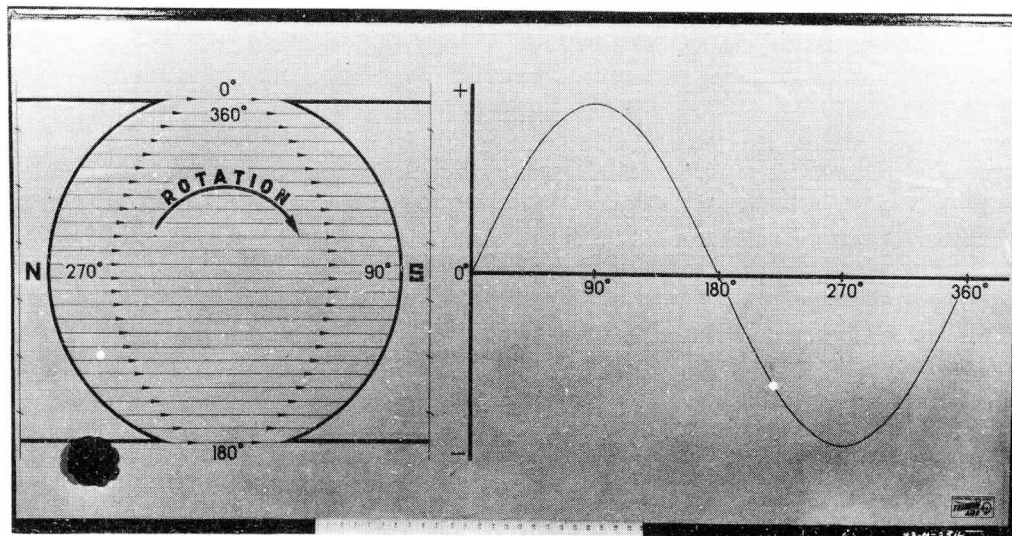


FIG. 1

leading by 90 degrees, and lagging by 90 degrees. The instantaneous values of the current are shown in red light. The maximum values of voltage and current are emphasized by the word "MAXIMUM" appearing through the paper and an arrow pointing to the value on the curve.

A five-position rotary switch and a toggle switch are counter sunk in the frame at the end of the aid. The toggle switch controls the motor driven unit and the five-position switch has an "OFF," conductor and voltage, current in phase, current leading, and current lagging position.

All electrical material came from confiscated pinball machines.

MILITARY PERSONNEL

EFFECT OF ASF CIRCULAR 26 UPON THE SIGNAL CORPS

ASF Circular 26, entitled "Utilization of Manpower Based on Physical Capacity," is intended to make as many enlisted men in the continental United States as possible available for overseas assignments. It is planned that the operating enlisted personnel of Signal Corps and Army Service Forces continental activities will be comprised of those not qualified for overseas service and those who have previously served outside the continental limits of the United States.

Enlisted men now in continental overhead installations who are physically qualified for overseas service and are currently assigned to operational duties, having served in the Army for a period of 12 months or longer, will be reassigned as rapidly as practicable to units or activities which are ultimately destined for overseas service. Such reassignment is to be accomplished by all commanders having assignment jurisdiction over operating personnel by 30 June 1944. Reassignments will be made in grade under current regulations; surpluses in grades resulting therefrom may be carried as excess in grade until absorbed.

Under the provisions of ASF Circular 43, 9 February 1944, the age limit for exempt personnel was raised from 35 to 38 years of age. Personnel within the following categories are thus exempt from reassignment to overseas units: those who have served outside the continental limits of the United States subsequent to 1 December 1941; those 38 years of age or older; and a few rare technical specialists.

Replacements for enlisted personnel thus reassigned to overseas units have been designated as follows in the priority indicated:

1. Civilians.
2. WAC personnel.
3. Enlisted men disqualified for overseas service.
4. Enlisted men over 38, or who have had overseas service, or whose special skills cannot be used overseas.
5. Enlisted men with less than 12 months service.

As a result of the above policy, the Chief Signal Officer will release several thousand enlisted men from overhead units who can thus be shipped overseas. Replacements may become available from the ranks of the Women's Army Corps and arrangements have been made to requisition German and Italian prisoners of war for duties which are not highly classified in nature. As with the other arms and services, as many able-bodied, combat-fit men as possible will be overseas by the middle of 1944.

MILITARY PERSONNEL

1943 SIGNAL CORPS AWARDS

A total of fifty-five awards or decorations for meritorious and distinguished service was approved by the War Department during 1943 for Signal Corps officers and enlisted men. Among these awards, representing 38 for officers and 17 for enlisted men, were six Soldiers Medals, three Silver Stars, ten Purple Hearts, 30 Legion of Merit, one French Foreign Legion, one Croix des Services Militaires Volontaires, one Distinguished Service Medal, one Distinguished Flying Cross, one Air Medal and one British Citation.

RECLASSIFICATION BOARD ESTABLISHED AT FORT MONMOUTH

On 25 January 1944, a Reclassification Board was established at Fort Monmouth, New Jersey, under the provisions of Section 1, Army Service Forces Circular 18, 15 January 1944. Nine officers have been assigned to duty on this board. Cases under the jurisdiction of the Chief Signal Officer which were previously tried by boards established within the Service Commands will, in the future, all be heard at Fort Monmouth.

Of the 33 Signal Corps reclassification proceedings prior to 31 December 1943, 14 involved officers under the jurisdiction of the Chief Signal Officer. As a result of the proceedings, eight officers were transferred to new organizations, seven resigned, seven were discharged, two were reassigned, one was discharged and reappointed, and one officer was disciplined under the 104th Article of War. In three cases the proceedings were terminated, and as of 1 March 1944 four cases were pending for further action. All commanding officers of installations under the jurisdiction of the Chief Signal Officer have been urged to uphold the standards of the Signal Corps and to take immediate steps to eliminate incompetent or ineffectual officers under their command.

CHIEF SIGNAL OFFICER HONORED BY VENEZUELA

Major General Harry C. Ingles, Chief Signal Officer, has been honored by the Republic of Venezuela which conferred upon him the decoration of the Orden del Libertador, in the grade of Comendador. This is one of the highest distinctions with which Venezuela rewards distinguished services performed for humanity and the citizens of the country.

This decoration, which carries with it a certificate of award and the medallion of the Order, was conferred on General Ingles by direction of the President of the Republic according to the favorable vote of the Council of the Orden del Libertador, for the services rendered while the present Chief Signal Officer was Chief of Staff of the Caribbean Defense Command, during which time he planned and supervised the installation and maintenance of communication systems in that area.

MILITARY PERSONNEL

ASSIGNMENT OF WAC OFFICERS TO OVERHEAD POSITIONS

More than a hundred WAC officers have been assigned to Signal Corps overhead installations to replace male officers in administrative positions. All organizations under the jurisdiction of the Chief Signal Officer have been urged to make a survey of their establishments to ascertain whether or not WAC personnel might be utilized to good advantage in replacing male officers. The agencies to which Wacs are now assigned are the Signal Corps Ground Signal Agency, the Holabird Signal Depot, the Signal Corps Aircraft Signal Agency at Wright Field, Dayton, Ohio, the Philadelphia Signal Depot (with Wacs assigned to the Storage and Issue Agency and Stock Numbering Agency), the Eastern Signal Corps School, and the Signal Security Agency.

RECRUITING WACS FOR SIGNAL CORPS DUTIES

To augment the recruiting plan now underway in the Second Service Command for Women's Army Corps enlisted personnel to take over Signal Corps duties, plans are being made to conduct recruiting in the First, Fifth, Sixth, Seventh and Ninth Service Commands, bringing the total recruitment quota to over one thousand Wacs. The need for this personnel is urgent and requisitioning fulfills the need only at a very slow rate. The jobs for which Wacs are needed are clerical, and statistical, including code clerks and teletype operators. Signal Corps Wacs thus recruited will be assigned to Signal Corps installations primarily on the Eastern seaboard, a great proportion of their duties to be classified in nature.