



BELL LABORATORIES RECORD

University of California
Division of War Research
U. S. Navy Radiating and Sound Laboratory
San Diego, California

JULY 1945 VOLUME XXIII NUMBER VII

The Voice of Ship Command

By L. B. COOKE
Apparatus Development

THE shrill scream of the bosn's pipe startles a sailor from well-deserved slumber. A few seconds later, wide awake, he hears a "Bong! Bong! Bong!"—the repeated bell-tone of General Alarm. This means an emergency. He listens carefully to the announcement which follows, telling him the cause of the emergency. It might be a fire, a call to battle stations, or any other serious condition, and he goes quickly to the station he has been trained to man in such an emergency.

These alarms and instructions come through the Battle Announcing System,

The headpiece shows the results of a bomb explosion as a Navy Avenger landed on the flight deck of a carrier. The bomb armed itself as the plane rolled down the deck. Loud-speakers of the battle announcing system are evident on the island at the left of the photograph—U. S. Navy photo.

with which all of the two or three thousand men aboard a large warship are informed of trouble and given any necessary special instructions.

This is one of the more spectacular but less usual uses of the announcing system. Every few minutes during the day the equipment is used for the more prosaic job of calling together a group for a work detail, paging an officer, or calling the men to mess. It is the means by which all general commands are transmitted to the crew, members of which may be in any of the hundreds of separate compartments on the vessel.

Western Electric Announcing Systems on naval vessels go back more than twenty-five years. The earlier uses were entirely as paging systems, and most of the equipment was based on standard telephone designs.

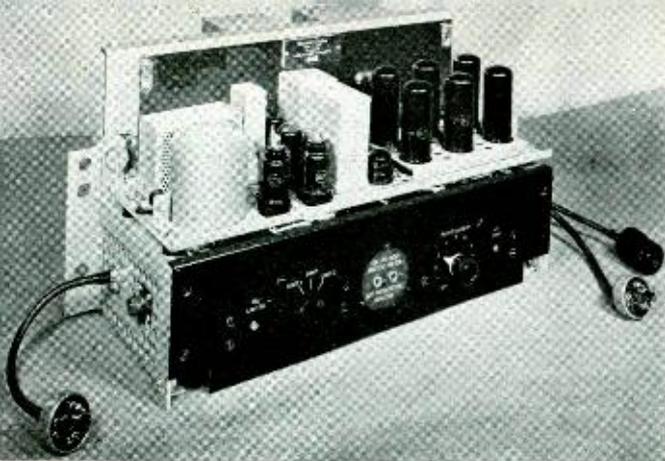


Fig. 1—Preliminary amplifier used with Battle Announcing System

About ten years ago the Navy, seeing the possibilities of announcing systems for handling certain battle functions, laid down basic requirements, and the Laboratories was requested to design experimental equipment to test out these ideas. Surveys were made of the noise conditions on all types of naval vessels. Intelligibility tests under shipboard conditions were made to determine optimum frequency characteristics for speech. Tone signal characteristics were analyzed to determine the most attention-arresting signals consistent with limitations of amplifiers and loud-speakers. In this work the Laboratories' basic studies of hearing and intelligibility of speech provided the background for the study of the specialized conditions on board ship. The results of these tests, and the success of the experimental equipment, led to a change of name from General Announcing Systems to Battle Announcing Systems, and to the issuance of new Navy specifications covering the new requirements.

The first systems built to the new requirements were in service on large ships such as battleships and aircraft carriers before Pearl Harbor, and the application of this type of system has been extended rapidly by the Navy to smaller vessels such as destroyers, submarines and landing craft. Designs have been changed to increase ruggedness and to eliminate faults disclosed under battle conditions, but even the earlier designs met the needs of Naval service with considerable success.

Announcing equipment on shipboard is divided into several separate but inter-

related systems. The general system might well be termed the commanding officer's system. Announcements on this system are usually made from the point of ship control: the bridge while under way; the quarter deck while at anchor; or the central station, deep in the most protected part of the ship, during special conditions. As many as two hundred or more loud-speakers are distributed throughout the ship. These may be selected in groups, so that it is unnecessary to disturb most of the crew when an announcement is of interest only to men in a particular section, such as the engine rooms. Alarm signals, such as the bell tone for general alarm and the special signal for gas attack, are generated by electronic means, and sent out over the loud-speakers. This system is often used during battle to keep the officers and crew below decks informed of the progress of the fighting.

The engineer's system is primarily intended for use by the Chief Engineer in giving instructions to machinery spaces. On aircraft carriers, the aviators' system provides for instructions to hangar and flight deck. These systems are tied in with the general system, however, so that alarms and general orders can be sent to all spaces.

Each turret on cruisers and battleships, incorporating a maze of compartments and intricate machinery, has a special two-way announcing system over which the turret officer gives orders for operating the turret and the loading, aiming and firing of the guns.

THE AUTHOR: L. B. COOKE joined the Laboratories in 1921 and, with the Commercial Products Department, engaged first in the development of radio receivers and then in the design of circuits for power-line carrier telephone equipment. In 1928 he turned to the development of circuits for reproducing equipment such as sound pictures, public address systems, and speech input systems. Since 1940 Mr. Cooke has devoted his entire time on the development of battle announcing systems for naval vessels.



The larger anti-aircraft guns are under the control of an officer at an anti-aircraft director station, located high up in the ship's superstructure. Loud-speakers at the guns transmit verbal orders from this officer, and also special tone signals to begin and cease firing.

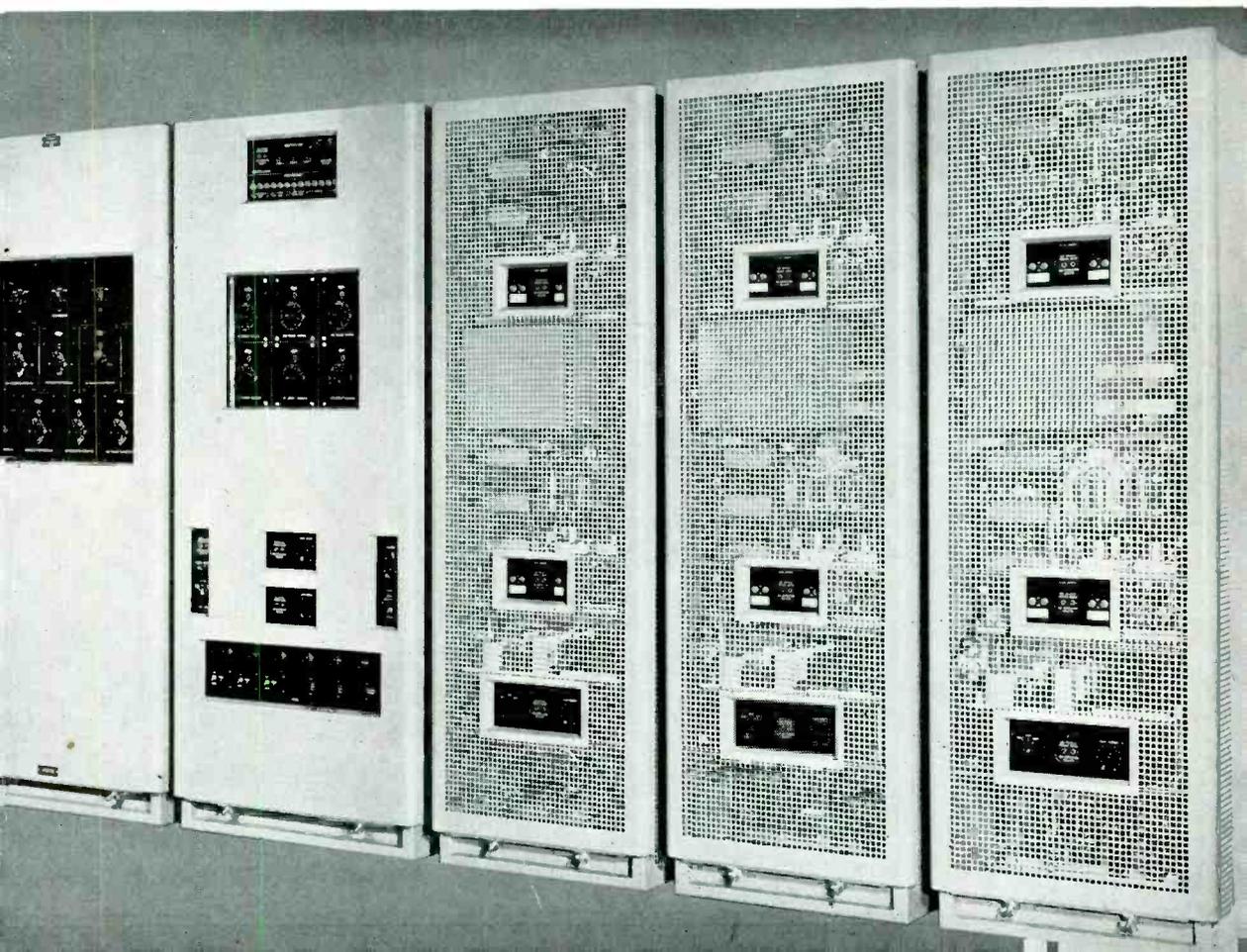
One of the more interesting uses of announcing systems is on the flight deck of aircraft carriers. Several super-power loud-speakers are located in the island structure, and pointed so that the entire flight deck is covered. Each of these loud-speakers is driven by an audio amplifier of 500 watts output capacity. These loud-speakers form part of the system over which the Air Officer, located at the fly control station above the flight deck, can give orders to pilots and deck crews during flight operations and while the airplane engines are being warmed up. This system is also used for transmitting warning signals in flight deck emergencies.

The frequency band transmitted by these systems, including microphone, amplifier,

and loud-speaker, is approximately 500 to 6,000 cycles. The low end is cut off at about 500 cycles, partly because these lower frequencies do not add materially to the intelligibility, and in fact often serve to reduce intelligibility in noisy, reverberant spaces, and partly because this low-end cut-off permits loud-speakers and amplifiers to be smaller and lighter than would otherwise be required. The higher frequencies have been accentuated to give better intelligibility in noisy spaces. Volume compression which averages 2:1, and thereby compresses a 40-db volume range into a 20-db volume range, is used to bring up the volume of the weaker syllables, and thus to improve intelligibility in noisy locations. As full amplifier output is approached, the compression ratio increases until at rated output the compression is about 10:1, helping to prevent overload and blasting of the loud-speakers.

Two types of amplifiers have been standardized for this equipment. One is the 40-watt, 120-db gain amplifier shown in Figure 1. In small systems, such as the

Fig. 2—Amplifier and control equipment for Announcing System



turret or anti-aircraft systems, this is the only amplifier used. In larger systems, this amplifier is used to drive one or two 500-watt amplifiers. Figure 2 shows the amplifier and control equipment for the combined general, engineer's, and aviators' battle announcing systems on a large aircraft carrier. The two racks at the left contain switching equipment and signal generators for the production of alarm signals. Each of the three racks at the right is a high-gain, 1,000-watt audio-amplifier channel which uses the 40-watt amplifier and two of the 500-watt amplifiers mentioned above. At full audio output, this system draws 100 amperes from the 115-volt, three-phase power supply.

The three systems combined in this set-up may be used simultaneously to transmit announcements to three separate parts of the ship. Each amplifier channel, however, is capable of handling the loud-speaker load of the three systems combined. In case of amplifier trouble, the facilities normally associated with the disabled channel may be combined with those of another channel

until repairs can be made. Even if two of the three channels are disabled, messages can still be transmitted throughout the whole ship. Figure 3 shows a simplified circuit of this system.

The more interesting design problems arise because of special requirements for service on naval vessels. Short circuits on loud-speakers must not interfere with operation over other loud-speakers. Short circuits or trouble grounds on microphone circuits or control wiring at microphone locations must not prevent the system being used from any other microphone location.

Mechanically the design problems become even more interesting. Great strength is required, and protection against shock, because equipment must not be rendered inoperative by the ship's own gunfire or the shock of torpedoes or near misses by aerial bombs. Vibration over long periods, caused by the ship's engines, must cause no damage. Loud-speaker and microphone diaphragms must be designed to withstand the blast from nearby gun muzzles.

All equipment located on weather decks

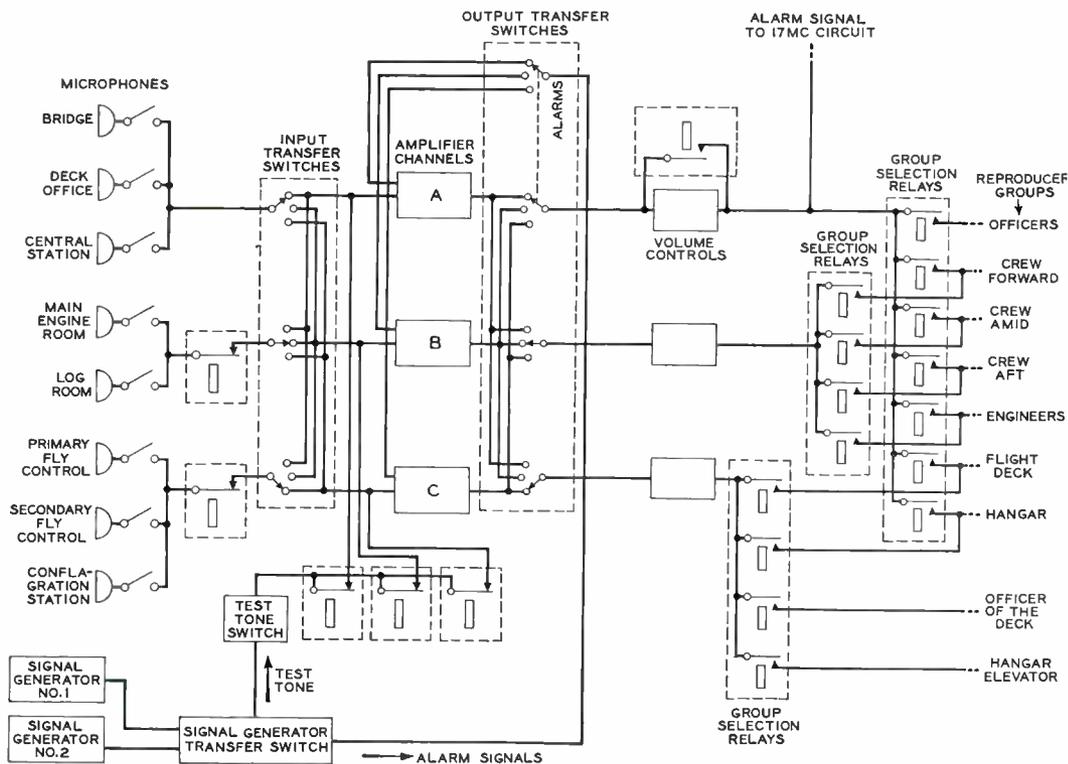
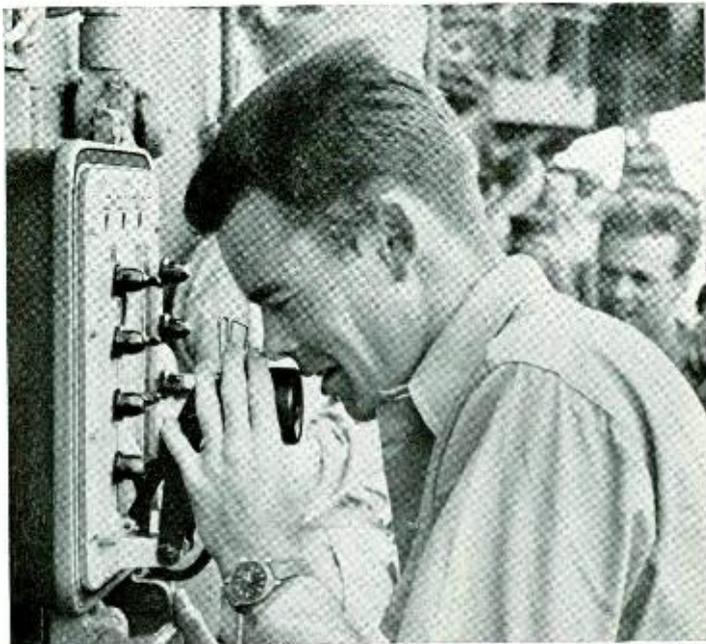


Fig. 3—Simplified schematic of the announcing system

must be protected from corrosion by salt water. This includes microphones, control boxes, and loudspeakers. In some cases equipment is made watertight so that no water can enter the enclosure. In others, equipment is designed with the expectation that water will enter, and drain holes are provided. Under these latter conditions, all internal parts must be made immune to the corrosive effect of sea water.

How effective the equipment of the Battle Announcing System has proved to be is evidenced by the following telegram that was sent to Western Electric by Rear Admiral Cochrane:



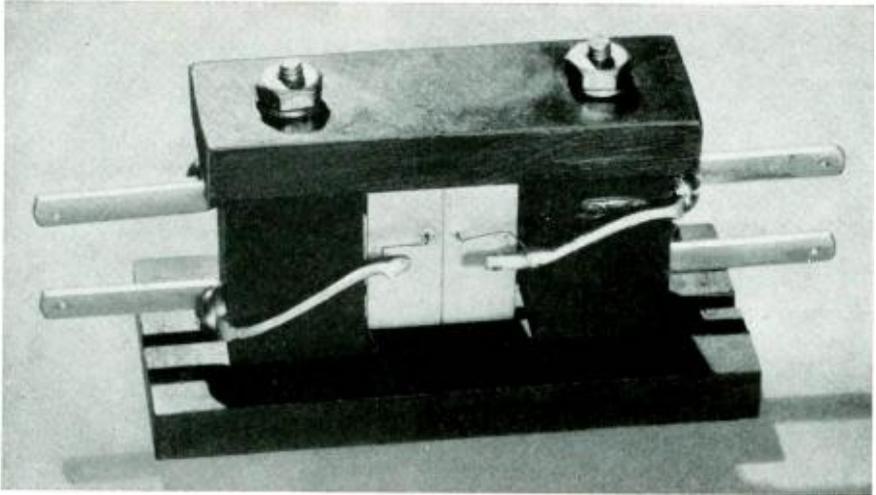
U. S. Navy Photo

Fig. 4—A transmitter control station with cover down

To the Men and Women of Western Electric Company

ONE of our warships reports that her Battle Announcing System produced in your shops has rendered outstanding service during eighteen months of almost continuous use under rigorous wartime conditions, including combat with the enemy. The report states "The reliability and effectiveness of this equipment was forcibly demonstrated during and after an extended period of battle, when many of the sound-powered telephone systems were severed and the automatic ship's service telephone was rendered inoperative, leaving the battle announcing system the only remaining method of disseminating information." From this it is clear that the quality you build into Western Electric communications equipment can be just as important to our fighting ships as the accuracy of their guns. You are to be commended for keeping quality and quantity of your production on a high level.

E. L. COCHRANE, Rear Admiral, USN,
Chief of the Bureau of Ships.



Historic Firsts: Wire-Mounted Crystals

QUARTZ crystals were used in electrical circuits during World War I, and they began to come into wide use as oscillators and as standards of time and frequency during the following decade. With the invention of the crystal filter in 1930,* the scope of their employment greatly widened, and within the next few years, the use of crystals in filters and oscillators became normal practice. During this period, research in the Laboratories had introduced new cuts and improved methods of processing so that by the beginning of World War II the crystal art was well advanced. As a result, the crystal plates themselves were very satisfactory, but no way had yet been devised of preventing the supports from affecting their vibration.

Proper functioning of a crystal plate depends on its being able to vibrate freely at its natural frequency. For any practical use, however, the plate must be held in a more or less fixed position, and any rigid supporting structure, by opposing restraint to vibration, tends to affect the crystal's behavior. With many types of crystal vibration there is a surface node—a line or point at which no movement takes place—and ideally, clamping at the node would not affect vibration. Practically, however, any clamp must make contact with a crystal over a small area, and thus under the most

favorable conditions will overlap the node to some extent. Moreover, there are some types of crystal vibration where the node lies within the body of the crystal, and is unreachable. With any rigid clamp arrangement, therefore, damping cannot be completely eliminated. Moreover, under shock conditions, the crystal may slip with respect to the clamp, and a changed characteristic will result, or with severe shocks, the crystal may break. If the crystal is removed from the clamp for any purpose, it is rarely possible to replace it so accurately in its original position that its initial behavior will be reproduced. When plated crystals are used, still another difficulty may arise from clamping. The clamp bears on the metal coatings that serve as the electrodes, and this coating tends to wear through in time, causing the crystal to become inoperative.

A method of mounting that avoided these various difficulties would be highly desirable, and studies had been carried on from time to time to devise a more satisfactory arrangement. In the late 1930's, A. W. Ziegler was working on this problem and conceived the possibility of supporting the crystal by light wires. Obviously, however, it was not as simple as it might sound, since if the wires were strong enough to support the crystal under all conditions of use, they would be rigid enough to interfere with its vibration. Wire had been used in experimental work

*RECORD, August, 1944, p. 504.

before, but in these instances it had been employed only to establish connection to the electrodes; the crystal was laid on cotton, or was supported in some other manner that would affect its vibration as little as possible.

Mr. Ziegler's proposal was threefold. A wire should be used that was strong enough only to support the weight of the crystal. To further reduce its effect on the crystal, the wire should be bent once or twice between the crystal and the rigid supports to which the wire was fastened. These bends in the very light wires would give the crystal complete freedom of motion in all directions, and would avoid pressure being exerted against the crystal by the wires connected to each face. Since such wires are permanently connected to the crystal electrodes, no shifting of the point of contact is possible, and frequency adjustment is simplified.

With such light wires, free to deflect in any direction, large deflections may occur, however, under the influence of external shocks. The third part of Mr. Ziegler's suggestion, therefore, was the provision of stops—preferably of relatively soft material—that would prevent the crystal from moving more than a very small distance in

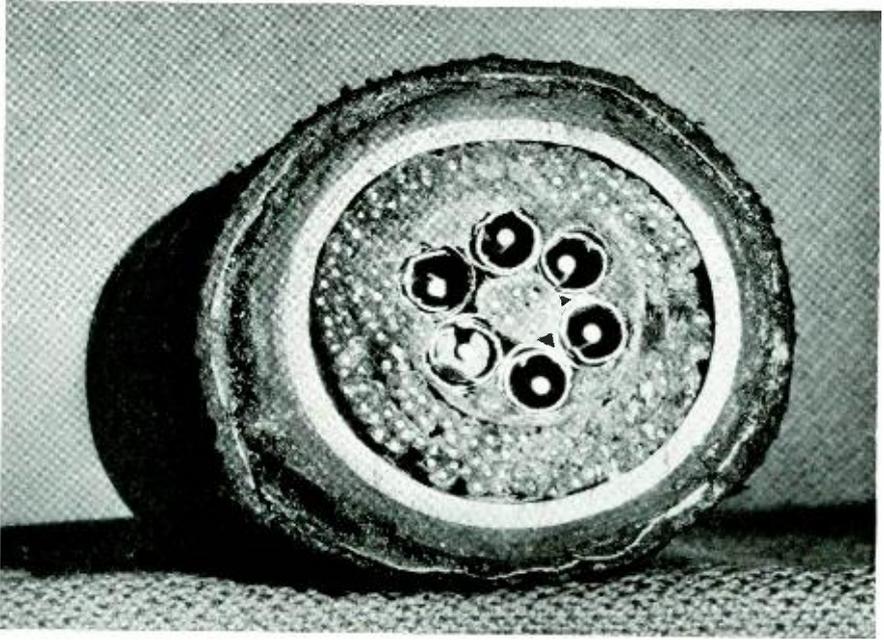
any direction. These stops, by arresting motion of the crystal in response to external shocks, would prevent the supporting wires from being bent beyond their elastic limit or from being torn from contact with the crystal. A patent was applied for to cover these various basic features in June, 1940, and Patent No. 2,275,122 was issued on March 3, 1942.

The first experimental crystal of this type is shown in the headpiece where the supporting wires are the very fine ones attached directly to the crystal. It was a 99-kc filter crystal of the divided-electrode type, and thus had two wire supports on each face. The hard rubber frame provided the stops. It will be noticed that there is a small gap at each side between crystal and frame, and a similar gap at the top and bottom, not evident in the photograph, is provided by slots in the top and base of the frame.

Since that time, wire-mounted crystals have come into extensive use. Over eight million of them have been used in tank radio sets alone, and large quantities have also been used for aircraft radio sets and in filters for cable and coaxial carrier systems.

M. R. MCKENNEY APPOINTED GENERAL PATENT ATTORNEY

M. R. McKenney became General Patent Attorney of the Laboratories and head of its Patent Department on June 25, 1945, succeeding E. W. Adams who became General Patent Attorney of Western Electric Company. E. V. Griggs, in accordance with his own desire, will continue as Assistant Patent Attorney of the Laboratories, reporting to Mr. McKenney



Lightning-Protected Cable

By L. S. INSKIP
Protection Development

LEAD-SHEATHED cable was employed by the Bell System as early as 1879 to reduce the congestion of overhead wires in the streets of large cities and to provide mechanical protection for telephone circuits. The earlier types of toll cables generally used for voice-frequency circuits have always experienced some lightning damage, but the rate of damage, whether the cable was aerial, underground, or—more recently—buried, was usually insufficient to warrant extensive protective measures. When the small-size buried cables now widely used for carrier systems were first suggested, it was recognized that the rate of lightning damage to such cables in many areas would be greater than to the full-sized cables formerly used, and that protective measures might be needed. Where these smaller cables are buried in areas subject to frequent lightning storms, or where the soil is of high resistivity, strokes directly to the cable or to trees or other objects nearby have caused pair troubles, holes in the sheath, or crushing of the sheath due to the explosive

effects of arcing between sheath and steel tapes on tape-armored cable or to the lightning arc to the sheath on non-armored cable. Because of the number and importance of lightning damage cases on buried cable, and because of the difficulties in locating and clearing troubles on cables buried in the ground, extensive studies of lightning and its effects on buried cable have been in progress for several years.

Many cases of damage to buried cables have been investigated, and interesting evidence of the variations in the effects of lightning have been noted. Holes in the sheath and burned insulation on the conductors were the most common effects noted. Crushing of the sheath was found in a few cases. Figure 1 illustrates a severe case of crushing on a short piece of one of the four coaxials in the cable between Stevens Point and Minneapolis. The coaxial was flattened from pressure, probably due to gas generated by the lightning arc in passing through the outer wrapping of the cable.* All four

*RECORD, January, 1941, p. 138.

coaxials in the cable were similarly crushed.

The tremendous electromagnetic forces created by the large current along the coaxial tube resulted in the complete collapsing of the coaxial shown in Figure 2. This coaxial is of somewhat different construction than the telephone coaxials and was the transmission line to a radio antenna at a broadcasting station. There was no outer sheath to carry the current in this case, and it all passed along the one coaxial. Buried telephone cables containing coaxials have a conducting cable sheath and in addition contain several coaxials, so that the likelihood of such complete collapsing of coaxials is remote.

Lightning investigations, including both theoretical studies and field tests,* showed that when lightning strikes, the current spreads in all directions from the point where it enters the ground. If there is a buried cable nearby, the cable provides a low-resistance path, so that much of the stroke current will flow to the cable and thence along the cable in both directions, decreasing with distance because of leakage from the sheath to earth. As a result of this flow of current, a voltage is produced between the sheath and the core conductors that varies in magnitude, depending on the resistance drop in the sheath between the stroke point and a remote point where the current has substantially all leaked off the sheath. The magnitude of the stroke, which determines the total current involved, the earth resistivity, which determines the rate at which the current leaves the sheath, and the size of the cable, which determines the resistance of the sheath, are the controlling factors in determining whether voltage likely to cause insulation breakdown will occur. There is no evidence to indicate that because a cable contains coaxial conductors, it is more likely to fail.

If the insulation from core conductors to sheath breaks down, the conductors to which arcing occurs will then take the same potential as the sheath at that point. Arcing will quite likely occur between these conductors and others in the cable near the stroke point. Other breakdowns will occur some distance away where the potential between conductors and sheath has been increased as the result of voltage redistribu-

tion caused by the breakdown at the stroke point. Arcing may cause pair troubles by fusing conductors to the sheath or to each other, or by fusing open one or more conductors. In addition, arcing from conductors to sheath may pit the inner surface of the sheath, and if the arcing is sufficiently severe, holes may be burned in the sheath.

Most of the large toll cables installed before cable carrier systems were developed were designed to withstand a factory test of 1,000 volts a-c between core conductors and sheath. The insulation of much of the smaller cables has now been approximately doubled, and is tested at 2,000 volts. The insulation has been increased on the gas alarm system and cableman's talking circuit, and additional insulation has been incorporated in splices.

In addition to the increased insulation, bare copper wires have sometimes been plowed in just above the cable by the cable laying plow. The shield wires are so spaced from the cable that a substantial portion of the current flows in them. It is expected that a stroke nearby will cause arcing between the shield wires and the cable. In all cases, however, the proportion of the stroke current carried on the cable sheath will be lower than without shield wires, and the likelihood of damage will be less.

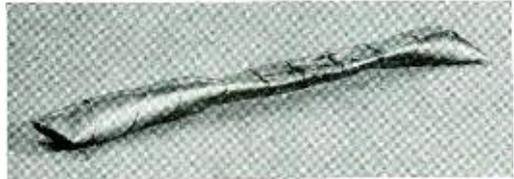


Fig. 1—Section of a coaxial conductor from the Stevens Point-Minneapolis cable that was damaged by lightning

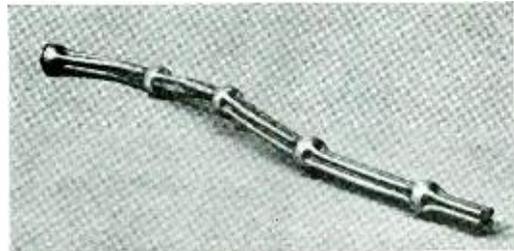


Fig. 2—Section of a coaxial conductor used as an antenna feed line that was completely collapsed by lightning current flowing along it

*RECORD, May, 1943, p. 294.

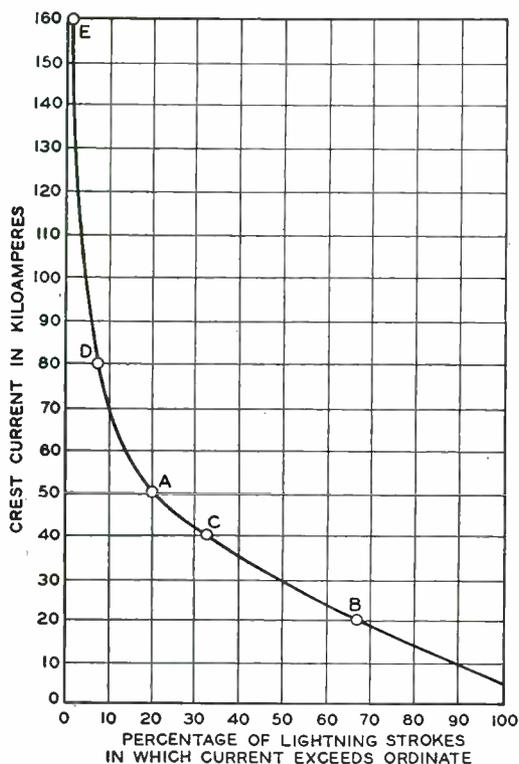


Fig. 3—Relationship between size of stroke and their frequency of occurrence

In Figure 3 is plotted a curve showing the approximate relationship between the maximum current in the stroke and the percentage of all strokes equal to or exceeding a given maximum current. Five points, A to E inclusive, at which lightning may cause breakdown on various types of cable, are indicated on the curve. A soil of moderate resistivity is assumed. A full-size cable (2½ inches in diameter) with ordinary core insulation is represented at A. Breakdown of such cables will not occur with strokes of less than 50,000 amperes, and only about 20 per cent of all strokes are as large as this.

B is a 1½-inch cable with ordinary insulation. Strokes of 20,000 amperes or more will insure conductor-to-sheath breakdown in such cables, and currents of this magnitude occur in about 67 per cent of the strokes.

C is the same size cable as B, but with doubled core-sheath insulation. Breakdown in C will be caused only by strokes of 40,000 amperes or more, which occur only about 30 per cent of the time.

D is the same as C, but with two copper

shield wires buried above the cable. Under these conditions, 80,000 amperes in the stroke is required to cause breakdown, and this current occurs only 7 per cent of the time. The shield wires carry about 50 per cent of the current of the stroke.

If it were practicable to increase sufficiently the insulation strength between the core and the sheath, taking into account both the insulation of the cable itself and that of various connections which must be made to it, failure of insulation from lightning strokes could be entirely prevented. The same result could be obtained by sufficiently increasing the conductance of the sheath. There are difficulties in increasing the strength of the insulation beyond a certain point, due mainly to the necessity of bringing conductors out of the sheath at intervals along the cable. By surrounding the sheath itself with a high-breakdown dielectric, however, and placing outside of this a copper jacket of moderately low resistance, it is feasible to exploit both means of approaching immunity from lightning damage. This method has the further advantage, as compared to shield-wires, of incorporating the protection in the cable structure itself.

A six-tube coaxial cable incorporating these features has recently been developed and is now being installed in the first section of the transcontinental coaxial system.*

*RECORD, December, 1944, p. 619.

THE AUTHOR: After receiving an E.E. degree from Rensselaer Polytechnic Institute in 1922,



L. S. INSKIP spent the following two years as an instructor in electrical engineering at his Alma Mater. In September, 1924, he joined the Department of Development and Research of the American Telephone and Telegraph Company as a member of the Transmission Development Department, and was transferred to the Laboratories in 1934. His work has been chiefly concerned with the protection of telephone plant against lightning damage and the effects of contact between power wires and telephone plant.

The copper jacket forms a low-resistance path over which the large lightning currents can flow, and the insulation—tested to 10,000 volts d-c at the factory—prevents breakdown between jacket and sheath, and thus damage to the cable, even when the currents are large enough to develop very high potential difference between them.

The construction of this cable is evident from Figure 4 and in the photograph at the head of this article. It carries six coaxial units with service pairs within the coaxial group and in the interstitial spaces immediately around them. Over this assembly is a wrapping of paper, and then a group of paper-insulated quads with another layer of paper surrounding it. The lead sheath is placed directly over this latter wrapping. Over the lead are two wrappings of thermoplastic material and a layer of tough cloth known as gray sheeting. Over this insulation is placed the copper jacket, which is 10 mils thick and is corrugated transversely to the length of the cable to give flexibility. An open cloth tape is wrapped over the copper. Each layer over the lead is flooded with a thermoplastic compound that remains soft after cooling. The outer cloth tape protects the copper in handling, and also reduces corrosion of the copper. It offers comparatively little resistance to the entrance of lightning current or to its leaking off along the length of the cable.

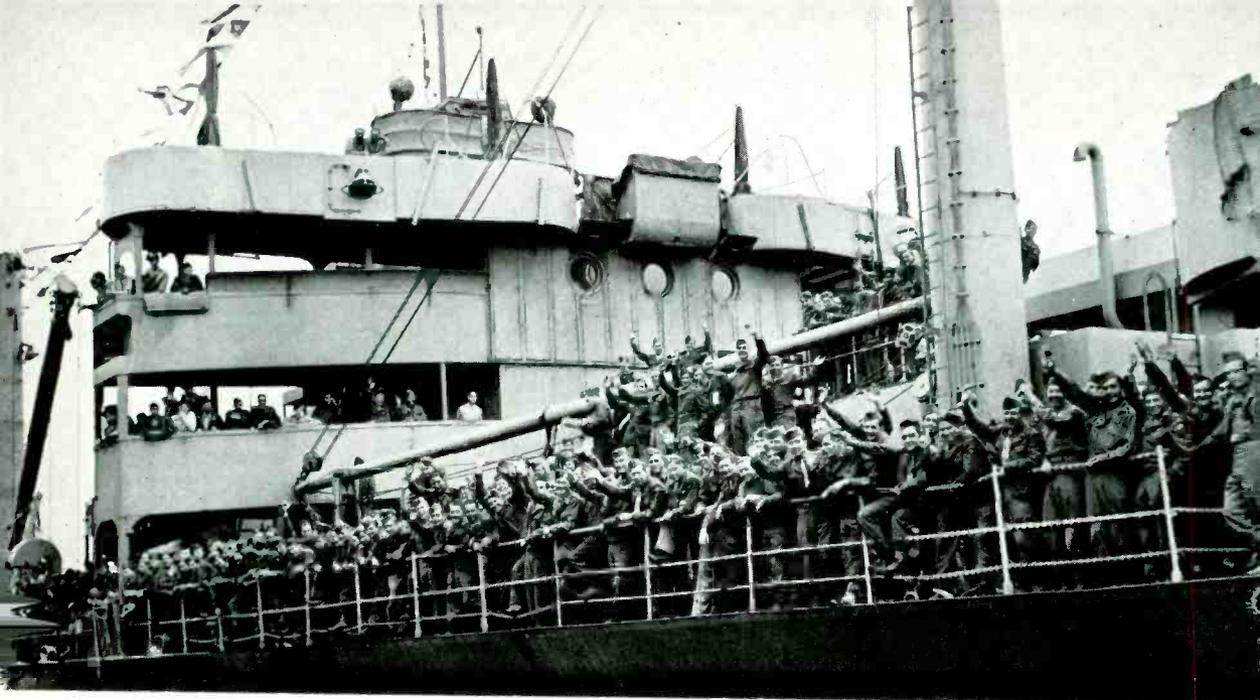
During early trials of cable buried directly in the ground, it was found necessary to protect the lead from damage both from handling and from gophers. One or two wrappings of steel tape have been used for this purpose. Tests indicate that the corrugated copper jacket will give essentially as good protection as the steel tape.

There has not been time as yet to determine from experience and field tests the position of the new lightning-protected cable on the curve of Fig. 3, but theoretical studies and limited tests indicate that it would in practically all cases be above the range of strokes thus far observed—E on Figure 3. Only an exceptionally heavy stroke to a cable in soil of very high resistivity would cause damage. This added security for coaxial cables is particularly interesting at this time because of their probable uses for television networks after the war.



Fig. 4—The new lightning-protected cable

The effectiveness of this cable depends upon the insulation strength between the copper and lead. It is therefore necessary to maintain the insulation between jacket and sheath at such points as loading coils, gas pressure valves, splices, pressure contactors, and terminals. Methods of providing the proper insulation have been developed for all such locations. At auxiliary repeater points, the apparatus cases and cable sheath must be kept insulated from the copper jacket. Switches will be provided for connecting the sheath to the jacket for protection of personnel during maintenance operations at the repeater point.



Acme Photo

Service “On the Double” for Soldiers

A MIGHTY tide of American manpower is on the move westward—and telephoning as they go! Legions of men in khaki are returning from European battle zones, some to be discharged from military service and others to be furloughed and then sent on to the Pacific theater to help finish off the Japanese.

They're coming back in large numbers, these conquerors of the Nazis. A whole flotilla of Army transports and former passenger liners discharges its human cargo at an East Coast port at one time. And when as many as 10,000 to 15,000 telephone-hungry men pour into one debarkation center the same day, there are just about that many calls to handle in the brief 12 to 48 hours before they move on.

Most of the returning men go through one of the major debarkation centers on the East Coast. The problem of handling the concentrated volume of calls in the short time allowed is made more complex by the fact that many of the troops are coming back in units. And when an entire unit is calling from one place, a large percentage of the calls may go to one section of the country. This obviously puts a terrific strain on all of the toll routes serving that section.

The problem of getting calls through for a

whole division of men during their 12 to 48-hour stay at a debarkation camp is further heightened by the necessary Army “processing” routine which must precede each joyous “Hello Mom.” This cuts several hours off the precious time available for getting the thousands of calls through.

That, briefly, is the problem we face. What is the Bell System doing about it? We are doing everything that is humanly possible to get the servicemen's calls through during their short stay at the debarkation camps—everything that the limited time permits in the way of providing additional camp telephone facilities and long-distance circuits needed to give them the best and most pleasing service that the emergency requires.

The Associated Companies are adding new telephone centers at the large military camps; adding switchboard positions and the necessary cable at existing telephone centers; installing more booths (in some cases the number is being doubled); adding personnel; keeping the camp telephone centers open 24 hours a day when necessary; increasing the number of trunks between the camps and the nearest toll centers; and using every technique in the telephone man's book to provide the circuits when and where they are

needed. Circuit layouts, for example, are rearranged temporarily to provide additional circuits to regions where most of the calls may be going during a given period.

Large numbers of people are required to help give the returned men the kind of service they deserve. We are recruiting operators and other attendants to serve the men by recording their calls, making change and generally seeing to the soldiers' telephone needs. Many of these attendants must receive special training. Additional camp managers also are going on the job.

Attention is also being centered on ventilation, seating arrangements and other means of providing comfort and convenience for the men while they wait for their calls to go through. In some cases the telephone company furnishes transportation for the men between attended telephone centers in order to distribute the load more evenly between centers. At all the camps, telephone directories for a large number of cities are available to the men who may have forgotten the numbers they want to call.

In view of the added load the returned soldiers' calls will put on the System's long-distance lines and switchboards, the kind of service provided for Army personnel will depend a great deal on the continued understanding and help of the general public. To enlist this cooperation, telephone company advertising is asking civilian customers to save long-distance circuit time for the fighting men whenever possible.

Those are some of the things the Bell System is doing. All of them must be done

"on the double." The movements of troops are expected to reach a peak in August and continue heavily for several months beyond.

Experience has shown that in any large body of returned fighting men, the number of long-distance calls will average about one per man upon arrival in the States. This takes into consideration that some men place a large number of calls for buddies still overseas, offsetting the number of returnees who place no calls.

All of the foregoing applies chiefly to the major debarkation camps in the East. But the big job doesn't end there. From these camps the men move to personnel centers and redeployment camps, from which they are either discharged or given a 30-day furlough. The furloughed men report back to redeployment camps at the end of their visits home, and from the camps they will go finally to the staging areas for re-embarkation for overseas.

At all of the personnel centers there are large numbers of men moving in and out. They stay for only brief periods and they must have long-distance telephone service in a hurry. The resulting traffic peaks will not be as severe as those at the Eastern debarkation camps because the men are dispersed, but the various types of camps present real problems that are to be handled as efficiently as possible.

This is an emergency because it means handling sudden surges of long-haul calls in addition to the unprecedented volume of traffic already on the wires. It's an emergency because of the worth of the service to

The tense faces of newly arrived soldiers at Camp Kilmer watching an attendant working on their calls reflect the importance of "talking to the folks"



the Nation's cause, and because of what those calls mean personally to the men who have been out of the country for long periods.

Taken altogether, then, the telephone company's responsibility to Army personnel during this East-to-West transition period is "fairly rugged," as the soldier himself would say. It shapes up as a challenge to the skill and ingenuity of a large segment of the System's telephone operating companies and of the Long Lines Department.

TYPICAL EXPERIENCES

Shortly after the first units arrived in Camp Kilmer on a hot Sunday, men began to appear at the telephone centers to place long-awaited calls to their families. At one of the centers an early arrival was maneuvered around and ordered to strike various poses at the telephone by a zealous cameraman who was surprised at the big smiles on the faces of some watching GI's. He soon found out that the soldier he had been pushing around was the Major General commanding their division.

As the afternoon wore on the centers became more crowded. The attendants were

kept busy placing calls and keeping track of available booths and the men whose turn it was to use them. The soldiers themselves were very coöperative. Time and again they expressed appreciation to the girls for a quickly executed call or some helpful information on a forgotten telephone number. A captain emerged from his booth after a call to his wife on the West Coast and said, to no one in particular, "Only four minutes to get her in L.A. Gosh, what service!"

When delays were posted on certain routes, the soldiers would sit around on the benches in the centers and reminisce. When their names were called over the public address system, the one called would leap toward the booth indicated, his face all smiles or tense with excitement.

Incidents such as these were part of the reward for the hard-working attendants, a good many of whom work evenings at Camp Kilmer after their regular day's work is done elsewhere. On particularly busy nights they willingly carry on far into the wee small hours, when necessary. For them, the happiness of the boys at being able to talk to their families makes up for the long hours.

Men crowd around one of Camp Kilmer's eight telephone centers within an hour of disembarking



Rehabilitating a Telephone System

HELPING to set up behind-the-lines communications systems—and not so far behind, at that—are several members of the Laboratories who are in Europe as technical advisors to the Army. They are in uniform, with a triangular shoulder patch, and they hold various “assimilated” ranks as high as Colonel. An assimilated rank, by the way, is a pious hope that, if captured, the T.O. will be treated as such by the enemy. Fortunately, no experimental data have been taken on this problem.

Longest service of the present contingent is that of Lee L. Glezen, who left in June, 1944. R. B. Hearn left in September; E. J. Noon and Carl L. Cahill left in January last. E. L. Pedersen, who went over with Mr. Glezen, has recently returned to this country. A letter to the Editor from Mr. Glezen is excerpted below:

April 10, 1945.

I promised a long while ago to try to get something off to you in the way of news and have neglected to do so, as you already know.

I will not go into any detail on work for most of it has been just ordinary application of telephony and telegraphy that all you fellows know better than I do. The application to Army needs and conditions has been the interesting part of the work.

First—Pete (Erling Pedersen) and I came into London literally with the first “Buzz-Bombs”—we arrived just in time to hear all hell break loose. The guns in the Park actually shook our beds. Not being allowed to go out on the street we hung out the

The Paris Militaire switchboard, shown above, is the communications center which connects this headquarters with all military installations on the Continent.—*Signal Corps Photo.*



window to see the fireworks until a piece of flak went “wham” on the roof across from us and we quickly made up our minds to remain inside.

After the first few nights we got used to the excitement and watched the bombs come in with considerable interest. We never cease to marvel at the stoic unconcern of the British over this part of war. How they managed to carry on over the five years of it is beyond me. The precision of their immediate attack on the places where the bombs fell was beyond belief. We saw wardens, ambulances, fire fighting equipment, doctors and nurses arrive within seconds to a few minutes after a bomb exploded. A bomb at midnight had its wreckage cleared from the streets by daylight, except of course for the leveled houses. After having the windows pulled out of our quarters a couple of times in one night, we lost much of our fear and usually slept through most of the nights.

We had fine opportunity to see lots of the English countryside. A trip to Barry, Wales,

to near Liverpool and to the Isle of Wight, primarily made for military reasons, gave me plenty of chance to see several different phases of English life.

I had luncheon twice with Mr. Chamney, head of the Lines Department of the General Post Office; Mr. Montgomery, head of Standard Telephones and Cables, and several of their Staffs. Also Brig. Gen. Harris, head of the SHAEF Long Lines group, came up to one of the luncheons and has been a very agreeable and valuable contact here on the Continent.

I left London on three hours' notice to come over to the Continent with the Ninth Air Force. I flew over, landing near Cherbourg at a temporary air strip about 5:30 p.m. the evening of August 13. Pete had preceded me by a couple of weeks to the First Army. I finally got to San Savior Landline about midnight by jeep, driving in total blackout through convoys of trucks, rubble-filled streets, and crowned, narrow country roads. I realized I was actually near

Sewers in Europe serve as conduits for everything, including telephone cables. These members of a Signal heavy construction battalion are feeding cable into a sewer manhole in a French city in order to restore the telephone system for Allied military use

—Signal Corps Photo



the war on my first "HALT, who goes there" of this war. It took me so long to figure out what to do, it is a wonder that the guard didn't shoot me.

We worked until 2:00 a.m. that first night and for the next month averaged 18 hours a day on the job, most of that time eating one or more meals a day without stopping work.

With Lt. Col. Kammerer from Long Lines in Chicago, I made a reconnaissance of the cable route from St. Lo to east of Le Marco and started rehabilitation of the cable and repeater stations. All but three of the nine repeater offices between Cherbourg and Paris had been blasted and burned beyond repair. It was decided to put through 40 circuits; reconnaissance started August 15 and the first circuits were put through to Paris on August 28 at 4:30 in the morning. Our packaged voice frequency repeaters and ringers were used at the six stations and our 1000/20 cycle ringers at the terminals since the Continental system is 500/20 cycle operation.

I was assigned to work with Major L. D. Weiser from Southwestern Bell on the repeater installations. Major Weiser literally worked himself out on the job and before the end of the year had to be placed on the hospital list from overwork. He is now recuperating at Camp Carson, Colorado. He, along with Lt. Col. Kammerer, deserve a lot of credit for the success of putting through communications to the fast-moving Armies.

We were badly in need of help at the Paris end of the circuit—Weiser and myself being at Rennes, and finally succeeded in getting "Pete" away from the First Army and into Paris about the first of September.

Since that time our work has been largely concerned with rehabilitation of the French and Belgian systems, equipping the open-wire lines built by the Army with CF and C



LEE L. GLEZEN

carrier systems and now the German systems. Some idea of the magnitude of this job is shown by the more than 5,000 circuits averaging 65 miles in length now in military service in France and Belgium. The Germans had destroyed about 80 to 90 per cent of the offices as they retreated and the repeater and switchboard installations were developed largely using Western Electric equipment. Type-C carrier systems are working from Cherbourg to Paris, Paris to Verdun, Verdun to Liege, and will presently be working into Germany from these extensions. An interesting use of CF carrier is on B9 loaded cable pairs present in many of the Continental cables.

Circuits have become so long that, except for the open-wire circuits, careful engineering and circuit layout is required to avoid detrimental echo effects. Many circuits extend from near Army headquarters clear back to the U.K. via cross-channel cables.

Coördination and establishment of standards with the British has been effected with harmony and I have enjoyed working with both the British G.P.O. people and the Royal Signals people—many of these in civil life with the G.P.O. Recently complete standards were established using the C.C.I.F.* recommendations and fitting them to Army needs so that the British G.P.O., French PT&T, Belgian PT&T and the British and U. S. Army were working to a common purpose. I worked on these standards along with Major Jim Neiswinter and Major Charlie E. Williams, both in civil life with Long Lines—Neiswinter in New York, Williams in Chicago. Major Joe Schmitz from Long Lines circuit layout group in New York is heading up the circuit layout work for Com Z and has done a fine job although badly overworked.

I have had many interesting trips in France, Belgium and Luxembourg, where I was within gun sound of the front in January and through Bastogne. Have been working with the 21st Army Group and 12th Army Group Signal officers and staffs recently on forward plans and work along with Harry Hitchcock of the Pacific T & T who has followed me, or I him, all across France.

Carl Cahill, Eric Noon, Dick Hearn, all from B.T.L., and Percy Maynard of Pacific

*Comite Consultatif International-teleFonique.



*Two members of a Signal Corps unit set up a testing point in the Nancy sector, France
—Signal Corps Photo*

Tel. and Tel. are working with us here now. P. A. Ramey of Long Lines, New York, left about a month ago after five months with us, and Harry Talberth, also of Long Lines, New York, has been running a carrier and repeater school for several months.

People do funny things under stress and often the serious aspects are forgotten. The night we were strafed at Rennes, we all ran out of the repeater station to see what was going on instead of taking shelter as we should have done. Pete and I stood in the middle of the street in London watching the natives crawl into the curbs, not having sense enough to do likewise when a Buzz-Bomb came close.

I will sure be glad to return to the fold when the job here is tied down and never again wish to leave the comforts of home, yet I wouldn't have missed the experiences I have had nor the wonderful friendships established over here.

Working Conference for Speakers From Associated Companies

To expand the activity of Associated Company men who handle lecture and demonstration work, the men shown in the accompanying illustration have been attending a ten-week training course to more thoroughly acquaint them with the research work carried on by the Laboratories. These men, most of them experienced speakers, have the responsibility of telling the story of the Bell System to the public. They are here to learn the Laboratories' contributions.

Working to an intensive schedule, the men visit various locations, hear talks from responsible engineers and view demonstrations. Next day they meet to discuss notes, digest data, work out items adaptable to lecture-demonstrations and to clarify obscure points in direct discussion with the engineers who worked on the project. In this way they are able to form an intimate picture of the aims, methods and atmosphere of the research which creates for the Bell System in peace and the Armed Services in war.

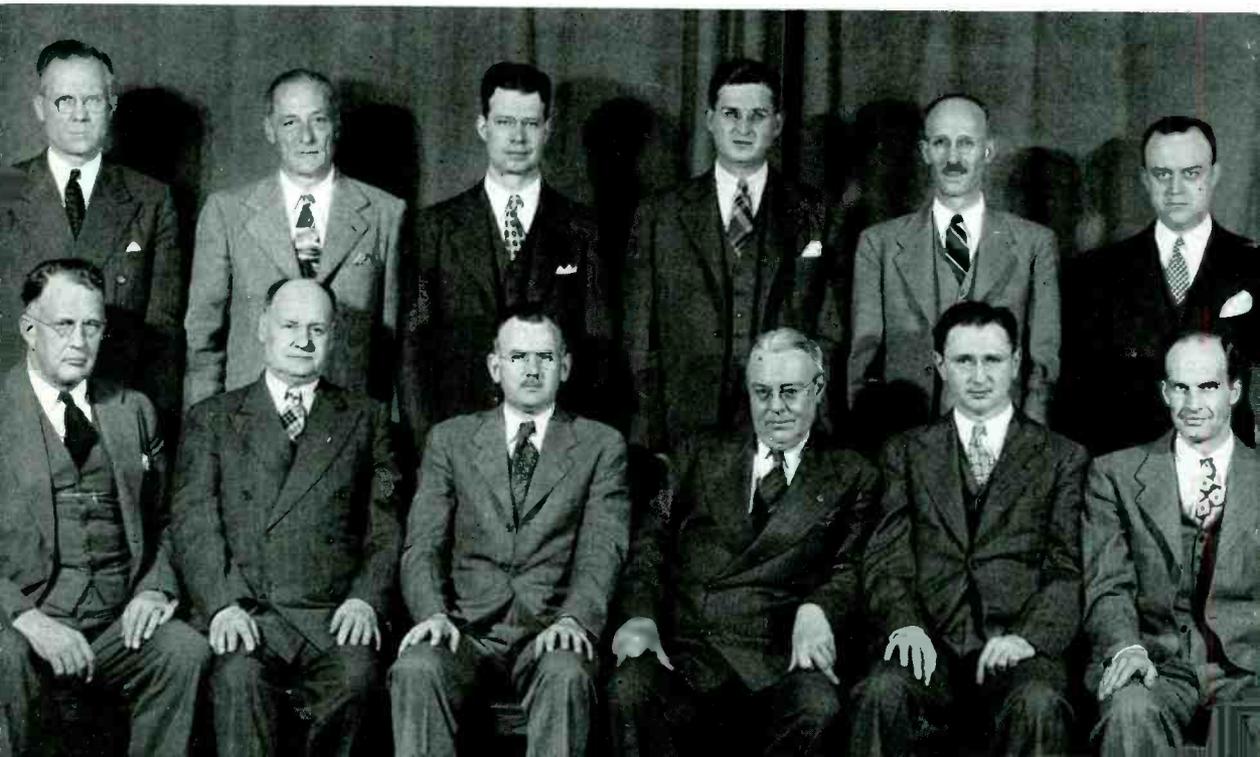
Strenuous note-taking and vigorous questioning testify to the deep interest in the program. One visitor declares that he is beginning to feel like an encyclopedia and this is no quip since even a partial knowledge of the 1,200 projects which the Laboratories have executed for the war is likely to assume encyclopedic proportions. These key men will later serve as information centers in their respective territories.

More ambitious in scope than similar conferences previously held at the Laboratories, this meeting is to extend over a period of ten weeks. Toward the end, the conference will be joined by other representatives of the Associated Companies. At that time, a brief review conference will be undertaken.

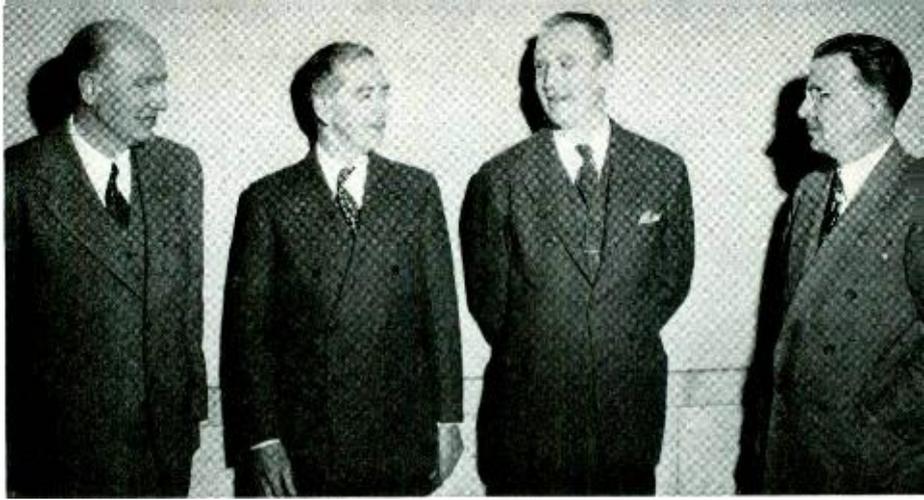
The conference was planned by J. O. Perrine of the A T & T and R. K. Honaman of the Laboratories. It is under the detailed direction of C. D. Hanscom assisted by J. T. Lowe and M. Brotherton. However, the project would be impossible without the active coöperation which the technical departments have shown.

SPEAKERS FROM ASSOCIATED COMPANIES RECEIVE TEN-WEEK TRAINING CONFERENCE AT THE LABORATORIES

Standing, left to right—S. Davis Page, New Jersey Bell; A. G. Schermerhorn, Pacific Tel; H. N. French, A T & T; Roger F. Marshall, Ohio Bell; George L. Long, Bell of Canada; W. E. Pothen, Northwestern Bell. Seated—E. C. Belzer, Indiana Bell; Irvin Mattick, Southwestern Bell; W. M. Welch, Bell of Pa.; W. W. Wheeler, C & P; Henry J. Habley, Illinois Bell; Dana Rose, Michigan Bell



L. A. Wilson, Vice-President of A T & T, addressed an executive conference luncheon of the Laboratories on June 7 on the financial needs of the Bell System. Pictured above are O. E. Buckley, R. L. Jones, Mr. Wilson and M. J. Kelly



Long-Distance Rates Reduced

The American Telephone and Telegraph Company announced recently that reductions in its long-distance rates amounting to over \$21,000,000 annually have been agreed upon with the Federal Communications Commission to be effective July 1. The reductions are at the longer hauls beginning at 790 miles. For example, the day station-to-station rate between New York and San Francisco will be reduced from \$4.00 to \$2.50, while the rate between New York and Denver will be reduced from \$3.25 to \$2.35.

In commenting upon these reductions, President Walter S. Gifford of A T & T pointed out that the Company's rates are under the exclusive jurisdiction of the Federal Communications Commission which has jurisdiction over interstate rates only. The Commission has insisted that the earnings from such rates should be considered by

themselves, regardless of overall Bell System earnings, and has insisted that, when so considered, they produced a return greater than could be justified—this in spite of the fact that the return resulted from the extraordinary wartime volume of long-distance calls and the overloading of facilities.

Telephone Service to Three European Countries

The first relaxation of wartime restrictions on telephone calls to Europe went into effect on June 15 when radio-telephone service between the United States and Portugal, Spain and Switzerland again became available for general public use. The direct radio-telephone circuits between New York and Lisbon, Madrid and Berne have been operating throughout the war, but wartime restrictions have limited the service to only official and press calls.

During the Months of March, April and May the United States Patent Office Issued Patents on Applications Previously Filed by the Following Members of the Laboratories

W. M. Bacon (2)	K. S. Dunlap	W. H. Holden (2)	R. F. Mallina	R. A. Sykes
W. O. Baker	W. H. Edwards	K. S. Johnson	W. A. Marrison	C. C. Taylor
J. F. Barry	I. E. Fair	L. H. Johnson	A. S. Martins	D. E. Trucksess
H. M. Bascom	E. P. Felch	W. F. Kannenberg	R. F. Massonneau	C. L. Van Inwagen, Jr.
W. M. Beaumont	J. B. Fisk	G. A. Kelsall	R. C. Mathes	H. E. Vaughan (2)
B. S. Biggs	N. R. French	J. P. Laico	N. D. Newby	J. G. Walsh (2)
J. H. Bollman	L. A. Gardner	W. Y. Lang	F. A. Polkinghorn	A. Weaver
A. J. Busch	M. C. Goddard	W. V. K. Large (2)	W. T. Rea	A. H. White
C. J. Calbick	H. W. Goff	M. A. Logan	O. A. Shann (2)	H. T. Wilhelm
H. N. Christopher	C. S. Gordon	C. A. Lovell	S. A. Schelkunoff	I. G. Wilson
F. S. Corso	W. S. Gorton	G. R. Lum	H. H. Schneckloth	W. A. Yager
W. A. Depp	J. R. Hefe (2)	W. R. Lundry	F. J. Singer	M. K. Zinn
T. L. Dowey				

The photograph at the right shows a salvage crew unloading reels of Spiral-4 cable brought back from the front for reclamation at a Signal Corps depot in France. That at the bottom shows French civilians reclaiming similar cable at a Signal Corps depot.—U. S. Signal Corps Photos



Huge Signal Corps Salvage Depot in Paris

Reports reaching the Office of the Chief Signal Officer reveal the magnitude of the salvage task being accomplished by the Signal Corps, with the aid of French civilians, in a Paris department store warehouse of enormous proportions. The warehouse has been converted into the U. S. Army's principal Signal Corps salvage and reclamation depot in the European theater; and the depot is unique in that it is the only spare parts market for signal equipment on the

entire Continent. The depot is staffed by five hundred Signal Corps officers and men and employs an average of a thousand French civilians to handle the varied demands of so big an assignment.

One chief phase of the work is a clean-up job reclaiming nearly 100,000 miles of wire that was left strung across the battlefields of France, Belgium, Holland and more recently Germany in a vast tangle running through orchards, gardens, ditches, and over mountains and rivers to carry the urgent messages and orders of war and supply.



Other sections of the depot rebuild radios for tanks, grind crystals for secret communications channels, repair damaged radar units, telephones, teletypes and telegraph instruments, and power generators. Much of the damage caused has been due to buzz-bombs, but fortunately that type of destruction is over, so far as Europe is concerned.

A Capacitor for the "Years of Light and Peace"

A capacitor taken from a Japanese field telephone set captured at Guadalcanal is shown in the accompanying illustration. "Showa 16th year 1st Month" is a translation of the last line and is equivalent to January, 1943. The word "Showa," a sort of slogan, was chosen to cover Hirohito's reign and means "Light and Peace." The beginning of "Showa" was January 1, 1928, although the coronation took place on November 10, 1927.

"Type 4B Paper Capacitor" is a translation of the first line and "The Tokyo Electric Radio Co., Ltd." of the next to last line.



Japanese capacitor taken from a captured field telephone set



Mrs. Lenora H. Doble of New Jersey Bell Receives Vail Medal

A Pitman, N. J., telephone operator, Mrs. Lenora H. Doble, has been awarded a silver Vail Medal and \$500 in cash for saving the life of a woman through resourceful and effective use of telephone facilities. The Bell System National Committee of Award, which named Mrs. Doble, also selected for special recognition a group of Ohio Bell Telephone Company employees for their acts of public service during a series of explosions in a Cleveland area where liquefied natural gas from storage tanks caused 130 deaths and property damage estimated at 4 to 6 million dollars. The telephone group received a special bronze plaque.

In making its awards, the national committee considered noteworthy acts performed in 1944 by 17 individuals and groups. Committees within the various Bell companies had previously awarded 21 bronze Vail medals to the principals.

The new year, 1944, was just twenty minutes old and the rush of holiday traffic was at its height when Mrs. Doble answered a line signal on the Pitman switchboard. An excited man asked to be connected with a certain doctor. The doctor was not at home and the frantic man asked for the police. Sensing an emergency, Mrs. Doble moni-

tored the call and learned that a woman in an isolated farm house was in an extremely critical condition, requiring immediate medical attention. The caller asked for an ambulance to take the woman to a hospital.

Mrs. Doble volunteered to help. She tried doctors, the police and a hospital. Still unsuccessful in getting aid at that hour, she persisted until a call to the State Police brought an ambulance. The doctors said further delay would have proved fatal.

In the Cleveland disaster last October 20, telephone employees rushed into the devastated area after the first explosion. They im-

mediately began restoring telephone service at a fire engine house in the vicinity and setting up temporary service in a telephone truck. The liquid gas from the storage tanks had poured into the sewers and other underground conduits where more explosions followed. Manhole covers were being blown into the air. But the telephone men stayed in the danger zone, checking telephone plant damage and doing whatever they could to prevent further damage. The special plaque was awarded to members of the Plant, Traffic, Commercial and Engineering Departments at Cleveland.

V. J. Albano
W. J. Albersheim
H. W. Allison
C. G. Arnold
W. A. Arny
Jean Asbury
A. B. Ashton
A. E. Bausmith
L. W. Bellevue
A. P. Besier

H. Gaestel
H. T. Goedeke
Emma Graetz
F. N. Grant
T. B. Grant
C. B. Green
J. Halligan
F. I. Hayes
J. A. Hole
C. E. Hollister

Edna Lynch
C. Maggs
D. J. Mahoney
L. D. Mann
A. Martini
Jean Mater
C. F. McAteer
Dorris McCauley
H. A. McCormick
M. H. McCormick

J. J. Oestreicher
Rita Ohnystey
M. C. Olm
Lillian Ortolan
N. R. Pape
W. Pelgorsch
Theresa Potignano
J. F. Potter
J. R. Power
M. Roland

G. Bittrich
D. Bjelke
M. E. Brandin
Janice Burford
Lois Burford
Winifred Burke
A. R. Burrell
A. T. Calvano
G. Chabra
R. J. Chappell

Red Cross Blood Donors



Mildred Ryan
Lillian Sangberg
Dorothy Schmidt
S. Sempey
Patricia Seymour
W. S. Snyder
H. J. Sorenson
M. Sparks
J. Spender
M. A. Stevens

Marian Stites
Barbara Stollery
K. F. Stout
W. D. Stratton
P. Tansey
M. Thorburn
H. S. Tiger
Ann Tingley
R. L. Trent
P. Venneman

Angela Vetrone
William Vierling
Anna Walsh
A. B. Walther
M. E. Watkinson
D. A. Weaver
W. Weiser
R. W. Wickham
J. P. Williams
Rosemary Wittkop
C. Zoeller

J. Clark
W. F. Clemency
Sidney Condon
M. H. Cook
Grace Cooney
L. S. Cooper
E. Corcoran
Anna Coughlan
W. J. DeLuca
L. Dorrance
L. W. Drenkard
R. H. Erickson
I. E. Fair
Anna Falcone
H. Feltheimer
B. R. Ficke
J. R. Fisher
D. Footett
L. O. Frey
E. W. Gaal

Mildred Hoogstraat
J. B. Howard
Evelyn Hummer
C. J. Humphrey
O. Jackson
A. J. Kane
P. Kiotto
Gloria Kirby
J. W. Kittner
Herman Koppelman
G. W. Lees
A. F. Leyden
G. T. Loman
E. H. Lord
E. J. Louis
C. E. Luffman

J. J. McNiff
Joan McNulta
Emma Miletich
C. G. Miller, Jr.
Isabelle Miller
Alice Mittelstaedt
G. Morfopoulos
F. J. Morin
V. Mosie
Anne Mutschler
N. Mehl
Phyllis Nimmo
Lillian Norkin
C. W. Norwood
W. O'Connor
M. O'Donnell



In Our Nation's Service

Lieut. Ralph D. Horne Liberated From German Prison Camp

Lieut. Ralph D. Horne, a prisoner of war since May 20, 1944, was released on April 29, 1945, by General Patton's Army. He returned to the States on May 5, and visited the Laboratories recently. A pilot of a B-17, Lieut. Horne was first held at Sagan, Germany, but was later moved to Moosburg, which is northeast of Munich. He said that he was treated fairly well by the Germans and that he received and appreciated the cigarettes sent by the Laboratories. He also praised the Red Cross for the good job they did in getting packages to the prisoners of war. Lieut. Horne has the Air Medal with two clusters, and the European campaign ribbon with a battle star. He is on sixty-day leave now and later hopes to be reassigned to active duty.

Colonel A. M. Elliott

"I enjoy the RECORD although I just received the February issue—but it was such a pleasant surprise to see RAND BAILEY's picture because he is right here on Okinawa with us. He had not yet seen it himself.

"I'm told that our Nisei Japanese interpreters are unable to understand Okinawan at all! It appears to be a very early mixture of Chinese and Japanese dialects. Some of the youngsters who have gone to Jap-controlled schools are understandable.

"Contrary to prior intelligence reports we had, this is very pleasant country in general. Of course April is rated the best month as to low rainfall, few typhoons and moderate temperature. From here on typhoons are expected at increasing frequency starting with par of one a month for May to six a month in September! We were told the island was alive with numerous species of snakes, each more deadly and aggressive than the other, but no one yet has seen even a little grass snake. Rainfall averages 100 inches, which is quite a bit.

"As you have no doubt heard, the Japs were fooled to the extent that we got ashore with extremely light opposition. Since then, however, the going has been more difficult. There has been no destruction by the Japs of facilities and materials they abandoned. There are three excellent open-wire lines the length of the island, quite a bit of buried cable and a great deal of supplies—line wire, cross arms, etc. With the shipping as short as it is, that really helps. This Army headquarters is a telephone-using bunch, too. A three-position board put in service April 21 and with 80 local lines yesterday handled 4,350 calls, with over 600 an hour in the morning and afternoon busy hours. The operators had never operated before except at Signal School in the States months ago!

"We are less than an hour by plane from the Jap home island and there is much visit-



ing back and forth—all very unneighborly. Raids always interfere with supper which the Medical Department would probably criticize as an unhealthful condition. We think it is, too, and are trying to clear it up.”

Lt. Colonel R. W. Harper

Excerpt from an article by Bob Taylor which appeared in a recent edition of the *Newark Evening News*:

“The Navy does its best to rush a war correspondent to the fighting areas in the Pacific, but it also is rushing forward the gear and the sinews of war—and the correspondent must sweat out necessary delays in his own transportation.

“It was during one of these periods of waiting that I met LT. COL. R. W. HARPER of

West Orange. Harper is second in command of the Army Communications Service for the area in which the heavy fighting now goes on against Japan. I was told of the accomplishments of the Communications Service. The story can't be fully told for security reasons, but it involves a marvel of radio communications over a wilderness of water.

“Harper, a veteran of World War I, has been on, and worked on, practically every island we have taken in the Pacific. He is alert and curious about everything and the end result is that he feels better and fitter than before Pearl Harbor.”

Warren J. Boo

Warren J. Boo, back in this country after being wounded in action in Germany, visited

Roll of Honor

Killed in Action

Lieutenant Ernest G. Graf	Captain Orrin F. Crankshaw
Ensign David F. Greenhagen	Private Harry A. Malone, Jr.
Private Sarkis Karibian	Private Eugene H. Sheehan
Private Edward A. Fern	Lieutenant Thomas M. Pepe
Lieutenant Stanley W. Erickson	Ensign Joseph Kelly

Missing in Action

Lieutenant Robert F. Healy	Lieutenant Everett T. Urbanski
Private Joseph T. Murphy	Lieutenant John K. Gardner

Leaves of Absence

As of May 31, there had been 990 military leaves of absence granted to members of the Laboratories. Of these, 60 have been completed. The 930 active leaves were divided as follows:

Army 517 Navy 307 Marines 30
 Women's Service 76

There were also 18 members on merchant marine leaves and 23 members on personal leaves for war work.

Recent Leaves

United States Army

Raymond F. Hornbruch	John J. Naughton
Andrew J. Monaghan, Jr.	Francis X. Roddin
Robert E. Ward, Jr.	

United States Navy

Victor G. Chirba	Rudy P. Luttkus
Golden Bennett Clark	Robert C. McAdam
Christopher T. Huhn	Leon Pasqua

National Defense Research Committee

Robert C. Shaw



Morgan F. Hickey receives the Croix de Guerre from General Du May

West Street while on a thirty-day furlough from the Valley Forge General Hospital in Phoenixville, Pennsylvania. He has been awarded the Purple Heart and the Combat Infantryman's Badge. He had been overseas nine months with an Infantry regiment in England, France, Belgium and Germany.

Raymond S. Troeller

Raymond S. Troeller, on military leave of absence from Murray Hill, visited the Laboratories while on a thirty-day convalescing leave. Private Troeller, with the 30th Infantry Division, was wounded on October 2, 1944, during the initial attack on the Siegfried Line. In addition to the Purple Heart, he has been awarded the Combat Infantryman Badge and the battle stars for action in the two major battles for Aachen and Liege. Private Troeller is now stationed at an Army hospital in Camp Fletcher, Ohio.

Morgan F. Hickey Receives Croix De Guerre

Sergeant Morgan F. Hickey, an M.P. with the 415th Air Service Group in England, was decorated by Lieut. General Du May of the French Air Force on May 4. He was awarded the Croix de Guerre. He, along with other members of his outfit, was taken on a

“Ruhr Observation Tour” by air over France, Belgium, and part of Germany to see the results of their efforts for victory for the Allies.

The part of Germany covered by this tour was once known as “Happy Valley.” It was probably the most intensely defended area in the world. They flew over Brussels in Belgium and Aachen, Duren, Cologne, Dortmund, Munster, Frankfort-on-Main, and Koblenz in Germany. “I flew over these places,” writes Sergeant Hickey, “and I take my hat off to the Air Force for the fine job they did on Germany. They really left it in ruins!”

Staff Sergeant William B. Adam Awarded Air Medal

In a letter from General George C. Kenny, William Adam's mother was informed of her son's decoration. “It was an award made in recognition of courageous service to his combat organization. . . . Your son took part in sustained operational flight missions during which hostile contact was probable and expected. These flights included dropping supplies and transporting troops over territory that was continually patrolled by



William B. Adam awarded the Air Medal



enemy fighter aircraft. Often landings were made on fields which were only a few miles from enemy bases. These operations aided considerably in the recent successes in this (Southwest Pacific) theater.”

John Mosko

“I’m feeling fine and the shoulder is coming along well. I don’t know whether I’m jinxed or not. The last time, I was hit on the head by a motorcycle wheel that was thrown through the air about 100 yards, after the cycle was hit by an 88. Luckily the damage was slight—I didn’t know the score for a few days but after that things came back.

“The flight from Germany to Paris was very nice. I couldn’t see much from my position, but nevertheless I enjoyed it. I may be able to get around to seeing some of Paris, something that I never dreamed of.”

Ensign Joseph Kelly Killed in Plane Crash

Ensign Joseph Kelly of the Development Shops Department was killed in an accident in California on June 3, 1945. He was stationed at San Diego. His Navy Corsair fighter crashed and burned in brush land near Escondido, when he was on a routine flight from the Navy Auxiliary Air Station at Ream Field, near San Diego.

Ensign Kelly was graduated from Brooklyn Technical High School in 1942 and came to the Laboratories in August of that year. He was granted a military leave of absence on April 14, 1943, and was assigned to naval cadet flying schools in Indiana and Chicago and later was stationed at Pensacola and Deland, Florida, before going to California.

Sons of Two Laboratories Engineers Killed in Action

Private Martin J. Friend, son of Otto A. Friend, and Private William M. Davidson, son of John Davidson, Jr., were both killed in action on the European front.

Private Friend died on March 11 of wounds suffered earlier that day in the Remagen Bridge area of Germany. He was attached to an Army Engineers Battalion.

Private Davidson, in the Infantry with the 1st Army, was killed in action on April 27 in Germany. He was sent to France as a mem-



Ensign Joseph Kelly, 1924-1945

ber of a Military Police Battalion, but at his own request was transferred to the Infantry about April 1.

Herbert K. Meyer

“So far I’ve done nothing but travel from one place to another. Travel for a GI means riding in old 40 and 8 (forty men or eight horses) box cars. They’re not very comfortable to say the least but they feed us pretty well, so that makes up for a lot of discomforts.

“I’ve seen such places as Abancourt, Reims, and Le Havre and others that I can’t mention right now. When you see the cities over here you soon realize fully that there is a war on. The countryside is beautiful and the weather hasn’t been too cold so I can say I’ve enjoyed the trip as well as can be expected under the circumstances.”

Thomas P. Gannon

“Our censorship regulations have eased up a bit and I am allowed to mention most of the ports I have visited. I have been in Leyte, Manus, Espirito Santo, Hollandia, Bora Bora, Aitope, Mindora, Lingayen, Galopagus, New Guinea and the Admiralties, and before coming to the Pacific I had been in Bizerte and Tunis in North Africa. I really have been around in the service, but now all I want to see is New York. We



C. J. KUHN



CAPT. R. D. DE KAY



W. A. FARNHAM

are supposed to be having summer weather out here now but it's no different from winter, always hot. I have been receiving the RECORD on schedule and I am enjoying it as much as ever."

Lieut. John Marrero, Jr., Awarded Bronze Star

For heroic achievement in action, Lieut. John Marrero, Jr., of Chemical Warfare



Service, was awarded the Bronze Star Medal on April 24, 1945. The citation reads in part: ". . . on 21 March 1945, near C Div Marchetti, Italy. During an enemy barrage several rounds landed near the platoon of mortars commanded by Lieut. Marrero. When one round scored a direct

hit on a mortar position, there was a flash of flame and the ammunition and powder rings started to burn. Realizing that the position would be given away to the enemy and, without thought for his personal safety, Lieut. Marrero immediately ran out to the position and endeavored to extinguish the fire. Enemy shells continued to come into the area as he and another man ripped open sand bags and threw the sand on the fire. Their efforts were successful and the ammunition did not explode. The heroic action of Lieut. Marrero in fighting the fire saved many lives and casualties among the personnel of his command and also of a nearby Infantry command post. The courage, fore-

sight and coolness displayed by Lieut. Marrero during this time was an inspiration to his men and a credit to himself and the military service.—*Wm. G. Livesay, Major General, U. S. Army, Commanding.*"

Flight Officer Herbert E. Earl, Jr.

F/O Earl, navigator on a B-17 Flying Fortress, is a member of the 91st Bombardment Group, veteran heavy bomber unit of more than two and one-half years' service in the European Theater of Operations. This group is the combat home of the famous flying fortress "Memphis Belle" and was the group which made the initial American assault against the Ruhr Valley in March, 1943. F/O Earl recently took part in the group's 340th aerial assault.

Captain R. D. de Kay

Captain Rodman D. de Kay recently returned to the Laboratories after more than four years' active service in the Navy. He commanded a destroyer escort in convoy duty in the Atlantic to Gibraltar and Casablanca. In the spring of 1944 Captain de Kay went to the Pacific where he took part in the campaigns of Guadalcanal, the Solomon Islands, New Guinea, Hollandia, Biak, and Wakda. He was Division Commander in the Lingayen Gulf operation off Leyte in the Philippine Islands. Later they brought Marines back from Iwo Jima to the Hawaiian Islands.

While on duty, Captain de Kay met his son, who was aboard an Army supply ship at Hollandia.



Walter A. Farnham

Walter A. Farnham, back in this country on rotation after a year in the Pacific, received a discharge when he arrived at Ft. Dix in May, and is now back at the Laboratories. He was with the 7th Air Force, flying missions out of Kwajalein and Guam as an engineer on a B-24. He had been on 40 missions, and had accumulated a total of 92 points for his discharge.

Charles J. Kuhn

Charles J. Kuhn, home on rotation after three years' service in the Pacific, was discharged on May 28 when he returned with 104 points and is back at the Laboratories. He was with a Combat Engineers outfit, and saw action at Guadalcanal, the Fiji Islands, Russell Island, New Georgia, Bougainville, the Admiralty Islands, and Luzon.

Herbert J. Braun

"I've been moved up into the Philippines and have shaken the dust of Australia from my feet. We've just hit the beginning of the rainy season here. I've been to Manila and have seen the awful wreckage, it's really something to see."

Alfred O. Schwarz

"I've been with the staff of a broadcasting station as a technician for quite some time now. We are part of a network covering most of the South Pacific area. Our transmission is mainly from transcriptions of the more popular programs heard over the National Networks back home, but we also have a huge library of records for use in programs made up here. We have facilities for studio programs and give daily news summaries."



Alfred O. Schwarz is a Technician in a broadcasting station in the South Pacific

Joseph O'Keefe

"Since my last letter we have been on two invasions—Panay and Negros. There wasn't the usual heavy air attacks or bloody beaches that accompany an invasion. Our aircraft took care of the Jap planes; there were said to be only five serviceable planes on Negros. The guerrillas took care of the Japs on both islands and what resistance was met was quickly dispersed. I believe some pictures were taken by cameramen, so you might have seen our ship on the beach. According to the latest reports, the only organized Japanese resistance left in the Philippines is on Northern Luzon and Mindanao. This morning I heard the Soviet army was fighting in Berlin against fanatical resistance. I wonder if it is anything like what our boys experienced out here. The Japs know their number is up but it is going to be a long, tough campaign before they surrender unconditionally and we are able to come home.



Frank J. Gunther of the Marine Corps is somewhere in the Marianas

"We are still going on 'Milk Runs' around the Philippines; a few days here and a few days there, then we come back to our operating base to rest up."



Herbert J. Braun before he left Australia



MAJ. H. J. KEEFER

J. R. MAY

Promotions

The following members of the Laboratories on military leave have recently been promoted: William A. Anderson, RT 2/c; Louis J. Antonucci, MM 1/c; Pfc. Robert Beattie; Sgt. John H. Berntson; Paul R. Brookman, RT 3/c; Peter A. Byrnes, Jr., S 1/c; Frank A. Chionchio, S 1/c; Michael F. Coffey, EM 3/c; Carmen D'Amico, RT 1/c; Milton Dudeck, O/C; Col. Albert M. Elliott; Cpl. Joseph A. Fairbrother; 1st Lt. Philip W. Foy; Michael F. Griffin, RT 1/c; Pfc. Frank J. Gunther; S/Sgt. Harold H. Hoffman; Lt. Col. Harry W. Holmlin; Alfred W. Johnson, CM 3/c; Frank A. Koditek, QM 1/c; Joseph Kocan, ART 3/c (T); Lt. (jg) Robert H. Light; Lt. Col. Stanley H. Lovering; Ens. William F. Lynch; 1st Lt. Herman E. Manke; Peder M. Ness, FC 3/c; Cpl. Robert W. Mann; John V. Moynihan, F 2/c EM; T/Sgt. Ralph Nelsen; T/4 Arthur T. Olsson; Major Irving C. Osten-Sacken; T/4 Henry Petzinger; T/4 Harry G. Reimels; Frank R. Santasier, F 1/c EM; William H. Schwartz, RT 3/c; Alfred O. Schwarz, RT 3/c; T/5 George A. Seibel; Charles F. Weiss, S 2/c; 1st Lt. Frederick W. Whiteside; Sgt. William L. Willdigg; Pfc. Richard C. Williams; Capt. R. C. Winans; Pfc. Stanley M. Wojtaszek.

JOHN H. STELLJES, the first member of the Laboratories to be drafted under Selective Service, returned from overseas to visit the Laboratories recently. He is back on a 45-day leave after service in a Signal Operating company with the U. S. Seventh Army in Africa, Italy, and France. He has been in the service over three years and overseas for two years.

MAJOR HOWARD J. KEEFER visited the

Laboratories recently when he returned after serving overseas for 3½ years. Major Keefer, in the Signal Corps, had been stationed in Hawaii as Signal Officer of an Anti-Aircraft Artillery Command. He left the Laboratories in April, 1941, and is now back in this country for reassignment.

WILLIAM L. WILLDIGG says that he is "installing a fourteen-position switchboard. After that is over I am supposed to work on installing a dial office."

JAMES P. LARIMER writes "I am somewhere in the South Pacific. Can't write about much that goes on out here. I visit a few small islands once in a while. We have movies on board ship. There is plenty of sunshine, and it is always very hot."

GEORGE SEIBEL has "Just finished a six-day rest in one of the large cities in France, had a swell time. Now in Germany and find conditions not bad here. I'm enjoying excellent health and am in the best of spirits."

HENRY G. PETZINGER writes: "This past December I was transferred to Frankford Arsenal, Philadelphia, where I am working as a toolmaker in the laboratory division headed by our own LIEUT. COL. GREENALL. I recently received my T/4 rating there."

FRANK NAVRATIL is now driving a command car—"swell job."

CHARLES F. MOORE is a Hospital Apprentice stationed at a Navy hospital in Parris Island, South Carolina.

C. W. LOWE attended the commissioning of the light cruiser U.S.S. *Providence* on May 15 at Boston. His son, Ensign L. E. Lowe, is a communications officer on this ship.

HAMILTON BAILLARD, who has been on a personal leave of absence with The Pearl Harbor Section of Columbia University's



J. J. MCKEON

R. G. URBANEK



George E. Schoener, left, is nearing the end of his training schedule at the Naval Training Station at Sampson, New York. Matthew Tomb, right, of the Murray Hill Development Shops, sends the accompanying photograph of the "secret weapon" with which he camouflages his identity while he is fighting the Japs as Machinist's Mate 1/c in the Pacific



Division of War Research, has returned to the Laboratories.

ENSIGN WILLIAM F. LYNCH is at Bronson Field in Pensacola flying PBY's and PBM's.

LIEUT. ROBERT H. LIGHT says: "I'm finally in the Fighting Navy."

ROBERT T. MONAHAN is stationed at an Air Transport Command Base in Algiers. As a 1st Sergeant, one of his main jobs is to see that his men are kept in good spirits, a job which he has done well. Prior to going overseas, Sergeant Monahan held down the top Sergeant's desk at Turner Field, Albany, Georgia. He remained there for two years. The North African cities he has visited have been Oran, Casablanca and Algiers.

FRANCIS R. MERRITT is with a Signal Service Company in the Marianas; JOSEPH D. MEAD is now in Italy; EDMUND H. PARSONS has been sent overseas to the Pacific theater recently; ALFRED T. STILLER is with an Infantry company in Germany.

LIEUT. RICHARD J. COMER has been awarded the Air Medal at a Ninth Air Force Bomber Base in France for meritori-

ous achievement in aerial flight. A veteran of more than 25 combat missions, he is pilot of the B-26 Marauder Bomber "War Horse II." He took part in the Ninth Air Force offensive against tactical targets in Germany, in cooperation with Allied ground forces fighting there.

ALBERT R. STRNAD says that it "looks like Laredo, Texas, will be my permanent base. I like my work very much. I'm stationed at a gunnery research lab and it's here that many gunnery problems are solved—very interesting work."

RALPH NELSEN writes: "My last A.P.O. was temporary but it looks as though this one will last. It's in the Marianas but that's all I can say."

JOHN R. MERCHANT is entering B-29 Flight Engineers' School at Amarillo, Texas; HERMAN E. MANKE is stationed in Orlando, Florida, going to school six mornings a week and flying in the afternoon.

JAMES CAMPBELL: "I am still a mechanic and my job is servicing trucks and heavy equipment. My outfit is now in Germany."

JOHN J. McKEON visited West Street recently. He is stationed at the Naval Training Center at Sampson, New York.

PETER F. O'DONNELL has been promoted to Sergeant. He has been in the Army since September, 1942. Since going to Panama in February, 1943, he has been on duty in a finance section of Headquarters, Panama Canal Department.

ARTHUR T. OLSSON is with the Signal Corps in the Pacific.

CLAUDIA BOURNE, formerly a Technical Assistant at Murray Hill, visited friends there recently. She is now a Cadet Nurse.



J. H. STELLJES

FRANK NAVRATIL

Alfred C. Merriam, 1873-1945

A. C. MERRIAM, who retired in 1938 after forty-four years of service, died on May 7. A detailed biography of Mr. Merriam appeared in the RECORD for October, 1938. For the ten years before his retirement he had been in the General Accounting Department, first handling the accounting phases of vacuum tube manufacturing and then with the expense accounting group.

Virginia Long, 1918-1945

VIRGINIA LONG of the General Service Department died on June 10. She received the degree of B.S. in Psychology from the



University of Chicago in 1939 and then continued for a year of graduate work. Mrs. Long joined the Personnel Department of the Laboratories during the summer of 1943 as a receptionist in the women's employment group. Later she did clerical work and then assisted in interviewing prospective employees, particularly for messenger service. Last fall she transferred as assistant to the supervisor of the mail group of General Service.

News Notes

The first "Certificate of Appreciation for Contribution to the War Effort" awarded in New England by the War Shipping Administration was presented to The Southern New England Telephone Company on May 15. The award was made in recognition of efforts of the Company to assist the Maritime Officers' School at Fort Trumbull, New London, by providing a telephone servicemen's center, as well as entertainments by groups of employees.

* * *

UP TO MAY approximately 18,000 liberated prisoners of war awaiting transportation back from Europe had availed themselves of American Red Cross facilities to cable word of their release to their families. Supplementing War Department notification and commercial cables sent directly by the soldiers themselves, the messages are accepted by American Red Cross field directors and cabled at Red Cross expense. They are received in Washington in daily batches averaging about 1,300 and are wired out to the Home Service workers of the local Red Cross chapters, who undertake to deliver them personally to the families.

* * *

THE NATIONAL SCIENCE FUND of the National Academy of Sciences has an-

June Service Anniversaries of Members of the Laboratories

10 years	R. O. Gridale	G. A. Smith	F. F. Shipley	L. K. Swart
T. O. Berthold	C. M. Hanley	Bernhard Stauss	C. B. Sutliff	F. W. Treptow
F. B. Combs	J. R. Haynes	Patrick Sullivan		G. J. Wismar
Mary Dunham	L. H. Hinrichsen	J. J. Tanski	25 years	Estelle Womack
C. W. Haas, Jr.	L. W. Hussey	V. P. Triolo	T. M. Benseler	
Margaret Jaeger	J. T. Kenny	R. L. Vance	C. E. Brooks	30 years
Harriet McNamara	A. P. King	J. P. Whistler	E. T. Burton	J. T. L. Brown
T. M. Morris	B. J. Kinsburg	R. F. Wick	Emily Callagy	Ira Cole
J. L. Schweitzer	J. J. Kleimack	W. J. Wood	G. B. Crofutt	J. R. Fry
G. C. Wilson	E. V. Kuzela	J. A. Word	J. F. Dalton	B. J. Keating
	W. A. Landy		D. P. DeMarco	Sallie Mead
	J. K. Lantz	20 years	F. S. Farkas	S. D. Morrison
15 years	W. T. Larner	F. G. Buhrendorf	H. W. Flandreau	Albert Tradup
M. C. Biskeborn	J. F. Lawrie	V. J. DeGhett	G. A. Hurst	S. H. Willard
E. W. Borden	A. N. Luce	Elmer Graf	Herbert Keppicus	
Michael Brosnan	J. C. McCoy	J. P. Guerard	S. R. King	35 years
Howard Christensen	Erna Merseburger	K. H. Haber	F. A. Korn	J. G. Brearley
T. J. Dolly	L. H. Moore, Jr.	V. J. Hawks	Wilfred Leemon	R. E. Peoples
T. F. Egan	Ethel Ott	F. E. Haworth	H. R. Rein	
N. J. Eich	G. E. Perreault	E. J. Jedlicka	N. A. Newell	40 years
W. L. Filmer	G. M. Phillips	R. S. Kennedy	J. R. Nordstrom	Fred Berger
R. E. Friedley	J. P. Radcliff	J. G. Kreer, Jr.	G. H. Peterson	
Willard Gabel	N. O. Rae	Howard Morrison	C. E. Pierce	45 years
M. B. Gardner	F. F. Romanow	Ramon Ortega	G. A. Pullis	S. F. Butler
R. J. Gotta	O. W. Schaefer		J. A. Ratta, Jr.	

The chess tournament at Whippany, which has been in progress since February with a field of 64 entries, was won by J. C. Crowley with W. N. Lightbowne runner-up. Here we see Roy Coram presenting a memento folder to Mr. Lightbowne. Seated are Mr. Crowley and Helen Berg, chess secretary



nounced the creation of the Charles L. Mayer Nature of Light Awards, two prizes of \$2,000 each to be presented in 1946. K. K. DARROW is a member of the Advisory Committee in charge of award recommendations.

* * *

FOR THE second successive year *The Telephone Hour* was voted "best radio program by an orchestra with featured soloists" in the annual poll of Music on the Air, conducted among the music editors of the daily newspapers in the United States and Canada. The choice was announced by *Musical America*, which conducts the poll. Donald Voorhees, conductor

of *The Telephone Hour*, placed second to Frank Black of NBC as "best program conductor," in the same poll.

* * *

R. L. JONES, on May 24, attended the Council meeting of the A.S.A.

THE ANNUAL DINNER of the American Society for the Palestine Institute of Technology, held at the Waldorf-Astoria, was presided over by WILLIAM FONDILLER national president of the Society.

K. K. DARROW spoke on *Entropy* before sections of the A.I.E.E. at Dallas, Houston and Austin, Texas.

AT THE COLUMBUS MEETING of the American Physical Society, held on June 15 and 16, FRANK GRAY presented a paper entitled *The General Solution for an Electron Stream in a Parallel Plane Diode*. HARVEY FLETCHER, President of the Society, presided over a session devoted to *Biophysics*.

W. A. SHEWHART, at a luncheon session of a one-day meeting devoted to the discussion of quality control methods, spoke on *Some Straws in the Wind*. The meeting was sponsored by the Metropolitan Section of the A.S.M.E. and was held in New York City on May 8.

H. W. BODE spoke on *Applied Mathematics in Industry* as a general introductory survey prefacing a symposium on the use of mathematical analyzers for industrial problems. This symposium was sponsored by the Case School of Applied Science in Cleveland.



Noontime golf at Murray Hill



Distaff

“Symbolically, the work or activities of women, or woman’s authority or domain”—Webster

Vacation at Home and Like It

No gas for your car—no seats on the trains—the transportation problem is serious, so a vacation near home is not only patriotic, but smart. Sightseeing in New York can be fun. There are countless things that people come from all over the country to see and do—things that we who live and work here are usually too busy to notice. Have you eaten at a sidewalk cafe near Washington Square, or seen the pandas at the Bronx Zoo, or visited the art galleries on 57th Street? You can go to Carnegie Hall or the Museum of Modern Art if you are interested in the more serious entertainment. If it’s fresh air you crave, baseball games, amusement parks, nearby beaches,

HELEN TREMMEL



PAT ROONEY



and races at Jamaica offer an opportunity for plenty of that. With all these attractions close at hand, why worry about train and hotel accommodations? Stay home for your vacation where you can relax and enjoy it.

* * *

HELEN TREMMEL is an important part of the new blueprint department which has recently been started at Murray Hill. When Helen first came to the Laboratories, she worked in the black and white reproduction department. Now that the blueprint department has been set up, she operates

the machine, cuts orders, folds, sorts and stamps them, and, in a pinch, she even delivers them.

Before Helen came to the Laboratories she was a secretary in Summit. She likes all sports, but swimming especially, and she collects snapshots.

* * * * *

GERTRUDE ROONEY, better known as "Pat," does mechanical drafting in the Commercial Products Development Department at Whippany. She learned drafting in the first classes for this training to be held at Whippany two years ago. Previous to her drafting work at the Laboratories, Pat was a member of the accounting department of New Jersey Bell Telephone Company.

Pat has lived in Morristown all her life. She likes to cook and collect recipes, and tries



EVELYN KELLY

attends night school five evenings a week taking Latin and Spanish courses. These courses are necessary in order to fulfill her ambition to become a nurse some day. Virginia lives in Brooklyn. Week-ends she usually spends visiting her father who has a small farm on Long Island.

* * *

EVELYN KELLY was one of the first girls to work in the girls' model shop at Murray Hill. She had been doing office work in Newark until she was married. When her husband joined the service in 1942, she came to the Laboratories. Her husband was killed in action in

France last summer, but Evelyn continued her war work. Now she is doing clerical work in the men's model shop at Murray Hill. She keeps records and submits schedules and takes care of the time cards for the general shop organization.

Evelyn belongs to the American Legion Auxiliary, is a hostess at the USO in Summit (her home) and belongs to a sewing club of servicemen's wives.

* * * * *

JOAN GRENIER of the Development Shops Department at Murray Hill is shown at the lower left of page 276 with some excep-



VIRGINIA HALE

them all — successfully — judging from the reports of her friends.

* * * * *

VIRGINIA HALE used to operate an elevator at Coney Island—now she operates the lathe and the milling machine making small parts, following blueprint instructions, and doing assembly work in the machine shop at Chambers Street. She likes her war work—says it is never monotonous and there is always something new to learn.

Apparently Virginia likes to learn, for she



FLORENCE METZ

tionally beautiful iris grown by E. W. GENT of Switching Development.

* * *

FLORENCE METZ does computing in work connected with a war project being developed by the Laboratories. Specifically, she is adapting computing processes to a form so that the formulas and the problem data requiring solution may be computed. This involves all kinds of mathematical problems—especially high degrees of interpolation and various types of differential equations, and the solution of

JOAN GRENIER



simultaneous equations having a very large number of unknowns.

An economics and mathematics major at Mount Holyoke, Miss Metz is active in her class alumni work. She lives in East Orange, New Jersey, and enjoys the theater and sports, but her greatest love is traveling. She has already seen most of the United States, and has been to Europe, South and Central America, and Mexico. Her next trip, she says, will be to Hawaii.

* * * * *

ANN GWOZDZ is the teletype operator at Whippany. When Ann came to the Laboratories, she was sent to the American Telephone and Tele-



ANN GWOZDZ

graph Company to be instructed in TWX operating. She sends and receives messages for the people at Whippany to be transmitted to any place where a teletypewriter is in service. She has been with the Laboratories at Whippany for over two years. Before coming to the Laboratories, Ann was employed as a bookkeeper in the bank in her home town of Whippany.

Ann is a member of the local American Red Cross, and takes an active part in collecting

funds during the Red Cross Campaigns. She is also active in the War Bond Drives in her community. Ann likes sewing and most sports and spends much of her free time writing to her brother who is in the Army Air Forces.

* * * * *

SINCE GUAM was recaptured from the Japs, it has been given a complete new telephone system—and the switchboard in the air-conditioned Quonset hut which also houses the dial equipment is shown below. Here also are the day operators, Guamanian girls newly trained to this work, and quite conscious evidently that they are operating the first dial telephone system in the Pacific forward area. Navy men operate the switchboard at night.

Guam's carabao cart civilization is shifting rapidly to one of four-lane highways, modern airports and harbors. About 5,000 telephones are in service on the island. Lieutenant A. H. Haase, of the Navy, who is in charge of joint communications activities on Guam, is a former Mountain States Telephone and Telegraph Company man.

News Notes

K. G. COMPTON and J. LEUTRITZ, JR., visited the Rensselaer Polytechnic Institute in Troy to set up the study of the effects of humidity and fungus on hook-up wire for the N.D.R.C.

C. H. SAMPLE, K. G. COMPTON, and A. MENDIZZA examined corrosion specimens at Kure Beach, N. C.

K. G. COMPTON has been elected Chairman of the Metropolitan Section of the Electrochemical Society.

To discuss metallurgical problems, E. F. SCHUMACHER visited the Mellon Institute, Carnegie Institute of Technology and the Westinghouse Electric Company, Pittsburgh; the Gen-

Air-conditioned Quonset hut serves as central office on Guam



Engagements

- *Russell D. Wylie—*Edwina C. Hazen
 Ens. James J. Doherty, U. S. Navy—
 *Margaret J. Kilroy
 *Charles H. Wallschleger—*Carol L. Townley

Weddings

- *Alfred W. Johnson, U. S. Navy—*Elaine Bauman
 John Duffy, U. S. Navy—*Marilyn Daniels
 Albert Radko, U. S. Navy—*Lorraine Dimier
 *Lt. Richard Benkert, U. S. Army—*Marjorie Flynn
 Capt. Thomas J. Crowe, U. S. Army—
 *Frances L. Hyde
 *Carroll Worley—*Jean Lafitte
 *Lt. Charles M. Redding, U. S. Navy—
 Idelle Lofton, WAC
 *William A. Poulson—*Elizabeth Ann Reeves
 C. H. Sanecki, U.S.C.G.—*Petrina Ribis
 *Capt. George M. Richards, U. S. Army—
 Barbara Ann Riley

*Members of the Laboratories. Notices of engagements and weddings should be given to Miss Mary Ellen Wertz, Room 803C, 14th Street, Extension 296.

eral Motors Research Laboratories and the Barnes-Gibson Raymond Company, Detroit; and the Western Electric Company's plant at Hawthorne.

C. H. AMADON was in Cleveland to study pole inspection procedures and results.

R. H. COLLEY attended the annual meeting of the American Wood-Preservers' Association which was held in Chicago.

LOUISE WOODWARD of the Chemical Laboratories has recently received her degree of A.B. in Chemistry from Barnard College.

G. N. VACCA has been elected treasurer of the North Jersey Section of the American Chemical Society.

C. J. FROSCH has been appointed chairman of the Program Committee of the Newark Section of the Society of Plastics Engineers.

W. O. BAKER, J. H. HEISS, JR., N. R. PAPE and R. W. WALKER attended a meeting devoted to *Rubber Research* held in New York City under the auspices of the Rubber Reserve Company.

B. W. KENDALL has been reelected a director, for a three-year term, of the New York Electrical Society.

F. J. GIVEN, P. S. DARNELL and H. G. ROMIG went to Red Bank on May 2 on matters pertaining to resistances.

H. A. STONE was in Chicago on network problems.

J. A. KATER went to Chicago to assist Western Electric engineers on condenser problems.

B. E. STEVENS and L. EGERTON visited the Line Material Company, Zanesville, Ohio, in connection with transformer manufacturing problems. A. B. HAINES also visited this company on power transformer problems.

C. C. HOUTZ spent ten days in Chicago on matters relative to the manufacture of ceramic condensers.

AT THE HAVERHILL PLANT of the Western Electric Company, J. P. WHISTLER discussed scanning tests on high-voltage pulse transformers; R. MUELLER discussed a new type of winding machine for toroidal coils; and B. SLADE attended a survey conference on balancing coils.

“THE TELEPHONE HOUR”

(NBC, Monday Nights, 9:00 p.m., Eastern War Time)

JULY 9, 1945

Concerto No. 2 in D Minor— *Bruch*
First Movement
Jascha Heifetz and Orchestra
Pastorale *Bizet*
from “L’Arlésienne Suite No. 2”
Orchestra
The Girl with the Flaxen Hair *Debussy-Hartmann*
Sumaré *Milhaud-Levy*
from “Saudades do Brazil”
Habañera *Sarasate*
Jascha Heifetz and Orchestra

JULY 16, 1945

High Flight *Sacco*
Nelson Eddy
Theme Slave from “Coppelia” *Delibes*
Orchestra
Beautiful Dreamer *Foster*
My Brudder Gum *Foster*
Comrades, Fill No Glass for Me *Foster*
Don’t Bet Money on De Shanghai *Foster*
Nelson Eddy
Introduction to “Kjovantchina” *Moussorgsky*
Orchestra
The Moon Is High in the Sky *Rachmaninoff*
from “Aleko”
Nelson Eddy

JULY 23, 1945

The guest artist will be Maggie Teyte, famous English Soprano

JULY 30, 1945

Waltz *Arensky*
Orchestra
Spring Song *Mendelssohn*
Prelude in G Minor *Rachmaninoff*
Josef Hofmann
Ball Scene *Hellmesberger*
Orchestra
Concerto No. 2 in F Minor— *Chopin*
Slow Movement
Josef Hofmann and Orchestra

AUGUST 6, 1945

Prologue to “Prince Igor” *Borodin*
Chorus and Orchestra
Komm, süßer Tod *Bach*
Marian Anderson
If I Loved You from “Carousel” *Rodgers*
Orchestra
Black Roses *Sibelius*
Comin’ Through the Rye *Traditional*
Marian Anderson
Ritual Fire Dance *DeFalla*
Orchestra
Carry Me Back to Old Virginny *Bland*
Marian Anderson and Chorus

Bell Laboratories' Club has no more tickets for these programs because its limited supply has already been distributed to applicants.

C. A. WEBBER and W. J. KING were at the Naval Research Laboratory, Washington, on high-voltage cables and connectors. Mr. King was also in Chicago to discuss similar apparatus.

W. L. CASPER and R. A. SYKES, at the Long Branch Signal Laboratory, discussed crystal units.

G. M. THURSTON visited the Bureau of Ships in Washington in connection with quartz crystals.

AT THE POINT BREEZE PLANT of the Western Electric Company, C. A. WEBBER discussed general cord development and W. V. THOMPSON, audiphone cords.

W. F. MALONE and H. J. STRELESKY were in Washington in connection with crossbar equipment in the Georgia central office.

P. W. SHEATSLEY, D. G. BLATTNER, L. E. PARSONS and F. W. CLAYDEN were in Hawthorne on step-by-step equipment.

A. J. WIER was in Boston to confer with engineers of the New England Telephone and Telegraph Company on type-K carrier problems. He also visited the Haverhill plant of the Western Electric Company in connection with a Quality Survey on crosstalk balancing equipment.

V. T. CALLAHAN visited the General Motors Corporation, Detroit, where he discussed Diesel engines.

A CONFERENCE at the Bureau of Ships, Washington, on low-inertia motors was attended by W. S. ROSS.

C. J. CANKI was at the Speedway Manufacturing Company, Chicago, and the Thomas B. Gibbs Company, Delavan, Wis., in connection with small-motor design.

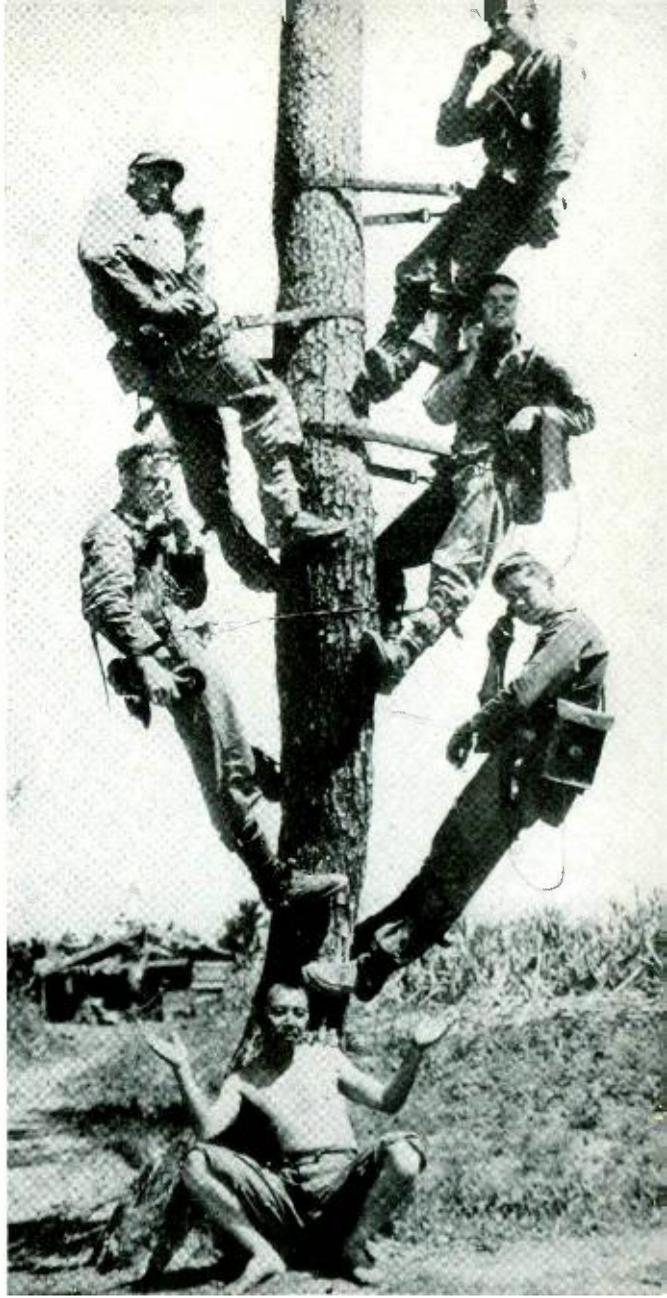
C. T. MILLER visited the Emerson Electric Manufacturing Company, St. Louis, where he discussed small motors.

H. W. PURCELL was in Albany and Richmond in connection with a trial of precious-metal contacts in step-by-step offices.

D. F. SEACORD visited Philadelphia and Cincinnati to conduct noise surveys in panel offices.

S. P. SHACKLETON, in his capacity as a member of the Engineers Committee for Student Guidance of the A.I.E.E. New York Section, spoke on *Electrical Developments in the Post-War Period* before students of the New Utrecht High School in Brooklyn.

W. H. S. YOURY recently visited the plant



Marine Corps Photo from Acme Horseplay on Okinawa. Amid the blood and sweat of this hotly contested fight, American soldiers can still pull a laugh for the camera

of The Willson Products Company at Reading, Pa., in connection with studies pointed toward the standardization of new types of goggles in the Bell System.

J. A. CARR and B. R. FYTH, with L. E. Brace and F. W. Lloyd of the Western Electric Company, visited the Armstrong Cork Company in Millville, N. J., to discuss the manufacture and inspection of insulators.

Please put your RECORD in the "Correspondence-Out" box when you are through with it so that it can be sent to a Serviceman's family.

R. H. COLLEY and C. H. AMADON led a discussion on present-day pole and timber problems at a Regional Construction Conference in Cincinnati.

A. M. BAUM was recently elected Treasurer of the Queens-Nassau branch of the National Association of Vocational Guidance Counselors.

F. D. LEAMER has completed a series of lectures at the University of Newark on the subject of *Practice of Labor Relations*. Mr. Leamer was elected Chairman of the Morris County Personnel Group at a recent meeting held in Denville, N. J.

E. L. NORTON's paper, *Dynamic Measurements on Electromagnetic Devices*, presented before the A.F.E.F., was published in the April issue of *Electrical Engineering*.

B. L. CLARKE, under the auspices of the Armed Forces Radio Service, discussed *Careers in Chemistry* in a short-wave broadcast beamed to all overseas theaters of opera-

tion. This was one of a series of broadcasts on *What's the Deal*.

DR. CLARKE visited the Mellon Institute in Pittsburgh to discuss methods of chemical analysis.

M. B. LONG, S. H. WILLARD, E. V. MACE and A. F. LEYDEN represented the Laboratories at a meeting held in Newark, on June 4, of the New Jersey Chamber of Commerce. C. F. Kettering, Vice-President of General Motors and directing head of its Research Laboratories, spoke on *Industrial Research Looks to the Post-War Period*.

R. MARINO was at the Patent Office in Washington during the month of May relative to patent matters.

AN ABSTRACT OF R. M. PEASE'S, *A 1000-g Centrifuge*, published in the December, 1944, issue of the RECORD, was abstracted in the April 21 issue of *Nature*.

Correction

THROUGH AN unfortunate last-minute change, the lip microphone shown in the photograph on page 199 of the June RECORD was erroneously attributed to the Western Electric Company. Lip microphones are being produced by a number of manufacturers, but the one shown was not a Western Electric product.

Magazines Carrying the Laboratories' Series of Technical Advertisements*

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Army Ordnance	Journal of Engineering Education	Radio
Automotive and Aviation Industries	Journal of The Franklin Institute	Radio News
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Electronic Industries	Popular Mechanics Magazine	Scientific Monthly, The
Electronics		Telegraph and Telephone Age
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		Proceedings
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*One of these advertisements is shown on the opposite page