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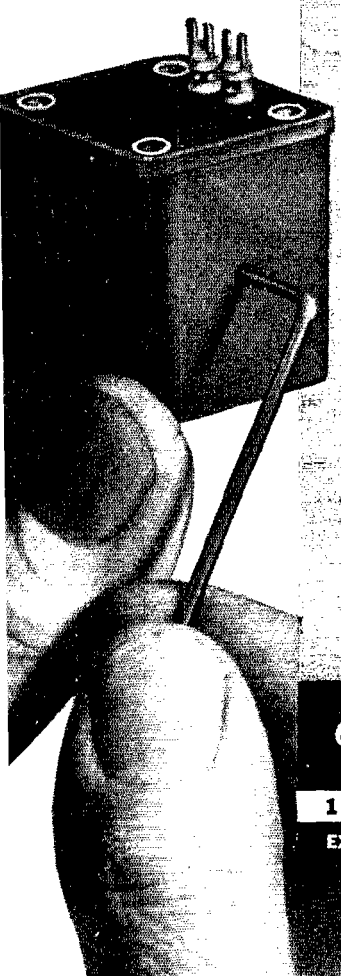

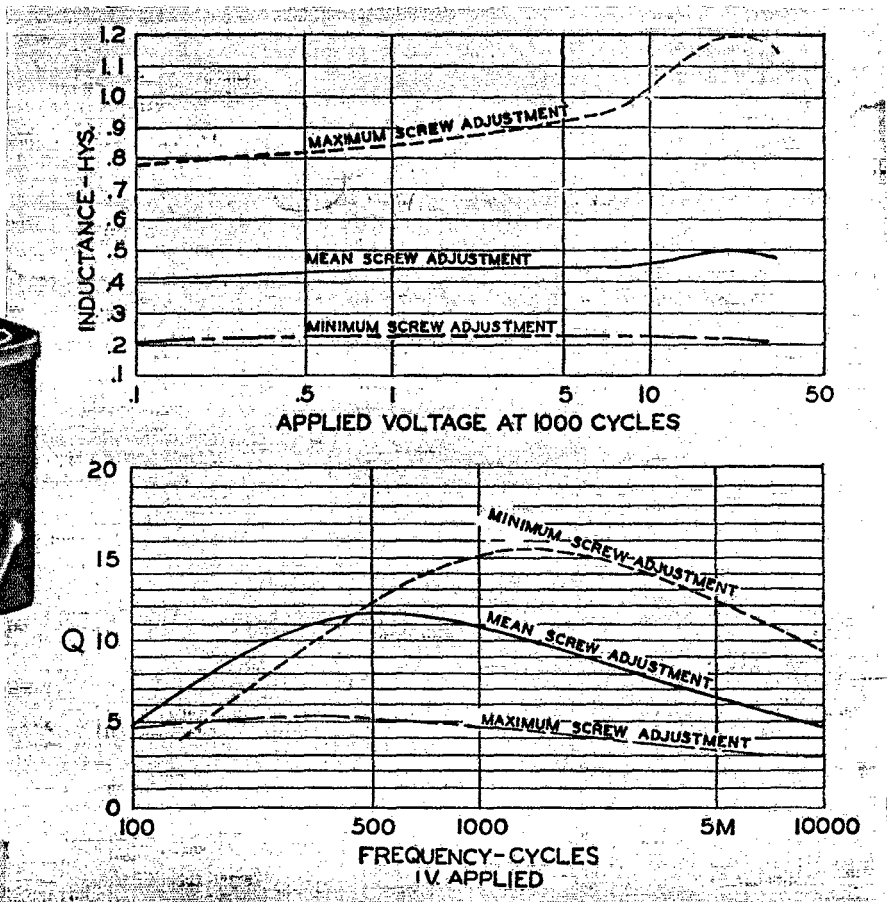

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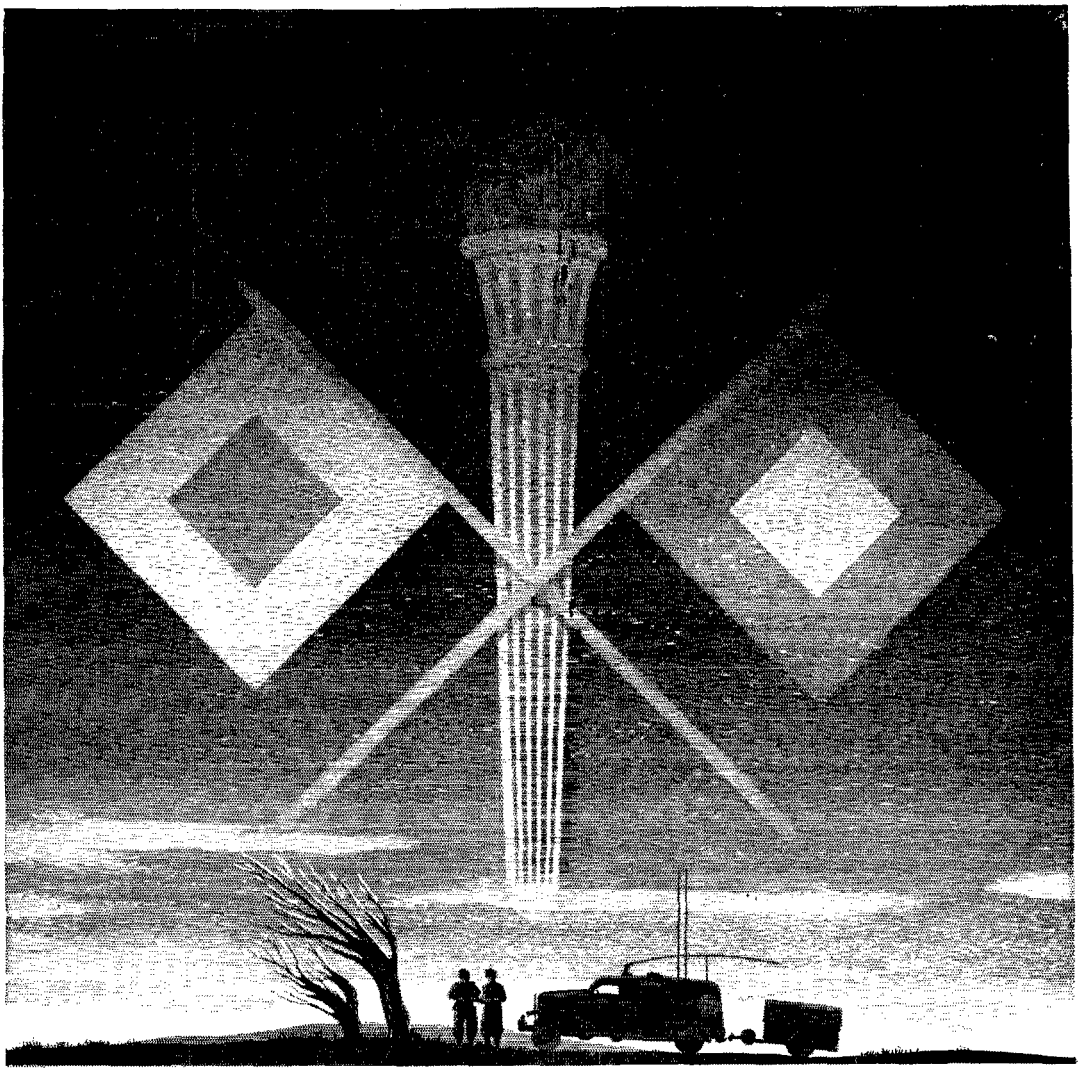

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APRIL 1944

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QST *devoted entirely to*

AMATEUR RADIO

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

CONTENTS

Section Communications Managers of the A.R.R.L. Communications Department

Reports Invited. All amateurs, especially League members, are invited to report communications activities, training plans, code classes, theory-discussion groups, civilian-defense building or planning each mid-month (16th of the month for the last 30 days) direct to the SCM, the administrative official of ARRL elected by members in each Section whose address is given below. Radio Club reports and Emergency Coördinator reports representing community organized work and plans and progress are especially desired by SCMs for inclusion in *QST*. **ARRL Field Organization appointments**, with the exception of the Emergency Coördinator and Emergency Corps posts, are suspended for the present and no new appointments or cancellations, with the exception named, will be made. This is to permit full efforts of all in Emergency Corps plans.

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

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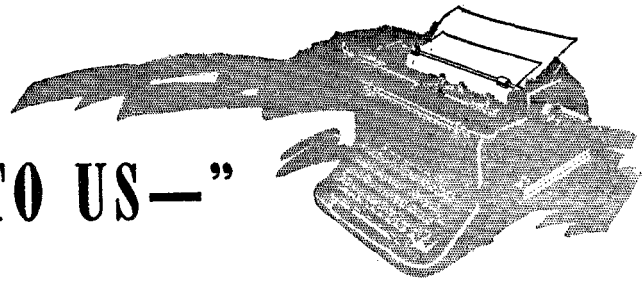


"IT SEEMS TO US—"

TO OUR GANG OVERSEAS

WE'RE addressing this page this month to the men and women of American amateur radio who are on foreign service in the armed forces. This great journal of the American shack is reaching a surprising and increasing number of you, even though your shack today is on a "tin can" or in a Fort or a hut in the palms or a 299 on the edge of the road. We want to pass along some thoughts to you.

We had a letter a few days ago from W9IYP, who is a naval communications officer on the staff of the motor torpedo boat squadrons attached to one of the fleets in an active theater. He has a lot of interesting things to say in criticism of the operating habits of some of the other amateurs he has encountered in the service. The more we thought it over, the more important his points seemed to us; and we decided to lay them before you because we think they'll appeal to you as good American horse sense. Now we're going to let Lt. Larimer talk:

It has recently become apparent that amateurs in the Services have one great responsibility that a minority are failing to meet. That is the observance of circuit discipline.

On a few circuits in this forward area there is some free circuit time, although most circuits are seldom free of traffic. On the less busy circuits, some of which are for combat reports, etc., the practice of "hamming" has occurred. Some, not all, has been originated by hams. The various services have ways of dealing with these individuals. However, every amateur who is guilty of this practice is jeopardizing the rest of us. My only interest here is that I thoroughly enjoyed being a ham for ten years before coming into the service and I am looking forward to the time when I can again build and operate and be free of reports and red tape. This rag-chewing on service circuits has caused monitoring stations to be set up, taking vital equipment, which has been transported thousands of miles, from operational status. My experience deals only with the forward areas, where all communications is by radio and equipment is at a premium.

When the war is over, the Army and Navy will have much to say about allotting frequencies to amateurs. If amateurs, one and all, have built a good reputation, help can be expected. Every amateur who falls below perfection is a detriment. The services know that the amateurs did much to save the communications situation at the beginning, but our responsibility is far from over. Like the fellow who worked in a machine shop for fifteen years before they'd call him a machinist, but when he took one file they called him a thief.

A ranking communications officer recently stated to me that the Army didn't train their operators to give out with FB, OM, TNX, and other abbreviations. Nor with the "shave-and-a-haircut" routine at the end of contacts.

I personally know of one instance where American lives were lost because a dispatch was seven minutes late. This wasn't due to maldiscipline, but it is an example of what even a few wasted minutes can do. Those messages with what seem to be just so many jumbled letters are pretty damned important.

Then there is the "Lake Erie swing." A lot of amateurs pride themselves in this. Cases are known where the enemy has followed ships and stations wherever they went, simply because some "smart" operator had a peculiar fist that was recognizable regardless of the call-sign used.

And there is the case of the fast operator who has to give many fills. Surveys have shown that 35-word operators actually netted 10 words a minute while 20-words ops were making good at 17 w.p.m., both in coded groups. This is typical, and there were too few exceptions. Communications Instructions call for 18 w.p.m.

When a regular operator commits these errors it is blamed on lack of training or improper training. When a ham does them it reflects all too seriously on our whole institution. Only the hams in the operator positions can help our cause. Correction of these practices not only will bring quicker promotion but an even better name with the powers whose help will be needed to retain the amateur's status.

With the League doing a bang-up job, and the ham on the line delivering the goods regardless of his position, we can't lose.

While we're putting things on the table we'll add another thought that we picked up from several communications officers, representatives of different branches of the services, with whom we were talking recently. We were all amateurs, friends for many years, so we were engaged in frank talk about our defects — for the amateur is a perfectionist, you know. Nobody was losing sight of the main fact, that the ham in the services is doing the job better than anybody else can do it; but if there is room for improvement, don't we all want to know it? Well, these fellows have it that the worst fault of amateurs in the services is tinkering with apparatus. Under emergency conditions the ham has a priceless superiority over the regular operator or the quicky maintenance man. Say you're down on a reef or your station has been shot up or some of the stuff didn't come. Everybody knows that under those circumstances

the amateur ability to improvise is positively invaluable; he'll get through if it is humanly possible to do so. But, the way they tell us, if regular apparatus is working well the amateur ought to learn to leave it alone and stop his unauthorized "improvements" and his perpetual tinkering with adjustments. Seems nothing is so likely to make a nonamateur communications officer have fits. Poor guys never having had ham experience, they're simply unable to appreciate the beauties of these improvements and as a result some of them are coming to nurse an active distaste for amateurs. Which is something we don't want.

Let all hands note carefully that these are no blanket indictments. The American amateur is doing a real job in this war, and we are never going to stop saying so. These are matters concerning a very small minority — but a minority that can do a lot of damage to our reputation as an institution, because of the perverse habit of human nature of remembering things of this sort. We want to ask you to look deep down inside yourself and examine whether by any chance you could be considered one who is offending in any of the respects named. If, when you think it over, you have to plead guilty on any of the counts, we are confident that the very act of thinking about it will scratch you off the list. Individualities are proper enough on the peacetime air at home. They have to be repressed in the mass effort of winning a war, as you fellows know better than most. The reputation of amateur radio is pretty much in your hands. We know that you'll want to come as close to perfection as possible — for the good of American communications, for your own good, and for the good of amateur radio.

—•••—

The prospects for good jobs for good radio men released from the services after the war are pretty bright, the way we get it from some manufacturers with whom we've talked. Despite big employment lists, maufacturers now engaged in war production do not seem to feel that they are well enough staffed with the right kind of personnel to do the things that they want to do, come peace. The capable men are not going to have much to worry about in getting resettled. But a uniform alone isn't going to insure a postwar job in a field as technical as radio, where know-how counts. It is likely to be the old story of good positions for the qualified, with plenty of room at the top, and a struggle for those of no particular ability. You wonder what reason we have for bringing this up at this time? It's simply stated: The competition will be keen, but the outlook is heartening for the better-qualified technician. Service training offers excellent opportunity to prepare for the scramble of civilian life. Don't just gold-brick through your radio instruction the easiest way. Make the most of it, really get your teeth into it, and you'll be prepared both for the present and for the future.

—•••—

An over-age civilian feels pretty humble sitting here talking to you men in the active theaters. We particularly hope that you won't think of us as trying to "preach" when we bring up these things. We aren't trying to tell you how to do your jobs. Because we have amateur radio in common we feel pretty close to you, and we think you'll understand that our only aim is to advance the cause of amateur radio which we all love. Although we'll talk among ourselves about some of amateur radio's deviations from perfection, it's something we won't let anybody else do. We're damned proud of you all. And we're going to do our part to see that you have ham frequencies to work on when you come home. 73.

K. B. W.

★ SPLATTER ★

OUR COVER

THIS light-beam stuff must be fun — to judge from the expression on the face of this month's cover subject, at least. Of course, you might suspect that his telescope transmitter has strayed upon some enticing visual QRM — but we don't think so. Either way, you'll agree that "Deke" French's light-beam transmitter-receiver is a source of intriguing entertainment.

•••—

PAPER, PLEASE

THE fact that we haven't mentioned paper in the past couple of issues doesn't mean that it has ceased to be a problem. (Not that you'd guess there was any paper shortage when you look at some of the publications in the radio field these days — referring to the advertising sections, of course; not the editorial content.)

The shortage still exists; in fact, it's even more critical now than ever. For 1944 WPB has decreed further drastic restrictions on magazines, making an over-all cut of 25 per cent from the 1942 base. In compliance with this order, *QST* this year will have to be a little lighter and a little thinner. The amount of editorial content will still be kept about the same, however; befitting the organ of a noncommercial association, the required paper saving is being made by further reductions in advertising quotas, in the basis weight of paper stock, and in newsstand allocations — not in reading pages.

•••—

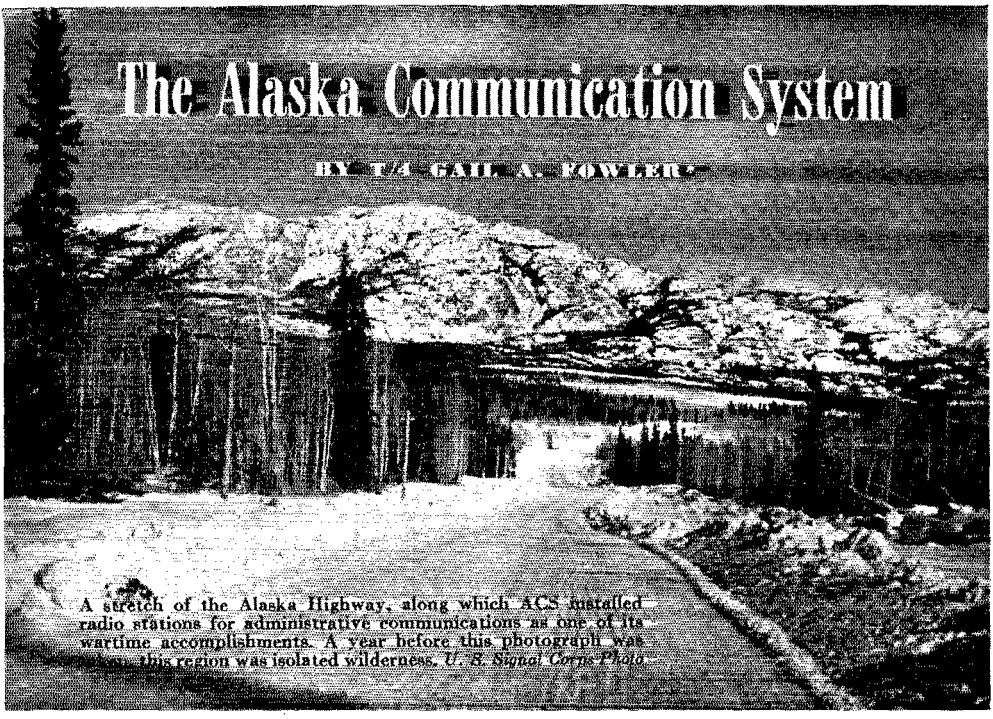
FOOTNOTES

PAPER shortage or no, we're proud to present in this issue — one of the fullest and most diversified in recent times, we feel — no less than

(*Continued on page 94*)

The Alaska Communication System

BY T/4 GAIL A. POWLEE*



A stretch of the Alaska Highway, along which ACS installed radio stations for administrative communications as one of its wartime accomplishments. A year before this photograph was taken, this region was isolated wilderness. *U. S. Signal Corps Photo*

A 37-mm. Jap shell whirred through the Aleutian fog with a muffled whistle and exploded above the camp fire. Eight Signal Corps enlisted men of the Alaska Communication System hit the tundra simultaneously. After a fear-filled moment they sheepishly rose, dusting the mud and the campfire debris from their Arctic clothing. None was hurt, but a flying piece of steel had winged a soldier from a unit near by.

The locale was Attu, and these men had just finished building a temporary Signal Corps radio station to furnish administrative communications for the American invasion forces. Inside a near-by pyramidal tent, set up within a bomb crater, the radio station was still carrying on its business of "getting the message through."

Getting the equipment to the site had been even more of a task than actually setting up the station. The transport on which the equipment was loaded ran aground near shore. With rising waters and oil in the hold threatening the cargo, the signalmen worked valiantly all night to extricate their equipment. Still without sleep, they finally succeeded in getting it all ashore the next morning.

"Cats" and trailers made scant headway over the churned-up beach and the soggy tundra. All hands got in and pushed when the going was tough — which was most of the time. Even Col. Irwin L. Kaufman, Alaska Defense Command signal officer, lent the weight of his shoulders.

It was when the men were up at the next daybreak, eating a K-ration breakfast, that the Jap shell punctuated the meal. That day, and for days thereafter, American machine guns routed out Japs burrowed into foxholes on the hillsides flanking the valley station site.

The story at Kiska was different. One signalman, a chief operator, had two narrow escapes in 24 hours from unexploded "duds." There may have been no Japs left on the Island, but they had left plenty of calling cards.

From WAMCATS to ACS

Task-force operation was something new to the Alaska Communication System in its 43-year-old history as the "Western Union of the North."

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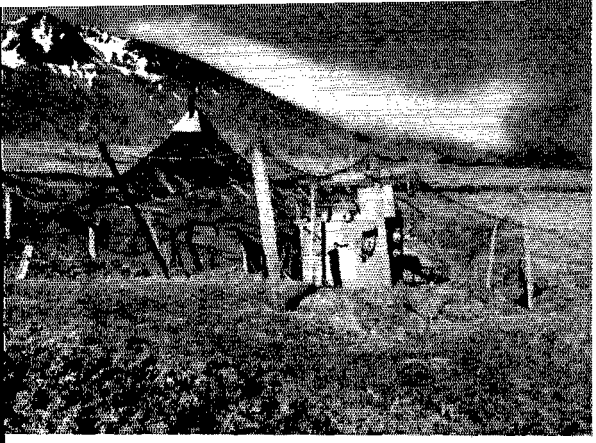
If there was ever a major region of the earth where radio — and notably amateur radio — ranks as a No. 1 indispensable, it is the vast Alaskan empire. True in peacetime, this has been even more true in war. This article tells the story of Signal Corps communications in Alaska from the days of the WAMCATS, beginning at the turn of the century, up to the present-day Alaskan Department and the Alcan Highway. It tells, too, how hams and ham gear helped make possible the wartime expansion of Alaska Communication System operations required to meet and thwart the Japanese threat in the North Pacific.



Above — A radio station with a bomb crater for a basement. This is the original operations pyramidal tent housing an ACS station at Attu while the Japs were still being exterminated. Note the camouflage net.

Right — The new Attu quarters. This view shows a portion of the interior of the permanent Attu operations Pacific Hut. Quite a change from the old tent! Operators are manning long-haul circuits. One of a bank of teletypes appears at the right. *U. S. Signal Corps Photos.*

The ACS is part of the Signal Corps' Army Communications Service, headed by Brig. Gen. Frank E. Stoner.

The story of the ACS goes back to 1900, when Congress set up the Washington-Alaska Military Cable and Telegraph System to furnish communication to, from and within the Territory of Alaska. The lawless days of "The Spoilers," recorded in Rex Beach's famous novel, prompted Congressional authorization of the old WAMCATS, so-called because of the System's initials at that time. The prime purpose of the Army Alaska network was to link the various garrisons scattered through the territory. Commercial business also was authorized.

The system always operated on a paying basis, all funds received being turned into the Treasury Department. Allocations for carrying on the communication work which the system performed were made from War Department funds provided for that purpose.

Ocean cable and landline telegraph stations were established during the first four years of the century, one link in the chain being the first overwater radio communication on the North American continent — from Fort St. Michael across Norton Sound to Safety Harbor, near Nome, a distance of 107 miles.

Furnishing territorial communication was no small chore, considering that Alaska proper, from its westernmost island of Attu to the southernmost portion near Ketchikan, extends over as great an expanse as the distance from San Francisco to Jacksonville, Fla., and that the area of the Territory is slightly more than three times the size of the State of Texas.

The WAMCATS operated the cable, telegraph line and radio system within Alaska until the change-over in the last decade, which brought virtual cessation of the worn cables and the tripod telegraph lines in favor of medium-frequency and high-frequency radio operation. About this same time the name was changed to the Alaska Communication System, or ACS.

Wartime Expansion

Alaska was a backwater in World War I and the System carried on much as it had in peacetime. There were then only 24 infantrymen stationed in Alaska — a far cry from the thousands manning the northern outposts in World War II!

The System followed the ups and downs of the various growths and declines of the territory until a few months before Pearl Harbor, when the Alaska Defense Command, now known as the Alaskan Department, was established.

Various expansions planned by ADC were allocated to the ACS. Chief among these was the furnishing of long-line radio communication to tie the various outpost airfields and garrisons into a cohesive network which would furnish the ADC with administrative communication.

Progress on this work had barely started when the Japs struck at Pearl Harbor. Promptly there came an order from the Chief Signal Officer, then Maj. Gen. Dawson. Olmstead (himself formerly officer in charge of the ACS from 1931–33), designating the ACS as responsible for all fixed communications within Alaska. The directive, in effect, ordered ACS "to procure, contract for, install, make any necessary arrangements, to furnish any necessary fixed communications for the vital defensive zone of Alaska."

This meant not only ACS installations but ACS-ADC stations, harbor defenses, Army Airways Communications System installations, and post telephone exchanges. It was a gigantic responsibility for an outfit which in September, 1941, had numbered scarcely more than 300 officers and men. And it meant spending millions of dollars annually, instead of a mere two or three hundred thousand as before.

Far from being dismayed, the ACS, headed by its commanding officer, Col. Fred P. Andrews (then a major), buckled to the job.

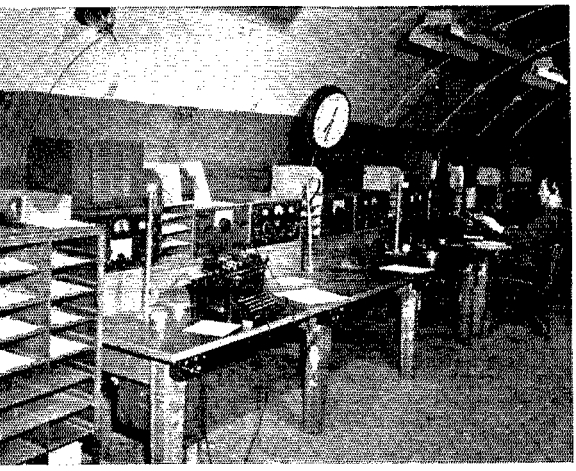
Col. Andrews believed that, regardless of the lack of standard Signal Corps equipment for the long-haul radio links required, it was the System's primary function to get those wartime messages through — no matter how.

He ordered the radio market scoured for communications receivers and transmitters of any type which could be modified to meet the various point-to-point communication requirements within Alaska. The ACS shops were expanded to handle the modification and reconstruction of this equipment.

Hams and Ham Gear

It was not at all uncommon for detachments of ACS operators and engineers to leave Seattle in all kinds of weather — mostly bad — with 40 to 60 tons of freight with which to establish an outpost station. Nearly always, if this freight could have been examined, one would have found various amateur and rebuilt obsolete commercial transmitters within the cargo.

An intensive enlistment program had been inaugurated and the System grew to more than six times its original size. Radio hams especially were sought. One of the largest radio operators' schools in the country was established.



New stations popped up in Alaska like mushrooms. Where there had been 24 peacetime stations, there were now a wartime 48. At each "defensive" — later to become an offensive — airfield, you'd find an ACS station in operation, handling administrative and command traffic for the ADC.

Improvisation in the field was the rule rather than the exception. It was not unusual for a detachment, arriving at a remote location to establish a radio station, to discover that much equipment was missing, that radio gear had been broken by rough hauling, or that many parts had been damaged by the incessant rains.

Fortunately, through its previous experience with the ups and downs of communication, the System had developed an excellent quality of officer and enlisted man. This quality was reflected in many station jobs where men without their experience would have been stymied.

Five stations sprang up in the interior in six days during the hectic summer of 1942. One ACS captain bought up all the equipment he could find in Fairbanks and dispatched it, with crews, by air to the station locations, thus saving a couple of weeks over the time that would have been required to have the hurry-up order shipped from Seattle or Anchorage.

ACS in Combat

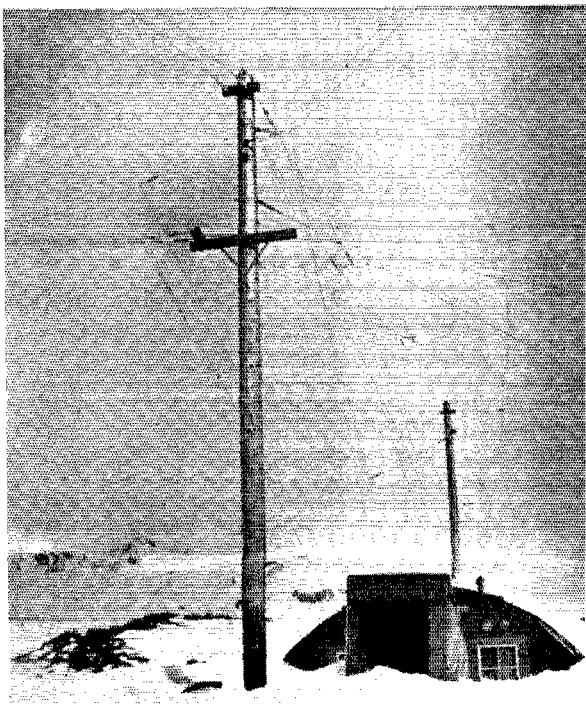
First connection of the ACS with task-force operations came shortly before the Jap bombing of Dutch Harbor, when ACS teams put ashore with their equipment at points on the bleak Alaskan Peninsula and in the vicinity of Dutch Harbor.

Later there were the landings at Adak, Atka and Amchitka, made right under the noses of the sea-based Jap bombers. Then came the Attu, Shemya and Kiska landings. By that time task-force operations had been refined to a neat point, earlier shortcomings becoming yardsticks for future simplification and improvement.

Nowadays two complete stations are packed and assembled, one to provide initial landing communication and the other, on a second boat, for use should the first equipment be lost by enemy

Left — The interior of a westward ACS station after some of the refinements of a permanent station have been installed. The ruggedness of early operation immediately after an Aleutian landing is gone. The neat filing cabinet at left, the clean-cut operating positions, the big wall clock and the fluorescent lighting — all are a far cry from the mud-floored tent in use when this station was first established.

Below — B-r-r! An ACS installation huddled in the drifts "somewhere in the Aleutians." The winds in this region usually blow away the snow before it has a chance to reach any depth, but there are exceptions — and this is one of them. *U. S. Signal Corps Photos.*



This scenic view shows an ACS installation along the Alaska Highway in Canada. The road is visible in the immediate foreground. The long building at the right is a telephone repeater station, and in the woods behind it is the radio station. The power shack is in the center.

action or other mishap. A third station, of a permanent type, is left behind at an advanced base, to be sent along when consolidation of the new position is established.

The ACS usually goes in with the second or third waves. When the landing craft grates upon the inhospitable shore, out leap the signalmen, carrying tents, portable power plants, antenna wire, and the smaller radio equipment. While the advance guard heads for the temporary station site, a detachment remains behind to supervise bringing the heavier crates ashore.

Within a matter of hours communication is set up with the net control station. Machine guns may rattle, mortars may boom, Jap bombers may unload their sticks — but still the high staccato hum of c.w. comes from the hastily erected and camouflaged operations tent.

From this time on, operations are routine. More equipment is brought ashore. A permanent station site is selected. Reconnaissance is made for remote receiver and possibly remote transmitter sites, and permanent station construction, based upon the ever-popular Quonset or Pacific hut, is initiated.

Later comes the installation of post telephone lines and exchanges and the establishing of teletype communication between various commands.

Long-Haul Administrative Circuits

The ACS does not serve a tactical function, in that its purpose is *not* to establish intercommunication for a battle front. Its true function, among others, is the installation and operation of administrative long-haul command circuits, upon request from authorized agencies.

In the summer of 1942 the ACS went into Northwestern Canada. ACS-trained operators were sent into one sector of the Alaska Highway, where they manned command cars and bumped along behind the engineers' bulldozers, keeping the isolated road groups in communication with supply centers and sub-headquarters.

The ACS also engineered and installed fixed radio stations of comparatively low power every 100 miles or so along the highway. These stations provided administrative communication for the myriad trucks plying the highway, until the new Alcan telephone line, also ACS supervised, was put into operation. This line travels along 1950 miles of some of the most difficult terrain ever penetrated by copperweld wire — from Edmonton to Fairbanks.

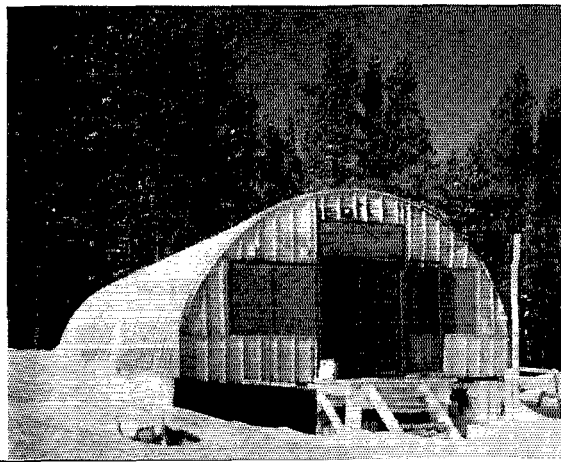
Radio engineering and installation also was an ACS job at the airports linked by the Alcan supply road. These ultimately connected with AACS nets already installed in Alaska.

The ACS did the Signal Corps' trouble-shooting in Canada until the Northwest Service Command was set up and ready to function with its own Signal Service Battalion. Many of the men assigned to this battalion receive training at ACS headquarters in Seattle before being shipped north.

Meanwhile, many abandoned submarine cables were restored and new ones laid as a means of providing added security for wartime transmission. Radio, telephone, cable — the ACS is a three-way operation, with radio comprising 50 per cent of the installations.

So goes the story of the Alaska Communication System, an organization unique in the annals of communication. It is owned and operated by the Army, yet it also serves a civilian commercial function. It is not tactical, in that it does not provide intrafield requirements, yet it links command posts over long distances to base stations. It is served by one company of men — the Signal Service Company — and yet it is nearer in size to a regiment. The area served by the ACS may be visualized by drawing an approximate circle, starting at Seattle, through Edmonton, Point Barrow, Attu, Ketchikan, and back to Seattle. The sturdy crow's flight enclosing this vast communication empire covers a route of more than 9000 miles.

And if this empire should ever be extended southwest from its present westernmost point — well, the ACS will be ready to answer that call when it comes, too.



Located in a clearing hewn out of wilderness, this metal Nissen hut is the home of one of the Alaska Highway ACS radio stations. It was 50° below zero when ACS engineers started this installation, and the men had to peck out the earth a spoonful at a time to make post holes for the antenna masts. *U. S. Signal Corps Photos.*

A Ham-Built Communications-Type Receiver

Constructing a 12-Tube General-Coverage and Bandspread Superhet

BY A. D. MAYO, JR.,* W4CBD

The increasing trend toward the use of manufactured equipment, especially receivers, by amateurs in recent years is understandable enough, since the construction of a modern communications-type receiver is not the simple job the assembly of the old two-tuber used to be. Nevertheless, the argument that there is no better way to gain an understanding of the operation of a piece of radio gear than to build it and make it work is thereby strengthened, for there is much more to be learned by actual experience. A receiver such as the one herein described by W4CBD will provide a good wartime project for those who have the time and material available.

ONCE upon a time all ham receivers were home-made. No problem was involved in deciding what tubes to use; either you had a storage battery and used 201s or you had a UV-199 with three dry cells and a 30-ohm rheostat. The first chassis was a cigar box, with the top as the panel. After trying the two or three circuits which were known at the time, the ham ended up with the "Schnell tuner" — a regenerative detector and one-step audio. Signal-strength reports were given as audible so many feet from the 'phones.

Dead spots on the dial plagued the ham and caused him to wiggle the regeneration condenser back and forth like mad, but this bug was small potatoes compared with the trials and tribulations encountered in the construction of a modern receiver. Nowadays most hams who are smart buy themselves the best set they can afford and let it go at that. However, there are dopes like myself who still try to build receivers because we feel there is more to ham radio than the mere operation of "boughten" gear.

The design of the receiver shown in the photographs was started in 1939. The chassis and panel were made up and the parts all were bought at that time. Then, before construction could get under way, I moved half-way across the continent and, worse yet, got myself married to a YL unfamiliar with ham radio. Woe was she! No sooner had she become resigned to living in an apartment which (as she describes it) "looks like a cyclone struck it after you walk through it once" than I broke out on the kitchen table with thousands of little parts and wires. She swore the receiver would never make a single squawk; at least, she hoped it wouldn't. A situation of this kind requires extreme diplomacy, and if you can get over this hurdle the rest is easy by comparison.

*610 E. North St., Greenville, S. C.

Features

Before laying out the circuit I made a list of the features I thought ought to be included. As you will see, the list contains practically everything except perhaps dual diversity:

1) General-coverage and ham-band tuning ranges from 1.7 to 30 Mc.

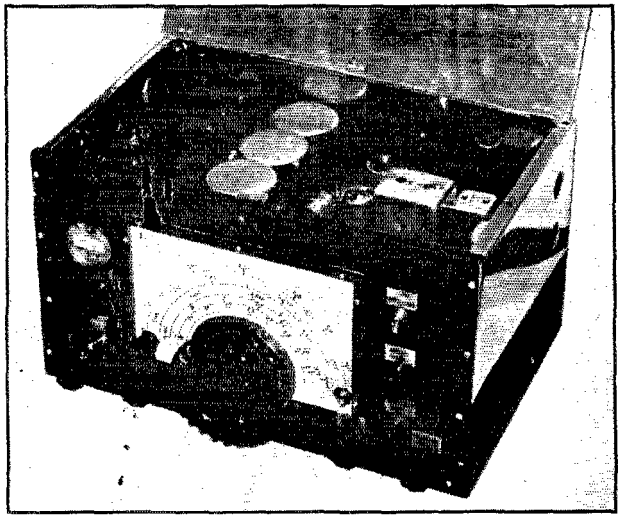
2) Full-dial bandspread for the 3.5-, 7- and 14-Mc. bands.

3) Two r.f. stages, giving high gain ahead of the mixer.

4) Two i.f. stages, giving good selectivity without the crystal and ample gain for proper a.v.c. action.

5) Crystal filter with variable-selectivity and rejection controls on panel.

6) Noise silencer with threshold adjustment on panel.



Panel view of the completed receiver. Below the S meter are the b.f.o. tuning control, the power switch, the stand-by switch and the r.f. gain control. The ganged-trimmer control is in the lower left-hand corner of the dial chart. To the right are the b.f.o. switch, the audio gain control and the crystal-filter and noise-silencer adjusting knobs. The a.v.c. switch is in the lower right-hand corner of the dial chart.

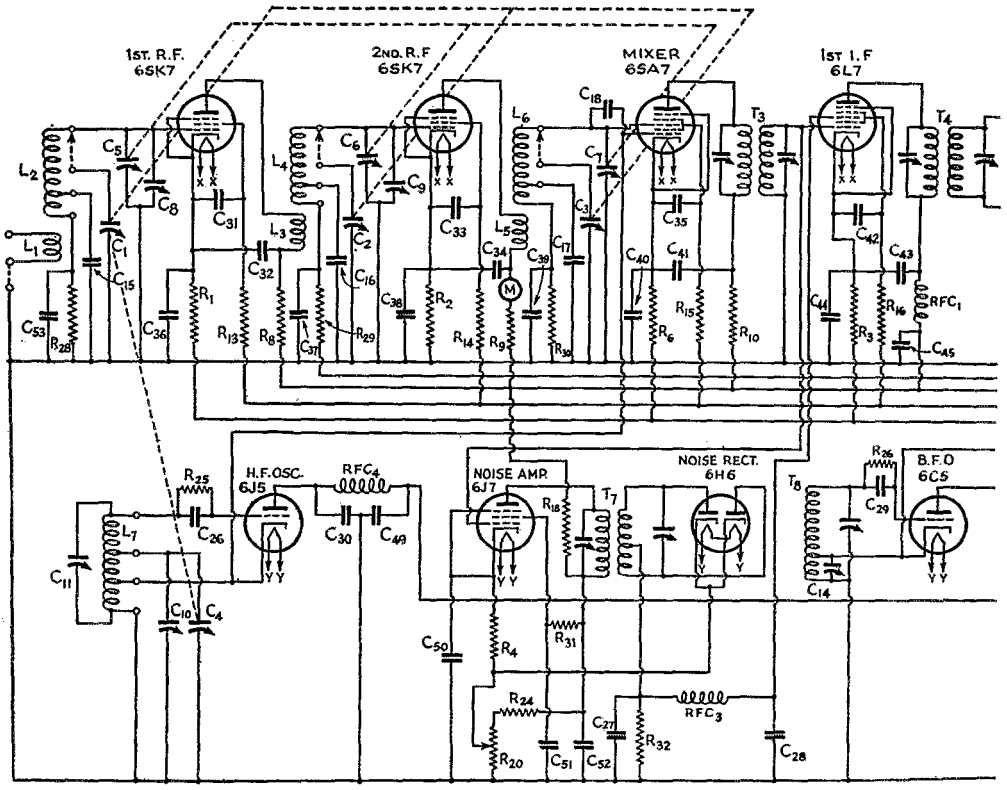


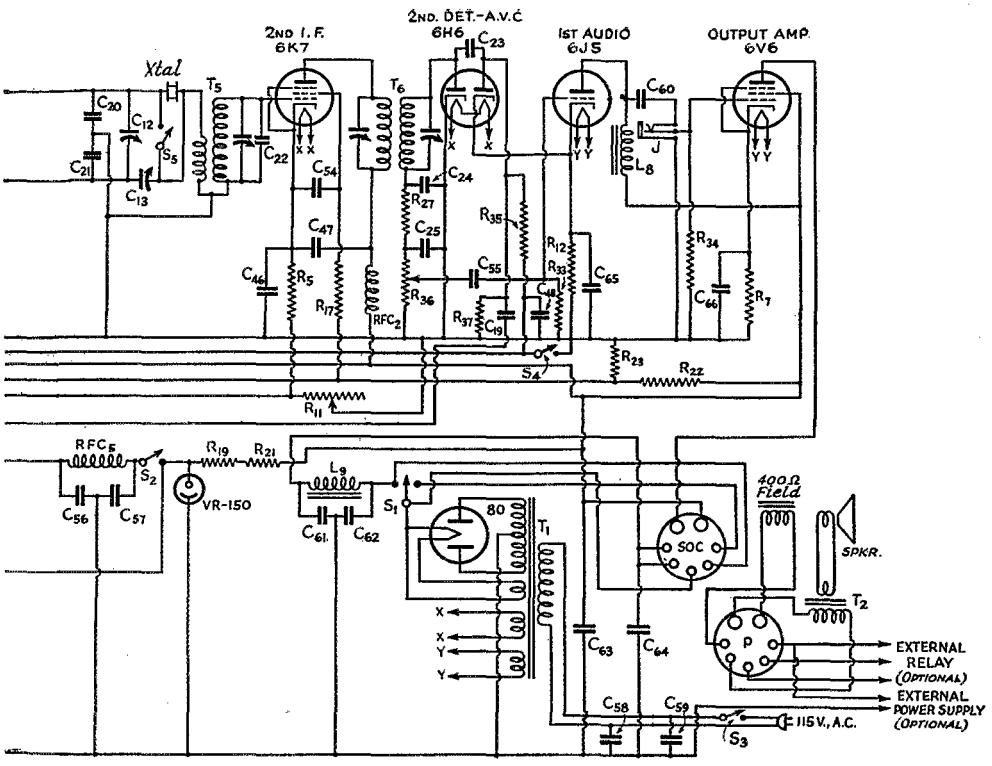
Fig. 1 — Circuit diagram of the ham-band receiver.

C_1, C_2, C_3, C_4 — 50-$\mu\mu$fd. variable (ganged tuning condensers).
C_5, C_6, C_7 — 15-$\mu\mu$fd. variable (ganged r.f. and mixer trimmers).
C_8, C_9 — 15-$\mu\mu$fd. variable (stray-capacity equalizer).
C_{10} — 50-$\mu\mu$fd. variable air padder (see text).
C_{11} — Oscillator padder inside L_7 (see coil table).
C_{12} — 50-$\mu\mu$fd. variable (crystal selectivity control).
C_{13} — 15-$\mu\mu$fd. variable (rejection control).
C_{14} — 140-$\mu\mu$fd. variable (b.o. tuning control).
C_{15}, C_{16}, C_{17} — 25-$\mu\mu$fd. fixed mica padder.
C_{18} — Approximately 1 $\mu\mu$fd. (neutralizing condenser made from twisted insulated leads).
C_{19} — 10-$\mu\mu$fd. mica.
C_{20}, C_{21}, C_{22} — 50-$\mu\mu$fd. mica.
C_{23}, C_{24}, C_{25}, C_{26}, C_{27}, C_{28} — 100-$\mu\mu$fd. mica.
C_{29} — 0.001-μfd. mica.
C_{30}, C_{31}, C_{32}, C_{33}, C_{34} — 0.002-μfd. paper, 600 volts.
C_{35}, C_{36}, C_{37}, C_{38}, C_{39}, C_{40}, C_{41}, C_{42}, C_{43}, C_{44}, C_{45}, C_{46} C_{47}, C_{48}, C_{49}, C_{50}, C_{51} — 0.01-μfd. paper, 600 volts.
C_{52}, C_{53}, C_{54}, C_{55}, C_{56}, C_{57}, C_{58}, C_{59} — 0.1-μfd. paper, 600 volts.
C_{60}, C_{61}, C_{62}, C_{63} — 8-μfd. electrolytic, 450 volts.
C_{64}, C_{65} — 40-μfd. electrolytic, 25 volts.
R_1, R_2, R_3 — 250 ohms, 1 watt.
R_4, R_5 — 400 ohms, 1 watt.
R_6 — 500 ohms, 1 watt.
R_7 — 500 ohms, 10 watts, wire-wound.
R_8, R_9, R_{10} — 1000 ohms, 1 watt.
R_{11} — 1000-ohm r.f. gain control, wire-wound.
R_{12} — 1500 ohms, 1 watt.

7) Signal meter.
8) A.v.c. with cut-out switch on panel.
9) Beat oscillator with cut-out switch and beat-note adjustment on panel.
10) Separate r.f. and audio gain controls.
11) Knob on panel for tuning r.f. trimmers off resonance in severe QRM.
12) Plug-in coils for low losses.
13) Stand-by switch in "B"+ so power supply may be used externally during transmission.
14) External stand-by switch leads so receiver can be cut off by transmitter relays if desired.
15) Headphone jack.
16) Externally mounted speaker.
17) Doublet antenna input connections.
18) Complete shielding, to minimize stray r.f. pick-up.
19) Strong chassis construction.
20) Last but not least, a handwheel big enough for accurate tuning and with a low-enough gear ratio so the knob does not have to be spun a half-dozen times to get across the band.

Circuit Details

The final circuit is shown in Fig. 1. The two r.f. stages are similar except that the first stage is not tied into the a.v.c. circuit. While the first tube runs at maximum gain all the time, a grid resistor inserted in the ground return protects the tube against strong r.f. fields. A.v.c. is applied only to the second r.f. tube and the mixer. This provides sufficient a.v.c. action while it also produces a greater deflection of the signal meter than would be obtained with more stages tied to the



R_{13}, R_{14}, R_{15}, R_{16}, R_{17}, R_{18} — 2000 ohms, 1 watt.
R_{19} — 5000 ohms, 10 watts, wire-wound.
R_{20} — 5000-ohm potentiometer (silencer gain control).
R_{21} — 7000 ohms, 10 watts, wire-wound.
R_{22} — 10,000 ohms, 10 watts, wire-wound.
R_{23} — 15,000 ohms, 10 watts, wire-wound.
R_{24} — 20,000 ohms, 1 watt.
R_{25}, R_{26}, R_{27} — 50,000 ohms, ½ watt.
R_{28}, R_{29}, R_{30}, R_{31}, R_{32} — 100,000 ohms, 1 watt.
R_{33}, R_{34} — 500,000 ohms, ½ watt.
R_{35} — 1 megohm, ½ watt.
R_{36} — 1-megohm audio gain control.
R_{37} — 2 megohms, ½ watt.
L_1, L_2, L_3, L_4, L_5, L_6, L_7 — See coil table.
L_8 — Audio coupling impedance (primary winding of audio transformer).
L_9 — Filter choke (Thordarson T-49C41).
T_1 — Power transformer (Thordarson T-87R85).
T_2 — Speaker output transformer, universal type.
T_3 — 465-kc. air-tuned i.f. transformer.
T_4 — 465-kc. i.f. transformer altered as described in text.
T_5 — 465-kc. b.f.o. unit (see text).
T_6 — 465-kc. diode input transformer.
T_7 — 465-kc. diode input transformer (see text).
T_8 — 465-kc. b.f.o. unit.
RFC_1, RFC_2, RFC_3 — Approximately 11 mh. (replacement 175-kc. i.f. coil).
RFC_4, RFC_5 — 2.5-mh. r.f. choke.
S_1 — S.p.d.t. switch.
S_2, S_3, S_4 — S.p.s.t. switch.
S_5 — Crystal-filter switch (see text).
J — Double-circuit jack.
SOC — 7-prong socket on rear of chassis.
P — 7-prong plug for speaker cable and external leads.
M — Signal-strength meter (7-ma. movement).

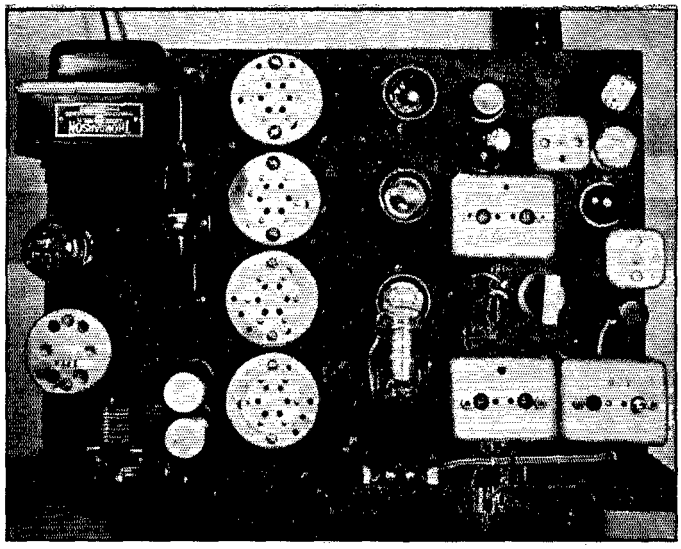
a.v.c. line. The manual r. f. gain control, R_{11}, controls all stages except the second r.f. stage. Since the only available meter for the signal indicator had a 7-ma. movement, it was placed in the plate lead of the second r.f. stage where it performs in a very satisfactory manner.

The 6SA7 proved better than a number of other types tried in the mixer position. It operates well with low injector-grid voltage from the oscillator and provides good gain. The small condenser, C_{18}, is a very necessary item. It is used to neutralize the space-charge coupling between the No. 1 grid and the signal grid.

The 6J5 h.f. oscillator and the Hartley circuit were selected after several other combinations had been tried. Although the cathode is operated above ground for r.f., no hum modulation was encountered after one filament lead was grounded at the socket. It was found important to have the plate of the oscillator by-passed to ground and isolated from the plate-supply line. C_{30}, RFC_4 and C_{49} take care of this requirement.

Tuning System

The four-section ganged tuning condenser consists of C_1, C_2, C_3 and C_4. For general coverage the tuning condensers in the r.f. and mixer stages are connected across the entire coil. C_5, C_6 and C_7 are air trimmers ganged to one of the small controls along the lower part of the panel. Since the stray capacities in the mixer stage are slightly higher than in the r.f. stages, C_8 and C_9 were added to permit compensation. Two sets of coils are required to cover the frequencies between one



Plan view of W4CBD's ham-band superhet receiver. To the left, from front to rear are the "S" meter, filter condensers, b.f. tube and tank circuit (T_8), filter choke, rectifier tube and power transformer. The line of empty sockets are for the plug-in coils of the first and second r.f. stages, the mixer and the h.f. oscillator in order from front to rear. The parallel line of corresponding tubes is to the right. The h.f. oscillator tube is hidden by the VR tube mounted on the panel. The two shielded transformers to the right near the panel are the crystal-filter input and output transformers, T_4 and T_5. In line in back of T_4 are the 6L7, the first i.f. transformer, T_3, the 6J7 and the 6H6 noise rectifier. Along the right-hand edge of the chassis, from front to back, are the 6K7, the diode coupling transformer, T_6, the 6H6 second detector and the two audio tubes. Between the two lines are the crystal and noise-silencer transformer, T_7.

amateur band and the next. This means quite a few coils, but it provides a good degree of bandspread for even the general-coverage ranges.

When bandspread tuning is desired, the main tuning condensers are tapped down on the coils of the r.f. and mixer stages by a switching system in the bottom of the coil form, as shown in the detail photograph and the sketch of Fig. 2. This connection would cause considerable non-linearity in calibration, with crowding at one end of the scale, were it not for the padder condensers C_{15}, C_{16}, C_{17}, and C_{10}. C_{10} is an air-insulated condenser which is mounted inside the oscillator shield compartment. After it is set initially to about 25 $\mu\mu$fd., no further adjustment is required. The other condensers are mica units, especially selected for equal capacities.

I.F. Amplifier and Noise Silencer

The mixer output transformer feeds the grids of the first i.f. stage and the 6J7 noise-amplifier stage in parallel while the crystal filter is coupled to the output of the 6L7. This portion of the circuit, comprising the crystal filter and noise silencer, follows very closely Jim Lamb's original recommendations in *QST* and the ARRL *Handbook*. The 6J7 amplifies the noise and the 6H6 rectifies the noise and applies the d.c. impulse to the injector grid of the 6L7, cutting it off for the duration of the noise impulse. R_{20} provides the threshold adjustment.

As Lamb has pointed out, the noise silencer must work at a high level. The two r.f. stages serve the very useful purpose of getting the signal strength up before it is applied to the silencer circuits. A little more gain would not hurt in this part of the circuit, and the 6J7 might be replaced by an 1852 with better results.

Since the crystal filter follows the noise silencer, it is protected against noise transients which cause ringing. The absence of such trouble is quite noticeable in the operation of this receiver at high-selectivity settings, especially to one accustomed to a conventional crystal filter.

The 6H6 second detector is connected so that one section handles the audio signal while the other section supplies a.v.c. voltage. In this arrangement a bias of several volts is placed on the a.v.c. side, since the cathode of the 6H6 is returned to the 6J5 first audio cathode rather than to ground. Because the 6J5 cathode is above ground for d.c., no a.v.c. action is obtained until the signal level exceeds the bias. Thus a.v.c. action causes no reduction in sensitivity for weak signals. The delayed a.v.c. effect can be further manipulated by adjustment of the r.f. and audio gain controls.

The beat-oscillator circuit is similar to that used in the h.f. oscillator. It is operated at a fairly low level and the output to the diode detector is taken from the cathode. Thorough shielding of the lead to the 6H6 is important, since it is about 24 inches long. The tuning condenser, C_{14}, is connected from cathode to ground to keep the r.f. voltage across it low and thus minimize pick-up in neighboring r.f. circuits. This connection makes it necessary to use the unusually large capacity of 140 $\mu\mu$fd. to cover the desired frequency range. The amount of oscillator voltage fed into the detector is low enough so that good limiting of volume on c.w. signals is obtained, and the hiss level is low.

Audio System

Many manufactured sets have push-pull audio output stages which develop considerable power, although a fraction of a watt is plenty for good room volume on speech and c.w. The manufacturers build plenty of power capability into their receivers because we hams often erroneously judge a set on a dealer's shelf by the amount of noise coming from the speaker. Perhaps we think that, if a set will make the noise loud, it will probably make a weak signal loud.

Anyway, this practice was not followed in this receiver, because a lot of audio power is not needed in a ham station or in any place where the person listening is located near the speaker. In fact, it is desirable to have some sort of automatic limiting in the audio section to prevent occasional blasting which will drive the neighbors crazy without adding to the intelligibility of the signal. In this set a single output tube is used, and the output transformer feeding the 6-inch speaker is connected to furnish a higher than normal load resistance for the 6V6 plate circuit. Plenty of volume for ordinary use is available.

Power Supply

A 7-prong socket is placed at the rear of the chassis so that a plug may be inserted in it to provide leads to the speaker and to external controls. When the stand-by switch, S_1, is in the "off" position, the d.c. power is thrown to one of the socket leads and the receiver plate supply can be used to operate a small transmitter, crystal oscillator, or what have you. It will be necessary to provide a suitable external filter, however, since the "B"+ lead is broken ahead of the filter. This power could be used to operate a battery of d.c. relays to turn on the transmitter directly from the receiver panel. Conversely, external d.c. plate voltage can be supplied to the receiver through the leads on this socket, or an external control relay can be used to turn the receiver on and off.

The a.c. power lines are by-passed where they enter the chassis. The VR-150-30 stabilizes the plate voltage for both oscillators sufficiently so that no variation in beat note occurs with ordinary line-voltage changes.

Mechanical Details

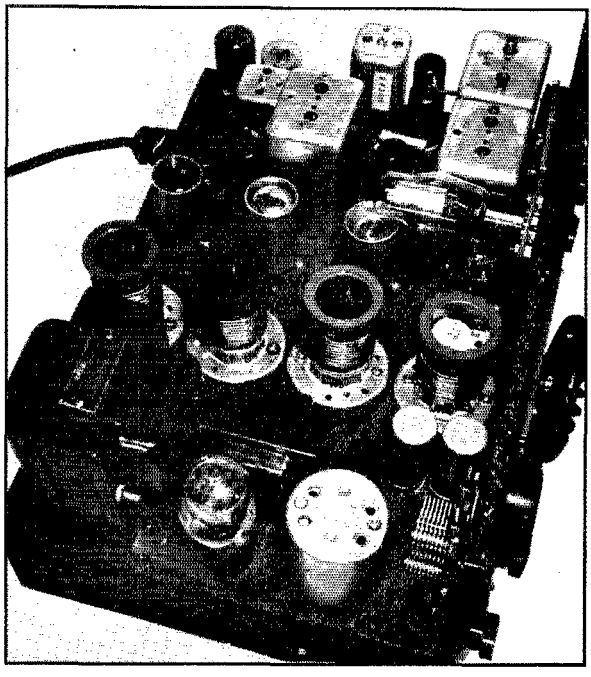
Almost anyone can wire up a batch of parts according to a circuit diagram and produce something that will work electrically, but it takes a good craftsman to construct a mechanical job that won't fall apart. Not being a sheet metal expert, I located a willing ham who worked in a gadget factory and let him do the dirty work after laying out the chassis and panel.

The chassis was formed from 0.050-inch sheet steel. Reinforcing braces were spot welded in the corners and L-shaped strips were added along the bottom edges of the chassis for reinforcement and to form a shelf to which the bottom cover could be attached with sheet-metal screws. The cover plate was equipped with rubber mounting feet, one at each corner. The panel was formed from 0.062-inch sheet steel. A ½-inch edge with a slight radial bend was formed along the top. All holes were drilled first, and later everything was given a thick coat of baked-on crackle enamel.

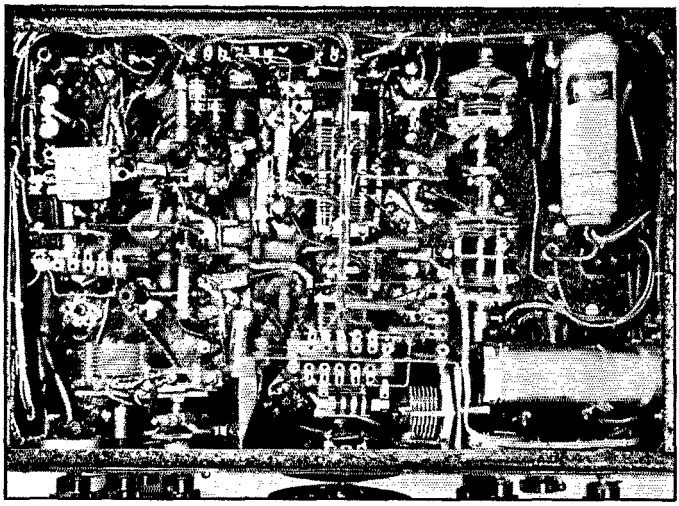
The sides, back and cover are made of aluminum. Unlike the other parts, they were cut with tin shears and formed by hand in a vise. Their chief purpose is to assist in shielding the r.f. components, but they also add bracing between the panel and chassis. With the bottom cover fastened in place, the assembly is very rigid. It does not bend when picked up by one corner and the sides do not give under thumb pressure. When a stable signal is tuned in, it stays on the nose until the dial is turned. These considerations are very important in a receiver with high selectivity.

The shielding is good enough so that little but tube noise comes through with no antenna connected, even with both gain controls wide open. When the beat oscillator is turned on some of its harmonics can be located, but they are very weak. An additional shield on the beat-note adjusting condenser would probably eliminate this pick-up, but its use is hardly worth bothering about.

The tuning control, built around an old National Velvet Vernier dial, is similar to the newer ACN model except that it is larger. The ACN would probably have been used had it been available at the time. The handwheel is a 4-inch valve-control knob; it won out over several other types which were tried on the set after it was completed. While it does not look much like a radio knob, it operates with gratifying ease. Many radio manufacturers seem to think that operators like to grasp a tiny knob between two fingers and gently twist it, debutante-like. Watch an operator sometime — yourself, for instance — and you will see that he tries to roll the knob like a ball on



Top view of the ham-band superhet with coils in place but with the coil shields removed. The h.f. oscillator tube is below the VR-150-30 tube, which is mounted horizontally on the panel.



Bottom view of the twelve-tube superheterodyne. The four-gang tuning-condenser is at the center. The ganged trimmers, C_5, C_6 and C_7, are at the right, while the crystal-filter selectivity control, C_{12}, and phasing condenser, C_{13}, are near the front at the left. C_8 and C_9 are fastened to C_5 and C_6, respectively. A separate shielded compartment at the center contains the h.f. oscillator components, with C_{10} at the right. By-pass condensers are placed close to the points to be by-passed and other small parts are placed in the nearest available space.

the inside of the right hand. The valve wheel is about the shape of an open hand and it just fits inside the four fingers; it is not for those who would steer a ship with a doughnut.

The general lay-out plan of the receiver is shown quite clearly in the photographs. The main essential is, of course, the close grouping of components in the high-frequency stages. All parts, especially those forming the various tuned circuits, should be mounted with good mechanical anchoring to prevent any slight movement which might cause a noticeable change in frequency.

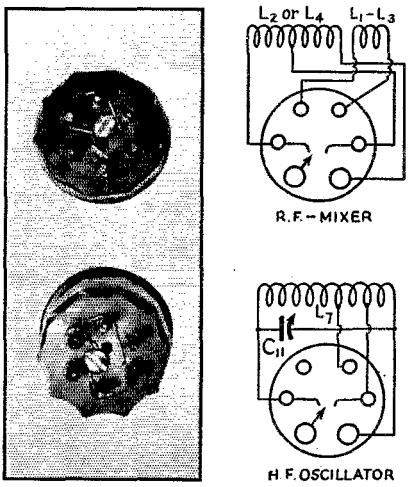


Fig. 2 — Pin connections for the r.f. and h.f.o. plug-in coils.

The bottom views of the coil forms in the photograph show the bandspread switching arrangement. The screw head completes the connection between either pair of pins, depending upon its position.

Care should be exercised in lining up the units of the ganged condensers so that they will not spring when the shaft is turned. All r.f. wiring should be made as short as possible and kept well spaced from the chassis. Power wiring may be cabled and laid flat against the chassis wherever it is convenient to do so.

Coils

Although the coil table includes data for the 28- and 1.7-Mc. coils, the figures shown for these bands are only calculated and the coils have not yet been wound. Likewise, the calibration shown on the dial for these ranges was estimated. The data for the other coils, especially those requiring bandspread taps, were determined by calculation and checked by

(*Continued on page 90*)

COIL TABLE

Band	*Coil*	*Turns*	*Wire Size*	*Cathode Tap*	*B.S. Tap*
1.7–2.4 Mc.	L_2, L_4, L_6	60	26 d.c.c.	x	x
	L_1, L_3, L_5	8	28 enam.	x	x
	L_7	51	26 d.c.c.	6	47
2.7–4 Mc. or 3.5–4 Mc.	L_2, L_4, L_6	42	22 d.c.c.	x	24
	L_1, L_3, L_5	8	28 enam.	x	x
	L_7	37	22 d.c.c.	5	20
3.4–4.8 Mc.	L_2, L_4, L_6	30	22 d.c.c.	x	x
	L_1, L_3, L_5	4	22 d.c.c.	x	x
	L_7	25	22 d.c.c.	4	x
4.8–7.2 Mc. or 7.0–7.3 Mc.	L_2, L_4, L_6	19	22 d.c.c.	x	6¾
	L_1, L_3, L_5	4	22 d.c.c.	x	x
	L_7	15	22 d.c.c.	3	5¾
7.0–10 Mc.	L_2, L_4, L_6	14	22 d.c.c.	x	x
	L_1, L_3, L_5	4	22 d.c.c.	x	x
	L_7	12½	22 d.c.c.	3	x
10–14.2 Mc. or 14.0–14.4 Mc.	L_2, L_4, L_6	10½	16 bare	x	4
	L_1, L_3, L_5	4	22 d.c.c.	x	x
	L_7	9¾	16 bare	2¾	3
22–30 Mc.	L_2, L_4, L_6	5	16 bare	x	x
	L_1, L_3, L_5	4	22 d.c.c.	x	x
	L_7	4½	16 bare	2	x

NOTE: All coils are close-wound on 1¼-inch diameter forms except L_2, L_4, L_6 and L_7 for the 10- to 14.2-Mc. range, where the turns are spaced the diameter of the wire, and the same coils for the 22- to 30-Mc. range, where the turns are spaced to make the coil length 1¼ inches. Taps are made the specified number of turns from the bottom or ground ends of the windings.

HAPPENINGS OF THE MONTH

EX-A.S.T.P. INSTRUCTORS

IT IS now no news that the Army Specialized Training Program, at many colleges and universities, is being sharply curtailed. It is believed that many instructors and professors engaged in this program will be affected. Their services are needed at once in other portions of the war effort, both in instruction work and in development. If qualified persons who find themselves available will communicate with George W. Bailey, special assistant to the director of the Office of Scientific Research & Development, at 1530 P Street, N. W., Washington 25, D. C., it is probable that interesting information can be put at their disposal.

PHYSICISTS & ENGINEERS NEEDED

THE League's president, George W. Bailey, who is serving during the war as assistant to the director of the Office of Scientific Research & Development, 1530 P St., N. W., Washington 25, advises us that a need still exists for engineers and physicists capable of participating in the research and development programs which are producing new technological tools for our armed forces. The search is particularly on for higher-qualified men in the upper brackets of their profession who possess the ability to take charge of important portions of this work and direct a staff.

Although we are now well into the war, many problems remain unsolved, new ones constantly arise, and there is ample opportunity for the full play of the talent of the best American minds. Qualified persons interested in exploring the possibilities of this matter are invited to engage in confidential correspondence with Mr. Bailey at the above address.

F.C.C. NOTES

IT'S NOW the Honorable Ewell K. Jett. While our last issue was on the presses Mr. Jett's nomination to be an FCCommissioner was confirmed by the Senate, and he was sworn in on February 15th.

George P. Adair, ex-W5AMT, has been promoted from assistant chief engineer in charge of broadcasting to become FCC's new chief engineer. He has been in radio for twenty years, starting as an amateur while in high school. Graduating from Texas A & M College in communications engineering, he spent several years with General Electric before joining FCC's broadcasting division in 1931.

Philip F. Siling, who also has some ham blood in his veins dating back to his Yale days, has become assistant chief engineer in charge of broadcasting, being transferred in from the position of chief of the FCC engineering department's International Division. He first joined the FCC staff in 1935 as a telephone engineer, in 1937 was made assistant chief of the international division, and became its head in 1941. He has also been serving both as secretary of IRAC and as FCC's alternate thereon, and similarly as chairman of FCC's committee studying postwar allocations, and these duties he will retain in his new position.

Marion H. Woodward is the new chief of the international division. An EE from Virginia Polytechnic Institute, his chief experience in communications has been in the cable field, with both Western Union and Postal, before joining FCC as senior telegraph engineer in the common-carrier engineering division in 1935. He has served for some years as assistant chief of the division which he now heads. He was a technical adviser to the American delegation at Cairo in 1938.

Coincident with these changes, FCC made public a letter of highest commendation to George E. Sterling, W3DF, assistant chief engineer in charge of the Radio Intelligence Division, and, incidentally, the author of Sterling's *Radio Manual*. The letter stated the Commission's desire "to thank you for the splendid services which you have rendered in a highly responsible and most difficult task," and said that he had shown "greatest skill and greatest interest" in the building up and directing of his division during this war, with tremendous benefits to the country. RID, in addition to operating seven permanent and comprehensive monitoring stations, is the organization that has established and operated the innumerable little four-man stations all over the country that have done such a Sterling job in defense work. One reason for that good work, we know, is that a heavy percentage of its personnel is amateur.

SEGAL TO PACIFIC

LT. COMDR. PAUL M. SEGAL, ex-W9EEI-W3EEI, ARRL general counsel, has been transferred at his own request from legal duty in the office of Director of Naval Communications to communications duty in the Pacific theater. On active duty the past two years, Commander Segal was classified Legal Volunteer (Specialist) and had been assigned to the Special Projects Section in ODNC. Yearning for more active duty, he polished up his radio engineering and was transferred to C-V (S).

A leading radio attorney of Washington and an expert in both amateur and broadcasting law matters, Commander Segal is on leave from the law firm of which he is the senior member, Segal, Smith & Hennessey. During his absence from Washington his general counsel duties in ARRL will be handled by one of his associates.

AMATEUR WAR SERVICE RECORD

HAVE you sent in to ARRL Headquarters the record of your wartime radio service? The League is endeavoring to compile a card record of the wartime service of every licensed amateur of the United States and Canada who is engaged in communications or any other application of radio technique. We need the data for the defense of the amateur position. We want your record whether you're in uniform, in the Civil Service or other essential government service, or in radio industry wholly devoted to the war effort. We hope you'll feel it a duty to register the simple information we need for this purpose, both on yourself and on your ham friends on whom you have reliable information. It is only necessary to use the convenient blank printed on this page or to reproduce its essentials on a post card. Thanks!

V.W.O.A.'S NINETEENTH

THE Veteran Wireless Operators Association held its nineteenth annual "dinner-cruise" at the Hotel Astor in New York on February 12th, saluting this year the United Nations. As always at these affairs, a large and brilliant assembly of prominent names in radio was present, including consular representatives of many of the United Nations and representatives of the armed forces of our own country.

Pursuing the VWOA tradition of bestowing recognitions for special radio accomplishments, numerous awards were made under the chairmanship of its president, William J. McGonigle, W2ASN. A special commemorative medal was presented to General Henry H. Arnold, commanding general of the Army Air Forces, for his pioneering work with radio in aviation. A Marconi Memorial Medal of Service was presented to R. Morris Pierce, chief engineer of WGAR on leave to serve as a civilian engineer in the Psychological Warfare division of the Office of War Information overseas, for special wartime accomplishments. Honorary membership was tendered to Major General Harry C. Ingles, chief signal officer of the Army; Rear Admiral Joseph R. Redman, director of naval communications; Rear Admiral Joseph F. Farley, assistant chief operations officer of the Coast Guard; General Thomas Holcomb, retired commandant of the Marine Corps now on special duty; Paul Galvin, president of RMA; Bryan S. Davis, publisher of *Communications;* and Mark Woods, president of the Blue Network. Medals of Achievement honored four former professional wireless operators who have attained the presidency of radio organizations which have been awarded the Army-Navy "E" pennant: Ludwig Arnson, Radio Receptor Company; William J. Halligan, The Hallicrafters; Ted R. McElroy, McElroy Manufacturing Corp.; and E. A. Nicholas, Farnsworth Television & Radio Corp.

ARRL President George Bailey has been special Washington representative for VWOA for several years, and this year enjoys appointment as "Assistant to the President, VWOA."

"A WORD IN BEHALF OF THE RADIO AMATEUR"

IN HIS Sunday column, "One Thing and Another," on the radio page of the New York *Times*, Jack Gould recently talked about amateur radio under the above heading. We think all our readers will be interested in his sympathetic remarks:

> In the columns of *QST*, the organ of the American Radio Relay League, there currently is being conducted a discussion of the postwar lot of the amateur radio operator, popularly known as "the ham." Underlying the majority of communications is concern as to just how the amateur will make out when peace comes and the anticipated boom in all phases of radio bursts on the American scene.
>
> The fact that many amateurs feel it necessary to prepare to fight for their future is in itself little short of disgraceful. If the nation ever owed a debt to any group of "hobbyists," it owes it to the radio amateur. In peace it was the ham who was always on the job whenever disaster struck a community, generally affording the only means of communication when flood or wind wiped out normal facilities. With war the country had a ready-made band of specialists in radio, an incalculable contribution in a conflict where communications are of such prime importance.

AMATEUR WAR SERVICE RECORD

_____
Name

Call, present or ex; or grade of op-license only

_____
Present mailing address

SERVICE

☐ Army
☐ Navy
☐ Coast Guard
☐ Marine Corps
☐ Maritime Service
☐ Merchant Marine
☐ Civil Service
☐ Radio industry, 100% war

_____
Rank or rating

_____
Branch or bureau: Signal Corps, AAF, Bushps, WAVES, etc. If civilian industry, give title and company.

ARE YOU LICENSED?

When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

The ham also could teach the statesman a thing or two. Before the war forced them off the air the amateurs talked regularly with unseen friends around the world. More than one English amateur was practically a member of the family in some Midwestern operator's home. Global understanding was not something you made speeches about; it was just a normal, everyday occurrence and the unsung hams have been making it work for years.

Technically, radio as we know it today probably would have been some years in coming had it not been for the ham. It was the amateur who opened up the short waves on a large scale and in more recent years kept many a manufacturer on his toes. Much of the equipment of the Army and Navy today is basically nothing but "ham stuff."

A Little Room, Please

What, then, worries the ham today? It is the omnipresent question of having a little room on the air in which to work. Not only is the potential number of amateurs expected to be increased by those introduced to radio in the services, but there is going to be a tremendous demand for frequencies. Already the partisans of FM and the adherents of television are quarreling politely about how much space they're going to need. Aviation, international short wave, military radio and other Government operations will add to the congestion.

Fortunately, James L. Fly, the FCC chairman, who may be expected to know his way around in the impending battle for frequencies, and influential persons in the Army and Navy are aware of the amateur's contribution. But in years past, under the pressure of formidable commercial interests, the amateur has had to fight valiantly for his rights and it is by no means encouraging that with all the powwow over post-war radio the amateur has been practically ignored. The American ham is too important an asset for that sort of thing.

★ BOOK REVIEWS ★

Electron-Optics, by Paul Hatschek. Published by American Photographic Publishing Co., Boston. 161 pages, 6 × 9. February, 1944. Price, $3.00.

This is a textbook on the fundamentals of electronics, written in plain language and without mathematics. It was first published in Germany in 1937. Arthur Palme has made an excellent translation of the original work, and has added a chapter which outlines recent developments in this rapidly progressing science.

The book is of particular interest to the amateur who desires a foundation for the study of the principles of television and other applications of cathode-ray tubes. The chapters on the nature of a light beam and the optics of image formation should be very helpful to experimenters with light-beam communication. The electron microscope is treated in the final chapter.

The author employs a happy faculty for easing the reader into understanding of a new subject by means of associations with familiar knowledge and the use of apt illustration. He writes clearly and concisely, and shows marked ability in selection of the most essential matter in a wide field of knowledge. A reading of this book will furnish a broad groundwork for an understanding of the new developments which are continually appearing in the science of electronics.

—*H. M. F.*

IRE Winter Meeting

THE Winter Technical meeting of the Institute of Radio Engineers, held January 28th and 29th, at the Hotel Commodore in New York City, was devoted to the discussion of domestic and international aspects of present and postwar radio and electronic engineering problems.

The work of the Radio Technical Planning Board, in which the ARRL is represented as a member society, was presented by RTPB Chairman W. R. G. Baker and thirteen panel chairmen. The dominant note was the necessity for compromise of the many and conflicting claims by interests seeking postwar frequency allocations.

E. K. Jett, then FCC chief engineer (see p. 19), presented the engineering work of the FCC, assisted by George P. Adair, William N. Krebs and Philip F. Siling of the Commission's Engineering Department.

During the technical sessions as well as in the floor exhibits, considerable attention was given to the joint Army-Navy tube standardization program and the proposals of the American Standards Association. The papers presented by A. B. Bronwell on "Transmission-Line Analogies of Plane Electromagnetic Waves" and J. R. Whinnery and Simon Ramo on "A New Approach to the Solution of High-Frequency Field Problems" were of particular interest to the advanced amateur, in the light of probable future concentration of amateur attention in the field of guided-wave propagation.

"Peace, War, and Future Application of Radio in China" was the subject of an interesting paper given before the closing session by T. M. Liang of the Chinese Supply Mission. In the course of his discussion Mr. Liang observed that the designs and data for the construction and installation of China's first national radio system of 34 stations were largely drawn from information published in *QST*. The system was immediately successful and supplanted in many cases the earlier national landline telegraph system.

Prof. Hubert M. Turner of Yale University was installed as president of the Institute for 1944 by Dr. Lynde P. Wheeler of the FCC, retiring president.

—*H. M. F.*

***RADIO NEWS* SIGNAL CORPS ISSUE**

THE February, 1944, issue of *Radio News* was the annual special U. S. Army Signal Corps issue of that publication. The activities and accomplishments of the Signal Corps are featured in 452 crowded pages filled with photographs (many in beautifully handled four-color reproductions) and articles from official sources.

So comprehensive is the coverage of Signal Corps operations and non-restricted radio and wire equipment that the issue is more like a handbook than a magazine — and, we understand, is in fact so being used by many both in industry and in the service.

A Portable Light-Beam Transmitter-Receiver

A Complete Battery-Operated Light Source and Phototube Amplifier for Field Use

BY HOLLIS M. FRENCH,* WIJLK

Light-beam communication need not be confined to locations where a.c. power supply is available. Some of the pleasure of portable field operation which has made the spring and summer months attractive to v.h.f. operators can be sustained for the duration by a compact battery-operated light-beam receiver and transmitter. Such a unit may also be used in WERS networks for short-haul transmissions when licensed radio operators and v.h.f. transmitters cannot be secured in sufficient numbers.

OF ALL the unrest stirred by Spring in an OM's fancy, nothing can compare with the yearning of a v.h.f. addict as he looks unto the hills from whence he was wont to work DX. It is no satisfaction for him merely to climb a hill for the exercise. To him the mountain tops are altars sacred to the beacon fires of communication.

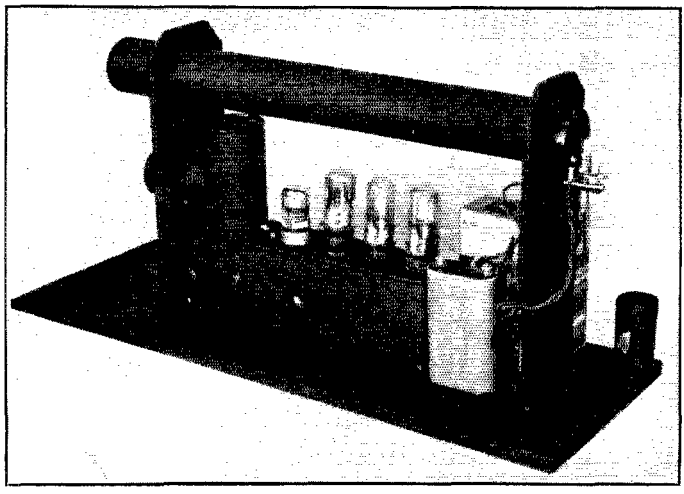
Speaking of beacon fires, why not try light-beam communication between some of those hilltops this spring? Looking back through "Quist" for usable dope, one finds plenty — thanks to W6PCB and W6TOY for their contribution to the May, 1942, issue of *QST*, and to W1ANA for his report in the Experimenter's Section in the same issue and for his discussion of optical fundamentals in the June, 1942, issue. The article by W1BDV in *QST* for January of the current year supplied further helpful ideas.

* Assistant Technical Editor, *QST*.

The portable light-beam rig to be described owes something to each of these sources. It is offered especially for the roving, hill-climbing experimenter who will be packing 56- and 112-Mc. gear once more when peace returns.

In addition, such equipment offers a practical solution to a problem often met in WERS installations. Report centers in the civilian defense system are seldom located with a view to providing ideal conditions for v.h.f. communications. Frequently the control station must be located in a building where it is difficult or impossible to erect a v.h.f. antenna at a height sufficient to insure good reception of low-powered mobile transmitters from some locations. Often there is a much better receiving location within sight of the control station, yet control must be maintained from the designated report center. If an auxiliary operator is stationed at the better receiving location to receive and relay weak signals to the report center by radio, he must be one of the licensed personnel of the WERS staff. Many stations are insufficiently staffed with qualified operators. The use of a light-beam transmitter permits the employment of an operator before he has received his WERS operator's permit, and it does away with the necessity for another v.h.f. transmitter being tied up for the short transmission path. In areas where many transmitters must operate in relatively close quarters, the QRM problem will be reduced by any practicable resort to another medium than r.f.

The light-beam rig to be described is compact and portable. Including batteries, key, head-



The portable light-beam transmitter-receiver completely assembled except for the eyepiece, which has been removed to show its construction and the arrangement of the lamp mounting. The long telescope barrel with its objective lens, the lamp mounting section and the eyepiece together constitute the beam head. The phototube pick-up, the amplifier-modulator chassis, and the battery power supply are underneath the beam head. Controls appearing on the chassis are, left to right, the voltage regulator control for the phototube, the microphone jack, the volume control for the amplifier, and the headphone jack. The 1LN5 screen-voltage control is on the chassis top to the right of the tube, which normally is covered with a shield. The 930 phototube is inside the "magic-lantern" shield can.

phones and microphone, the total weight is 13½ pounds. Provision is made for two systems of light-beam communication — a simple blinker system for visual reception, and a voice-modulated system for audible reception. When the blinker system is used its transmitting range is governed only by conditions affecting the line of sight, and may be up to 10 or 12 miles. For shorter distances, ranging up to one-half mile or so, voice modulation of the light beam may be used.

The entire receiving and transmitting unit, exclusive of batteries and accessories, can be constructed for less than twelve dollars.

A light-beam projector, a phototube pick-up unit, and a high gain amplifier-modulator all are mounted on a single baseboard. The phototube pick-up and amplifier are required only when the unit is used for transmitting or receiving modulated light beams. They occupy a single narrow chassis which has a shielded phototube housing and a lens barrel at the front end and looks like an old-fashioned magic-lantern lamp house, as seen in the photographs.

Directly over the pick-up and amplifier unit, the equipment used for projecting the light beam is mounted. This consists essentially of a small, bright light source mounted inside a telescope in such a way that the image of the light source may be focused upon a distant target.

In the simple type of telescope suited to this use, only two lenses are required. One of these lenses, called the objective lens, is of about 20 inches focal length and is mounted at the front end of a long piece of tubing. The other lens, called the eyepiece lens, is of very short focal length — ½-inch or ¾-inch — and is mounted in the outer end of a short piece of tubing. The eyepiece lens tube slides within another short piece of tubing in which the light source is supported by means of an adjustable mounting, and this mounting tube in turn slides within the open end of the long tube in which the objective lens is mounted. The entire assembly is referred to as the "beam head." It is used for visual reception of blinker signals by the telescope method as well as for projecting a signal beam. Blinker signals may, of course, be received by the unaided eye.

The circuit of the beam head is so simple that no diagram should be required. For blinker communication the filament of a Type 48 low-drain 2-volt dial lamp is wired in series with a dry cell and a telegraph key. When the beam head is used for transmitting a voice-modulated signal, a switch in the pick-up–amplifier circuit substitutes the amplifier output for the key and at the same time substitutes a crystal microphone for the phototube in the amplifier input circut. In this hook-up, audio current from the amplifier output is impressed upon the direct current flowing through the lamp filament. In some manner which has not as yet been satisfactorily explained, this results in modulation of the light emission from the lamp.

Circuit of the Pick-Up–Amplifier

The pick-up–amplifier circuit is shown in Fig. 1. An incoming light beam is focused upon the cathode of a phototube by means of a lens of about 4 inches focal length. A 930 tube was used in this circuit, although any one of several other types, such as the 923, may be substituted. A positive potential, not exceeding 90 volts, is applied to the anode of the phototube (pin No. 4 on the octal socket). The anode voltage is varied with a potentiometer, R_1.

Electron flow from the cathode to the anode varies with the amount and color of the light falling upon the cathode. Any rapid variations in this current flow are amplified by the succeeding stages, the first of which, designed for high gain, is built about a 1LN5 tube. Although it is not shown in the diagram, a paper condenser having a value of 0.01 μfd. is used to by-pass the screen of the 1LN5.

Two resistance-coupled voltage amplifier stages employing 1G4G tubes follow the 1LN5. These are operated without grid bias. The power stage uses a 1Q4G. Although an attempt was made to dispense with bias for this stage also (and none is indicated in the diagram, nor is it needed when using the amplifier for receiving purposes), a

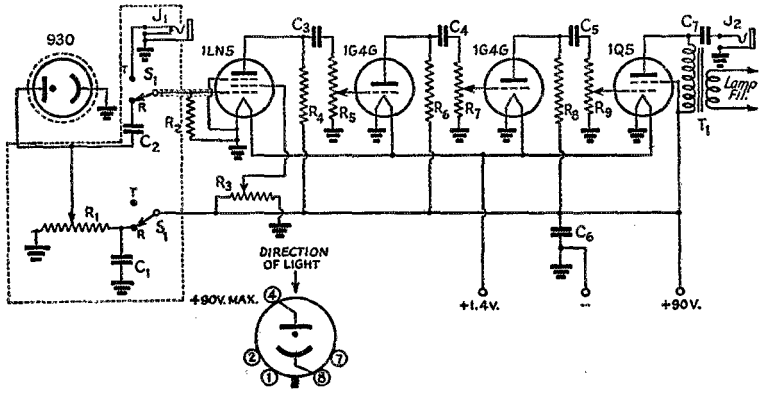
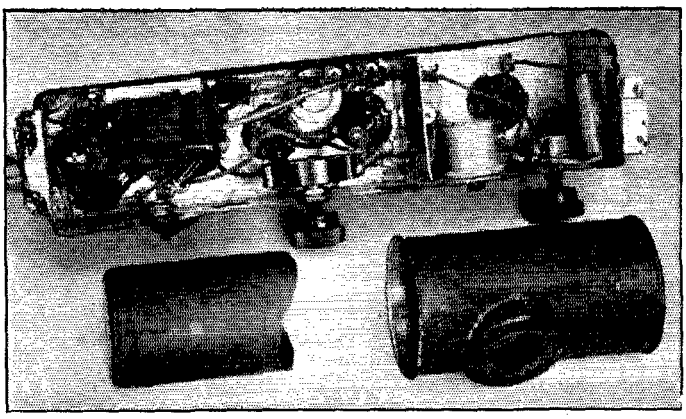


Fig. 1 — Circuit diagram of the light pick-up and amplifier-modulator unit.

C_1 — 2-μfd. paper.
C_2, C_5, C_7 — 0.01-μfd. paper.
C_3 — 0.002-μfd. mica or paper.
C_4 — 0.006-μfd. mica or paper.
C_6 — 1-μfd. paper.
C_8 — 0.01-μfd. paper (screen by-pass for 1LN5, omitted in drawing).
R_1 — 3-megohm potentiometer.
R_2 — 2 megohms, ½-watt.
R_3 — 500,000-ohm potentiometer.
R_4 — 250,000 ohms, ½-watt.
R_5 — 500,000-ohm potentiometer
R_6 — 250,000 ohms, ½-watt.
R_7 — 100,000 ohms, ½-watt.
R_8 — 250,000 ohms, ½-watt.
R_9 — 100,000 ohms, ½-watt.
S_1 — D.p.d.t. wafer switch.
J_1 — Closed-circuit jack.
J_2 — Open-circuit jack.
T_1 — Output transformer.



An under-chassis view of the pick-up–amplifier, showing the wiring and arrangement of parts. The phototube input section is at the right, separated from the amplifier components by a baffle shield. In use, a bottom shield plate covers the chassis. The lens barrel and shield can for the phototube are below.

higher percentage of modulation can be secured for the beam head by applying a negative bias of 4½ volts to the grid of the 1Q5G.

The plate supply required for all tubes is 90 volts and, since the over-all current drain does not exceed 25 ma., small "B" batteries may be employed with reasonable economy. The total filament drain is 250 Ma., which may be supplied by a No. 6 dry cell or even by one of the smaller 1.4-volt cells.

A d.p.d.t. switch, S_1, is provided for shifting the amplifier input from the phototube to the crystal microphone when voice modulation is required for the beam head.

Construction of the Pick-Up–Amplifier

The shield can of the "catacomb" from an old Radiola AR-812 portable superheterodyne was used as the chassis for the pick-up–amplifier. Its dimensions are 10 ½ × 2½ × 3 inches. The input section is shielded from the amplifier section below the chassis by a 2½-inch square baffle plate. The microphone jack is further shielded by mounting it within an aluminum cap from a prewar shaving soap container. Grounded shield braid is placed around the lead from the input switch to the 1LN5 control grid, passing through the baffle plate.

As the phototube requires both a light shield and an electrostatic shield, it is covered by a can 2½ inches in diameter and 4 inches high, with a friction mounting base. A 1¼-inch hole centered 1½ inches from the bottom was cut in one side of the can to admit the signal beam. A collar made from a 1¾-inch diameter can cover, ½-inch deep, was attached over the aperture to support a short piece of 1¾-inch inside diameter bakelite tubing. In the outer end of this tubing a double convex lens of 4 inches focal length, 1¾ inches in diameter, is fastened by means of a collar of black Scotch tape.

Such lenses can be obtained at most five-and-ten stores in the form of a pocket magnifying glass in a plastic mounting. The purpose of this lens in the light-beam pick-up assembly is to focus the incoming beam on the cathode of the phototube.

The open end of the tubing or lens barrel is shaped to fit the contour of the shield can around the mounting collar, as shown in one of the photographs. Its over-all length is trimmed until the distance from lens to cathode is exactly 4 inches, or whatever the focal length may be if any other lens is used. The can and the lens barrel are finished inside with dead black paint to eliminate undesirable light reflections. A cap covers the lens when not in use to prevent unnecessary exposure of the phototube to strong light.

Shielding of the assembly is completed by adding a tube shield for the 1LN5 first amplifier tube and attaching a bottom cover plate to the chassis. The change-over switch is mounted just behind the phototube. Next comes the 1LN5 socket, and behind this is the potentiometer, R_3, used in its screen circuit. Next in order are the sockets of the two 1G4Gs and the 1Q5G, mounted on the top of the chassis. On the side of the chassis the potentiometer, R_1, is mounted below the phototube in the shielded input compartment. In the same compartment, next to R_1, is the microphone jack, J_1. Beyond the baffle partition is the volume control, R_5. Next is the headphone jack, J_2. The last component to be mounted on the side of the chassis is the 4-ohm midget output transformer, T_1. Its secondary leads are brought out through the rear wall of the chassis by means of a pair of pin-jacks. The smaller components are supported from the socket terminals.

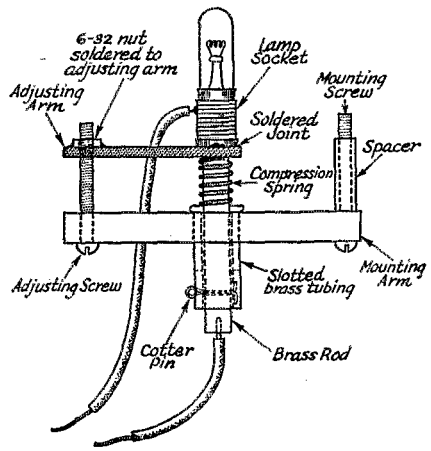


Fig. 2 — Method of mounting the lamp for the light-beam transmitter to provide vertical adjustment for alignment of the lamp filament with the the center of the optical system. This assembly is mounted in a sliding tube at the eyepiece end of the telescope; another sliding tube carrying the eyepiece fits into the lamp-assembly tube behind this mounting. The eyepiece tube is slotted on one side so that it will clear the lamp mounting.

Construction of the Beam Head

The first step in constructing the beam head is to secure the necessary lenses for the telescope. The front lens, or objective, is an unfinished 2-diopter spectacle lens. Such lenses may be obtained from any optician at a cost ranging from 80 cents to $1.25, depending on whether the desired focal length is available in a plano-convex, a periscopic or a meniscus lens. Any of these will serve the purpose. The focal length of a 2-diopter lens is approximately 20 inches. The rear lens or eyepiece may be the lens from a camera view finder or any other double convex lens of ½-inch to ¾-inch focal length.

The objective lens is fastened at one end of an 18-inch length of tubing, 2¼ inches in diameter, by means of a mounting ring cemented in the end of the tubing and a slip-on collar, made from a shield can of proper diameter. The tubing, which may be cut from a cardboard mailing tube, is given a dead black finish inside and out, as are the two smaller pieces of tubing used in the telescope.

The eyepiece is mounted in one end of a 2½-inch piece of tubing, 1½ inches in diameter, by means of a wooden or cardboard disk with a small central aperture over which the tiny lens is cemented. The reflector from an old flashlight is cut down to the proper diameter and cemented to the opposite side of the eyepiece mounting disk with its center aperture concentric with the eyepiece lens. The disk is then cemented in place in the end of the short piece of tubing. A slot ½-inch wide and 1⅞ inches long is sawed along one side of the eyepiece tubing.

A 4-inch section of tubing, having an inside diameter such as to just admit the open end of the eyepiece tubing with a sliding fit, is built up with added layers of paper and glue until it will itself make a smooth sliding fit in the open end of the long telescope barrel. At one end of this section the lamp mounting, shown in Fig. 2, is attached by means of a 1½-inch machine screw and spacer. Details of construction are outlined in the drawing. The mounting is designed to provide for adjustment of the position of the lamp filament, to center it within the optical axis of the telescope. Vertical adjustment is secured by turning a 1-inch 6-32 machine screw through a nut soldered to the movable arm which carries the lamp socket. Tension is maintained by a compression spring. Only a slight horizontal adjustment is necessary, and this may be done by swinging the mounting slightly about the mounting screw. In order to concentrate the light source as much as possible, the lamp socket is rotated until the plane of the filament is parallel to the axis of the telescope.

Leads from the lamp socket go to one side of the 1.4-volt dry cell and to one side of a telegraph key for blinker transmission, or to the dry cell and one side of the secondary of T_1 for voice transmission.

The beam head is assembled by inserting the lamp mounting in the telescope barrel up to a point where the lamp filament is approximately

(Continued on page 86)

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Gold Stars

A/C Luther A. Harrell, jr., W4EVT, was killed on April 9, 1943, when the airplane in which he was accompanying another student on a routine instrument training flight crashed near Bush Field, Ga.

W4EVT was studying for the ministry at the time he enlisted in the Air Corps in September, 1942. He received pre-flight training at Maxwell Field, Ala., primary training at Door Field, Fla., and was completing basic training at Bush Field at the time of the fatal accident.

Luther received his first ham ticket in 1937, and his enthusiasm for amateur radio was an inspiration to others. He helped a number acquire licenses, one of whom was his brother, William A. Harrell, W4FDH, now serving in the Marine Corps. He also helped to organize amateur radio clubs at Brunswick and Valdosta, Ga.

W4EVT was awarded an ARRL certificate for public service at the time a devastating tornado struck Georgia in February, 1940. For several hours he maintained the only communication out of stricken Albany, and for the next two days handled much emergency traffic.

An experimenter at heart, W4EVT constantly rebuilt his rig, varying its power from 5 to 150 watts. Most of his operating was on 7- and 14-Mc. c.w., with some 160-meter 'phone work. He had made over 3000 contacts on the air.

Henry F. Rand, ACRM, W1PG, was killed on August 24, 1943, when the plane in which he was making a routine flight crashed at Fentress, Va. The pilot, who was the only other occupant, also was killed.

An old-timer in ham radio, W1PG became actively interested in the game during his high school days and received his first call prior to World War I. In recent years his special interest was operating 20- and 40-meter c.w. W1PG was a member and at one time the president of the Hi-Q Radio Club, W1LRN, in Lynn, Mass.

Aviation Chief Radioman Rand was called to active duty in the Navy in May, 1940. He had served in the Naval Reserve for twelve years previous to that time.

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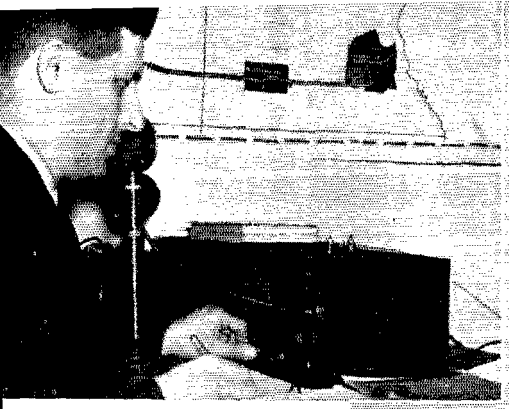
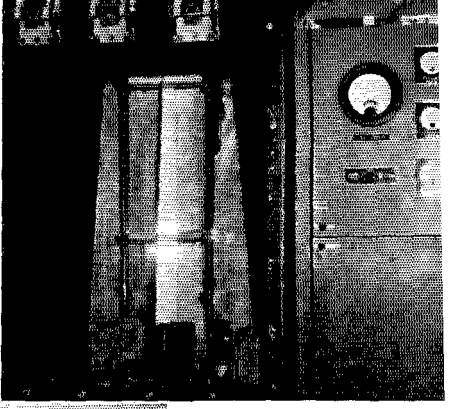




WJJH-40 is located on the 44th floor of the Terminal Tower (center) on the Public Square in Cleveland. Visitors to this famed Tower will recall that the observation room is on the 42nd floor. Above, Geo. H. Lister, W8NV, deputy radio aide in charge of WJJH-40, is shown at the receiving position.

The tower is 750 feet above ground level. The transmitter of WJJH-40 is shown in the view above. The net control unit is crystal-controlled on a frequency of 112,128 kc. with two doublers from 28 Mc. An 829, grid-modulated, in the final, which uses parallel-line tuned circuits. The r.f. unit is at left.

Cuyahoga County Amateurs Accept a Challenge

The Story of WJJH—Ohio's Outstanding WERS Network

BY JOHN A. KIENER,* W8AVH

ON January 12th of this year, with local and state officials and U. S. Army officers observing, the WJJH network swung into action in such praiseworthy fashion that, at the conclusion of the test, County Defense Director William A. Stinchcomb remarked, "This test has demonstrated that communication can be maintained all over the county by amateur radio alone."

Not only did Mr. Stinchcomb compliment WJJH by these words, but he unintentionally paid tribute to the amateurs engaged in WERS work all over the country. For, although WERS is not strictly an amateur endeavor, it is well known that its success has been made possible mainly through the efforts of amateurs.

Major Robert S. French, Fifth Corps Area Controller, representing the Army in observing the test, enthusiastically commented: "This was a remarkable demonstration. The smooth working of the network here was an eye-opener to me." Major Charles Miller, liaison officer between the Ohio State Council of Defense and the U.S. Army, said: "I hope and believe this network or its equivalent will be maintained after the war. It would prove invaluable in a real emergency." Frank Celebrezze, Commander of the Cuyahoga County Council for Civilian Defense and Director of Public Safety added this comment about the test: "I know that if Mayor Lausche could have gone around with us in the mobile units tonight he would have been delighted to see the wonderful performance all of you have given. . . . I was very much impressed by the work that can be done, and by the fast work that you can do with radio. . . . I hope that you will continue this work, no matter what rumors are cast about in reference to civilian defense and its need. We want to be prepared in case of an emergency. . . ."

The Beginning

Naturally, before WJJH became the smooth-working network which rated these generous compliments, it had its share of growing pains. These were not so great as they might have been, however, had not plans for this sort of emergency work been laid several years previously.

In common with most WERS groups, WJJH traces its earliest beginnings back to the creation of the ARRL Emergency Corps in 1938. At that time emergency-minded amateurs in Cuyahoga

*Chief Radio Aide, WJJH, 1703 Doan Ave., E. Cleveland, Ohio.

County joined the Corps and laid plans which proved to be the firm foundation on which WJJH was built. Two of the present leaders of WJJH, Earl S. Nelson, W8DS, and John A. Kiener, W8AVH, were also members of the Disaster Relief Corps of the American Red Cross at that time. W8DS, also president of the Cuyahoga Radio Association at that time, worked closely with the Red Cross in its emergency program. The club sponsored several emergency tests and demonstrations to show the public how amateur radio could be of service.

In August, 1941, the Cuyahoga County Council for Civilian Defense was formed, and W8AVH was made a member of the communications committee of that body. W8AVH also was placed on the radio sub-committee and W8DS was placed on the sub-technical committee. These appointments were a definite sign that the amateurs were expected to play a major role in civilian defense.

In consequence, the Amateur Emergency Planning Committee became active in Greater Cleveland even before Pearl Harbor. In fact, plans were completed for emergency networks and everything was pronounced ready to go at the time of the Committee's last prewar meeting on December 4, 1941.

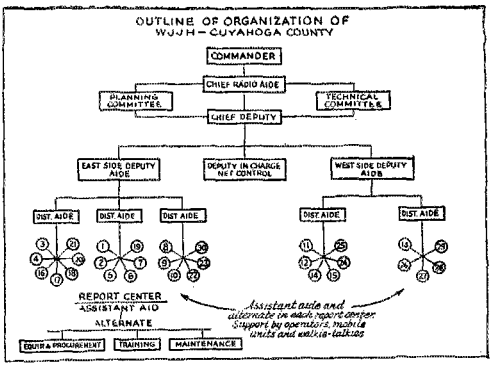
Of course the events of the next few days silenced all ham transmitters except those which had been granted a special temporary license to transmit. The application of the Cuyahoga Radio Association was not approved, so W8URA, the club's station, and all other amateur stations which were to have been in the network, were "shelved" until such time as the order to reactivate might be given.

When the announcement of the WERS was made in June of 1942, the chairman of the communication committee, Randolph Eide, president of the Ohio Bell Telephone Company, requested W8AVH to draw up a plan for the formation of such a service for Cuyahoga County. On July 23, 1942, the finished plan was presented. On August 12th it was submitted to the County Council.

On September 11th, the executive committee of the Council designated W8AVH as its radio aide. The Board of County Commissioners then authorized its president to apply for a WERS license. The application was also mailed on this date, listing eleven portable-mobile units and thirteen operators. At long last, after the usual amount of delay, red tape and grief, the FCC granted the license. WJJH was brought to life on December 5, 1942.

WERS Established

The hardest part of establishing WERS in the Greater Cleveland area came in trying to "sell" the people who could and should use the service. With a splendid emergency communication system thrown right in their laps, nevertheless they had to be enticed into getting acquainted



with what was offered and browbeaten into using the facilities after they were installed.

As mentioned in *QST* recently, it was found that the best way to interest local officials in the work was to take them out in a mobile unit. By letting them talk to the report center station, and permitting them to participate in the sending and receiving of messages, we were able to bring home most forcibly to them the value of the service which was theirs for the asking.

One controller became convinced of the worth of WERS by accident. During a Wednesday night test he telephoned the operator of WJJH-13 and told him that his sister-in-law was in need of a blood transfusion and needed a donor. The operator immediately put out an urgent call on the WJJH network, and within fifteen minutes several volunteers had been rounded up. Although it later developed that the volunteers were not needed, the manner in which they had been assembled was proof enough to the controller that WERS was effective.

In other cases much valuable time was wasted by local civilian defense officials in discussing the pros and cons of WERS. It usually developed that these officials were reluctant to contribute any money for the construction or installation of WERS units. Although the matter was then considered "closed" by them, they found they hadn't reckoned with the fact that they were dealing with an organization which was composed chiefly of radio amateurs, who have long been noted for their pluck and ingenuity. These amateurs immediately took up the challenge.

Thus it was that WJJH became an efficient emergency communications system, composed of

Mrs. Mildred Wildman, W8PZA, at the operating position in the WERS room at the main control center — location of units WJJH-1 and WJJH-101.

Radio aides and deputies of WJJH. *Left to right, front row* — Chief Deputy Earl S. Nelson, W8DS; Chief Radio Aide John A. Kiener, W8AVH, and Deputy (Net Control) George H. Lister, W8NV. *Back row*: District Aide Ellis Smith, W8QV; West Side Deputy Cliff E. Noel, W8AXQ; East Side Deputy G. W. Irwin, W8GW; District Aide Fred Brewster, W8AOK, and District Aide J. R. Wildman, W8PWY.

operators who had built and furnished their own equipment and then had trained themselves to a high peak of operating proficiency.

Equipment

The equipment problem was, of course, a serious one. There was practically no gear available, and all construction had to be done with parts which were never meant to be used on 112 Mc.

The aid of several local engineers who had years of ham experience behind them proved invaluable in solving many of the problems. In several instances developments were made which are almost certain to be of importance in future v.h.f. work. A few of these able engineers who contributed much valuable time and effort are Andy Summerville, W8CTI; George Lister, W8NV; Al Prescott, W8DLD; Al Gross, W8PAL; Fred Brewster, W8AOK; Frank Whittam, W8FP, and Harry Caskey, W8LEX.

During the many months in which fruitless financial discussions were going on in local councils, the operators were building equipment and donating it to the licensee without any thought of recompense. These operators built up a system which now approximates $25,000 worth of equipment on a budget of $250 from the Cuyahoga County Council which was granted for the whole year of 1943. A similar sum has been set up for 1944, which of course does not even approximate the total expected cost of the work to be done and the equipment purchased during the year. In several of the report centers the individual municipalities did purchase some minor items of equipment, but the great majority of the equipment has been obtained from the operators themselves. Perhaps the fact that financial assistance has been almost nil has helped make WJJH a stronger and more self-reliant organization.

West side assistant radio aides and alternates. *Left to right, front row* — James Walls, W8MXK; Hal Foyer, W8TMD; Earl Gumz, W8QCB; John Thomas, W8WCC, and Bill Mazur. *Back row* — August Gable, W8UWF; Leonard Johnson, W8QYH; Cliff E. Noel, W8AXQ; William B. Davis, W8JNF, and Earl Holl, W8JVN.

East side assistant radio aides and alternates. *Left to right, front row* — Charles Griesfelder, W8OFF; Cleo Digby, W8DLJ; Frank Snyder, W8BXR; John Rau, W8TAZ; Hugh O'Neill, W8SJS; R. L. Archbold, W8SSW; and Al Foley, W8NEY. *Back row* — Fred Brewster, W8AOK; K. L. Bowen, W8QLN; Ladis Lisy, W8WRY; Joseph Oliver; D. L. Howe, W8EBJ; Mrs. Mildred Wildman, W8PZA; Myron Pierce, W8NGN; Howard Kline, W8UDM; James Hausser, W8LB, and Frank Kollarits, W8WLW.

Technical Details

The circuits employed in WJJH receivers are to some extent unique, inasmuch as they are built around the 7H7 tube. If a receiver was commercially built originally, it was almost invariably altered to take the 7H7 tube. (This particular arrangement features a tuned-grid circuit instead of the familiar tuned plate.)

Very few transceivers have been used, and even many of the walkie-talkies have separate sections. With a fairly good number of crystal-controlled transmitters, accompanied by several ECOs with modulated doublers and the modulated oscillators which are in the majority, a high degree of frequency stability has been achieved.

Two receivers are ordinarily in use at the net control station, WJJH-40. A superregenerative

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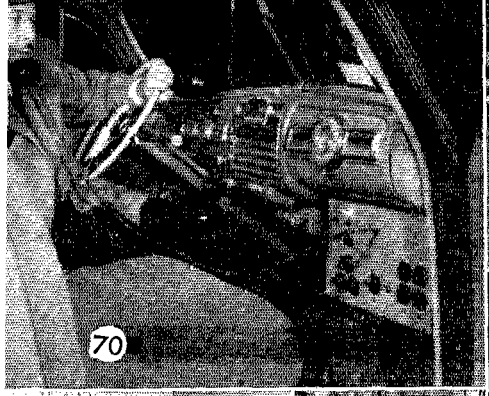
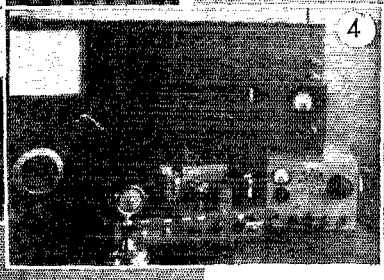
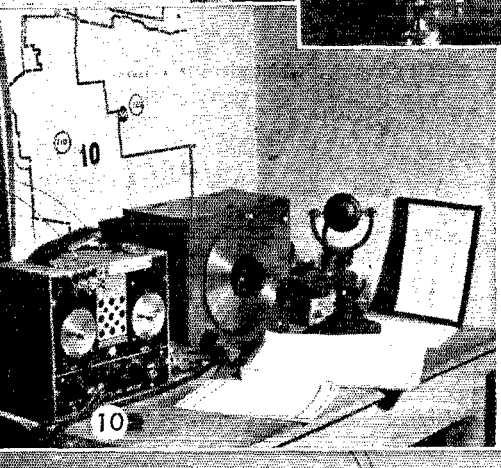
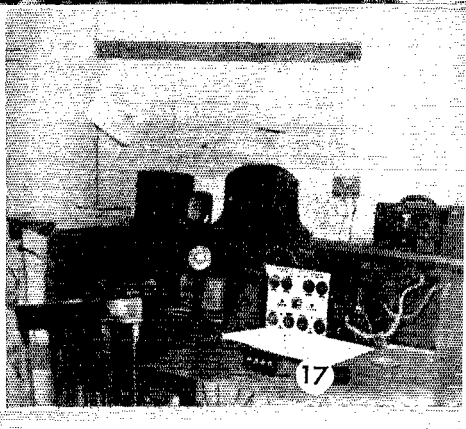
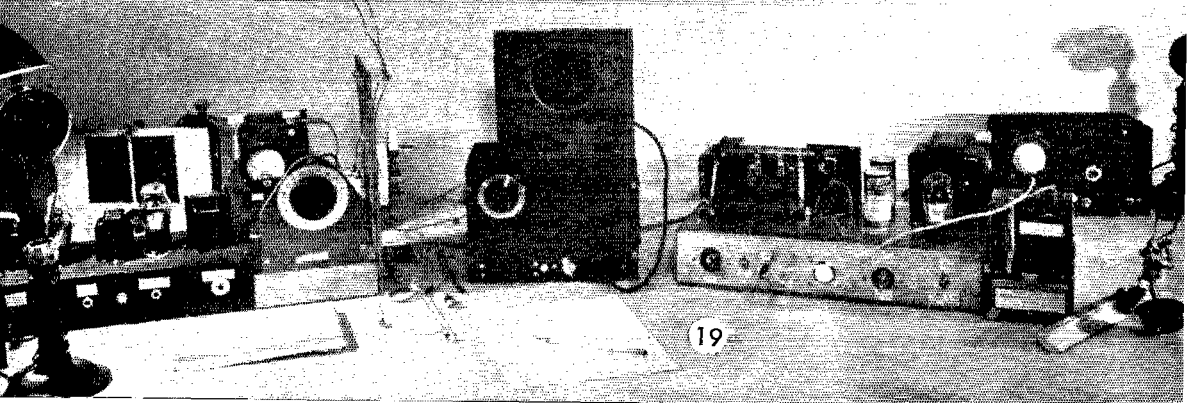






Typical report-center and mobile units of WJJH. Numerals indicate unit numbers. Earl S. Nelson, W8DS, chief deputy, is seen operating mobile unit WJJH-70 at upper left. Unit No. 85, located in a casualty station, and mobile unit No. 78, work into No. 18. Installations numbered 3, 17 and 18 contain dual units, one used to contact the net control and another to contact units within the control area.





Ohmmeter Circuits

A Discussion of Basic Arrangements

BY DR. TRUMAN A. GADWA,* W2KHM

While an ohmmeter for checking unknown resistance values is a simple device, a considerable amount of thought must go into its design if inaccuracies in measurement are to be held to a minimum. W2KHM discusses some of the basic circuits, pointing out the advantages and disadvantages of each and adding several useful suggestions for the design of a practical instrument.

EVERY amateur has frequent occasion to determine resistance values. If he has access to an ohmmeter, the problem is simple. For those with a milliammeter, a battery and a known resistance, the problem should be no more complicated, since basic ohmmeter circuits can be duplicated readily. However, an understanding of the principles involved and of the limitations which restrict the use of the ohmmeter is important if miscalculations are to be avoided.

Basic Principles

By means of the circuits shown in Fig. 1 it is possible to measure an unknown resistance by comparing it with a standard or known resistance. First, the current, I, is measured with only the standard or known resistance, R, in the circuit of Fig. 1-A. Next, the unknown resistance, R_X, is inserted in the circuit, as shown in Fig. 1-B, and the new current, I_1, is read. The current with both known and unknown resistances in series will be less than with the known resistance alone. From these two readings the unknown resistance can be calculated by the following equation:

$$R_X = R\left(\frac{I - I_1}{I_1}\right) \qquad (1)$$

*214 Hillcrest Road, Mount Vernon, N. Y.

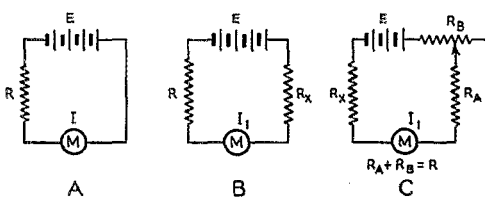


Fig. 1 — Basic ohmmeter circuits. The current first is measured with the known resistance, R, in the circuit of A. The unknown resistance, R_X, is then connected as shown at B and the new current noted. The unknown resistance may then be calculated by the formula given in the text. C shows the addition of a variable resistance, R_B, to compensate for battery deterioration.

This equation is derived from Ohm's Law, as follows:

$$E = IR = I_1(R + R_X) = I_1R + I_1R_X$$
$$I_1R_X = IR - I_1R = R(I + I_1)$$
$$R_X = R\left(\frac{I - I_1}{I_1}\right)$$

The value of the unknown resistance is calculated by multiplying the known resistance in ohms by the difference between the two readings and dividing the product by the current reading after insertion of the unknown resistance. The readings may be directly in amperes or milliamperes, or simply as fractions or percentages of full-scale meter deflection.

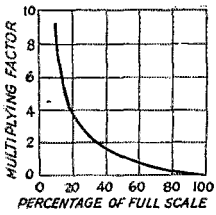


Fig. 2 — Characteristic curve of a series ohmmeter circuit, showing the factor by which the known resistance is multiplied to obtain the unknown resistance value corresponding to any percentage of meter deflection.

The equation is conveniently solved by means of a slide rule or long-hand arithmetic. If, for example, with a known resistance of 5,000 ohms the current, I, is 0.87 milliampere, and with the 5,000-ohm and unknown resistances in series the new current, I_1, is 0.30 milliampere, substituting in equation (1) and solving will give:

$$R_X = 5{,}000\left(\frac{0.87-0.30}{0.30}\right) = \frac{(5{,}000)(0.57)}{0.30} = 9500 \text{ ohms.}$$

Series Circuits

The ohmmeter circuit of Fig. 1-C has provision for adjusting the current to full scale with the known resistance. In this case the known resistance, R, consists of R_A and the portion of R_B in the circuit. Then, if insertion of the unknown resistance, R_X, causes the meter reading to fall from full scale to one-half scale, we know that the circuit resistance has been doubled and that $R_X = R$. If the reading falls to one-third scale, the resistance has been tripled and $R_X = 2R$. Similarly, a drop to one-quarter scale means that the circuit resistance has been multiplied by four and that $R_X = 3R$. Thus a curve, such as that shown in Fig. 2, may be drawn from which may be obtained the factor by which the known resistance, R, must be multiplied to give the unknown resistance for any percentage of the original full-scale reading. If, for example, the known resistance is adjusted so that the meter reads full scale with R short-circuited and the insertion of the unknown

resistance causes the meter reading to drop to 40 per cent of full scale, the curve of Fig. 2 shows that the unknown resistance is 1.5 times the known resistance.

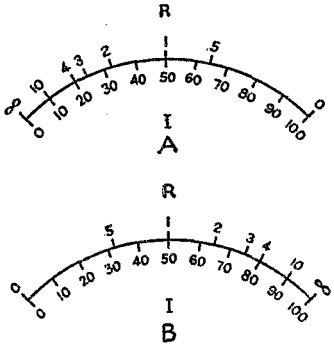


Fig. 3 — Typical ohmmeter scales applied to a milliammeter. The reversed scale at A occurs when the unknown resistance is connected in series, while the scale at B is of the type which results when the unknown resistance is connected in parallel with the meter.

If desired, the meter may be fitted with a scale of the type shown in Fig. 3-A, which permits the meter to be read directly in ohms, the calibration being obtained by the use of Fig. 2. The scale is not linear, of course, and it is reversed from the normal milliammeter current scale, since zero resistance occurs at full-scale current while infinite resistance is indicated by a zero-current reading.

Measurement of resistance by means of the circuit of Fig. 1-C is subject to increasing error as the battery deteriorates, because the adjusting resistance, R_B, which is unavoidably part of the calibrating resistance, must be reduced to compensate for the reduction in battery voltage if a full-scale reading is to be maintained with zero resistance at R_X.

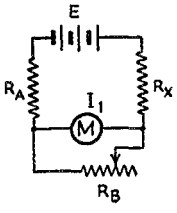


Fig. 4 — Circuit for measuring high resistances. The battery compensating resistance, R_B, is in shunt with the meter, varying its sensitivity. R_A is the standard, and its value must be known. The unknown resistance, R_X, is connected in series.

An Improved Circuit

A circuit which makes the measurements practically independent of battery voltage is shown in Fig. 4. It is similar to the circuit of Fig. 1-C except that the compensating resistance, R_B, is connected in shunt with the meter. The circuit operates on the principles previously set forth for the circuit of Fig. 1-C insofar as resistance measurement is concerned. It has the important advantage, however, that adjustment of R_B to compensate for battery age has a negligible effect upon the total circuit resistance. So long as the circuit is adjusted first with the R_X terminals short-circuited, the accuracy will not be affected, for all practical purposes, regardless of the value of R_B. The formula for determining the unknown resistance value from the meter reading is equation (1), where R_A is substituted for R. The value of R_A in this circuit should be known as accurately as possible. With a 1-ma. meter and a resistance of 2000 ohms for R_A, a reading of 1/100 ma. will indicate a resistance of 198,000 ohms, while a reading of 99/100 ma. will indicate a resistance of approximately 20 ohms. The measurement of still higher resistance values will require the use of a higher resistance at R_A and a correspondingly higher battery voltage to obtain the initial full-scale deflection.

Measurement of Low Resistances

The circuit of Fig. 5 is more suitable for the measurement of low resistances. In this arrangement the unknown resistance is connected in parallel with the meter instead of in series, the meter resistance serving as the standard. Before the unknown resistance, R_X, is connected, the circuit current is adjusted to full-scale meter reading by means of R_B. Then, when R_X is connected, the total circuit current will be divided between the meter branch and the R_X branch in inverse proportion to the resistance of the branches. Thus, if a 1-ma. meter with a resistance of 30 ohms (an approximate figure for a meter of this type) is used and R_B is adjusted so that the meter reads full scale, connection of a 30-ohm resistance at R_X will cause the meter reading to fall to half scale. Other values of unknown resistance will give a meter reading above or below half scale, depending upon whether the values are respectively above or below 30 ohms. A 1-ma. meter can be read with fair accuracy down to about 1/100 ma. Since the circuit current has been set initially at 1 ma., a meter current of 1/100 ma. means that 99/100 ma. must be flowing through R_X. Therefore, the resistance of the latter must be 1/99 of the meter resistance, or 30/99 = 10/33 ohm. This value represents the minimum value of resistance which can be measured by this system with reasonable accuracy. At the other end of the range, a meter current of 99/100 ma. means that the current through R_X is 1/100 ma. and therefore that the resistance of R_X is 99 times that of the meter, or $99 \times 30 = 2970$ ohms. The resistance for any meter reading may be determined from the formula

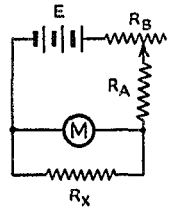


Fig. 5 — Circuit for checking low resistances. The resistance of the meter, M, serves as the standard, R_B compensates for battery deterioration with negligible effect upon the calibration, while R_A (exact value not critical) assists in setting the initial full-scale current. R_X is the unknown resistance.

$$R_X = \frac{I_1 R_M}{I_1 - I} \qquad (2)$$

where I is the full-scale current before R_X is connected, I_1 the new current with R_X connected

(Continued on page 84)

IN THE SERVICES

THE OMs and YLs appearing in the department this month are making their contributions to the shortening of the duration in many and varied ways. Along with the members of the armed forces, we are listing, as promised, some of the amateurs working in 100 per cent war work — industry. The first-district hams, all at Southbridge, Mass., are employees of Harvey-Wells Communications, Inc., where they are engaged in the construction of radio communications equipment. The remainder, located at Cleveland, Ohio, are at Hickok Electrical Instrument Co., engaged in high-priority electronic work.

Also included is a list of amateurs presently employed at the Harvard Radio Research Laboratory, doing development work on special war projects under contract with OSRD.

These are examples of the type of lists we'd like to have from the hundreds of manufacturing plants and laboratories falling in this category. Surely some amateur in each outfit can start the ball rolling — perhaps by heading a potential list on a bulletin board — in order that the roster may continue to grow.

We do have numerous individual records, and they will be published as soon as they are sorted and collected under the names of the companies represented.

We know you are all putting in long, arduous hours, but, as you'll notice from "Happenings of the Month," we do need your help. Send in that AWSR today!

ARMY—GENERAL

1BXC, Swan, T/5, Elking, W. Va.
1DUZ, Vermeiren, M/Sgt., foreign duty.
1GIM, Walsh, T/5, Camp Polk, La.
1IUX, Hanson, T/3, Camp Polk, La.
1NCT, Burnham, Pvt., Camp Davis, N. C.
1NET, Ricker, Pvt., Ft. Adams, R. I.
1NRM, Nickerson, Pfc., San Francisco, Calif.
2AAW, Littell, Lt. Col., foreign duty.
2BSH, Fuller, Lt., address unknown.
2IAY, Mrozek, Sgt., Ft. Monmouth, N. J.
2MES, Hellman, Pvt., Camp Upton, N. Y.
3JOB, Way, Pvt., Bloomington, Ind.
3JOQ, Minton, Capt., Watertown, Mass.
4CYC, Cain, Lt., Granite City, Ill.
4GCD, McCall, T/Sgt., Valdosta, Ga.
5HFI, Scott, S/Sgt., address unknown.
5IOX, Huddleston, Pvt., Truax Field, Wis.
5IZM, Hale, Pvt., Memphis, Tenn.

This FB group of Coast Guardsmen are a few of the instructors at the Coast Guard Training Station at Atlantic City, where the teaching staff is comprised largely of hams. *Front row, l. to r.:* CRM L. J. Huntoon, W1LVQ, (Asst. Secretary of ARRL, on leave); RE L. J. Le Drew, W2LEO, and Ens. C. C. Charley, ex-W3JYW. *Middle row, l. to r.:* RM2c W. C. Hess, W8RIK; RM1c H. M. Craddock, W1KBP; RM1c R. B. Brown, W8RCQ, and RM1c R. L. Brewster, W8WDQ. *Back row, l. to r.:* RM3c D. J. Lee, W1LYN; RM3c O. L. Gulseth, W9TEF, and RM1c W. Hibler, ex-W9NKM.

5JTN, Moody, T/4, foreign duty.
5JYQ, Taylor, Pvt., Camp Barkeley, Tex.
5JZV, Isbell, 2nd Lt., Camp Adair, Ore.
5NU, Pike, CWO, foreign duty.
6UEL, Papineau, M/Sgt., foreign duty.
6JLX, Arnold, T/3, Camp Polk, La.
6KCC, Kahn, Lt., Minter Field, Calif.
6NNE, Holt, Pvt., foreign duty.
6UNG, Bechtle, Pfc., Camp Beale, Calif.
7BUS, Carroll, Lt., foreign duty.
7JDS, McDonald, Pvt., foreign duty.
8AON, Turrel, Pvt., Camp Crowder, Mo.
8FOF, Pound, T/Sgt., Camp Shelby, Miss.
8IEH, Campbell, T/5, Camp Polk, La.
8JPP, Bullock, foreign duty.
8OOA, Kaib, Sgt., Robins Field, Ga.
8TGP, Kratz, Sgt., Camp Haan, Calif.
8TVC, Johnson, Lt., Camp Adair, Ore.
8VAA, Pagano, Sgt., Camp Swift, Tex.
8WAQ, Lewis, Capt., Camp Claiborne, La.
9BIN, Perdew, Pvt., North Camp Hood, Tex.
9FIJ, Anderson, T/5, Camp Davis, N. C.
9FPF, Paul, Lt., address unknown.
9HAD, Colwell, foreign duty.
9HKK, Bakeman, Cpl., Robins Field, Ga.
9NTD, Engels, Major, Milwaukee, Wis.
9OQO, Kieser, address unknown.
9PZI, Lundeen, Sgt., Ft. Sill, Okla.
9WDF, Popp, Sgt., foreign duty.
9YJF, Barber, Pfc., Ft. Knox, Ky.
9ZDC, Dzengel, Sgt., Camp Haan, Calif.
9ZJG, Schaper, Pvt., Ft. Knox, Ky.

Operator's license only:

Bennett, Pvt., Ft. Jay, N. Y.
Chesebrough, Pfc., address unknown.
Frank, Pvt., Ft. Benning, Ga.
Niedermeier, Pvt., foreign duty.
Prokop, Capt., Camp Pendleton, Va.
Schwalm, T/5, Camp Cooke, Calif.

COAST GUARD

ENS. DICK WITTE, W8VKJ, on liberty near Waikiki recently, added his call to the following list which had been inscribed on the wall of a "head" in a Chinese restaurant there. Among the other visiting hams there had been: W4HNG, W4HYA, W2NYR, W1LAG, W8TWT, K6QJT, W9DUN, W8RHM, W1KKL W6LXI, W6KIW and W8EYU.

1BLR, Shulkey, RM2c, Reading, Mass.
1CME, Davis, Ft. Lauderdale, Fla.
1KGH, Spooner, CRT, foreign duty.
1KYX, Smith, RM2c, Bedford, Mass.
1NDU, Onoyan, RT1c, foreign duty.
2FAD, Schwartz, Marshfield, Mass.
2LTV, Johnson, Lt. (jg), New York, N. Y.
3IDV, Wood, Ensign, Atlantic City, N. J.
3IIM, Piontkowski, S2c, Manhattan Beach N. Y.
3IQP, Turner, RM3c, foreign duty.
4GJI, Curran, RT1c, Palm Beach, Fla.
4IGG, Thornton, RT3c, Ft. Myers, Fla.
6CLU, Stokes, RT1c, Washington, D. C.
6TKY, Poyser, CPO, foreign duty.
ex-8BLB, Cluff, RM1c, foreign duty.
8DVZ, Sponeybarger, CRT, foreign duty.
9NMW, Cooke, address unknown.
9NRB, Smits, Chicago, Illinois.
ex-9QHW, Lantto, RM3c, Southampton, N. Y.

Operator's license only:

Johannsen, RM3c, San Diego, Calif.
Ossene, RM3c, Atlantic City, N. J.
White, S1c, Miami, Fla.

ARMY—AIR FORCES

W9RHT, a technical representative now "somewhere in Italy" with the AAF, has this to say about the weeks he spent in North Africa before crossing the Mediterranean: "Having read so much about the 'Kee-Kee bird' of the North, we who spent many weeks in the Libyan Desert have become used to the 'Gah-Gah bird.' When the wind plows through the sand dunes, the 'Gah-Gah bird' sits in the dust and sand and, in a choking, sputtering voice, cries 'Gah-Gah-Gah-Dam the Desert.'"

1DBH, Woodford, Pfc., Rome Field, New York.
1DPM, Manning, Cpl., Tuskegee Field, Ala.
1EBM, Tewksbury, M/Sgt., foreign duty.
1NGE, Middlebrook, A/C, Maxwell Field, Ala.
1NGS, Grillo, T/Sgt., Scott Field, Ill.
2FEJ, Nestler, 2nd Lt., Wright Field, Ohio.
2HLT, Tucker, Sgt., Sioux Falls, S. D.
2MDZ, Livingood, A/C, Kingman Field, Ariz.
2NPF, Hook, Pfc., McClellan Field, Calif.
3HOI, Kanach, Sgt., Avon Park Field, Fla.
3IRL, Jones, Pfc., Scott Field, Ill.
3IYS, Franklin, Lt. Col., foreign duty.
3JAV, Catona, Pvt., McClellan Field, Calif.
4CMR, Byrd, Pvt., Ft. Monmouth, N. J.
4DNR, Walker, 2nd Lt., Boca Raton, Fla.
5GUU, Bradley, Lt., Malden Field, Mo.
5IVF, Wilenzick, Pfc., Miami Beach, Fla.
5JGO, Vendt, Pvt., Smyrna Field, Tenn.
5JSH, Wilder, Pvt., Kelly Field, Tex.
5KGZ, Mason, S/Sgt., Kelly Field, Tex.
5KMV, Thomey, A/S, Spartanburg, S. C.
6AWC, Pease, Sgt., address unknown.
6GDS, Troup, T/Sgt., foreign duty.
6QHM, Stephens, Lt. Col., Asheville, N. C.
6RQV, Kahl, Pvt., McClellan Field, Calif.
6TEA, Kolstad, Hamilton Field, Calif.
7FXI, Beaudette, Lt., Williams Field, Ariz.
8DSB, Herrle, Sgt., McClellan Field, Calif.
8EDG, Stefl, Truax Field, Wis.
8GPV, Lukas, S/Sgt., foreign duty.
8JWL, Henthorn, Pvt., Smyrna Field, Tenn.
8OJD, McGaffic, Pvt., Scott Field, Ill.
8PRR, Kline, Cpl., Sioux Falls, S. D.
8QHX, Godwin, Cpl., Salt Lake City, Utah.
8QVF, Kiefer, Capt., Bergstrom Field, Tex.
8RXY, Richardson, A/C, Ft. Worth, Tex.
8SBS, Van Dusen, Cpl., Redding Field, Calif.
8UBR, MacQueen, T/Sgt., DeRidder, La.
8VEV, Brown, Pfc., Scott Field, Ill.
9AD, Lawton, Scott Field, Ill.
9CNW, Elliott, Pfc., Truax Field, Wis.
9FJD, Becker, Sgt., Marshall Field, Kans.
9FLJ, Jackson, 2nd Lt., Cambridge, Mass.
9HAW, Hildebrandt, Pfc., Sherman Field, Kans.
9HDF, Corteville, M/Sgt., foreign duty.
9JNC, Dale, Pvt., Amarillo Field, Tex.
9LKQ, Lenz, 2nd Lt., New Haven, Conn.
9MCD, Metcalf, Sgt., Sherman Field, Kans.
9OEB, McClaine, Sgt., foreign duty.
9OXH, Crain, A/C, Santa Ana, Calif.
9QXN, Leese, Pvt., foreign duty.
9RRQ, Wampach, Pvt., Bradley Field, Conn.
9SNF, Barry, Pvt., Amarillo Field, Tex.
ex-9VLI, Bivens, S/Sgt., foreign duty.
9WAW, Borchardt, Cpl., foreign duty.
9WJS, Seymour, 2nd Lt., Stuttgart Field, Ark.

Operator's license only:

Ackerman, Lt., Ellington Field, Tex.
Beers, Sgt., foreign duty.
Edelman, Cpl., McClellan Field, Calif.
Ellison, 2nd Lt., Allenhurst, N. J.
Hogel, Pfc., Scott Field, Ill.
Nielsen, Cpl., Chanute Field, Ill.
Peed, A/S, Springfield, Ohio.
Rickard, Pfc., Las Vegas Field, Nev.
Shimp, Cpl., Liberal Field, Kans.
Tyler, Lt., foreign duty.

This picture of T/Sgt. Howard R. Griswold, USMCR, W1MGT, shows what Texas sunshine does to a New Englander! Then attending NATTC at Corpus Christi, at present he is stationed at the MCAS, Cherry Point, N. C. W1MGT ("Where One Marine Gets Through") was a radio technician in Hartford for fifteen years before joining up—"and I still have my fingers in radio of one sort or another in the Marine Corps, learning something new every day."

MARINE CORPS

1KYK, Gertz, Sgt., Camp Pendleton, Calif.
2JYF, Kersta, Lt., Camp Murphy, Fla.
2LHA, Mitchell, W/O, foreign duty.
4AHT, Carson, Lt., Quantico, Va.
4HKD, Speck, Pvt., San Diego, Calif.
5GJU, McFarland, Pvt., San Diego, Calif.
5JSD, Perot, T/Sgt., foreign duty.
6EJH, Lilly, Cpl., Midway Island, Va.
6OFB, Stanfield, T/Sgt., foreign duty.
6UMI, Judd, Pfc., Camp Lejeune, N. C.
7IOL, Trueblood, Pfc., Quantico, Va.
8LRV, Buntain, Montpelier, Ohio.
9DFD, Sears, Lt., Quantico, Va.
9KPM, Leach, Pfc., San Diego, Calif.
9OZU, Kavis, San Diego, Calif.
9TVF, North, Pvt., San Diego, Calif.

Operator's license only:

Ahmann, Pvt., San Diego, Calif.
Whitefield, Cpl., foreign duty.
Hanson, Mar. Gun., foreign duty.

ARMY—SIGNAL CORPS

1IJW, Smith, Lt., Springfield, Mass.
1MAF, Marsh, Capt., Orlando, Fla.
1NGU, Caldwell, Pfc., Lubbock, Tex.
2ARZ, Cox, Capt., foreign duty.
2BXP, Delvin, address unknown.
2DXC, Green, Pvt., Camp Crowder, Mo.
2IEL, Melnyk, Pvt., Camp Butner, N. C.
2IWP, Bethel, Lt., foreign duty.
2KCQ, Nicholls, S/Sgt., foreign duty.
2OIR, Clements, Pvt., Camp Crowder, Mo.
2ONF, Bohs, Pvt., Camp Crowder, Mo.
3AQC, Remmlein, Lt., foreign duty.
3CPG, Geist, Capt., Avon, N. J.
3EHD, Mower, Lt. Col., foreign duty.
3EKZ, Rock, Pvt., Camp Crowder, Mo.
3EVC, Hoeflich, Pvt., Camp Crowder, Mo.
3FAU, Walker, Sgt., foreign duty.
3GHM, Yust, Pvt., Camp Crowder, Mo.
3ICL, Galeski, Pvt., Camp Crowder, Mo.
ex-3PR, Beam, Lt., North Hills, Pa.
4CXM, Caldwell, Lt., foreign duty.
4EJV, Alford, T/3, foreign duty.
4GVQ, LeCraw, Pfc., Camp Murphy, Fla.
4HQF, Voight, Sgt., foreign duty.
5EIH, Edwards, Pvt., Camp Crowder, Mo.
5GGL, Schroeder, 2nd Lt., Camp Lejeune, N. C.

Our OMs are really "winning friends and influencing people" these days. Pvt. Aaron Nemoyten, W2NHQ, for instance, is pictured here with a cabineri (Italian cop) "somewhere in Italy." Wonder if W2NHQ's partner was ever a ham?

5HUA, Hiltpold, Lt., address unknown.
5JUS, Zudell, S/Sgt., foreign duty.
6AZZ, Wright, Major, Ft. Monmouth, N. J.
6EBO, Palik, Major, San Bernardino, Calif.
6PGH, Henderson, Pfc., Columbus, Ohio.
6PGP, Roed, Sgt., foreign duty.
6RPE, Bartlett, foreign duty.
6UIG, Erickson, Lt., address unknown.
6UNA, Taylor, Lt., address unknown.
7EWS, Fleming, Pfc., Ft. Lewis, Wash.
7GHU, Juhola, Lt., address unknown.
7GUR, Boland, Pvt., Ft. Benning, Ga.
7GUV, Dack, S/Sgt., foreign duty.
K7IXJ, Greene, T/5, foreign duty.
ex-7MH, Perkins, Capt., Ft. Monmouth, N. J.
8AXL, Kanble, Warrenton, Va.
8BRB, Dewey, Pvt., Camp Crowder, Mo.
ex-8BXO, Meyer, Lt., Philadelphia, Pa.
8CFQ, Corey, Pfc., Camp Murphy, Fla.
W8LH, Abaffy, foreign duty.
8NAI, Evans, Lt., Columbus, Ohio.
8ODX, Williams, Pfc., Camp Murphy, Fla.
8PEX, Haycox, Pvt., Camp Crowder, Mo.
8QXR, Egg, Pvt., Camp Crowder, Mo.
ex-8RFE, Crawfis, Sgt., Drew Field, Fla.
8RIX, Malick, Pvt., Camp Crowder, Mo.
8SDN, Beckman, Pvt., Camp Crowder, Mo.
8SFT, Knapp, Cpl., Camp Crowder, Mo.
8TZZ, Knowles, Pvt., Drew Field, Fla.
8UXF, Weise, Pvt., Camp Crowder, Mo.
8WDY, McCord, 2nd Lt., Cambridge, Mass.
8WSW, Mensch, T/Sgt., Ft. Monmouth, N. J.
8WTH, Shumaker, Pvt., Flushing, N. Y.
9BTU, Oberzil, Lt., foreign duty.
9EGO, George, Pvt., Camp Crowder, Mo.
9IWI, Bennett, foreign duty.
9KCI, Kearins, 2nd Lt., foreign duty.
9LPW, Colby, foreign duty.
9OOX, Thurston, Lt., Ft. Monmouth, N. J.
9PXS, Fitzpatrick, Pfc., Camp Murphy, Fla.
9QAX, Rock, T/3, foreign duty.
9QMH, Walker, Pfc., Camp Murphy, Fla.
9SMA, Prendergast, T/Sgt., foreign duty.
9TAT, Nordstrom, T/Sgt., foreign duty.
9TTG, Winterheimer, Lt., Philadelphia, Pa.
9WDY, Lisowski, S/Sgt., Brooklyn, N. Y.
ex-9YPC, Byrne, T/Sgt., Lakeland Field, Fla.

Operator's license only:

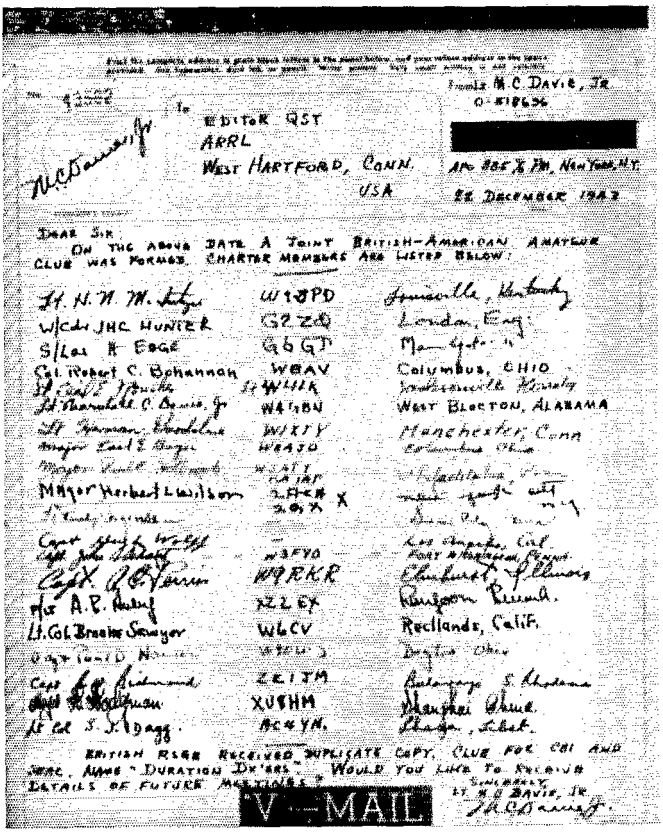
Alderman, Cpl., New Orleans, La.
Byrne, S/Sgt., foreign duty.
Carpenter, Pfc., Claremont, Calif.
Cornelsen, Pvt., Camp Crowder, Mo.
Fagans, Pfc., Camp Murphy, Fla.
Johnson, Cpl., Camp Crowder, Mo.
Kaiser, Pvt., Ft. Monmouth, N. J.
Munns, Lt., foreign duty.
Norweb, Lt., foreign duty.
Russell, Pvt., Louisville, Ky.
Sheer, Lt., foreign duty.
Sherman, T/Sgt., foreign duty.
Slusser, Pvt., North Camp Polk, La.
Weeks, Cpl., Ft. Monroe, Va.

NAVY—GENERAL

1FSV, Teachout, RM3c, Pasco, Washington.
1GCN, Chadbourne, Lt., Egypt, Mass.
1GGV, Grush, A/S, Claremont, N. H.
1NCS, Hale, Sea., Ithaca, N. Y.
2ETI, Hamlin, S2c, Rutherford, N. J.
2IYH, Wingood, S2c, Sampson, N. Y.
2IZJ, Benjaminson, S1c, Chicago, Ill.
2JFA, Kent, Lt., Corpus Christi, Tex.
2NUI, McGrath, EM3c, Great Lakes, Ill.
3DWZ, Schwenk, Princeton, N. J.
3HPI, Kelly, Lt. (jg), Bethesda, Md.
3ILQ, Goldsmith, A/S, Lafayette, Ind.
3IUX, Johnston, CRM, Washington, D. C.
3IVW, Child, CRM, Riverdale, Md.
3IZB, Jones, Lt., Philadelphia, Pa.
3JLX, McCarthy, Lt. (jg), Ft. Schuyler, N. Y.
ex-4DAS, Kirkpatrick, Lt., Miami, Fla.
4FWT, Hicks, S2c, Newport, R. I.
4GNS, Harnett, Tampa, Fla.
4GQE, Foy, A/S, Princeton, N. J.
4IEJ, Mason, Lt., Los Angeles, Calif.
4MS, Collins, Corpus Christi, Tex.
6CHA, Schisel, San Diego, Calif.
6JLL, Crane, RM1c, San Francisco, Calif.
6JRW, Stephens, RE, Washington, D. C.
6PDS, Euler, San Diego, Calif.
6QPP, Johnson, San Diego, Calif.
7IKA, Hendrickson, S2c, Farragut, Idaho
7JK, Lischke, Lt. Comdr., Seattle, Wash.
ex-8CBD, Rafferty, Vero Beach, Fla.
ex-8LYX, Jancar, Phom1c, Washington, D. C.
8NHT, Cundiff, MM3c, Camp Parks, Calif.
8PPF, Boschert, CRT, College Station, Tex.
8RTB, Johns, RM3c, Pasco, Washington
8VSQ, Ballard, Lt. (jg), Wickford, R. I.
8VVA, Schmertz, Annapolis, Md.
8VZ, Anderson, Lt., Norman, Okla.
9ACV, Kline, A/S, Minneapolis, Minn.
9AGO, Rodenburg, Ens., Ft. Schuyler, N. Y.
ex-9CXA, Calhoun, S2c, Oceanside, Calif.
9DGL, Gartner, RM2c, Oceanside, Calif.
9GCP, Simantel, S2c, Hillsboro, Ore.
9HCR, Zindars, CRM, Madison, Wis.
9ICN, Jones, RM, Treasure Island, Calif.
9LCW, Straughn, address unknown.
9OPJ, Hill, Ens., Kearny, N. J.
9RRO, Reilly, Ens., Brunswick, Me.
9SKO, Jewell, A/S, Austin, Tex.
9VDV, Orr, S1c, Takoma Park, Md.

Operator's license only:

Bradley, RM2c, Norfolk, Va.
Corbin, A/C, Lakehurst, N. J.
Cotie, RM2c, Alameda, Calif.
Don, Lafayette, Ind.
Evans, RM1c, Washington, D. C.
Nolde, A/S, Great Lakes, Ill.
Pixler, RM1c, Miami, Fla.
Porter, RM3c, Newport, R. I.



So now there's a newly formed amateur radio club for CBI and SEAC, christened "Duration DXers" — and what DX! Just in case the signatures don't print legibly, the charter members who signed the V-mail letter reproduced above are: Lt. H. N. McIntyre, W9JPD; W/Cdr. J. H. C. Hunter, G2ZQ; S/Lar. H. Edge, G6GD; Col. Robert C. Bohannan, W8AV; Lt. Cecil E. Ffoulkes, ex-W4LK; Lt. Marshall C. Davie, jr., W4GBN; Lt. Herman Goodstine, W1XTY; Maj. Earl E. Boyer, W8AJO; Maj. Paul E. Holbrook, W3ATY-ex-KA1AF; Maj. Herbert L. Wilson, ex-W2ACA-ex-W2QX; Lt. Paul Jorgensen; Capt. Hugh Wolff; Capt. John Schantz, W3FYD; Capt. A. C. Perrin, W9RKR; F/Lt. A. R. Avery, XZ2EX; Lt. Col. Brooke Sawyer, W6CV; Capt. Paul D. Hauser, W9OWJ; Capt. R. W. Richmond, ZE1JM; Maj. H. Hodgman, XU8HM, and Lt. Col. S. J. Dagg, AC4YN.

MERCHANT MARINE AND MARITIME SERVICE

ex-1BSF, Payne; 1CF, Clifford; 1COM, Ashton; 1JXV, Vogeler; 1NKY, Sagan; 2AUW, Geise; ex-2AXL, Katzen; 2BRV, Albert; 2CFJ, Byers; 2FSW, Bicket; 2JOE, Matteson; 2MKT, Hack; 2MUH, Baker; 3CYV, McConnell; 3IGS, Jordan; 3HRI, Bush; 3IJN, Conkle; 3JWN, Crissey; 4DCG, Clark; 4EST, Mansfield; 4GHO, McLeod; 4HMS, Hill; 5EGA, Frank; 5FXK, Ammen; 5GYI, Eckhardt; 5ILQ, Garcia; 5JCV-8ORY, Weaver; 5JPC, Wehrli; 5JRN, Hicks; 6DGC, Limber; ex-6IRR, Epstein; 6MBS, Dixon; 6RUT, Ratekin; 6TDO, Gilliam; 6UIH, Hair; 6UPB, Schrader; 7ALU, Olin; 7BDU, Leaders; 7DXV, Mapes; 7FEH, Tonn; 8KDV, Ropar; 8SAU, Brincka; 8SGE, Smith; 8UWQ, Sienkiewicz; 8VCL, Hoffman; 8WAV, Foster; 9BWW, Ore; 9HGG, Musall; ex-9JUN, Buckles, and 9YCT, Farmer. Fish, Gieseke, Haas, Davidson, Miller, Snyder, and Stockwell hold operator's license only.

100 PER CENT WAR WORK—INDUSTRY

1ABW, Racicot, Southbridge, Mass.
1AVW, Falke, Southbridge, Mass.
1DQH, Mahler, Southbridge, Mass.
1ERC, Lacaire, Southbridge, Mass.
1HFO, Chase, Southbridge, Mass.
1JPL, Kinsman, Southbridge, Mass.
1LTC, Nobrega, Southbridge, Mass.
1MSP, Dumas, Southbridge, Mass.
1RF, Harvey, Southbridge, Mass.
1ZD, Wells, Southbridge, Mass.
3EHW, Roller, Southbridge, Mass.
8IJZ, Bricker, Cleveland, Ohio.
8MAK, Moss, Cleveland, Ohio.
8MWX, Landfear, Cleveland, Ohio.
8OCZ, Hammond, Cleveland, Ohio.
8PWY, Wildman, J., Cleveland, Ohio.
8PYE, Voight, Cleveland, Ohio.
8AZA, Wildman, M., Cleveland, Ohio.
8QPQ, Thompson, Cleveland, Ohio.
8ROX, Sangrik, Cleveland, Ohio.
8SJS, O'Neill, Cleveland, Ohio.
8TP, Davies, Cleveland, Ohio.
8UDZ, Boring, Cleveland, Ohio.

HARVARD RADIO RESEARCH LAB

1AKY, Myrbeck, E. S., Braintree, Mass.
1AWP, Pratt, R. W., Hingham, Mass.
1DNL, Lefkovich, R. H., Dorchester, Mass.
1IKK, Stuart, W. A., Waltham, Mass.
1JOY, Woodsum, S. P., Nahant, Mass.
1KPL, Sawtelle, H. J., Peterboro, N. H.
1KPO, Teele, J. W., Cambridge, Mass.
1LZX, Neilson, R. P., Wellesley Hills, Mass.
1NEN, Schwartz, S., Revere, Mass.
1VT, Lane, H., Belmont, Mass.
1WK, Wood, L. G. S., Quincy, Mass.
2DIW, Rich, S. R., New York, N. Y.
2MWX, Barbee, B. C., New York, N. Y.
5FOO, Jones, F. B., Austin, Tex.
5GUM, Clatfelter, A. C., El Paso, Tex.
6NWW, Heinbach, P. R., Los Angeles, Calif.
7FVZ, Powers, A. B., Kent, Wash.
7GDW, Engh, D. F., Tacoma, Wash.
8ALG, Handel, N. E., Newark, Ohio.
8ANJ, Marlow, W. C., Granville, Ohio.
8CBN, Howe, R. H., Granville, Ohio.
8HMB, Scott, R. M., Cleveland, Ohio.
8LLT, Ebaugh, P., Granville, Ohio.
8MDA, Newburgh, H., Ann Arbor, Mich.
8MTO, Kirkland, R. E., Hays, Pa.
8OA, Hunt, F. V., Barnesville, Ohio.
8SAV, Blackman, N. M., Cleveland Heights, Ohio.
9AMB, Hathaway, J. L., Denver, Colo.
9BDT, Carle, R. F., Terre Haute, Ind.
9CFO, Lange, T. R., Appleton, Wis.
9ECO, Frelich, P. D., Chicago, Ill.
9FFQ, Carlson, M. R., Rockford, Ill.
9GEH, Merritt, T. P., Aurora, Ill.
9HQH, Mills, F. H., Chicago, Ill.
9OAL, Aldridge, A. G., Highland Park, Ill.
9TRI, Morrison, H. J., Galesburg, Ill.

Operator's license only:

Haskins, M. K., Belmont, Mass.
James, P. G., Jr., Brockton, Mass.
Wells, C. H., Falmouth, Mass.

CIVIL SERVICE

1AMT, Herrick, SC, Boston.
1BNJ, Moses, FCC, monitoring officer.
1BNS, Counsell, CAA, Pittsfield, Me.
1CMM, Cox, SC, wire chief.
1CPS, MacIntosh, FCC, radio inspector.
1DBD, Heath, SC, radio techinician.
1DIU, Gahm, SC, radio repairman.
1EUS, Cushing, Navy Dept., inspector.
1GZ, Brown, Washington, D. C.
1HJI, Cushing, jr. radio eng., Washington, D. C.
1HL, Bearse, FCC, Grand Island, Neb.
ex-1HXD, Lajoie, Tucson, Ariz.
1ILU, Parker, SC, inspector.
1JCK, Slupstikas, Navy Dept., Boston, Mass.
1JL, Kazokas, CAA, Jackson Heights, N. Y.
1KFT, Cranston, mechanic, Naval Air Sta.
1LGI, St. James, AAF, instr., Moody Field.
1LJN, Nickerson, Cambridge, Mass.
1LZR, Jeffers, FCC, San Antonio, Tex.
1NVB, LeBrun, SC, Boston.
2AGG, Sprung, Middletown Air Depot, Pa.
2BAD, Bamberg, CAA, aircraft communicator.
ex-2BAR, DiGrigoh, SC, radio technician, Jackson Heights, N. Y.
2BDS, Ercolino, SC, radio engineer.
2BPO, Cross, radio engineer, Allenhurst, N. J.
2DA, Aaron, instructor, Truax Field, Wis.
2DLT, Grunbok, Middletown Air Depot, Pa.
2ELK, Amy, address unknown.
2JK, Colligan, FCC, monitoring officer.
2KCZ, Freedman, Middletown Air Depot, Pa.
2LBF, Zuckerman, SC, foreign duty.
2LMN, Gursky, SC, radio engineer, Washington, D. C.
2MAK, Dumont, Middletown Air Depot, Pa.
2MPS, Peterson, Navy Dept., inspector.
2MSE, Plummer, Navy Dept., Norfolk, Va.
2NEU, Gaspierik, SC, radio engineer, Ft. Monmouth, N. J.
2ODU, Kronitz, AAF, senior mechanic.
2ODX, Siegel, foreign duty.
ex-2PW, Koch, SC, Camp Murphy, Fla.
3AUB, Darlington, OWI, New York, N. Y.
3AXG, Sorrell, Washington, D. C.
3AZJ, Stickney, Middletown Air Depot, Pa.
3CA, Hornack, SC, plant engineer, Philadelphia, Pa.
3DJZ, Hopple, Middletown Air Depot, Pa.
3EOV, Fisher, CAA, radio electrician.
3ESV, Coover, SC, radio engineer, Ft. Monmouth, N. J.
3EWW, Quynn, FCC, monitoring officer.
3FUV, White, FCC, Baltimore, Md.
3GNW, Riggs, Middletown Air Depot, Pa.
3HDJ, Williams, SC, radio eng., Delanco, N. J.
3HWN, Hertzler, Middletown Air Depot, Pa.
3IE, Chapman, CAA, radio engineer.
3IVM, Hyatt, CAA, foreign duty.
3JNM, Johnson, FCC, monitoring officer.
3JQH, Garland, Scott Field, Ill.
3UU, Thompson, Middletown Air Depot, Pa.
4CTP, Coan, SC, inspector, Bridgeport, Conn.
4DPO, Alexander, radio mech., Rome, N. Y.
4EXW, Arlt, CAA, Lincoln, Neb.
4FNZ, Poindexter, aircraft radio mech., Baton Rouge, La.
4GN, Watkins, CAA, aircraft communicator.
4GPW, Houston, research engineer, Washington, D. C.
4GQM, Finger, CAA, radio engineer, East Point, Ga.
4GYJ, Sartain, FCC, Marietta, Ga.
4HD, Rhea, CAA, airways engineer.
4HMG, McGraw, CAA, Columbia, S. C.
4HMP, Baucum, SC, radio eng., Mobile, Ala.
4HWS, Cunningham, instructor, Naval Air Sta., Atlanta, Ga.
ex-5BU, Cutter, FCC, intercept officer.
5CCL, Butler, radio operator, Ft. Sam Houston, Texas.
ex-5DME, Molloy, CAA, Tulsa, Okla.
5EJG, Tompkins, CAA, Austin, Tex.
5ELO, Irwin, radio mechanic, Pampa, Tex.
5FUD, Bradley, CAA, foreign duty.
5HJT, Hays, CAA, Tulsa, Okla.
ex-5HQJ, Valentine, radio operator, Ft. Sam Houston, Texas.
5HQM, Maupin; radio mech., Oklahoma City.
5HTL, Meador, FCC, radio inspector.
5HYV, Musselwhite, radio mechanic, Grenada, Miss.
5ILJ, Dansby, instructor, Kelly Field.
5INN, Morgan, SC, radio mech., Monroe, La.
5IWJ, Glover, radio eng., Washington, D. C.
5JQX, Hale, radio operator, Ft. Sam Houston.
5KBA, Brooks, Oklahoma City Air Depot.
5KBZ, Crosby, CAA, radio technician, Ft. Worth, Tex.
5KMM, Cline, radio operator, Ft. Sam Houston, Texas.
5KPY, Jeffcoat, CAA, radio electrician.
5VQ, Gisel, CAA, Ft. Worth, Texas.
6AD, Webb, inspector, Alameda, Calif.
6CVG, Reese, SC, radio technician, Lakeport, Calif.
K6ETF, Blatt, Navy Dept., foreign duty.
6FKQ, Sinclair, Navy Dept., Calif.
6HLM, Orella, SC, San Francisco, Calif.
6HPB, Wolfe, SC, communications operator, Oakland, Calif.
6HWW, Hammer, foreign duty.
6LD, Hammond, foreign duty.
6LNS, Pilkington, SC, San Francisco, Calif.
6LSK, Woodley, radio mech., Luke Field, Ariz.
6OMQ, Barrick, FCC, monitoring officer.
6RFS, McLeroy, CAA, aircraft communicator.
6RLC, Lawrence, Navy Dept., foreign duty.
6SIZ, Wallace, foreign duty.
K6SMP, Banks, CAA, Arlington, Va.
7AMN, Thompson, FCC, radio inspector.
7AVR, Staples, CAA, aircraft communicator.
7DVK, Zeckman, CAA, radio electrician.
7GJU, Jordan, radio operator, Puyallup, Wash.
7GOA, Wilson, Middletown Air Depot, Pa.
ex-K7GZ, Clark, radio engineer, Ft. Sam Houston.
7HXG, Bates, CAA, radio communicator.
7HXV, Cowles, CAA, radio electrician.
7IVJ, Woods, instructor, Camp Hale, Colo.
8CPZ, McElbeny, Middletown Air Depot.
8DEC, Bonawitz, radio inspector.
8DQE, Grimes, FCC, radio operator.
8DYO, Grove, SC, inspector.
8JMC, Smith, CAA, aircraft communicator.
8KEW, Fleming, SC, radio engineer.
8LIQ, Sage, SC, radio engineer.
8QPB, White, Middletown Air Depot.
8RHB, Warnock, radio engineer, Wright Field.
8VHO, Crammer, repairman, Ft. Adams, R. I.
8WWL, Hedgecock, CAA, radio electrician.
ex-9AXR, Wiggins, radio mech., Oklahoma City.
9BHS, Biermann, CAA, Tulsa, Okla.
9DCC, Horton, Dayton Signal Depot.
9DPB, Gerard, Navy Dept., instructor.
ex-9DQ, Range, CAA, aircraft communicator.
9FUI, Grissom, SC, radio mechanic.
9GDZ, Bath, SC, inspector.
9GTD, Ebel, Wright Field, Ohio.
9GWF, Ramsey, instructor, Scott Field.
9IYN, Harding, AAF, instructor, Sioux Falls.
9JMQ, Hill, Signal Corps.
9LHQ, Saucke, CAA, Kansas City, Mo.
9LUE, Klein, FCC, monitoring officer.
9NWY, Rasmussen, CAA, aircraft communicator.
9OGT, Novotny, CAA, aircraft communicator.
9OXQ, Snoddy, FCC, monitoring officer.
9PLP, Henderson, Wright Field, Ohio.
9QFC, Lomprey, instructor, Truax Field.
9RPD, Lawrence, CAA, radio electrician.
9WHO, Lain, AAF, radio engineer.
9ZLM, Killilea, CAA, aircraft communicator.

Operator's license only:
Huddleston, AAF, radio mechanic.

Paul M. Wilson, W4HHK, a radio officer in the merchant marine, surely has a fitting number-plate for a ham. Hi! WJG is the call of a ship-to-shore radiotelephone station in Memphis, where W4HHK operated in early 1943, and, for good measure, the city license on the car is 88!

HAM HOSPITALITY

SOUTH AFRICA comes to the fore with an extended hand and a hearty welcome this month. L. W. Ensor, ZS6BJ, Honorary Secretary of the Radio Amateur Society, Johannesburg, Union of South Africa, tells us that his home is always open to hams. His address is 143 Great Britain Street, Kenilworth, Johannesburg. Busses: 39, 32 and 19. Telephone: 32–1765.

An effort is being made to compile a list of all others willing to offer hospitality and accommodations to visiting hams in South Africa. As these names are received, they will be mentioned in this section in future issues of *QST*.

As you will see from the picture at the left below, many of our boys are now meeting their former DX contacts all over the world. Lt. J. J. Macnak, W9RGB, of the U. S. Signal Corps, visited J. D. S. Fahey, ZK1AA, while on leave in the South Pacific. From their expressions we'd guess that the demands of the war were temporarily abandoned for pleasant reminiscences of pre-Pearl Harbor days.

There are many welcome mats out all over the globe for our OMs. We would appreciate information about more of these so that this portion of our column may be continued.

While on leave from his duties with the Signal Corps in the South Pacific, Lt. J. J. Macnak, W9RGB, paid a visit to Des Fahey, ZK1AA. Looks like very pleasant country down in those islands, too!

Left — The transceiver in operation, mounted on a tripod.

WKXM-8— A Novel WERS Transceiver

An Easily Constructed Battery-Operated 112-Mc. Transceiver

BY HAROLD L. MITCHELL,* W4IBZ

Here is a practical solution to the problem of supplying WERS needs for battery-operated equipment which can be made from priority-free components. Almost every part required can be salvaged from discarded equipment or adapted from junk-box materials. The construction is simple, and the performance of the transceiver is reported to be adequate for the purpose for which it is designed.

ONE of the major objections to the use of the same tube for both transmitting and receiving, as is done in the usual transceiver circuit, is the tendency for the frequency setting to creep across the assigned band during a series of transmissions between two such transceivers. This tendency arises from the fact that the dial setting for best reception often differs from that for optimum transmission on the same frequency. If the receiving operator tunes his transceiver to give maximum response from the received signal, when he switches to transmission his frequency will have shifted. The operator of the other transceiver in turn will be compelled to readjust for better reception. Thus a halting trek across the dial begins, ending all too often outside the band.

Unit No. 8 of the Mobile County (Ala.) WERS station, WKXM, was designed to avoid this difficulty while still retaining the transceiver's characteristic advantages of simplicity, compactness, and low battery drain. This feature was achieved by incorporating a device for changing the degree of antenna coupling when shifting from the "receive" position to "send," and vice versa. In the arrangement used the grounded end of the antenna coupling coil is attached to the moving rotor plate of the wafer-type change-over switch, the other lead being a length of flexible wire connected to the antenna. Turning the switch knob automatically changes the coupling. The antenna coil is trimmed in size and the length of its leads adjusted until the required difference in coupling is attained for either position. This arrangement does away with the necessity for using separate tubes for detector and modulated oscillator, together with the r.f. switching which would be required if separate tuned circuits were used.

*311 S. Monterey St., Mobile, Ala.

Another novel feature of this unit is the use of a close-spaced parasitic element as a reflector, yielding appreciable gain over the usual simple transceiver antenna. The choice of half-wave elements likewise represents an improvement over the more usual quarter-wave rod.

This transceiver was designed for use with the Signal Corps Type BA 32 battery pack. The BA 32 is a single unit which supplies 3 volts for filaments, 4½ volts for microphone, 13½ volts for bias and 144 volts for the plates. Thousands of these packs have been released to WERS organizations after the expiration dates assigned by the manufacturers were reached. Most of the batteries are still good for many hours of service. They may be obtained on application of the deputy radio aide through his district radio aide to the state WERS radio officials.

Circuit

A 1Q5GT beam-power amplifier tube, triode-connected, operates as a self-quenched superregenerative detector for receiving and as an ultraudion oscillator for transmitting, as shown in Fig. 1. The grid condenser, C_2, is returned to the high-voltage portion of the circuit instead of being placed across the grid leak.

A 1D8GT diode-triode-pentode tube serves as a two-stage audio amplifier for receiving. It was found that the triode section was not needed when transmitting, since a good single-button carbon microphone provides sufficient input for the pentode section alone for adequate modulation of the 1Q5GT oscillator. The triode and pentode sections of the 1D8GT are resistance-capacity-reactance coupled, employing the secondary of the microphone transformer, T_2, as a grid impedance. This winding will present a high im-

pedance when the primary is opened in the receiving position. The diode section of the 1D8GT is not used in either transmitting or receiving, and therefore has been omitted in the circuit diagram.

Sufficient bias for the triode section of the 1D8GT is secured by connecting its filament to the "A"+ terminal and grounding the grid return from the interstage transformer, T_1. The filaments of the two tubes are series connected because the filament supply provided by the BA 32 battery pack used is 3 volts.

When the wafer-type rotary change-over switch is in the "receive" position, the output of the 1Q5GT is connected to the primary of T_1 and plate voltage is supplied through the regeneration control, R_3. At the same time, the modulator lead from T_3 is broken. The grid of the 1Q5GT is connected to the 2-megohm receiving grid leak, R_1, and at the same time the low-value transmitting grid leak, R_2, is removed from the circuit. A third set of contacts on the switch breaks the microphone circuit and completes the voice-coil circuit of the p.m. speaker.

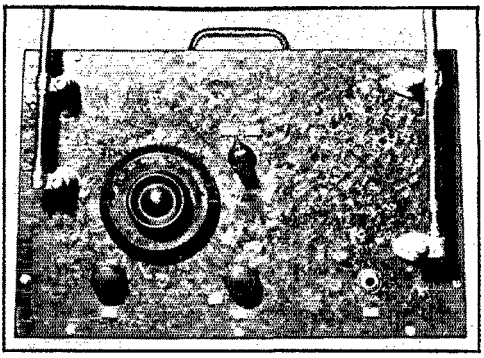
The fourth set of contacts on the change-over switch is unused except for the movable contact, which is grounded. The antenna coupling coil, L_2, is soldered to this contact by one of its leads in such a way that the shift of switch position moves the coil with respect to the tank coil, L_1, to vary the coupling and compensate for differences in coupling requirements for receiving and transmitting.

Construction

The case, which measures 12 × 8 × 4 inches, is made of sheet metal finished on the exterior with black crackle paint. A handle is attached to the top of the case to provide for hand carrying when the unit is not used on a fixed support. A camera tripod socket is mounted flush with the bottom surface.

The chassis is also of sheet metal, folded to make a pan 11 × 3½ × 2½ inches. It is attached to the removable front panel of the case. The 4-inch p.m. speaker is mounted at the right front of the panel, opposite the tuning dial for C_1. Between them is the change-over switch, S_1. On the front of the panel, to the left of the tuning dial, are the stand-off insulator and the lower feed-through insulator used to support the antenna rod. Stand-off insulators for supporting the reflector rod are mounted on the right of the panel. The reflector is spaced a distance of 10 inches from the antenna.

Looking at the chassis top from the rear, the output transformer, T_3, is mounted at the left. Near T_3 is the inverted socket for the 1D8GT. The triode section plate resistor, R_5, and its bypass condenser, C_6, as well as the electrolytic condenser, C_7, are mounted on the socket terminals. On the change-over switch, S_1, are mounted the receiving grid leak, R_1, the quench-frequency bypass condenser, C_4, and the two r.f. chokes, RFC_1 and RFC_2. To the right of the change-over switch is the tuning condenser, C_1. This is a midget single-section b.c. condenser, stripped



This panel view of the transceiver shows the antenna rod at the left and the close-spaced parasitic reflector at the right. The main tuning dial is at the left, with the change-over switch knob at its right. The regeneration control knob is at the lower left, the volume control knob at the lower center and the microphone ack at the right.

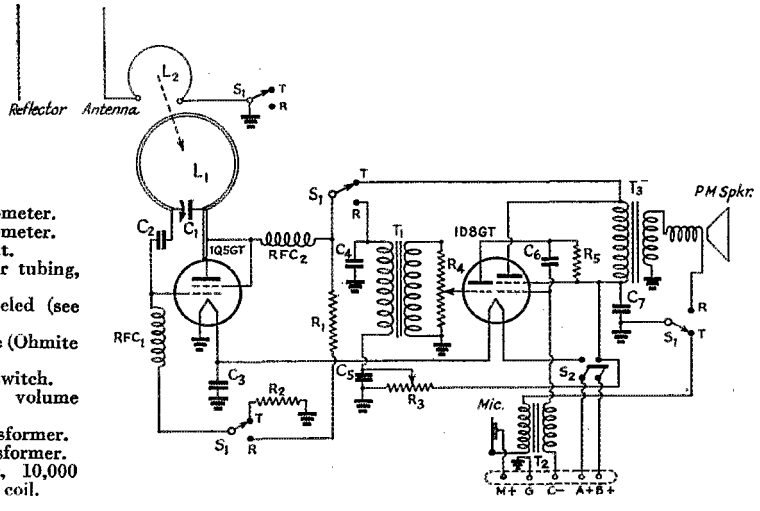
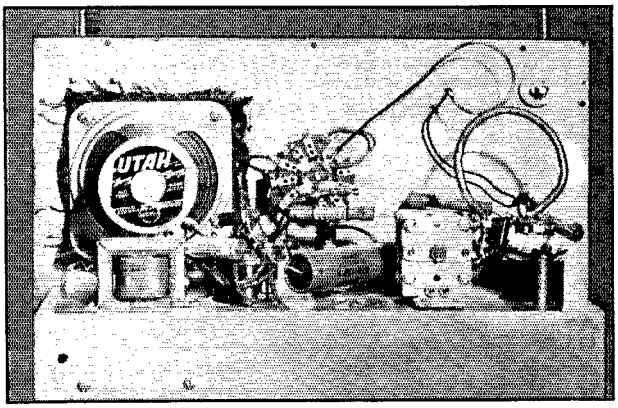


Fig. 1—Circuit diagram of the WERS transceiver.

C_1 — B.c. variable cut down (see text).
C_2 — 0.0002-μfd. mica.
C_3 — 0.001-μfd. mica.
C_4 — 0.005-μfd. mica.
C_5, C_6 — 0.05-μfd. paper.
C_7 — 20-μfd. electrolytic.
R_1 — 2 megohms, ½-watt.
R_2 — 15,000 ohms, 1-watt.
R_3 — 100,000-ohm potentiometer.
R_4 — 500,000-ohm potentiometer.
R_5 — 150,000 ohms, ½-watt.
L_1 — 1 turn ¼-inch copper tubing, 2¼-inch diameter.
L_2 — 1 turn No. 12 enameled (see text).
RFC_1, RFC_2 — v.h.f. choke (Ohmite Z-O).
S_1 — 4-p.d.t. rotary wafer switch.
S_2 — D.p.s.t. switch on volume control.
T_1 — Interstage audio transformer.
T_2 — S.b. microphone transformer.
T_3 — Output transformer, 10,000 ohms to 3-ohm voice coil.



A rear view of the WERS transceiver chassis. The inverted socket for the 1D8GT tube appears at the left and the 1Q5GT r.f. tube socket is at the right. The method of mounting the antenna coupling coil on the movable rotor of the change-over switch is shown, as well as the relative size of the coil for this particular unit. Experimental adjustment of the coupling coil required under various conditions may result in some departure from the arrangement shown.

down to one rotor and one stator plate. It is insulated from the chassis by means of ceramic strips. An insulated coupling and extension shaft connect the rotor to the tuning dial, isolating the condenser from the metal panel and lessening body-capacity effects.

The tank coil, L_1, is made of a single turn of ¼-inch copper tubing, 2¼ inches in diameter. One end is soldered to a lug on the end-plate of the tuning condenser, C_1. The other end is connected to the plate terminal on the 1Q5GT socket.

At the extreme right of the chassis as viewed from the rear is the inverted socket for the 1Q5GT. This socket, as well as that for the 1D8GT, is raised above the top of the chassis by means of 1-inch spacers. Clearance holes are cut in the chassis below the sockets. These holes are made large enough to permit inserting the tubes from the bottom. Condensers C_3 and C_3 are supported from the socket connections, as are the transmitting grid resistor, R_2, one end of RFC_1, and the plate end of L_1, all being arranged below the chassis as convenience dictates. A d.p.s.t. switch, S_2 (not shown in the photographs), has been added to disconnect the battery circuits when the transceiver is not in use.

Antenna

The antenna and the parasitic reflector both are made of auto-type whip antenna sections which can be adjusted to one-half wavelength at 2½ meters. When in use the antenna rod is extended to approximately 48 inches and the reflector to approximately 51 inches. Mounted on the front of the panel, they are separated by 10 inches. By means of the feed-through insulator at its lower end, the antenna is connected to the free end of the antenna coupling coil, L_2, which is rigidly mounted on the grounded moving contact of S_1. The coupling coil is made of No. 10 or No. 12 solid copper wire, the heavy wire serving both to prevent undue vibration and to provide rigid support. The diameter of the coupling coil as well as the length of its leads were varied experimentally until the combination of these with the capacity of the antenna feed-through insulator was anti-resonant at the desired frequency, in the neighborhood of 115 Mc. The arrangement allows the coupling to be made very loose and still load the 1Q5GT tube to its limit.

The battery pack, which is in a separate container, is connected to the set through a five-wire cable, 6 feet in length.

Performance

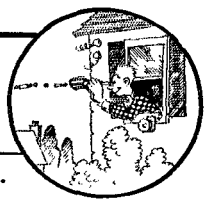
When first constructed the unit was used with a simple half-wave antenna. However, it was found that with this antenna the set did not have quite enough range for its intended use. The addition of the parasitic reflector resulted in a three-fold increase in field intensity as indicated by a field-strength meter. The signal was brought up sufficiently to provide an S7 signal at the control station, over a distance of three miles. Communication has been carried on satisfactorily with moving cars at a distance of two miles.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1JUV, Frederick W. Pierce, Fort Fairfield, Maine.
W1KBT, Clarence L. Moore, West Bridgewater, Mass.
W2ONU–ex-W1NEJ–ex-W3HDI, Daniel S. Pensyl, Garden City, L. I., N. Y.
W3FTS, George D. Walter, Harrisburg, Pa.
W3HKM, Pvt. Walter J. Reis, Lindenwold, N. J.
W6UNY, S1c William F. Grabe, jr., Tucson, Ariz.
W8VNK, Paul L. Miller, Leavittsburg, Ohio.
W9MCA, Paul F. Barnes, Ferguson, Mo.
G8SS, LAC John G. Stokes, Queensborough, Isle of Sheppey, Kent, England.
VK3HM, Mrs. L. E. Hutchings, Callawadda, Victoria, Australia.

EXPERIMENTER'S SECTION



Address correspondence and reports to ARRL, West Hartford, Conn.

PROJECT A

Carrier Current

FOLLOWING the appearance of the articles on carrier current in *QST* for March, 1942, I ran tests on 10 Mc. I found that the radiation was about as strong as the line signals and immediately abandoned tests on frequencies above 200 kc.

In February of 1943 I built a low-frequency oscillator similar to the one described in the March, 1942, issue. The only difference was in the tank coil and condenser values. At about the same time a friend and fellow-ham, Howard Cripe, built a similar oscillator.

In April I built a low-frequency converter, although thus far I have not been able to receive signals with it beyond a few hundred feet. I have now found the trouble and hope to get the converter going soon. Meanwhile, last October I turned in desperation to the use of a regenerative detector and one-step a.f. amplifier. First tests with Howard Cripe, on 187 kc., were without results until we discovered that conditions were more favorable before 5:30 P.M. We assume that this is because of the greater loading of the line by lighting fixtures during the evening hours. On our first successful attempt we covered a distance of about half a mile on a frequency of about 160 kc. We continued to carry on successful communications until Harry's power transformer burned out. We plan to resume as soon as he has completed a new power supply.

We would be exceedingly glad to exchange signals with anyone else out here. I would be glad to furnish information about the circuits we use.

Since we are wartime hams, we have never been on the air nor had calls assigned. Realizing that we have a lot to learn, we believe that wired wireless is a fair substitute for better circumstances in which to learn the ham game. — *Harry Keep, 4156 Neosho Ave., Venice, Calif.*

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I have at last completed construction of a carrier-current transmitter-receiver like the one described by W6RLJ in June, 1943, *QST*. While I have not heard any signals, I believe that the rig is working properly since I hear various line noises. Now I would like to find someone to communicate with in Kansas City. — *Robert Hyman, 408 E. 63rd St., Kansas City, Mo.*

— • • • —

I have a three-tube converter working into a Sky Buddy for w.w. reception, and a transmitter is under construction. I would be glad to test with anyone in the vicinity who is interested. My telephone number is TA-7232. — *Robert S. Smith, 3019 Ruckle St., Indianapolis 5, Ind.*

— • • • —

I'd like to know of some fellows in the Chicago area who are interested in carrier current transmissions. I have a *QST* transmitter. My receiver is a Corona home receiver. I'd like to hear of a simple converter circuit requiring few parts. — *John Bartlett, 5636 S. Maplewood, Chicago, Ill.*

— • • • —

W2OCV of Ridgefield, N. J., and I have constructed wired-wireless rigs but I guess our power lines do not connect, since we haven't had a QSO. I would like to know if any of the boys in my locality are interested. — *John J. Oetjen, W2OCH, 1217 86th St., North Bergen, N. J.*

— • • • —

Please print my name and address. I am interested in c.c. transmission. — *John Boisvert, 153 W. Pleasant St., Westbrook, Me.*

— • • • —

I am interested in c.c. and would like to contact anyone similarly interested in my area. — *Richard Siegler, 371 Stegman Pkwy., Jersey City, N. J. Tel. BE-4-3583.*

— • • • —

I would like to hear from persons in Baltimore interested in c.c. transmission. The rig here is a five-tube 'phone job which tunes from 140 kc. to 300 kc. The r.f. section consists of a 6SK7 oscillator and 6U6G amplifier. The speech line-up is a 6F5 driver and 6V6G modulator with a built-in power supply employing a 5U4G rectifier. I have access to many c.c. kinks as we have several c.c. jobs in production in our test department. — *K. Kelly, 3303 Walbrook Ave., Baltimore 16, Md.*

PROJECT B

Light Beams

A GOOD "front lens" for light-beam projectors can be obtained from the "Air Raid Warden" telescope manufactured by the Air-Line Mfg. Co. in Indianapolis, Ind. It is available in some five-and-ten stores at a cost of 50 cents. The lens is about 1½ inches in diameter. It is plano-convex and has a focal length of about 15 inches, about right for light-beam experiments. The lens is a cheap one, naturally, and non-achromatic, but I have found that achromatic corrections are secondary to a desirable focal length.

My first rig had a very expensive German-made lens which was achromatic and anastigmatic and a built-in focusing arrangement in the mounting, and everything else that is good. However, the lens was taken from a movie camera and had a focal length of only 2 inches. Despite my best efforts I got a beam about four feet wide at only a couple of hundred feet. When I built another rig using the above-described telescope lens of 15 inches focal length, it projected a readable beam for a distance of 1.8 miles. This was in the middle of a city and the many lights made it hard to pick out the right one. The beam was aimed at a traffic signal, and five feet away from the target the beam could not be seen. A 1.4-volt bulb was used with a single dry cell.

It has been found that, for accuracy in focusing, the filament must be visible against the target. At night this may be achieved by placing an auxiliary light about five feet in front of the rig and to one side. A point will be found at which the filament can be seen clearly, and the target at the same time. (A weak light mounted in a housing over the projection lamp and illuminating it through a slit will also accomplish the purpose.)

The usual method of fixing the distance between the lens and projector lamp filament is not sufficiently accurate. When the eyepiece is focused on the filament and the front lens is adjusted for a clear picture, the result is not always satisfactory. The eyepiece should be focused upon the *center* or even the front end of the filament, but with the filament mounted endwise as is recommended for the greatest concentration of light, the portion which usually is focused upon is the back end of the filament. An improvement results when the light beam is thrown upon a white screen, two or three feet in diameter, at a distance of about 65 feet. The front lens is then adjusted for minimum width of beam, then the eyepiece may be adjusted for a sharp image for aiming the beam.

A good elevating and horizontal-shift mechanism should be incorporated in the rig for easy focusing. It is very difficult to secure satisfactory adjustments when using a simple tripod.

The camera-type transmitter may be held in the hand during transmissions and kept on the target by sighting through the eyepiece, if an automatic shutter is incorporated to block the eyepiece whenever the filament is lit. Such a device is suggested in Fig. 1. When the shutter is being adjusted, great care should be taken to avoid injury to the eye which may be caused by looking at the lighted filament.

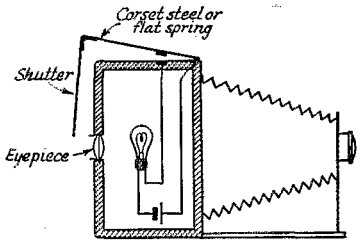

Fig. 1 — A device for keying a light beam which permits constant inspection of the target. The shutter covers the eyepiece whenever the filament is lighted, preventing injury to the eye. The spring should be so adjusted that the eyepiece is entirely covered before the contacts close. Keying is accomplished by pressing down on the spring at a point behind the contacts.

Two lighted buildings a couple of miles apart may be utilized by operators to help them to find each other and to keep "on the beam." Each operator keeps in a position along the line of sight between the buildings.

I would like to communicate with someone in Burbank, Calif., and arrange for trying light-beam experiments with him. It takes too much gasoline to drive away a couple of miles after setting up the rig, to see if it is visible! I am interested in hearing from anyone in the Los Angeles-Glendale area who would like to attempt some "DX" communication across the San Fernando valley. I have a 6-inch reflecting telescope with a focal length of 50 inches which can be adapted as a part of the equipment. — *Frank Williams, W6ULE, 748 Glenview Rd., Glendale 2, Calif.*

PROJECT F

Supersonics

A SUGGESTION concerning supersonics which I have not seen in print is the use of a condenser-type loudspeaker as a signal source. The speaker is clipped across a choke coil in the plate circuit of a power output tube. It seems to me that, as a result of the high impedance and high a.c. voltage existing at that point in the circuit, the speaker should be driven at fairly high efficiency. — *Harlan E. Grimes, W8QHW.*

Strays

Optical lenses for military use are now being coated with a very thin chemical film which helps to reduce reflection characteristics. As a result, American troops will be equipped with superior binoculars and telescopes.

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Television color reception has been obtained by Adolph H. Rosenthal of New York by adaptation of the "subtractive method" of ordinary photography instead of the often proposed "additive method." The new system has produced pictures of equal brilliance with only a fraction of the illuminating light necessary in the latter method. White light is passed through successive transparent image screens which "subtract" the unwanted color wavelengths of the light. — *Science News Letter.*

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Film sound recording and reproduction equipment has made possible new military training techniques which have cut by 40 per cent the time formerly required to instruct recruits.

Key-Click Elimination

A Blocked-Grid System Using a Keyer Tube

BY A. FICIONADO*

IN THESE days, when all we can do with the old rig is make plans for its future, the time is ripe to open the closet door and drag out that old skeleton — key clicks.

Ever since Noah built the first ark, transmitters have been keyed by putting the key in some circuit where output stops when the key is open, where the current is not heavy enough to melt the contacts, and which is not at such a high-voltage point that it would electrocute the operator if his finger slipped off the knob. (Some transmitters don't even fulfill these conditions!) This method will cut up the carrier into chunks resembling dots and dashes, but it also produces key clicks that sound like peanut-brittle in church.[1]

Sometimes harsh words from the RI or the threat of lynching at the hands of neighboring BCLs have led hams to thumb through references for dope on key-click filters. However, some of these things are only palliatives. Let's see what causes the clicks and perhaps we can find a cure.

To get down to fundamentals, there is energy stored in each inductor that carries a current and in each condenser that has a voltage across its terminals. Since the change from "key up" to "key down" (and vice versa) causes changes in these currents and voltages there must be a shifting of this stored energy whenever the key is closed or opened. Now a telegraph key opens and closes a circuit abruptly, with the result that this rearrangement of energy takes place *instantly*. Even a small amount of energy trying to move instantly produces surges of current and voltage that are very much greater than the normal values. These brief surges are called transients.

Transients in the keying circuit itself sometimes result in arcing at the key contacts. If we key in a grid circuit we can avoid the arcing, but the transients will still be produced in other circuits. If all these transients did was to break down the insulation once in a while, we wouldn't care. The bad part is that these transients also cause sharp peaks of antenna current, which in turn produce key clicks.

Putting condensers and chokes around the key is like drilling a hole in the bottom of a boat to let the water out. They simply store up more energy that must be shifted around. If, by careful juggling, we do find a combination which will eliminate the click when the key is opened, it usually makes the click that much worse when the key is closed. Even if Einstein could make one of them work (which I doubt), it won't stay put and it is still wrong in principle. The proper way to prevent key clicks is to provide a circuit which will raise and lower the output gradually and smoothly as the key is opened and closed.[2]

Fig. 1 (you can't miss it — it's the only one there is) shows a circuit which will give you keying as smooth as a baby's — well, never mind the simile. The bias supply (marked 250 volts in Fig. 1) must be high enough to block one of the low-power buffer stages. When the keying-tube grid is negative it has no effect on this bias. When the keying-tube grid is at zero voltage the plate-to-cathode resistance of the keying tube acts as a heavy load on this bias, thereby reducing it so that it no longer blocks the buffer. R_3 is placed in series with the bias supply to make the short-circuiting effect more complete. Keying is thereby effected by changing the grid voltage of the keying tube.

The grid voltage of the keying tube is made to change gradually and smoothly by means of the condenser, C_1, and resistor, R_2. The action is like this: With the key closed, the grid voltage of the keying tube is zero. When the key is opened, the grid gradually goes negative as the condenser, C_1, is charged by the 45-volt battery through the resistors, R_1 and R_2. With the values shown it will take roughly 1/100 second for the grid to become fully negative. When the key is closed again, the grid voltage will gradually return to zero as the condenser, C_1, discharges through the resistance of R_2. This likewise takes about 1/100 of a second. Condenser C_1 must be mica insulated, because the leakage of a paper condenser will be enough to spoil the timing. Incidentally, resistor R_1 has been put in to keep the current down to about 1 ma.; otherwise the 45-volt battery would be short-circuited when the key is closed.

Just one word of caution. Don't plan on keying the oscillator. It won't start oscillating gradually, but will hold fire and then take off with a bang.[2] This produces key clicks and voids your guarantee.

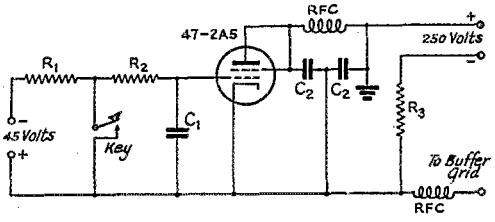


Fig. 1 — Wiring diagram of the blocked-grid click-eliminating keying circuit.

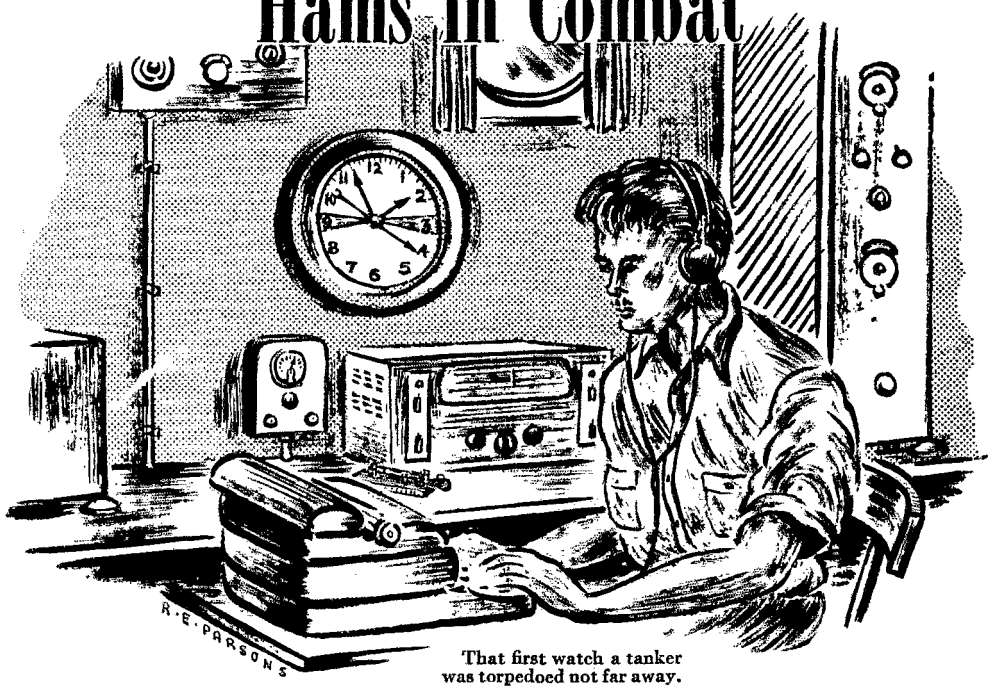
C_1 — 0.01-μfd. mica. R_2 — 1 megohm.
C_2 — 0.002-μfd. mica. R_3 — 25,000 ohms.
R_1 — 50,000 ohms. RFC — 2.5-mh. r.f. choke.

* See "Splatter," this issue (p. 94).

[1] Peanut brittle *es un tio de dulce, muy duro, que hace mucho ruido cuando se come.*

[2] Goodman, "Some Thoughts on Keying," *QST*, April, 1941, p. 17; "Keying the Crystal Oscillator," *QST*, May, 1941, p. 10; "Tube Keying," *QST*, June, 1941, p. 30.

Hams in Combat



That first watch a tanker was torpedoed not far away.

A Ham Goes to Sea

BY A. C. JONES,* W3NE

LATE in 1941 things were going swimmingly with the Peninsula Amateur Radio Club down in W3. What did you want in the way of ham radio? Code classes? Step this way — twice a week. Want to go on the air? Just kick the switch under the edge of the desk. Hamfests? Naturally, complete with fried chicken. Technical talks? Learned club members, given any encouragement or no discouragement, would hold forth at great length on the latest radio developments. (But not W3NE. He was the lad who wore out all the diagrams in the book when pestered by the constructive urge and whose jaw hung slack as the wizards of the slide-rule and blackboard expounded higher mathematics.)

Meanwhile, of course, there was a war going on. But that was over in Europe, and we were going to be the Arsenal of Democracy. Well, we had a good time, didn't we?

Then came December 7th, and our country relinquished the side lines and began to carry the ball. Word was passed that Uncle needed radio operators and technicians, and attendance at club meetings began to drop off. Younger members joined the armed forces while the older heads went after radio jobs essential to the war effort.

W3NE scanned Civil Service notices long and carefully. By the time the fine print was reached the outlook seemed very gloomy; most of the requirements constituted a diabolical list of his shortcomings. He held no B.S. in E.E., had no commercial license, could not take 25 per in code groups on the mill. Applicants were being hired on the strength of the information given in their applications, without written examination. If they proved unsatisfactory on the job, they were shipped home COD.

Which was better — to kid 'em a little on an application blank or risk a long trip back from Lord-knows-where "at expense of applicant"? Honesty carried the day, and our hero tempered the truth not at all. Also, he got no job.

Then, at the club one meeting night, W3AKN tossed him a post card, remarking that here was something W3NE might be able to do. The card bore an admission that a certain big oil company was interested in hiring radio operators, the main requirement being an ability to copy code at 15 per. Yes, here *was* something W3NE could do. He'd had the club's code class on his hands for over five years, and his signal was not entirely unknown on the low end of 40. . . .

So it came to pass that, one meeting night in the spring of '42, W3NE informed the club that he was going down to the sea in ships. Thereafter events moved swiftly. Arriving at his prospective employer's office, W3NE sought the office of the radio supervisor. Paper work, code test, interview, physical exam — all went well.

Finally the supervisor telephoned another office, winding up with: "Put him on the payroll. Yes — today." Then, turning to W3NE: "By

*48 Claremont Avenue, Hampton, Va.

the way, we expect you to get a commercial license at the earliest possible time."

Up to that moment the commercial exam had been an ordeal viewed dimly through a haze of time. Now it suddenly became a Thing-That-Must-be-Done. Obviously, some heavy cramming was in order. Books were bought — two of them. One would have been sufficient. . . .

There followed a week of standing night watch at the company's shore receiving station, waiting for a ship. That week was an ear-opener. It disclosed the conditions under which the harried merchant marine was operating, and also served to initiate W3NE in the ways of marine radio procedure.

The technical books were tackled several hours daily, and it became apparent that a commercial ticket wasn't too tough, after all.

At the end of the week, no ship appearing, they loaded W3NE on a train and shipped him prepaid to another port. There he was signed on one of the largest tankers in the world, a long, low vessel in a dull coat of wartime gray. She was loaded to the gills and ready to shove off.

After that week of listening at the shore station, it was a surprise to discover that the men on the big gray ship were a light-hearted crew, free of foreboding over the menace in their path. Their friendly welcome made W3NE feel entirely at home by the time the tanker slipped out to sea.

The first day was fine, but when night came he couldn't sleep. Off watch he sought the deck, but he found no help there. The sea was full of spectral periscopes and every streak of phosphorescence was a torpedo's wake. Back in his bunk, he tossed and tumbled until 3:45 A.M. — time to go on watch.

That first watch a tanker was torpedoed not far away. Her SOS with its 500-cycle modulated note sounded like a voice from another world, telling the shore stations the ship was sinking. They immediately acknowledged and rebroadcast her distress message. That was the last that was ever heard of her.

Somehow the realization that actual danger had brushed closely by served to dispel the imaginary hazards. Off watch finally at 8 A.M., W3NE turned in — and promptly slept. It wasn't hard to sleep in the daytime, he found. After the first few days it wasn't hard even at night, and the number of mental periscopes diminished.

Nearly every night brought its quota of SOS and SUB SIGHTED calls. A second tanker was torpedoed near by. She went up in flames before the operator could get off an SOS, but another ship took a chance and fired up with the grim announcement that the tanker had exploded. The following afternoon a terse SOS TORPEDOED proclaimed that yet another cargo vessel had got it in broad daylight. . . .

The Caribbean, in the Spring of '42, was no place for man or vessel to tarry.

Over in the Pacific, headed for an undisclosable but well-known port, the forgotten radio books were broken out. W3NE went to work, in a mild way, to prepare for that radiotelegraph second. He forbore studying enough to cause permanent damage, but nonetheless some headway was made with the unstinted aid of the first op. There were distractions, such as one very beautiful island at which the ship remained several days. There were also the poker games; W3NE was never one to pass up a poker game. In spite of these things, there came a time when the first op told him to go ahead and get that ticket. Seeing no plausible way out of it — the ship was in a port close to an FCC office at the time — he had a try at it. The first op told him a failure would mean a salt-water bath, complete with clothing. Maybe that had something to do with it. . . .

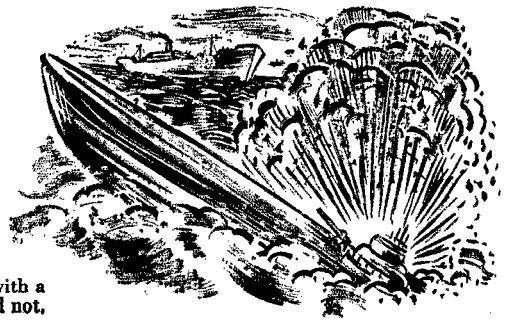
Anyway, he made the grade. He was duly "authorized to operate any radio station of the class specified," and received a twenty-buck raise in base pay and many congratulatory drinks from his immediate associates. All was well.

Time went by in large gobs, smoothly for the most part. Many were the ports at which the big ship called and many were the sights seen by her officers and men.

Talks with the first op brought out the fact that he had come out of the very first class at Gallups Island. He was a typically good product of that institution. W3NE was astonished to find how much these lads had been taught in such a short time. Few old-timers were seen; most of the ops he met had known nothing about radio prior to attending school at Gallups Island.

At the time we entered the war this first op had been on a tanker hauling aviation gasoline, which is not a very lovable cargo to be monkeying with in sub-infested waters. So long as he slept fully clad, his luck held; but the very first night he turned in undressed a large, angry torpedo whacked into the ship about thirty feet from where he was sleeping, tossing him across the room and messing things up generally. Unaccountably, the whole ship did not go up in flames, although there was a fire in the pump room and the air was so saturated with gasoline fumes that everyone became very ill. The radio installation was knocked galley-west and damaged to such an extent that it was impossible to get off an SOS.

Followed several hours in a lifeboat — the first op still unclad, in midwinter in the open sea —



A freighter took a Jap torpedo and then replied with a shell or two. The freighter survived, but the sub did not.

and then rescue. Several men were lost, including the skipper. Nerves were not improved by the fact that the enemy sub stuck around for some time, awaiting any craft that might come to their aid. The first op went home for a short vacation, but soon he was back at sea like a good merchant mariner. Later, whenever things looked dark, he'd point out that, so far as he was concerned, he was living on borrowed time anyway. To bear this out he'd tell the story of what happened to another of the same company's ships. This vessel also was torpedoed while laden with crude oil. She went up in flames in a matter of seconds, and the information is that only one man of her crew survived.

In the Pacific things weren't quite so bad — not that Moto didn't scout the sea lanes with his subs. After all, the Pacific is a lot of ocean, making it necessary for the Nips to spread their undersea boats pretty thinly. Besides, the Jap subs weren't so effectively manned as were those of the Herrenvolk. On one occasion a freighter a few miles from W3NE's ship took a Jap torpedo — and then replied with a shell or two. The freighter survived, but the sub did not.

That was life — sometimes you took it, and sometimes you dished it out. The men of the merchant marine can do both. They are a rugged, reliable, courageous lot — officers and seamen and radio operators alike.

Surprisingly, few of the ship radio ops were amateurs. In fact, the scarcity of amateurs encountered in the merchant marine remains a source of wonder to W3NE. It can't be that they are not cognizant of the need for marine operators. So long as our ships are sailing with less than three operators, there should be an urgent need for licensed men. Making due allowance for differences in the two classes of operation, almost any amateur with three or four years' experience, capable of building and maintaining modern ham equipment, can easily hold his own as a commercial op.

Shipping agencies who hire radio operators don't care a hoot in Hades whether an applicant holds a college degree or if his education began and ended at the little red schoolhouse. In their quaint way they assume that the major qualification for a job is the ability to do the required work. In the case of shipboard radio operating, this ability can be demonstrated by, as the question-and-answer book puts it, posting a license of proper grade in the station.

A maritime radio operator doesn't have to be a perfect physical specimen. If he has the usual number of limbs, eyes and ears and no serious internal troubles, he will probably be acceptable. Even the above are not necessarily hard-and-fast requirements. W3NE, a victim of hay-fever in the worst way, was elated to discover that, once away from land, he was entirely free of it. For men getting along in years or having physical imperfections, marine radio operating should be a satisfactory solution. It affords an opportunity to get into the middle of the war effort with little delay and to fill an extremely important need. The work is light, the pay comparable with that commanded by similar skills ashore, and life in the merchant marine is a free-and-easy affair.

Discipline, as generally understood, is just about non-existent. The skipper is the unquestioned boss, but usually his policy is to let things alone so long as they run smoothly. In the merchant marine there are no salutes, no formality, no red tape except as introduced by wartime conditions. Food in general is good. It is required that officers wear pants and shirts to meals, of course, but this is a hardship to which the adaptable ham can become accustomed without too much difficulty.

There is some danger from enemy submarines, mines, aircraft and raiders, and this danger varies according to the part of the world. However, their record during both World War I and in the present fracas fails to show that danger ever prevented the hams from hopping in feet first in large numbers. With the increased protection at present being given it, our merchant marine is faring much better than it did in the early months of war. Then casualties were much higher proportionately than those of the armed forces.

Assuming that you have acquired the requisite ticket and are anxious to board the lugger and sail the bounding main — what next? Well, you could look up a shipping agent, or you might contact the U. S. Maritime Service or a radio operators' union. W3NE joined the American Communications Association, which is reputed to have labored long and well for downtrodden radio ops in the lean years. Any way you choose to work it, there should be no difficulty in getting a ship. At this point you had better put yourself in the hands of someone who knows the ropes, for you are going to be very busy getting the necessary seaman's papers and whatnot. The agent of the company hiring you will probably help you out on these details.

The final step before going to sea is to familiarize yourself with the routine and procedure you will follow. This is not hard to learn. Your duties will be light, but they will also be very important, and it is possible that the safety of the ship and crew may depend on you at any time. So don't shirk the chore of learning every detail. A few hours spent with an experienced operator should be profitable. If you're offered a chance to ship as second op, accept it; it will enable you to learn how things are done. Whatever you do, don't go to sea ignorant of what is expected of you, with the idea that you can pick up the required details at leisure. Be prepared to take care of your end of any situation that may arise.

Give thought to your relations with the officers and crew of your ship, because you will probably spend long periods of time without seeing anyone else and it is very easy for friction to develop under such conditions.

The first consideration in this respect is the matter of getting along with the captain or (as he is called in his absence) the "Old Man." He can do more to make your shipboard existence pleasant or otherwise than any other of the ship's

company, and if you get off to a bad start with him you had better look for another ship as soon as possible. Most skippers make up their minds just once on any person or subject; thereafter they seldom reverse their decisions, right or wrong. There was one captain who decided that his second op, a good 50 w.p.m. man, couldn't copy code. Thereafter he practically refused to accept any message this operator delivered. Messages copied by the second op but delivered by the first brought the comment that he — the Skipper — wished the second op could copy that way. It would have done no good to point out the facts to him; his mind was made up, closing the subject to further discussion.

However, although years of practically unquestioned authority seem to have had an effect on nearly all of them, it is only fair to state that more shipmasters are reasonable than otherwise. W3NE served under five, and only one was of the type with whom no one could get along.

In general, it is best to have as little as possible to do with the skipper in regard to the handling of your department, so long as things go smoothly. It is possible that he may give you an order which if carried out will cause you to violate, by commission or omission, an FCC or Navy regulation. Should such a situation arise it is best to explain just once the status of the matter and then follow his order, whether changed or not, entering the facts in your log.

With regard to both fellow officers and crew, the best attitude to adopt is one of the pleasant civility. Avoid as you would the plague any familiarity, back-slapping or horseplay; nothing will do more to bring you the contempt of all hands in a hurry. It is best to go slowly in the matter of making friends. Much conversation on short acquaintance will get you tabbed as a windbag, especially if you show a tendency to talk about yourself. Don't try to take a prominent part in shipboard discussions at first, even though you may have more specialized knowledge of the subject under discussion than anyone else aboard. Most merchant marine officers have followed the sea for many years, and you will find that in some respects their minds don't work in the same manner as those of landsmen.

But don't get the impression that the new "Sparks" will find himself beset by unfriendliness on all sides; such is far from the case. These suggestions are given only to show you how to avoid getting started out on the wrong tack.

With a little observation, tact, and intelligence, no difficulty should be experienced in getting along with everyone from master to messman, including armed guard crews and their officers. The latter usually are college graduates and Naval Reserve men, and it is quite likely that the average ham can find common interests with them. Contrary to some reports, relations between armed guard crews and merchant seamen, so far as W3NE was able to observe, are good in every way.

Smooth sailing, and see you in San Pedro or Tokyo or maybe on the low-frequency end of "forty" one of these days.

We homed right on in until we found these guys in a wadi with their chutes spread out over the ground.

SOS in the Sahara

BY TECH. SGT. HOWARD R. SULLIVAN,* W9QGS

AT THIS particular time I was stationed "somewhere in the Sahara." I can't say where. But the book "Beau Geste" was written in the fort on top of the rocky knoll, and for that reason, if for no other, it was an interesting place. In all directions as far as the eye could see there was nothing but the monotonous dunes. During the daytime the wind would blow the sand — first north, then south, and then back again. At night the wind would howl around the low mud building and through the rifle slits in the battlements, but the sand would be still and we got to like the sighing of the wind because it would sing us to sleep.

At the foot of the knoll, on the western side, was the Arab village. It was a dirty place, almost as dirty as the Arabs themselves. From dawn 'til dusk the Arabs would scrabble around in the sand and rocks, trying to make some kind of a living out of what little they had. Occasionally two or three camels in line astern would plod from nowhere to nowhere, hauling wood or a few kegs of water. The camels would squall and bellow all day long, because any work is too much work for a camel. Then they'd holler all night, too, as though they knew that another hard day was coming on the morrow.

In the evening the natives would plunk their dilapidated mandolins and, in their own odd, disorganized sort of harmony, sing all the queer tunes they could think of. On Saturday evenings they'd all get together and throw what sounded suspiciously like an old-time midwestern barn dance.

We lived in the fort. Mostly we did nothing but lie around, reading whatever magazines and pocket-sized books we could find. Perhaps once a week we'd get some "Vino," which is guaranteed

*36053146, APO 606, Miami, Fla.

U. S. War Bonds for Stories of War Service

***QST* wants reports on the experiences of radio hams in active service on the battlefronts — for immediate publication in this section, where feasible, or to be held confidential where security considerations so require.**

Do *you* have a story of war service to tell — either your own or that of someone you know? Then write us a letter giving full details, including photographs, clippings and other substantiating data where available. If your story is published in *QST*, you will receive a $25 U. S. War Bond. Please indicate clearly on the report if it is available for publication in its entirety, if names, dates or places should be deleted, or if all information must be held confidential.

to produce the screeching meemies in technicolor. Cost? "For you, *Americain*, last price fifty francs. Is good, no?"

And we had C-ration and flies. At first the C-ration was reasonably edible. But after a while the subsistence situation became somewhat discouraging, to say the least. Then one of the guys would jump up in the middle of a meal, get his ammo belt, canteen and rifle, and take off in the jeep. When he came back to the fort he'd have five or six gazelles aboard. Wotta feed we'd have then!

There was always plenty to do. We had our day and night frequencies, of course; the rigs put out not quite a half kilowatt into folded dipoles, which are just about the best antennas I've ever seen. The receiver shack was a mud room about eight by twelve feet, just big enough for our Super-Pros, a bug and a mill.

That was the place we lived and worked in. It wasn't much. But it was a typical desert station, and if any of the gang read this I'm sure they'll remember not only the sweat and the grime but the good fellowship, as well.

Well, I told you all about the place mostly for atmosphere. The story itself isn't much, but out there, sick as we were of looking each other in the face all day long, it was quite a thrill. I was chief op, and I used to take a shift now and then just to keep the wrist oiled up. At about ten hours one morning I heard a guy on the air-to-ground. His fist was made of Plexiglass, and he was blooping it out at about six w.p.m. I remember wondering to myself whether he was trying to send a "3" or a "7" before it dawned on me that I was listening to my first SOS. What a feeling *that* was!

I gave him a blast on the hand key. In my excitement I slipped right back into ham procedure, and doggone if he didn't do the same! It would have been a peach of a ragchew — except for the uncomfortable fact that he was on the ground between two hills and nearly everything but the radio equipment was a total washout. The octant was a mess, and for some reason neither the pilot nor the navigator had the slightest idea of their position. We couldn't even shoot a bearing, much less get any kind of a fix.

I talked it over with the guy for most of the afternoon; the put-put in the back of his ship was going great guns. We made a sked for the following morning at six hours and let it go at that for the night.

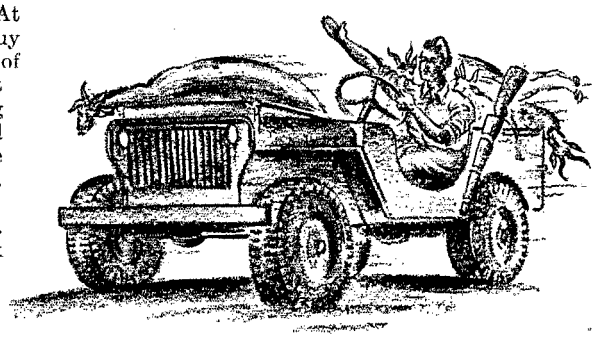
By morning we had a transport sent down to make a search, but they forgot to send a radioman with it. So we told the guy to hoist a kite antenna and crank up the emergency transmitter on the international distress frequency. (Those little "Gibson Girl" rigs are really sweet; honestly, I wouldn't be surprised to find that they are bullet-proof. I do know that they hardly ever get scratched even in a crash.)

I went along in the DC. We homed right on in until we found these guys in a wadi with their chutes spread out over the ground. We shot for a landing about half a mile away — but fast. You see, we'd spotted a force of horse cavalry some five miles to the east, and it wasn't any of ours. I can't say where we were, of course, but it most certainly could have been considered enemy territory. We pulled the detonators in the ship and fired her with our flare pistols, and then got the hell out of there.

That's about all there was to it — except that the incident could have had sad, if not tragic, consequences. I don't know who the op was on that ship because I've forgotten his call, but I'd like to get in touch with him.

We in the Air Force like to think that, if the situation calls for it, we can act fast, accurately and with results. I know we do a pretty good job with radio all the time here in the AACS, but it is only in instances such as this that we are able to rise above our ordinary routine and get a bit of action.

As a story I realize that this isn't so much, but I've tried to give you some idea of desert life in these pages. If you think you'd like it, come on over. Personally, I'll take Chicago.



One of the guys would take off in the jeep and come back with five or six gazelles. Wotta feed we'd have then!

A Flexible Code Table Circuit

A Simple Wiring Scheme Providing Many Circuit Combinations

BY DARWIN B. APPLETON,* W9LBJ

In this article W9LBJ points out that a proper code-practice circuit may have much to do with improved efficiency in the teaching of code. The simple circuit he describes provides for the segregation of students according to individual ability and length of training. Perhaps one of its best features is that any of the many circuit combinations available may be set up on a central control panel at the instructor's position.

SINCE December 7, 1941, the amateur fraternity has been cut off from its most important function — that of radio communication. Many members of the amateur group have sought to keep alive their interest in radio in various ways. I have been fortunate in being able to do this by supervising pre-induction courses in radio code at Proviso High, a school of nearly 4000 students located in the Chicago suburban area.

It is my belief that the value of radio code work is apt to be greatly underestimated. It is a fundamental means of communication and so should be a part of general education. Its great value in defense and war is obvious. In time of flood and national emergency, radio code may be the only means of communication available. One of the objectives of education is to develop the individual to the highest extent of his personality and make him a good member of society. Radio code work, as a part of amateur radio, provides a hobby that is almost unequalled for making worthy use of leisure time. Perhaps one of the more important public-service tasks for amateur radio after the war will be in the rehabilitation of disabled men.

The vocational value of radio code lies in training toward a commercial operator's license, which is necessary for such positions as broadcast operator, police radio control operator, commercial airlines operator, and marine seagoing and shore operators. A licensed radio operator must be in charge of every radio transmitter, and code ability is one of the requirements in obtaining most grades of licenses.

When plans were made to offer radio code work in our school during the second semester of 1942–43, as a pre-induction course on a full-time credit basis, no serious attempt was made to take into consideration differences in individuals and their rates of learning. An audio oscillator and loudspeaker were provided, and licensed members of the high school amateur radio club sent practice for the group. However, aptitude tests soon showed that members of a class vary considerably in code-learning ability, and consequently that some flexible system should be provided to take adequate care of slower individuals without hampering the progress of those who find code easier to master. Expense of equipment and ease of installation also had to be considered.

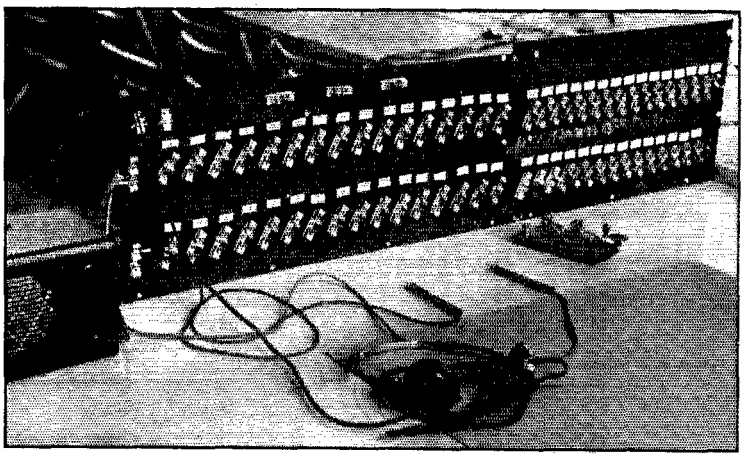
The Circuit

A survey was made of existing data on code-practice tables. Some were too elaborate and entailed too much expense for the purpose desired, while others did not offer the necessary flexibility. With the help of Hervey Shutts, physics instructor at the school, a composite design was worked out which is simple, inexpensive, and, at the same time, flexible. It has been in use now for over a year and has proved entirely satisfactory. The wiring diagram is shown in Fig. 1.

An analysis will show that it is not complicated. One side of each headset is connected to a terminal or jack in the lower row on the instructor's terminal panel. Likewise, one side of each key is wired to one of the terminals in the upper row. The other side of each key goes to one side of the companion headset. The lower sides of all

The code table in use, with the author at the instructor's position. The wooden housing which normally covers the connecting-wire cable to the panel has been removed for the photograph.

* Instructor of Chemistry and Radio, Proviso High School. 2030 South 21st Ave., Maywood, Ill.



Front view of the terminal panel on the instructor's table. The instructor's 'phones and key are in the foreground and the audio oscillator is partly visible at the left.

headsets are connected to a common wire which also joins one side of the output of each of the three signal sources. These are an audio tone oscillator, a record player for code-practice records and a communications receiver. The other signal-source terminals are wired to individual connections on the terminal board. By connecting the terminals in various ways, several useful circuit combinations are available.

If the instructor wishes to transmit to the entire class, the lower row of terminals, including the instructor's circuit, are connected together by a bus wire inserted across all of them. The upper terminal at the instructor's position is connected to the output of the audio oscillator. The continuous signal from the oscillator is then heard only when the instructor's key is closed. The student keys are ineffective, of course, because the other terminals of the top row are open.

Similar connections are made when it is desired to pipe the output of either the record player or the communications receiver to the entire class, except that the lower row of terminals is connected to the output terminal of either the player or the receiver, thus by-passing the instructor's key.

Individual Sending Practice

Each member of the class may practice sending without interference to the others by connecting all terminals in the top row together and to the oscillator output terminal. The lower row of terminals is open. Since the key is in series with the headset at each position, the operator hears the tone only when his own key is closed. An especially valuable feature when this combination is used is the monitoring facilities offered the instructor. By connecting his own lower terminal to the lower terminal of any particular student position, his headset is connected in parallel with that of the selected individual so that the instructor can monitor the student. The keys also are connected in parallel, so that the instructor can break in to communicate or offer suggestions. Since the student never knows when he may be monitored, it provides an excellent check on sending ability; some students get nervous and do not give a fair sample of their sending ability under other conditions.

In the course of instruction it is sometimes a valuable aid to have selected individuals send to the entire class, so that the instructor can point out common faults in the formation of characters. To make this possible, all terminals of the lower row are connected together with a bus wire. The upper instructor's terminal and the upper terminal of the selected student's position are connected together and also to the output terminal of the audio oscillator. Thus only the student and the instructor have "live" keys. This connection also makes possible a demonstration of correct calling and message-handling procedure between the student and the instructor, with the rest of the class listening. By moving the common connection along the upper row different members of the class may be worked by the instructor, with the rest of the class standing by. In addition, an opportunity is provided for selected members of the class with better "fists" to send to the class for practice periods.

Net Operation

The various student positions may be divided into any desired number of independent groups for the purpose of simulating net operation. All top terminals are connected together and to the audio-oscillator output terminal. The lower terminals are connected together according to any desired grouping. An especial advantage exhibited by the terminal panel in such combinations is that any number of stations may be chosen to form any number of nets and, at the same time, they can be located anywhere along the code table. In fact, neighboring stations often work better when they are not in the same net. I have found it usually desirable to choose combinations separated by several students and to group one good operator, as net control, with two poorer operators.

Depending upon the progress of individual students, it is desirable at times to so group them that one portion of the class may copy recorded code lessons from the record player while other selected students are copying signals from the communications receiver, without interrupting the sending practice of still another group. Suitable connections for this can be made by connecting together the lower terminals of

those stations which are to be supplied with signals from the record player and then connecting the group to the output terminal of the record player. The positions of those students desiring signals from the receiver are similarly grouped and connected to the output of the receiver. Thus the keys of all stations in these two groups are cut out. The *upper* terminals of the stations of those students who desire to continue keying practice are connected together according to any grouping desired and to the audio oscillator, so that the keys become effective.

This combination gives the flexibility so desirable in a class of varying individual abilities. The advanced group may receive press from the air while the slower group is receiving code instruction from records at any desired rate of speed. Simultaneously, other students also may be divided into groups. One of these may be doing remedial work, with the instructor sending by means of the hand key. Another group may be working together as a net, while a third group may be practicing individual sending.

Construction and Wiring

The dimensions of the code-practice table will, of course, depend upon the estimated size of the class to be handled. The arrangement shown in the photograph was designed to accommodate 32 students. It consists of two tables of heavy wood construction, each 18 feet long and 4 feet wide, with a height of 31 inches. The sections are spaced 6 feet apart, so that students may be seated along both sides of each table. A small table for the instructor is placed between the heads of the two student tables, thus completing a U-shaped formation. This gives the instructor a good view of the class and at the same time provides for short wiring leads to the student positions. The positions are numbered consecutively.

The control panel or terminal board is 48 inches long and 11 inches high and is mounted on the instructor's table where he can conveniently change the circuit combination as he desires. While a system of plugs and jacks could be used for switching connections, double Fahnestock clips are not only obtainable at a fraction of the cost of jacks, but in practice they proved to be more convenient to use. The clips are arranged in two horizontal rows, the top row controlling the key connections, while the lower row controls the headset switching. It is an easy matter to connect a complete row together by simply laying a bare wire across the backs of the clips. This is one of the most used connections and is much easier to make in this manner than it would be were it necessary to place a plug in a jack for each position. For other arrangements, flexible leads fitted with 'phone tips or test prods may be used for making the connections between clips. Each pair of clips is labeled with a number corresponding to the operating position which it controls. The three clips at the top of the panel are for connections to the audio oscillator, record player and receiver.

The two leads from each student position are composed of ordinary bell wire twisted together to keep induction and cross-talk down to a minimum. A length of No. 12 wire serves as the common bus connecting one side of all positions. The lead wires, as well as the bus, are bunched together to form a cable which passes down the center of the top of each arm of the table and converges at the panel on the instructor's table. A double Fahnestock clip fastened to the table at each position serves as a terminal for connecting one side of the headphones to the common bus. The keys, one for each student's position, are mounted close to the center line of the table so that a clip on one post of the key serves as the other headphone connection. The keys and headphones may be of the inexpensive variety. Used equipment usually may be obtained; in fact, students often prefer to bring their own headphones and keys.

Auxiliary Equipment

The audio oscillator is a commercial unit costing less than ten dollars. It runs continuously and furnishes more than ample power, even when all 32 'phones are in use. In fact, it is necessary to control the output with a variable resistance. The record player and receiver are, of course, more expensive items, but often they can be borrowed.

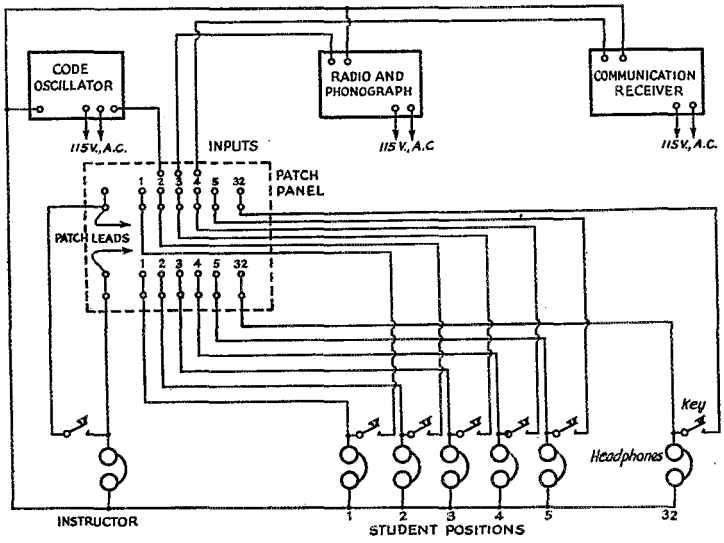


Fig. 1 — Code-practice table wiring diagram. The upper row of terminals controls the keys, while the lower row takes care of connections to the headsets. The various combinations of the switching arrangement are discussed in detail in the text.

FLEET SERVICE SCHOOLS

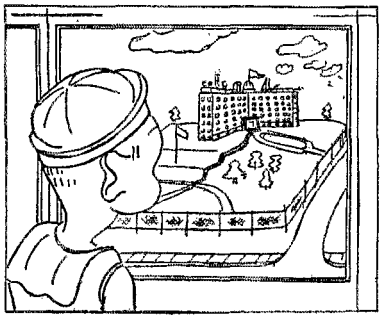
VIRGINIA BEACH, VA.

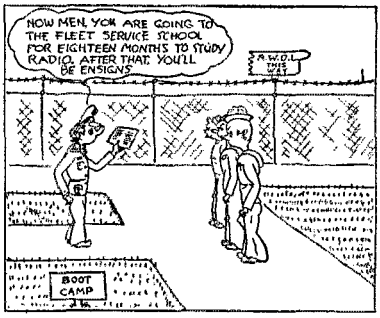
The purpose of this series of drawings is to present a "blow by blow" description of a typical (?) student's life during his course of instruction at the Fleet Service School, Virginia Beach, Va. Any similarity to any person or persons living or dead (and we ain't kidding!) is purely coincidental.

by Pat Hoch

The Cavalier Hotel, Virginia Beach, Va., was converted into a First Class Navy Operators School in October, 1942. The hotel, the finest on the beach, is ideally located amid beautiful surroundings on the shore of the Atlantic ocean. Besides the school facilities, the station has its own sick-bay, ship's store, bakery shop, workshop, commissary and family clinic. For recreation there is swimming, tennis, football, baseball and basketball (weather permitting!).

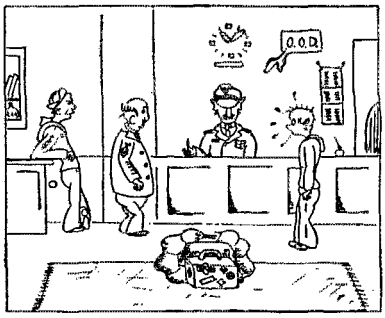
Courses are three weeks long for the shipborne students and two weeks for the airborne students. The course is plenty tough but a surprising number make excellent marks. Classes are held every week day including holidays. There are lectures, study periods, and lab sessions every morning, afternoon and evening. Liberty comes only once a week, either on a Saturday or Sunday. With so much time spent in classes, plus inspections and cleaning details, there is little time to do anything else. These guys sure do get shoved around! An average student's version of his course of instruction probably would go something like the following:

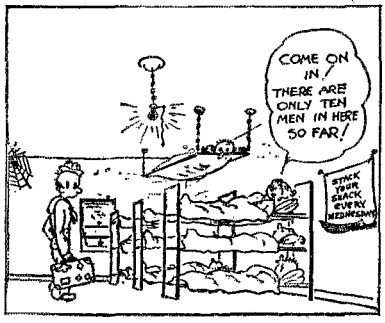


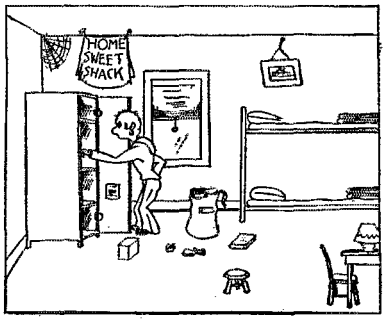


I'M just finishing my boot training and strongly considering striking for some *sensible* rate like storekeeper or yeoman, when some officer comes up with a proposal that I volunteer (ha!) to go to Fleet Service School. He promises me I will stay a long time, that the liberty is wonderful, and that I will become a radio technician or even get a commission. I decide to go along peaceably, having been drafted anyway — and it *does* sound interesting. . . .

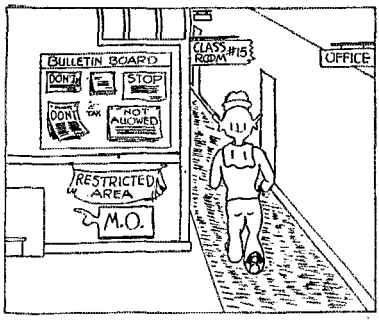
Our draft arrives on a Saturday, tired, bewildered and covered with coal dust. We're marched inside and told to form a double rank, square our hats, answer up when our name is called, and then shut up. Everybody and his brothers gather around to glare at us. Where you from, mate? . . . did you know Joe Blow from Company 16? . . . another bunch of suckers! . . . I'm thinking a certain person back at boot camp is going to be very unpopular before I graduate from here.



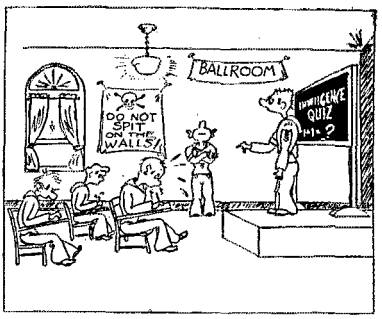




After paying a visit to the sick bay, I receive my room assignment and start climbing stairs; only four floors of them. Here it is, a private room all my own (methinks before entering). Just wait until the folks back in Podunk hear about this! So I enter my $18.00 per day room — and there, draped out before my eyes, are ten other students! What in hell is this? Call the OD! Call that #$%(&& instructor who assigned me to this madhouse! . . . Okay, so I'll stay — but don't think I'll like it.



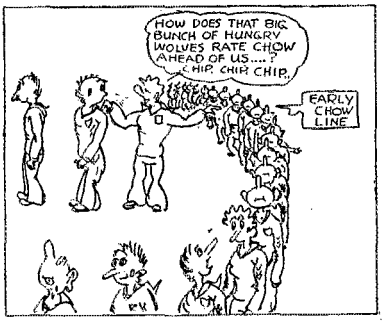
On Sunday there's an indoctrination lecture and an intelligence quiz. Right there they should see that I'd make a better mess cook than an operator, but these guys get paid twice a month and they got nothing else to do — so I stay. Monday morning bright and *early* (after chow and a practice "pass-out in review"), classes start in good old Navy style with a pep talk. I spend the rest of the day trying to find the right room. I am shoved, bawled out and stomped on until noon.

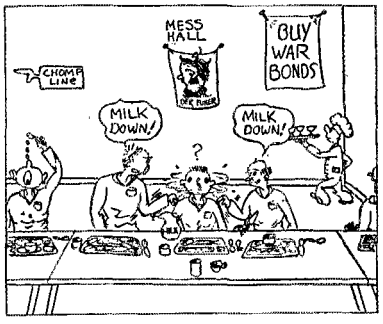


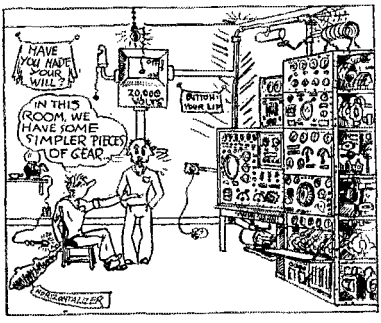
A brief pause comes when I stand in line waiting for chow while the ship's company takes its time getting the best of the feed. After chow that bunk sure looks good, but 1300 comes around and off to the races again: upstairs, downstairs, back upstairs, and so on throughout the afternoon. . . . A few more hours of this and I'll begin to look like the regular students!

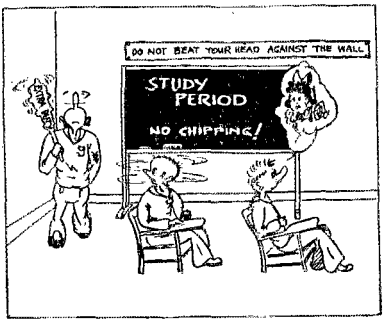
When afternoon classes are over I think I'm due for a rest, but some guy shoves a swab into my hands and I am on a cleaning detail. By the time I get through it's chow time again; another long wait in line while the ship's company gets the "fat of the lamb." After chow I climb the stairs and fall into my bunk. I just get nicely settled when that damn bell rings again . . . back to the slaughter . . . evening classes. Two more hours of studies, an hour of movies, and the day is done. Boy, what a long day! I crawl up the stairs and fall asleep before I hit the sack.

The next day is worse than the first. I think that someone must sit up nights to dream up all this mess. The day is started off with an inspection and a parade in review. I'm not prepared; my clothes aren't pressed; I need a haircut, shoe shine, etc. I'm on the report; I'm in a sweat. I'll have to go before the captain for mast, and worst of all they just built a brig and they'll probably try it out on me. Oh, golly — what a mess . . . damn Hitler, anyway!





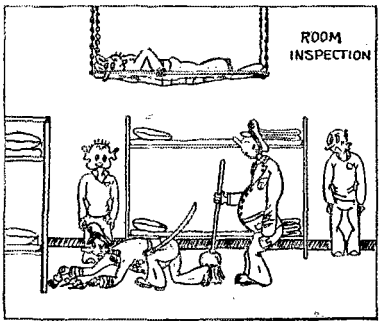




The classes are difficult. I'm told about micros, ohms, mills, electrons, sine waves, grids, cathode-ray tubes, antennas, *watch standing* — things I never even heard of before. I am confused; in fact, I'm lost. I'm just a humble browbeaten boot who never did anything wrong. It doesn't seem possible to cover all these things in just three weeks. I'm all set to throw in the towel, but the day finally ends. At least I can get a few hours rest before they go at me again.

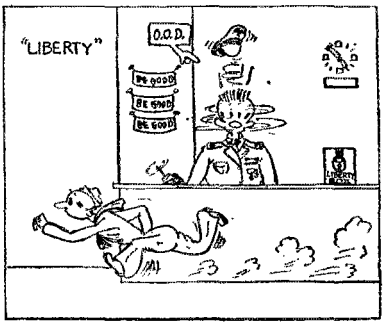
The third day starts off with another inspection. I swab the deck, scrub the head, put on a clean mattress cover, roll my clothes, wash my face, comb my hair, break out in a sweat — and wait for the worst. An instructor gives the room a preliminary inspection. He says it's no good. I start all over again — wash the windows, paint the chairs, clean the wall paper, put on another clean suit of whites, even sweep under the bunk. The whistle blows; the captain comes. I stand stiff as a board. He says: "Poor stowage, spot in the tub, marks on the bulkhead, dust on the floor." I'm on the report again!

Well, on to classes. They begin beating out the same unfamiliar subjects — tubes, lobes, meters, ergs, plates. I'm in a stupor again. My head is spinning. I become a first-class prospect for the nut house. . . . Oh, for the peace of a New York subway!



The end-week examinations seem more than any guy can handle, but the prospect of liberty on Saturday makes it worth a try. I sweat through the qualifications; my hands are greasy, the knobs slip, the meters just won't read right. I'll swear I never heard of half the things they asked. A mark of 62.5 is passing; I get a 63. Well, maybe I can make it up next week. . . . Anyway, now to get ready for my first liberty and look the town of Norfolk over.

(To be continued)



STRAYS

What it takes to *really* thrill a ham:

Larry Boyts, W5GEU, a captain in the Air Corps back in the States after a flight to India, was visiting some old friends, one of whom is a ham. Larry mentioned that he had been grounded for a few days in Egypt. Someone asked, "Then you had a chance to see the pyramids?" "Oh, yes," said Larry apathetically, "we spent a while looking at them and at the Sphinx and so forth." Then his face lighted. "But say — did I get a kick out of running into a ham over there! He was W5AOT from El Paso and I'd worked him twice. . . ."

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The Signal Corps recently completed the construction of six high-power long-wave radio stations at North Atlantic points in the remarkably short time of twenty-eight days. The long-wave radiotelegraph and radioteletype network will link the United States with Newfoundland, Labrador, Greenland, Iceland and Great Britain, and, because it will be free from fading and ionosphere fluctuations, will insure 24-hour service for administrative and command communications. Equipment was sent to the areas by plane and by ship, and technical and installation specialists were flown in from all parts of the world.

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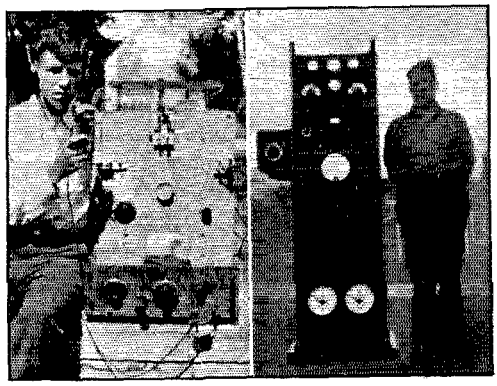
A Mayor LaGuardia scholarship for Latin-Americans for the year 1943–1944 has been awarded to Walter W. L. Heininger, PY1ADA – ex-PY2GS, and he is now in New York studying a course in communications engineering.



Here we see the earliest and the latest transmitters owned by Harold S. Roth, W9LFH. At the left is his 1924 model, which sported a VT-2, a Crosley book-type condenser, and a Ford spark coil with the contacts screwed down. The latter was used as a grid modulation transformer with the secondary connected as a grid leak. The receiver used a UV-199 with the traditional variocoupler wound on a Quaker Oats tube.

The rig at the right was in use up to the time of Pearl Harbor with an input of 300 watts on 'phone and c.w. on all bands from 160 to 20. Quite some change in the equipment — not to mention the operator!

Micro Switch Corp. has released a new color and sound 16-mm. motion picture, entitled "Uses Unlimited," which features Micro Switches in ships, planes, tanks, trains, motor vehicles and in the control of all kinds of weapons and equipment. The film may be secured by application to Micro Switch Corp., Freeport, Ill., or to Motion Picture Bureau, National Council Y.M.C.A. at New York, Chicago or San Francisco.

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A new bulletin on controls may be obtained upon request from Centralab, 900 E. Keefe Ave., Milwaukee, Wis. It contains eight pages of data, photographs, drawings, specifications and resistance curves on Standard, Midget, Sub-Midget and Elf Radiohms as well as switch covers, shafts and bushings that apply to these controls.

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A folder entitled "Occupations in Electronics" gives helpful information regarding the abilities and training required, earnings, methods of entrance and advancement, geographical distribution of employment and postwar prospects in radio work. The leaflet may be obtained for 25 cents from Occupational Index, Inc., New York University, New York 3, N. Y.

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Metal poles must be used in some parts of Australia because white ants completely devour wooden ones, according to Signal Corps men serving there. Doubting Americans set one wooden pole as a test, and on returning later found nothing but the glass insulators, wire, bolts, braces — and an empty hole!

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A student pursuing a course in electronics at M.I.T. was asked by a lab instructor to examine a complicated waveform on an oscilloscope and to find the d.c. level. Some time later the student requested assistance, explaining that he had searched the laboratory thoroughly and had been unable to find a d.c. level anywhere. — *W6TFE.*

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A new kind of steel, developed by Westinghouse, which can be rolled to a thickness of 2 mils is being used for cores of transformers for application in radio detecting devices. The cores, weighing from one-fifth of an ounce up to seven pounds, are wound from a continuous ribbon of the ultra-thin steel by a process which is much faster than the old one of laboriously stacking punched laminations by hand.

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OM: "Do you know who was the first radio-electrician?"

YL: "No, who?"

OM: "Adam. He furnished spare parts for the first loudspeaker."

HINTS AND KINKS FOR THE EXPERIMENTER

SIMPLE V.H.F. TANK CIRCUIT FROM SALVAGED MATERIAL

AN ARTICLE on page 15 of the September, 1942, issue of *QST* suggested an added economy in the design of a tank circuit. The tank coil is made from an old coil shield. Opposite sides are clipped out, leaving a U-shaped segment, as shown in Fig. 1. If the shield is of rectangular

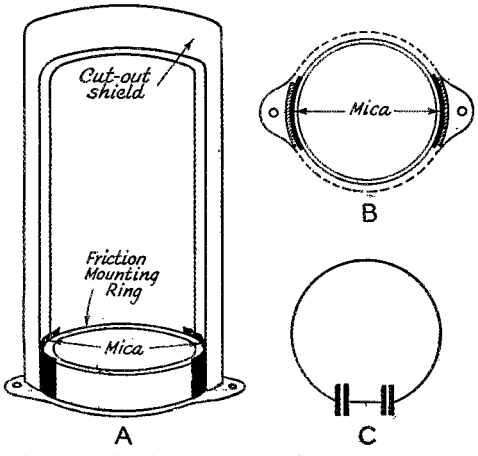

Fig. 1 — A v.h.f. tank made from a cut-away coil shield. (A) Perspective view. (B) Top view, showing use of mica spacers to adjust capacity. (C) Equivalent circuit.

shape, the curved corners are retained to provide strength. In any case some of the side is left near the closed end. Cylindrical shields provided with a separable bottom mounting offer an added advantage. Pieces of mica are inserted between the bottom ends of the "coil" and the friction mounting, constituting a tank condenser. Resonance may be adjusted roughly by inserting more or thicker pieces of mica. To preserve electrical balance, the same thickness should be used on both sides. Finer adjustment can be secured by sliding the "coil" up or down on the insulated mounting.

A short piece of bakelite tubing of the proper diameter to make a sliding fit with the shield "coil" may be substituted for the friction mounting, if covered with thin copper or shim brass. The tube socket is mounted concentrically with the tank assembly to provide short grid and plate leads. The high-voltage lead is taken off the middle or closed end of the "coil," opposite the tube. Experiment will determine whether a particular tube will operate best with the cathode grounded. A tab of shim brass and a small piece of mica may be used as a grid condenser. Any conventional circuit can be employed.

No dimensions are offered, as the material available will govern the constants of the circuit. After an assembly is constructed of whatever is at hand and placed in operation, the resonant frequency should be measured by Lecher wires or other means. The tank then may be trimmed in the proper direction to reach the desired frequency. Average-sized to large shields will resonate in the neighborhood of 56 Mc., while smaller shields may be trimmed to resonance in the 112-Mc. band.

No low-loss insulation is required except in the tube socket. A rubber band may be used to hold the ends of the "coil" firmly against the mounting ring. — *Charles A. Moore, K7LO.*

SUBSTITUTING A 14A7/12B7 FOR A 12SA7

WHILE a 12K7 tube may be substituted for the scarcer 12SA7, as suggested in January, 1944, *QST*, even the 12K7s are scarce here on the West Coast. However, there seem to be a lot of 14A7/12B7 loktal-base tubes available. By building up a suitable adapter I have made this substitution in about twenty-five sets so far, and have had good to excellent results. Sometimes it is not necessary even to touch the alignment or tracking. I have not heard of anyone else using this particular tube in place of the 12SA7, so am submitting a wiring diagram for the adapter.

A flat or wafer-type base is used, such as is to be found on the 12SA7 or 6SA7, together with a loktal socket to receive the 14A7/12B7. Lengths of about 1½ inches of push-back wire are used to make the interconnections shown in Fig. 2.

(*Continued on page 88*)

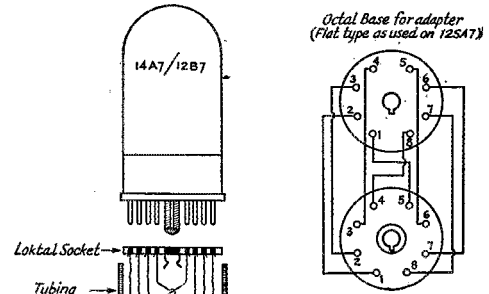

Fig. 2 — Adapter and wiring diagram of connections used when substituting a 14A7/12B7 tube for a 12SA7. No changes in set wiring are required.

CORRESPONDENCE FROM MEMBERS

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

WATT POWER?

As predicted in the March issue, there follows a digest of the correspondence resulting from the January *QST* editorial concerning the perennial high-vs.-low power question. And "digest" it is — for if all the letters received were published in full they would occupy literally an entire issue of *QST*. In excerpting those which follow we have endeavored to sample the range of opinion expressed and to include typical expressions of each individual argument and viewpoint presented. —EDITOR.

ONE KILOWATT? YES!

761 Chamber of Commerce, Minneapolis, Minn.
Editor, *QST:*

The fun we have isn't what preserves our place in the radio spectrum, nor is it the kind of communication facilities we produce — aside from emergency communication in times of disaster. Our potential value to our country is what counts.

That potential value has both military and commercial aspects. . . . If amateurs are going to be reduced to "pip-squeak" power . . . the effect on the radio industry will be serious, and the training which hams will get in the course of pursuing their hobby will not be so valuable from Army, Navy or commercial points of view.

Skills acquired from building and operating high-powered transmitters are much more valuable than those acquired from building and using low-powered equipment. In wartime especially . . . this extra experience counts. Transition to government and commercial apparatus and practices is easier.

The amateur makes a great contribution to his country by forming a ready and important market for radio apparatus. In time of war, the radio manufacturers don't have to start from scratch. If only low-powered apparatus were allowed, the market would be relatively unimportant. . . .

A lot of your letters will deal with the . . . desirability of . . . minimizing QRM. There always will be QRM on crowded amateur bands, but power won't be the only cause of it. . . . QRM between amateurs is not a matter of much real importance, anyway. It isn't interfering with anything vital in the way of communications. Presence of QRM among ourselves won't tend to lose us our place in the air. Our "family" QRM even tends to bring about sharper receivers and better-tuned transmitters. Like the "bugs" on a dog's back, our QRM has kept us busy, you might say. . . .

— *Sumner B. Young, W9HCC*

4214 Country Club Drive, Long Beach 7, Calif.
Editor, *QST:*

. . . Victory is in the hands of those having enough high-power amateurs to make progress on such forms of radio as radar. . . . For instance, the German power limitation was 10 watts. The British power limitation was 500 watts — just the advantage needed in the Battle of Britain. . . . Then the United States came in. Our boys understood kilowatt operation and the higher voltages for pulse operation and the troubles that might develop. We were just that much better fitted for handling the electronic equipment which gave us our measure of victory. Japan, with its 10-watt amateur rating, is reported far behind in radar and electronic development. It looks as though hams should be allowed 5 kilowatts, so as to develop further skills for World War III! . . .

. . . We have to be careful not to eliminate the average city amateur who does not have room for beams, and also not to put a premium on the amateur who . . . can buy a fine location with lots of space . . . and thus get superior results. . . .

So far as interference is concerned, we who live . . . in the center of the so-called California Kilowatt area are almost unaware of local QRM. . . . There are 4000 amateurs right here in the Los Angeles-Long Beach area, yet local interference on a modern receiver is negligible; certainly nothing to compare with the interference created by stations at a distance. . . .

— *Don C. Wallace, W6AM*

6208 Master St., Philadelphia 31, Pa.
Editor, *QST:*

. . . Limiting power further limits the sphere of ham experience. The high-power ham is conversant with corona, circulating currents, shock excitation, etc. Qualified amateurs should be licensed for 10 kw. Dangerous? You can get killed just as dead by being careless with 500 volts. I don't think anyone will get careless with 10,000! . . .

— *Jerry Mathis, W3BES*

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18 Bacon St., Waltham 54, Mass.
Editor, *QST:*

. . . Most of the "sloppy" and broad sigs on the air come from low-powered transmitters. You can stand poor tuning, improper neutralization, bad insulation and improper antenna matching with low power. But with high power . . . such bad practices must be eliminated. . . . Hams need high-power experience. . . .

— *Ken Rohan, W9EKY*

10052 Sheldon Dr., St. Louis, Mo.

Editor, *QST:*

. . . Future developments in radio could bring forth something that needs the kick of 1 kw. to make it successful. Wouldn't the amateurs be in a nice pickle under such circumstances if their power limit were pegged at 200 watts? . . .

— *Earl R. Linder, W9DZG*

P. O. Box 3886, Honolulu 12, T. H.

Editor, *QST:*

. . . I want that privilege to remain one of the rights of the ham . . . to be allowed to step up the power to a kw. when that elusive DX station comes through. Those of us who have the space for collinear stacked arrays, rhombics, V-beams or other types can cut our power and grin at the fellow who has a half-wave, because we know that we have about 12 db. additional going out. . . . Then it will be the antenna gang who will have the upper hand. (This could . . . end up with a mad rush by all hams to buy farms!) No, OM, so long as there is ham radio or any kind of free enterprise in America, there will be some who have things the rest of us do not have. . . .

— *A. Prose Walker, ex-W2BMX*

Bishop, Calif.

Editor, *QST:*

. . . In operating on ARRL and AARS traffic nets, power flexibility is very advantageous. Many is the night I have been on the 3500-kc. band with a fistful of traffic and, because of weather, QRM, skip or other conditions, the reception of my signals was impossible for fast traffic handling with 200 watts input. By raising the power to 600 or 700 watts . . . traffic moved along in good shape. . . .

Many of the QRP boys have griped about the blanketing effect of high-powered transmitters located in close proximity. With the use of superheterodyne receivers this type of QRM has been virtually eliminated. Even a low-power transmitter . . . will blanket a t.r.f. or similar receiver at close range, but with a superhet the blanketing effect of 1-kw. rigs may cover only a few kilocycles. Some transmitters have bad key clicks across the band, but this condition may be experienced from a 10-watt rig as easily as from a kw. Broadcast interference is basically the same, only the higher-powered transmitters have to be adjusted a little more closely. . . .

Even at the time we were taken off the air there were dead spots in the bands at all times. Many of the boys believed that they had to sit right in the first or last ten kc. of the band to work anybody, and there was plenty of room in the middle of the bands. I don't believe that power limitation would relieve this situation at all, but most likely increase it.

— *Albert E. Hill, jr., W6JQB*

1311 Jessica Ave., Las Vegas, Nevada

Editor, *QST:*

. . . On the Pacific Coast were those who liked to push traffic to the Philippines and China. That activity, in the writer's opinion, was one of the most worth while in amateur radio. It served people who could not afford to use commercial channels for personal emergencies. It just could not be done consistently with low power! A kilowatt was none too much. . . .

An intelligently operated crystal-controlled kilowatt transmitter with d.c. supply will cause no more QRM locally than a 250-watt rig. Key clicks should not be tolerated from an outfit of any power, and a clicking, chirping pair of 45s, TNT, can mess up the band more than a pair of HK-243s running at a kilowatt. . . .

— *Virgil Talbott, W6GTE*

Rte. 6, Lancaster, Pa.

Editor, *QST:*

. . . I experienced a surge of anger and rebellion when I read . . . "that would eliminate the advantage of a fat purse. . . . We would all be on the same democratic basis. . . ." . . . As you have used the word "democratic" it doesn't mean of, by and for the people; it means of, by and for those who haven't the ability, or perhaps the ambition, to earn a little extra "dough." . . . When we say we are all equal, we don't mean that we are all of the same size, shape and ability; we mean that we all have equal rights and privileges. To try to put everybody on a literally and physically equal basis is nothing short of rank Communism or Socialism and will never work. We know this because other countries have tried it and failed. The fact that a high-powered station is giving him competition is going to be a good incentive to the less powerful station to improve and progress. Where there is no competition there is no progress, and without progress there is always retrogression. . . .

— *Robert C. Beard, W3HAN*

5230 E. Washington St., Indianapolis 1, Ind.

Editor, *QST:*

. . . Democracy is definitely not a "share-the-wealth" form of government, so why apply restrictions against the fellows who have a little more than others to put into a transmitter? . . .

— *R. S. Koerner, W9DQF*

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327 Magnolia Ave., Elizabeth, N. J.

Editor, *QST:*

. . . The fat purses own the kw. stations? Decidedly wrong. In a few cases, yes — but you know as I know that some of the "poor" boys used the two-dollars-down two-dollars-a-week system and built some darn nice stations. . . .

— *Jack Heidt, W2LKN*

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348 W. Liberty, Reno, Nevada

Editor, *QST:*

. . . Because most of us drive one of the big three in autos, should we cut out Cadillac, Packard, Pierce-Arrow? American tradition is exactly the opposite! Radio stations have become more powerful, not less so. Planes, cars, scrapers, shovels (the list is endless) get larger and better, *not* smaller and weaker. Why is there need even

to question this trend? My postwar rig is already planned to include power control . . . from 10 per cent to 100 per cent of final input! FCC now has that regulation (which you yourself noted); a self-imposed boycott of offending operators could solve the problem in a single month. . . .

— *Earl Alcorn, W6QVP*

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160 Zimmermann Blvd., Kenmore, N. Y.
Editor, *QST:*

. . . Reducing power from 1000 to 100 watts . . . seems to me to be more or less sour grapes from the boys who hate to see the other fellow have more power than they do, or a bigger car or a better home, which is what America means — free opportunity for all to progress as far as their abilities and ambitions direct them. . . .

Low-power transmitters are okay for short hauls under good conditions. But how often are conditions good? To relay consistently you have to have something better than low power. Not many hams live in the country and can erect swell arrays to make up for low power. The average city installation is such that plenty of losses are brought into the picture by steel buildings, telephone and electric wires, etc. The QRP man working under such conditions would finally give up and quit.

Lots of our boys are over there fighting and hoping to come back to an America as good or better than they left it. Many of them had high-power rigs which they don't want to junk because of some who can't or will not learn to adjust their rigs properly. The QRP argument is just as sound as would be that of taking all automobiles off the road because some people drive like fools and jeopardize others by their actions.

The remedy is . . . stated near the end of the editorial . . . the reg stating that the minimum of power shall be used. . . . Every amateur should be forced to obey this regulation or lose his license. He would have no more right to transgress on others than the reckless autoist. Let us have more policing and no further power restriction.

— *K. W. Conrad, W8IIE*

12306 Kinsman Rd., Cleveland, Ohio
Editor, *QST:*

. . . I say, keep the maximum at one kw. but enforce reduced power for local contacts. K.B.W.'s idea of using v.h.f. rigs is the logical solution. Nearly all hams have the necessary parts in their junk boxes to build such a rig. . . .

— *C. R. Mackay, W8TKZ*

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83 College Ave., Poughkeepsie, N. Y.
Editor, *QST:*

. . . Provision should be made for all types of operation in each station, either by separate transmitters, optional additions, or "twist-a-knob" circuits.

No single power rating is practicable, or even legal. (See Sec. 324, Communications Act of 1934.) Unless we amateurs incorporate QRO–QRP control in our stations willingly, that long-violated section of the Act may well be enforced.

It is true that existing amateur components and circuits are ill adapted to inclusion of QRO-QRP control in our rigs. Two solutions of the difficulty are, however, practicable. . . .

Assuming that power control in "steps" will suffice, we can use several final stages in cascade, each of higher power than the preceding one, and arranged to be usable as complete transmitters of varying power capabilities. For 'phone operation, each final should, of course, be associated with a corresponding modulator, these being cascaded at the higher output levels. . . .

The second system is this: The final stage should be supplied with plate voltage, bias and excitation, all variable in steps. For 'phone purposes the final can be grid modulated at high input, plate modulated at low input, and cathode modulated in between — all with a single modulator stage. (See the ARRL *Handbook*, Section 5-5.) With thoriated filaments, filament voltage reduction can be practiced at very low power levels and no further provision need be made for power reduction while tuning up.

With QRO-QRP control, a kilowatt is available for raising that VK and a few watts will suffice to work that friend in the next town. With the advantages of such control, doesn't the whole power question seem rather foolish?

— *Gurdon R. Abell, jr., W3IXK*

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128 So. 30th, Lincoln, Neb.
Editor, *QST:*

. . . No matter what the power limit, we will still have to contend with the operator who builds right up to that limit. Since this is basically a game of ratios, I fail to see what is gained by setting a lower power limit. . . .

There are two possible avenues of escape. First, every station should go e.c.o., so that we can slip out from under QRM, or have a visual band scanner and an adequate supply of rocks, which should be a cinch after the war. The other escape will be the v.h.f. channels with which so many of us have become conversant. . . .

— *John F. Weatherly, W9EQM*

Truax Field, Madison, Wis.
Editor, *QST:*

. . . The future prospects of amateur radio are irrevocably linked with the prosperity of our manufacturers and suppliers. Should we make any move to imperil that prosperity it will result inevitably in loss of support for our cause. . . .

The starry-eyed dreamers and the QRP addicts (I'm in the latter category) will have to face the cold hard fact that the postwar scramble will have the $ as its motif, and we will be just plain damn fools if we ignore it. Any attempt to bring about reforms which will result in antipathy toward our cause by the manufacturers . . . will merely be flying in the face of Providence. . . .

— *Cpl. Earl A. Parker, W2LDV*

60 Hudson St., New York, N. Y.

Editor, *QST:*

. . . Let it remain at 1-kw. input to the final. The minute you start giving away rights you start the ball going in the wrong direction. . . .

— *Albert C. Uthe, W2JZO*

2008 N. East St., Lansing 6, Mich.

Editor, *QST:*

. . . Just like prohibition created bootlegging in liquor, so will reduced power create bootlegging in power. . . .

— *Paul G. Bauerle, W8AIHV*

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116 Ordway St., Albany 6, Calif.

Editor, *QST:*

On January 24th, the Society of Amateur Radio Operators held their regular monthly meeting. . . . It was the unanimous opinion of all members present that any reduction of the prewar amateur power limit should be violently opposed.

— *W. T. Gompertz, W6DDO, Secretary*

3443 Euclid Ave., Cleveland, Ohio

Editor, *QST:*

At the Cuyahoga Radio Association meeting in February . . . the club put itself on record . . . that power allowed prior to December 7, 1941, remain in the postwar period.

— *Mildred D. Wildman, W8PZA, Secretary*

Sentiments similar to those above, favoring retention of the 1-kw. limit, were also expressed by: G. Carroll Utermahlen, W3HVD; Sgt. A. M. Faries, W7IXX/5–ex-W6OOU; Roger C. Dickinson, W4IGV; W. O. Porter, W5FAH; Anne K. Porter, W5GKH; Annie L. Porter, W5KOP; Ernest J. Schultz, W2MUU; Marion Sawyer, W9UWL; C. Spencer Powell, jW7HWL; Bob Johnson, W5GRQ; Henry K. Rich, ex-W9RNM; A/C Kenneth T. Lida, W7GMV; John G. Hunt, W8QIE; Marion T. Hill, W5HOW; O. U. Tatro, W7FWD; Albert W. Ellis, W6BKT; George E. Serrill, W5CNX; D. G. Bawmann, W9IFO; R. O. Klemetti, W9EXT; Ernest A. Austin, W5JRL; Emmett F. Bristow, W5JNU; Paul C. Watson, W5JQQ; N. D. Voss, W5FIW; J. W. Knoth, W6CFJ; Rex E. Miller, W5BSQ; C. G. Graff, W9OFN; Paul V. King, W5HXV; Eugene S. Strout, ex-W2NX-9EXR-9EXP-5EKZ-9API-9SBO; C. M. Scroggins, W5AKN; Allan R. Cross, W7GAO; A. A. Davidson, W5TI-W5BIM; Louis A. Bove, W8REC; Alex J. Giese, W5HIZ; F. J. Kern, op. license; F. W. Greene, W1JDE; E. F. Cleveland, W5JKL; L. R. Goodell, W9JMN; P. H. Bloom, W8DV; L. C. Skipper, jr., W4CW; J. L. Cunningham, W5JJC–ex-W7EDC; Elwin C. Wigton, W8NAX; James L. Hill, W5EGP; U. D. Brickey, W9AMP; Louis A. Bauer, jr., W5CZF; Glenn R. McIntosh, W9DIN; Oscar A. Rasmussen, jr., W5IBA; Robert G. Sherbeck, W6NPW; B. P. Stephens, W5KQK; Chas. C. Phares, W5CFK; W. K. Tell, W5JFL; J. L. Speer, W5FPL; W. O. Porter, W5FAH; Claude Hannibal, W5EEZ; R. J. Best, W6MZV; S. M. Simpson, ex-W6AEB; Cy E. Blackburn, W5GBT; W. H. Wooster, op. license; H. M. Seitz, W9NQE; W. E. McClure, W8VZL; M. A. Nickel, W9HNI; D. I. Dodson, W5IAY–ex-W8BEY–ex-W9AGG; R. L. Kalmbach, W8IP; J. H. Stuckey, W5FTA; S. P. Foster, W5FEB; Ivan G. Landfather, W9RUV; P. A. McNichol, W8QJM; M. A. Bowers, W5KCJ; D. H. Christensen, op. license; R. K. Schaefer, W5CON–ex-W5DQL-6FWJ-OM1TB-XU2SC; Basil E. Miller, ex-W5AVB-5VM; Warren C. Shook, W8FBC; Shuler C. Schenck; R. W. Harter, W8SRB; Silvano F. Sandoval, Slc; R. K. Ruether, W2MRO; T/Sgt. Kenneth M. Reickenbach, W2KIF; Eli Nan, jr., W9EBB; Ted Cullion, W8WPJ; Matthew L. Bergin, W3JAR; Harry E. Lamport, W5EGY–W4AJJ; Wallace B. Saunders, W2LXI; Horace B. Goss, W1AB; and G. Graham MaConomy, W6BUK.

QRP? YES!

Plaquemine, La.

Editor, *QST:*

. . . I believe that all ham stations should be limited to a power input of 250 watts. . . . Such a move would assure more exactness in construction and a definite advancement in . . . radiating equipment, something to which 75 per cent of us have never paid enough attention. . . .

Improved parts and accessories would be made available, and we will then begin to dream and to build. . . . We would all have more transmitters, perhaps a rig for each band or at least a complete r.f. section, each capable of peak allowable power input. These would take the place of the high-loss and cumbersome coil and condenser switching. . . .

There would no longer be any excuse for poor quality signals, for we would not be straining tubes and parts to their limit and beyond. We would be forced to devote more time to the all-important features so many of us have neglected. . . . We would be allowed to put so much power into the final stage; what we get out of it would be up to us. I believe every ham would work harder to learn the methods which would allow him to get greater power output for a given input.

With the less expensive parts and accessories which will no doubt be forthcoming, we will see a large increase in the number of peak-powered transmitters. A continuance of the kw. input level could eventually put an end to ham radio. . . . Local QRM to BCL and other services, to say nothing of QRM to each other, could cause us to lose our bands or have them narrowed and the power level cut to much lower than 250 watts. . . .

— *Samuel G. Daigre, W5ACY.*

60th and Broadway, Galveston, Texas

Editor, *QST:*

. . . It does not take a lot of power to get out satisfactorily. . . . If one can't be heard with

250 watts, an increase to 1 kw. will make little difference — other than . . . QRM to the lads near by.

The angle of financial loss to the manufacturers . . . I think rather far-fetched. If we were limited to 250 watts . . . more of us would wind up with more rigs, built for one or two bands each, and get better efficiency. Also, what ham is satisfied with the same rig for more than a few months? . . . The constant cycle of experimentation and re-building will provide a ready market for parts. . . .

Of course, there should be special provisions for those who arrange to provide communication for expeditions, flights, etc., if such continue to depend on amateur radio. And in an emergency the law reads to the effect that "anything goes!" . . . .

— *Le Roy Clough, W5GQV*

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180 High St., Holyoke, Mass.

Editor, *QST:*

. . . Looking at the matter objectively, I fail to see where the ability to put out an "S-meter-busting signal" should be directly proportional to a ham's Dun & Bradstreet rating. . . . I fear that too many of us took the easy way out — boosting the input to the final instead of trying to get maximum efficiency from lower power.

As to foreign DXers with "three-tube home-made receivers" being unable to hear low-powered U. S. stations, I note that many of them had made WAC. I sincerely doubt that the other stations worked were in countries allowing 1-kw. rigs!

After the war we're going to have new b.c. channels to contend with; namely, the commercial f.m. and television channels between our 28- and 56-Mc. bands. The lower portion of the f.m. band falls within the third harmonic range of our 14-Mc. band. . . . Poorly adjusted transmitters . . . are going to make it difficult for ham radio to keep its nose clean in relation to these newly accelerated services. The accent *must* be on improved transmitter design and operation. . . .

I fail to see how the science of radio in general and the enjoyment of amateur radio in particular would suffer with power input democratically limited to a maximum which prewar statistics indicate was used by the majority.

— *Thomas R. Humphrey, W1FAU*

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903 N. Second St., Garden City, Kans.

Editor, *QST:*

. . . I am of the opinion that it is only the "big money" boys who spend enough to install a kilowatt, and it is certainly folly to run that much power. . . . With 100 watts efficiently operated and a good antenna we can work anything on the face of the globe with pretty good consistency. . . . Anything above a couple of hundred watts only goes to try to overrun the QRM from some neighboring ham with a little more power. If it is just a matter of overrunning the high-power fellow why not settle for 250 watts, so that all have an equal chance. . . . Then we can see a little competition in building efficient rigs. . . .

Also there is the question of safety. . . . By cutting the power we cut the voltages used to a safer level. Another advantage is the flexibility of the rig. With less money tied up in the job, we can afford to try new circuits, equipment, etc. . . .

— *A. L. Ellington, W9FDY*

Pine Notch, Polecat County

Editor, *QST:*

. . . The surest way to meet QRM is improved selectivity. That doesn't mean only receiver selectivity. The narrower the beam the greater effective selectivity it has — not to mention, of course the greater power in the beam. I figger I'd'ruther have a really good sharp rotating array and 100 watts input than a non-directive antenna and a corn-fed California kilowatt. Receiver selectivity goes without saying.

Before the war even on 5 meters the going was tough, especially in the receiver, because there were few tubes available to the amateur that were okay. From all I hear there should be plenty of transmitting and receiving bottles cheap to buy and easy to use that will work swell on 2½ and even 1¼, and along with them there are sure to be good parts to put in the set.

The best single factor to make the bands livable would be an all around reduction in power. These kilowatt-plus fellers not only blast the little guy right off the air but they blast each other too. I reckon if a feller had a sixty-ton tank for his private car he could be sure of getting down to the end of Main Street without much worrying about the traffic. 'Course, he might squash a couple of little guys in flivvers, but that wouldn't slow him up worth a darn. Now if he druv a regular car he might have to get out of some feller's way once or twice and maybe even stop for a traffic light 'fore he got t'other end of town. ('Course we don't have 'em up here, but that's what they tell me.) Don't see how that would hurt him any and it would save a lot of gas and wear and tear on the road and the foundations of the buildings beside the road.

From that don't get the idee I mean everyone should ride a bicycle or wear roller skates — that's the other extreme. There must be some power rating that we can all agree on that will be the same as a good, reliable, comfortable car that will take us where want . . . without squashing the kid who can only afford a Model T. . . .

Best part of hamming is that for every old saddle britches who moans about how tough the going is getting to be there are a couple score bright young fellers (and a few old 'uns, too) who just naturally pick up the old soldering iron and lick the elementary stuffing out of the problem. . . .

— *Sourdough*

8007 Georgia Ave., Silver Spring, Md.

Editor, *QST:*

. . . The virtues of a high-gain antenna array fed by a low- or medium-power transmitter have

been stated time and again in *QST*. Maybe my memory is short, but I don't recall having worked any kilowatts with anything unusual in this line. Most of 'em figured any piece of wire would get the signal out with that steam behind it. . . .

— *Louis J. Frenkel, jr., W2MWI*

37-21 76th St., Jackson Heights, N. Y.

Editor, *QST:*

. . . It has been said that power must be multiplied by 5 or 6 for any noticeable increase in signal at a remote point. . . . When conditions are such that readability is low . . . with 200 watts, hardly any improvement is noticeable with a kw. . . . On the other side of the picture . . . the interference, both QRM and BCI, is in reverse proportion — that is, the near-by rig running a kw. blankets much more than five times as much as the similarly located rig running 200 watts input.

And the high-power advocates are not always transmitting. When listening, their QSOs also are ruined by near-by blanketing signals. . . .

— *Joseph Singer, W1MJK*

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757 E. 13th, Idaho Falls, Ind.

Editor, *QST:*

. . . I believe that the present power limitation places more of an emphasis on the size of a person's pocketbook than on his ability.

I am acquainted with several hundred hams, and of these only a very select group have the money to buy a kw. rig. The rest have rigs ranging from 10 watts to 250 watts. Of those who have the kw. beauties, all custom-built and putting many a broadcast station to shame, I can recall only one who had the ability to design, construct and operate his rig. Also, he was the only one who ever used an e.c.o. or changed bands. . . .

There should be some reward for the boys who have what it takes to design and build a rig but don't have the money to keep up with the Jones's. . . . A limit of 250 watts . . . is within the reach of most, and, properly used, can do the work of a kw.

— *Ben Penners, W7HLV*

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846 South Front St., Sunbury, Pa.

Editor, *QST:*

. . . After this war we will need all the space we have plus as little QRM as possible to accommodate the many thousands of new hams. . . . Most of them will be average working men, the heart and soul of amateur radio, who cannot afford large sums of money . . . to compete with a few wealthy boys putting on high power and blocking out portions of the bands. . . .

— *Donald A. Klinger, W8GGE*

R. R. 1, Martin Ave., Rockford, Ill.

Editor, *QST:*

. . . As for business volume decreasing, what ham hasn't a piece of equipment he could put in a cabinet, or wouldn't like a better operating position, or hasn't a use for a rotary beam or a better receiver or a break-in system or what have you? Then, too, after building his station up to the 100-watt limit and finding extra dough in his pocket, he might spend some on a v.h.f. transmitter, thus creating a new interest and getting acquainted with more of the gang. . . .

— *Bud Kopp*

Kamp Kill Kare, Raquette Lake, N. Y.

Editor, *QST:*

. . . For ten years I had my full quota of power on most of the bands. . . .

My only reason for the kw. was "keeping up with the Jones's" and the thought that "might makes right." . . . After all, we were allowed a kw. and all men are created equal and if a guy couldn't get by with a few hundred watts he could go the limit. . . .

No doubt I was the most disliked person operating on 160. . . . For the good of amateur radio, if there is any smaller power limit set — and I suggest 250 watts — I will gladly throw out three-quarters of my gear and get down to earth. . . .

— *Riley Parsons, W8BXY*

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201 So. Balliet St., Frackville, Pa.

Editor, *QST:*

. . . Personally, I believe 100 watts is plenty. But I'm sort of "stuck" on one of those 250-watt beam-power tubes, so I'd say ¼ kw. Hi! . . .

— *Bertram C. Felsburg, W8VD*

Tank Destroyer School, Camp Hood, Texas

Editor, *QST:*

. . . Quite a good bunch of hams are here at the Tank Destroyer School . . . teaching neophytes this business of radio. . . . The opinion seems to be that the ham fraternity would be better off with a 100-watt power limit, coupled with more stringent regulations. . . .

— *Lt. James A. Gundry, W8KNP*

Similar letters favoring reduction of the maximum power limit were also received from Federick A. Rudd, W9EUT; Eric Nosworthy; Arthur W. Plumer, W3EQK; Chauncy A. Hoover, W9KWY-ex-W9AMU; William W. Simpson, W8KPL; Harvey R. Pierce, W9OPA; A/C Julius Galinsky, W1LOP; Lt. J. D. Bennight, W5JRQ; Vincent L. Rosso, W5KC; Gordon B. Woodruff, W4GVC; Thomas A. Huges, RM3c; Harold S. Roth, W9LFH; Tex Housenfluck, W5HYD; Gordon E. Hopper, W1MEG; Sgt. Wm. A. Wildenhein; Pvt. Robert M. Gordon, W4HXC; C. L. Brown; Pfc. M. W. Schuster, W9MIO; Harold W. Ryall, W1NKW; W. H. M. Watson, W5NT; Mrs. W. H. M. Watson, W5ETX; E. M. Gettys, jr.; and Alva Parham, W4MR.

Orville E. Bean, W1MXX; L. R. Mitchell, W1HIL; Jennings Chesnut, W9YLW, and John H. Bedel, W9UXH, while favoring retention of the 1-kw. maximum, proposed progressive power levels under graded licensing plans.

OPERATING NEWS

GEORGE HART, WINJM
Acting Communications Manager

CAROL A. KEATING, W9WWP
Assistant Communications Manager

FCC Report. The Annual Report of the Federal Communications Commission for the fiscal year 1943 contains a fine plug for amateurs participating in WERS. Since that part of the report is self-explanatory, I quote it herewith verbatim:

Amateurs in large numbers have affiliated with the various local civilian defense organizations and have aided in the establishment of radio stations for this purpose in the relatively new War Emergency Radio Service. In the majority of cases such organizations have appointed licensed amateur operators to serve as the "radio aides" required by regulations of the Commission. The appointment of many amateurs to assume the responsibilities of "radio aide" in this work indicates widespread recognition of technical qualifications and experience obtained through amateur station operation. At the close of the fiscal year the Commission's records indicated that 208 organizations operating stations in the War Emergency Radio Service, where the total number of such organizations was 259, had given the position of "radio aide" to amateur operators.

The urgent need for radio equipment for use in the War Emergency Radio Service challenged amateurs, among others, to cope with the problems of supplying equipment without the assistance of government priority authorizations. Through skill, ingenuity, and determination, amateurs have constructed innumerable stations from scrap and rejected materials and miscellaneous parts from discarded radio receivers, and in many instances have donated or loaned equipment formerly operated in their amateur stations.

Operating conditions in the short-distance radio frequency band 112 to 116 megacycles, which is utilized on a temporary basis by stations in the War Emergency Radio Service, are familiar to amateur operators, inasmuch as all frequencies within this band are allocated to the amateur service by the Commission's rules, and prior to the war were utilized in connection with widespread amateur station activity.

After indicating that the issuance of amateur station licenses had been suspended for the duration, the FCC has the following to say about amateurs in general:

Nevertheless, amateurs have continued their interest in radio and allied subjects and have taken an active part in the war effort. Thousands of amateur operators have entered the military services of the nation, where the experience they gained as operators of amateur stations has proved valuable. Amateurs holding operator licenses issued by the Commission have received special recognition by military authorities who endeavor to assign them to communication branches of the services, where their special qualifications are most useful.

These are impressive and heartening testimonials on behalf of the amateur made by an important government agency, and we thought you would be interested.

War Department Attitude. While we are quoting things, you might also be interested in part of a letter from Secretary of War Stimson to Acting Director Martin of OCD concerning the attitude of the War Department toward continuation of civilian defense activities:

The War Department has a primary concern in maintaining the maximum productive activity and emphasizing offensive operations in the assignment and utilization of its personnel. We are, however, thoroughly aware of the importance of maintaining a well trained force of civilians in our communities to assist the War Department to meet possible war hazards beyond the scope of its primary mission. This requires the continued maintenance and training of the civilian *protective* forces along our Atlantic and Pacific coasts for protection against all such war hazards, including air raids. *In inland areas*, the continuance of Civilian Defense training to protect *against disasters of all kinds* is likewise of major importance.

We have italicized certain words and phrases in the above quotation to emphasize that the *protective* forces include WERS, and that inland areas and protection against all kinds of disasters are included in this request for continued civilian defense organization and training.

FCC has patted us amateurs on the back for the good work we are doing in WERS, and the War Department indicates that it wants us to continue. What more proof of the desirability for continuance do we need? We are doing a good job and our work is not going unrecognized. Let's keep it up.

C.W. in WERS. I wish to report to you the result of an exchange of correspondence between one of our more enterprising radio aides and FCC on the general subject of c.w. operation of WERS station units by WERS permittees who hold only restricted radiotelephone permits. The question was whether or not it was legal for such permit holders, who ordinarily are not authorized to transmit by telegraph, to diddle a key at a WERS station by virtue of their WERS permits.

The interpretation given by FCC was, as usual, the logical and inevitable one. Holders of third class radiotelephone permits cannot indulge in type A-1 or A-2 emission, but the WERS regulations say that WERS stations may be operated by any person holding a WERS permit (Sec. 15.101) — also that WERS stations may use A-0, A-1, A-2 or A-3 emission (f.m., c.w., i.c.w., voice). The logical conclusion, therefore, is that any WERS permit holder is legally entitled to operate c.w. from a WERS station provided his permit is valid for that particular station and subject, of course, to the usual direction and supervision of the radio aide.

It's an angle. Train your WERS permittees in code and have a c.w. net, if you like. If c.w. is not practical, tone modulation might be, especially in some crowded areas where there is plenty of QRM. Has anybody tried it? Drop us a line, or a short write-up for "WERS-of-the-Month" on the subject.

Amateur Training for WERS Permittees. In connection with the above, it has occurred to us that thousands of WERS permittees who are

not amateurs would be interested in receiving training in radio code and theory with the ultimate objective of themselves becoming amateurs. Radio aides continually bombard us with praises for the conscientious work being done by civilian volunteers, and we have become convinced that many of these volunteers would make *good* amateurs, amateurs we should be proud to welcome to our fraternity. Their introduction to ham radio has been made through the medium of a government radio service which has demanded that they toe the line and observe strict operating practices. In all probability most of them will carry these practices with them into their amateur careers, thus making valuable contributions to the efficiency of the amateur emergency networks which are certain to develop after the war.

You amateur WERS participants who have sung their praises owe it to them to provide the necessary training to give them amateur status. You radio aides who owe the success of your organizations partly to the unselfish devotion and loyalty of civilian volunteers should feel obligated to help them obtain amateur licenses if they wish to do so, and the best and easiest way to accomplish this is to establish regular classes in code and theory leading to a ham ticket, not necessarily sponsored by the defense council of your community but by the WERS organization itself, as a reward and as an indication of gratitude for what the volunteers have done.

On the other hand, the reasons for such training need not be entirely altruistic. By training your volunteers you are maintaining their interest in the organization and keeping them constructively busy. You are giving them better understanding of the workings of the transmitting units they operate, thus enabling them to operate more efficiently and to cope with minor technical difficulties when they arise. Other radio-minded persons of the community, hearing of the classes, will become interested in the organization, thus adding new personnel to the group.

True, many radio aides are so busy with their other duties that they cannot possibly take on a code/theory class, but the larger organizations have training sections, many of which are less active now than they were when the need for operating personnel was desperate. Once a reasonable code speed has been reached it might be feasible to install audio oscillators in each transmitting unit and conduct one drill a week entirely on c.w.

ARRL publications are available at moderate cost for guiding such training, and code training manuals for instructors are available free of charge. It seems to us that the advantages of instituting radio training classes for non-amateur WERS personnel are too great to be overlooked.

Honor Roll. Our Honor Roll of clubs participating in the ARRL War Training Program, while still in existence, has greatly diminished in the past few months. In an attempt to enlarge it once again we have decided that in the future this Honor Roll shall be open to WERS groups who are conducting code and/or theory classes for their non-amateur personnel, and club code proficiency certificates are available for issuance to members of the group who attain certain code speeds set down by the radio aide or his deputy conducting the training. We supply the certificates; you issue them.

This additional WERS activity will serve to publicize the fact that your WERS organization is a wide-awake, enterprising group which has, in addition to its primary duties, both the welfare of its own personnel and of amateur radio at heart. Can we list your group on the Honor Roll?

CUL. Hereafter the initials at the bottom of this column will be those of Miss Carol A. Keating, W9WWP, who takes over the affairs of the Communications Department while the present writer answers the call to duty with the armed forces. It has been a pleasure and an honor to serve you during the past year and one-half, and I know that I can count on you to give C.A.K. the same wholehearted coöperation you have always given me. 73, CUL.

— *G. H.*

BRIEFS

Some of the phonetic alphabets we have heard being used on various WERS nets sound almost like the one published on page 76 of December, 1942, *QST*. Perhaps the reason for this is that there are so many different versions floating around. For your information, therefore, we reproduce herewith the "Combined Phonetic Alphabet" as used by the armed services of Great Britain and the United States. We suggest its adoption for general use in WERS nets, replacing the alphabet appearing in the first printing of the 1944 edition of *The Radio Amateur's Handbook*.

A — Able (Affirm)*	J — Jig	R — Roger
B — Baker	K — King	S — Sugar
C — Charlie	L — Love	T — Tare
D — Dog	M — Mike	U — Uncle
E — Easy	N — Nan (Negat)*	V — Victor
F — Fox	O — Oboe (Option)*	W — William
G — George	P — Peter (Prep)*	X — X-ray
H — How	Q — Queen	Y — Yoke
I — Item (Interrogatory)*		Z — Zebra

* From the U. S. Navy General Signal Book, used within the Navy for flag signaling.

0 — Zē-rō	3 — Thuh-reé	7 — Se-ven
1 — Wun	4 — Fō-wer	8 — Ate
2 — Too	5 — Fi-yiv	9 — Niner
	6 — Six	

Example:

WQRR-49 — William Queen Roger Roger Fō-wer Niner.

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The Cuyahoga Radio Association will start a code class on March 5th at 2 P.M. in South Hall A, Public Auditorium, Cleveland, Ohio. The fee for members will be $1; for nonmembers, $2. Further information can be obtained from E. A. Smith at FAirmount 8226.

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A radio class in code and theory will be conducted for prospective WERS operators in Room 603 at the Washington Irving High School, 16th St. and Irving Place, New York City. The class will meet on Mondays and Fridays at 8 P.M.

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The Society Radio Operators is holding an open house meeting April 19, 1944, at 8 P.M. at the Gompers Park Field House, 4224 Foster Ave., Chicago, Ill. All amateurs, both civilian and those in the services, are cordially invited to attend and have a good time. A very interesting program has been planned for this meeting.

WERS of the Month

Waterville, N. Y.

ALTHOUGH the usefulness of WERS in emergencies has been widely publicized, little mention has been given the other benefits which a community derives from the existence of a WERS organization within its borders. Waterville, N. Y., the home of WKSW, is an example of such a community.

With the increasing drain of young men into the armed forces from our community, and with the realization of the importance of pre-induction radio training, the local high school authorities sanctioned the plan of having a radio club. Since ham radio was out, WERS supplied the objective for the work of the club members. In due time the village was assigned the WERS call of WKSW, and, since I held a ham ticket and was a science teacher in the school, I was made radio aide and sponsor of the club.

It wasn't long before all the members were busily studying radio theory and radio law, and soon they were taking the examination for restricted radiotelephone operator permits. Transceivers were built; antenna and feeder problems were hashed out. At length six rigs were completed, and at this writing three more are under construction.

One of the six is equipped with a vibrator power supply and is used to work mobile with some of the mobile and fixed stations of WKOM in the Utica, N. Y., WERS net.

We have been fortunate in having one of the highest spots in the county to work from. At an elevation of 1944 feet, it is an ideal place to contact Syracuse and Utica for relay work. Interesting topographical and propagational phenomena have been noted, and contour maps and profiles of air-line stretches have been found necessary and useful. This has been another activity which has kept the operating personnel interested.

While we have been carrying on in WERS, the following thoughts have occurred to me on the service which has been rendered to the community at large: First, we are using WERS as a means to give pre-induction training to boys who will probably be grateful for it later; second, we are enlisting future hams, and at the same instant are giving them a worth-while hobby to follow; and third, we are helping to curb juvenile delinquency by keeping adolescent hands and heads busy with a service which will be of unquestionable benefit to the community in time of emergency.

Let's keep WERS going! Besides all it is accomplishing now, it may be one of the deciding features in helping us to maintain our amateur bands when we lay down the shootin' irons for our old signal shooters!

— M. L. Peterson, W8FMX
Radio Aide, WKSW

Each month under the above heading we shall publish the story of an outstanding WERS organization as an item of general interest to all WERS participants. Contributions are solicited from any radio aide or WERS participant, whether he be an amateur or a WERS permittee. Descriptions of organizations which have already been featured in *QST* articles will not be considered. The story may describe the organization in general, how it came into being, how it was set up and how it operates; or it may describe some particular phase of the organization which makes it unusual or unique. Contributions should be brief (two or three typewritten pages, double-spaced, is maximum) and may include photographs, if desired, although only one photograph will be printed with each story. Each story must be released for publication by the radio aide of the licensee, in writing. Address your contribution to the Communications Department, ARRL, and mark it: "For WERS of the Month."

ELECTION NOTICES

To all ARRL Members residing in the Sections listed below:

The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present incumbent and the date of expiration of his term of office. This notice supersedes previous notices.

In cases where no valid nominating petitions have been received from ARRL full members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from full Members of a Section, the incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filing of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in West Hartford on or before noon on the dates specified.

Due to resignations in the Missouri, San Joaquin Valley and Colorado Sections, nominating petitions are hereby solicited for the office of Section Communications Manager in these Sections, and the closing date for receipt of nominations at ARRL Headquarters is herewith specified as noon, Monday, April 17, 1944.

Section	*Closing Date*	*Present SCM*	*Present Term of Office Ends*
San Diego	April 3, 1944	Richard Shanks	April 15, 1944
Idaho	April 3, 1944	Don D. Oberbillig	April 15, 1944
Missouri	April 17, 1944	Robert C. Morwood (resigned)	.....
San Joaquin Valley	April 17, 1944	Antone J. Silva (resigned)	.....
Colorado	April 17, 1944	Stephen J. Fitzpatrick (resigned)	.....
Hawaii	April 17, 1944	Francis T. Blatt	Feb. 28, 1941
Sacramento Valley	April 17, 1944	Vincent N. Feldhausen	June 15, 1941
Nevada	April 17, 1944	Edward W. Heim	Nov. 1, 1941
Oklahoma	April 17, 1944	R. W. Battern	Nov. 1, 1941
Alaska	April 17, 1944	James G. Sherry	June 14, 1942
Southern Minn.	April 17, 1944	Millard L. Bender	Aug. 22, 1942
New Hampshire	April 17, 1944	Mrs. Dorothy W. Evans	Sept. 1, 1942
West Indies	April 17, 1944	Mario de la Torre	Dec. 16, 1942
Maine	April 17, 1944	Ames R. Millett	June 7, 1943
South Carolina	April 17, 1944	Ted Ferguson	Aug. 25, 1943
Western Fla.	April 17, 1944	Oscar Cederstrom	Oct. 1, 1943
South Dakota	May 15, 1944	P. H. Schultz	May 18, 1944
Alabama	May 15, 1944	Lawrence Smyth	May 22, 1944
Iowa	May 15, 1944	Arthur E. Rydberg	May 26, 1944
Montana	May 15, 1944	R. Rex Roberts	June 1, 1944
Arizona	June 1, 1944	Douglas Aitken	June 15, 1944

1. You are hereby notified that an election for an ARRL Section Communications Manager for the next two-year term of office is about to be held in each of these Sections in accordance with the provisions of the By-Laws.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list in alphabetical sequence the names of all eligible candidates nominated for the position by ARRL full members residing in the Sections concerned. Ballots will be mailed to full members as of the closing dates specified above, for receipt of nominating petitions.

3. Nominating petitions from the Sections named are hereby solicited. Five or more ARRL full members residing in any Section have the privilege of nominating any full member of the League as candidate for Section Manager. The following form for nomination is suggested:

(Place and date)

Communications Manager, ARRL
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the ARRL residing in the.....Section of the.....Division hereby nominate.....as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Five or more signatures of ARRL full members are required)

The candidates and five or more signers *must* be League full members in good standing or the petition will be thrown out as invalid. *Each candidate must have been a licensed amateur operator for at least two years and similarly, a full member of the League for at least one continuous year, immediately prior to his nomination or the petition will likewise be invalidated.* The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit to the number of petitions that may be filed, but no member shall sign more than one.

4. Members are urged to take initiative immediately, filing petitions for the officials of each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

— George Hart, Acting Communications Manager

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

West Virginia — Kenneth M. Zinn, W8JRL — Feb. 15, 1944

In the Louisiana Section of the Delta Division, Mr. Eugene H. Treadaway, W5DKR, and Mr. W. J. Wilkinson, jr., W5DWW, were nominated. Mr. Treadaway received 41 votes and Mr. Wilkinson received 30 votes. Mr. Treadaway's term of office began Feb. 25, 1944.

The Month in Canada

ONTARIO—VE3

From Leonard L. Mitchell, VE3AZ:

A LETTER from 3XR, Fraser Cummings, advises that he and 3FA, Elmer Mock, are civilian wireless instructors at the Galt Aircraft School where they are teaching theory and practical wireless to RCAF operators and mechanics. 4ALN, R. H. Brown, of Wendthorst, Saskatchewan, is one of their students. 3XR thinks that about five per cent of the men going through the school would make good amateurs after the war.

3EB, Flying Officer William C. Crofton, was married on February 19th to Flight Officer Jessie Elizabeth Nichol. Congrats, OM!

ALBERTA—VE4

From W. W. Butchart, VE4LQ:

4NU, Gordie Sadler, of Edmonton, has learned from 4AGZ, Don Stewart, of Edmonton, now with the RCAF in North Africa, that someone is "bootlegging" the call 4NU in North Africa. It appears that AGZ bumped into a chap named Whetstone over there, who said his call was VE4NU. NU is plenty burned up over it!

4AEA, Bill Horton, of Edmonton, is serving with the RCCS and at present is stationed at Fort Simpson, N.W.T. 4WH's brother, Stan Hughes, who has been in the Far East with the RCAF, has returned on furlough. He has some very interesting stories of his travels, which include the siege of Singapore.

In a recent letter, 4ZI, Elwood Irwin, of Barons, laments the fact that there has been no curling to date down there. It appears that 4AQP, Milson Hodgson; 4WZ, John Row and 4ZI, all of Barons, are addicts of the "Roarin' Game." ZI enclosed a letter from 4PZ, Vic Row, of Barons, now with the RCAF at Montreal, and from it we glean the fact that Vic is putting in long hours, especially on days when he gets hooked for scrubbing floors, etc., after classes. He saw a Hallicrafters' SX-16 sitting on a bench one day, but it happened to be on the other side of a doorway marked "out of bounds," so Vic had to suppress his desire to "try her out." In the same letter Vic provides ZI with positive proof that there is no such thing as "wireless" or "radio"! Ask ZI to explain it sometime!

4AOZ, Slim Marsden, of Milo, found out through this column that his old pal 5SO, Walt Joe, of Vernon, is in the RCAF. Apparently Walt had tried on numerous occasions to join the Air Force or the Army and had been rejected because he was of Chinese origin. Slim advised Walt to keep trying anyhow and apparently that is what he did. Walt is wireless operator, air, now, and the last we heard of him he was in the vicinity of Vancouver. AOZ finally managed to drive a bargain with 4AEV, Norm Lockhart, of Vulcan, for his Meissner 14 receiver, and it now reposes on AOZ's bench. Slim also tells us that Glen and Maude Phillips, 4AHZ and 4APA, respectively, are still doing business on the same old spot, and are looking forward to the day when they can get the rig on the air to renew acquaintances.

4SW, R. Hugh, of Standard, has moved into Calgary, where he has been transferred to the inspectors staff of the Royal Bank. 4HK, Tony Jensen, of Standard, is still in the same locality and has gone all out for wheat farming instead of diversified farming. 4APZ, Alvin Campbell, of Innisfail, went into Calgary to take his exam for 2nd-class projectionist and passed with good marks. 4AMA is still at Brandon where he is a civilian radio technician with the RCAF. 4GD, James Smalley, of Calgary, is kept rather busy around the "Gyp-Joint" these days.

Thanks for all the news, Slim, and, for your information, 4VJ, Ken Angus, of Edmonton, is very much alive! He still works at CFRN, and drives 9 miles to and from work each day in his car, as he has the late shift at the transmitter. 4AOZ has just taken on the job of Mayor of Milo for another three-year term.

4KK and 4ZW turned out in force to the Ciné Club's screening of members' pictures several weeks ago. 4EA provided suitable "mood music" for the movies, and added much toward making the screening a complete success.

We're still looking for news items for this column. Can you help?

BRITISH COLUMBIA—VE5

From Jack Sibson, VE5BQ:

HAD a very interesting visit from an English ham, Les McGlade, G3MG, who is stationed at Sidney, B. C. 5MJ, Sid Jones, who came to the coast on his honeymoon, called on us for Sunday dinner and a visit. His new XYL is interested in ham radio and hopes to get her ticket after the war. Sid, who has been with the RCAF for the past three years, is a sergeant and stationed at Edmonton.

Had a letter from Bill Sharp, 5DB, who is with Consolidated Mining Co. at Pinchi Lake, B. C. He and Bill Spence, 5AES, operate a company station there. They also do radio service work on the side. Ted Goade's, 5ND, new house is nearing completion. George Goode, 5EO, at present is an instructor for T.C.A. at Winnipeg. Out of a class of 79 he has five B.C. hams. Haven't found out yet who they are. To our surprise Fred Taylor, 5HA, went and "dood it" and is a very happily married man.

I have received correspondence from Ottawa stating that all rebuilding of transmitters for use after the war is strictly forbidden and is punishable by a heavy fine or imprisonment.

In case any of you fellows care to drop me a line, my address is 8695 Laurel St., Vancouver, B. C.

MAILBAG

A/PO Tel. David Scholes, VE5DY, furnishes these notes on British Columbia amateurs:

"A recent addition to the staff of my station is S/Lt. W. K. L. Lore, 2NQ, of Montreal. A few days ago I met 5ADB and he told me that 5PK, of Victoria, is working in the same shipyard with him and 5JA.

"In case 5HR didn't mention it to you when he wrote some time ago, I might say that the Victoria Short Wave Club met at my shack for an annual meeting on December 9, 1943, and completed necessary business transactions before having a good old fashioned rag-chew. Although the club hasn't held regular meetings for over a year, we have to make an annual report to the Registrar of Companies under the terms of our incorporation. Those attending the meeting included 5CH, 5HR, 5ADB, 5IE, 5GB, 5AAZ, 5AAH, 5DY, and possibly one or two more. Officers stated that the club has a balance in the bank, insurance has been kept up, taxes are paid, and no debts are outstanding. The clubhouse is being transferred to the club's name from 5DQ who has held the title in trust until now. It was pointed out that regular meetings are virtually impossible due to the occupations of the members remaining in the city, and also due to the fact that of all the licensed hams in Victoria, some 42 per cent have joined the services, and others have taken positions in essential industries and services which have necessitated transfers to other regions.

"Recently I had an airmail letter from 5ACE who is in the RCAF and stationed in Ceylon. He says he has not met any Victoria hams since he left here over a year ago, but that 3AYA and 4AQQ are in his section of the RCAF. He says he has made the acquaintance of tropical rain and lizards among other things (one of which was censored). 5RM is in Italy in the Signals as, I believe, is another Victoria ham whose call I forget."

From Bill Sharp, VE5DB, comes the following:

"I see in *QST* that the BCARA is still carrying on with most of the member clubs in and around Vancouver. I am sorry to say I had lost track of the old gang and would like very much to get back into the fold.

"At present I am employed at the C.M. & S. Co. station, CZ2O, at Pinchi Lake, B. C., about eighty miles north of Vanderhoof. I would appreciate receiving letters from any of the old gang, especially from VE5 hams in the services, and I would be glad to answer same. I have planned a little scheme for rehabilitation of ex-service hams from the VE5 and VE4 districts."

BRIEF

Sir:

I havx rxcxivxd thx typxwritxr you sxnt. You can sxx from this lxttxr thx sort of rot it writxs. What's thx good of sxnding out a machinx without a lxttxr "x" in it? For hxavxn's sakx sxnd somxonx to takx it away and bring mx onx that writxs sxnsx.

Yours sincxrxly,

—Ham Chatter

AMATEUR ACTIVITIES

ATLANTIC DIVISION

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Hermann E. Hobbs, W3CIZ — WERS meetings are held every Thurs. evening at 7:30 at the YMCA in Washington. The WERS gang is planning to continue meetings and practice work. Ex-IW, an old-time spark-set operator, was lost at sea. New WERS permits: Tom Pendleton, Rita Schaefer, Charles Jacobs. Robert L. "Bob" Caviness is stationed at the U. S. Naval Training Station, Co. 126, Great Lakes, Ill. He would like to hear from the WMDD gang. Mac Williams, assistant C.O., has been doing a fine job directing net operations during drill periods. Mrs. Alice Le Beau has been present and operating at WMDD-1 about every drill period since she received her ticket. Radio Aide Blair is up and around again after a session with the mumps. A.R.A. Mock is still pinch hitting for the r.a. and is doing a fine job. Ralph Stewart and Nick Smith are to be commended for their engineering on the antenna tower at WMDD-1. Nick Smith is taking a radio course at G.W. three nights a week. Dean Young and Paul Thomsen made recordings of the net operations and played them back to the gang at a general meeting. Tom Pendleton, age 12, is heard operating occasionally when school work permits. Don Weinroth and Alan Bringle, the other two youngsters of the WMDD net, are making a record that some of the old-timers should try for.

SOUTHERN NEW JERSEY — SCM, Ray Tomlinson, W3GCU — Asst. SCM, ZL Regional EC for So. N. J., technical radio advisor for N. J. state defense council, N. J. state radio aide for WERS and radio aide for Hamilton Twp. WERS, ASQ. Radio aide for Hillsboro/Branchburg Twps. WERS, EC for Somerville and vicinity, including South Branch, ABS. ASQ reports that the municipality of Upper Penns Neck Twp. has been licensed to operate under the call WJYD with Frank H. Wood, 23 Harrison St., Carney's Point, as r.a. Hamilton Twp. WERS has received some new operator permits from FCC. ABS reports that Bridgewater Twp. has applied for WERS license. All six operators under Bridgewater Twp. are hams. Hillsboro/Branchburg Twp. is running regular test drills and had a special test called for by OCD officials, all of whom were very highly impressed with the results. They have worked out a plan whereby they will go into operation automatically in case of storms causing the disruption of telephone service. 8ISK, formerly of Columbus, Ohio, and now of Toms River, writes that he has returned home from the services with a broken back and the doctors advise him that he is facing the loss of use of both legs as a result. Bart is known to his old friends as ex-WLHO, WLRR, 2AWJ, BPW, 8DDE and 8ISK; also ORS, AARS and RCC. Dick Hewitt, of Glendale, Calif., writes that he and BYR broke into ham radio together back in '13 with a jointly-owned spark station at Dick's home, which was kept going until Dick moved to Philly, and that BYR's last known QTH was with the Signal Corps in Belmar, N. J. Vic has since been moved and nobody has his latest QTH. HWT is CPO in Naval Air Corps somewhere in England. INF's latest QTH is: Cpl. Carl Miller, Co. X, 800th Sig. Tng. Regt., Camp Crowder, Mo. He is now an instructor in code and traffic at the Central Signal Corps School. HOJ's address is: Walter S. Scott, RT1c, c/o Fleet Post Office, San Francisco, Calif. He writes that the last time he was in Phila. he dropped into the FCC office and got himself radiotelegraph 2nd-class and radiotelephone 1st-class tickets. When last heard from FXV was at Yale studying electrical engineering. 1FT made CRT. HUZ is doing personnel classification work in Tenn., and HHY is now in England. ZI has been appointed Assistant Director by 8BQ, Acting Director. CCO, our former SCM, has been transferred from Wright Radio Labs, Dayton, to Ft. Monmouth. GER recently returned from Naples. HPX is now a radio operator in the merchant marine. 3PC is radio technician for N. J. State Forestry Service. HKO is in the Pacific Northwest on a special mission for the Signal Corps; 2OEN is reported as being with him. AWH and AMP are doing research at M.I.T. BZX has been reported as having changed his QTH to Fla. HCL is now a sgt. instructor at the Signal School at Ft. Monmouth. ARN's brother just received his commission in the Navy. Ex-8BRJ has accepted a position with Federal Tel. & Radio Corp., Electronics Div.

WESTERN NEW YORK — SCM, William F. Bellor, W8MC — The Rochester Amateur Radio Association held a small banquet and hamfest on Feb. 12th. There were 48 present, among whom were a W6, W9, W2 and W7. Present also was NCM, who has been home on sick leave. Fran got pretty well shot up while in the South Pacific area but is mending fast. BDK tells us the Adirondack Amateur Association is still conducting code and theory classes and has 134 members. BDK and FV are teaching school. CRF is building transmitters. ITN is in the experimental lab at G.E. DKX is now a major. GFV is doing wire work for Western Union. The Gloversville gang expect their city fathers will soon sponsor a WERS unit. 2OPF-ex-8UGT, is now in England and has been promoted to warrant officer. Louis says it's good for the morale of the boys over there to hear that hams back home are working for postwar hamming. PK is back home after work with RCA that took him all through South America. They tell us that EO is glad to be back home. The application for the Monroe County WERS unit has been filed with FCC. 73, *Bill*.

WESTERN PENNSYLVANIA — SCM, E. A. Krall, W8CKO — All ECs are reminded to renew their ARRL membership when due as failure to do so means automatic suspension of the appointment. Upon renewal your SCM should be notified. HLM is a civilian instructor of radio at Ft. Monmouth. HXU is a s/sgt. at the same location. AET, an Air Force captain, is stationed at Washington, D. C. DJE is flying with the CAP and is located at a Texas air base. NDE, is radio aide for the Elk Co. WERS, WMGR, and is ably assisted by HRW, KXP, VMX, IOI and Dr. Fleming. A station in Emporium is needed to complete the circuit. RIK is now RM1c in the Coast Guard at Atlantic City. AYH is CPO in the Navy and was home on leave before assignment to the Great Lakes. JLM is in Australia, assigned to RR Engineers as a 1st lt. RXT is back from the Army and is now a movie operator. FIP is working at R9 crystals. FCO has been very ill. DAB is connected with KDKA. VZA is working at a steel company. SGV is assistant chief at a Fairmont, W. Va., b.c. station. TUY and WAN have opened a radio shop. OKU and HAD are defense workers at a ship-building plant. TVG is at Pitt and the Stupakoff Eng. Co. DNO, to whom we are grateful for much of the above news, is m/sgt., Pa. State Guard, Signal Platoon, Hunt Armory, Pittsburgh, Pa., and needs radio, telephone and sound men. Technical ratings are available. The Steel City Radio Club still holds regular monthly meetings at their clubhouse, R. D. No. 5, Crafton, Pa. Your SCM desires news from amateurs in the services from Erie, Altoona, Johnstown, Uniontown and Warren.

CENTRAL DIVISION

ILLINOIS — Acting SCM, George Keith, jr., W9QLZ — ARN is trying to keep a list of all hams from his area who are in the services. LF, of Peoria, is still working with VHF. ALU is near the Fiji Islands as radio officer. RGH is still an engineer with RME. GFW is working in a control tower at an airport near Chicago. JVC has spent some time with an intelligence group in Italy learning their operating methods and while there worked with an old friend from the Canal Zone. 1EU, in the merchant marine, requests correspondence from the Ill. gang. Write him: Ben Roberts, Radio Officer, Cities Service Oil Co., c/o *Postmaster, New York*, N. Y. MIO, formerly of Mt. Carmel, is stationed at Mather Field, Calif., and has had only eleven days at the key since entering the services. WJS has been in the Army nearly four years. He spent a year as t/sgt. doing radio work in the infantry and then transferred to the Air Corps as an instructor. YZT is a fighter pilot stationed in Egypt. MZW is stationed at Camp Crowder. BIN is at North Camp Hood, Tex., in a tank destroyer battalion. Ex-WSR, now 3JPK, continues to work hard for the Navy Dept. in Washington, D. C. RMA is now the papa of a jr. op. Ex-UPG/8VKJ is "touring" the Marshall Islands at the request of the Coast Guard. UKZ has two husky jr. ops. PGB, working overseas with a Signal Depot unit, recently escaped serious injury when some hot lead splashed on him. 73, *Geo*.

INDIANA — SCM, Herbert S. Brier, W9EGQ — M/Sgt. KBQ is in charge of the radio operations section of his unit. RDC, ART2c, likes his work, but he would much rather be home rag-chewing. MPB has made plenty of new friends in Hawaii. TIY, also in Hawaii, works for the FCC. IUM is again EC for Auburn and vicinity. IIL is a Cadre officer, and

reported from his tent in the Fla. swamps. DUT is a radio engineer, doing development work for the Navy. YMV has finished training and is now a radio operator for the Maritime Commission. KMY is assigned to an infantry battalion. AB reports that Mishawaka's WERS license has been modified to permit the use of f.m. on the control transmitter; all units are now portable or portable-mobile. DMH, communications officer for South Bend WERS, WKQE, reports they have a class of 55. EHT is in Lowell, Mass., studying for the Navy. He met YMV in Boston for a two-man hamfest. SVH reports that the Elkhart Radio Club was addressed by LEZ, who has been chief operator for HCJB, Quito, Ecuador, for quite a while. DEE has been going to college in Ohio for the Air Forces for a year. HUV helped a neighbor salvage his furniture from a burning house and narrowly escaped a falling flue. MVZ has just finished instructing another small class of WERS volunteers. Gary and Indianapolis received their batteries from OCD. PBS heard a dramatization of WERS work over a Detroit station. WISH of Indianapolis also carried a program about WERS. SAG is doing underwater sound detection research work. Ninety per cent of his associates are hams. UGH works seven days a week. EOC is the only ham left in Bicknell. JIM is married and works for RCA at Bloomington. ZLJ is working in a defense plant in Evansville. HBD finally heard from FCC about Bloomington's WERS license. 6THU was a guest at his home recently. EBQ visited me one drill night. YWE was also here. The government radio station where he worked was closed, but he is now working for another one. PUB is now ART2c in a bombing squadron. The grapevine says that WIB is now married. The *Bison* is still printed and goes to all continents. A report will get you a copy. 73, *Herb.*

MICHIGAN — SCM, Harold C. Bird, W8DPE — The DARA bulletin reports that 8WOJ is now at Miami Beach, Fla. 8VRQ is in New York City with Western Electric. J. R. Beljan's address is APO 634, c/o Postmaster, N. Y. C. 8SWA's new address is Hq. Co. 125 Inf. Regt., CP Maxey 18, Tex. 8SKV writes that he is a civilian instructor at the Tomah (Wis.) Radio School. 8FX says he tried wired wireless transmissions on his own house current and it is okay, but he has no one to work. 8RTN's address is Lt. A. L. Tippet, 99th Sig. Co., Camp Maxey, Tex. He has been in the Army for three years. 8NXB, secy. of the Detroit Edison Radio Club, writes that the club is still going although the attendance has dropped. The following club members are very active in WERS: 8AZZ, Walter Bone, 8VRB, 8UYG, 8UQR, Malcomb Stevens, 8TWG and 8NXB. 8PLC reports that the CAP unit located at Cadillac has received its license under the call WLEZ 18-19. The stations are complete except for a receiver for the fixed station. Lansing Radio Aide 8AHV says they are carrying on their tests twice a month. Some of the boys are building more equipment. Flint has promoted John H. Stuewe for EC. WKOY reports that they had a chance to use their set-up to good advantage recently. An accident of major importance occurred outside of the metropolitan area. They rushed four units to the scene and transmitted the information back to a station located in the vicinity of the airport. At their recent meeting they had the Flint traffic engineer and local controller for OCD as a speaker. The Oakland County Club members are holding a radio school each Mon. night in the local police station. WKYM has several stations now functioning with excellent coverage. Please send in reports. 73, *Hal.*

OHIO — SCM, D. C. McCoy, W8CBI — Greetings, gang. My Eastern trip was brightened by a few hours spent at ARRL Hq. Another bright spot was a dinner Dec. 11th with 2EXM, 2JGA and 2FG, all pre-World War I buddies of your SCM. Continued WERS activity is urged. Communities which are not licensed should give consideration to tying up with a nearby licensed community by use of an inter-municipal agreement if the burden of preparing for a license is too great. *Most of our Ohio EC appointments have run out and it is up to you fellows to send in your tickets for renewal as soon as possible.* All appointments now expired will be canceled if tickets are not in my hands by April 15th. Please get busy and get that ticket, and yearly report if required, off to me as soon as you read this. *Cleveland:* A number of radio aides from other WERS networks were on hand for the state inspection Dec. 12th. The problem was a simulated tornado. Well over 100 incidents were handled, operating was snappy and efficient with no confusion. Emergency power was used at many locations, and an FB job was done. HC's publication "Radio Amateurs of Greater Cleveland" has been well received. BAH is now a Lt. Comdr. with the Navy in the South Pacific. It is our sad duty to record the death of POQ on Dec. 13th. UUW, RM3c, is now a ground operator with the Naval Air Transport Service. He was married recently. His address is 144–09 41st Ave., Flushing, N. Y. *Youngstown:* VHL writes from Pyote, Tex., where he has been an aerial radio instructor on B-17s. He went on 68 missions in the South Pacific and returned to the U. S. about a year ago. He was awarded the Silver Star, Air Medal and D.F.C. He wants to hear from some of his old buddies in Ohio. Address him: T/Sgt. Edw. G. Osborne, Maintenance Unit "B," AAF, Pyote, Tex. *Toledo:* The Toledo Radio Club will pass its tenth anniversary within a few months. Carl Wilson is a supervisor of military installations for Philco and rumor has it that he has been sent to the South Pacific. Former club secretary Wm. Follmer is now in Rochester, N. Y., at 335 Ridgedale Circle. He is cost accountant for the Rochester Hospital Council. Glen Winisch was last reported taking his boot training at Great Lakes. Larry Scott, RT1c with the Navy, has seen active service in the Pacific and Mediterranean — his service ribbons carry two gold stars. *Canton:* UIL writes from French N.W. Africa urging us here at home to keep amateur radio alive. Write me for his address and drop him a line, gang. *Portsmouth:* ACG, chief technician for b.c. station WPAY, was appointed radio aide. The Scioto County license was issued in Oct. ACG and the gang have done a fine job, getting 12 units built and 27 operators trained. John Albrecht and Carl Dachler are deputy radio aides. Five amateurs are reported in the system. How about some of the rest of you fellows getting going down there along the river where there is no WERS? *Lima:* WERS application has not yet been approved by FCC. *Cincinnati:* State inspection of WERS was held on Dec. 8th with a simulated Ohio River flood as the problem. Maj. Charles Miller of the 5th Svc. Command; Harry Meier, OCD field representative, and Don Park, communications coördinator, were the inspecting officers. Excellent performance in covering three counties was reported. *Middletown:* Nine WERS stations are in operation with two more contemplated. Twenty-five licensed operators are reported, with others in training. We regret to record the passing of VNK, who died suddenly of a heart attack Dec. 26th. *Hamilton:* a general meeting of WERS personnel was held Dec. 6th. Several new operators were sworn in. Several WKOD stations are heard by some of the Dayton stations with good regularity and workable signal strength. *Greenville:* Indirect reports to the SCM indicate that EC and radio aide UWA has been drafted. *Piqua:* Indirect reports indicate that KQN is trying to extend his WERS system to Troy and Sidney. *Dayton:* The state inspection of Dayton WERS was held Dec. 1st, with Maj. Miller, Don Park and others officiating. The drill was considered a success. Thirty-nine members of the Dayton WERS personnel have qualified for OCD service ribbons. A deputy radio aide will be placed in full charge of all activities in each sub-control area. AZH, at Franklin, and RSQ, at Vandalia, are now in the services. No. 2 is to be moved to a location where a fine antenna can be erected. One of our three hospital installations has been put in operation. QQ and several other members of the Columbus WERS system were guests for one of our Sunday drills. Sgt. TOZ is still at Chanute Field doing operating. VYE was drafted. NAF has been transferred to Dayton from Detroit, continuing his activities as a Signal Corps inspector. QDI is at Fort Schuyler. MFV is at Alamogordo, N. Mex. SVI was last reported to be in New Guinea. Duck. MFV's brother, was last reported still at Bowman Field, Ky. Lt. (jg) Charles Deger is now in the Pacific. Write me for his address. TYH, back at Dayton Airport, is now assistant chief aircraft communicator and has been teaching code at the YMCA radio school. VHJ is now at Maxwell Field taking pre-flight training. His father is a major at Patterson Field, Dayton. *Pomeroy:* Three hams, twelve trained operators and one in training comprise the WERS personnel. Eight units are in service including two mobile and three portable-mobile units. Ten members of the WERS personnel have been awarded OCD service ribbons. VWW is now in the Army. *Bellefontaine:* Application for WERS license has been forwarded to FCC to cover Logan County. *Springfield:* EQN reports that WERS license has been granted with the call WKXB. The r.a. is Paul Crowell. Radio classes have been conducted regularly. TIM was last reported in Greenland. Thanks for the letters from the boys overseas. 73, *Dan.*

WISCONSIN — SCM, Emil R. Felber, jr., W9RH — The MRAC now meets in the Conference Room of the Public Museum every Thurs. at 8:00 P.M. The WERS units of WFMI are being installed in their respective locations

and tests are being made. Ens. Theo C. Kercher has taken unto himself a wife. RH, club treasurer, reports the purchase of two $25 War Bonds, bringing the club's total to nine. VWG is the proud papa of a baby girl. Lester Kolle, who was a ham about ten years ago, is a new member and is interested in assisting with WERS. Kenneth Le Gros is another new member. DJC was home on a furlough. Ens. W. W. Black, USNR, sends regards. S/Sgt. Ollie Zander writes that the club bulletin is appreciated. SYT, now with RCA, was introduced to pea soup fog in Pittsburgh. Letters will reach him as follows: Wendel Ciganek, RCA Bldg 5-6, Camden, N. J. Capt. Fred F. Seifert of Wright Field, Dayton, Ohio, was surprised to hear that Lt. L. Wollaeger was married. KCY is now a sergeant. Letters were received from Pfc. Steve Rukavina, Pfc. Gilbert W. Rink, Raymond L. Urban, Art Kaufman, Pfc. John Holmes, Sgt. James Fischer, ACRM Romie Hudzinsky, Pvt. John F. Rashinsky. Answers to questions asked are as follows: All members in good standing who left Milwaukee for military service are exempt from payment of dues for the duration. All members who left Milwaukee for positions elsewhere can retain their membership at the reduced rate of $1 a year. Non-members in military services can join the club by paying a total of $1 for initiation and two months' dues and then, as members, are exempt from dues for the duration. Non-members away from Milwaukee can join the club by paying $1 for initiation and two months' dues and $1 per annum thereafter, as an inactive member, until they return to Milwaukee. The ARRL must have our support. Please, fellows, back them up by paying your ARRL dues or joining up. The dues, which include the monthly official organ of *QST*, for club members are $2 per year and for non-members $2.50 a year. Please drop your SCM a line about the whereabouts of your local boys. 73, *Emil*.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, P. H. Schultz, W9QVY — Pierre hams are renewing interest in WERS. They are planning a set-up of two fixed and five portable-mobile stations. GLK is radio aide and WLP is assistant radio aide and superintendent of construction. We must have reports or we cannot pass on any news. 73, *Phil*.

NORTHERN MINNESOTA. — SCM, Armond D. Brattland, W9FUZ — Wally Lamb, op. license, of Thief River, reports that HBI has been honorably discharged from the Army and is back at his old job as serviceman. HZM is somewhere in England. JNC has been transferred to Amarillo, Tex., for basic Air Corps training. ORT reports from Jefferson Barracks, Mo., where he is a member of the Air Corps. BMX and JIE are heading up WERS in St. Paul, West St. Paul and So. St. Paul with EKX, ex-FWO and others assisting. IFW, formerly of Winona CAP, will shortly be attached to the St. Paul group as communications officer. RPT, assistant communications officer of the Minn. wing of the CAP has been getting out blueprints on equipment for the gang throughout the state. The Army Air Force is now releasing certain equipment to CAP for WERS. MTH, wing training officer, finds time to continue the building of equipment. BHY, wing communications officer would like to contact any ham interested in joining the CAP. Assistance is required in practically every squadron and flight in the state. A new squadron at Rochester will soon be organized. How about a few more reports? 73, *Army*.

DELTA DIVISION

LOUISIANA — SCM, W. J. Wilkinson, jr., W5DWW — This is my final report and I wish to express my appreciation to all who have furnished information to keep the column going. 4IFE, ex-GJO, is now in New Orleans with the FCC Radio Intelligence Division. CEW furnished quite a lot of dope on WERS this month. HEJ sent some photographs with his dope. Ex-ASJ was in after another tour as operator aboard a cargo ship. HSH was last heard of in Calif. GEK is still and out around the old home town. BYY is back in the city. HMV is now a "hot-shot" c.w. man with TCC and is on a C-47. Ex-FGN is aboard an Army transport ship as operator. AYZ is still in civil service steno work near San Antonio. WF is still railroading as dispatcher for KCS-L&A at Shreveport. AGZ is seen often when stopping over in this city. ERV is keeping in practice for postwar c.w. FJW is going in for Little Theater plays. IRO has been fighting flu. ADJ and EB have been doctoring receivers. HEK is studying theory for Class A with the OM, HEJ, doing the teaching. JET has been promoted to chief petty officer in the Navy. HOS is training carrier pigeons as a hobby. INN was a visitor back home. JEY has received a promotion. AKJ is painting the shack. CNG is still in Atlanta. Shreveport WERS is on the go again and drills are held on Sun. and Wed. evenings. Several new operators were added. Fifteen units are operating with the following hams taking part: ZS, communications officer; CEW, radio aide; BHL, KJE, QH, BFX, JHY, KKI, KMD, KEK, AEN, JJT, RR and Steadman Gunning, an engineer for KWKH. Most of the rigs are mobile units. To all goes a vote of thanks for their fine services. Let's have WERS dope from other points. Cpl. Grady Alderman, Ships Comp. Det., Jackson Barracks, New Orleans, would like to meet some of the New Orleans gang.

HUDSON DIVISION

NORTHERN NEW JERSEY — SCM, Winfield G. Beck, W2CQD — Asst. SCM, IIN. Yours truly and the Asst. SCM will attempt to keep No. New Jersey in print. We can do this job well only if you drop us a line occasionally and tell us what the gang is doing. Maplewood, with COT as r.a., has received license WKZW. IKO, r.a. for South Orange, is awaiting license and has erected a coaxial antenna on top of the Town Hall. COT visited 1HDQ and found out that he is doing war work in Fla. DO is in the Pacific, and while in Hawaii tried to meet K6OQM, who he had worked on Dec. 7, 1941. 3HOH's jr. operator, 3HPX, is in the U. S. Maritime Service. At a meeting of radio aides in Leonia the state announced the appointment of 3ASQ as state radio aide and Thos. S. Field, jr., as state communications officer. Meetings have since been held in Newark in the interest of developing WERS in all communities. Maj. Lawrence Silverborg, 1AYW, regional communications officer, attended all meetings and aided in clearing up problems in WERS. Mr. Wilson of the FCC field office spoke on the duties of the r.a. The state r.a. has worked out plans for procuring salvage equipment from some defense plants which could be used in the building of WERS equipment. AER expects to be moved and has turned over his EC duties temporarily to Wm. G. Domidion, jr., 188 Spring St., Red Bank. Bill is interested in v.h.f., is a member of the fire department and is with Bell Labs. KYI, in the Marine Corps, would like to hear from some of the boys. Write me for his address. EUR, A. Kozlowski (C.J.), APO 636, c/o Postmaster, New York, N. Y., would like to hear from his friends. FOV is the new r.a. for Westfield's WERS network, WKCS, and reports seven units. His address is 245 Scotch Plains Ave. Cpl. 4HXM is in Camp Crowder, Mo. John O'Leary, 45 Dales Ave., Apt. 736, Jersey City, writes in and requests help in trying to locate a power pack (2½ v.) for an FB7. He has tried to purchase tools for building same from dealers with no success. He is quite ill, and has recently been sent home from a Navy Base in Trinidad to recuperate. If you have the materials or pack on hand and wish to help John, please communicate with him. LH, of the Orange County Radio Association, reports the following: The Middletown, N. Y., WERS net is very active. A surprise alert at 2:30 A.M. was a complete success. All traffic was handled by radio. Another interesting duty was performed by this organization. The State Police were called out to apprehend four escaped prisoners. Lacking the necessary communication facilities, they requested aid from the Middletown WERS. Permission was granted and five mobile units and the control station were used in the man hunt. The prisoners were captured and returned to confinement. After one of this organization's test periods they had a hot dog roast, with twenty-six in attendance, including JRX, GFT, MJH, GUW, BGO, LH. BGO, r.a. of N. Y. C., was the surprise guest. LH is EC and Middletown's call is WKJB. EUI, EC and r.a. for Roselle, has been awarded high honors at Eastern Aircraft, where he is employed as a radio specialist-engineer at the airport.

MIDWEST DIVISION

IOWA — SCM, Arthur E. Rydberg, W9AED — The Linn County Radio Club is having a little difficulty with its WERS license application, but does not seem to be discouraged. At the Jan. meeting the club elected the temporary executive committee for 1944, thus enabling those who started WERS to carry on. WERS work in Des Moines has recently had encouragement which may lead to a WERS license. Anyone in Des Moines interested in WERS should contact URK, r.a. TWX is teaching a code class for CAP at Iowa City. Ex-APK, now an instructor at the Naval Training School (Radio), Moscow, Idaho, says 73 to the Iowa gang. CCE is busy keeping 1300 miles of hi-line going. LKL is now working for police radio, Joliet, Ill. OJD is in Italy.

(*Continued on page 68*)

It seems to be a characteristic of these United States to become very enthusiastic over unpredictable things. It may be swimming the English Channel, or buying Florida real estate, or sitting on flagpoles. There is nothing wrong with swimming (we do it ourselves) and there is certainly nothing wrong with Florida real estate. Sitting on flagpoles is all right, too, if your taste runs along those lines. We never cared much for it ourselves.

At the present time, radio and electronics are being built up in the same familiar pattern. We hope the build-up will not be followed by the same old "let-down."

At the risk of being reactionary and narrow-minded, we confess that there are some things we think radio tubes will not do. Radio will certainly supply soft music after the war, and it very likely will provide the floor show also. However, we respectfully submit that it will not open the oysters and cook the dinner. Not for my[1] wife, anyway. She thinks she might press the wrong button and open twelve cans of split-pea soup instead of the dozen oysters.

We have seen the suggestion published that miniature cameras would be focused by radio on "the principle of radar, perhaps." We have been told that automobile engines were pretty old-fashioned. The car of the future will get its power by radio. Radio will soothe the baby and make the cow give down. It will kill the mosquitoes and make the begonia plant grow faster[2]. Radio will press your pants.

OK. Some of these things sound amusing, but when a sufficient number of million people believe them, they are not funny.

Lots of people believe that they have been promised these things when the war is over, and the goods are not going to be delivered. We think that is serious.

Radio receivers will be better after the war. They will perform better, particularly at very high frequencies. They will have better stability, and greater reliability. They will be more convenient to operate. You will get more for your money. It will be an FB job in every way, but you will not have to throw the old textbooks away and start learning radio all over again. Postwar receivers will use old circuits with new details, old principles with new applications and old components in new designs.

National postwar receivers will do a superb job of pulling signals out of the air. We think that is what you want. But they won't pull rabbits out of a hat.

W. A. READY

[1] The editorial "we" does not work here. It is MY wife, not OUR wife.
[2] Not our begonia.

(*Continued from page 66*)

FPO, now of Cambridge, Mass., has a new jr. operator. KLC is still troubled with illness. IQF is a CRT in the Navy assigned to Post-Graduate School at Annapolis. MYA, RT1c, is at Radio Matériel School, Chicago, Ill. When last heard of NUR was a radio officer lt. in the Navy. ATG is at the Navy Fire Control School in Washington, D. C. INF is a Naval instructor at Great Lakes Training Station. SAI is working for FCC at Grand Island, Nebr. SQV, in Navy radar work, was home on furlough recently. JIH went to Ill. for a QSO with KMI. Please write. 73, *Art.*

KANSAS — SCM, Alvin B. Unruh, W9AWP — OZN, who operated at KGPZ before going in the Signal Corps. was home on furlough. ZUY reports her OM, YYW, has been on Naval maneuvers. HCU is now a radio and electronic flight-test crew member at Boeing. QQI has been making radio flights in PT-17s, checking sky wires. The Wichita Amateur Radio Club was reorganized, with the following officers: QQT, pres.; AWP, vice-pres.; YVI, secy-treas.: QMB, publicity director. A banquet was held recently. A discussion of the radio compass will be a feature of the next regular meeting. Years ago, when AWP lived in the family home, his roommate was his kid brother, Walt. AWP's ham activities in the wee small hours evoked many and varied protests from Walt. Recently a letter from Walt, now in the Army, broke the news; he has been sent to radio school to become a G.I. operator. QEF sends a letter from the Farragut radio school to advise that he is now copying on the mill. He says AWC is in Hawaii with WE, and is a proud poppa. CKJ is looking for a receiver. ZJE is in the Boeing armament shop. Send in some news, fellas. — *Abie.*

MISSOURI — Acting SCM, Mrs. Letha A. Dangerfield, W9OUD — A newspaper notice announced the approaching marriage of ONW to Lt. Guerra at McCord Field, Wash. KIK's brother, UAB, is stationed in Hawaii and enjoys listening for DX. Al also said he talked to VXV, who, with his pals PYC and FEB, runs the WERS in that section. There are 160 operators and fifty stations in the net. A good work-out was had last summer when the Mississippi went on a tear. BAF and others are experimenting with beams. KEF sold his receiver to the Signal Corps. RHA wrote to ask for details on the death of WQY. Mel was located at Camp Crowder for sometime where he was acquainted with BMB, who is an instructor at the radio school there. Mel's present QTH is Army Air Forces, San Antonio. JWJ wrote of the death of her father, MCA, on Jan. 29th. Joanna is carrying on with the WERS work the two started together. NSU is the tax expert down in Mountain View. Wayne will have two brothers in the service before long. So will ARA. PYS writes from a ship in the South Pacific where he is with the merchant marine. TGN, in the South Pacific with the Navy, is hoping for a leave soon. Leo has been out since the NCR was first mobilized without a single leave. OQI has a swell job with G.E. in Chicago. OUD acted as liaison for a couple of post official employees recently. BMS is still at ARA's crystal plant. Ray Long, of Dayton, Ohio, who received his ham ticket in 1942, read in the Mo. notes that HVW was carrying mail up in Pleasant Hill and wanted to QSO. He sent a letter to your SCM with a request that she forward it. Has anyone else any requests? I have lots of addresses here that I'll be glad to share. And I'd like to write to any of the boys and girls. How about a letter with your address? Thanks for all the letters.

NEBRASKA — SCM, Roy E. Olmsted, W9POB — EAT-KGLZ writes that he has been working with the Army officer who has been assigned to liaison work with WERS in this state and elsewhere. A revamping of the system is under way and the small local nets are being reorganized into larger county or district nets. It is contemplated putting Washington, Douglas, Sarpy and Cass Counties in district No. 1 with UFD, 3176 So. 13th St., Omaha, as radio aide. District No. 12 is comprised of Seward, Lancaster and Otoe Counties and the radio aide is WOA, 3529 Melrose, Lincoln. Darold has undertaken the job of helping to organize district No. 7, which includes Colfax, Dodge, Polk, Butler and Saunders Counties. I urge every amateur residing within these districts to get in touch with these aides and offer your services. I would like to hear from amateurs all over the state so that radio aides may be appointed for all districts and further information sent out. EDN is in India with the Signal Corps. DTT is at Davis, Calif. QMA is at Crowder. Luverne Voss, Ashland, goes to the Navy on graduation from HS. GDB is substituting O1As for 50L6s in his service work. VAS says his radio diet is limited to copying WSL and that JRZ is doing small machine parts on his lathe. GFI gives out that QWU is pounding brass in Africa with the Signal Corps. QWW is in Fla. with as ASTP unit. BZR is instructor in the Signal Corps at Davis, Calif. IZR, who has been operating for Northwest Airlines at Bismarck, has been called to military service. YNO is RM1c in the South Pacific and YDZ is RT1c at Lakehurst. GFI gave the Class C exam to E. K. Anderson of Wausa. HYR brags that he has made the last payment on a new skywagon and is putting more hours in the log. Stan is one of the technical staff of KFAB-KFOR. MLB goes down and stares at the TZ40s and the 813 and then starts up the instructograph for sound effects. Marv, you'd better get busy on district No. 5 and spread WERS over your nine counties! — *Pop.*

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — SG-WERS now has a communication section in the hq. company of each battalion, writes APA, who has recently been commissioned a 2nd Lt. of the communication section Hq. Co. 7th Battalion CSG, commanded by Capt. Dow and containing T/Sgt. ACV and S/Sgt. KAB. More recruits with radio experience are needed. Call is WKMV. They are using a HY-75 rig at control with three TR-4s complete with a.c. and d.c. supplies, seven DK-3s and two composite walkie-talkies. Tests are held every Tues. night at 8 P.M. IJ, CD-WERS r.a. and a member of SG-WERS Company E of Madison-Guilford, reports the latter organization has six licensed operators, two transceivers and a TR-4 which are both a.c. and d.c. powered. KAT, Guilford r.a., assisted in the construction of the transceivers. MEF completed the making of an honor roll containing the names of 25 GB members now serving in the armed services. Edward J. Deak is the latest addition, having enlisted in the Navy. The operators of WJLH in the N. H. warning district are very proud of having been rated No. 1 in the country out of 95 licensees in a recent ARRL survey and are struggling hard to maintain that rating. AKG, Shelton r.a., reports four new operators recently licensed; he and KAT are conducting code classes on WERS test nights. Steve Van Esen, holder of radio 1st, radio-telegraph 2nd and LSPH, formerly WERS operator at White Plains, is now instructing cadets at Yale and is taking an active part in West Haven WERS activities. All warning districts in Conn., with the exception of Torrington, have been tied in on the Mon. night test periods. DGG and Kelly of Milford have their WKAO units operating very smoothly. WJQA-42 was a recent visitor at WJLH. EUF is now chief engineer at WELI with GC working with him. CTI reports interest is still running high in Norwalk WERS activities. BIC just recovered from an appendectomy. BIH, one of Conn.'s outstanding hams, is recuperating after a year of illness. 9ONW, YL instructor of Army cadets at Yale, recently transferred from Scott Field, has announced her engagement. KKS sends 73 to the gang from the West Coast where he is still with FCC. KQY, SCM Conn., and HRC, SCM R. I., had a recent QSO at 3 A.M. on the 0.1-4.5-kc. band (AT & T Co. order wire circuit). Many thanks for the news, gang.

MAINE — Acting SCM, G. C. Brown, W1AQL — AUC and the Mrs. are at Fort Lewis, Wash. with the CAP. DUD is servicing juke boxes and cigarette machines. IMC is in Washington, D. C. JSY sent a nice letter in which he reports the passing of JUV, who was a U. S. Custom Officer along the Canadian Border in Aroostook County for several years. JKV is working in the shipyard at South Portland. ATS says that there are just two of the old gang left down Bar Harbor way, he and DHD. CRI is still setting type at the Furbush Printing Co. in Bangor. CBV is in New York. BPX is looking for a good high-frequency receiver. Why not get busy and send in a few items, gang? Also, there must be some ECs who have an endorsement due. 73 to all. — *Brownie.*

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — Boston received its WERS license Feb. 1st under the call of WJPY, starting with thirty-four units. Boston hams are invited to help out. Please get in touch with Radio Aide John L. Strain, KDF, 22 Winton St., Roslindale, 'phone Parkway 4450-W. To all radio aides: Renew your license; do not let it run out. Remember we want to keep this WERS before the public eye as we hams have done a good job which will help us after the war. The following are doing a nice job in the handling of batteries to be used in WERS set-ups: GAG, BSJ, Merrill W. Preston, IBF and KCT. A meeting was held in Boston Feb. 7th to talk over the battery job and the following were present: BSJ, GAG, BBL, AJW, EKT, ALP, KDF, JEA, JGQ,

(*Continued on page 70*)

(*Continued from page 68*)

HPC, KCT, BB, ACM, MKX, MUB. ACM was present with a delegation of seventeen from Lawrence. We are sorry to have to report the death of KBT. 9GSQ has a new son. IN has a new daughter. KDH, MCS and 41HA are working at M.I.T. GWK is in the merchant marine. OM has moved to Melrose. MJT is now at Gallups Island. FVD bought a new house. LZB is a sgt. in the Marines. LVR is working in Bridgeport, Conn. NDA graduated from the Navy preflight school at Athens, Ga., and is now at Bunker Hill, Ind. JNK was home on leave and had a nice chat with LVZ. Dick Jilson, who was a member of LVS, a radio club in Brockton, has gone into the Navy. New officers of the South Shore Amateur Radio Club of Quincy are: CPD, pres.; IHA, AKY, vice-pres.; ALP, secy.; LZW, treas. Meetings will be held the first Fri. of each month at the Quincy YMCA. Those present at the last meeting were: AKY, ALP, CCL, CPB, CPD, CT, DIR, FWS, HCL, IHA, IS, JXU, KJD, LAT, LZW, MMH, WK. JXU, who is home and expects to be a civilian in April, gave a nice talk on his experiences in the South Pacific. MPT, who is a radio operator on a ship, writes that he met G2FS on one trip. KH is a member of the administrative committee of the RTPB and says that the hams are well represented. JFS sends in some news about the North Shore hams: LQQ is in the Navy in Boston; MQE is on an island in the Pacific; ex-AFF is with G.E. in N. Y.; JMW is in Hartford, Conn.; at G.E. in Lynn: AIX, KVW, DKS, ITJ, HMJ; at Sylvania in Danvers: KZK, CVM, IXB, BVL, JKY, HBG; MVQ is at United Shoe in Beverly; ZZC is in the Army. IZE is still a cop; AOT is at WOV. To all radio aides and ECs: Please help the ARRL by filling out the "Report of WERS Organization" forms. A lot of towns in this section have never reported. 73, *Frank.*

WESTERN MASSACHUSETTS — SCM, William J. Barrett, W1JAH — M/Sgt. DUZ writes from Camp Cushing, Tex., where he is a train dispatcher in a railway operating battalion. John met quite a few hams, but none from West. Mass. MKR sends 73 to the gang from New Guinea. Bill has been in the So. Pacific for eighteen months, first with the AACS and then with the SOS. WERS here in Region 1 is still plugging along. JAH stopped in Pittsfield to watch some of the gang do their stuff. The grapevine has to rely on the postal service for news, so how about a card or letter to arrive here by the fifteenth of the month, gang? 73.

NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTJ — We have heard that EWF is a lt.(jg) in naval communications. Can anyone confirm this? CFG was home on leave recently. We understand that LBJ is planning on doing some servicing along with his war work. LVG recently built a little two-tube battery receiver. KKQ is taking in all the sights at Miami while she is stationed there.

VERMONT — SCM, Burtis W. Dean, W1NLO — The Vermont State Guard WERS license was issued Sept. 11th, with the call letters WKWT. CGV and EKU, now in the services, were instrumental in getting the license and building equipment for Co. E. BD has joined Co. E as radio technician. Roy, the first one to hold a WERS operator permit in the SG, is conducting a training program on Mon. and Fri. evenings in the Armory at Barre. FRT and NDL are training operators for the Montpelier SG unit. LMO and KXP manage to get home to Burlington once a month between flights. IQG has his 2nd-class 'phone ticket. GKA is working for Harvey in Cambridge, Mass. JKF is now in the ATC. KXP recently visited IQG, CBW and JKF. HPN, NLO and Ed Rybak, LSPH, are busy moving the WCAX studios. HPN took unto himself a bride on Feb. 5th and is living at 107 Main St., Winooski. BZS, former pres. of the BARC, is a radio technician 2nd-class in the Coast Guard and has been assigned to sea duty. The BARC has suspended radio classes temporarily due to lack of instructors. The various State Guard companies are in need of hams to train operators and supervise building of 2½-meter equipment. How about getting in touch with the communication officer of your local VSG? 73, *Burt*.

NORTHWESTERN DIVISION

IDAHO — SCM, Don D. Oberbillig, W7AVP — DKY visited in Boise while on furlough. BMF was called home because of the serious illness of his mother. DKY and BMF are in the Navy. ABK is employed at the Mountain Home Air Base radio repair section. CUG is located at Stibnite. BAW is recovering from an illness. HPH is active in CAP. BDX is working in Northern Idaho and is active in the State Guard Signal Company. AQK moved to Troy, Mont. APK joined the Navy. — *Don.*

MONTANA — SCM, Rex Roberts, W7CPY — BHW is now in Miles City as manager of the Park Theater. JDZ, with the CAA the past year, is in Fort Worth, Tex.; he has been all over the Northwest. DSS reports all quiet in Great Falls. 73, *Rex.*

OREGON — SCM, Carl Austin, W7GNJ — Sgt. GVC, at Sheppard Field, Tex., sends the following dope: GYH is RM2c in the Southwest Pacific; AIG is still at Milton; GIU is in the Navy at Corpus Christi; GYI is an intelligence officer, Australia; GXM is a sergeant in the AAF at Lincoln, Nebr.; FMJ is an electrician at Walla Walla; FPT is with United Air Lines; HOQ is a sergeant in the Army in Australia; FUA is at Milton. Warrant Officer ASG sends regards to the Ore. gang from India. By snooping into one of HHH's letters, I find that IHJ is a major in Italy, and that IHK (his XYL) is working for Douglas, at L.A. HLF, who is active in WERS work at Medford, writes that DBZ, radio aide, has a b.c. announcer on the mike at "control." Also, ABD was last heard from in Tex.; FMQ is still selling groceries; EZR is in Ardmore, Okla.; GUP moved out of town, and HWH is now in Timber Products. IEJ is still at Maui, having canceled his transfer, and says he gets plenty of code practice. HXG and his XYL, who are in the CAA radio school at Seattle, met AUH and EIU (his XYL), who are also studying for operator jobs in Alaska. FTA and ITZ (his XYL) are also attending communicator school at Seattle, and are then going to Alaska. FTA and ITZ visited CZJ, who is now in the test lab. of Press Wireless in Chicago. HVF and HKT are in Aussieland, and FPD is in Africa. 73, *Carl.*

WASHINGTON — SCM, O. U. Tatro, W7FWD — GXI suggests that FPV be given credit for doing one of the biggest jobs in the Northwest for ham radio by holding together the gang that used to chew the rag on 160 and 75. With his small hand press he started, as a hobby without financial gain, a paper called Wa'Wa. Through it hams can exchange QSOs. It is non-competitive, does not enter the technical field, is a booster for ARRL and *QST*, and is doing a good job keeping up interest. It is published at Oroville by FPV, a veteran of World War I, who has a son in the services down in Tex. Ray also heads the radio club at Oroville that meets every Tues. LVC is at Camp Crowder for basic training and will then report for radio schooling. ANN, CRM, is now in the Aleutians. AVW, radio operator for Goodnews Bay Mining Co., has been out on a visit and will report back to Platinum, Alaska about Mar. 15th. IHJ writes by V-mail, "I have met hams coming across Africa, Sicily and Italy — all seem cordial and have a genuine and steadfast urge to learn more. I think ham radio is a grand fraternity." 6PLG, ex-2HYH, now ACRM and married to an ORC member, has just returned from overseas patrol squadron duty. He visited here with his XYL and 2½ year-old boy. 73, *Tate.*

PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, Earl F. Sanderson, W6IUZ — RDF/JWI reports that he's very busy with CTC abroad and has met many of the ZLs, K6s, K7s, Gs and Ws serving over there. BPT is recovering from a recent operation and should be back on the beam soon. Sorry the column is so short. Please, more reports. 73, *Sandy.*

EAST BAY — SCM, Horace R. Greer, W6TI — EC, QDE; EC v.h.f., FKQ; Asst. EC v.h.f., OJU; OO v.h.f., ZM. Another WERS meeting was held at the Oakland City Hall in Court Room No. 1 called by EE. These meetings are held the third Thurs. of each month. OJU writes that he is now almost at the end of his second year in the Signal Corps Labs at Ft. Monmouth, N. J.; he and the XYL are enjoying their four months' old jr. YL operator: Why not drop a few lines to B. W. Southwell, 37 Holly Road, West Belmar, N. J.? How would you fellows like to see a new boat named, ARRL or *QST* or Amateur Radio? It seems to me that this would be a wonderful gesture to the good work done by the hams in this war. Another day closer to Victory. — *TI.*

SAN FRANCISCO — SCM, William A. Ladley, W6RBQ — EC: 6DOT. RAH, a field engineer with Raytheon, passed through San Francisco on his way west. He is the proud father of a new six-pound boy. LLW of the SFN-CCN network visited in San Francisco recently. MC is still located at Salinas; he recently concluded a radio course with United Air. Radio Aide DOT conducted a special drill on Sun., Jan. 16th, without previous notice to the participants, by establishing contacts between KGCW local units; KFRQ, Vallejo; KFMY, Oakland and KFHM, San Mateo. Control stations as well as portable-mobile units were permitted to contact each of the above cities and also the control stations

(*Continued on page 72*)

(*Continued from page 70*)

in each of these cities made direct contact. This drill proved the value of 2½ meters as a means of carrying on reliable communications. WERS tests with 1¼ meters for inter-zone communication are just about concluded and it looks like we will soon have additional useful frequencies. TR-4s are being used by substituting parallel rods for the regularly wound tank coils. 7HMJ, from Olympia, Wash., is stationed at San Bruno. Address: Don Ashley, RT2c, USN, ABPD, San Bruno, Calif. 7FWD is stationed at Treasure Island. 7FLF, of Salem, Ore., is in the Signal Corps and can be addressed as follows: Sgt. Gordon J. Tucker, APO 7, c/o Postmaster, San Francisco, Calif. HJP is now a 1st lt. with military intelligence. Address: Lt. A. Monsees, A.C. 0-426774, A.A.B., Smyrna, Tenn. DJI, an ardent 2½-meter enthusiast before Pearl Harbor, is back in town after completing radar studies in the East. 9ISM, lt. in Q.M.C. on duty in San Francisco, would like to hear from his old friends and wishes to take part in local activities. An evening banquet and general gathering of all local amateurs to be held on Sat. night, Mar. 18th, is being planned by the following committee: VX, WN, NGU, AEX, KNZ, AY, T. J. Delasaux, TI, RBQ, EY, DOT, IUZ, Ed. M. Sargent, Ex-SC, and CVP. Staff Sgt. JWF is back in town for a short visit and will return to McCook Field, Nebr. ZM invited him to attend WERS drill at KFMY, Oakland. PGB is now on duty at the Presidio as a field engineer for the Army Signal Corps. 9EKY, of the Egyptian Radio Club, is touring the Coast on special business for Raytheon. JJS is now a CRM on duty in the North Atlantic. 2GAR, formerly with NBC, is on the West Coast awaiting overseas duty. Lt. Comdr. WF will soon be on his way west. SCR is with the Submarine Signal Co. SDT, when last heard from, was on the Atlantic. IPH is in No. Africa and hopes to pick up a belated QSL card from Egypt in person. 73, Bill.

ROANOKE DIVISION

VIRGINIA — SCM, Walter G. Walker, W3AKN — The SCM was visited by Lt. HDQ, AAF, who was in this vicinity while awaiting orders to further duty. He reports that when last heard of GON was still in the Caribbean Area. The Peninsula Amateur Radio Club purchased two $50 War Bonds during the Fourth War Loan Drive. News is very scarce, so how about a little help? 73, *Walt.*

ROCKY MOUNTAIN DIVISION

COLORADO — Acting SCM, H. F. Hekel, W9VGC — 7GYY/9, from Boise, Idaho, is now making his home in Denver. Margaret Swanlund was hostess for the Radio Widow's Club meeting Feb. 17th. NFX, formerly at Lowry Field, Denver, was last reported a 2nd lt. in the 10th Air Force in China. ODV is doing his stuff with the chemical warfare service at the Rocky Mountain Arsenal in Denver. FKK has been stationed at Lowry Field. For 2½ years he was a flying operator but in Jan. he was transferred to AACS as chief of maintenance. WJJ/6, Phoenix, Ariz., reports his wife is recovering. EHC's last stop was Walker Army Air Field, Victoria, Kans., 327th Eng. Sqdn., 303rd Sv. Gp. (SP). GPI, Milwaukee, Wis., who used to be a regular 28-Mc. contact for the Denver gang, sends his best wishes to all his old friends in Colo. VTK has moved to his new home, 928 So. Gaylord, Denver, just across the street from CAA. WYX now holds classes two nights a week; one night is devoted to theory and code and the other to transmitter and receiver construction. 73, *By Heck.*

SOUTHEASTERN DIVISION

ALABAMA — SCM, Lawrence J. Smyth, W4GBV — Acting SCM, James W. Marley, W4EW — AJC is a lt.(jg) in the USNR doing radar work. APJ is in the British Isles doing technical work. BMF, CNV, DGS and ISZ had a nice rag-chew in Boston along with BMF and CNY. CNY and BMF are both U. S. technicians. AGI is a Marine Corps major in the So. Pacific. BMF paid a surprise visit to EVI in Washington, D. C. Lt. EBZ made a flying visit to Mobile and Birmingham and is now at Camp Crowder, Mo. GVO is a 1st lt. and flight instructor at Gunter Field, Ala. ECF is with the AACS in New Caledonia. GKZ is pounding brass in Australia. ERM is a member of the electronic unit at the Sacramento Air Depot, McClellan Field, Calif. The gang here at the pre-flight school, Maxwell Field, Ala., still include HKG, 1JOS, 1BN, 9MIC, 8NQY, EW. GDU is keeping the refrigeration going at Gunter Field. If all you fellows who read this column will drop Larry a card it will enable the rest of the gang to keep up with you. This is the only means that we have to keep in touch with each other until this thing is finished, so please coöperate. 73, *Jim.*

WESTERN FLORIDA — SCM, Oscar Cedarstrom, W4AXP — 6PNI, formerly of Millbrae, Calif., is one of the officers in Aircraft Radio. He was a 40-meter fan and ran around 400 watts to the final. 6PNI and AXP had a nice personal QSO. DAO has had a siege of flu. Lt. PE is now matériel officer. Lt. Comdr. Hodge, an old-timer in ham radio, has been transferred. Culp has been transferred, too. Lt.(jg) Ludwig; Slattery, RM1c, and our WAVE, Wooldridge, have just finished compiling a pocket signal, communication and procedure handbook that's a pippin. ECT is keeping things humming at A & R where he is assistant supervisor. FJR keeps the home fires burning at ECT. FIO is going to work at WCOA soon. Sally Walker is now educational officer in the communication training department. QK's youngster is a whopping boy. Blackman is a full-fledged inventor. The section's sympathy goes to the family of Ewart Sconiers, air hero, who died in a German prison camp recently. 73, *The Old Maestro.*

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, H. F. Wood, W6QVV — This magazine is read plenty by those who are away doing a whale of a job for us, so please send in something for this column about the fifteenth of each month. PFE, in the Coast Guard on an LST overseas, sends in the following: RGN has recently joined the Navy, NAM is an instructor of Navy radio operators at Consolidated, MLA is an engineer at one of the radar shops, LUU is now with the Bureau of Power and Light as a radio operator. PFE wants to know where he can get in touch with NQG, so if any of you know his address, send it to me. OTZ, a radio operator at KVEC in San Luis Obispo, wants to know where he can get certain parts like filament transformers and universal output transformers. If any of you have any "spares," write him; he has some tubes to swap or sell. EGJ has been heard from and says he has been mighty busy since "that December," but may have some time for WERS work. PPW telephoned recently to let us know he is still bearing up well and working hard. SSU signed for Western Hops and is going places. UQL is still up in the Pacific Northwest, so his XYL reports. MFJ's XYL reports that he is very busy. Several new WERS units have been added to the Los Angeles County, Inglewood and Long Beach groups. The Los Angeles main license was renewed, but at this writing we are still waiting for the modification to come through, adding many units to those now energized. We *must* keep the organization going, so keep up your work and don't let your interest lag. If you have any suggestions or criticisms pass 'em along. 73, *Ted.*

ARIZONA — SCM, Douglas Aitken, W6RWW — A nice letter was received from QWG who is somewhere in the Pacific. REJ is now at Jefferson Barracks, Mo. UKB was home on a visit and we staged several bull sessions. TSZ has been upped to RT1c and is now attending M.I.T. UOG, who is in the Army, has been visiting in Tucson. SOB is at David Monsthan Field in a civilian capacity. OZM has been ill. MLL dropped in on the Tucson bunch. GS had an old-time kick in talking over the Army rig during the bond drive. He says they have a new class of cadets (gadgets) and twenty civilians. HIB, assistant state radio inspector, and PDA, with the Santa Fe, dropped over for a visit and a pleasant time was had rehashing departed days. CDU has been installing new radio equipment for the Yavapai County Sheriff's Office. Bob Bookman has been visiting his family in Tucson. SQN says LJN has been dabbling with 112-Mc. oscillators. RJN reports plenty of hours in the air as radio operator for PAA. 73, *Doug.*

WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. R. Collins, jr., W5IAU — DDJ visited Dallas and CDU recently. ISD is in the Army. SN is in India. ALA, working at Lockheed in Dallas, reports sixteen licensed hams there. JNN is in training as an Army aviation cadet at Yale University. After being in several foreign countries, EVI visited in Dallas recently and has returned to his work in Hialeah, Fla. DII visited in Dallas in Jan. IJC is in V-12 training at the U. of Okla. taking electrical engineering course. ESC has the Memphis to El Paso route working for American Airlines. Ken has been serving as radio operator on transport planes in India and China. GZH would like to hear from HCA. EN writes from Calif. inquiring about the AARS gang. Come on, gang, let's try to send in more dope so we can pass it on to others. 73, *N. R.*

WWV Schedules

STANDARD-FREQUENCY transmissions are made available as a public service by the National Bureau of Standards over its standard-frequency station, WWV, on the following schedules and frequencies:

2.5 Mc. — 7:00 P.M. to 9:00 A.M. EWT (2300 to 1300 GMT).

5.0 Mc. — Continuously, day and night.

10.0 Mc. — Continuously, day and night.

15.0 Mc. — 7:00 A.M. to 7:00 P.M. EWT (1100 to 2300 GMT).

Each of these radio frequencies is modulated simultaneously at accurate audio frequencies of 440 cycles and 4000 cycles, excepting 2.5 Mc. which carries only the 440-cycle modulation. In addition, there is a 0.005-second pulse, heard as a faint tick, every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted precisely on the hour and each five minutes thereafter, resuming after an interval of precisely one minute. This one-minute interval is provided to give the station announcement and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. The announcement is the station call (WWV) sent in code, except at the hour and half hour, when it is given by voice.

The accuracy of all the frequencies, radio and audio, as transmitted, is better than a part in 10,000,000. Transmission effects in the medium may result in slight fluctuations in the audio frequencies as received at a particular place; the average frequency received, however, is as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.00001 second. The 1-minute, 4-minute and 5-minute intervals, synchronized with the second pulses and marked by the beginning and ending of the periods when the audio frequencies are off, are accurate to a part in 10,000,000. The beginnings of the periods when the audio frequencies are off are so synchronized with the basic time service of the U. S. Naval Observatory that they mark accurately the hour and the successive 5-minute periods.

Of the frequencies mentioned above, the lowest provides service to short distances and the highest to great distances. In general, reliable reception is possible at all times throughout the United States and the North Atlantic Ocean, and fair reception over most of the world.

Information on how to receive and utilize the service is given in the Bureau's Letter Circular, "*Methods of Using Standard Frequencies Broadcast by Radio,*" obtainable on request. The Bureau welcomes reports of difficulties, methods of use, or special applications of the service. Correspondence should be addressed to the Director, National Bureau of Standards, Washington, D. C.

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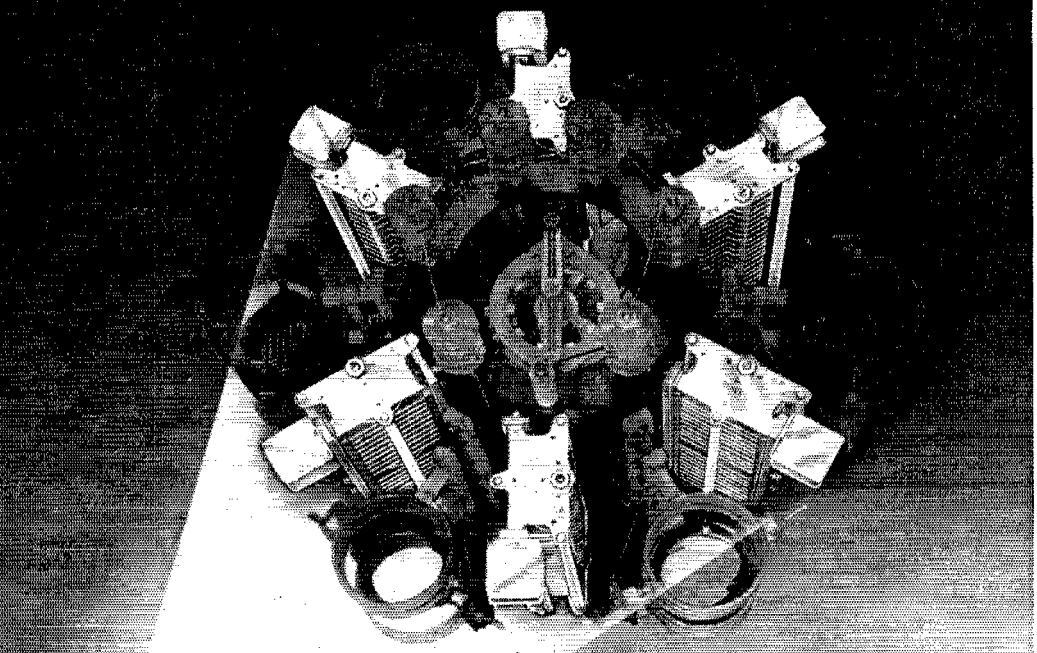

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Cuyahoga County WERS

(*Continued from page 29*)

receiver, using a 7H7 detector followed by two audio stages, is usually used. In cases where extreme interference exists, a superhet, employing a 20-Mc. i.f. with a superregenerative second detector and two audio stages, is used. While this type of receiver is a bit too selective for the usual modulated-oscillator type of transmitter, it is excellent for reception of master-oscillator controlled or crystal-controlled transmitters.

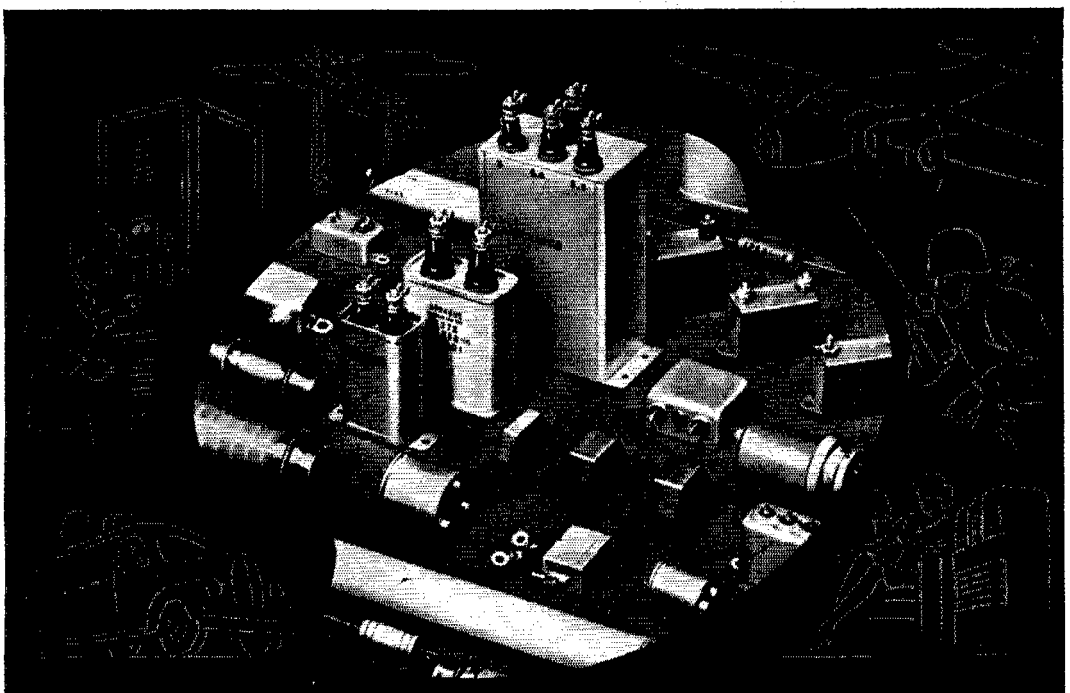
The transmitter used at WJJH-40 is crystal controlled. A 7-Mc. crystal in the grid circuit of a form of Tri-tet oscillator, whose plate circuit is tuned to 28 Mc., drives a 56-Mc. doubler stage. A second doubler to 112 Mc. drives an 829 push-pull amplifier on the net control frequency of 112,128 kc. The plate circuit of the final stage is tuned with a pair of long lines. The final stage is grid-modulated with a 30-watt amplifier. A big share of the output of the a.f. amplifier is dissipated in a load resistor in the grid circuit of the modulated stage. A crystal mike is used. The final amplifier input is 500 volts at 50 ma., resulting in approximately 6 watts of carrier power.

Two antenna systems are used. The antenna for west-side operation consists of two half-wave horizontal elements, fed in phase, headed due west. The east-side antenna has four half-wave horizontal elements in phase, with four half-wave reflectors. Either or both antennas may be used, depending on the antenna relays selected for operation with the main power-control switch.

A spare transmitter, essentially the same as that described above with the exception that an 815 is used in the final, is kept near by. Six storage batteries, delivering a total of 36 volts to drive a 650-watt 32-volt d.c. to 115-volt 60-cycle a.c. converter, are provided as a source of emergency power. The receivers, transmitters, antenna relays and lights in the room may be operated from this emergency power for a period of four hours before recharging is necessary. The batteries are normally on charge from the 115-volt d.c. mains at all times.

This provision is in line with the premise around which the entire organization has been built — that emergency communication by radio must be ready at any minute of the day or night and must be built to operate on emergency power supplies, since regular power lines, in common with telephone and telegraph lines, are more than likely to be crippled during a catastrophe. Thus all thirty report centers, the main control center station, the net control station, mobile units and walkie-talkies all are designed for emergency power operation.

WJJH-101, which is used for the link with WJJH-40, has a conventional self-excited oscillator type of transmitter using an HY-75 modulated by a 6V6 and operating on 112.15 Mc. The other transmitter is a compact crystal-controlled unit using a 6V6 oscillator, 6V6 frequency multiplier, 6V6 amplifier and 815 final, plate-modulated by a rebuilt phonograph amplifier using 2A3s in push-pull. This transmitter operates on



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(Continued from page 78)

115.1 Mc. when serving as control for report center number 1 as WJJH-1, and on 112.15 Mc. as alternate net control in place of WJJH-40. Both transmitters and receivers operate simultaneously within 1.5 megacycles of each other without interference. Emergency power is furnished by several vibrapacks and storage batteries.

The self-excited oscillator works into a Pickard half-wave antenna, which is just above ground level, but works over the one-mile airline distance to WJJH-40 quite satisfactorily. The crystal rig works into a "Y" match half-wave antenna mounted on a 20-foot 2 × 4 on top of the six-story police station building. Exceedingly good coverage of the entire county is obtained with this antenna, both on receiving and transmitting.

The Net in Operation

The net control station, WJJH-40, operates crystal-controlled on a frequency of 112,128 kc. Unit numbers WJJH-1 to 30 represent the control center stations which also operate on this frequency. The control centers also have individual frequencies on which they contact their mobiles. This means dual transmitting units, in many instances, as well as two receivers, a broadcast receiver for a double check for shut-down orders, and frequency-checking equipment in each of the report centers.

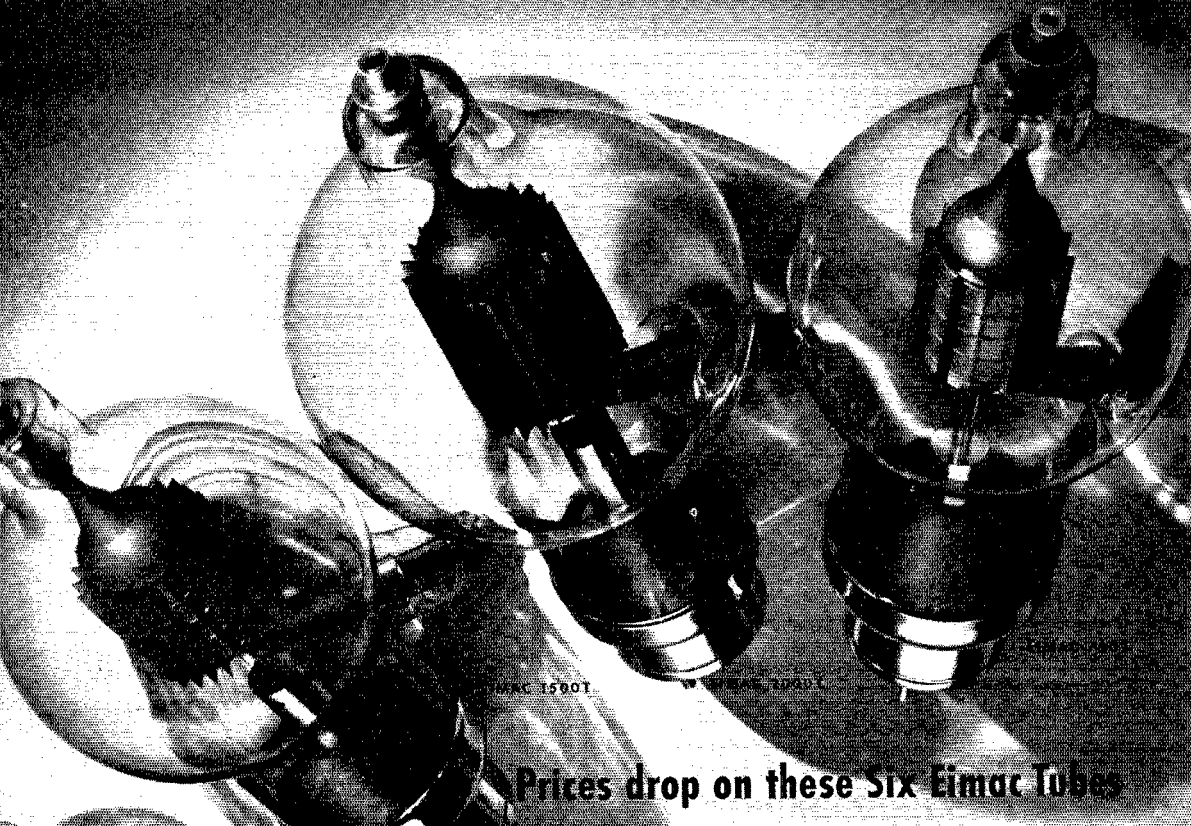
The WJJH network is controlled either through the primary station, WJJH-40, or through the alternate control, WJJH-1. The room in which WJJH-1 is located is partitioned off from the rest of the main control center, which also includes the district warning center and report center number 1. Wide glass windows in the wall at one end afford a view of the operation in the control room.

The initial plan of having fixed stations in the report centers, with a large fleet of mobile units to be dispatched within those centers or transferred to other centers when necessity dictated, has been carried out. There were so many amateurs in the net who wanted to possess mobile units in their own automobiles and built them that the whole organization can now operate from mobile units alone, if the occasion ever arises.

On March 18, 1943, a modification of the original license was obtained, and 85 complete two-way transmitters and receivers were put into operation. On September 10, 1943, the third license was obtained, which covers the 150 units now operated and thirty more proposed units. This is certainly an increase over the original eleven units which were put into operation under the first license obtained on December 5, 1942!

Personnel

The WJJH license was taken out by the county commissioners, and this proved beneficial in more than one way. Cuyahoga County, which has a population of 1,250,000 and ranks sixth in size among counties in the U. S., consists of 54 municipalities. Licensing by the commissioners obviated the necessity of getting each of the 54 municipali-



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450-TL	~~75.00~~	**60.00**
750-TL	~~175.00~~	**135.00**
1000-T	~~175.00~~	**100.00**
1500-T	~~225.00~~	**185.00**
2000-T	~~300.00~~	**225.00**

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(Continued from page 78)

ties to sign a mutual aid agreement — a Herculean task in itself. It also eliminated any debate over boundaries, and made authorized police passes valid anywhere in the county.

All of the operators are fully certified as members of the Citizen's Defense Corps, and their identification cards are certified also for passage on the streets during an emergency. All the WERS personnel are also considered members of the staff of the Cuyahoga County Council for Civilian Defense.

Looking back now, the first operation was crude and "amateurish." As time went on, however, the operators became more experienced. It is felt that the mandatory attendance requirement for all personnel at Wednesday night tests helped immensely. These test periods proved to be the best "classrooms" for development of operators who would be skilled in message handling and general operating procedure. Much of the credit for this development goes to George Lister, W8NV, of net control, who coached the network operators by interspersing his transmissions with helpful suggestions for improvement of the operating procedure.

Monthly meetings of the assistant radio aides, district aides and deputies have been held to discuss operations and make plans for future activities. At intervals the entire group is brought together for a full program of instruction. During one such program a small scale report center was set up, and the various stages of handling a message were depicted.

In general, operators have been assigned to units located near their homes. Fortunately for the network, only a few operators have had to give up their posts for the military services. When one assistant radio aide went into the service on a special radio assignment his wife took the exam for a restricted 'phone permit, and now she has taken over the OM's post in a very creditable fashion.

Organization

The east and west sides of the county are divided geographically by the Cuyahoga River, and each side has a deputy radio aide in charge of the report centers located therein — nineteen and eleven respectively. Each report center is supervised by an assistant radio aide and his alternate, and each has a staff of mobile units, and operators on call. The assistant radio aides are responsible for the installation and maintenance of equipment, and for the training of operators.

After WJJH had grown it was decided to appoint district radio aides, under the deputies. At the present time the east side has three district aides and the west side but two. Each of these men is responsible for the operations in his district, and it is his obligation to make periodic checks of operations, equipment, etc.

The chief radio aide of the licensee is John A. Kiener, W8AVH, who has been emergency coördinator for the county since the inception of the ARRL Emergency Corps. Logically enough, his present chief deputy is the assistant coördinator

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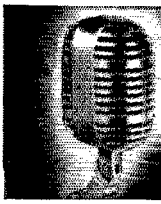

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(Continued from page 80)

of those earlier days, Earl S. Nelson, W8DS. W8DS has been put in charge of a committee to plan activities for each Wednesday-night test. Since civilian defense activities have been curtailed lately, it was decided that the best way to avoid a let-down in the enthusiasm and attendance of the WERS operators at drills would be to keep the network fully occupied with activity at the drills. Since testing of equipment is seldom necessary now, actual emergencies such as those which would occur during an earthquake, flood or fire are simulated, with all the attendant active dispatching of equipment, etc.

The east side deputy aide is G. W. Irwin, W8GW, and the west side deputy aide is C. E. Noel, W8AXQ. One of the district aides, J. R. Wildman, W8PWY, and his wife Mildred Wildman, W8PZA, form an efficient operating team at the control center. They man WJJH-1 and WJJH-101.

George Lister, W8NV, has been a deputy radio aide since WJJH first went on the air, and it is his unenviable job to be master of the net, operating at WJJH-40. This station is located on the 44th floor of the Terminal Tower, 750 feet above the ground level at Cleveland's public square. It's a fine location, but W8NV would certainly have a walk if the elevators ever stopped running!

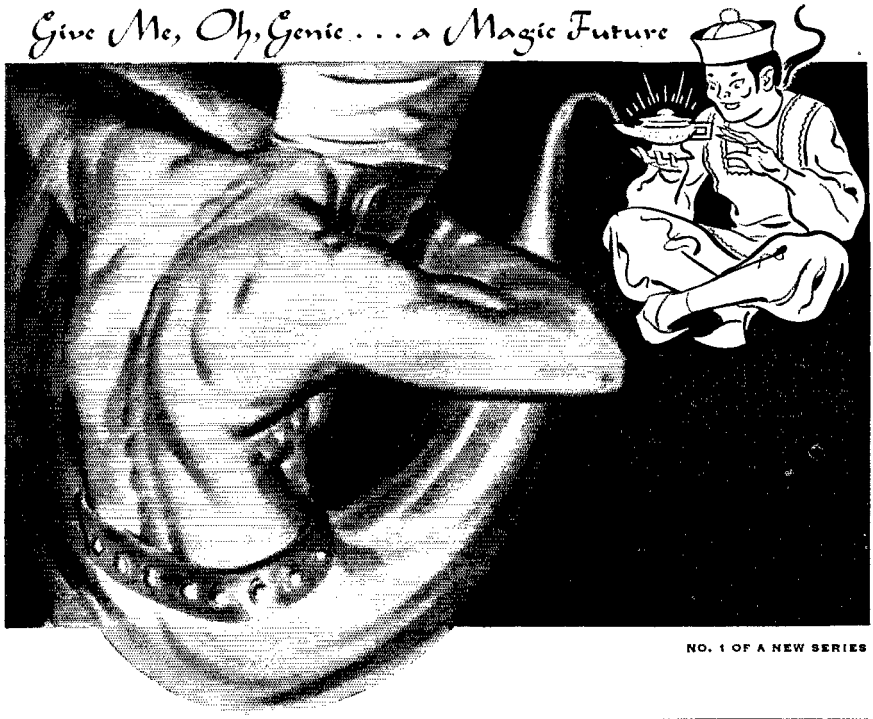
General

The growth of WJJH has not been devoid of excitement — as one of the operators at report center 13 can attest. One night while on a test drill he parked his mobile unit close to the Cleveland Airport. Mike in hand, he started talking to the report center. Suddenly he was horrified to find the business end of a pistol shoved close to his face. Instead of a nocturnal bandit, however, it was only an airport guard who was doing his duty — and luckily one who waited long enough to find out what it was all about before he started shooting. After much explaining and showing of credentials, a badly scared operator signed out of the net and went on his way.

In spite of all the hardships, trials and red tape, however, the amateurs of WJJH feel that they have had a wonderful opportunity in WERS. They accepted a challenge and met it with the matchless fortitude and stick-to-it-iveness which have characterized the actions of all amateurs under stress since their first days in radio. It is a symbol of the spirit with which the radio amateurs will defend their rights in the bright, new postwar world to come.

(The author wishes to extend his thanks and appreciation to the following for their coöperation in the preparation of this article: Earl Nelson, W8DS; G. W. Irwin, W8GW; George Lister, W8NV; J. R. Wildman, W8PWY; Ladis Lisy, W8WRY, and K. L. Bowen, W8QLN, for their excellent photography, and special thanks to Ralph Delaney, chief engineer of WHK-WCLE of the United Broadcasting Company, for his wholehearted coöperation in giving WJJH-40 a "home" in the Terminal Tower.)

Give Me, Oh, Genie . . . a Magic Future



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Ohmmeter Circuits

(Continued from page 81)

and R^M is the resistance of the meter. It will be noticed that a resistance scale for the milliammeter will run in a direction opposite to the scale for the circuit in Fig. 1-C, minimum resistance now coinciding with the minimum current reading, as shown in Fig. 3-B.

A battery voltage should be chosen which will permit the sum of R_A and R_B to be at least 100 times the resistance of the meter. Then the meter resistance forms a negligible portion of the total circuit resistance and the total circuit current remains essentially constant regardless of the value of R_X connected across the meter. For this reason, the exact value of the series resistance is not important so long as it is initially adjusted to give full-scale deflection, and R_B may be changed to compensate for a drop in battery voltage without affecting the calibration of the meter. With a 3-volt battery and a 1-ma. meter, R_A and R_B should each have a resistance of about 2000 ohms.

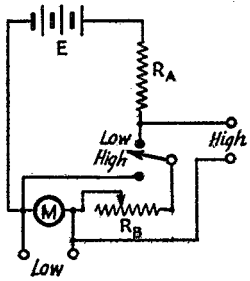

Fig. 6 — Combination circuit for measuring high or low resistances. With a battery voltage of 3 and a 1-ma. meter, suggested values are an accurately known resistance of approximately 2000 ohms for R_A and a variable resistor of 1000 to 1500 ohms for R_B.

A combination of the circuits of Figs. 4 and 5 for measuring high and low resistances is shown in Fig. 6. For the ranges mentioned in connection with those circuits, R_A should be adjusted as accurately as possible to 2000 ohms, while R_B may be a variable resistor of 1000 to 1500 ohms with a current-carrying capacity of 2 or 3 ma. The battery should have a voltage of 3 and the meter a scale of 1 ma.

Accuracy of Measurement

In the determination of resistance by this method, the accuracy of the result will depend upon the accuracies of the following:

1) Standard or known resistance.
2) Meter calibration.
3) Initial setting of meter to full-scale.
4) Meter readings with known and unknown resistances in circuit.
5) Voltage regulation during test.

The tolerance of a cartridge-type resistor can be ascertained from the RMA color band, a gold band indicating an accuracy of 5 per cent, silver 10 per cent, and no color 20 per cent. Standard resistors suitable for voltmeters are available with even closer tolerances. Meters can be calibrated against precision standards for high accuracy. Care in the adjustment of the initial setting as well as in observation of readings will reduce the error to a minimum.

(Continued on page 86)

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(Continued from page 84)

If any error is made in reading the meter, the resulting error in resistance determination will not be constant at all points on the meter scale. It will be minimum at half scale when the current with the known resistance alone produces a full-scale reading. The total error increases as the current readings with both resistances in the circuit approach either end of the scale. The curve of Fig. 7 illustrates how the resulting error varies at different points on the scale for an error in reading of as little as one per cent of the full-scale reading. It is obvious that errors in readings of the meter affect the accuracy of measurement least when the known and unknown resistances are equal. Where greater accuracies are required, the Wheatstone bridge principle must be utilized.

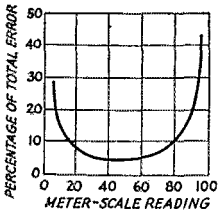

Fig. 7 — Curve showing resulting inaccuracies in resistance measurement when an error of as little as one per cent is made in the meter reading.

Light-Beam Transmitter

(Continued from page 85)

20 inches from the objective lens, and inserting the eyepiece section in the lamp mounting section, turning the former until the slotted side will pass the lamp socket, and focusing the eyepiece upon the center of the lamp filament.

The pick-up–amplifier chassis is mounted on a 9 × 24-inch baseboard of ½-inch pine. The beam head is supported directly above the chassis by uprights of Presdwood, cut to 4 × 11 inches, with 2½-inch holes centered 9½ inches from the bottom of each upright. The front upright has an additional 2-inch hole centered at a height which will pass the pick-up lens barrel.

Batteries may be carried in a separate case, with a cable connection to the unit, or, if they are of the smaller portable type, may be mounted directly on the baseboard as shown.

Adjustment and Operation

Preliminary adjustment of the beam head involves centering the lamp filament and focusing the eyepiece upon its center, using the means outlined in connection with the lamp mounting and beam head assembly. The next step is to light the lamp and direct the beam upon a white screen at a distance of 20 yards or more, moving the lamp housing until the narrowest possible beam is secured. Final adjustment of the eyepiece is made with the filament unlighted, the telescope being trained upon the target at the distant communication point. When correctly adjusted the filament center will appear in sharp focus against the background of an inverted view of the target, which likewise should be in sharp focus.

(Continued on page 88)

HE is your round-the-corner RCA Tube and Equipment Distributor. He is *your personal* Emergency Electronic Expediter. Too often you think of him as a last resort, when every other source fails you. Give him a break — yourself too — by calling him in first, when trouble *starts*.

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RCA

RADIO CORPORATION OF AMERICA

(*Continued from page 86*)

A warning is sounded against sighting through the eyepiece at any time when the filament is lighted. A note in the Experimenter's Section of this issue of *QST* suggests one method of applying an automatic shutter to guard against injury to the eye while focusing.

When the telescope is focused upon the distant target, both beam head and pick-up will be correctly aimed if the same method of mounting is used in the instruments at both ends of the "circuit."

The incoming light beam may be viewed through the telescope, if desired, when the "blinker" method of keyed transmission is used. Such signals may be converted to an audible tone and then received and amplified in the receiver-modulator if a satisfactory method of modulating the incoming beam is incorporated in the unit. Experiments along this line are still in progress at the time of writing.

As an initial attempt a method of electronic modulation by means of a second photocell in series with the receiver phototube was tried. The series photocell was to have been modulated at audio frequency by the light of an oscillating neon tube. However, since a neon tube will oscillate only at very low input, its light proved insufficient for the purpose. The next choice for electronic modulation would be either the use of an amplifier for the output of the oscillating neon tube, or the use of a separate audio oscillator of relatively high output to ignite the neon tube and thereby produce light sufficient to activate the phototube. Even with such an arrangement, it is probable that the series photocell or phototube used must be one which is designed to give peak response to light in the yellow-red portion of the spectrum.

The most obvious method of modulating the incoming beam is through the interposition of a mechanical "light-chopper," such as a motor-driven rotary shutter. The experimenter who is able to secure a small battery-operated motor may find it practicable to apply such a "chopper" to this portable rig. Experimentation with motor speed control and with the type of shutter will be required to produce a pleasing tone.

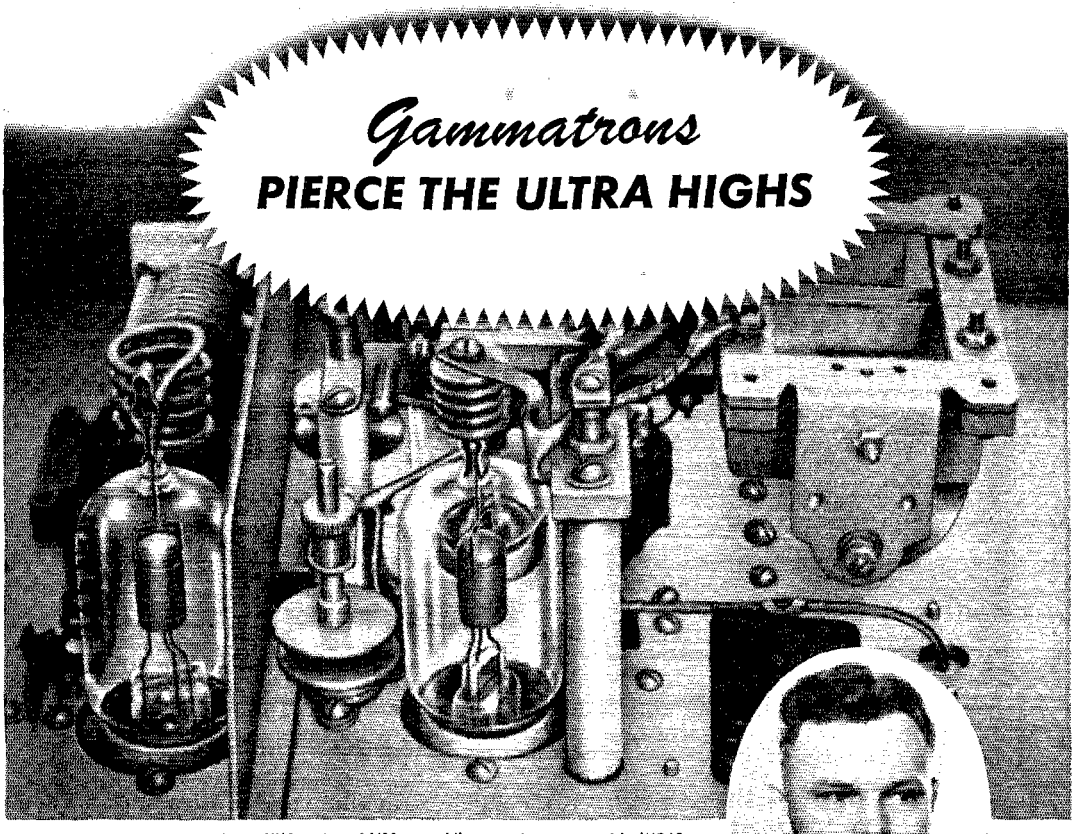
Hints & Kinks

(*Continued from page 55*)

If a short piece of cardboard or bakelite tubing of the proper diameter can be obtained, the mechanical strength of the assembly will be improved if the adapter socket and base are cemented in it after wiring.

No changes will be required in the set wiring if such an adapter is used, although in some cases a slight realignment of the i.f.s is necessary and sometimes the h.f. circuit will require retracking. The same scheme has been used here for substituting 7A7s for 6SA7s, since we recently exhausted our stock of the latter. — *Chuck Lunder, W6HWJ.*

Gammatrons
PIERCE THE ULTRA HIGHS



Above: UHF section of 161.1-mc mobile transmitter operated by WGAR, and designed by W. L. WIDLAR, UHF Engineer for the Cleveland station.

"The HK-24 is the best UHF tube for operation at 161.1-megacycles"

The work of W. L. Widlar in the ultra high frequencies is attracting national attention. After several years of research and experiment between 30-mc and 250-mc at WGAR, he designed a 157.5-mc AM mobile transmitter with an operating range of 17 miles.

Two years ago the 157.5-mc special events mobile unit was modified into a 161.1-mc FM transmitter, which reduced noise and improved transmission, and has a satisfactory operating range of 20 miles from the receiving location.

Now he is engaged in testing a 10-watt 225.6-mc crystal-controlled AM transmitter, and the results will be published in the near future.

For the driver-amplifier and power-amplifier stages of these transmitters Mr. Widlar selected Gammatron tubes.

"I know from experience," he says, "that the HK-24, because of its small physical size and high efficiency, is the only available UHF tube that will operate successfully at 161.1-mc."

In addition to small size and high efficiency, there are other reasons for the ability of HK-24's to pierce the ultra highs. For example, confined electron paths, getter-free bulbs that avoid metalized resistor effects, and lack of internal insulators.

Heintz and Kaufman engineers constantly utilize the results of UHF field tests to design more efficient Gammatrons, and thus they are making an important contribution to the opening of new electronic frontiers in the centimeter region.

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Gammatron Tubes

FOR VICTORY AND SECURITY BUY WAR BONDS

A Ham-Built Communications-Type Receiver

(Continued from page 18)

a frequency meter with the set in operation. The dial calibrations were made at 50-kc. intervals and the 10-kc. points for bandspread on 14, 7, and 3.5 Mc. were located by interpolation.

All of the coils in each set are wound to be as nearly identical as possible. The r.f. and mixer coils are then adjusted to exactly the same inductance by spacing the turns and heavily doping all but one or two turns at one end with clear nail polish. When the dope has set, a further adjustment may be made by moving the free turns on the end and then cementing them firmly in place. The inductance of the coils can be checked by interchanging two coils at a time in the r.f. stages. If there is a difference in inductance, the stray-capacity equalizers, C_8 and C_9, will have to be readjusted when the coils are interchanged. When the inductance of the three coils is adjusted correctly, it should be possible to place the coils in the three positions in any sequence without necessity for readjustment of any trimmer to restore resonance.

I.F. Transformers

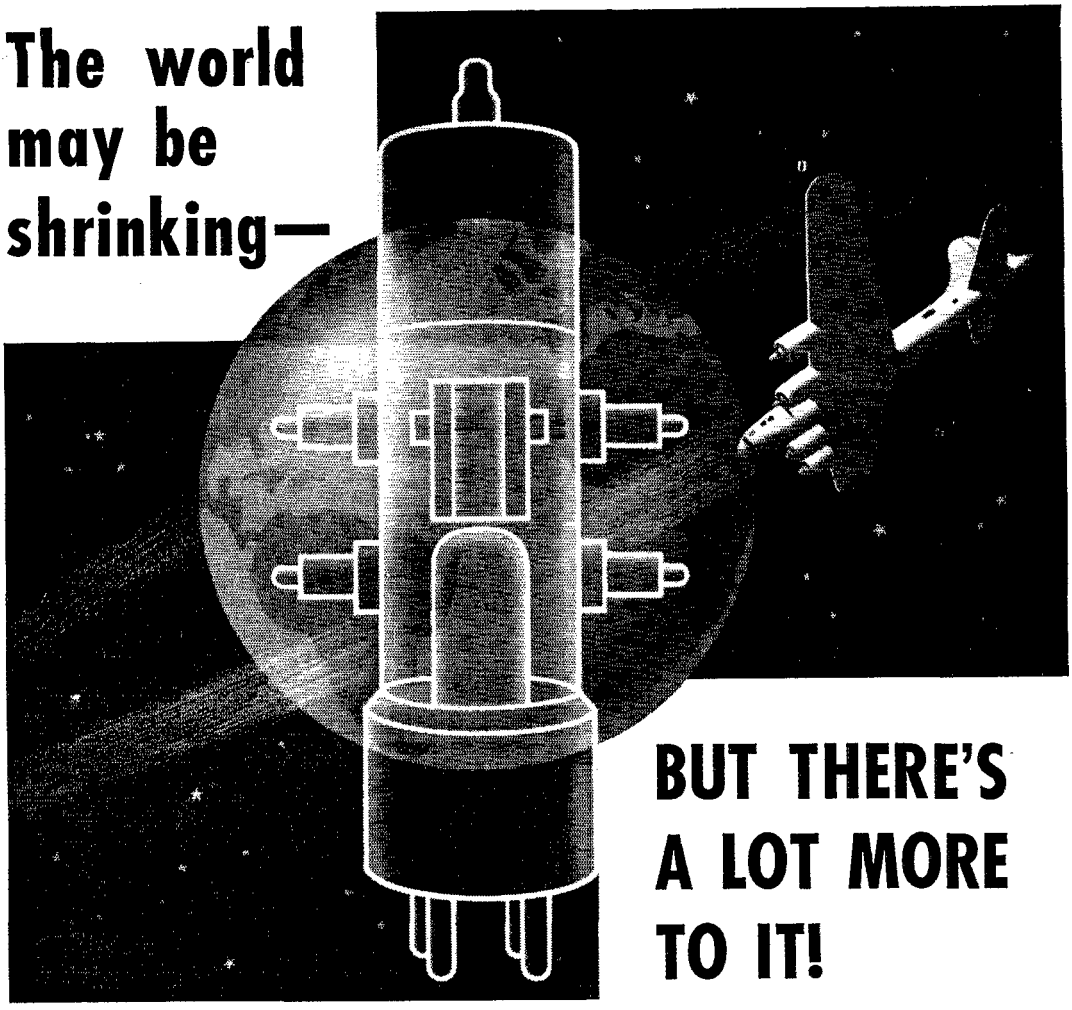
The i.f. coupling transformers, which were already on hand, were modified to fit the circuits. About one-fourth of the turns were removed from the secondary of T_4, and C_{20} and C_{21} were mounted inside the shield can. The primary and secondary windings were pushed a little closer together. T_5 originally was a b.f.o. unit. The tickler winding was replaced with a 100-turn coil of No. 34 enameled wire, which became the new primary. The two windings were placed close together for tight coupling. It was found that a 50-$\mu\mu$fd. fixed condenser, C_{22}, had to be added to the secondary to hit resonance at 465 kc. An auxiliary brass contact was added to C_{13}, so that the crystal could be shorted out for straight operation. T_6 is tuned by a mica trimmer, but since it drifts a little as the set warms up it could well be replaced with an air-insulated trimmer.

Tracking

With the minimum and stray capacities in each stage set at the same value, it is easy to secure good tracking of the r.f. circuits. It is necessary for them to track accurately, since the over-all selectivity of the three resonant r.f. circuits is high. If one of the circuits is detuned by moving a trimmer 2 or 3 $\mu\mu$fd. away from resonance, the signal meter will indicate a drop of several db. This makes the initial adjustment of the circuits very critical, but it insures that the r.f. portion will perform as intended.

The main tuning condensers, C_1, C_2, C_3 and C_4 have a capacity range of about 2 to 50 $\mu\mu$fd. All of the other capacities in the resonant circuits, including tube-input capacities, trimmers, wiring and the distributed capacity of coils, total about 38 $\mu\mu$fd. The ratio of total minimum to maximum capacities throughout the tuning range is then

The world may be shrinking—



BUT THERE'S A LOT MORE TO IT!

Right now, in action on ships and planes and vehicles, there are radio and electronic applications that were vague dreams a few short years ago. They were built for war, but their principles promise new products and refinements to enrich the peace that follows.

It has been Delco Radio's privilege to work closely with Army and Navy engineers in exploring the possibilities of radio and electronic equipment. Many problems of design have been solved through cooperative research—many problems of production overcome by Delco Radio's experience as a large manufacturer of precision radio instruments. From laboratory to drawing board to production line, Delco Radio has been in on the job of making electronics practical for mobile artillery, tanks, aircraft, ships and field units.

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DIVISION OF

GENERAL MOTORS

(Continued from page 90)

about 2.2 to 1, and the frequency range covered is about 1.5 to 1. With the above ratios the spread of frequencies is not quite linear, but there is no noticeable crowding at the high-frequency end of the dial.

The final circuit departs considerably from the one which was drawn up at the start. Innumerable bugs were encountered in getting the receiver finally to perform satisfactorily. When the adjustment of C_{18} is correct, there is no observable interaction between the oscillator and mixer tuning. Should there be any, it is a good idea to check the bias on the signal grid. It should be at least 5 volts. To insure that this voltage will be obtained, a 500-ohm cathode resistor is used in this stage. Grid current flows and upsets the whole stage if the cathode potential drops to below 5 volts above ground.

A parasitic oscillation in the mixer developed while the bandspread taps were being adjusted on the 7- and 14-Mc. coils. Its exact cause was not determined, but it is not present when the coils are wound as shown in the coil table.

One of the 6J5 tubes I had lying around persisted in a parasitic oscillation, apparently of high audio frequency, which modulated the r.f. signal. This particular tube was a 6J5GT/G with a bakelite base. All other tubes, both glass and metal, worked without trouble. Nearly every other stage in the set developed some kind of parasitic oscillation at one time or another. Generous use of isolating resistors and by-pass condensers in all screen and plate circuits was necessary.

During the adjustment of the crystal filter it was found that the rejection control allowed rejection of interference on one side of the desired signal but not on the other. It was necessary to add a little capacity, consisting of a pair of twisted wires across the crystal holder, to get the rejection slot to move to the other side of the signal.

Naturally, this receiver has not been used in actual communication. It will probably not get a thorough test of its full capabilities at handling QRM until ham radio comes back, since a ham band is about the only place where one can find twenty-five stations on every frequency! In listening to what the ether has to offer these days, its performance appears to be about as good as that of any receiver ever made available to hams and a sight better than many. The noise silencer is very effective in reducing or eliminating most of the noise floating around my apartment, and there is plenty. The crystal filter is effective in reducing noise, also, and it is broad enough at minimum selectivity to be useful on 'phone signals. When a signal generator is coupled to the input of the i.f. stage and output plotted against frequency, the curve obtained is very much like the sample curves given by Jim Lamb in his original description of the crystal filter.

The gain and image rejection in each r.f. stage have been checked roughly with a signal generator. The gain at 14 Mc. runs about 30 in each r.f. stage with the controls wide open and a.v.c. off.

(Continued on page 94)

(Continued from page 88)

The signal-to-image ratio, measured by detuning the stage about 1000 kc., is approximately 50 to 1. The mixer stage is not quite so good. For all practical purposes, the over-all image rejection is complete. This can be checked quite easily since at the high-frequency end of the dial the ganged r.f. and mixer trimmers have sufficient range to tune to the image frequency from the front of the panel. The capacity of the trimmers is decreased until the noise level rises in the speaker. With the trimmers lined up to the image, a strong signal is tuned in. Then when the trimmers are tuned back to normal setting the signal disappears, indicating rejection of images. This feature is particularly useful in rejecting images of short-wave b.c. stations operating near 15 Mc. when listening in the 14-Mc. band.

The sensitivity of the receiver could not be accurately checked with the equipment available. Mere listening, however, shows that the noise can be brought up to speaker level either with or without the antenna connected. With the antenna connected the tube noise is negligible in comparison to other noise and signals.

Splatter

(Continued from page 8)

six new non-staff contributors and two already-familiar names.

Darwin B. Appleton, W9LBJ, tells how he started his code-teaching activity in the lead to his article (p. 47). But teaching code is only one phase of his varied pursuits. For instance, he has been varsity baseball coach at Proviso Township High for twelve years, in the course of which he helped develop such talent as Orval Grove, star White Sox pitcher. Dar himself made the Indiana University nine and since has spent several summers playing semi-pro and pro ball. Nor is it only on the diamond that he shines. An A.B. and an M.A. (and soon to be a D.Sc.), he has taught science in secondary schools for fifteen years and for the past twelve years has been instructor of chemistry (and recently radio) at Proviso. Now 38, he finds time to make hobbies of music and photography — apart from baseball and, of course, radio. He's been a persistently active ham for over twenty years, progressing from spark coil through rotary to c.w., and (naturally) holds an ARRL Code Proficiency Certificate. . . . **A. Ficionado** (p. 41) is the quite appropriate although somewhat surprising *nom-de-plume* chosen (since he cannot these days write under his own name) by a former FCC inspector who is now a lieutenant in the USNR, on active duty in Washington. Except that he is also a ham of many years' standing we cannot say much more about him now, but about his article we can say that it is based on ample experience — both official and unofficial! . . . **T/4 Gail Fowler** is, frankly, also somewhat of a mystery man to us. We do know his name, but that's about all. One dreary New England morning his story on the ACS (p. 9) arrived anonymously via the War Department's Bureau of Public Relations. When

(Continued from page 94)

pressed, they divulged his name; but beyond that they couldn't be of much help. Official records disclose that, after having been a reporter for 13 years, he quit the newspaper game in 1942 to enlist in the Army and that, so far as is known, he is unmarried. About all we can think of to add is that (as if you didn't know) the T/4 means he is a technician 4th grade — which merely means that he draws a sergeant's pay. . . . **Ted Gacek, RT1c,** perpetrator of the pages on the Fleet Radio School at Virginia Beach (p. 50), started down the road to a ham ticket as a youngster of 13 a full ten years ago. (He has the ticket now, but still no call.) Meanwhile, he had acquired enough radio knowledge by hanging around ham shacks and working in the radio industry to be of value to his country when it needed him. He joined the Navy right after war was declared, received training first at the Navy's famous Chicago RT school at State and Lake and later at Treasure Island, and was assigned to the then newly opened Virginia Beach School as an instructor. In the past year and a half he has seen many a student come and go, and his net impression of their collective experiences is the subject of his cartoon series. . . . **John A. Kiener, W8AVH,** is the kind of ham who will go to any lengths in behalf of his hobby. A reporter in earlier life, he soon learned that the newspaper game couldn't support W8AVH in the style to which it wanted to become accustomed — so he went into the coal business. Now "Kiener Koal" (exclusive distributors of "Blackies" and "Black Gems") provides the necessary shekels nicely. W8AVH was born in 1924 and its owner has been active on both 'phone and c.w., as verified by OPS and ARRL Code Proficiency certificates issued in his name. In later years John has been active in organizational work, having progressed through the various slots in the officer's roster of the Westlake Amateur Radio Club to the post of ARRL EC for Cleveland in 1938, culminating with his present outstanding work in WERS (p. 26). . . . **Harold L. Mitchell, W4IBZ,** is a pre-World War I ham who boasts, typically, that his 1914 rotary at 5DA could be heard farther by ear than by its signal. When World War I came along the government seized all his equipment, afterward returning it to him in a heap in a box. This time he took no chances; he sold his manufactured transmitter, receiver and everything else to the Signal Corps right at the start. But the radio itch (to which he ascribes, among other things, the loss of his hair) could not be satisfied with merely having radio as a business and teaching an ESMWT course at Alabama Polytech, so he became active again in the only way possible — through WERS, in which he now operates the control unit of WKXM. Before starting his own radio business in Mobile he was employed by RCA, this following electrical engineering studies at Rennselaer and the University of Alabama. . . .

Added to which is, of course, a hearty return welcome to **Dr. Truman A. Gadwa, W1KHM**

(Continued from page 96)

(p. 30), and **A. D. Mayo, W4CBD** (p. 13), first presented in Splatter in, respectively, February, 1943, p. 12, and November, 1943, p. 10.

Speaking of *nom-de-plumes*, we're happy to report that at least one such hidden identity has come out from under cover. "Eddie Current," the author of those pungent cracks appearing in Strays from time to time, is now disclosed as **Frank Courtney W4FDX**, announcer-engineer at WRDW (5000 watts day and night; CBS affiliate) in Augusta, Ga.

• • • —

FEEDBACK

IN THE problem given under the subheading "Tank Current" on page 33 of the January issue, a subtraction of wrong figures at the beginning invalidated the remainder of the problem. The corrected example is as follows:

A current of 10 amperes flows in a series circuit of 22 ohms inductive reactance, 43 ohms capacitive reactance and 27 ohms resistance. What is the voltage across the terminals of the circuit?

$$E = IZ$$

where

$$Z = \sqrt{R^2 + (X_C - X_L)^2}$$
$$= \sqrt{27^2 + (43 - 22)^2}$$
$$= \sqrt{27^2 + 21^2}$$
$$\log 27 = 1.43136$$
$$\log 27 = (2)\ (1.43136) = 2.86272$$
$$\text{antilog} = 729$$
$$\log 21 = 1.32222$$
$$\log 21 = (2)\ (1.32222) = 2.64444$$
$$\text{antilog} = 441$$
$$441 + 729 = 1170$$
$$\log 1170 = 3.06819$$
$$\log Z = \frac{3.06819}{2} = 1.53409$$
$$\text{antilog} = 34.2$$
$$E = IZ\ (10)\ (34.2) = 342 \text{ volts.}$$

In the last problem on page 33, the log of 187.5 is 2.273 instead of 2.73, giving results of 0.636-μhy. inductance per foot and 1.86-$\mu\mu$fd. capacity per foot, respectively.

Two typographical errors in the same article also have been brought to our attention. On page 32, the answer to the matching-section problem should be 112.25 ohms, while a zero has been omitted after the decimal point in each of the figures for the dimensions of No. 14 wire in the statement of the following problem dealing with characteristic impedance. The calculations have not been affected by either of these errors.

Moving on now to the February issue, the second term of the formula appearing in the caption for Fig. 3 on page 18 should be multiplied by 2, so that the formula will read:

$$\text{Maximum range} = \sqrt{2h_t} + 2\sqrt{2h} + \sqrt{2h_r}.$$

In the parts list for the simple signal tracer on p. 29 of the March issue, C_8 is described as a 1-μfd. 25-volt electrolytic. Actually, it should be a 1-μfd. 450-volt electrolytic. Also, R_6 should be 12,000 ohms and not 1200.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.
(2) No display of any character will be accepted, nor can any special typographical arrangements, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.
(3) The Ham-Ad rate is 30c per word, except as noted in paragraph (6) below.
(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.
(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.
(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

Having made no investigation of the advertisers in the classified columns, the publishers of *QST* are unable to vouch for their integrity or for the grade or character of the products advertised

QUARTZ — direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

COMMERCIAL radio operators examination questions and answers. One dollar per element. G. C. Waller, W5ATV, 6540 Washington Blvd., Tulsa, Okla.

USED TELEPLEXES, Instructographs bought, sold. Ryan's, Hannibal, Mo.

WHY NOT turn your unused equipment into ready cash which may be applied towards new and better equipment after the war? Leo, W9GFQ, offers you the best cash prices for communications receivers and test equipment. Write today for large illustrated catalog. Wholesale Radio Laboratories, 744 W. Broadway, Council Bluffs, Iowa.

CRYSTALS available — all types, including 100 KC, 465 KC and 100 KC. Broadcast and Aircraft given prompt attention. Scientific Radio Products, Council Bluffs, Iowa.

PROMPT Repair Service on Meters and Electronic Instruments. Braden Engineering Company, 3317 Kenmore Ave., Dayton 2, Ohio.

HIGHEST prices paid for used receivers, test equipment, bugs, oscillators. What have you? W9ARA, Butler, Mo.

IN STOCK without priority: Meter rectifiers $1.95, meters, transformers, panels, chassis, radio supplies of all sorts. Your inquiries and orders invited. Henry Radio Shop, Butler, Mo.

IN STOCK on priority: New SX-28s and SX-25s for immediate shipment. Henry Radio Shop, Butler, Mo.

DUAL SPEED phono motors needed. Write VAN SICKLE. Box 1583, Indianapolis, Indiana.

WANTED: One 3" oscilloscope in good condition; one pair 866 JR and one pair 866 rectifiers. W6OLR, H. N. Luke, 2113 Somerset Place, Oklahoma City, Oklahoma.

CRYSTALS: New crystal bulletin L5 just off the press — Send for your free copy. Prompt delivery of those dependable time-proven Eidson Crystals in the 100-10,000 kilocycle range. New Type units now available. Also repair and regrinding service. "EIDSON'S", Temple, Texas.

WANTED: Compact self-contained 5 meter transmitter, 25 to 75 watts. Write full particulars, price. ALSO WANTED: SW3 coils, Nos. 14A, 10, 18, 19, 20 W1BB.

SELLING OUT — One 600 watt transmitter, complete, plate modulated, 2 100THs in final amplifier, housed in 66" ParMetal cabinet, suitable for Police Dept. One 250 watt transmitter, complete, cathode modulated, two 35Ts in final, 36" metal cabinet. One 100 watt transmitter, complete, grid modulated, 2 T40s in final, 10" metal cabinet. One 110-C Stancor transmitter complete, cathode modulated, using an 812 final. All transmitters use phone and c.w. and tubes are brand new. Used transformers, chokes, bleeders, tubes, capacitors, relays, etc., etc. Send for list. Dixon, 1038 Boston Road, Bronx, N. Y.

WANTED: Quality magnetic phonograph pick-up. True tangent head mounting. Broadcast quality or similar. Cpl. W. C. Hieber, Jr., Signal Depot APO 869, c/o Postmaster, Miami, Fla.

1000 VOLT 300 watt transformer, 300 mill. 20 hy. choke, 1300 volt 2 mfd condenser. Antenna relay. Several small transformers and chokes. W1BBM.

FOR SALE: 35 watt c.w. transmitter, Lear portable receiver, Simpson hammeter, voltmeters, milliammeter, filter condensers, list and prices on request. Captain Robin, W3HYP, NCAAB, Wilmington, Delaware.

URGENTLY NEED: Two National 1-10 Receivers for State Guard radio. Write or wire: 2nd Lt. G. F. Williams, Communications Section, 7th Battalion, Connecticut State Guard, State Armory, Bridgeport, Conn.

WANTED: Hallicrafters SX28 or 32 Receiver. W8QBR, Tupancy, 2036 25th St., Detroit 16, Mich.

SELL new, unused Abbott TR-4 Transmitter-Receiver, with tubes and Mallory VP-554 Vibrapack. $60.00. E. Hartnell, W9WTE, Salem, Wisconsin.

ENGINEER — NBC affiliate has immediate opening First Class Operator or man who can pass F.C.C. Examination within few months as Transmitter Engineer. Living accommodations furnished at transmitter building. Draft exempt. Single preferred. WSAV, Savannah, Georgia.

WANTED: Cardwell, XT210PD, Meissner 1941 Traffic Master and preselector, Thordarson T-11M74, T-19P55, T-19C36, T-19C43, or equal. RCA 815. W1HIL, Mitchell, 4 Sidney st., Wakefield, Mass.

SELL: Ham station, many BC and PA parts including tubes, 6-V generator, meters, condensers, etc. Write for list. O. G. Hessler, W9OH, 1926 Freeman Avenue, Owensboro, Kentucky.

WANTED: Operator with first class license, draft deferred. State salary, non-defense area. Room and board $12 weekly. Good opportunity for steady employment. RADIO STATION WSYB, Rutland, Vermont.

WANTED: 1916 QSTs, also early Ham receiver. W2ELN, Bradshaw, 89-19 78th Street, Woodhaven 21, New York.

SELL: RME 69. Excellent condition. $90 cash. W2OCS.

SELL Abbott TR-4 with battery operated power supply. Both new. Want National 1-10 receiver. Rice, 2011 West Court St., Flint 3, Mich.

HALLICRAFTERS SX-28, $163 used. Howe, P.O. Box 32, Woodford's Station, Portland, Maine.

WANTED: Late Model tube tester in 1A condition. "Seb" Torrisi, 57 Mechanic Street, Lawrence, Mass.

WANTED: Radio parts: tubes, etc. For servicing receivers. W3HPO, F. Kost, 24 Green La., Chester, RD #1, Penna.

SELL: Pair 100THs. Used about 3 hours. $25. W6OJU.

WANTED: 12" Kine 12AP4 or 1803P4. S. Oddo, Allendale, New Jersey.

WANTED: Gas driven generator. About 1 k.w 110 v.a.c. or d.c. W6ACT, 704 G Street, Crescent City, Calif.

WANTED: Communications receiver, moderately priced. Give description, condition, data. Stanley Hunter, Milford, Delaware.

WANTED: Cathode ray tube, any size. W5KNC. Max L. Kingsley, 1st Sub Depot Signal Section, Alamogordo, New Mexico.

WANTED: Bug type keys for boys in the service. There's a shortage and you who have idle Bugs can help by selling them. Come on, . . . be patriotic. Write me and I will send addresses of service men who replied to my Ham-ad in the February QST. No fee. J. Crowdus, 7431 York, Clayton 5, Mo.

INEXPENSIVE communications receiver wanted. Gingrich, 4613 Derry, Harrisburg, Pa.

ADVERTISERS

. . . in this column are again reminded that check or money order must accompany advertisement since an unavoidable delay otherwise ensues.

Echophone Model EC-1

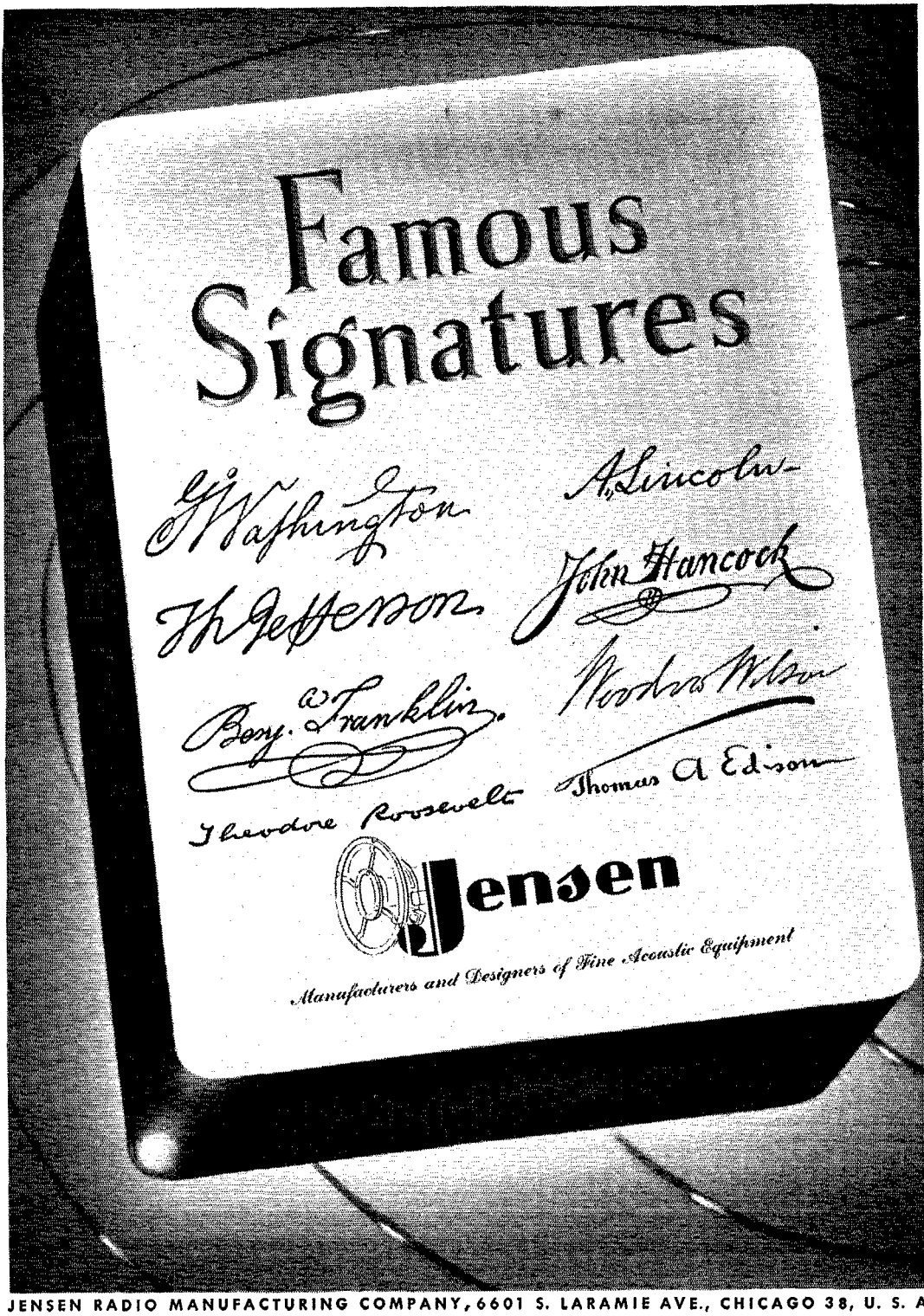
(Illustrated) a compact communications receiver with every necessary feature for good reception. Covers from 550 kc. to 30 mc. on three bands. Electrical bandspread on all bands. Six tubes. Self-contained speaker. 115-125 volts AC or DC.

Echophone Radio Co., 540 N. Michigan Ave., Chicago 11, Illinois

Index to Advertisers

All of the above advertisers are coöperating with the A.R.R.L. to permit publication of an editorially adequate *QST* during this period of war-rationing of paper. Using less advertising space but at higher rates, they continue their customary support of *QST*. Some are using smaller space in each issue and some are using space only every second or third issue. Of the latter, those whose advertising does not appear in this particular issue are indicated by the ** above.

PRINTED IN U. S. A.
RUMFORD PRESS
CONCORD, N. H.



JENSEN RADIO MANUFACTURING COMPANY, 6601 S. LARAMIE AVE., CHICAGO 38, U. S. A.

PAINTED FOR ELECTRONIC LABORATORIES, INC., BY BENTON CLA

"Beach 3 Calling Fire Control 3 ... pinned down by pillbox on right flank!"

★ Landing parties must depend on supportng fire from ships off shore until their own artillery can get into action. By radio communication the Navy's fire is brought instantly to bear on enemy strong points holding up the advance.

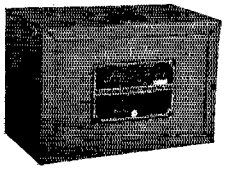
When the Marines carry out the tough landing operations for which they are noted, Walkie-Talkies are among the first ashore. **They must get the messages through!** For unfailing power, many depend on ***E • L*** Vibrator Power Supplies.

Wherever reliability is a "must," ***E • L*** Vibrator Power Supplies are also proving their other advantages of light weight, small size and high efficiency. They are products of the most extensive research in vibrator power supplies and circuits ever known.

That research has extended the scope and usefulness of vibrator type power supplies beyond all previous conception. Certainly, in the electronic era of peace to come ***E • L*** Power Supplies will contribute new advances and economies wherever electric current must be changed in voltage, frequency or type.

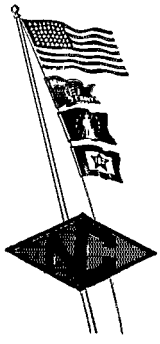
Electronic
LABORATORIES, INC.
INDIANAPOLIS

E-L ELECTRICAL PRODUCTS — Vibrator Power Supplies for Communications . . . Lighting . . . Electric Motor Operation . . . Electric, Electronic and other Equipment . . . on Land, Sea or in the Air.



Power Supply using rechargeable, non-spill storage battery for operation of Walkie-Talkie radio equipment. Input Voltage: Volts D.C.; Output: Numerous Voltages, supplying plate and filament requirements of the equipment. Width, 3½"; Length, 6½"; Height. 4⅜".

● The NC-100XA has gone to war. Under the pressure of the emergency following Pearl Harbor, many stock receivers of the NC-100 series went into action, and served brilliantly. Since then growing experience has led to a long series of minor changes and improvements, culminating in the superb receiver shown in the photograph above. We cannot show what is inside the cabinet until after the war, but a glance at the front panel will make any amateur recognize an old friend. It is stripped for action and in battle dress, but it is still the old reliable NC-100XA. And like its amateur prototype, this new Navy model is winning an impressive reputation for brilliant performance and absolute reliability.



NATIONAL COMPANY, INC.

MALDEN, MASS., U. S. A.

UHF OPERATION?

Yes—and Power, Performance, and Low Price, too, with RCA-815

HERE'S a natural for that u-h-f transmitter you've been planning — the RCA-815. Handles 75 watts input (ICAS) at 150 Mc with less than 0.5 watt driving power! And it's priced at only $4.50. RCA-815 is a favorite for u-h-f work—FM or AM—for 9 good reasons:

1. Small Size: Glass-button stem structure provides short leads and compactness. Less than 5 inches high.

2. Two Tubes—One Envelope: Combining two tubes in one envelope eliminates one socket; saves space; simplifies electrical problems.

3. Low Driving Power: At full input, the 815 needs less than 0.5 watt grid drive. That means simplified construction of low-power stages.

4. No Neutralization: The 815's beam-power construction ordinarily makes neutralization unnecessary. Circuit stability is thus improved.

5. Low Heater Power: The 815 takes only 1.6 amps at 6.3 volts or 0.8 amps at 12.6 volts.

6. Low Plate Volts: You can get full CCS input (60 watts, class C telegraph) with 400 volts on the plates; full ICAS input (75 watts) with 500.

7. High Output: Only a small package, but 815 will give you plenty of wallop right up to 150 Mc; and at reduced ratings it will operate up to 225 Mc.

8. Price: For all these features, the amateur net price is just $4.50.

9. Performance: Only one thing need be said about the performance of the RCA-815: To meet war demands, we increased production of this tube type to 46 times the 1941 level. Isn't that fact alone *proof* of performance?

Get your copy—35c

RCA, 599 So. Fifth St., Harrison, N. J.

Please send me the newly revised 72-page RCA Transmitting Tube Guide. Enclosed is 35¢.

Name_____

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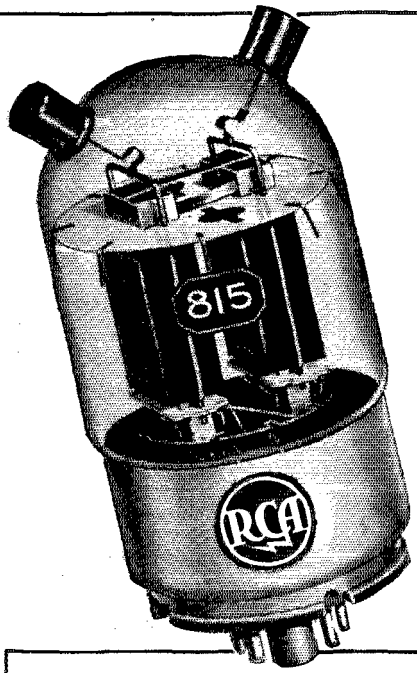
City_____ State_____



MAXIMUM RATINGS

Class C Telegraph Service (All values are for both units)

	CCS	ICAS
Plate Volts	400	500
Screen Volts	225	225
Plate Current, Ma.	150	150
Grid Current, Ma.	7	7
Plate input, watts	60	75
Screen input, watts	4.5	4.5
Plate dis., watts	20	25
	Units in Series	Units in Parallel
Heater Volts	12.6	6.3
Heater Amperes	0.8	1.6

RCA

RADIO CORPORATION OF AMERICA