

QST

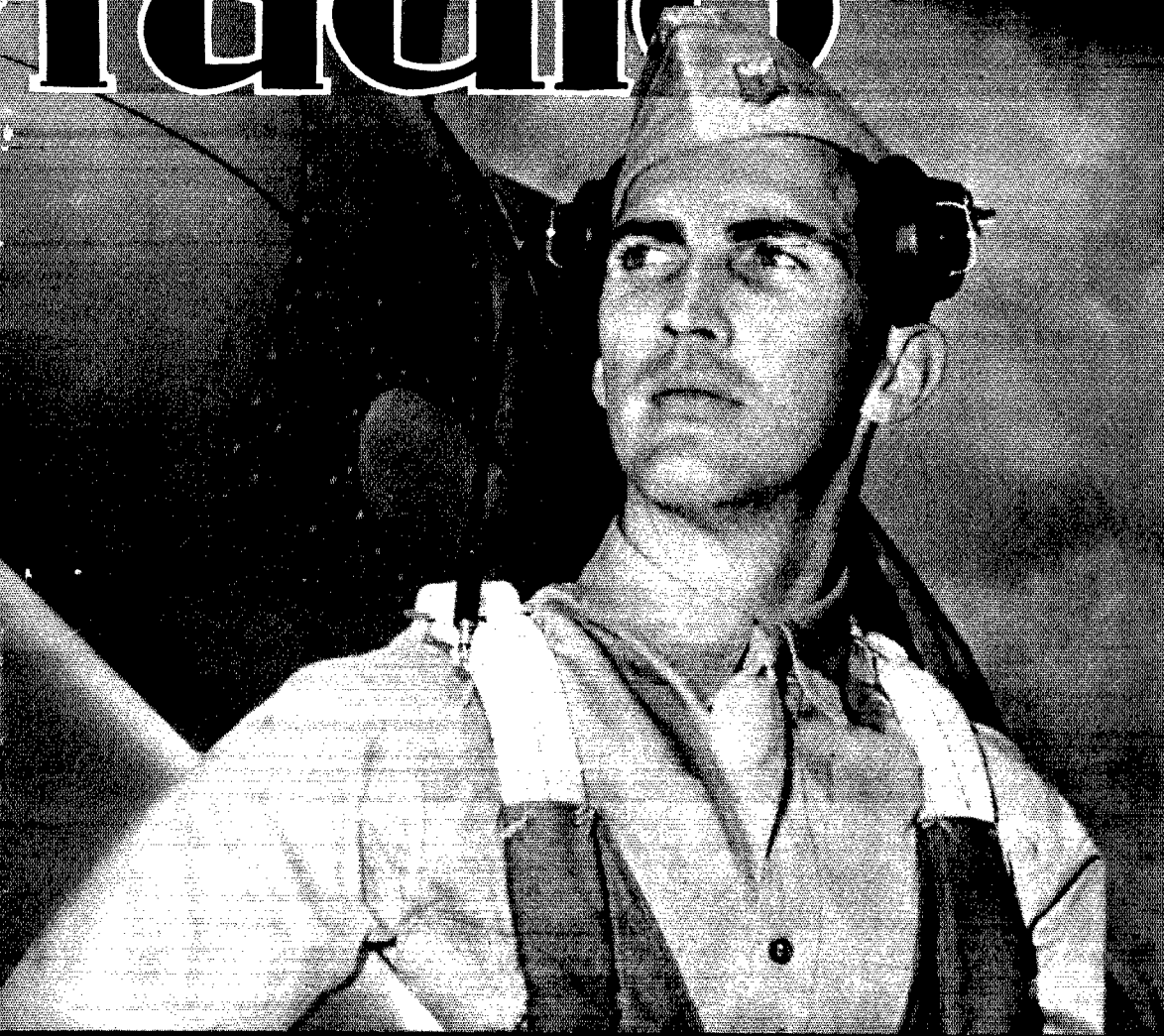
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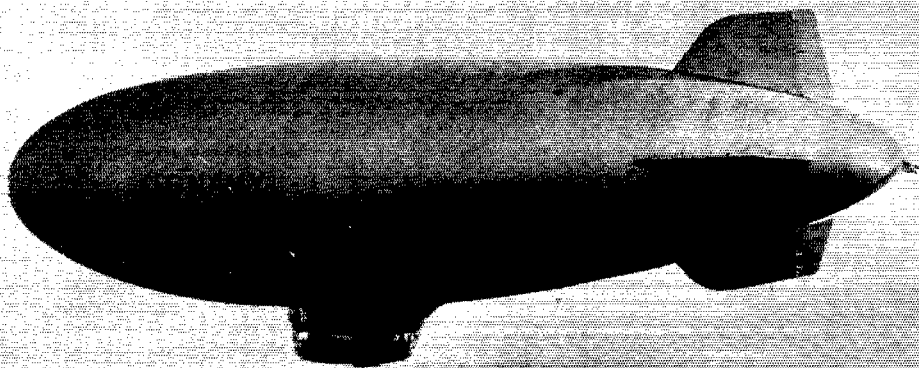
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In This Issue — QST Visits the Army Air Forces



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AMPEREX Electronic Tubes are incorporated in vital protective equipment serving an alert convoy system speeding vital materials over vast and dangerous distances.

And AMPEREX, now building for battle, is working steadfastly to produce electronic tube designs with highly important military significance. Coincidentally, we are contributing, in these same wartime engineering advancements, to the myriad of practical industrial applications which are already evident . . . for tomorrow.

AMPEREX ELECTRONIC PRODUCTS

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BROOKLYN, NEW YORK

Christmas 1942

We have come a long way since last Christmas, all of us. American Amateurs have flocked to the colors — made themselves the backbone of the great Army Signal Corps and Navy Communications. Makers of Amateur equipment have put their entire effort into design and construction of Military communications units. For example, the Hallicrafters have, since Pearl Harbor, turned out production that would normally have taken seven years! ☆ We can all be proud that we have in one short year turned the tide of battle from almost unopposed conquest by the enemy to the first stages of the Victory drive on every front. And, let us all fervently hope that another wartime Christmas will be unnecessary.

W. J. Halligan

the hallicrafters co.
CHICAGO, U. S. A.



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Keep Communications Open!

JANUARY 1943

VOLUME XXVII

NUMBER 1



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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



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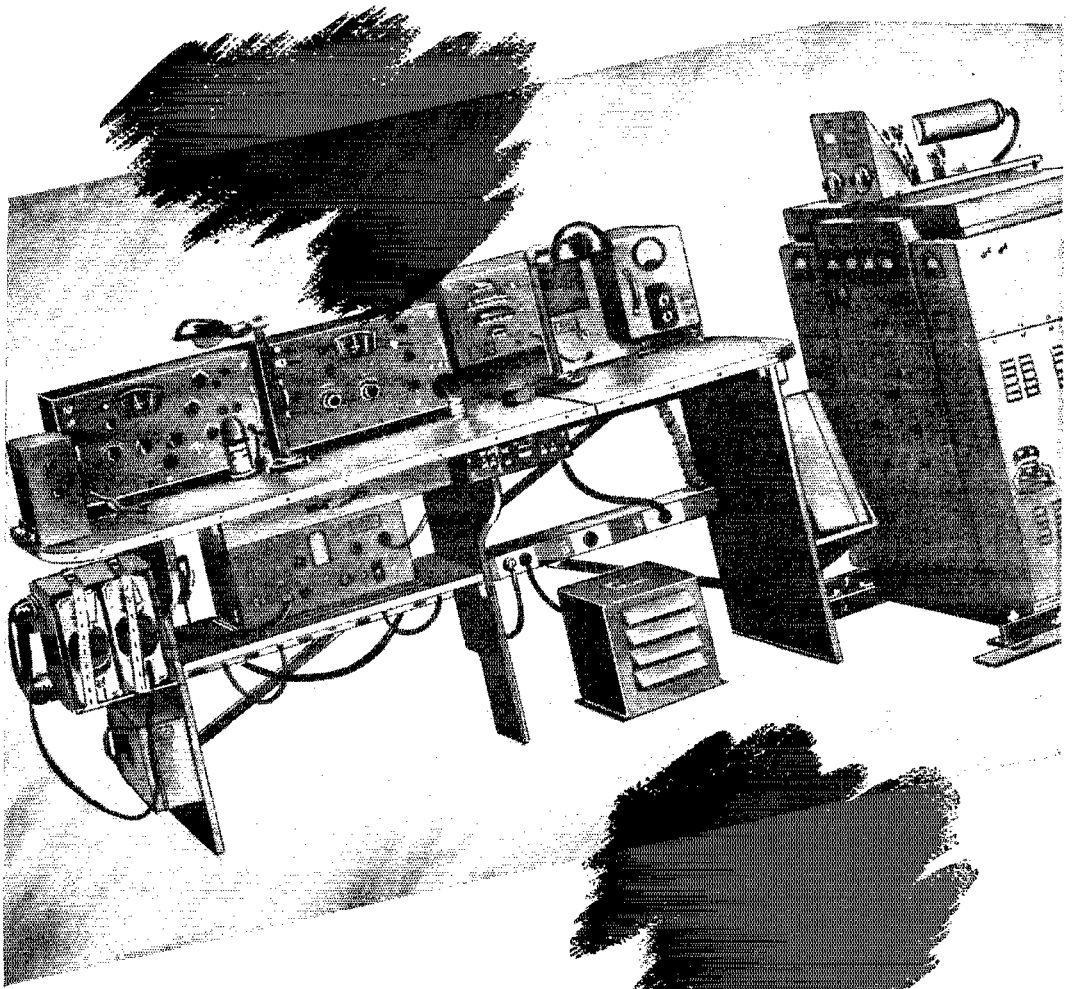
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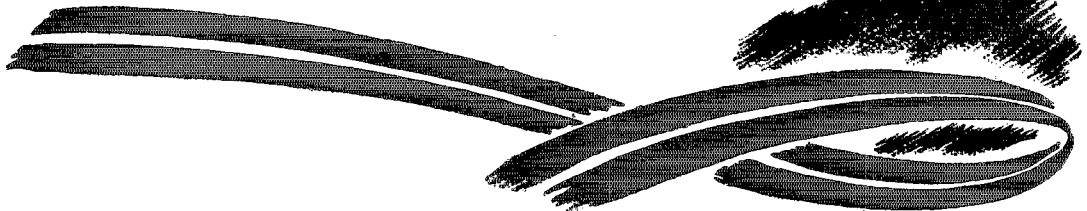
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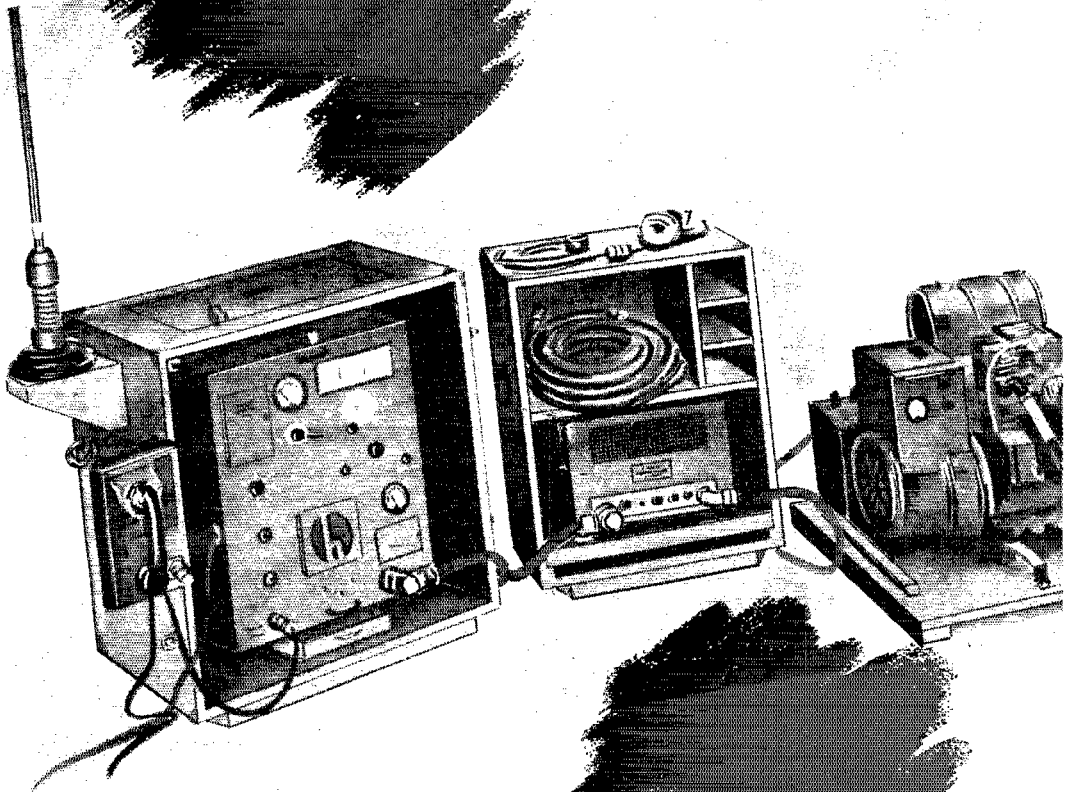
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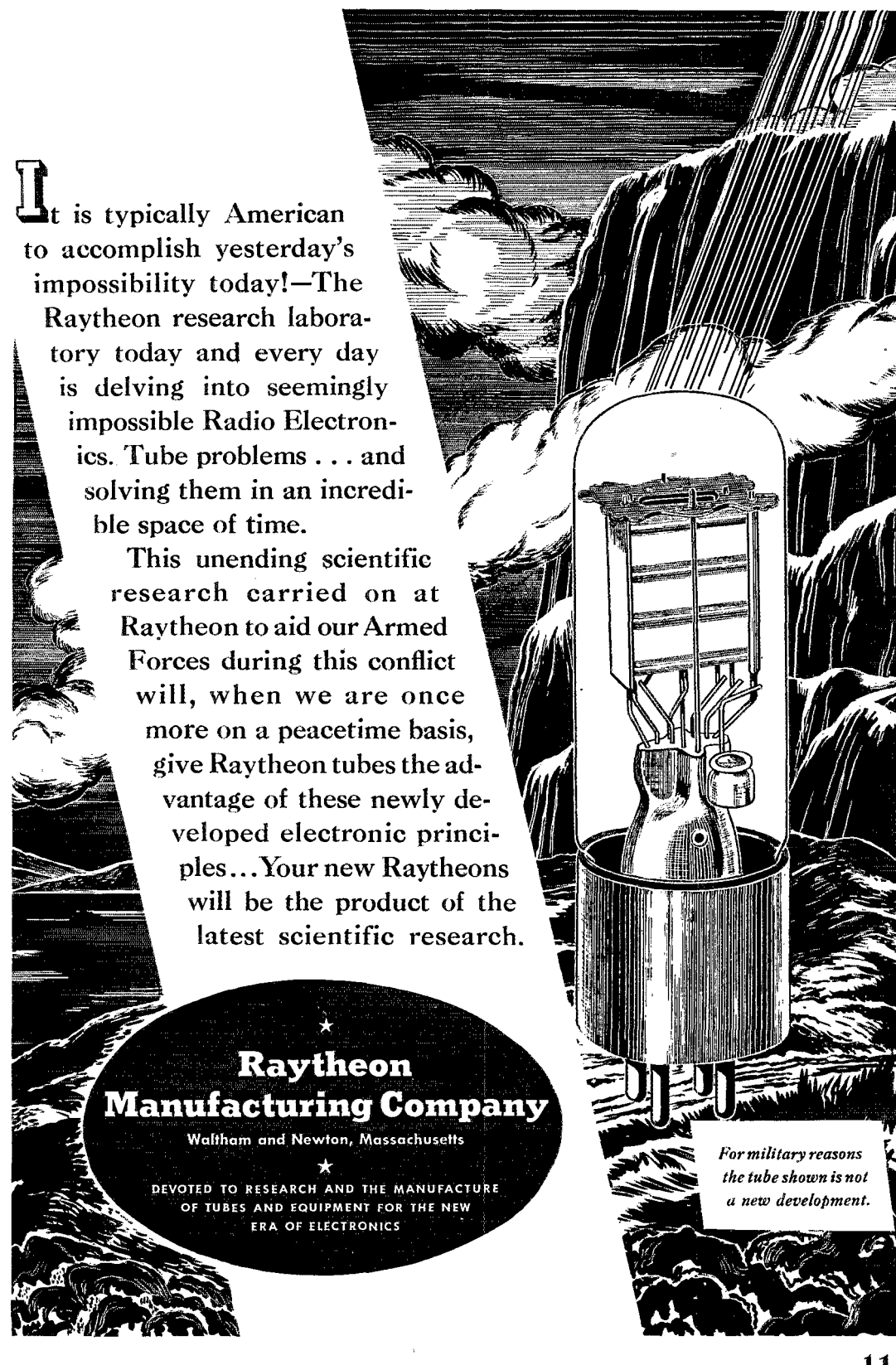
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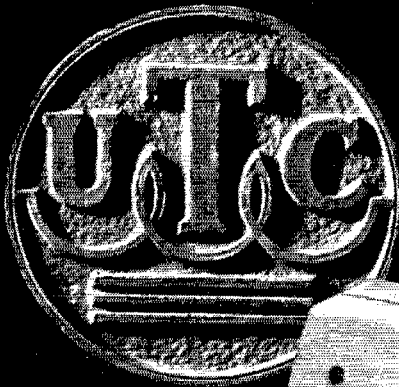
*For military reasons
the tube shown is not
a new development.*

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 Coordinator 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 Coordinator 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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THE AMERICAN RADIO RELAY LEAGUE, INC., is a non-commercial association 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 non-commercial 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.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.



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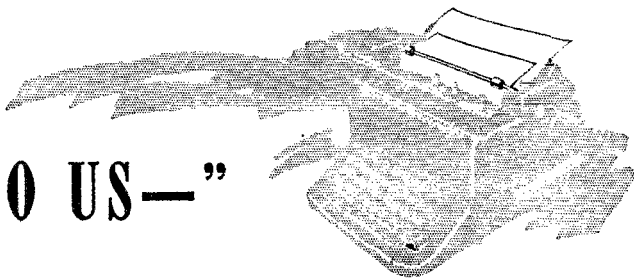
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*On leave of absence. Address correspondence to the Acting Communications Manager, George Hart, West Hartford, Connecticut.

"IT SEEMS TO US—"



GREETINGS!

IT HAS been our custom on this page, about this time each year, to review the joint accomplishments of the radio amateur in the previous twelve months. It is so different a task this time that we would let it go by default did it not seem likely that the stock-taking process would have some incidental benefits.

We complete our first year of existence off the air, the keys and mikes of our home stations still silent. That is a thing that we could never have expected would befall us, albeit a minor tragedy in a world of greater ones. Meanwhile we have dedicated ourselves, one and all, to the sober duty of helping to make this world the kind of place where our kind of amateur radio may flourish in the future. Our amateur operating is necessarily QRT until that job is done. The record of our year is therefore exclusively the story of our participation in that effort.

The number of licensed American hams serving in the armed forces must now, we think, be approaching the twenty-five thousand mark. Many thousands more are in the development laboratories and manufacturing plants that turn out radio apparatus or on the staffs of schools where radio is taught. There is probably a greater percentage of radio amateurs in war service than has been yielded by any other category of American life. It is neither trite nor inaccurate to say that they are making history, whether on the field of battle or in the field of technical development. Throughout this national task the radio amateur is making good and in many spots he is worth a dozen of any other sort of radio folk.

The War Emergency Radio Service has come into our lives, with the duty of lending our hearts and hands to emergency communication arrangements for our communities. In some hundreds of cities the year-end sees this work well advanced, the amateur home-front busy installing and testing, building new apparatus, training new people.

The year has seen a great change in the nature of the work carried on by League headquarters, as it makes every effort to contribute

usefully to the country's effort. Gone are the days of operating contests, of building new stations, of fights over new regulations. The activities now are things that will help win the war: the administration of our part of WERS, the Apparatus Bureau which sends your equipment (including meters!) to places where it is needed, the Personnel Bureau which has placed so many hundreds of hams in places where their radio skill counts, the writing of training literature, the constant recruiting work which tells you of the growing radio needs of our armed forces. *QST* itself has changed, reflecting the altered tempo. The emphasis to-day is on a sounder appreciation of theory and basic math, a wholesome thing. Cryptology and foreign-language codes find their way into our pages. There is much interest in microwave technique. Constructional work is chiefly confined to WERS apparatus. Yet *QST* has grown too—in circulation, in size, and, we feel sure, in its effectiveness and usefulness to us all during this period.

What used to be the holiday season is upon us. This Christmas finds the American radio amateur scattered to the four winds, the seven seas, the score of battlefronts, the myriad industries and schools of the nation. Wherever you men and women are, your headquarters staff sends you heartiest Christmas greetings and earnest good wishes. And reminds you that some day there will be a great homecoming. What a day that is going to be! Our gangs will come trooping back to the home towns, filled with new skills and concepts, eager for the pursuits of peace—including amateur radio. A new era in our art will open then and our imagination simply bursts into flames as we contemplate it. Ruskin put it into words: "When love and skill work together, expect a masterpiece." We do, completely.

Meanwhile, MERRY CHRISTMAS!

K. B. W.

"BOOKS ARE WEAPONS"

PRESIDENT ROOSEVELT said in a recent speech: "In this war, we know, books are weapons." This thought is echoed in many a high place. The Office of War Information has

applied it in the slogan: "Books are weapons in the war of ideas." In the British Parliament it was proclaimed: "Books are in fact weapons of war." The Book Mobilization Committee has adopted the basic phrase, "Books are weapons," as its rallying call to workers in the publishing industry.

Most potent of these weapons are the technical books and manuals used for specialist training in the military and for their civilian associates. And in the top-priority bracket among these technical texts are the books which teach radio — the most critical of all the nation's specialized needs.

Every ARRL radio publication seems to be as vital a weapon for democracy as a rifle or an incendiary bomb. From its pages is imparted the lore that enables the Signal Corps to "Get the message through," the Air Forces to "Keep

'em flying," and the Navy to save our seas. There were ARRL *Handbooks* on Bataan, giving guidance to the maintenance crews who kept the battered transmitters perking until the end. We heard of a Marine who kept his *Handbook* as one of the indispensables when lightening his pack for a forced march through the jungles of Guadalcanal. They're to be found in abundance wherever radio training is carried on — in the Coast Guard, the Signal Corps, the Navy, the Air Forces, the Marines.

This isn't an advertisement. We just thought ARRL members would take pride in knowing that the publications from which they learned their amateur radio are out there in the thick of battle along with the machine guns and tanks, as well as on the front lines of war training everywhere.

C. B. D.

★ SPLATTER ★

OUR COVER

IN this issue *QST* takes to the air — the air of the U. S. Army Air Corps and of the Civil Air Patrol. Fittingly, therefore, our cover shows Pvt. Charles Monahan, student radio operator at Scott Field, gazing aloft beyond the blue horizon which will become his domain when he enters that Army plane. It is, of course, an official U. S. AAF Technical Training Command photo.

...—

FOOTNOTES

THAT amateur radio is represented in all walks of life is well-known. In this issue of *QST*, for instance, our non-staff contributors include a professor, a salesman-engineer, a defense worker and a manufacturer. The manufacturer is Capt. Samuel E. Fraim, W3AXT, (p. 50) CAP's national communications officer, who in civilian life is a partner in and general superintendent of The E. F. Fraim Lock Co., hardware manufacturers. Equally at home in the air and on it, he has been a licensed pilot since 1927 (with 1600 hours on his log) and a licensed amateur since 1919. First as W3BIT and then as W3AXT, he was active until Pearl Harbor on 20 'phone and 40 c.w. WAC on 'phone, an A-1 op, assistant ARRL EC for Lancaster County, Pa., he is another real ham filling a big war job capably. Arthur H. Lynch, W2DKL, (p. 30) our salesman-engineer, is widely known for his work in all fields of radio — including the editorial.

Erstwhile editor of *Radio Broadcast* and *Radio News*, for a decade now he has been a National Co. representative. He has had finger in many other pies, as well — such as Lynch resistors and antenna kits in other days, and war matériel now. Long an outstanding u.h.f. man, he is working hard on WERS at present.

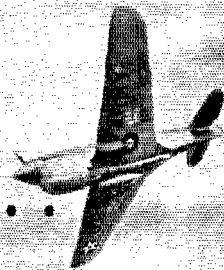
Defense work doesn't leave Paul J. Palmer, W8UGR, (p. 38) much time — just enough to carry on as the "Fred Sutter W8QBW-QDK Memorial Station" by wangling an occasional "QSL" rig or two in the orthodox Sutter tradition. A genuine old timer, W8UGR started in radio in 1906 at the University of Puget Sound. For a while he was in the commercial and b.c. end, but since 1939 he has been simon-pure ham, with enough appointments and activities to fill the rest of this page. Prof. W. H. Worrell, W8SKW, teaches Semitic languages at the University of Michigan. An international authority in his field, there's an interesting background to his knowledge of the Arabic code. While studying in Egypt in the spring of 1936, he had occasion to send a cablegram from a remote telegraphic office in Upper Egypt. Being at the time in line for a ham ticket, he took advantage of the opportunity to procure the information on p. 34 from the native telegrapher.

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LISTENING OUT

AS we write, the Office of War Information is pleading with the American public to abjure the spreading of rumors. It is a simple and yet a vitally-important thing they ask: only that we do not repeat the "inside" dope that garrulous

(Continued on page 32)



QST Visits the Air Forces . . .

BY CLINTON B. DESOTO, WICHD

IF THERE is any branch of the services that warms the blood more than any other, it is the U.S. Army Air Forces. The pulse quickens at the surging call that comes to the combat-hungry fighter pilots astride their thunderous steeds. The will stiffens at thought of the rock-firm discipline of bomber crews inexorably grinding along on their missions, coolly slapping off the sharp stings of pursuit attack. Even the vision swells with new breadth in viewing the prosaic — at least so it seems to a high-flying angel-demon — business of chauffeuring men and material across trackless wastes of sea, desert and enemy-polluted air.

If earth-bound groundlings thrill to their deeds, what then of the men who actually ride these warrior vessels of the sky? There are the pilots who steer the course, and the navigators who chart it, and the engineers who keep the engines turning over and the bombardiers whose vital moment comes when the objective is reached. And there are the radiomen — two in the air and one on the ground for every medium bomber. Their hearts, too, must swell with the glory of their role. What do they think about it all?

You know the answer. In combat there's no time for thinking; then's the time for doing. But on the ground, before the flight, and most of all during the time of training while they ready themselves for the dangerous task ahead — that's when they think. At night, perhaps, waiting for sleep to reach one particular Army cot among all the millions of Army cots, or in the day, perhaps, patiently sitting out a ride on bus or train, waiting for it to end so that furlough can begin — then they live or relive past or future engagements, as the case may be.

Take the radio operator. He sees himself seated in an aluminum-and-canvas seat behind the engineer, tightly wedged in his form-fitting operating position. The bomber rides high above blue water, but not too high to obscure its turbulence or the way its rim meets the haze of the sky. There are wisps of cloud drifting past, and down below there are what look like toy ships sailing in the blue pond.

They look like toys, that is, but they are warships — enemy vessels that must be destroyed. Imperturbably the pilot changes course, the bombardier clutches his bomb-release relay handles. The radio operator fingers his controls, but his eyes stray now and again to glimpse the

*Executive Editor, QST.

little he can of the spectacle that follows as the bomber reaches its objective, the bombardier sees the hairlines cross over a battleship through his rubber eyepiece, the open bomb bays discharge their catastrophic cargo and the white plumes burst around and on the enemy craft on the sea below.

Then a lone fighter returning belatedly from patrol flashes down out of the sun. "Enemy fighter coming in — man your guns," the pilot-commander's voice gruffs sharply over the interphone. The radio operator slides swiftly out of his seat and goes to his post in the waist of the ship. He slides the fuselage panel back and swings the muzzle of his .50-calibre machine gun sharply. Catching the enemy fighter in his ring sight, he squeezes the trigger in short, precise bursts while the fighter curves in, and leads it down. The gun spouts flashes of flame and the tracers make weirdly-aligned rows of spaced white dashes in the sky. Will that damned Jap come on forever? The radio-gunner steadies himself against the bomber's movement and the 300-mile-per-hour blast of the air stream. He makes himself aim deliberately, forces his tensed muscles to traverse smoothly. It seems that that fighter will never stop. . . . And then it veers, a stream of black smoke pours out of the fuselage behind the cockpit hatch — and the Jap slips with slanted wings downward to the sea and oblivion. . . .

The giant bomber pitches sulkily among the puffs of a.a. fire. The radio operator, back at his post, mentally tightens the headphones on his ears. He must not miss a letter of the squadron commander's instructions that will follow. The order comes in coded staccato, the operator relays the information on the interphone, and the pilot points the bomber's nose on a new course in response. . . .

A hundred times they have lived that scene or its equivalent in their minds — the pilot, the bombardier, the navigator, the engineer . . . and the radio operator. A hundred times during the weeks and months at the technical training schools where they learn their trade.

Yes, their *trade* — the grim and yet glorious trade of war. The trade they learn with such painstaking preparation — each knowing that he is to be a member of a magnificently-coördinated team of combat specialists, each determined that he shall not be found wanting in his job, each convinced that *his* job is the most important one in the crew.



"Into the Wild Blue Yonder..." Typical of the stalwart eagles turned out at the radio schools of the Army Air Forces is this student radio operator and gunner, shown in the turret of one of America's mighty new bombers.

For that, too, is what they think — each man in an aerial combat crew knows that his specialty is the best job there is. That's true of the bombardier, the navigator, the engineer, the pilot — and it's particularly true of the radio operators and mechanics. They know that without radio communication the Air Forces could not possibly perform its functions in modern war. Without their skill as radio men a bomber probably could not achieve its objective, and without their skill as gunners it probably could not accomplish its mission. Certainly it would not return — for long-range bombing is successful only in ratio to the impenetrability of the protective screen against outnumbering pursuit attack afforded by the deadly cross-fire of its gunners and the skill in radio direction-finding of its radio men.

So they know that the tricks of their trade — radio and gunnery — are important. When they graduated from the radio-training school they received a pamphlet, on one page of which they read:

"For every plane in the Air Corps to-day, with the exception of pursuit ships, two radio men are necessary. Theirs is a part without glory, without headlines, without fame, and often without appreciation from the civilian population. But to the pilots, who depend upon the beam to get them safely home, who depend upon perfect radio signals and messages to steer them in the correct maneuvers, the role of the radio operator is not to be taken lightly. It is a part to be played with pride, with no apologies."

Not that they're given much to telling the world how important they are — or how good they are, either. The lack of glory or headlines or fame is no loss to them; they don't want these things.

The student learns how it feels to be the voice and ears of a bomber, as he takes over the duties of radio operator in one of America's mighty new sky ships. AAF Technical Training Command Photos.

What they want most is to do a good job — to learn thoroughly everything that can be useful to them about radio operation and maintenance, to become first-rate gunners with split-second reactions and expert judgment of lead and swing. They want that for several reasons: the genuine interest they have in the subject, the knowledge that they must be good or be dead, the earnest conviction that it is their destiny to be free men and that the Star-Spangled Banner must wave in a world made safe for the democracies. . . .

You don't hear them putting these thoughts into words very often, of course. But — well, we've lived with them, for a short time, recently. We've talked with them, and most of all we've watched them at work and training and play.

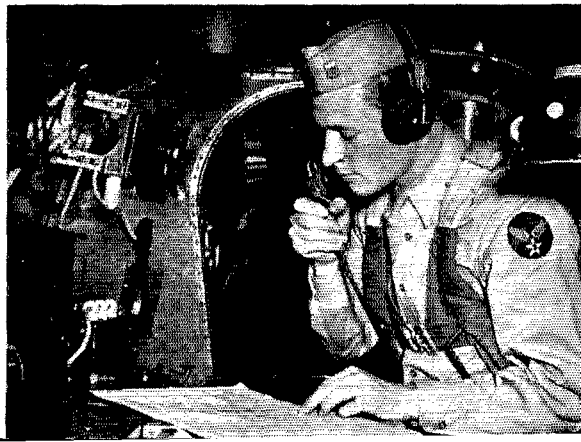
And we believe that now we have a sort of an idea of what they think and feel — way down inside, where even a man's own mind gets together with his heart only now and then.

It has to be something more than mind that propels a man of the Army Air Corps — be he pilot or radio-gunner or just a ground-crew technician. It takes more than a set of enlistment papers and an order from a brass hat to make a man drive himself to the utter limits of human — no, make that superhuman — capacity, first in training and then in the desperate sport of aerial war.

Those who do would put it under the heading of a hell of a lot of fun, of course. Well, you can call it that — if you go beyond the superficial meaning of fun as sport or merriment and name it the business of doing something you want to do more than anything else in all the world because of the satisfaction it gives you to do such a job — grim though it may be.

We won't philosophize about it any more than that. This isn't the place for it, and anyway it would be embarrassing to the boys to read about. They'd hate to think they'd given themselves away — that they could be taken for anything other than an utterly hardboiled, hardbitten, give-'em-Hell crew with exactly as much sentiment in their bellies as a B-17-E Flying Fortress might have.

And what if we went on to say that maybe a B-17-E has a heart — a fighting heart, that brings it back when half its guts are shot away and it is a mangled mockery of the intricate



mechanism that first proudly took the air? Would you reply that it wasn't the metal structure or even the X-million feet of wiring that gave the craft its heart, that it got that heart from its crew . . . ?

Well, that's just the point!
. . .

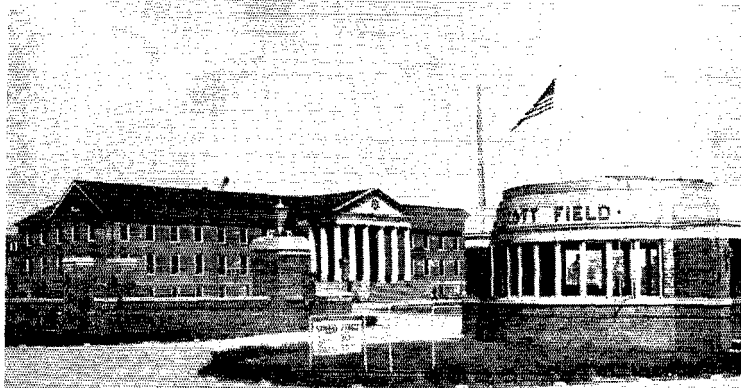
What we started out to do was tell you something about the radio work in the Air Forces. Maybe all this foregoing has nothing to do with the subject — and maybe it has. Maybe it will help you to understand some of the things we're going to tell you about the fellows who help keep 'em flying by pounding microphone and key, by soldering and wiring and servicing, by being voice and ears to those few to whom so many owe so much.

So bear that in mind when you read what follows. Some of it will seem prosaic unless you read it with the whir of a sky-demon's propeller mentally audible in the background. A man at work on his job is not usually very exciting. A man training to go to work at a job is even less so. Yet were it not for this training, those blood-warming (and letting!) chargers of the sky with their fire-spitting lances, those death-laden bombers carrying carnage to Armageddon itself, would never get airborne — for there would be no men to put them there and keep them there.

The men who will do that job (the radio end of it, anyway), when Casablanca and Tunis are as remote in wartime current events as Pearl Harbor and Hongkong, are now to be found receiving the training they will need to do it, at the radio schools of the U. S. Army Air Forces Technical Training Command. They are to be found at Scott Field in Illinois, and at the Chicago schools in the Stevens and Congress hotels, and at Madison, Wisconsin, and Sioux Falls, South Dakota. They're there being trained — umpty-ump thousands of them. We can't tell you how many because the Germans and the Japs would like to know, too — but it's plenty! You've heard some figures — the newspapers carried reports of 30,000 at the Chicago schools alone, for example — and those figures are probably not too far off, at that.

But we're not primarily interested in numbers, anyway. What we want to know is the kind of fellows these are — the kind of training they get, how well they are being fitted for the job at hand, how they will perform now that the time has come for us to write *our* chapter in this war.

That's what we wanted to know. To find the answers, we went to visit the Army Air Forces schools at Scott Field and Chicago.



. . . At Scott Field

Parent Radio School of the A.A.F.

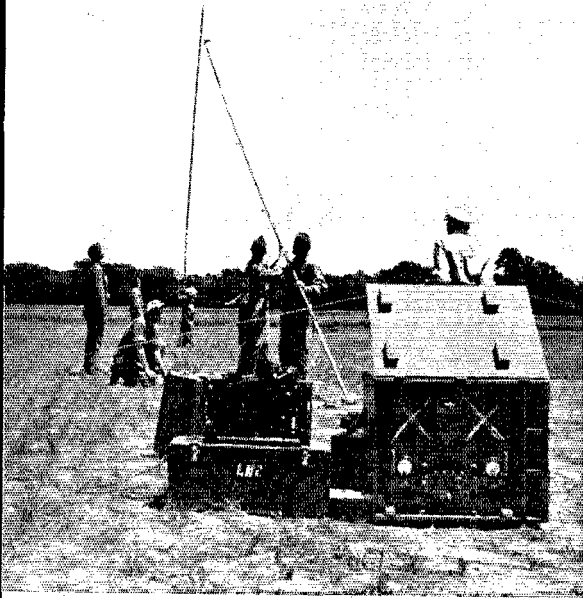
WE went to Scott Field, to see the radio operator-technicians of the Air Forces being trained.

What is an Air Forces radio operator-technician?

Well, according to the book he is an enlisted man of the U. S. Army who has been inducted, received his basic military training, selected for this duty because of special aptitude or experience, and trained at a Technical Training Command school in the operation and line maintenance of aircraft radio equipment and in the installation and field maintenance of allied tactical ground radio equipment. As a radio operator he must be able to make perfect copy on a typewriter through interference at a minimum of 16 words per minute, be able to send with satisfactory transmission at the same speed, know standard radiotelephone and radiotelegraph procedure, network procedure and the principles of flight operation, and be able to shoot bearings, plot fixes, and perform other similar duties. As a radio technician he must have a complete knowledge of the operation and tuning of all standard Air Corps equipment, be able to install the equipment and put it into operation, recognize components and understand their performance and functions, perform standard inspections and do prescribed maintenance work.

According to the officers at Scott Field, he is a man who is equipped with a "seventh sense" — the knowledge of wireless communications.

How does he get equipped with that sense? Well, to quote an official release there are two ways. He may have been one of the "thousands of lads who were radio hams" whose "adaptation into army radio men was simple enough." In the case of the radio hams, their amateur experience alone qualified them for the job. "But America is building the mightiest air force ever known, an armada of far-ranging bombers that will need more radio men than ever touched an amateur set in peacetime." The second, and by far the largest



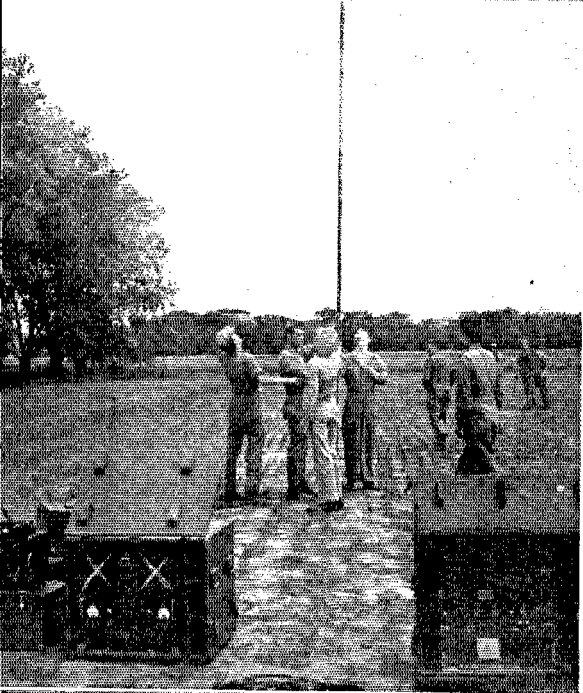
group comes from men who have little or no preliminary radio experience — and in these that seventh sense must be instilled without previous preparation. “Here at a gigantic radio school thousands of men who knew nothing about the technical details of wireless before joining the Army Air Forces are rapidly taught the fundamentals, are graduated and sent out for duty with tactical outfits.”

That, then, is the purpose of Scott Field — to give to men with no previous radio experience a knowledge equivalent to that possessed by a well-qualified amateur plus, of course, a specialized knowledge of standard Army equipment and operating practice.

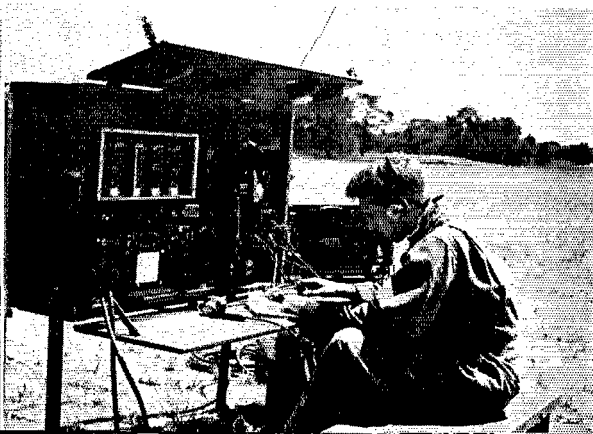
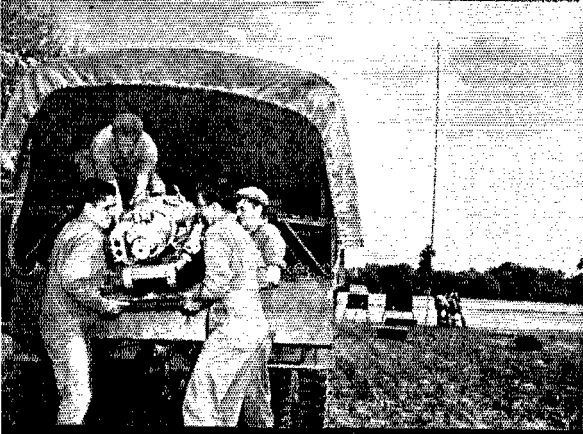
Scott Field — the parent radio school of the Army Air Forces Technical Training Command — has been called “the world’s largest institution for instruction in radio communications.” Unlike the other AAF technical radio schools, it is not a new product of the present war. Indeed, its 25th anniversary was celebrated on May 24th of this year — although its status as a radio school goes back only to 1939, when the Air Corps radio communications school was moved there from Chanute Field.

Established in 1917

The field itself dates back to 1917, however. In June of that year the War Department, faced with a frantic need for trained pilots in World War I, purchased a square mile tract of table-flat cornfields in St. Clair County, near Belleville, Ill. The field was named, not after a prominent politician or brass hat as might have been expected, but for Corporal Frank W. Scott, who met death in an experimental flight in 1912, one of the first Army men to die in an aircraft. With an initial



Setting up a field-base installation of the AAF. *Top* — Erecting the sectional antenna mast for the high-power portable field transmitter. These units are carried to field locations and assembled by students grouped into crews. *Center* — Hanging the “sky hook.” Radio students at Scott Field raise the antenna for the main transmitter of their high-power field equipment as they go on a tactical problem. *Lower left* — Crew members unload the motor generator for the high-power field equipment used by the advanced class in the aircraft radio division. In the background is seen the transmitter and receiver units set up between the antenna masts. *Below* — At the main transmitter of the high-power field equipment, a student operator puts into practice the training he has received in the radio-operating classes. *AAF Technical Training Command Photos.*



Congressional appropriation of one million dollars, two thousand laborers set to work to convert the cornfields into an air field. In September the first airplanes arrived — four of them — and the advanced pilot training course began. For a year the Yankee birdmen moved in a steady stream from Scott Field to France. Then came the Armistice, and the Army no longer needed pilots — not, at any rate, on the vast scale for which training had been set up. So the program at Scott Field was deflated and the permanent force cut down to 65 men. In 1920 all heavier-than-air training was discontinued at the field and it was converted into an experimental lighter-than-air base, headquarters for the training of airship pilots and balloon observers.

For the next couple of decades, the story of Scott Field is one of accomplishment amid constant struggle. Many a noteworthy event in lighter-than-air history was staged on the post. The RS-1, largest army dirigible in the world, was completed there in 1926. In 1930, when the War Department's budget made no provision for construction projects at the field, local civic groups united to form a "national defense" committee to fight for maintenance of the post — and won a \$1,206,500 appropriation. The post became the most completely-equipped inland government airship base in the nation.

But the fight for lighter-than-air craft was a losing one. Soon heavier-than-air operations were resumed at the field. In 1937 all army lighter-than-air craft were discontinued and the last two dirigibles at the field decommissioned.

That was the end of the balloons, but it was far from the end of Scott Field. In 1938 the post was given a major overhaul. A \$7,500,000 building program was launched. The helium plant and the dirigible tower came down. The mile-square field was enlarged and gigantic new concrete runways were laid. New barracks, officers and non-coms quarters, a new hangar and general headquarters were added to make the field one of the most modern in the country.

AAF radiomen in combat. *Left* — Detail guard field outpost, one of several outpost units strung out from a main transmitter during maneuvers. From these outposts communication is established with their commands through the main field transmitter, from one to seven miles away. The outposts are connected by direct telephone line, strung out as the men move into advantageous positions. *Right* — An outpost scouting party returns through a smoke screen with their telephone equipment. Scouting parties connected by telephone line are sent out from the main transmitter unit up to distances of five to seven miles. From their vantage points, through this main unit they carry on direct two-way communication with their headquarters. *AAF Technical Training Command Photos.*

The next year Scott Field became the "Radio University of the Air," and the year following that, with the breath of war blowing hard down its neck, the Army spent another two million dollars on the construction of 160 new temporary buildings. In December of 1940 the students moved in and the expanded radio school got going.

From then on the record has been one of still greater expansion. New runways, messhalls, barracks, hospital, school buildings, a hundred homes for non-coms built under FWA — nearly five million dollars more were spent to make Scott Field the enormous establishment it is to-day.

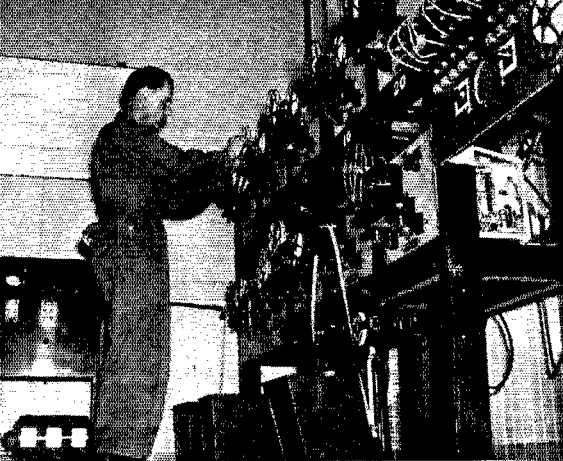
The Visitor Leaves for Scott Field

We reach Scott Field from Belleville, in a lumbering red bus piloted by a dry old character with a well-developed sense of Southern Illinois wit — than which there is no keener. The bus loads quickly with khaki-overcoated soldiers and a sprinkling of civilians, loads until it seems the passengers must hang from the roof. But there's always room for one more; the driver cajoles the crowd to squeeze a little tighter so that last running khaki figure won't have to stay behind. What if the door won't close — or if we're a little late? There's even time to let one lad push out at a light to pick up his clothing from the Pilgrim Laundry on the corner. Sure — there's a war to fight, and these are the boys that are going to fight it. . . .

Finally we roll out over Belleville streets and on to the smooth concrete ribbon over the Looking Glass prairie. Yes, that's its name — from the time when the heavy spring rains fell, as they still do in Southern Illinois, and the flat prairie became a sheet of shining water. The Indians named it that, then (remind us to tell you that legend some day), and it was a good name.

Only now the Looking Glass prairie is a sere, brown expanse of harvested cornfields, mile after mile split by the straight flat concrete. The road





Radio operator training. *Top* — Main code control room. Pictured is a group of Boehme automatic code-sending machines, fed through the control panel in the upper right-hand corner of this picture. *Center* — AAF radio operators must send as well as they receive. This student is examining a tape recording of his hand sending to identify faults which he must learn to correct. *Bottom* — A network class in session. Simulating field operating procedure, the students operate individual "stations." *AAF Technical Training Command Photos.*

goes on forever, but the bus grinds to a halt and then turns sharply left. There are more miles of restless cornstalks waving limply in the autumn breeze, and then, so suddenly that it seems one has indeed passed through the Looking Glass into Wonderland, we pass the last concealing rows of corn and Scott Field stretches off into far distances.

We wait while a methodical MP works through a line of visiting wives and other civilians. Finally he comes to us. After a verbal tussle over what seems to him a discrepancy between the "Washington" on our War Department credentials and the "West Hartford" address on our other identification, we are sent along to the Administration Building.

There we meet Major J. R. Johnston, post public relations officer, and Lt. Clifford K. Jaffe, his assistant. Major Johnston is busily clearing off his desk preparatory to moving into a new billet as athletic director for the school, but he has made this *QST* yarn one of his last projects before turning over to Lt. Jaffe, who is to be his successor. They give us a cordial welcome.

In the cramped confines of the public relations office we first glimpse something of the real scope of Scott Field, as these men begin to unfold the story. We review the detailed record of its history, we hear an outline of the training work being carried on and of the physical layout of the post, we look at hundreds of photographs and press clippings and other data concerning the school.

We Tour the Field

After lunch we set out to see it all for ourselves. Lt. Jaffe has seen to it that we are supplied with an olive-drab Army car for our stay. Our soldier-driver, an ex-chauffeur, takes us around the First Area at a leisurely 20-mile jog. (The speed limit at Scott Field is 20 miles an hour for automobiles, 15 for trucks — and 8 for bicycles! There are plenty of the latter, too; the distances at the field discourage pedestrian travel.)

Scott Field as a whole is divided into four areas, we learn. These surround the large central airfield with its magnificent new runways. The First Area contains the administrative establishment and the miscellaneous functions of the post as a whole — post headquarters, school offices, hospital, fire station, officer's mess, service club, the several small specialist schools other than radio, and the hangars. It is the original Scott Field nucleus, home of the 8th Air Base squadron, which is the permanent detachment stationed there for maintenance of the post.

The Second and Third Areas are the training units. Practically identical, each is a complete radio school in itself, with its own quota of trainees, instructors, barracks and instruction buildings. Each even has its own mess halls, post exchanges and recreation centers. More about these two areas later.

A variety of miscellaneous activities occupy the Fourth Area, but mainly it is a receiving and shipping center. The long railway siding running along it is loaded with passengers and freight cars. An average of 10 to 12 passenger cars alone leave and depart from there each day, we discover. Every day hundreds of men arrive at the field from basic training centers and other hundreds leave for service assignments; the traffic is tremendous. The waterworks and power station — Scott Field operates its own utilities — are also found in the Fourth Area. In this area, too, vast sections of new construction are under way — barracks and other buildings for the still-expanding camp.

Our first stop is at the executive offices of the Scott Field radio school. There we meet Col. Albert T. Wilson, the director of training, and Major Robert H. Orr, secretary to the director. Typical Air Forces officers are they — lean and rangy men, with eyes that crinkle at the edges from long hours of peering through the unfiltered rays of the sun at a mile or two up, and hands that are built to the fit of a joystick rather than a desk-set fountain pen. Good administrative men, though — the very best. And if you understand that they'd prefer the tarmac to the polished oak, you understand, too, that this only makes them the better at their jobs.

No need to tell these men about radio amateurs or *QST*, of course. They know. They know that the best of their students (and many of their best instructors, as well) come from ham ranks; they only wish there were more. They're interested to know about our activities back at West Hartford, and what the hams are doing elsewhere in the service. We talk about war, and the hams; about the ARRL men on the staff there — and the women, too. Col. Wilson mentions Mrs. Carrie Jones, W9ILH, our Illinois SCM, describing her as "one of his best men."

During the discussion we are introduced to 1st Lt. James H. Kuhns. He undertakes to show us through the school from power source to antenna. Lt. Kuhns proves a good guide — matter-of-fact and practical, as befits the officer in charge of gunnery instruction, and genuinely helpful, as befits the officer in charge of foreign nationals on the post — both of which he is.

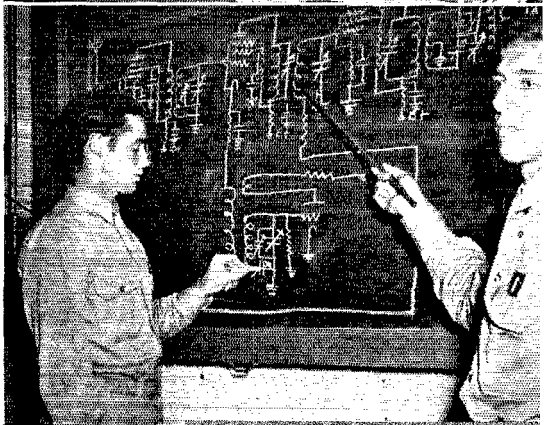
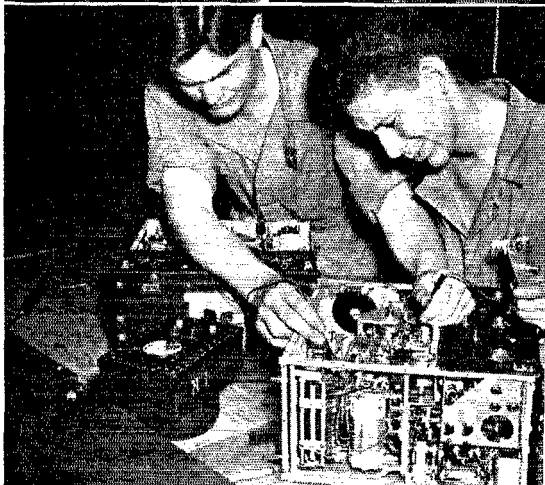
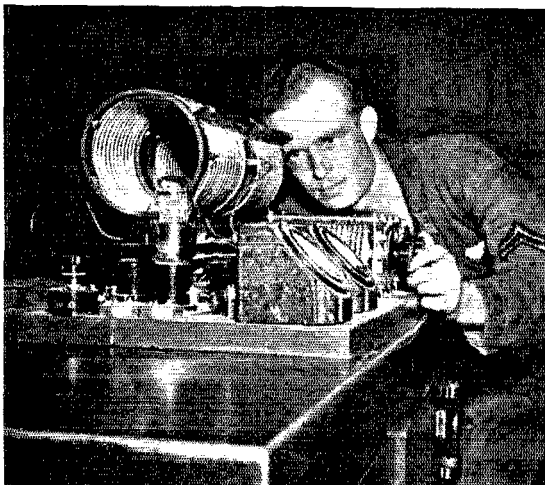
Radio Technician Training

We go first through the RT — radio technician — part of the school. In its essentials the course resembles that previously described for Fort Monmouth¹ although the application differs in many ways.

The course is laid out on the assumption that the trainee, although he has indicated special aptitude, comes to the school with no initial technical knowledge of radio. "They start from scratch," Lt. Kuhns tells us.

¹"QST Visits Fort Monmouth," *QST*, p. 28, October, 1942.

Radio technician training. *Top* — Learning by doing. A Scott Field student practices tuning the breadboard transmitter he has constructed. *Center* — An instructor shows a student how to make a resistance check with a continuity meter. In this lab the instructor takes transmitters and receivers and purposely throws them out of adjustment, after which the students learn to do the necessary repairs. *Bottom* — There's plenty of basic theory, too. Students attend daily lecture periods, illustrated by blackboard diagrams and displays of components and complete sets of equipment. *AAF Technical Training Command Photos.*



There are three principal stages to the training, each with several subdivisions. The classrooms for each of these stages are permanently assigned, and through them the classes move in and out, period after period, in successive shifts. Each instructor sticks to his own specialty.

Associated with each lecture room is its own fully equipped lab. In lab sessions the classes split up into teams, each of which is provided with its own outfit of equipment. The size of the teams varies with the subject, being prorated according to the quantity and character of the equipment available.

During the first part of the training period — known as the radio fundamentals course — the trainees spend much of their time listening to lectures covering basic mathematics as applied to radio, a fairly thorough treatment of d.c. and a.c. theory, and the basic principles of transmission and reception. All of the points brought out in lecture discussions are illustrated with actual equipment — display boards showing typical components, panel demonstration sets of the "dynamic demonstrator" type — and are verified by the experimental assembly of simple oscillators and similar equipment in the lab.

Toward the end of the initial period the lab work is stepped up and the student is carried along into circuit analysis, the use of small tools, soldering and other mechanical operations — the practical side of radio. All materials for this work are, of course, supplied by the school; each lab has its supply room from which the parts, measuring instruments, tools and miscellaneous equipment required for the day are handed out to the men as they file by and sign the required receipt forms.

Each lecture period begins with a quiz covering the previous day's work in both class and lab, and periodic written exams are given. These are all of the multiple-choice type, prepared on standard forms. When "X"-day arrives the instructor goes to the central "exam room," picks up exactly the right number of books for his class, takes them to the classroom and passes them around. At the end of the period he collects the books and takes them

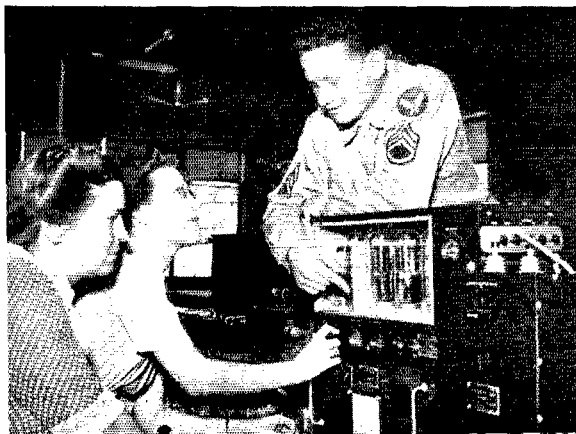
back to the exam room. There the detail permanently assigned to that duty feeds them through an automatic grading machine which delivers the results with complete accuracy in no time at all.

In the second phase of the course the trainee applies this grounding in fundamentals and goes to work upon actual Army radio equipment. He becomes acquainted with the standard command set used both on the ground and in aircraft and with the equivalent universally-standard super-heterodyne receiver, with both low- and high-powered aircraft liaison installations, the radio compass, d/f equipment and even with the "walkie-talkie" and "handie-talkie."

By the time he has finished this work he is a pretty good radio man. He knows the insides of much of the standard Army gear, what the various components do and why, how to use a volt-ohmmeter and an oscilloscope. In fact, he'd probably make a pretty good b.c. serviceman — as he may be called upon to prove by being handed a defunct junk broadcast receiver, from the stock of thousands the school has collected from civilians for just that purpose, and told to make it play.

When he has finished this work he goes on to the final phase — maintenance and inspection and the study of radio instruments. Here he is drilled in the workings of standard Air Forces radio equipment until he knows every screw and nut, every by-pass condenser and resistor, every element of the circuit. He must be able to show the location of any part named (in the dark, if need be), describe its function, draw the portion of the circuit in which it is located — and then go on to complete the circuit diagram for the unit as a whole. He is given transmitters and receivers in which "trouble" has previously been introduced by the instructor — an invisibly-broken connection or a shorted by-pass or an open resistor, or maybe complicated combinations of these — and told to get them going again. He does, too, and usually in a much shorter time than you might expect, thanks to the efficient and time-saving trouble-isolating procedure in which he has been relentlessly drilled.

Scott Field instructors. *Left* — "Can you teach 'em this?" Mrs. Leta Bush, W9DBD, left, and Mrs. Anna Marie Teylin, W9ONW, the first women to be accepted as instructors at Scott Field, get a few points on teaching methods from Staff Sgt. Eugene Slegel. Women are used to relieve soldier-instructors for active duty. *Right* — It's a bread-board — but not the kind you'd expect to see them working on. Kathleen Wiggins and Norma Arras are shown in the basic transmitter laboratory as they train to become radio instructors. *AAF Technical Training Command Photos.*



Frequency check. Students of the aircraft radio division are shown using a frequency meter on a plane installation. They study its operation both in and out of the air. *AAF Technical Training Command Photo.*

If the foregoing sounds like a pretty heavy schedule, remember that it represents only one-half of each day's training. For, as we have said, every radio man in the Air Forces is not only a qualified mechanic, but an operator as well. The training in both fields goes on concurrently. Half of each 7-hour working day is put in on RT training, half on RO.

Radio Operator Training

Lt. Kuhns explains the arrangement as we drive to the radio-operator training unit. Like the other instruction halls we've just viewed, this also is a low one-story red-brick structure. Inside are rooms of varying size, each calculated to hold the maximum number of students practicable for the type of class.

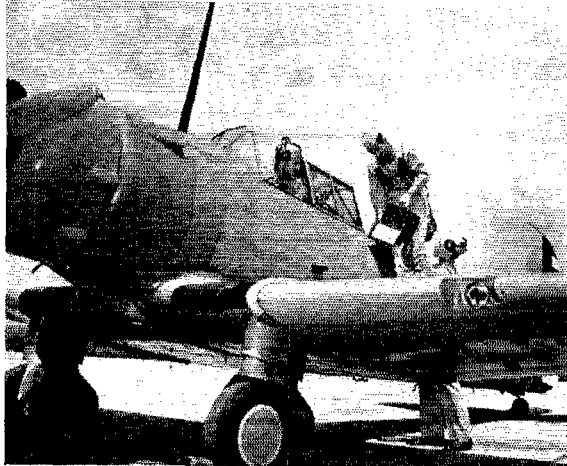
The beginner's classes are largest of all. There are tables for 300 students in a room, 20 to a table. In these rooms they receive basic code instruction for 3½ hours per day, in 10-minute periods punctuated by 5-minute rest intervals. Every student is required to receive a minimum of 16 words per minute before he graduates — or he doesn't. Some, of course, get up to 30 or 40, and a typical class average is usually around 20. Those with previous code experience have an easier time of it, naturally, but occasionally a soldier who had never heard a dot or a dash before will be taking 45 before the 12-week training period is over.

If the 16 w.p.m. requirement sounds low, let us say right now that this is not based on ordinary interference-free "practice-tape" transmission with perfect reception conditions. As soon as the students have learned to copy 16 per straight, they are required to receive through realistic "off-the-air" QRM, taken from an actual receiver and fed into the circuit along with the practice signal. They're also required to receive each other's sending, too — the toughest test of all!

All code practice signals are piped from a master tape room, where the output of a motor-generator is keyed at speeds of 8, 12, 16, 20, 25, 30, 35, 40 and 45 w.p.m. A 20-word tone speed is maintained at all speeds under that level, in accordance with accepted practice.

The Air Forces likes to give the men plenty of sending as well as receiving practice. Not only is the student's sending checked aurally by the instructor, but he is also given an opportunity to study his faults visually on recording tape.

From basic and advanced code practice he goes into preliminary network training. There are 100 positions in that room, each equipped with an individual Echophone receiver which picks up the signal from a transmitter in the room. The student listens to the instructor's transmissions over his receiver, thereby learning how to tune and



gaining practice in on-the-air operation. His own key is connected to a general tone source for the common return circuit, however. In this class he learns network procedure, answers calls and conducts simulated contacts.

The next step is advanced network practice. Each student is given a receiver and his own transmitter in the form of a small medium-frequency oscillator. These oscillators are crystal-controlled, but don't think they don't drift — they do! And the receiving operator must, of course, follow the signal. This is an intercommunication class, and here the students hold their first actual on-the-air QSOs.

Final Training On Actual Installations

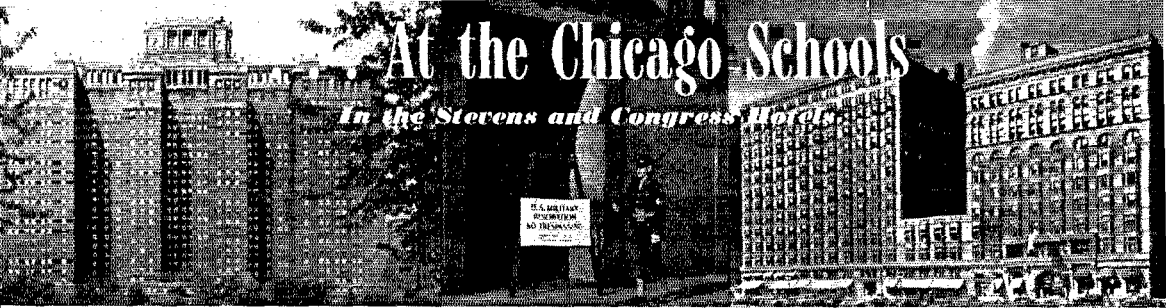
In the final stage of RO practice the keynote is absolute realism. This is one of Lt. Kuhn's pet projects, for he believes that in training there's nothing like working with the real thing. "Lots of times fellows who have only seen sets on a workbench don't even recognize them in an actual installation," he says. "How can you expect a man who has had only classroom drill with small receivers and oscillators to know all the tricks of operating when he encounters a complex aircraft installation out in the field?"

And so, toward the end of the training period the students are given a chance to operate actual field outfits, complete down to the self-powered gasoline generators putt-putting away outside the classroom walls.

As a final touch, they also operate actual aircraft installations in a line of Class 26 planes (the Air Forces' designation for "crackups; beyond repair") lined up along one of the post streets. This stage of the RO training at Scott Field is still in a developing stage. Although there are now a dozen or so more or less intact fuselages of various types on the line, ranging from a B-18 and an A-20 down to the lightplane scouts, it is hoped that soon it will be possible to acquire enough to handle a complete class group, with at least one example of every service craft from a Flying Fortress down.

Incidentally, these ships are used not only for RO practice but to give the trainees trouble-

(Continued on page 118)



THEN we went to Chicago. We went to the Stevens Hotel — but we didn't stop there. We registered, too — but we didn't get a room. There are no rooms for civilians at the Stevens any more.

For the Stevens, the world's largest hotel, and the Congress, its next-door neighbor, together with five other well-known Windy City structures are now the Army Air Forces Technical Schools in Chicago.

It will be hard for many a radio man to think of the Stevens as other than what it was in the Trying Thirties — perennial host to conventions and trade shows. But it's true — the Congress and the Stevens have gone to war.

Let's take a look around. You turn the corner of Randolph Street and walk down Michigan Avenue. The wind is blowing as it always does on Michigan Avenue. Lake Michigan lifts its blue belly up against the sky, and the bustling Chicago traffic hastens up and down the lake shore as it always did.

But then the traffic halts — and the resemblance to things-as-they-were ends. Like Moses and the Red Sea (if we remember our Biblical history correctly) the waves of cars pile up each behind the other. You hear a band playing, and then marching columns of khaki-clad men top the rise of the bridge and cross the Avenue at a steady 120 pace. A sharp "column left" and they disappear row by row into the cavernous mountains of stone that rise sheer from your leaning shoulder.

Yes, the place has changed. The shop windows are filled with collections of radio gear, Air Corps pictures, recruiting posters; the doors are sealed tight. Even the main entrance to the Stevens is closed to visitors; you enter through a small door down at the end. There's no doorman to greet you; only a well-armed guard who looks as though he'd just love to have you start something. And, of course, a coolly efficient receptionist who asks you the usual questions of an Army post, writes the answers on what looks like a department-store sales-slip register, examines your credentials and then telephones to clear the way.

How a Hotel Puts On a Uniform

Everything that made the Stevens look like a hotel has been removed, all the lobby furniture, the carpets, the reception desks — everything but the uniformed elevator attendants and the fact that it is a hotel.

A tour of the building reveals the change even more dramatically. The mezzanine is now the recreation hall, with ping pong tables and wooden seats where once were plush rugs and brocaded chairs. The huge exhibition hall, traditional setting for radio trade shows, is partitioned into dozens of classroom cubicles, with lecture rooms in the center and labs around the perimeter. The beauty parlor is turned into a dispensary. The third-floor ballroom is now a group of classrooms, its ceiling-high mirrors covered halfway up for protection. The Grand Ballroom is the B-19 mess, the "Boulevardier" room the B-17 mess. And the coffee shop — that's still the coffee shop, where visitors may be entertained and where outsiders can buy a meal.

But it is the only exception. Everything else has been converted to exclusively military use. Over in the Congress, the "Glass Hat" room now houses four radio-mechanic classrooms. Yes, the place has changed!

The Stevens and the Congress went into military service on August 1st. It was in July when the Air Forces decided to take over these existing facilities instead of building a huge new camp — with all the time and labor that would entail. From then on events moved fast. At eight o'clock on the evening of the 31st the buildings were still busy, bustling hotels. By ten o'clock many of the guests had checked out. And at midnight the last guest left and the Army moved in.

Events didn't stop moving then, though. First the hotels got their new uniforms — all the hotel trappings were moved out and stored in the Electric Garage nearby. Bunks replaced beds — four in a single room, six in a small double, eight in the large doubles. Carpenters worked around the clock nailing up partitions and tables, electricians strung out miles of BX for electrical connections in the classrooms, mess details set up kitchens to serve a bigger crowd of diners than even the Stevens and Congress had ever before accommodated.

On September 7th classes began. Men from a hundred basic training centers poured into Chicago that morning. Every type and character, every background and level of life, every age from 18 to 50. Two-thirds of them had never been in Chicago before — many had never seen any other really large city, for that matter. Some had never been in a hotel before. From 41 states they came — with Pennsylvania ranking first, followed by Texas and Louisiana. Of this first class, 20 per cent were college students. On the other hand,

"Single with shower facing the lake? Listen, soldier, you'll take what we give you and like it." A sergeant and a corporal operate the "front desk" of what was formerly Chicago's Stevens Hotel. The "desk" is now the billeting office and "locator" desk of the Army Air Forces Technical Training Command's Chicago schools, where thousands of soldiers are training as radio operator-mechanics. *AAF Technical Training Command Photo.*

perhaps half of them had never before been in a building over four stories high.

But there they were — fresh from basic training, ready to learn radio. Preparing for the day when they might join the stars shimmering up there above the gleaming triple peaks of the Stevens. For the day when, perhaps, from a throbbing seat in a bomber cradled in gossamer blue over Africa or the Pacific or Berlin, they might release from their fingertips a message of victory. . . . There was a newspaper columnist from San Francisco in the group, and a lobster fisherman (at least he was until one black night he saw the dark bulk of a Nazi sub rise off his bow). . . . There was a boy who boasted that his brother shot down a Jap at Wake Island, and one whose father is a prisoner of the Japs. . . .

There were a few hams, too. Not many, but a few. Most of the hams in the place are to be found in the roster of instructors, of course. There are plenty of those — some of them youngsters fresh from their books with the dew of learning still wet behind their ears, some trained instructors, others business and professional men (like Dr. Philip C. Weintraub, W9SZW) who renounced profitable careers to do a job that seemed more to need doing just now.

An Army Post in the Heart of Chicago

And that's where you find them — on the first military post to be established within Chicago's municipal limits since the days of Fort Dearborn,



Once a girl called a "floor clerk" sat behind this desk at the Stevens. Now a corporal called a CQ (charge of quarters) runs the show. Each squadron floor has its CQ. He summons the elevators, answers the telephone, keeps many squadron records and reports. *AAF Technical Training Command Photo.*

in 1868. The Stevens and Congress hotels — from the fourth floor up — are their homes. Part of their class rooms are there, too; those for the radio-mechanic courses.

It's hard to visualize an establishment like the Chicago hotel schools in terms of a typical Army post, but the comparison becomes a little easier if you think of a vertical equivalent of the customary horizontal layout. In the ordinary Army camp there are separate buildings for each function and service, spread out over a wide area. Here there are different groups of floors for each function, laid one on top of the other.

For example, post headquarters is located in the Stevens. The entire fourth floor is given over to the executive establishment. The first three floors chiefly contain classrooms and dining rooms (mess halls, we should say). From the fourth floor up to about the 20th are the barracks. There will be a floor occupied entirely by the students of a single unit, then a floor for the permanent details for the groups immediately above and below, followed by another floor housing only students, and so on. The topmost floors are occupied by the officers living on the post, while the 23rd floor is the hospital. (That is, it was when we were there. Subsequently the Chicago Beach Hotel has been taken over by the Army and converted into the station hospital.)

But the hotels are only part of the Air Forces Technical Schools establishment in Chicago. We've already mentioned the Electric Garage. There's the separate Service Building of the Stevens, too. The Wetten Building around the corner houses the quartermaster department. And the old 8th Street Theatre, whence once issued the famous WLS Barn Dance, is now a lecture hall and morale center for the school.

But to arouse the most pungently colorful memories of all there's the historic old Chicago Coliseum, now the scene of the radio-operator training. Under its smoke-grimed dome you see no more the Ringling pachyderms panting from their climb up the long cleated ramp when the circus came to town or the sweating human pachyderms





panting under the floodlights as they slugged and whirled and heaved when wrestling matches (sic) were advertised. Instead of the ring of ice-hockey skates or the snarl of the puma there is now heard the shrill echoes from a score of code machines and the murmurous clatter of relays, overlaying a background of shuffling feet and the punctuated mutter of instructors doling out counsel, criticism and encouragement.

Code Training at the Coliseum

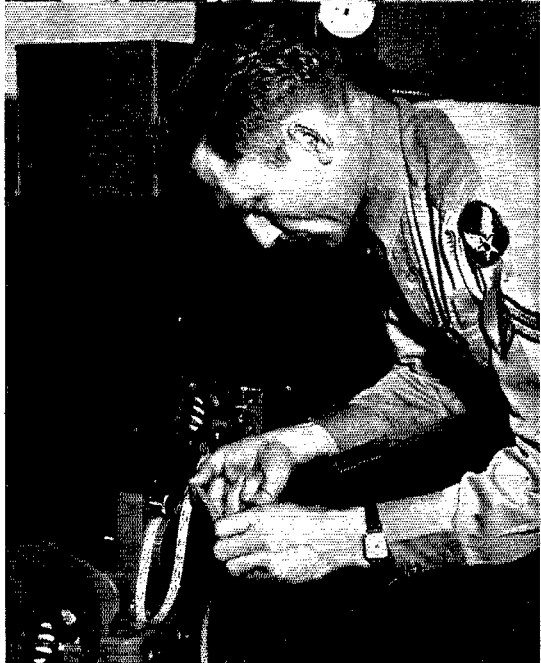
While we're at the Coliseum, how about taking a look around? We find a willing guide in Capt. David Sherman, the supervisor of the radio operating division, who is proud to show us his domain. And well he might be. For out of the shambles of the ancient structure — and it is dilapidated, however historic it may be — he and his hard-working crew have created a clean, comfortable, efficient educational unit. (We could almost say sweet-smelling; they had a little trouble with the part where the elephants lived, but a new floor helped a lot!)

On top of that, they have even managed to apply some new wrinkles to the business of feeding master code instruction from a central source, and in particular in developing ultra-flexible switching combinations for intra-class transmission and reception.

First of all, let's look at the layout as a whole. The main arena is partitioned off into fourteen good-sized classrooms. Three of these are ceilinged and are used for lecture purposes; the others just have walls. The classrooms are arranged in double rows, with corridors between each and down the center. The classroom group stands in the middle of the arena, with ample passage-way between it and the arena walls. It is in these circumferential regions where the students march to and from classes; the inner corridors are used only by instructors, to avoid traffic congestion.

The classrooms are equipped with half a dozen or more code-instruction tables — each 25 feet long and 4 feet wide, accommodating twenty students. Each student has his own set of headphones and key, of course, all interconnected

Learning the code at Chicago. *Top* — One of the fourteen code classrooms in the historic Chicago Coliseum, now a school building for the Army Air Forces Technical Training Command's Chicago Schools. Twenty students to a table, each with its own instructor, 10 tables to a room, adds up to well over one thousand men learning the new language of the International Morse code in a single class. *Center* — An instructor adjusts the "dit-dah" tape on one of the twenty automatic code sending devices which provide as many different code speeds for the fourteen radio operating classrooms in the Coliseum. *Bottom* — "Number, please?" You're wrong — he's not a telephone operator. The corporal is changing the circuits on the code-speed control board which supplies all the radio operating classrooms. Through this board flow code-practice transmissions all day long at 20 different speeds. Instructors in the 14 classrooms cut in for the speeds they want. *AAF Technical Training Command Photos.*



through a switchboard at the head of the table. There the instructor with his three rows of jacks can tie any or all into a common receiving circuit, supply any or all with instruction from the central code room at various speeds, interconnect positions by pairs or fours or sixes or more, listen to any student individually during sending practice or transmit to him alone — etc., etc.

There is an instructor for every table — i.e., for every twenty men — and this same instructor sticks to his group from start to finish of their training. A chief instructor supervises the work in an entire room, and he, of course, reports in turn to Capt. Sherman.

Training from 4 to 40

This seems like a good time to ask a few questions about the training, and we do. We learn that each man receives code training for two 90-minute periods per day, with a 30-minute break in between. In each period an hour and a quarter is devoted to receiving practice and a quarter of an hour to sending. He is expected to progress from the initial 4 w.p.m. to a minimum of 20 w.p.m. during the course. Many, of course, get well past 20, and there is plenty of demand for the 30-, 35- and even 40-w.p.m. speeds.

Leaving the arena, we climb upstairs to the balcony — or at least what was the balcony. Now a floor has been built out level with the rear deck, extending a few feet beyond the old limits of the balcony, from which point a wall has been erected to the ceiling. This arrangement substantially increases the available space. In it we find the facilities for advanced network training being set up.

(Here we pause a moment while it is explained that, in this first class at the Chicago schools, the staff has often of necessity been only one jump ahead of the class. While one phase was being taught the next was being prepared. If they had waited until everything was complete, the start of classes would have been delayed for weeks. As it was, the work of preparation went on simultaneously just a step ahead of the training.)

In this network-procedure class on the balcony the future Air Forces operators will receive the equivalent of on-the-air training — operating actual transmitters and receivers, several hundred of them, on a dozen frequencies.

Also on the balcony, in the booth that was formerly the p.a. control room in the carefree carnival days, is located the code center. In it we find a score of McElroy tape-pullers busily clacking away, keying the output of the 450-cycle motor-generator at different speeds. The output of each of these is fed to every code table, where the instructor has his choice not only of speeds but of material. There's a "talk-back" circuit, too, so he can request a different tape if he feels so inclined.

(Continued on page 108)



A hotel joins the Army. *Top* — One spot that hasn't changed much is the former Stevens Hotel pharmacy, now an army exchange. It's "soldiers only" now, but like the civilians before them they can "catch a smoke," grab a sandwich and a malted, shop for drugstore items or something nice for the girl back home. *Center* — Five thousand students can be fed three times a day here, in what was once the Grand Ballroom of the Stevens Hotel. It's now the B-19 mess (named after the world's largest land-based bomber). *Bottom* — He's on the 18th floor of the world's largest hotel, but this soldier can't squawk about the maid service. There are four men in a single room in Unit No. 1 of the Army Air Forces Technical Training Command's radio school. *AAF Technical Training Command Photos.*

A 112-Mc. Transmitter-Receiver

Another Station Assembly for WERS

BY ARTHUR H. LYNCH,* W2DKJ

The 112-Mc. transmitter-receiver shown in the photographs was built by W2DKJ for the WERS unit in Nassau County, N. Y. While it requires components not found in the average junk box, it is sturdily built and has several useful constructional features. It should hold special interest for members of the pre-war u.h.f. gang who don't have to look too far to find the required material.

LIKE most other hams left at home, we felt that the formation of the local WERS unit gave us an opportunity to contribute something substantial to the war effort. We were luckier than some, however, in that our special interest in u.h.f. communication before the war had resulted in the accumulation of a supply of good low-loss components. Since we figured that the best could not be too good in the event of an emergency, we decided to take advantage of this gear rather than throw something together from cast-off junk-box parts while the good stuff collected dust on the shelf.

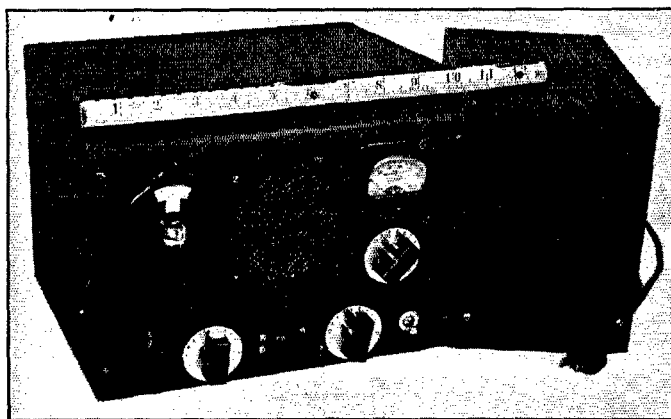
Therefore, in the circuit diagram of the transmitter-receiver in Fig. 1, we find a 955 acorn tube as the self-quenching superregenerative detector, while the transmitter section is built around an HY75. Each of these circuits is coupled to the output terminals by a low-impedance link (L_1 and L_2). The acorn as a detector not only is more

efficient than a conventional tube such as the 6J5, but also will operate satisfactorily at a much lower plate voltage, thereby reducing receiver radiation. The padder condenser, C_1 , is for the purpose of adjusting the tuning range of C_1 to cover the band. R_{11} is the regeneration control.

The audio section, consisting of a 6J5 resistance-coupled stage and a 6V6 Class-A output stage, is used both as an audio amplifier, feeding the 3-inch p.m. dynamic speaker, and as a modulator for the transmitter. The use of the transceiver transformer at the input of the audio section makes it unnecessary to switch the input back and forth between the microphone and the detector output; the separate windings for each permit both to be permanently coupled. When transmitting, the output of the detector is cut off by opening the cathode circuit, while the microphone circuit is opened up during the receiving periods. Separate gain controls are provided for the audio amplifier in the receiving and transmitting positions, so that speaker volume and microphone gain may be adjusted independently to the desired levels.

A 4-p.d.t. switch, S_1 , takes care of all switching operations in changing over between transmitting and receiving positions. In the receiving position, the antenna input is connected to the detector, the detector cathode circuit is closed, the grid of the 6V6 is connected to the receiver volume control and the output of the 6V6 is connected to the speaker input transformer. In changing over for transmission, the antenna input is connected to the transmitter, the microphone

*43 Transverse Rd., Garden City, N. Y.

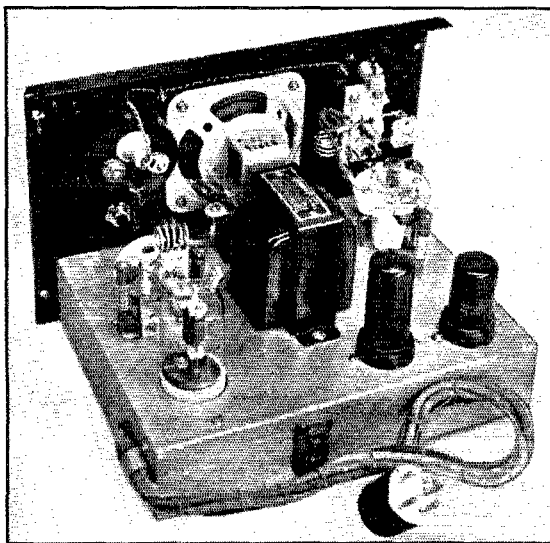


W2DKJ's 2½-meter transmitter-receiver in its cabinet and the power-supply unit. The dial at the left is for tuning the receiver, while the transmitter tuning control is immediately under the plate milliammeter. Along the bottom, from left to right, are the detector regeneration control, the receiver audio gain control, the change-over switch, and the transmitter audio gain control. The toggle switch shown at the right was later replaced by the microphone jack.

circuit closed, the grid of the 6V6 connected to the microphone gain control and the output of the 6V6 connected in series with the plate-voltage lead to the HY75.

In planning the construction of the unit, we decided to sacrifice some economy in size in order to gain in mechanical stability and circuit isolation, as well as to facilitate adjustments and servicing. We have seen too many of these highly-compact units with most of the components hanging off the tuning condenser like Christmas-tree ornaments. In some of these little 2×4 units it is all but impossible to get in among the resistors and by-pass condensers to make proper adjustments of the tuning inductances. We've seen

tube in the detector is quite unique. The ceramic acorn socket is mounted on an inverted Johnson No. 20 stand-off insulator. The holes in the mounting feet of this insulator are spaced exactly right to match the mounting holes of the National type XCA acorn socket. The recess in the stand-off provides room for the projecting glass bottom of the tube and protects it from injury. The screw at the terminal end of the insulator is used for mounting the assembly on the chassis. This brings the tube socket $1\frac{3}{4}$ inches above the chassis, where there is just room to squeeze the grid condenser, C_3 , between the grid terminal of the tube socket and the stator terminal of the tuning condenser, C_1 , which is mounted on the panel with spacers at three of the four corners. It is placed on the panel so that the shaft is $2\frac{3}{4}$ inches above the chassis and 2 inches from the edge of the panel. A couple of short pieces of wire serve to connect the padder, C_2 , in parallel with C_1 and to mount it with its adjusting screw toward the rear so that it may be reached with a screwdriver after the unit is placed in the cabinet. The rotor of C_1 is grounded to the panel through a soldering lug under one of the condenser mounting screws. The other upper mounting screw holds a bracket for the dial light. The coil, L_2 , is soldered directly across the rotor and stator terminals of C_1 . The two-turn antenna-coupling link is fastened in place

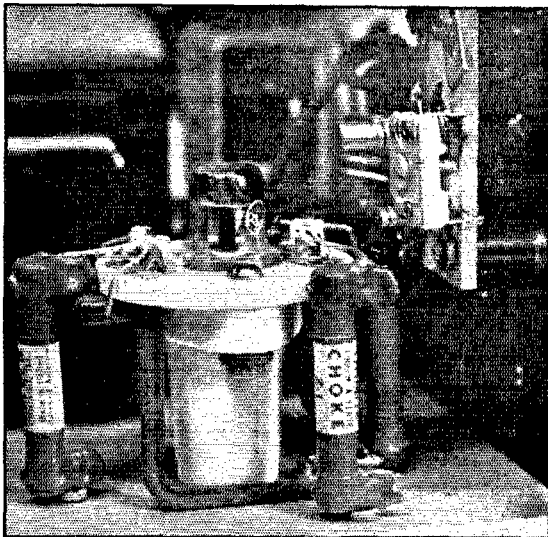


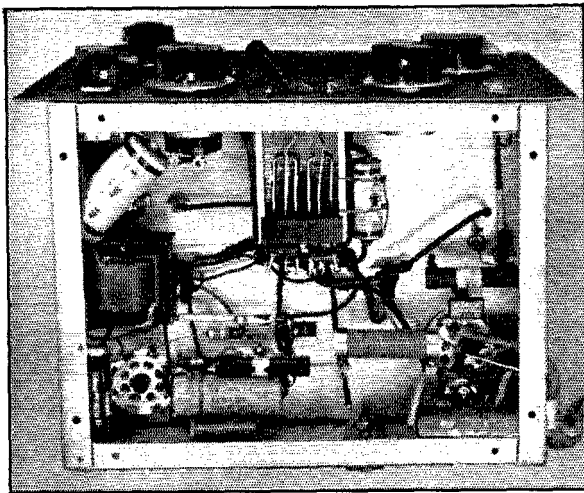
Left—Plan view of the transmitter-receiver. The acorn detector assembly is at the right and the transmitter oscillator at the left.

Below—Close-up view of the detector assembly, showing details of the tube-socket mounting.

some outfits with transmitter and receiver circuits so closely coupled that the tuning control of the receiver had almost as much effect upon the transmitter frequency as the transmitter tuning control itself! A little extra space gave us an opportunity to avoid these evils and permitted us to anchor the parts down in a good solid manner. In actual operation, the larger unit is much to be preferred, since we have sufficient space for controls of convenient size and the extra weight will hold the unit down on the operating table.

The chassis, which is of standard $7 \times 9 \times 2$ -inch size, has adequate space for all components without crowding. Viewed from the rear, the detector occupies the right-hand side of the chassis while the transmitter oscillator is at the left. The audio equipment makes use of the space at the center between the two r.f. units. The mounting for the 955 acorn





Bottom view of the W2DKJ transmitter-receiver. The transformer at the left is the transceiver transformer, T₁. The change-over switch is at the center.

above L₁ by soldering one end to the grounding lug mentioned above and the other end to one of the mounting screws of the acorn-tube socket which serves as an insulated anchorage. A wire

then goes from this anchorage down through a small polystyrene feed-through insulator in the chassis to the proper change-over switch terminal underneath.

The two u.h.f. r.f. chokes in the detector circuit are mounted vertically from the plate and cathode terminals of the tube socket, their lower ends being supported on small fibre washers, while connections to the lower ends of the choke windings are made with push-back wire passing through small holes in the chassis under the washers. The grid leak, R₁, and the bypass condenser, C₄, are soldered directly between the socket terminals and the chassis, while C₅ is soldered across the filament terminals of the socket.

Since both sides of the transmitter tuning condenser, C₉, are "hot," the components comprising the transmitter section are grouped back from the panel to reduce hand-capacity effects when tuning. The shaft of the condenser is

extended to the panel by using an Isolantite flexible shaft coupling and a section of 1/4-inch bakelite rod. The condenser is mounted on the chassis by means of a small piece of angle brass.

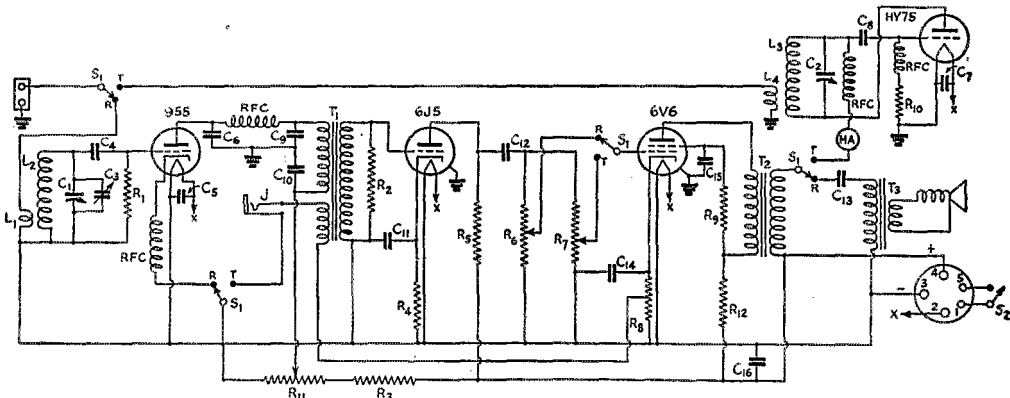


Fig. 1 — Circuit diagram of the W2DKJ transmitter-receiver.

- C₁, C₂ — National UM15 midget variable, with all but I stator and 1 rotor plate removed.
- C₃ — 30- μ fd. mica trimmer (National M-30).
- C₄ — 50- μ fd. mica.
- C₅, C₆, C₇, C₈ — 100- μ fd. mica.
- C₉ — 0.006 μ fd.
- C₁₀ — 0.5- μ fd., 200-volt paper.
- C₁₁ — 10- μ fd., 25-volt electrolytic.
- C₁₂, C₁₃ — 0.1- μ fd., 400-volt paper.
- C₁₄ — 25- μ fd., 25-volt electrolytic.
- C₁₅ — 0.25- μ fd., 400-volt paper.
- C₁₆ — 8- μ fd., 450-volt electrolytic.
- R₁ — 2 megohms, 1/4-watt.
- R₂, R₃ — 0.25 megohm, 1/4-watt.
- R₄ — 2000 ohms, 1/2-watt.
- R₅ — 0.1 megohm, 1/4-watt.
- R₆, R₇ — 0.5-megohm potentiometer (Centralab 103).
- R₈ — 500 ohms, 10-watt, with variable tap.

- R₉ — 30,000 ohms, 1-watt.
- R₁₀ — 5000 ohms, 10-watt.
- R₁₁ — 50,000-ohm potentiometer.
- R₁₂ — 2000 ohms, 25-watt.
- L₁, L₄ — 2 turns No. 16 insulated wire, 3/8-inch diameter.
- L₂ — 4 turns No. 16 wire, 1/2-inch diameter, turns spaced approximately the diameter of the wire.
- L₃ — 5 turns No. 16 wire, 1/2-inch diameter, turns spaced approximately the diameter of the wire.
- MA — Milliammeter, scale 0-100 ma.
- RFC — U.h.f. r.f. choke (Ohmite Z-1).
- S₁ — Poles of 4 p.d.t. switch (Federal anti-capacity).
- S₂ — Volume-control power switch on R₆.
- T₁ — Transceiver transformer (Thordarson T72A59).
- T₂ — Modulation, approximately 10,000 ohms primary to 5000 ohms secondary, 10-watt (Thordarson T17M59).
- T₃ — Universal speaker transformer.

The panel bearing for the shaft extension is $1\frac{1}{4}$ inches above the chassis and 2 inches from the edge of the panel in line with the center of the milliammeter immediately above. L_3 is mounted by soldering it across the terminals of C_2 . The two r.f. chokes shown in the transmitter circuit are mounted either side of the tuning condenser. The HY75 is placed close behind this assembly, with its socket submounted on angle pieces to lower slightly the grid and plate terminals at the top.

The modulation transformer, T_2 , is mounted at the center of the chassis immediately behind the chassis, while T_3 is fastened underneath the speaker. Sockets for the two audio tubes are submounted along the back edge of the chassis at the right. The three-inch speaker opening is cut out at the center of the panel, with its center $4\frac{3}{8}$ inches above the bottom edge of the panel.

Underneath, along the front edge of the chassis, from left to right are the regeneration control, R_{11} , the receiver audio control, R_4 , the change-over switch, S_1 , the transmitter audio gain control, R_7 , and the microphone jack. The latter must be insulated from the chassis with fibre washers. The transceiver transformer, T_1 , is fastened to the left-hand edge of the chassis. A jack terminal strip (National FWJ) is located at the rear edge for making convenient connections to a low-impedance line to the antenna.

Exact placement of resistors and most of the fixed condensers underneath the chassis is unimportant. However, C_7 should be connected across the tube-socket terminals and C_9 should be placed close to the r.f. choke. All components should be tied down securely, either by soldering with short leads or fastening with cord or wire so that there will be no chance of anything working loose with rough handling.

The unit is designed to operate from any power pack, a.c. or vibrator pack, delivering about 300 volts, 100 ma. Power-plug connections for both types are shown in Fig. 2. Connections between the power-supply and the transmitter-receiver are made through a short cable and 5-prong plug. Two of the cable wires are for the power-supply control switch, S_2 , which is combined with the receiver audio-gain control, R_4 . Since the battery current is quite heavy with vibrator-pack or genemotor operation, it would be advisable to omit connections for this switch on the power socket when this type of supply is used and simply use one of the battery clips for the power switch. The switch in the unit will be entirely satisfactory for a.c. operation. If the battery pack of Fig. 2-B is operated from a car battery in portable-mobile work, the polarity with which the storage battery is connected will depend upon which side is connected to the car frame. In the diagram, the positive side of the storage battery is shown connected to ground and to the negative side of high voltage. In some cars, the negative side of

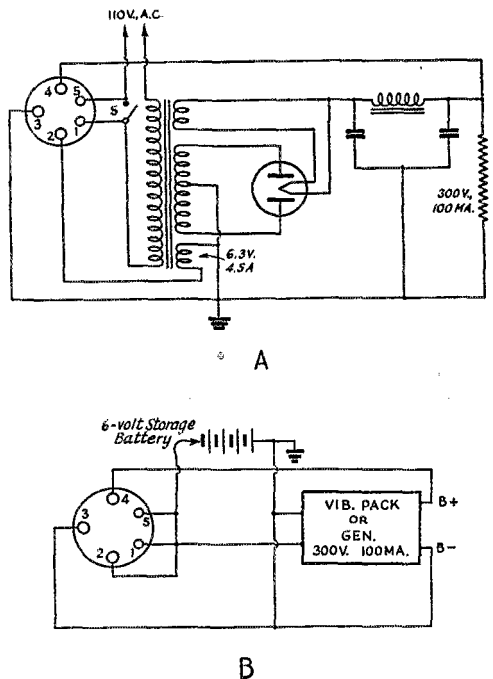


Fig. 2 — Power-supply connections. A shows connections for an a.c. supply. The switch, S , may be added as an auxiliary control at the power pack. With the battery pack of B, whichever is the grounded side of the battery should connect to negative high voltage.

the battery is connected to the frame; in this case, the negative side of the battery will, of course, then connect to negative high voltage.

When operating at a plate voltage of 300, antenna coupling may be adjusted to load the HY75 up to a plate current of about 60 ma. The remainder of the power-supply capacity will be consumed by the audio section.

Missing in Action

THE following amateurs have been reported missing in action:

- P.O. N. K. Adams, R.A.F., G5NM, London, England
- Flt. Sgt. J. D. Cameron, GM8CN, Peeblesshire, Scotland
- L.T. H. V. Prince, G3UF, Halifax, Yorks.
- G. T. Slawson, VK2AFN, Harbord, N.S.W.
- Lt. Col. T. C. Whimster, G8UJ, Pontefract, Yorks.

Don't let your operator license expire!

The Arabic Telegraphic Alphabet

Reading Radio Code in Another Language of War-Time Importance

BY W. H. WORRELL,* WBSKW

AS THE spread of global war to include all races and lands increases the internationalization of our thinking and planning, knowledge of the languages and customs of hitherto remote points on the globe becomes increasingly important. In the specific field of radio communication, the need for operators capable of transcribing messages transmitted in foreign tongues is obviously a significant one.

So long as the language to be copied is based on the familiar Latin alphabet, the problem of training operators for such duty is not too difficult. The difficulty arises in connection with languages employing other types of alphabets, such as the Japanese or Arabic.

The system used for transmitting the Japanese language in radio code has already been described in *QST*.¹ In recent weeks the Arabic tongue has achieved a new importance in our war program, for it is the language of all that country in the current theater of operations, from Morocco to the borders of Persia. Indeed, next to the Latin the Arabic alphabet is probably the most important one there is, furnishing as it does the alphabets of most of the languages commonly used in Northern Africa and Western Asia.

Although quite as difficult a language as the Japanese, Arabic as transmitted by code is much more easily transcribed because it is represented in a relatively simple alphabet comparable to the Latin, having only 28 characters. This does not mean that it can be sent by the standard Morse alphabet, however, because, although the number of characters is similar, the alphabet itself is quite different.

Telegrams in Arabic cannot be transmitted by means of the International Morse telegraphic alphabet because Arabic employs sounds for which there are no characters in the Latin alphabet. Beyond that, Arabic employs sounds which, though they do occur in European languages, cannot be represented by single characters of the Latin alphabet. This is felt to be inconvenient, because they are represented by single characters in the Arabic alphabet. Twenty-eight consonants and three long vowels have to be expressed, while the three short vowels, though necessary to the sense, are left unexpressed because they can be supplied from the context by anyone who knows the language.

Telegrams in Arabic are sent over the land wires within Arabic-speaking countries, and when they are so sent they are expressed in a special Arabic telegraphic alphabet. Telegrams in European languages are sent over the land wires within and beyond Arabic speaking countries, and by radio from Arabic speaking countries to countries employing European languages; and when they are so sent they are expressed in the common International Morse telegraphic alphabet. If telegrams were sent by radio in the Arabic language they would have to be couched in the Arabic telegraphic alphabet.

Fourteen Arabic letters represent sounds practically identical with common European language sounds, and are therefore represented by the common International Morse signs: ā, b, d, f, ĩ, ĵ, k, l, m, n, r, s, t and w. To these may be added q, for historical reasons.

Another lot of twelve Arabic letters represents sounds which do not occur, i.e., with a meaning, in European languages: ' , ĥ, ğ, đ, ž; or which are not represented by single Latin letters: th, kh, dh, gh; or which are felt to be identical with some in the first list: ũ (w), y (İ). All of these are represented by common International Morse telegraphic signs, but with unfamiliar values: ' . ĥ ž đ th kh dh gh ũ y

A third group, z and h, represents familiar European sounds, but now receives special telegraphic symbols because the common symbols for these Latin letters had been used up: h , z To this may be added the digraph, sh

Lastly, one letter represented a non-European sound for which a new telegraphic symbol had to be invented, because the characters of the International Morse had been used up: '

The complete Arabic telegraphic alphabet therefore is as shown in the following chart with code characters first, followed by the Arabic letters and Latin equivalents. The chart reads in lines, i.e., from left to right.

---	ا	ā	•	ع	•	ب	b	---	ت	t	
---	ث	th	---	ج	j	...	ح	h	---	خ	kh
---	د	d	---	ذ	dh	---	ر	r	---	ز	z
...	س	s	---	ش	sh	---	ص	s	---	ض	d
---	ط	t	---	ظ	z	---	ع	c	---	غ	gh
---	ف	f	---	ق	q	---	ك	k	---	ل	l
---	م	m	---	ن	n	---	ه	h	---	و	w
..	ی	y	---	آ	ā	---			---	ؤ	w.ü

* 2 Hillside Ct., Ann Arbor, Mich.

¹ Millikan, "The Japanese Morse Telegraph Code," *QST*, September, 1942, p. 23.



U.S.A. CALLING!



CIVILIAN INSTRUCTOR POSITIONS

UNDER a new announcement with completely modified requirements, the Civil Service Commission is seeking men and women Student and Junior Instructors for both the Army Air Forces Technical Schools and the Navy Aviation Service Schools. Student Instructors receive \$1620 a year, Junior Instructors \$2000.

Student Instructors will themselves be given training in radio operating, engineering, or shop work for a period of from three to six months. Those who successfully complete such training will be promoted to Junior Instructors and assigned to teaching duties at an appropriate school. All applicants must be high-school graduates or have completed at least fourteen units of high-school study. Student Instructors can qualify through completion, in addition, of one year's study in a college; through one year's progressive technical experience as radio operator, engineer, or maintenance and repair man; through completion of technical courses (six months) in a radio school or a radio war-training course; or through possession of an amateur or commercial operator license.

Additional training or experience is necessary for original appointment in the Junior Instructor position: an additional six months of progressive technical experience; six months of full-time or one year of night-school experience in teaching radio; or possession of a college degree in electrical engineering.

No written test is required. Applicants' qualifications will be judged from their record of training or experience. Minimum age, 20; no maximum age limit. Qualified persons are urged to file their applications at once with the Secretary, Board of Civil Service Examiners, at Chanute Field, Rantoul, Ill. It is useless for persons subject to early draft call to apply, and applications are not sought from persons engaged in war work unless the change would result in utilization of higher skills. Applications will be accepted until the needs of the service have been met. The forms for applying may be obtained at any first- or second-class post office or from the Civil Service Commission, Washington, D. C.

"HELP WANTED, FEMALE"

THE U. S. Army needs 200 women at once for interesting work in a confidential capacity in or near Washington. This is Civil Service work with salaries ranging from \$1440 to \$2000 according to age and capability. Age limits, 18 to 40,

married or single. Previous knowledge of radio is desirable but not necessary. For further information write, with particulars on yourself, to Mr. George W. Bailey, 2101 Constitution Ave., N. W., Washington, D. C.

As we go to press, all of the other opportunities for women mentioned in this department, on page 28 of December *QST*, are still open.

1000 RADIO OPERATORS NEEDED

THE Army Airways Communications System, which operates airways communications services for the Army Air Forces, has an urgent need for 1000 high-speed radio operators at once.

This is an organization which should prove attractive to many young radio operators as this system, among other communications services, provides airways communications for air ferry routes which operate throughout the four corners of the globe.

Although initial enlistment in the Army Air Forces for duty in the AACCS is in the grade of private, higher grades are available to those who display the necessary ability and interest in their work, and the way is open to Officers Candidate School. High-speed radio operators should consider the opportunities offered by the AACCS, not only for active and interesting service during the war but for the experience obtained to qualify for important positions in the many new commercial airways systems which will be established at the end of the war.

Operators should address their inquiries to the Control Officer, Army Airways Communications System, Operating Division, Directorate of Communications, Bolling Field, D. C.

ARMY COMMISSIONS IN U.H.F. WORK

COMMISSIONS from civil life have become tough to get—except for men qualified for work with the new secret devices. The Electronics Training Group of the Signal Corps continues in need of more and more officers. If you can qualify for this work you will probably find it the most important thing you can do in the war, its instruction the most interesting and having the greatest post-war value to you.

Since those appointed as second lieutenants for this work are given extensive special training, the standards are necessarily high: Candidates must be in prime physical condition, between the ages of 16 and 46, graduated from an accredited college with a degree either in science (with an electronic-physics major) or electrical engineering

(preferably in communications). On the practical side, commercial engineering experience or the possession of an amateur license will help a lot to get a man appointed.

The ARRL president, G. W. Bailey, W1KH, is secretary of the committee on scientific personnel of the Office of Scientific Research & Development. One of his major duties is to pass upon the technical capabilities of candidates for these appointments in the ETG. He will be glad to enter into correspondence with potential applicants and to supply further information. Men who are just now about to come up for the draft are particularly invited to write. Those interested in this opportunity may exchange particulars with Mr. Bailey at 2101 Constitution Ave., N. W., Washington, D. C.

NAVY AV(S) OFFICERS

THE only opportunity that we know about this month for direct commissions in the Navy is as Aviation Volunteer (Specialist). These officers deal with the installation and operation of some very special air-borne radio equipment. In many respects this work resembles the Signal Corps' ETG. Radio training and experience are absolutely necessary for these appointments, and at least some college education is required. The best candidates are the holders of electrical-engineering degrees or their practical equivalents, particularly those who have had communications experience, and especially in u.h.f. The age limits are 19 to 50. Initial appointment is generally as ensign, although a higher rank may be available for the specially-qualified.

Further information may be had by direct correspondence with the Commandant of your Naval District; or you may write for advice to G. W. Bailey, 2101 Constitution Ave., N. W., Washington.

MARINE CORPS AWS OFFICERS

APPOINTMENTS as commissioned officers in the Marine Corps Reserve, for assignment to special aircraft-warning duties, are offered men holding bachelor degrees in electrical communication or radio engineering. College graduates with special training in physics and math are also eligible. In some cases, candidates with two years of credits at a technical institution of recognized standing, plus considerable practical experience in these fields, will be accepted. The age limits are 20 to 45.

The usual appointment is as second lieutenant — which, with allowances, equals an income of \$2600-3000, plus allowance for uniform. Commissions in higher grades may be awarded applicants with exceptional qualifications. Physical defects which normally would be disqualifying may be waived in some cases. Men with dependents may be commissioned, and correspondence is particularly invited from qualified III-As.

Officers selected for this work, after the usual brief indoctrination in customs of the service, attend a special course of instruction on AWS equipment at one of the service schools. This means three to six months' training with this gear. They will then be assigned to Marine Corps units to supervise the operation and maintenance of such equipment, and will be charged with the organization and training of aircraft-warning personnel and units for both ground and air forces.

Prospective candidates should apply in writing to The Commandant, Headquarters, U. S. Marine Corps, Washington, D. C. If uncertain about your qualifications, write for advice to G. W. Bailey, 2101 Constitution Ave., N. W., Washington.

MEMO TO GOVERNMENT ENGINEERS

MEN who are now in the Civil Service and who are interested in accepting a commission in the Signal Corps' ETG, the Navy's AV(S) or the Marine Corps' AWS (on all of which there are items hereinabove) are advised that they are obliged to obtain a release from the federal agency which employs them before being authorized to sign an application for commission. This in no wise bars correspondence and investigation of these opportunities for commission, and it is also probable that an oral inquiry will show whether or not a release is obtainable.

OPPORTUNITIES IN THE MARINE CORPS

EXPERIENCED radio operators, technicians and repairmen are urgently needed for service in the Marine Corps.

Appointments in the Marine Corps Reserve with initial rank of staff sergeant have been opened to qualified men between the ages of 17 and 35, with the assurance that they will be assigned to aircraft-warning maintenance duties. The pay of staff sergeants ranges from \$96 a month, in addition to food, shelter, clothing and medical care, upward to \$181.25, including allowances. Candidates for appointment must be high-school graduates and must hold or have held an amateur operator's license, Class A or B, or a commercial radiotelegraph or radiotelephone operator's license, 1st or 2nd class. Men with experience in high-frequency experimentation, and others with professional experience in repair or service work, can take radio-mat'riel examinations before enlistment to determine whether they are qualified as candidates. The examinations cover arithmetic, algebra, shop practice, physics, electricity and radio. Application for the examination should be made at the nearest Marine Corps district recruiting office.

Men accepted will be transferred at once to a signal battalion for assignment to a special course of training in maintenance of aircraft-warning

equipment. Those not completing the course will be released from the Marine Corps if they so desire, or assigned to general duty at appropriate rank.

Men who meet the above requirements, but who are not high-school graduates, may be enlisted as privates in the regular Marines or Marine Corps Reserve with the assurance that they will be assigned to general communications duty if found qualified. Some of the candidates will be trained in civilian schools.

During assignments to duty outside the United States, all NCOs and enlisted men receive a 20 per cent increase in their base pay.

Prospective candidates for the appointments described above may apply to the nearest Marine Corps recruiting officer, or by letter to The Commandant, Headquarters, U. S. Marine Corps, Washington.

NAVY ENLISTMENTS FOR COLLEGE GRADUATES

THERE are two classes in the Naval Reserve which are open to college graduates who wish to enlist in the Navy and receive special training. This is not strictly a radio matter, the training leading to commissions in any division of the Navy, such as deck and engineering officers, aviation, public relations, etc., but it does also include communications commissions for those so qualified.

The first is V-7, which is available to men between the ages of 18 and 28, who have a college degree in arts, science or engineering from an accredited institution. Applicants who are selected enlist as apprentice seamen and serve for one month's indoctrination period. They are then made reserve midshipmen and are given three months' special training. Upon completion of this training they are commissioned ensigns in the USNR.

Special schools for reserve midshipmen are maintained at Columbia, Notre Dame and Northwestern universities. Candidates in the group assigned to Columbia, who have engineering degrees, are sent to the training ship *Prairie State*, nearby, for special training.

There has been no relaxation in the physical requirements for V-7 for general service, but the Navy has recently announced the creation of a new V-7 classification which enables college graduates with slight physical defects to apply for special technical service. Height requirements have been lowered to 5' 4"; vision to 12/20, corrected to 20/20; and weight to 124 lbs., if it is in proportion to the height.

The second classification is V-11, which is open to college graduates 28 years or more of age. Candidates in this group who are regarded as officer material, enlist, with the approval of naval authorities, as apprentice seamen and in this status receive a month's training and are then

commissioned probationary officers in the Naval Reserve, rank depending upon age and qualifications. They then receive additional training of two to four months, depending upon ultimate assignment, usually at Cornell University.

For further information, applicants should visit or write the nearest Naval Officer Procurement Office. If the address of this office is not known, it may be obtained from G. W. Bailey, 2101 Constitution Ave., N. W., Washington.

WOMEN WANTED FOR THE SPARS

THERE is a new woman's auxiliary — this time for the Coast Guard. It is called the SPARS, its name deriving from the Coast Guard motto "*Semper Paratus — Always Ready.*" The SPARS are organized on the same basis as the WAVES, for shore duty which relieves men for service afloat, and they are now seeking both officers and enlisted women.

To be an officer, a candidate must have a college degree and be between the ages of 20 and 50. Enlisted women for communications duty must be high-school graduates, possess an FCC operator license, and be between the age limits of 20 and 36. Special schooling will be provided at Madison, Wisconsin, which is also the home of a big school for WAVES.

Further information can be had from any Navy Recruiting Office, although officer candidates will get fuller information from a Navy Officer Procurement Office.

FLASH: ENLISTMENTS STOPPED

The items herein which refer to enlisted service are automatically canceled by the President's Executive Order of December 5th. We publish them because there may be certain modifications of this restriction in future. And please note that applications for commission from technically-qualified men are still being considered.

THE SPECIALIST CORPS IS DEAD

FOR a variety of reasons, the War Department found its experience with the Army Specialist Corps unsatisfactory and that corps has ceased to exist as such. Its files of applications have been turned over to the Army, but we doubt that applicants will ever hear anything more about it. We believe ASC to be a thoroughly dead duck, and we advise applicants to put no faith in their pending applications but to start anew in some other field. Men already commissioned in the Specialist Corps are being offered commissions in the Army of the United States provided they comply with all the standards, including the physical. Thus a lot of paper work for a lot of people comes to a sad ending.

The "Traffic Cop" Transmitter

A Compact and Economical 200-Watt Rig for the Traffic Man

BY PAUL J. PALMER,* W8UGR

"Hi there, fellers," said Tuffy 6L6G. "Wot's cookin'? Since 8QBW's gone I ain't had so much t'do, but dis guy 8UGR, one of Fred's stooges — he's got me scratchin'. Wow! He's makin' me feed a coupla dependents wid only a li'l more income than Fred usta sling at me. But boy, oh boy — kin me'n' tha kids sure dish it out now! Boleave muh, buddy, dis li'l rig kin soitenly go v' town — and say, pal, it won't cost ya a century, neider. All ya need's a coupla two-buck-'n'-a-half tubes and a li'l bigger power house. Well, anyhow, let P. J. spill it. Thotcha'd like t' be woikin at sumpin' while sittin' tight, or are ya?"

This little rig was built in memory of one of the finest hams that ever lived. Fred Sutter, W8QBW-QDK, who joined *Silent Keys* a little while ago after helping the little fellow out with his many fine "QSL" rigs. His ideas of small size, unit construction and simplicity have been carried out, and the complete job requires very

little more equipment than did Fred's "QSL-100" push-pull.

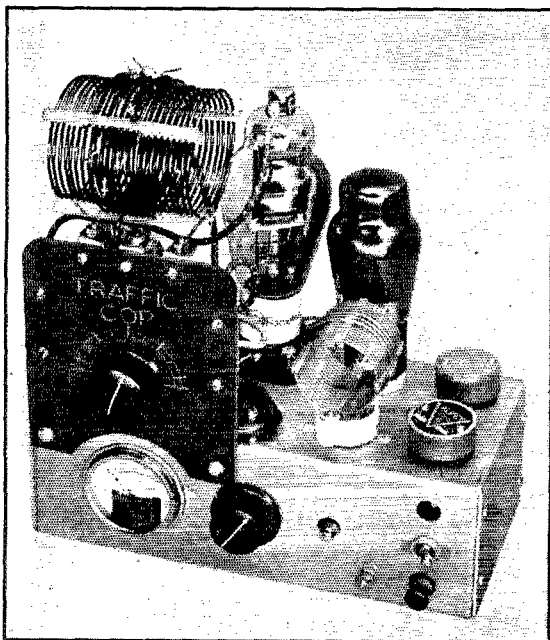
With its two crystals and switch for quick QSY from net frequency, it has been designed primarily for the traffic man. Basing costs on present amateur prices, the transmitter unit figures out to around \$15.50 without crystals. The power supply can be built for \$25.00 or less, while the bias supply will cost as little as \$2.75. This makes a total of \$43.25, which means that if one has to buy new crystals it would run in the neighborhood of \$50.00, or around 25 cents per watt — a small enough amount to put you in there with the traffic boys "getting the message through."

Referring to the diagram of Fig. 1, the oscillator circuit is the one with which W8QBW had such success — the simple 6L6 tetrode crystal oscillator. Shunt feed is used in the plate circuit to permit series bias feed to the amplifier with capacitive coupling between stages. Biasing voltage is obtained entirely from the cathode resistance, R_1 , while screen voltage is supplied through the dropping resistor, R_2 . A d.p.d.t. toggle switch, S_1 , is provided so that either of two crystals may be selected. Crystals in different bands may be used, or one crystal may be at the traffic net frequency and the other a random frequency for rag chewing or other purpose. The dial light, B_1 , is provided for the purpose of checking crystal r.f. current, while B_2 serves as a tuning indicator for the plate circuit.

The oscillator plate-tank circuit, L_1C_1 , is split to provide push-pull excitation for the amplifier by grounding the coil at the center through C_{10} . C_6 is a small fixed mica condenser connected across the lower half of the coil to balance the output capacity of the 6L6G, which is effectively connected across the upper half of L_1 . If this balancing condenser is not used, excitation to the two amplifier grids will not be the same and the load will not be distributed evenly between the two tubes.

In the amplifier circuit, which is entirely conventional, a pair of inexpensive 809s is used in push-pull. The plate tank circuit, L_2C_2 , is balanced by grounding the center of L_2 through the by-pass C_{13} . A single-section tank condenser was chosen in preference to the split-stator type because of its smaller cost. As a matter of fact, the unbalance caused by the use of a single-

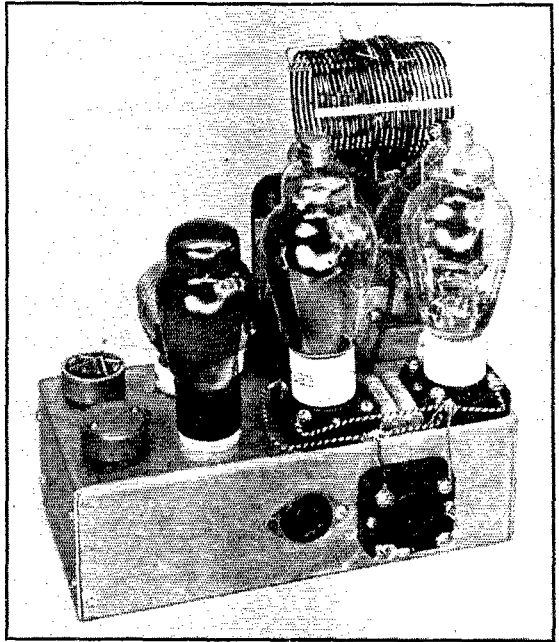
* 868 Whittier Blvd., Grosse Pointe Park, Mich.



Front view of the "Traffic Cop" transmitter, showing the tuning controls and the amplifier coil mounting.

section condenser is not often of practical consequence at the lower frequencies. Biasing voltage is fed to the grids in series with the tank circuit by introducing it at the center tap of L_1 . The dial lamp, B_3 , serves as an indicator of relative grid current. The chokes, RFC_2 , are for the purpose of suppressing u.h.f. parasitic oscillations. C_3 and C_4 are, of course, the neutralizing condensers necessary to prevent self oscillation in the amplifier at the operating frequency. L_3 provides a means of coupling to the antenna system.

Power-supply connections are made through a pair of 4-prong tube sockets at the rear. The circuit diagram of the combination power-supply unit built to work with the transmitter is shown in Fig. 2. It demonstrates one way of getting the required power from small transformers, although others may find a different arrangement preferable, depending upon the availability of components. In this case, it happened that the two transformers on hand were sufficiently alike in characteristics so that the high-voltage windings could be connected in series to give the required plate voltage for the 809s. Since one of the transformers has a rating of 250 ma., while the other has a rating of 300 ma., naturally the rating of the combination is limited to 250 ma. However, this should be entirely adequate for handling the full transmitter



Rear view, showing tube and crystal arrangement and the sockets for power-supply connections. The amplifier filament by-pass condensers are between the two amplifier tubes.

load with intermittent keying. The two high-voltage windings, each totalling 1050 volts, are

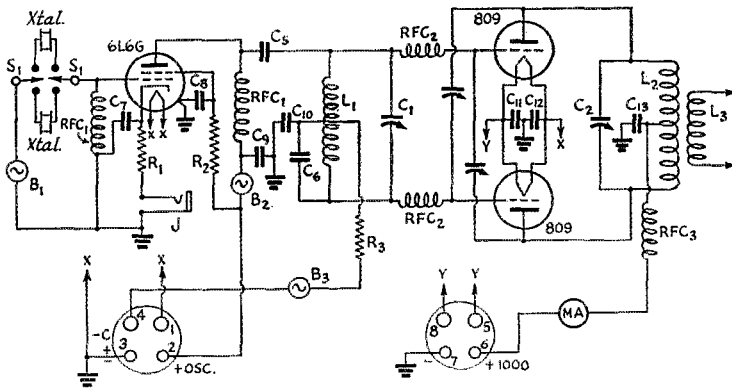


Fig. 1 — Circuit diagram of the "Traffic Cop" transmitter.

- C_1 — 100- μ fd. midget variable (Hammarlund SM-100).
- C_2 — 50- μ fd. midget variable, double-spaced plates (Hammarlund SM-50-X).
- C_3, C_4 — Homemade neutralizing condensers, see text.
- C_5 — 0.002- μ fd. mica.
- C_6 — 50- μ fd. mica, see text.
- L_1 — 3.5-Mc. band — 21 turns No. 20, $1\frac{1}{4}$ inches diameter, $1\frac{1}{4}$ inches long (Bud OCL-30).
7-Mc. band — 18 turns No. 18 wire, $1\frac{1}{4}$ inches diameter, $1\frac{1}{4}$ inches long (Bud OCL-40).
- L_2 — 3.5-Mc. band — 32 turns No. 16, 3 inches diameter, 4 inches long (B & W BXCL-80).
- L_3 — 7-Mc. band — 16 turns No. 14, $2\frac{1}{2}$ inches diameter, $2\frac{1}{2}$ inches long (B & W BXCL-40).
- L_4 — 3-turn link around L_2 or coupling coil of about 9 turns with taps wound around L_2 .
- $C_7, C_8, C_9, C_{10}, C_{11}, C_{12}$ — 0.01 μ d.
- C_{13} — 0.002 μ d., 1500-volt.
- R_1 — 200 ohms, 10-watt.
- R_2 — 25,000 ohms, 10-watt.
- R_3 — 500 ohms, 2-watt.
- RFC_1 — 2.5-mh. r.f. choke.
- RFC_2 — Parasitic choke; 20 turns No. 20 enameled, $\frac{1}{4}$ inch diameter, close-wound.
- RFC_3 — 1-mh., 300 ma. r.f. choke (National R-300).
- B_1 — 60-ma. dial light.
- B_2 — 150-ma. dial light.
- B_3 — 60-ma. dial light.
- J — Open-circuit jack for key.
- MA — 0.300 milliammeter.
- S_1 — Poles of d.p.d.t. toggle switch.

connected in series as shown in the diagram. The connection between the two secondaries then serves as the center tap of the rectifier system. The filaments of the 816 rectifier tubes are connected in series so that they may be operated from one of the 5-volt, 3-ampere filament windings. It will also be noticed that two of the 6.3-volt, 3-ampere filament windings are connected in parallel to handle the filaments of the 809s.

A separate 5Z3 or 80 rectifier is used to supply approximately 500 volts for the oscillator. The plates of the rectifier are connected between the taps which formerly served as the center tap of each transformer. Since we are now using the connection between the two transformers as the center tap, this gives us 525 volts each side of center tap for the rectifier. Incidentally, the combination transformers delivering 1000 volts and 400 volts simultaneously with choke input, listed by several transformer manufacturers, should just about fit this job, if one can be found.

The simple filters shown in the diagram have been found sufficient for c.w. work. While transmitting-type filter condensers might be used, those who have to watch their shakels will find that inexpensive electrolytic condensers in series will do a satisfactory job. If the electrolytics are used, the resistors R_1 , R_2 , R_3 and R_4 should be provided to equalize the voltage drop across the two condenser sections as shown.

Bias for the amplifier is supplied from a separate rectifier-filter system in conjunction with the grid leak, R_3 . This combination provides sufficient fixed bias for plate-current cut off when excitation is removed and also supplies the correct amount of operating bias when rated grid current is flowing. Plate voltage for this supply is taken directly from the 115-volt a.c. line and passed through the 6X5 rectifier. The exact values of R_3 (Fig. 1) and R_7 (Fig. 2) and the position of the tap on the latter will depend to a certain extent upon the d.c. resistance of the chokes, L_2 and L_3 , in the filter system of the bias supply. The values given under Fig. 2 assume a total choke resistance of 500 ohms, which is average for the type of choke specified. A 45-volt battery may be substituted for the bias supply, but it should be of the heavy-duty type if reasonable life is to be expected with a grid current of 50 ma. flowing through it. And don't use a worn-out battery; its internal resistance will usually ruin the performance of the amplifier.

A double-pole switch, S_2 , is provided so that plate voltage may be applied to the 816 rectifiers after the tubes have been brought up to proper temperature. This switch should be well insulated, such as a knife switch, and should be protected against accidental contact by the operator. If a separate filament transformer is used for the 816 filaments, this switch will not be required.

If a standard $10 \times 5 \times 3$ chassis is not obtain-

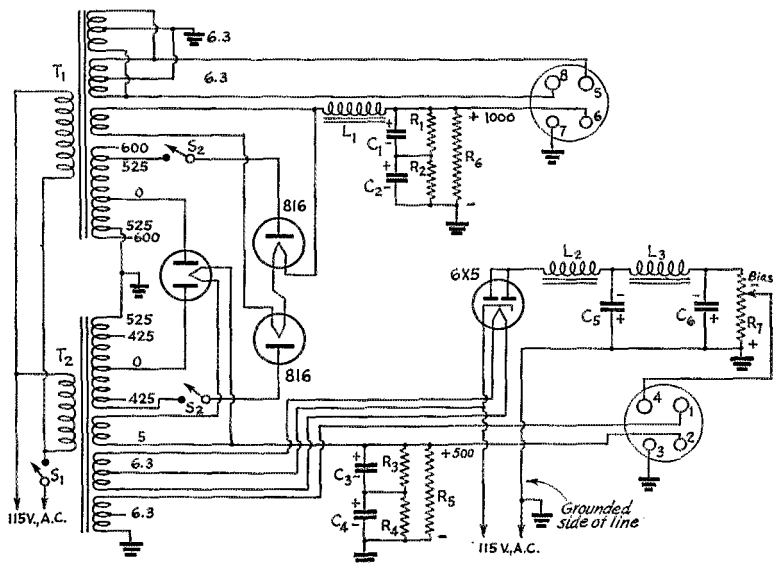


Fig. 2 — Circuit diagram of the combination power supply for the "Traffic Cop" transmitter.

C_1, C_2 — 8- μ fd., 600-volt electrolytic.

C_3, C_4 — 16- μ fd., 450-volt electrolytic.

C_5, C_6 — 20- μ fd., 250-volt electrolytic.

R_1, R_2, R_3, R_4 — 0.1 megohm, 1-watt.

R_5 — 25,000 ohms, 25-watt.

R_6 — 50,000 ohms, 50-watt.

R_7 — 1000 ohms, 25-watt, tapped at center.

L_1 — 15 hy., 225-ma. filter choke (UTC S31).

L_2, L_3 — 15 hy., 60-ma. filter chokes, 230 ohms each (UTC S-26).

S_1 — Toggle switch.

S_2 — D.p.s.t. high-voltage switch.

T_1 — Combination power transformer (UTC S42).

T_2 — Combination power transformer (UTC S40).

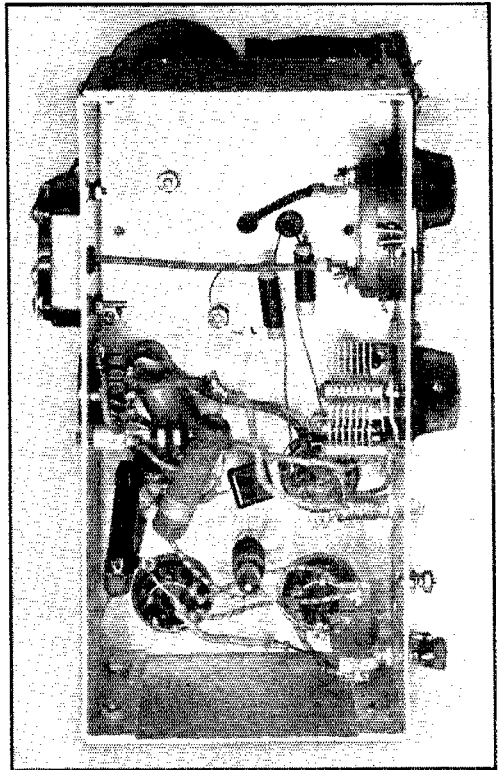
able, it is not at all difficult to make one up from any available sheet metal. The amplifier tank condenser, C_2 , is mounted at the center of a 5-inch square panel made from 3/16-inch insulating material such as bakelite, lucite or even shellacked plywood. The panel is fastened to the chassis at the left-hand end and has a cut-out for the 2 1/4-inch meter set in the chassis below it.

The two neutralizing condensers are made from scrap pieces of sheet metal. Each consists of two pieces 3 inches long by 1 1/4 inches wide. They are mounted on either side of the plate tank condenser. One plate of each neutralizing condenser is mounted directly on the panel by means of a machine screw through one end of the plate. The other plate is mounted from the other end and is spaced with a piece of bakelite, or other insulating material so that there is a gap of one-tenth inch between plates. The upper plate may be pivoted on its mounting screw to vary the capacity of the neutralizing condenser. The lower terminal of each condenser connects to the grid terminal of the adjacent amplifier tube socket, while the connecting lead of the upper terminal crosses over to the plate of the opposite tube.

The amplifier plate tank coil is mounted on the top edge of the panel. If manufactured coils are used, the plug-in mounting strip may be fastened to the edge of the panel by means of metal angle pieces. If homemade coils are used, they may be wound self-supporting and may be mounted by fastening the three terminal leads to the panel with machine screws along the top edge. Dimensions for separate coils are given under Fig. 1, but, if desired, a single coil wound for the 3.5-Mc. band may be made to serve also for the 7-Mc. band by short-circuiting an equal number of turns from each end to bring the number of turns in circuit down to the number specified for the higher-frequency band. The high-voltage connection to the center of the coil is made with an insulated wire brought up through a hole in the chassis lined with a rubber grommet.

Tube sockets for the two amplifier tubes, the oscillator tube and one of the crystals are mounted in line along the rear edge of the chassis. Those for the amplifier tubes are mounted above the chassis, while the latter two are submounted. Sockets for the second crystal and the oscillator plate tank coil are mounted in front between the right-hand end of the chassis and the panel. The by-pass condenser, C_{13} , is fastened to the chassis just to the left of the oscillator tank coil, with one of its terminals grounded.

Underneath the chassis, the oscillator tank condenser, C_1 , is mounted on the front edge. The condenser is insulated from the chassis by means of a pair of insulating washers around the shaft. The indicator lamps, B_1 , B_2 and B_3 , and the crystal switch, S_1 , are mounted in convenient



Bottom view of the 200-watt "Traffic Cop" transmitter. C_1 is at the center. The two u.h.f. parasitic chokes may be seen in the leads from the socket of L_1 to the grids of the amplifier tubes.

spots. Holes are drilled in the front edge of the chassis so that the bulbs may protrude to the front of the transmitter where they will be in full view of the operator. The various r.f. chokes, resistors and by-pass condensers are also fastened underneath the chassis. In most cases, it will be possible to fasten their leads directly to the points to which they should be connected. The two sockets mounted in the rear edge of the chassis are for power-supply connections. A pair of terminals, one of which is insulated from the chassis, is provided in front for making key connections. If preferred, an open-circuit jack may be used, as indicated in Fig. 1, in place of the key terminals.

A link winding of six turns of wire is wound around the amplifier plate tank coil at its center so that the output may be coupled to an antenna tuner or to a low-impedance transmission line. This link winding should be tapped at each turn so that loading may be adjusted properly.

In tuning up the transmitter for the first time, it is advisable to start out with low plate voltage. A 10-watt resistance of 5000 to 10,000 ohms in-

(Continued on page 90)

IN THE SERVICES

SOME of you have very aptly called this a "directory" — and we like it. Also, "A good way to find somebody quickly!" Having received no adverse comments as yet, this form of listing stays as is.

So far we have about 6500 names in our complete file but there are probably 25,000 unlisted. Are you one of these? Drop us a card with all the information — name, call, rank or rating, outfit, and P. O. address. As you know, we only list the city and state in *QST*, but many of your friends in and out of the service ask for your latest address. We are particularly anxious to hear from men in the Marine Corps and the Coast Guard. Also, don't forget that our file includes men in Civil Service work and defense industries as well as those in the armed forces.

Thanks for the pictures you are sending in — please keep them coming. We especially like those with a background as well as a face.

NAVY—SPECIAL DUTY

1LFI, Klar, RT3c, Boston, Mass.
 1NDN, Shippey, Sealc, Charleston, S. C.
 4EWQ, Thompson, RT2c, Treasure Island, Calif.
 4FLF, Lamar, RT3c, College Station, Tex.
 4GCZ, Myrick, RT2c, Treasure Island, Calif.
 4HNE, Hill, RT2c, Treasure Island, Calif.
 4HUB, Kennedy, Sealc, Corpus Christi, Tex.
 5AFH, Ward, RT3c, Chicago, Ill.
 ex-5AQT, Close, RT3c, College Station, Tex.
 5CUT, Tuck, RT2c, Corpus Christi, Tex.



This handsome-but-serious lieutenant is Kenneth P. Tompkins, W4PE. Almost 15 years a ham, one of the lucky ones to QSO Byrd in the Antarctic and a world-traveler in his own right, he's now in charge of the Radio School at the Naval Air Station in Pensacola.

5CYW, Shadow, RM2c, Corpus Christi, Tex.
 5GYK, Nance, RT2c, Treasure Island, Calif.
 5IGA, Berg, RT2c, Treasure Island, Calif.
 6BQS, Throop, RT2c, Treasure Island, Calif.
 6DEE, Rehn, RT2c, Treasure Island, Calif.
 6DERK, Meeher, RT3c, Stillwater, Okla.
 6FDC, Phelps, RT2c, Treasure Island, Calif.
 6GAC, Van Artsdalen, RT2c, Treasure Island, Calif.
 6GON, Murdock, RT2c, Treasure Island, Calif.
 ex-6HWF, Ottum, RT3c, College Station, Tex.
 6JO, Williams, RT2c, Stillwater, Okla.
 ex-6KLR, Curry, RT2c, Corpus Christi, Tex.
 6OFC, Adams, RT3c, College Station, Tex.
 ex-6PIF, Bunch, RT3c, College Station, Tex.
 6PWQ, Reed, RT2c, Treasure Island, Calif.
 6QBR, Warner, RT3c, College Station, Tex.
 6QHW, Rex, RM2c, Treasure Island, Calif.
 6RSY, Drake, RT2c, Treasure Island, Calif.
 6SAM, Heifner, RT1c, address unknown.
 6SDE, Pooley, RT2c, Corpus Christi, Tex.
 6SEA, Gardenheir, RM2c, Treasure Island, Calif.
 6SIB, Sherrif, RT2c, Treasure Island, Calif.
 6SJQ, Lively, RT2c, Treasure Island, Calif.
 7BLT, Provance, RT2c, Treasure Island, Calif.
 7EXB, Riley, RT2c, College Station, Tex.
 7FTQ, Jenkins, RM2c, Treasure Island, Calif.
 7HKN, Bland, RT2c, Treasure Island, Calif.
 7ILK, Sappington, RT2c, Corpus Christi, Tex.
 7IQB, Swan, RT2c, Corpus Christi, Tex.
 7IYF, Simon, RM2c, Treasure Island, Calif.
 8CJM, Houghtaling, address unknown.
 8NID, Brenner, address unknown.
 8NKR, Engel, RT2c, Corpus Christi, Tex.
 8POE, Schrack, RT2c, Treasure Island, Calif.
 8PYZ, Bobo, RT2c, Chicago, Ill.
 8SAB, Yambor, RT2c, Corpus Christi, Tex.
 8SIV, Smroek, RM2c, address unknown.
 8SJC, Labo, Sealc, Chicago, Ill.
 8TOQ, Harrington, RT3c, College Station, Tex.
 8TXJ, Eppich, RM3c, Chicago, Ill.
 8UJL, Lawrence, Treasure Island, Calif.
 8UKQ, Sorivano, Sealc, Chicago, Ill.
 8UPM, Honness, RT2c, Corpus Christi, Tex.
 8VXV, Travis, address unknown.
 8WQC, Bledsoe, RT3c, College Station, Tex.
 9AFD, Rudolph, Sealc, Chicago, Ill.
 ex-9AFR, Style, RT2c, Treasure Island, Calif.
 9BBJ, Kennedy, RT3c, College Station, Tex.
 9BFY, Holmstrom, RT2c, Chicago, Ill.
 9CCS, Howe, RT2c, Chicago, Ill.
 9CET, Maddox, RT3c, College Station, Tex.
 9DPV, Walters, RT3c, College Station, Tex.
 ex-9ECJ, Rudy, RT2c, Treasure Island, Calif.
 9EWS, Dannels, Sealc, Chicago, Ill.
 9FFI, Groves, RT2c, Chicago, Ill.
 9GRK, Sperbeck, Sealc, Chicago, Ill.
 9HGX, McDonald, RT2c, Treasure Island, Calif.
 9IGJ, Florence, RT3c, Chicago, Ill.
 9IGS, Herrell, RT3c, College Station, Tex.
 ex-9IXL, Gravit, RT3c, College Station, Tex.
 9JGM, Clark, RT3c, College Station, Tex.
 9JJM, Shimkus, Sealc, Corpus Christi, Tex.
 9JRU, Howe, RT3c, Chicago, Ill.
 9KUS, Siegel, RT3c, College Station, Tex.
 9MOE, Cain, RT2c, Chicago, Ill.
 9NOH, McCleery, RM2c, Treasure Island, Calif.
 9NVI, Betenderfer, RT2c, Corpus Christi, Tex.
 9OBE, Reber, Sealc, Chicago, Ill.
 ex-9OFU, Harvey, RT3c, College Station, Tex.

90LQ, Mosser, RT2c, Treasure Island, Calif.
 ex-9PGG, Heinlen, RT3c, College Station, Tex.
 9PXX, Brewer, RT2c, Chicago, Ill.
 9REV, Moore, RM2c, Corpus Christi, Tex.
 9RSV, Spratt, Sea1c, Chicago, Ill.
 ex-9RUN, Cox, ARM1c, Chicago, Ill.
 9SCH, Rockey, RM2c, Norfolk, Va.
 9STD, Hognes, RT3c, College Station, Tex.
 9TBI, Stotler, RT2c, Treasure Island, Calif.
 9WAA, Schacht, RT2c, Treasure Island, Calif.
 9WFW, Vician, RT3c, Chicago, Ill.
 9WGN, Burke, RT2c, Chicago, Ill.
 9WQN, Musgraves, RT3c, College Station, Tex.
 9YLJ, Cloudas, RT3c, College Station, Tex.
 9ZLW, Cramer, RT3c, College Station, Tex.
 9ZOM, Jacobs, RT3c, Chicago, Ill.
 9ZQG, Will, RT2c, Treasure Island, Calif.

Operator's license only:

Blake, RT2c, Corpus Christi, Tex.
 Granke, Sea1c, Chicago, Ill.
 Landess, RT3c, College Station, Tex.
 Martin, RT3c, Chicago, Ill.
 Oberlin, Sea1c, Chicago, Ill.
 Pezenitski, RT3c, College Station, Tex.
 Schattauffer, RT2c, Corpus Christi, Tex.
 Startup, RT3c, College Station, Tex.

ARMY—GENERAL

1AHJ, Batchelder, Pvt., Edgewood Arsenal, Md.
 1CQN, Fisher, Ft. Sill, Okla.
 1EXH, Barnes, Sgt., Camp Meade, Md.
 1ILO, Milnes, foreign duty.
 1KPI, Josephs, Pvt., Eglin Field, Fla.
 1KSC, D'Agostino, Camp Breckenridge, Ky.
 1MYI, Clement, Sgt., Ft. Jackson, S. C.
 2KKG, Stalhuth, address unknown.
 2LOM, Ozick, 2nd Lt., New York, N. Y.
 2LOZ, Grossman, address unknown.
 3ECP, Van Deusen, Col., Detroit, Mich.
 3IUF, Nickel, 1st Lt., Pine Camp, N. Y.
 3JJK, Marks, Pvt., Camp Kilmer, N. J.
 3JKH, Baldauf, Ft. Knox, Ky.
 4FQZ, Bryant, foreign duty.
 ex-5BP, Hagan, Capt., foreign duty.
 5GKZ, Wolfe, Major, Rice, Calif.
 5IHR, Rhorer, address unknown.
 6PQZ, Akiyama, Cpl., Camp Carson, Colo.
 6SIB, Norman, Pvt., Camp Edwards, Mass.
 6SIH, Workman, Sgt., foreign duty.
 6UET, Stoddard, foreign duty.
 7DRS, Graves, foreign duty.
 7FYQ, Phinney, Sgt., foreign duty.
 7GVF, Farquarson, foreign duty.
 7GVU, Stinsman, foreign duty.
 7GYG, Pratt, foreign duty.
 7HPE, Barnhart, Pvt., foreign duty.
 7HUZ, Aldrich, Lt., foreign duty.
 7IFH, Renz, foreign duty.
 7IRF, Compton, Capt., Ft. Riley, Kansas.
 8DUF, Lockwood, foreign duty.
 8FJK, Taksony, foreign duty.
 8IAR, Churchill, foreign duty.
 8LSQ, Sauer, foreign duty.
 8MVK, Cieslowski, foreign duty.
 8NKJ, Furget, foreign duty.
 8OGV, Mihail, Pvt., Fort Custer, Mich.
 8OLD, Schultz, Cpl., foreign duty.
 8PHO, Stevens, address unknown.
 8RNV, Lengle, Pvt., address unknown.
 8RRA, Engel, Pvt., address unknown.
 8SBQ, Mullins, Capt., Ft. Belvoir, Va.
 8SWE, Maranz, foreign duty.
 8TOI, Atherton, Pvt., Eglin Field, Fla.
 8ULF, Stickney, Pvt., Chicago, Ill.
 8UW, Klein, Staff Sgt., foreign duty.
 9ASE, Marhoff, address unknown.
 9BGA, Raible, Pfc., Ft. Knox, Ky.
 9COG, Clemans, Capt., address unknown.
 9CVH, Bleck, Pfc., foreign duty.

9FUT, Simmons, Lt., Ft. Knox, Ky.
 9HCQ, Robinson, Sgt., foreign duty.
 9IMT, Canterbury, Lt. Col., Boca Raton, Fla.
 9KCH, Broyles, address unknown.
 9KGG, Davies, Pvt., address unknown.
 9UWH, DiPaula, Cpl., Ft. Knox, Ky.
 9WUQ, Shuster, Tech. 5th, Kansas City, Mo.
 9YYE, Trainor, Master Sgt., Camp Davis, S. C.

Operator's license only:
 Engelbretson, Pvt., address unknown.
 Novick, address unknown.
 Silveira, Sgt., foreign duty.

NAVY—GENERAL

ex-1CLN, Gillespie, Lt. (jg), Washington, D. C.
 1FOQ, Moran, RM2c, address unknown.
 1GYZ, Hudson, Lt. (jg), address unknown.
 1JHC, Aymar, Lt., Fort Schuyler, N. Y.
 1JYW, Carlson, RM1c, Quonset Point, R. I.
 1NBM, Drozdick, RM2c, address unknown.
 1NS, Kozacko, Lt., Hingham, Mass.
 ex-2ANQ, Wilson, Ens., Washington, D. C.
 2JVB, Rinke, address unknown.
 2JZH, Stangel, Ens., Washington, D. C.
 3ARN, Rurs, As, Bainbridge, Md.
 3BUB, Powers, Lt., address unknown.
 4CYA, Watson, Lt. (jg), New York, N. Y.
 4FIY, Powell, RM2c, Norfolk, Va.
 4XE, Lee, Cmdr., Washington, D. C.
 ex-5HBZ, Clarke, ACRM, Corpus Christi, Tex.
 5HSH, Huckabay, address unknown.
 5IOZ, Chalmers, San Diego, Calif.
 6AA, Cronkrite, Lt., San Diego, Calif.
 6CWR, Sannazzari, RM2c, address unknown.
 6EGY, Venneri, WO, San Diego, Calif.
 6FFF, Anderson, Lt., address unknown.
 6IKG, Scott, San Pedro, Calif.
 6KJR, Hopkins, Lt., Philadelphia, Pa.
 6LRJ, Davison, address unknown.
 6PVO, Johnson, RT2c, San Diego, Calif.
 6SGR, Alton, RT3c, San Diego, Calif.
 6TDG, Skarin, RT2c, address unknown.
 7BGT, Blazek, RM3c, address unknown.
 7DYF, Stratton, address unknown.
 7EBS, Wheeler, Ens., address unknown.
 7IEA, Davis, address unknown.
 8QDU, Bornman, Lt., address unknown.
 8RYO, Dodson, RT3c, Takoma Park, Md.
 8SEU, Castor, address unknown.
 8SZO, Prechtel, RM3c, address unknown.
 8WEC, Brown, RT2c, Bellevue, D. C.
 8WEZ, Mink, Sea2c, Takoma Park, Md.
 9ATE, Davenport, RT2c, address unknown.
 9DEI, Kramer, Lt. (jg), Hanover, N. H.
 9FKW, Moran, Lt., address unknown.
 9MHL, Griffiths, Ens., Yorktown, Va.
 9TAM, Malinowski, address unknown.

Operator's license only:
 Peters, AS, Newport, R. I.

ARMY—AIR FORCES

1BN, Washburn, Pvt., Maxwell Field, Ala.
 1NFB, Sweeney, Madison, Wis.
 2AZT, Keller, 2nd Lt., LaGuardia Field, N. Y.
 2FF, Synnott, Lt., Philadelphia, Pa.
 2GDF, Smith, Lt., Philadelphia, Pa.
 2KQR, Daien, Pvt., Atlantic City, N. J.
 2MMQ, Johnson, Sgt., foreign duty.
 4AMR, Campbell, Lt., Maxwell Field, Ala.
 5BOC, Donnell, Lt., Ardmore, Okla.
 5DFY, Billingsley, Pvt., Sioux Falls, S. D.
 5JOT, Dickerson, Tech. Sgt., Ft. Bliss, Tex.
 5JXD, Rodenbaugh, Sgt., Gardner Field, Calif.
 6KME, Schoenbackler, Mather Field, Calif.
 6PKY, Larsen, address unknown.
 6TSE, Williams, address unknown.
 K6TKV, McCauley, Sgt., foreign duty.
 K6UQK, Lattig, Capt., Scott Field, Ill.

7ALY, Albertson, Lt., Miami Beach, Fla.
 7FN, Keay, Lt., Miami Beach, Fla.
 8JPE, House, Capt., address unknown.
 8KFU, Snyder, Lt., Presque Isle, Me.
 8KZV, Chinnery, Pfc., Baton Rouge, La.
 8MMF, Dubiaga, Sgt., Wright Field, Ohio.
 8NXD, Brandt, Pvt., Sioux Falls, S. D.
 8OAF, Ford, Staff Sgt., address unknown.
 8OOL, Marron, Lt., Tulare, Calif.
 8PUR, Hermann, Staff Sgt., address unknown.
 8QJH, Holley, Pvt., Lincoln, Neb.
 8QLB, Fisher, Pvt., Scott Field, Ill.
 8SIX, Filkins, Pvt., Atlantic City, N. J.
 8SZU, Van Aken, address unknown.
 8TJN, Merritt, Pvt., Madison, Wis.
 8UFA, Burke, Cpl., Mitchel Field, N. Y.
 8UJW, Gwyer, foreign duty.
 8UWM, Matuszyk, Pvt., Atlantic City, N. J.
 8VAU, Brecknock, Cpl., address unknown.
 8WKL, Hauck, Pvt., Chicago, Ill.
 8WWR, Markley, 2nd Lt., address unknown.
 9CZX, Schoch, Pvt., San Angelo, Tex.
 9DYQ, Bailey, Pvt., Gardner Field, Calif.
 9EDS, Rousar, Lt., Scott Field, Ill.
 9FKK, Colyar, address unknown.
 ex-9FWM, Kinahan, Sioux Falls, S. D.
 9FY, Correll, Lt., MacDill Field, Fla.
 9HRW, Doyel, Camp Luna, N. M.
 9IJK, Coxsey, Pvt., Sioux Falls, S. D.
 9LPS, Kengott, address unknown.
 9LTL, Reynolds, Pvt., Big Spring, Tex.
 9MEF, Nielsen, Pvt., Sioux Falls, S. D.
 9NZV, Zimmerman, Staff Sgt., address unknown.
 9OOV, Kolb, Pvt., Midland, Tex.
 9PCL, Hay, Sgt., Atlantic City, N. J.
 9TKD, Wisnowski, Sgt., foreign duty.
 ex-9UN, Forbes, Capt., Gulfport Field, Miss.
 9ZFC, Nelson, Pvt., Sunnyside, N. Y.

Operator's license only:

Freedman, A/C, Scott Field, Ill.
 Kruse, Pvt., Patterson Field, Ohio.
 Schenk, Lt., Mitchel Field, N. Y.
 Wilmeth, Sgt., Santa Ana, Calif.



Here we have a view of palm trees and three hams who graduated from the Army Air Forces Officer's Training School at Miami Beach, Florida, on October 17th and are now full-fledged lieutenants. You'll recognize their calls — L. to r.: Campbell, W4AMR, Maxwell Field, Ala.; Donnell, W5BOC, Ardmore, Okla.; and Allen, W3CCO, Stout Field, Ind.

ARMY—SIGNAL CORPS

1JFY, Fredin, Tech. Sgt., foreign duty.
 1JRB, Hollyer, Master Sgt., Fort Meade, Md.
 1MEP, Mallory, Pvt., Ft. Monmouth, N. J.
 1MKR, Fake, Tech., foreign duty.
 1MLA, Hitchcock, Cpl., Kansas City, Mo.
 1MZU, Pritchard, Lt., Drew Field, Fla.
 2BXT, Friedman, Pvt., Ft. Monmouth, N. J.
 2GGM, Viscusi, Sgt., Drew Field, Fla.
 2JGX, Brady, Capt., Fort Meade, Md.
 2KYE, Weissenberger, Lt., Drew Field, Fla.
 2LRG, Jeffries, Cpl., Washington, D. C.
 2MXL, Abels, Pvt., Camp Crowder, Mo.
 2NO, Suffern, Lt., Camp Crowder, Mo.
 2NPE, Knebbe, Cpl., Drew Field, Fla.
 2ZC, Churchill, Lt., Ft. Monmouth, N. J.
 3CXU, Allen, Sgt., Ft. Monmouth, N. J.
 3ENQ, Buchanan, Cpl., Kansas City, Mo.
 3FLC, Spargo, Governor's Island, N. Y.
 3FUV, White, Ft. Monmouth, N. J.
 3GFG, Wencke, Cpl., Scott Field, Ill.
 3HSA, Julstedt, address unknown.
 3IPK, Chidlow, Staff Sgt., Meacham Field, Fla.
 4CBR, Brewton, address unknown.
 4CGL, Wade, Lt., Drew Field, Fla.
 4EKK, Murrhee, Cpl., Drew Field, Fla.
 4EQZ, Ellison, Sgt., Drew Field, Fla.
 4FKN, Law, Pvt., Ft. Monmouth, N. J.
 4HXJ, Wilkerson, Tech. 5th, Camp Murphy, Fla.
 5BYY, Kern, Ft. Sam Houston, Tex.
 5HXB, Johnson, Cpl., Ft. Monmouth, N. J.
 5JXZ, Falk, Cpl., Camp Barkeley, Tex.
 5KEK, Tucker, Ft. Sam Houston, Tex.
 6DYH, Orr, Sgt., Kansas City, Mo.
 6GOZ, Sund, foreign duty.
 6IPH, Fiedler, address unknown.
 6MDG, Leber, Camp Kohler, Calif.
 6PJR, O'Conner, Lt., Drew Field, Fla.
 6SGX, Surgalis, Cpl., Camp Crowder, Mo.
 K6THF, Deliiipo, Staff Sgt., foreign duty.
 6UNN, Lawrence, Sgt., foreign duty.
 ex-7AYK, Allison, Washington, D. C.
 7CAH, Weidemann, Cpl., Drew Field, Fla.
 7CQ, Andrews, 2nd Lt., address unknown.
 7ISP, Wright, Kansas City, Mo.
 7IUV, Partee, foreign duty.
 8API, O'Lear, Pfc., Fort McPherson, Ga.
 8CJL, Quine, Cpl., Drew Field, Fla.
 8CJT, Duckwitz, Major, Ft. Knox, Ky.
 8JSP, Baldrige, 2nd Lt., Drew Field, Fla.
 8RQI, Zeh, Camp Crowder, Mo.
 8SLJ, Mollise, foreign duty.
 8SQQ, Rowan, foreign duty.
 8SSJ, Born, Pvt., address unknown.
 8UZX, Nerad, Cpl., Ft. Monmouth, N. J.
 8VCM, Kern, Cpl., Ft. Monmouth, N. J.
 8WWA, Seifert, Capt., Dayton, Ohio.
 ex-9AFR, Crose, address unknown.
 9AOD, Suhajda, Chicago, Ill.
 9BFE, Weedman, Pvt., Camp Claiborne, La.
 9CMT, Underwood, Indianapolis, Ind.
 9FAY, Zilis, Chicago, Ill.
 ex-9FDD, Engelbrecht, Master Sgt., Ft. Monmouth, N. J.
 9FIT, McNeas, Pvt., Camp Crowder, Mo.
 9HKZ, Richardson, Pvt., Camp Crowder, Mo.
 9MEV, Sandstrom, Chicago, Ill.
 9NCE, Peterson, Sgt., Drew Field, Fla.
 9NZH, Moench, Lt., Ft. Monmouth, N. J.
 9OEF, Carey, Pvt., Chicago, Ill.
 9PJV, Auston, Ft. Leavenworth, Kansas.
 9QLF, Bennett, address unknown.
 9QLT, Williams, Pvt., Jefferson Barracks, Mo.
 9RIE, Prell, address unknown.
 9SAK, Fox, Cpl., Camp Murphy, Fla.
 9YNZ, Zuehsow, Chicago, Ill.
 9ZES, Milks, Pvt., Ft. Knox, Ky.

Operator's license only:
 Hill, Tech. Sgt., foreign duty.

FIELD AND COAST ARTILLERY

1CQN, Fisher, 2nd Lt., Ft. Sill, Okla.
ex-2DAF, Kendrick, Tech. Sgt., foreign duty.
5ISD, Howell, Staff Sgt., Camp Adair, Ore.
5IZT, Parker, Master Sgt., Ft. Sill, Okla.
8ONN, Gardner, Pvt., Camp Stewart, Ga.
9BML, Wood, Pvt., Ft. Terry, N. Y.

Operator's license only:
Russell, Cpl., foreign duty.

NAVY—FOREIGN OR SEA DUTY

Since we cannot publish the location of men on ships or duty outside the continental limits of the United States, here are only their calls, names, and rank or rating:

3FOA, Peters, RM1c; 5HHU, Whittenburg; 5HST, Parnell, RM2c; ex-6MZY, Fitzgerald, Lt. (jg); 6OLD, Moore, Lt. (jg); 7HAD, Riggs, ARM2c; 7HDF, Pittalkay, RM2c; 7IEA, Davis, RT2c; 7IMC, Forman, ARM2c; 8URJ, Pfeiffer; 9RUZ, Friedrich, RM1c; and Gersch, RM2c, op. license only.

Here's a reprint-in-part of an editorial which appeared in the October issue of the *RSCB Bulletin*, published by the Radio Society of Great Britain. This and the list of RSCB members who want to entertain American amateurs is very timely. How about you hams in the Services taking advantage of these friendly invitations?

Ham Hospitality

Reprinted from *The RSCB Bulletin*,
October, 1942

FROM time to time members write to ask what arrangements have been made by the Society to ensure that overseas amateurs, serving in the British Isles, are put in touch with other amateurs.

From the earliest days of the war the Society has endeavored in many ways to make it known that a welcome awaits all amateurs who visit these shores. For example, complimentary copies of our Journal are sent each month to the Beaver and similar clubs frequented by soldiers, sailors and airmen from overseas, and notices have been posted in the reading rooms. The *Bulletin* is also sent to a number of RAF stations, including the various Signals Schools. *QST* has periodically published the address of RSCB Headquarters, and has urged ARRL members serving in Great Britain to get in touch with the Society. Our colleagues in Australia have gone one better, for each issue of *Break-In* (official journal of the Wireless Institute of Australia) carries a quarter-page advertisement inviting Australian amateurs now in Great Britain to communicate with the Society.

We realize however that much can still be done to bring our overseas visitors into closer touch. One suggestion, made by Mr. Streater, G5CM, calls for consideration. He recommends that the

RSCB windscreen sticker be prominently displayed in all YMCA and NAAFI canteens as well as in private clubs used by Service men. He also suggests that the name and address of the nearest amateur be clearly written at the foot of each sticker. In order to carry his suggestion into effect members would be required to contact the organizers of local clubs, but we do not visualize any difficulties in this direction. Our experience is that they are only too willing to assist. As supplies of windscreen stickers are available free of charge from Headquarters, it is hoped that members throughout the British Isles will make application so that Mr. Streater's suggestion can be given a fair trial. We believe it holds good promise.

A comprehensive list of members who offer hospitality to Service amateurs is published in this issue. In thanking them for their kindly gesture we made one suggestion for what it is worth — keep a Visitor's Book and ask all who accept hospitality to contribute a few comments — the pithier the better! When the war is over such a record will bring pleasure to those who have acted as hosts, besides providing interesting reading for all post-war visitors to the station.

Members who wish to avail themselves of hospitality are urged to note the conditions governing each offer. At the moment nearly everyone is working long hours, and appointments are not always easy to arrange. Before calling, endeavour to contact your host-to-be by telephone so that he can prepare for your visit. If he is not on the 'phone, drop him a postcard.

The difficulty of providing food and drink for visitors is known to us all; therefore, as an act of courtesy, suggest that your visit take place between meals. More often than not your host — and hostess — will go out of their way to provide a snack — if they don't, recognize that rationing is "tight."

After accepting hospitality remember to drop a line to your new-found friends and thank them for the courtesy extended. We have heard of cases in the past of members enjoying the friendliness of a home during their stay in a certain town, and then disappearing without a word of appreciation. . . .

It was decided to invite American officers at No. 1 S.S. to appoint one of their number to be co-opted to the committee to represent ARRL members, to whom a cordial welcome is and will be extended.

We have pleasure in listing the names and addresses of those members who have notified Headquarters of their willingness to extend hospitality to visiting amateurs. It is particularly requested that those who avail themselves of hospitality should note carefully the conditions governing each offer. (Listing on following page.)

HAM HOSPITALITY

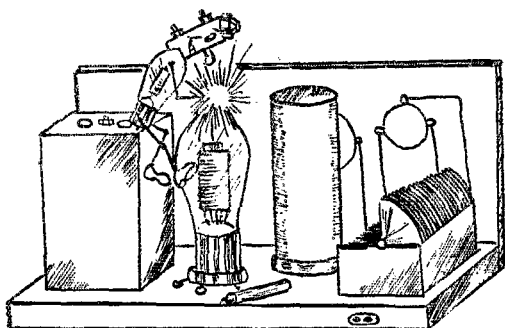
Town	Name and Address	Call or BRS	Telephone	Availability	Previous Notice Req'd.
BERWICK	O. C. Doley, Orkney House, Norham	4679	Wooler 43	Evena. & weekends*	No
BINBROOK (LINCS.)	F./Lt. H. W. Simpson, Wald View	G3DI	—	—	Yes
BOLTON	G. & M. Shackle, 32 Bromwich Street	2DVQ	Bolton 3945	Evena. & weekends	Yes
BOURNEMOUTH	L. J. J. Morgan, 45 Parkwood Road	2HNO	Southbourne 1118	Any time	No
BRADFORD	C. A. Sharp, 316 Poplar Grove, Gt. Horton	G6KU	Bradford 10772	Mon., Wed. (evena.), weekends after 2 P.M.	Yes
BURNHAM ON CROUCH	H. A. Savage, 53 Station Road	G2SA	Burnham 2136	Any day	No
CAVERSHAM	R. C. Hornell, 21 Nelson Road	G2YI	Reading 72871	Any time	—
CHADWELL HEATH	G. L. Sanderson, 52 Ashton Gardens	2DBT	Seven Kings 4655	Tues., Wed., Sat., Sun., after 7 P.M.	Yes
CLAPHAM PARK	R. F. R. Clark, 18 Parkthorne Road	G5PY	Tulse Hill 7133	Evenings	Yes
COVENTRY	W. P. Stevens, 143 Hall Green Road	4022	—	Weekends*	Yes
DUNS	Mrs. Burns Greig, 8 South Street	GM2IA	Duns 120	—	Yes
EALING (WEST)	K. J. Freeman, 106 Cavendish Avenue	2ADL	—	Evena. and weekends	Yes
FELIXSTOW	C. W. Packe, 86 Grange Road	G30J	Felixstowe 93	—	Yes
GT. CLACTON	D. Heightman, 234 Burrs Road	G6DH	Clacton 770 or 151	Weekends	Yes
GT. YARMOUTH	E. E. Buck, 24 Priory Street, Gorleston	3821	—	Any time	Yes
HAYES (KENT)	A. O. Milne, 129 Ketchill Gardens	G2MI	Hurstway 1877	Evenings and weekends	—
HESTON	G. Spriggs, 28 Almorah Road	G4KG	—	Any time except Mon. and Thurs.	—
HIGH WYCOMBE	C. M. Freer, 37 Melbourne Rd., Micklefield Estate	4781	—	Evenings Sats. after 5 P.M. Suna.	Yes
ILFORD	C. H. L. Edwards, 10 Chepstow Crescent	G8TL	—	Mon. to Wed. (noon)	Yes
LEICESTER	J. Fairley, 19 Francis Avenue, Narborough Road South	G2IX	—	Evenings from 6 P.M.	No
LOUTH	C. Thackeray, The Row, Benniworth	3880	—	—	—
MIDDLESBROUGH	G. A. Kenyon, 33 Emerson Avenue	G3YK	Middlesbro 3557	—	Yes
MINEHEAD	T. C. Bryant, Beaconwood Hotel	G3SB	Minehead 32	Evenings	Yes
NEWCASTLE	W. Haley, 43 Hyde Terrace, Gosforth	5236	—	Irregular	Yes
NORTHAMPTON	R. R. Waite, 61 Broadway	G3PZ	Cranford 254 Ext. 12	Irregular	Yes
NORTHFLEET	V. H. S. Curling, 66 Burch Road	G6VC	—	—	Yes
NORWICH	R. B. Houtt, 26 Elm Grove Lane	2FOH	Norwich 22335	Evena. & weekends	Yes
NORWOOD (S.)	W. D. Gilmour, 235 Grangecliffe Gardens	G2VB	—	Appointment only	Yes
PETERBOROUGH	R. C. Frisby, 32 Lime Tree Avenue	2FQV	—	Sun. and evenings after 6 P.M.	No
PLYMOUTH	Lt. H. Jones, 32 Dean Pk. Rd., Plymstock	G5ZT	—	—	—
PORTSMOUTH	J. S. K. Stephens, 65 Ebery Grove, Copnor	G8WC	—	Daily after 7 P.M.	Yes
POYNTON	B. Lingard, Alasdair, Chester Road	G3IR	Poynton 2087	Evenings	—
READING	R. G. Nash, 9 Holybrook Road	4573	—	—	Yes
ROTHERHAM	W. Hobson, 51 Warden Street, Canklow	4157	—	Any weekday	Yes
ST. MARGARETS ON THAMES	J. N. Roe, 27 Riverdale Gardens	G2VV	Popesgrove 4871	Some Saturdays	Yes
SHIPLEY	C. W. Kirk, 20 Branksome Drive, Nab Wood	G4CL ExZB2A	Shipley 1655	Sundays	No
SHREWSBURY	D. R. Pugh, 21 Racecourse Av., Monkmoor	3735	—	Any time	Yes
SLOUGH	W. S. Colclough, 33 Kendal Drive	G3XC	—	Weekends preferable	Yes
SOUTHEND (ESSEX)	K. W. Harbridge, 26 Hampton Gardens	G2KH	Southend 45186	—	—
STAFFORD	H. L. Mitchell, 271 Sandon Road	2AMG	Stafford 512	Evena. & weekends by appointment	Yes
STOCKTON-ON-TEES	R. J. Bradley, 36 Raby Road	G2FO	—	After 6 P.M. any day except Sunday	No
SUDBURY (SUFFOLK)	C. H. L. Edwards, Speedways, Bartholomews Lane	G8TL	—	Wed. 5 P.M. to Suna.	No
TAUNTON	C. J. Fish, Rosemary, Vera St. Rowbarton	G4OM	—	Any time	No
TAVISTOCK	T. G. Ward, Torreen, Mary Tavy	2FKO	Marytavy 78	Evena. & weekends	Yes
TOTTENHAM	W. V. Champion, 12 Bedford Road	G8CY	Sta. 1035	Evena. & weekends	—
WALLINGTON	W. W. Barnes, 30 Crichton Avenue	G2FI	Wallington 6208	—	Yes
WATFORD	C. Coates, 143 Hillcroft Crescent, Oxhey	G5CS	Watford 9003	Weekends from 2 P.M. Sat.	Yes
WESTON-SUPER-MARE	W. E. D. Parker, Kaynor, Worlesbury Park	G6BY	Weston 905	Any time	—
WORKSOP	E. R. Martin, Castle Mount	G6MN	Worksop 2190	—	Yes
"	A. Cartledge, 341 Carlton Road	3939	Worksop 2491	—	Yes
N. IRELAND					
BANGOR	A. T. Kennedy, 38 Donaghadee Road	G13KN	—	—	—
"	J. C. Graham	GM3TR	Bel. 58000	—	—
BELFAST	S. G. Black, "Avondale," Antrim Road, Glengormley	G13IA	—	—	—
"	R. S. Holden, 260 Grosvenor Road	G15HU	—	—	—
"	J. N. Smith, 19 Hawthornden Drive, Belmont	G15QX	Bel. 63323	—	—
"	S. N. Johnson, 10 Cyprus Avenue	G15SJ	—	—	—
"	F. A. Robb, 60 Victoria Avenue, Sydenham	G18TK	—	—	—
"	City of Belfast Y.M.C.A. Radio Club, Wellington Place (3rd Floor)	G16YM	—	Wed. evenings 8 P.M.	—
"	S. R. Watson, 53 Knutsford Drive, Cliftonville	G18GK	—	—	—
"	J. Nickle, 15 Clonlee Drive	2HCC	—	—	—

* Accommodation offered.

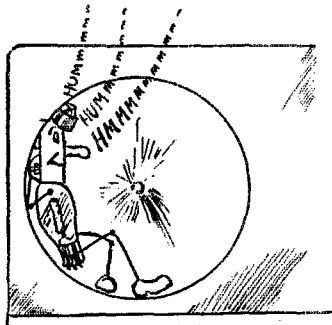
INTRODUCING SQUIMP

BORN AT THE ELECTRONIC RADIO AND TELEVISION INSTITUTE OMAHA NEBRASKA

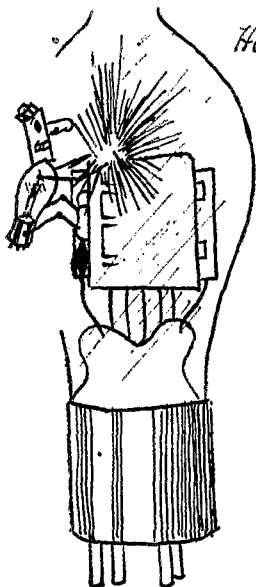
This little Grid-Leak Dripping who causes all the trouble in equipment of
 U.S. SIGNAL CORPS



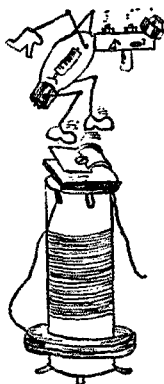
His favorite plaything is a
 Gridcap



He sits in the speaker
 and hums at
 60 cycles

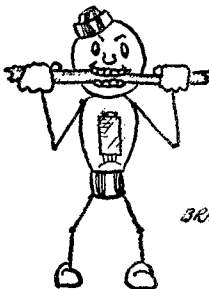


He causes all of
 the shorts in
 Radio Tubes

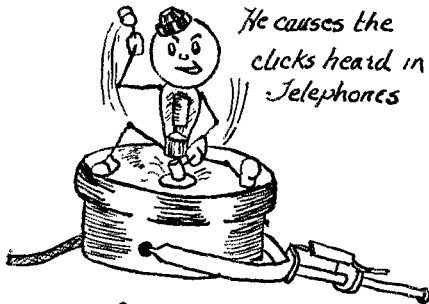


He likes to bounce up and
 down on Trimmer condensers

He eats
 insulation



He causes the
 clicks heard in
 Telephones



BRAIN CHILD

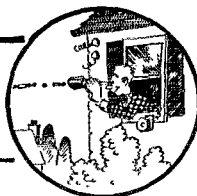
Cpl. Wm. J. Kiewel
 Cpl. Bob Geis.

11-7-42

You've heard of the Air Corps "Gremlins" — those mysterious little men who are responsible for all the weird troubles of planes and pilots attributable to no reasonable cause? Well, here is "Squimp," a sort of brother of theirs, the mascot of the Signal Corps. His name comes from the initial letters of words indicating troubles found in Signal Corps equipment: "Squeals — QRM — Interference — Motorboating — Parasitics." Responsible for identifying Squimp and classifying his habits are Cpl. Wm. J. Kiewel, W9DFU, and Cpl. Bob Geis.



EXPERIMENTER'S SECTION



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

PROJECT A

Carrier Current

WELL, here is another report on my wired-radio activities, perhaps the last for some time. It seems that my signals were radiating, because I had a call from the FCC monitoring officials. Since I have been using a frequency of about 150 kc., it seems that I interfered with naval communications at a station about ten miles away and was heard at a distance of about fifty miles. Unfortunately, I can't tell any more about the conditions of reception, since that is all I was told. . . .

Please tell the gang on wired radio to keep their power down to the absolute minimum. I have never run over 25 watts input. I don't believe I was heard until I increased power from 12 watts to 25 watts about October fifth, but can't be sure. W6ULE was also causing interference, and I believe he was using about 15 to 20 watts. I was told that the other stations which I mentioned in previous reports had not been heard. I don't believe any of them used over 5 or 10 watts.

I don't think the work on wired radio should stop; keep it up, but let us all be careful about radiation. . . .

It seems to me that the cause of this radiation may be the lack of cancellation between the two wires of the system. I was coupling only to the 115-volt circuit, hence one wire was the neutral and grounded. Since I have 230-volt service, 115 each side of neutral, I believe that I might have had better luck if I had coupled to the 230-volt circuit, as cancellation might have been more complete. The numerous branch lines leading off the main lines must cause some degree of phase shift and a consequent radiation of the signal. The report of W4NX in November *QST* also suggests this to me. Since I can no longer try these things, please pass this along: have someone check the comparative radiation of the two methods of coupling.

In regard to the contacts I have had with W6ULE in Glendale, I am now inclined to believe that direct radiation was responsible in some manner. Since checks were made at each end with outside antennas for pick-up, it seems that the sensitivity of our receiving equipment is not great

enough to receive these signals by direct radiation. When they are connected to the power line, the signal pick-up is stronger, perhaps because the signals tend to follow the power lines. — *Art Gentry, W6MEP*

So far as we know, there is no way in which it can be proved that radiation is taking place, unless it is possible to pick up the signal with an antenna located at a distance of $\frac{\lambda}{2\pi}$ from any

power or telephone wiring. A carrier-current signal may be transferred from one wire circuit to another by induction. By this means, it is readily possible for the signal to arrive at a point where it may be picked up by induction between the nearest power or telephone circuit and a receiving antenna. This does not involve radiation at any point. However, rules governing so-called induction transmitters specify the necessity for avoiding interference to radio communication. We have recognized that the possibility of such interference exists, even though no radiation may be taking place. It was for this reason that the article on carrier current in the March issue of *QST* advised careful selection of the transmitting frequency with respect to frequencies in use by services with stations in the locality of the carrier-current installation. — *D.H.M.*

Feeling you might be interested in a little wartime conversation, I have started something which is a little different by giving code practice, both by hand and machine, on 154 kc. carrier current. There are many interested, and it is a very easy and effective method of instruction. Since the suspension of normal activities, we all have to do more in less time and this is a good time saver.

As far as distance is concerned, we use only very low power — not exceeding 5 watts — and have a good coverage over approximately a three-mile radius.

The town is also doing much in the way of WERS work, and I expect soon to be a member. — *W2LJB/NSG*

In tests with a transposed telephone line operated by a power company, W90ZN at Udall, Kansas, has worked two-way with another station at Midian, Kansas, on low-power carrier current. The distance between stations is approximately 70 miles. He also received a report on his signals from Peabody, Kansas, a distance of 90 miles.

Clyde Washeburn and Joseph Paterchok of

Rochester, N. Y., are building c.c. equipment. The transmitter is to have a 6L6 in the final and they plan to work c.w. W9KRA, now in Rochester, is also planning to build gear for c.c.

W8SCG, Box 97, DeGraff, Ohio, wishes to contact anyone in his vicinity interested in c.c. communication.

Richard Graham, 391 Thomas St., Teaneck, N. J., has c.c. gear built and ready to work with anyone in the Teaneck areas.

Edgar O'Brien, 2704 N. Kildare Ave., Chicago, has low-frequency receiving equipment and would be glad to listen for c.c. rigs in that vicinity.

PROJECT E

Acoustic Aircraft Detection

FIG. 1 shows the circuit diagram of a four-stage amplifier built by Robert E. Hopkins, of Pasadena, Calif., for use in aircraft warning service. Three 6J7 pentode stages and a 6F6 output stage are used. Negative feed-back is used in two stages. Two gain controls are provided to facilitate operation, but the amplifier is said to be stable with both sides open.

In construction, Mr. Hopkins recommends that all grounds be brought to one point on the chassis and that both sides of the heater circuit be isolated from the chassis to reduce hum. The heaters are biased positive as shown in the circuit of Fig. 1-B. The tap across the heater line is variable for hum-balancing purposes.

The unit is designed to operate from a 180-volt supply, which must be regulated.

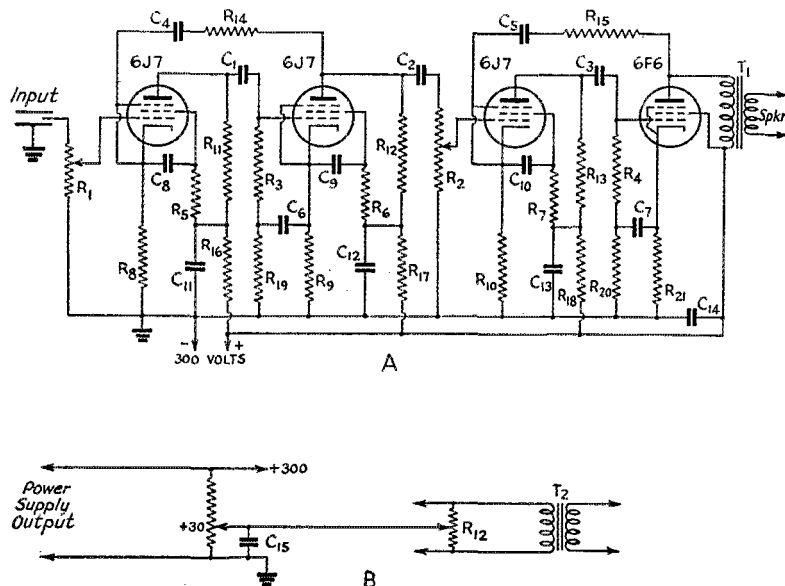


Fig. 1—A—Circuit diagram of a high-gain AAD amplifier.

C₁, C₂, C₃ — 0.1 μfd.
C₄, C₅, C₆, C₇ — 1 μfd.
C₈, C₉, C₁₀ — 0.5 μfd.
C₁₁, C₁₂, C₁₃, C₁₄, C₁₅ — 40 μfd. electrolytics.

R₁, R₂ — 1-megohm potentiometer.

R₃, R₄ — 1 megohm.

R₅, R₆, R₇ — 3 meg.

R₈, R₉, R₁₀ — 3000 ohms, ½-watt.

R₁₁, R₁₂, R₁₃, R₁₄, R₁₅ — ½ megohm, ½-watt.

R₁₆, R₁₇, R₁₈ — 125,000 ohms, ½-watt.

R₁₉, R₂₀ — 0.1 meg.

R₂₁ — 400 ohms.

R₂₂ — 80 ohms.

T₁ — Output transformer.

T₂ — Filament transformer.

B — Circuit of hum-balancing arrangement.

Strays

According to a special item in the *Newark News*, the course for enlisted men in the Signal Corps includes mathematics, electrical theory, vacuum-tube theory, audio systems and *wireless telepathy!* — *H. Spürler.*

I find that ¼-inch cable clamps, with the curved ends bent around the wire, make fine soldering lugs. They are best for No. 12 and heavier wires. The hole in the other end of the clamp is large enough for an 8-32 screw. This lug is handy for ground and high-voltage connections. — *W3VWK.*

A neighboring b.c.l. once wrote W8VBW as follows: "Please forgive the writing of this note, but I had to tell you how much I enjoy listening to your station, even though it isn't polite to listen in."

"It comes in very plain on my small set. Hope you don't mind too much."

After due consideration, W8VBW decided to forgive him. "But don't let it happen again!" said he.

Bound Volume XXVI of QST

We have a limited number of Bound Volume XXVI of *QST*. This volume is made up in two sections, each containing six issues of *QST* for 1942. Handsomely bound and gold imprinted, the complete volume is priced at \$7.50, postpaid.

Amateur Radio and the Civil Air Patrol

Radio Communication Plays a Vital Role in An Essential Civilian-Defense Function

BY CAPT. SAMUEL E. FRAM, CAP,* W3AXT

BEFORE the war the great majority of radio amateurs knew little about aviation or the use of radio in flying. As large a proportion of the private fliers of the country were without training in communications. Now there are thousands of ham pilots and ham operators in the Civil Air Patrol who have swapped experience and have gone a long way toward mastery of the air in both fields.

Like amateur radio, this business of civilian flying is a sort of freemasonry that attracts people from all professions and walks of life, all bound together by a common interest in aviation and its associated activities. So the radio men who have joined the CAP are putting their skill to wartime use in mighty congenial company.

The Civil Air Patrol was founded in 1941, a few days before the raid on Pearl Harbor, as a division of the Office of Civilian Defense, to mobilize the civil airmen of the country and their equipment for duties in the war effort. Several officers of the Army Air Forces have been assigned as national officers of CAP. Maj. Earle L. Johnson is National Commander.

* National Communications Officer, Civil Air Patrol, RFD 2, Lancaster, Pa.



CAP handles a wide variety of flying — and radio — assignments. The Nevada Wing, for example, has mounted units which ride into the back country to find lost planes spotted by its flying observers. Air and ground radio communication are fundamental to missions such as these. *Above* — The headquarters radio dispatcher transmits the position of a "crash" during a drill exercise. *Right* — The "crash victim" arrives by horse-borne stretcher at a motor road, is there transferred to an ambulance by the mounted patrol.

The Patrol is organized with a wing in each of the 48 states, subdivided into groups, squadrons and flights. More than 65,000 civilian volunteers have enlisted to serve in the local units which are active at more than 1,000 airports throughout the country. These units act as aerial home guards, practicing intensively for emergency missions, and as recruitment centers for active-duty missions for which members are detached from their local squadrons.

Most important of the active assignments is the CAP Coastal Patrol, which has been officially credited with the spotting of enemy submarines destroyed by Army or Navy bombers after radio reports from CAP planes, the saving of ships, and the rescue of the survivors of torpedoings. In this service, two-way radio plays a vital part. Obviously, the planes on constant watch over the coastal waters must keep in close touch with their shore bases to report their positions.

The civilian volunteers who man these bases brought not only their own planes and aircraft radios but their shore radios as well. The average radio room of a CAP coastal patrol looks like nothing more than an average amateur radio shack, tuned in to the scouting planes and doing a grand job for our country. For military reasons, most of the thrilling story of this work will have to wait till the war's end before it can be told. When the time comes, the ham radio operators and technicians will get their share of the credit for submarines spotted and for the prompt rescue of CAP pilots and observers rescued when their single-motor landplanes have fallen into the ocean on official duty.



Radio also plays a major role in the forest patrol which is maintained in a number of states by CAP in cooperation with federal and state forestry services. Many a tract of timberland has been saved from fire by the prompt reporting of incipient blazes by airplane radio.

Courier service to carry mail, dispatches, urgent shipments and personnel between Army posts and to speed the delivery of critical parts and materials to war industries is another big-time mission of the Patrol. Many thousands of miles are being flown daily by the small planes of CAP, to help relieve military equipment and airmen for combat duty. Here again radio is indispensable in the necessary flight clearances and landing procedures.

In all civilian flying the use of radio, which was merely a convenience and a safety aid to most pilots prior to the war, is now a necessity in order to comply with the emergency Civil Air Regulations. To guard against unauthorized flights the rules have been rigidly drawn so that the course of every plane in flight may be accurately traced. This requires the filing of a flight plan and a report on landing. At the larger airports planes cannot land or take off except on radio instructions from the control tower and radio acknowledgement by the pilot. Members of Civil Air Patrol are given an opportunity to learn these procedures in their ground classes and in flight operations.

Each wing, group and squadron of the Patrol has its own command and staff officers, including a communications officer, who is usually a man with good background both as a pilot and as a radio amateur or professional. These communications officers are appointed as captains and lieutenants in CAP. Appointments of specialist sergeants and corporals in the Patrol also are provided for radio personnel. All members of CAP wear the Army uniform with special CAP insignia and red braid and shoulder straps — a snappy outfit!

CAP has its own radio emblem (shown in



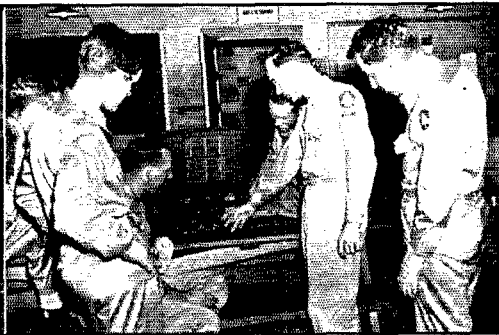
CAP plotting board at West Palm Beach, Fla. An attendant plots the position of CAP aircraft reporting latitude and longitude by two-way radio.

the heading of this article), similar to that of the ARRL. To wear it, the member must hold at least one of the following FCC tickets: radiotelephone or telegraph 1st or 2nd class, or amateur Class A. All members of the Patrol are encouraged to qualify for 3rd-class radiotelephone certificates. Basic training includes the Morse code, and many of the units have undertaken radio studies and field exercises in considerable detail.

Alternative methods of communication, such as airplane message dropping and pick-up, reading of panel signals on the ground, blinkers, and even carrier pigeons, are used by CAP. The policy of the units is to be prepared for all emergencies, such as flood and tornados as well as acts of the enemy, and to develop all available methods. Not all the units have adequate radio equipment and there may be occasions when they will have to work in radio silence.

But radio is the thing, and the versatile members of CAP think up new uses for it day by day,

(Continued on page 90)



Intensive training is an integral part of CAP activity. *Left*— Members of the Columbia Squadron, South Carolina Wing of CAP, receive code-practice instruction. *Right*— Capt. McGraw, wing communications officer, explains operation of a short-wave receiver.

HAPPENINGS OF THE MONTH



METERS WANTED:

You fellows have certainly come forward in a grand manner with your meters, and we've received and turned over twice as many as we expected, so many thanks. But the receipts are only a few per cent of Signal Corps needs, so a great deal more help is required.

See page 38 of December *QST*, page 43 of November. The meters are for the Signal Corps. ARRL is acting as banker and will ante up \$3 for each meter accepted. Meters may be burnt-out but must otherwise be in perfect condition except for normal wear. Must have had an amateur price of at least \$3 when new. Two kinds of meters are wanted: (1) d.c. voltmeters of 1000 ohms per volt or more, up to 4-inches dial diameter, any range; (2) d.c. milliammeters of up to 500 ma. full scale. Unaccepted meters returned. But please *do not* send a.c. instruments, thermocouple meters, \$1 toys, or meters with damaged movement or broken glass or case, since you will just put your League to the trouble and expense of returning them.

No need of yours can compare with the Signal Corps'. You can get better meters when we reopen. Send your meters to war! Pack carefully in shock-absorbing material, mark package "Meters," be sure to show your name and your own complete mail address clearly, prepay charges, ship any way you like, to American Radio Relay League, 38 LaSalle Road, West Hartford, Conn.

STAFF NOTES

THE war has brought the first YL ham to the headquarters' staff, in the person of Miss Carol Anne Keating, W9WWP of Chicago, our

new assistant communications manager. She holds a Class A ticket and has been licensed nearly seven years, having operated 80, 40 and 20 c.w. She is WAS, RCC and ROWH and holds a Public Service Certificate for work in the last Mississippi Valley flood. When the YLRL was



CAROL A. KEATING

formed she was its first vice-president and activities manager. A graduate of the University of Illinois, she was for a while in charge of the nutrition laboratory at the University of Wisconsin, got into war work with BuShips, joined us to help in our wartime WERS job.

Another YL name many of you are finding hitched to headquarters' correspondence these days is that of Miss Barbara Messinger, assistant in the Secretarial Department. Completing our local WERS course, she has a restricted 'phone permit, will serve in West Hartford's WERS.

Speaking of WERS, three other Hq YLs are also on the West Hartford rolls: Louisa B. Dresser, *QST*'s editorial assistant, Ethel L. Burnham and Marian E. Bayrer.

A.R.R.L. RECOMMENDATIONS

TAKE down your transmitting antennas. Turn in the copper.

Send in your d.c. milliammeters and high-resistance d.c. voltmeters. Details elsewhere in this department.

Find a place for yourself in local WERS work.

File with FCC at Washington applications for the renewal of both your station and operator licenses sixty days before expiration, or for necessary modification whenever you change address. Blanks from your district inspector. Operator license will be renewed by FCC. Station application will be held on file, perpetuating your amateur status and insuring early resumption after the war.

Whenever joining the League or renewing membership, state your class of operator license and station call, if any, to insure giving you the proper class of membership. Important in your own interests.

Register for sale with ARRL your factory-built transmitters and receivers. See previous articles in this department.

Register for sale with National Association of Broadcasters, 1626 K Street, N. W., Washington, D. C., the transmitter tubes you will sell to broadcasting stations. See page 39, December *QST*.

If available for radio employment, register with the ARRL Personnel Bureau, following the style of the form on page 38 of October *QST*.

If you're serving in the armed forces, please advise rank, branch, arm of service and old hometown call — for the amateurs' service roster and for *QST* mention.

Lend needed equipment to the training schools near you.

ELECTION NOTICE

To all members of the Northwestern and Rocky Mountain Divisions:

You are hereby advised that no eligible candidate for alternate director has been nominated from your divisions under the recent call. By-law 21 provides that if no eligible nominee be named, the procedure of soliciting and nominating is to be repeated. Pursuant to that By-law, you are again solicited to name a member of your division as a candidate for alternate director. See the original solicitation published at page 23 of September *QST* and page 37 of October *QST*, which remains in full effect except as to dates mentioned therein; nominations must now be filed at the headquarters office of the League, in West Hartford, Conn., by noon, EWT, of the 20th day of January, 1943. Voting will take place between February 1st and March 20th, 1943, on ballots to be mailed from the headquarters office the first week of February. The new alternates will take office as quickly as the results of the election can be determined after March 20, 1943, and will serve for the remainder of the 1943-1944 term.

You are urged to take the initiative and file nominations.

For the Board of Directors:

K. B. WARNER
Secretary

November 2, 1942.

DEATH OF DONLE

IN THIS column last month we reported the appeal of Dr. Harold P. Donle, research worker, for some 958 acorns. We regret now to have to withdraw this appeal because of the sudden death of Dr. Donle.

An early amateur, he had spent his recent post-war years in the development of an independent system of television. He was best known to old-time hams as the developer of Connecticut Tel's early vacuum tube, the one shaped like an oversized medicine dropper, with the anode electroplated on the outside of the envelope, plate current relying on electrolytic conduction through the glass.

F.C.C. AMATEUR EXAMINATIONS FOR 1943

THE Federal Communications Commission will give amateur examinations during 1943 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Inspector in Charge of the district. An asterisk (*) indicates that the examination dates shown are subject to change and should be verified from the inspector as the date approaches. No examinations are given on national or state holidays. All examina-

tions begin promptly at 9 A.M., local time, except as noted below:

Albuquerque: Mar. 26, Sept. 24.
Atlanta, 411 Federal Annex: Tuesdays, Fridays and Saturdays.
Baltimore, 508 Old Town Bank Bldg.: Wednesdays and Saturdays; other days by appointment.
Bangor, Me.: Mar. 20*, Sept. 18*.
Beaumont, Tex., 329 Post Office Bldg.: Thursdays.
Billings, Mont.: May 15*, Nov. 13*.
Birmingham: Jan. 15, Apr. 16, July 16, Oct. 15.
Bismarck, N. D.: Some time in April and October.
Boise: Apr. 24*, Oct. 23*.
Boston, 7th floor Customhouse: Daily except Thursdays.
Buffalo, 328 Federal Bldg.: First and third Saturdays of each month.
Butte, Mont.: May 12*, Nov. 10*.
Charleston, W. Va.: Some time in the third* week of March, June, September and December.
Chicago, 246 U. S. Courthouse Bldg.: Saturdays.
Cincinnati: Some time in the first* week of February, May, August and November.
Cleveland, 541 Old P. O. Bldg.: First and third Saturdays of each month.
Columbus, Ohio: Some time in the third* week of January, April, July and October.
Corpus Christi: Some time in June and December.
Cumberland, Md.: Apr. 14 and Oct. 14.
Dallas, 500 U. S. Terminal Annex: Tuesdays and Saturdays.
Davenport, Ia.: Some time in January, April, July and October.
Denver, 504 Customhouse: First and second Saturdays of each month.
Des Moines: Jan. 9, Apr. 10, July 10, Oct. 9.
Detroit, New Federal Bldg.: Saturdays.
Fort Wayne: Some time in February, May, August and November.
Fresno: Mar. 11* and 12*, June 15* and 16*, Sept. 15* and 16*, Dec. 14* and 15*.
Galveston, 404 Federal Bldg.: Wednesdays, Fridays and Saturdays.
Grand Rapids: Some time in the first* week of January, April, July and October.
Hartford, Conn.: Apr. 15* and Oct. 14*.
Hilo, T. H.: Jan. 25 and Aug. 17.
Honolulu, 609 Stangenwald Bldg.: Mondays and Saturdays at 8:30 A.M.
Huron, S. D.: Some time in March, June, September and December.
Indianapolis: Some time in February, May, August and November.
Jacksonville: May 8 and Nov. 6.
Juneau, Alaska, 7 Shattuck Bldg. (P. O. Box 1421): By appointment.
Kansas City, 809 U. S. Courthouse: Saturdays.
Kaunakakai, T. H.: Aug. 3.
Lana'i City, T. H.: Aug. 4*.
Lihue, T. H.: Feb. 8 and Aug. 24.
Little Rock: Jan. 12, Apr. 13, July 13, Oct. 5.
Los Angeles, 539 U. S. P. O. & Courthouse Bldg.: Wednesdays and Saturdays.
Memphis: Feb. 23 and Aug. 24.
Miami, 312 Federal Bldg.: Tuesdays and Fridays.
Milwaukee: Some time in January, April, July and October.
Mobile: May 25 and Nov. 18.
Nashville: Feb. 19, May 21, Aug. 20 and Nov. 19.
New Orleans, 308 Customhouse: Mondays at 8:30 A.M.; other days by appointment.
New York City, 749 Federal Bldg., 641 Washington St.: Tuesdays, Thursdays and Saturdays.
Norfolk, 402 New P. O. Bldg.: Class A, daily; Class B, Saturdays.
Oklahoma City: Jan. 23, Apr. 24, July 24, Oct. 23.
Omaha: Apr. 3 and Oct. 2.
Philadelphia, 1200 Customhouse: Wednesdays and Saturdays.
Phoenix, Ariz.: May 1*, and Oct. 30*.

(Continued on page 53)



ON THE ULTRAHIGH

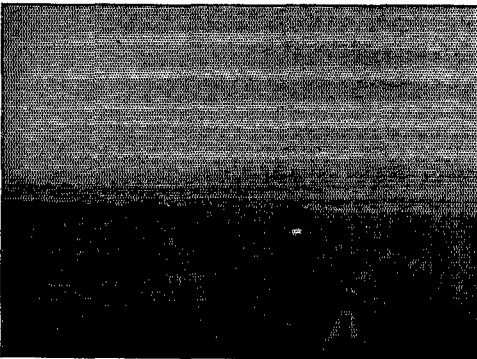


CONDUCTED BY E. P. TILTON,* W1HDQ

WE have just returned from a doleful mission — the complete dismantling of W1HDQ. Anyone who has put years of effort (and more money than he could well afford) into an amateur station will know what we mean. It took nearly two hours just to take down the QSLs! But this dismembering operation, hopefully delayed since December 7, 1941, now takes on a symbolic quality. The cessation of operation a year ago was much more than an interruption in our pleasant scheme of things; it should be recognized as the end of an era — a happy and eventful period, but one which has just about run its course.

Just as the automotive industry, by a complete conversion of its facilities to war production, will be in a position to bring many of its designers' dreams to reality once victory is won, so amateur radio stands at the threshold of a new era. If the training now being given so extensively to those who will make up the amateur fraternity of the future does not stir up enough new ideas to warrant scrapping much of our 1941 technique, then ham spirit will have suddenly undergone a considerable change. To anyone who has had a peek at the new gear now being employed in the prosecution of the war, especially in the u.h.f. field, it is unthinkable that we should pick up right where we were forced to drop things a year ago. Of course no one can talk in terms of technical details for a long time yet, but it may not be amiss to revise our ways of thinking about our avocation in preparation for changes which are as inevitable as was the conversion from spark to c.w. after World War I.

*329 Central St., Springfield, Mass.



A clearly-defined smoke or dust layer frequently provides visual evidence of a temperature inversion. Look for it at dawn or dusk in fair calm weather.

First, we should learn everything we can about microwave technique. There is plenty of literature available — the military secrets are concerned only with the war applications. The two-part article, "100 Centimeters and Down," by W3AOC, appearing in *QST* for July and August, 1942, is an excellent start. Once we venture beyond the 112-Mc. band we have to unlearn many of our standard conceptions. We have to get over the idea, for instance, that a tank circuit is necessarily a coil connected to a condenser. Every coil has capacity, and every condenser inductance. The two don't have to be two separate parts connected together by wires, just because they have always looked that way in our schematic diagrams. The development of efficient tank circuits will be an interesting field for exploration.

Second, when we think of "high-gain antennas" we must forget our lovely (to us) three-element rotary. We must learn what a really flat line is, and how to attain it. Getting radiation is no problem as one goes higher into the radio spectrum — it's preventing unwanted radiation that becomes increasingly hard. We should be investigating the parabola, and giving a thought to true point-to-point communication, where the signal goes only where you want it to go. Antennas which accomplish this feat may be truly termed "beams," and it's being done, now.

Third, we would do well to get the facts on f.m. before we rebuild that Class-B modulator to handle a final input of 1 k.w. We're going to want to give f.m. a good workout, certainly, when we get back to amateur communication.

Fourth, we should be boning up on cathode-ray technique. Current developments place heavy emphasis on the importance of this phase of the art in our plans for the future.

Ever since Ross Hull's work back in 1934 which resulted in his formulation of the theory of air-mass bending of u.h.f. waves, there has been a lot of talk about temperature inversions. The newer textbooks on meteorology devote considerable space to discussions of this phenomenon. Most of us who were active on 56 or 112 Mc. came to recognize the presence of an inversion in the increase in strength of signals from points beyond the horizon. We learned certain weather signs as evidence of the existence of "good conditions" on the ultrahighs, but one of the best omens passed almost unnoticed.

A temperature inversion exists when the air aloft is warmer than that at ground level. This

may result from numerous causes most of which cannot be detailed without running afoul of the censor, but it will suffice, for our purposes, to say that this layer of warm moist air is frequently outlined visually as shown in the accompanying photo. The sharply-defined smoke-dust line results when rising smoke or dust particles reach the base of the temperature inversion. This, probably the most advanced visual warning of the presence of an inversion, is most often visible in the calm of dawn or dusk, and may be seen, as in the case of the accompanying early-morning view over the roof-tops of Springfield, in an otherwise absolutely clear sky. Any sizeable city will provide sufficient smoke, and in the wide open spaces there is usually enough dust in the air during the summer months to provide us with this indicator. The co-holder of the world's 112-Mc. DX record, W2MPY, was the first amateur we know of to notice the presence of this "DX cloud." Bill reports that it was very low and exceptionally clear in definition on the evening of August 21, 1941, when he made his now historic series of contacts from the summit of Mt. Katahdin.

Not every ham who goes into the Army is pleased with what he finds in the way of radio procedure. Our good friend, W6QLZ, relates that one of his amateur acquaintances, a certain W3 who claimed the ability to copy 50 w.p.m., was assigned to the task of cranking the generator during recent maneuvers, while a higher-up who couldn't read code ran the rig. After a few weeks of Signal Corps duty (long enough to find out how things are done in the Army and get a peek inside most of the rigs thereabouts) Clyde was transferred to the Veterinary Hospital at Fort Bliss, Tex., where, after years of Mission Ranch, near Phoenix, Ariz., the presence of cattle and horses makes him feel right at home. Clyde wonders why some bright young man doesn't bring out a transceiver for WERS work which will have low radiation when used for receiving. He says that some of the new outfits the Army uses can be operated within fifty feet of one another without severe mutual interference when both are receiving the same station. Anyone know how it's done?

W1MEP, now Cpl. G. C. Mallory, Co. R, 15th S. S. Regt., Fort Monmouth, N. J., writes that rushing through the Signal Corps Training School is not much like watching for fires or working DX from Glastenbury Mountain, Vt. "Up there on the Mountain I did things tomorrow, but down here they don't do things that way."

We had a surprise visit last week with W1JLI, W1NHN, and W1MBS. Norma Schall, W1NHN, sister of W1JLI, has enlisted in the WAVES, and is awaiting orders to training in Wisconsin. W1MBS, perennial leader in 112-Mc. contest

activity, has also enlisted in the Navy and is awaiting assignment for training as an aviation cadet.

Another recent visitor was Ed Bryan, W9GEG, ex-K6MUL, son of K6MUV. Ed tells us that he did some work from Golden, Colorado, on Five during the summer of 1941, working with the boys in Denver. He managed to miss every DX session, however, and no DX contacts were reported involving any Colorado stations during all of 1941. You fellows had better make more noise out there next time.

That's a state almost all of us could use! Ed is now 2nd Lt. E. C. Bryan, Ft. Monmouth, N. J.

Here's one that came a long way. Frank Grey, W9LLM/6, says he recently received word from ZP2GA (Paraguay) who reports that LUs are allowed to operate on Five. Must have been a couple of those fellows we didn't hear the other night when we were tuning the band!



Pvt. Clyde R. Criswell, W6QLZ, Fort Bliss, Texas.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

- Capt. Clarence Bates, W9DTP, Minneapolis, Minn.
- Herbert T. Brunsdon, VK2BX, Leichhardt, N.S.W.
- Leslie Lyon Cook, W4HJZ, ex-W3BDH, Miami, Fla.
- Leonard P. Hyland, VK7LP, Hobart, Tasmania
- Harold S. Johnstone, W1FY, West Haven, Conn.
- Lt. George A. Messing, W6HOW, Oakland, Calif.
- J. C. Owens, jr., W4GWU, Pensacola, Fla.
- Ben O. Ruottinen, W8PXF, Flint, Mich.
- Vincent E. Whaley, W8RKA, East Randolph, N. Y.
- W. O. White, W6MUP, Tucson, Ariz.
- Arthur C. Wrigley, W8AKJ, Pittsburgh, Pa.

Straight from the Shoulder

New Signal Corps Manuals Are Written in Language That Americans Understand

THE criterion of dullness is the knife that "won't cut hot butter." Veterans of World War I might wish to add another example: "Nothing was so dull as the language used in army regulations and instruction books." However, fathers of the American doughboy, Model 1942, would hardly recognize some of the official language now



used in military terminology. It sounds human. Leaders of our modern Army have learned that, if the maximum amount of training is to be given our soldiers in the minimum amount of time, it becomes necessary to talk the language of the average soldier.

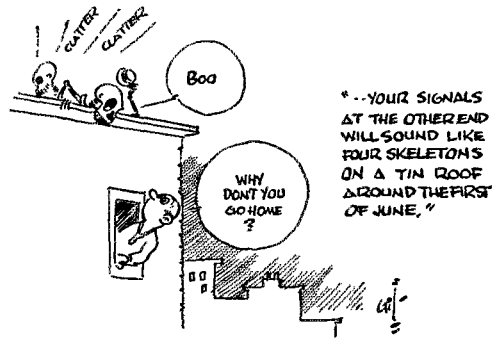
The Signal Corps has set the example in presenting instruction in plain, every-day Americanese. Instructional pamphlets using cartoons, slang, and typical Yankee terms have been issued to Signal Corps radio operators and maintenance men which supplement the formal, standard Army texts. These pamphlets are in use at Ft. Monmouth, N. J., home of the Signal Corps, and are being issued also to operators and technicians of other arms and services in the field.

Tank radio operators are instructed not to try to get more range out of their transmitters than they are designed for. "Some radio operators

Seldom does *QST* use the prepared publicity material that comes in endless flood from government, military and industrial sources, chiefly because it is not slanted toward our specialized field of amateur radio. There are exceptions to every rule, however, and in this case it is the accompanying release from Fort Monmouth's public relations office. Underlying its readability is an important lesson for all teachers of radio — which so many of us are these days.

after experience with the tank radio discover that by smart spot-picking (i.e. from a high hill) they can set up a long distance record of say umpty-five miles. . . . Then there's hell to pay. The umpteen mile sets are suspected of the worst and promptly sent back to maintenance for an injection of something or other. . . . Don't let the rumor that so-and-so's set will do a regular umpty-five miles fool you. Someone is shooting what is known in polite circles as 'the bull'."

Tank radio operators are cautioned to familiarize themselves with their equipment and learn how to use it properly. "There's one thing about this radio business that sort of gripes the old timers. Nobody expects to start shooting a 75, a 37, a machine gun or even a pistol until he's been taught a lot. But when it comes to a radio set — that's different, and any healthy American over 18 (and not dead drunk) is, for some reason or other, supposed to be able to walk up to the near side of a radio set, look it squarely in the eye, rapidly twist all the knobs in a different direction,



stick a couple of plugs inside and, presto — it talks both ways. But the above is pretty near 100 per cent baloney, and don't let it fool you."

Operators of mobile radio stations are cautioned against exposure to death-dealing high voltages and are taught the use of safety devices. The Signal Corps pamphlet whimsically observes that "broadcasters need these devices to keep half-canned announcers and over-fed sopranos from sitting on their tank-coils."

In order to keep extraneous noises out of the microphone, operators are told to speak directly into the instrument, and not to "sit comfortably back like a sports announcer and proceed to talk a foot from your mike. Your signals at the other

(Continued on page 84)

A Course in Radio Fundamentals

Lessons in Radio Theory for the Amateur

BY GEORGE GRAMMER,* WIDE

No. 8—Wave Propagation, Antennas and Transmission Lines

IN addition to the practical difficulties of measurement in connection with experiments on antenna systems, there is at present a regulatory prohibition against radiating a signal of any kind. Experimental work with radiating antenna systems is therefore definitely out of the question. Also, the limitations of simple test equipment preclude the possibility of comprehensive measurements on transmission lines. In this section of the course there is, as a result, only one experiment.

With this installment the series begun in *QST* last June reaches completion. To avoid the necessity for carrying over into the following issue, the answers to problems in the present group of assignments are given at the end of this installment. Those who have stayed with us this far should, we believe, have acquired a fair grasp of those fundamentals which are necessary for understanding the operation of practical radio apparatus. More than superficial effort will have been required — as we all know, there is no shortcut to knowledge. We hope, though, that we have succeeded in our attempt to make the path interesting — after all there is no reason, really, why study has to be just a grind.

It will no doubt have occurred to the reader that there are many ideas in electrical and vacuum tube fundamentals which could profitably be treated in greater detail. In any attempt of this kind there always arises the question of where to draw the line between the essential and the desirable-but-not-quite-essential. Where the line of demarcation is to be placed must be determined by the ultimate aim. In this case, those fundamentals were included for which the student is likely to have frequent use in the practical operation, maintenance and (particularly for amateur purposes) design of radio communication equipment. For example, the specific use of vectors has been avoided in connection with a.c. circuits, although vector diagrams have been introduced, incognito, where necessary. Likewise, it would be possible to go into more detail in the calculation of vacuum tube operation. Although unquestionably worthy subjects in themselves, and ones leading to a still more thorough understanding of the subject as a whole, their applications

fall more in the field of engineering than in the field for which this course was intended. Topics of this nature can be treated in further *QST* series if it appears that readers want it.

ASSIGNMENT 32

Study *Handbook* Chapter 9.

Questions

- 1) What is meant by the polarization of a radio wave?
- 2) Name the two general groups into which radio waves are classified as to the way in which they travel.
- 3) How may the direction of travel of a radio wave be changed?
- 4) Why is a ground wave vertically polarized?
- 5) Describe in general terms the relationship of the range of the ground wave to the frequency of the transmission.
- 6) In what units is field strength usually measured?
- 7) What is the ionosphere?
- 8) Name the important ionosphere layers. What are their approximate heights?
- 9) What is meant by the term "critical frequency"? What is its relationship to maximum usable frequency?
- 10) What is the "wave angle" or "angle of radiation"?
- 11) What is the skip zone? What factors determine the skip distance?
- 12) Why do radio signals fade?
- 13) Why is it desirable to have a "line-of-sight" path for communication on ultra-high frequencies?
- 14) The antenna at a u.h.f. transmitting station is 100 feet above the ground. If the receiving station is 20 miles away, what receiving antenna height is necessary for good reception? (Assume that the intervening terrain is flat.)
- 15) What is the general effect of the ray reflected from the ground on the strength of a u.h.f. signal at a receiving point?
- 16) Name three means by which u.h.f. signals may be transmitted beyond the horizon. What are the general characteristics of each?
- 17) Why is multi-hop transmission necessary for covering great distances?

ASSIGNMENT 33

Study *Handbook* Sections 10-1 to 10-4, inclusive.

Questions

- 1) What factors determine the optimum angle of radiation of a given antenna system?
- 2) What is meant by the impedance of an antenna? Where is it usually measured?
- 3) How is the polarization of an antenna system specified?
- 4) How are the standing waves of current and voltage distributed along a half-wave antenna?
- 5) What is the proper length, in feet, of a half-wave antenna which is to be operated on 7150 kc.? On 5000 kc.? On 12,500 kc.?
- 6) What is the resonant frequency of an antenna 32 feet 6 inches long?

* Technical Editor, *QST*.

7) What is a "radiation pattern"? Describe the pattern for a half-wave antenna.

8) What is the approximate value of the impedance of a half-wave antenna? How does the impedance vary at different points along the wire?

9) When a horizontal antenna is used, at what height, in feet, should the antenna be erected if maximum radiation is desired on 14,200 kc. at a wave angle of 20 degrees, assuming ground having high conductivity?

10) In general, how does the optimum radiation angle vary with the height of an antenna?

11) What factors determine the shape of the effective radiation pattern of an antenna, considering such a pattern to give relative field strength in various compass directions?

12) What is the effect of the ground on the impedance of an antenna system?

13) If the optimum wave angle of a half-wave horizontal antenna is in the vicinity of 45 degrees, would you expect the antenna to show any observable directive effects (in the horizontal plane) at distances for which such a wave angle would be useful?

14) What is meant by the terms "current feed" and "voltage feed"?

15) What is the disadvantage, in ordinary circumstances, of feeding power directly into an antenna without using a transmission line?

16) Draw a circuit showing current feed to a half-wave antenna. Explain the uses of the various circuit components.

17) A half-wave antenna has a resonant frequency of 3650 kilocycles. It is to be current fed, using a coupling coil having 16 turns 2 inches in diameter, spaced 8 turns to the inch. If two tuning condensers are used, one on each side of the coil, what capacity is required in each, assuming that they are adjusted to equal capacities?

ASSIGNMENT 34

Study *Handbook* Sections 10-5 to 10-8, inclusive. Perform Exp. 40.

Questions

1) Name four common types of transmission lines used for carrying radio-frequency power.

2) What are the principal requirements for a good transmission line?

3) Why is it necessary to use relatively small spacing between the wires of a transmission line? What determines whether the spacing is "large" or "small"?

4) What is the "characteristic impedance" of a transmission line? What line constants determine its value?

5) The outer conductor of a certain concentric transmission line has an inside diameter of $\frac{1}{2}$ inch. If the inner conductor is No. 10 copper wire, what is the characteristic impedance of the line?

6) What is the characteristic impedance of a two-wire line using No. 18 wire if the spacing, center to center, is $1\frac{1}{4}$ inches? What is the characteristic impedance if a line of the same spacing is constructed of No. 12 wire? If the line is made from half-inch tubing?

7) What is meant by "transposition" in a two-wire line? Why is it desirable on long lines?

8) Define standing-wave ratio. What determines the standing-wave ratio on a line terminated in a resistance?

9) A 500-ohm line is terminated in a resonant antenna having a resistance of 25 ohms. If the current flowing into the antenna terminals is 2 amperes, what is the current at a current node? What are the maximum and minimum values of the voltages along the line?

10) A 600-ohm line is terminated in a resistance of 70 ohms. If the line is a quarter wavelength long what is the impedance looking into the input terminals? What is the nature of the impedance? What is the impedance if the line is one-half wavelength long?

11) A quarter-wave line section is to be used as an impedance transformer to match a 100-ohm load to a 550-ohm transmission line. What value of characteristic impedance is required in the matching section? How could such a line be constructed?

12) Under what conditions does a transmission line show reactance at its input terminals? When does it show resistance only?

13) What is the difference between a resonant and a non-resonant line?

14) A twisted-pair line 125 feet long, having a loss of 1.1 db. per wavelength, is terminated in its characteristic impedance of 70 ohms. If the frequency is 3 Mc., what is the line loss in db.? What is the loss if the frequency is 20 Mc.? If a 70-ohm coaxial line having a loss of 0.1 db. per wavelength is substituted, what is the loss in the two cases? In terms of percentage, how much power is gained at the antenna by substituting the second line?

15) Draw a circuit diagram of a pi-section filter connected between a balanced tank circuit and a two-wire transmission line. Describe the method of adjustment.

16) What type of line operation is best suited to coupling to the transmitter by means of simple systems such as an untuned coil or taps on the transmitter tank coil?

17) What is the purpose of tuning equipment at the input end of a transmission line? Describe a method by which the loading on the transmitter may be adjusted.

18) A 600-ohm non-resonant line is to be coupled to a transmitter by means of the circuit given at (F) in the *Handbook* diagram showing methods of coupling to transmission lines. If the frequency is 14 Mc., what would be suitable values for the inductance and capacity? If the power is 500 watts, what current flows into the line, and what is the voltage across the line terminals?

19) Compare the various systems of coupling with respect to harmonic transfer.

20) Why is it necessary to make an antenna fed at the end by a two-conductor line exactly resonant if feeder radiation is to be minimized? How does an antenna fed at the center compare in this respect?

21) A half-wave antenna is fed at the end by a transmission line $\frac{1}{4}$ wavelength long. Which should be used, series or parallel tuning? Which should be used if the same line is connected to the center of the antenna?

22) What, in principle, must be done to terminate a transmission line in its characteristic impedance when it is connected to an antenna?

23) What are the respective advantages and disadvantages of resonant and nonresonant operation of transmission lines?

24) A 600-ohm line is to be matched to a half-wave antenna using a delta matching transformer. If the operating frequency is to be 7100 kc., find the dimensions of the system.

25) What are the advantages and disadvantages of the single-wire feed system?

26) A 500-ohm line is connected to the center of a half-wave antenna having a resistance of 70 ohms. What is the standing-wave ratio on the line? If it is desired to bring about an impedance match between the antenna and line, using a quarter-wave linear transformer with conductors of half-inch tubing, what center-to-center spacing is required between the conductors? Find the length of the antenna and the length of the matching section if the frequency is 8.15 megacycles.

27) Describe the method of matching a transmission line to an antenna when the line is tapped on an open-wire quarter-wave matching section, the matching section being connected to the center of the antenna.

ASSIGNMENT 35

Study *Handbook* Sections 10-9 to 10-11, inclusive.

Questions

1) What is a "long-wire" antenna?

2) What is the general effect of increasing the length of an antenna, in terms of half wavelengths, on the directive pattern of the antenna? What is the effect on the radiation resistance?

3) What is the "power gain" of an antenna? How is it possible for an antenna system to give a gain in field strength, in its optimum direction, as compared to the field strength

from half-wave antenna driven with the same power input?

4) An antenna is to be 3 wavelengths long at an operating frequency of 7.2 megacycles. What is its length in feet?

5) An antenna 130 feet long is to be operated on its fundamental, 2nd, 3rd, 4th, and 5th harmonics. What is the resonant frequency in each case? Compare the harmonic resonant frequencies with the actual harmonics of the fundamental frequency.

6) Why cannot a harmonic antenna be fed at a current node (except when fed at the end) if it is to operate as a long wire?

7) Describe an antenna system capable of operating on several harmonically-related bands.

8) Why is it difficult to use non-resonant feeders with a multi-band antenna?

9) What is the principle of the "V" antenna?

10) A "V" antenna is to be constructed with sides $4\frac{1}{2}$ wavelengths long to operate on a frequency of 14,100 kc. What should the angle between the wires be, and what is the length of the wires in feet?

11) In what direction with respect to the wires does the "V" antenna transmit and receive best?

12) Describe the horizontal rhombic antenna.

13) What is the purpose of the terminating resistor on a rhombic antenna? What is the effect on the operation of the antenna if it is omitted?

14) In general, what is the effect of the height and leg length on the power gain and optimum wave angle of a rhombic antenna?

ASSIGNMENT 36

Study *Handbook* Sections 10-12 to 10-14, inclusive.

Questions

1) What is the physical arrangement of the elements of an antenna array when the elements are collinear?

2) What is the difference between broadside and end-fire arrays? What is the physical arrangement of the elements in such arrays?

3) What is the basic principle upon which antenna elements are formed into arrays to secure power gain and directivity?

4) What is a phase-reversing section? When is such a device necessary in an antenna array?

5) What does the term "stacking" mean in connection with the elements of a directive array?

6) Sketch the arrangement of a simple four-element array using two parallel pairs of collinear elements, connected for broadside directivity with half-wave spacing. Connect the feed line to the junction of one pair of collinear elements and show proper phasing of the transmission line connecting to the other pair of collinear elements.

7) Using two parallel driven elements spaced a half wavelength apart, indicate proper connections of the transmission lines to give (a) broadside operation and (b) end-fire operation, when (1) the power is introduced into the system at the end of one element, (2) when the feed point is at the middle of the line connecting the two elements, and (3) when the feed point is at the center of one element. Show relative direction of current flow in the various wires.

8) What is a parasitic element? How is radio-frequency power fed to such an element?

9) What is the difference between a reflector and a director?

10) What is the meaning of the term "front-to-back ratio"? What relation does this ratio bear to the power gain of the antenna?

11) What is the effect on the radiation resistance of a driven element when the spacing between such an element and a director or reflector is decreased?

12) Describe a suitable method for feeding the driven element of an antenna system consisting of such an element with one or more parasitic elements.

13) For what frequencies is a grounded antenna most useful? Why is it desirable to have as much as possible of the total length of a grounded antenna vertical?

14) Describe the coaxial antenna. What is the purpose of this type of construction?

15) What is a "folded dipole"? What advantages does this type of antenna have over a simple half-wave antenna?

EXPERIMENT 40

Reactance Characteristics of Transmission Lines

Apparatus: This experiment requires the power supply, oscillator, a receiver capable of tuning to 30 megacycles (approximately), a small coil and variable condenser which also can be tuned to 30 megacycles, and an open-wire transmission line about 20 feet long. The line should preferably be made of bare wire (No. 18 is convenient for indoor use) and should be stretched tightly between such supports as may be available. A spacing of about two inches between wires will be satisfactory. Both ends of the line should be insulated. Spacers to maintain uniform distance between the wires may be made of two-inch strips of wood.

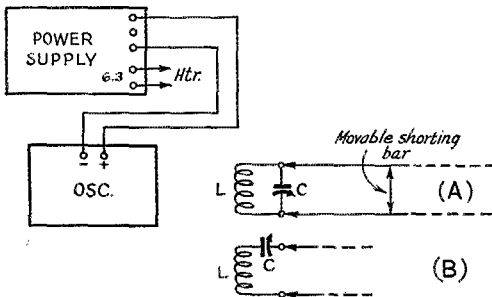


Fig. 1

The circuit arrangement is shown in Fig. 1. Condenser C may be the small condenser from the circuit board; it should have a maximum capacity of 35 to 50 $\mu\text{mfd.}$ and should be of the type having semi-circular plates. (Other plate shapes may be used if a capacity calibration curve is available for the condenser.) The coil L should have sufficient inductance so that the circuit formed by L and C can be tuned to 30 megacycles with C at approximately half capacity. Self-supporting construction can be used, with No. 12 wire wound to a diameter of about an inch. Allowing 7 or 8 turns per inch, the number of turns required will be of the order of 10. The variable condenser, C , should be provided with an insulating extension shaft five or six inches long so that hand capacity will not interfere with tuning. It should be equipped with a 100-division dial, of the "vernier" or slow motion type if possible, to facilitate accurate setting. The coil L should be mounted close to the condenser so that the shortest possible leads can be used to connect the two.

To use the oscillator at 30 megacycles it will be

necessary to provide new coils for the plate and grid circuits. The plate coil can consist of three turns of wire of any convenient size, the turns being spaced so that the total length of the coil is $1\frac{1}{2}$ inches. The grid coil should consist of about five turns, wound with about $\frac{1}{8}$ inch spacing between turns. A 5000-ohm 1-watt non-inductive resistor should be connected in parallel with the grid-leak resistor already in the oscillator unit. The plate voltage on the oscillator should be set, by means of the taps and variable resistor on the power supply, to 50 volts or so.

Procedure: The purpose of this experiment is to measure, by means of its effect on a tuned circuit, the reactance at the input terminals of a two-wire transmission line, as the line length is varied. The line length is changed by means of a "shorting bar" which actually may consist of a pair of small copper-plated battery clips fastened back-to-back to extend between the wires of the transmission line. The clips will make better electrical connection to the line than a plain metal bar or knife edge, and will hold themselves in position when measurements are being made.

Set the oscillator frequency to 30 Mc., as indicated by the signal in the calibrated receiver. The actual frequency is not especially important so long as it is near 30 megacycles, but the frequency selected should be maintained throughout the experiment. Therefore the receiver should be thoroughly "warmed up" before any measurements are made. Connect L and C in parallel, but do not connect the transmission line. Put the tuned circuit formed by L and C in the position it will occupy (at the end of the line) during the experiment, and bring the oscillator near enough so that when C is tuned through resonance there will be a slight change in the oscillator frequency. The beat-frequency oscillator in the receiver should be on, to make this resonance indication readily apparent. Use the loosest coupling between the oscillator and the tuned circuit which will give a good resonance indication.

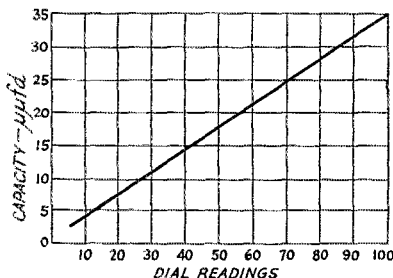


Fig. 2

In making measurements the shorting bar is moved along the line a foot at a time, so it will be convenient to mark one of the line wires at one-foot intervals, starting from the end which will

be connected to the tuned circuit. This measurement must start right at the tuned circuit itself, since any connecting wires unavoidably become part of the line.

After having set the tuned circuit to resonance, connect the transmission line as at A in Fig. 1, connect the shorting bar across the line at the three-foot mark, and readjust C to obtain the new resonance indication. The resonance point should be found near the maximum capacity end of the condenser scale. If there is no indication, set C at maximum and slide the shorting bar back and forth until the resonance point is found, as indicated by a shift in the oscillator frequency. Measure the length of the line at this point, then move out to the next one-foot interval of length and adjust C for the new resonance point. Note the condenser dial reading. Continue at one-foot intervals until the resonance point moves to the minimum-capacity end of the condenser scale. Should the resonance indication be weak (effect on oscillator frequency just perceptible) in any case, the oscillator can be moved nearer the tuned circuit, the oscillator frequency being readjusted whenever such a change is made so that it always corresponds to the frequency to which the receiver is set. Too-pronounced indications also are to be avoided, and in case the frequency change at resonance, with the line connected, becomes greater than is necessary for easy identification, the oscillator should be moved away from the tuned circuit.

At a line length of about 13 feet the capacity required at C for retuning to resonance probably will become too small for the condenser range, so that further measurements cannot be made until the line becomes about 19 feet long when the condenser again will resonate near maximum capacity.

The parallel-tuned circuit should be used over as much of the line as possible, but in the regions where it cannot be used the series connections shown at B can be substituted. Using series tuning, start with the line one foot long, tune C to resonance, and note the dial reading. Move the shorting bar to the two-foot point, again note the dial reading at resonance, and continue at one-foot intervals until no further measurements are possible (C at minimum capacity). Then move the shorting bar out along the line until a resonance indication is observed again, this time with C near maximum capacity. This will probably occur at about the 15-foot point. Continue taking readings until the end of the line is reached.

To interpret the dial readings it is necessary to have a capacity calibration for the condenser in the tuned circuit. In only a few cases is an actual calibration likely to be available, but if the condenser has semi-circular plates an approximate calibration can be constructed without much difficulty. It is necessary to know the maximum and minimum capacities of the con-

denser used; this information is usually to be found in the manufacturer's catalog. In the case of semicircular plates the capacity is, within reasonable limits, directly proportional to the angular movement of the rotary plates over most of the condenser range. The most important exception is at the minimum-capacity end of the scale, where there is usually a small range of movement of the rotary plates before they actually begin to mesh with the stationary plates. This normally amounts to about five divisions on a 100-division dial. By assuming that minimum capacity occurs at "5" on the dial scale and maximum capacity at "100," then drawing a straight line between these two points, the calibration will be somewhat nearer the truth than if the line is simply drawn from 0 to 100. Fig. 2 shows a calibration curve of this type. The condenser had a rated maximum capacity of 35 μf d. and a minimum of 2.5 μf d.

The condenser calibration curve gives a means of determining the change in capacity necessary to retune the circuit to resonance when the line length is varied. In turn these capacity changes can be converted into reactance variations, giving the amount of reactance which must be added to or subtracted from the circuit to compensate for the reactance introduced by the line. The way in which the compensation is brought about depends upon the way in which the tuned circuit is connected; that is, whether the tuning is series or parallel.

As an example, assume that the circuit is resonated by itself and that the coil and condenser each have a reactance of 500 ohms, as in Fig. 3-A. Suppose that the particular length of line used causes the line to have a reactance at its input terminals (at the resonant frequency) of 1000 ohms, inductive. Connecting the line to the tuned circuit is then equivalent to shunting an inductive reactance of 1000 ohms across the circuit, as in Fig. 3-B. The two inductive reactances in parallel will combine to give an equivalent reactance of $\frac{500 \times 1000}{500 + 1000}$ or 333 ohms. To make

the circuit resonant, the capacitive reactance must also be changed to 333 ohms. Since reactance is inversely proportional to capacity, the capacity of the condenser must be increased to a value which corresponds to a reactance of 333 ohms. The increase in capacity could be brought about by leaving the capacity of the original condenser unchanged and adding a second condenser in parallel, as in Fig. 3-B. The capacity required at the second condenser would be such that its reactance would be 1000 ohms, when the two capacity reactances in parallel would combine to give an equivalent reactance of 333 ohms. In other words, the difference between the capacity required for tuning to resonance with the line connected, and the tuning capacity at resonance with the line disconnected, is equiva-

lent to a shunt capacity having the same absolute value of reactance as the reactance exhibited by the line. The type of reactance is opposite to that of the line, however.

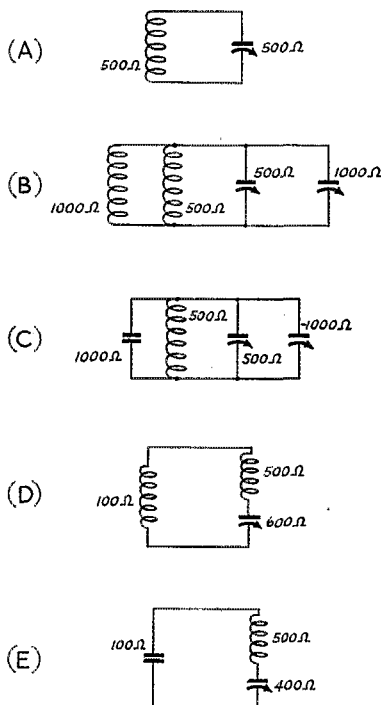


Fig. 3

When the reactance of the line is capacitive, the capacity of the line and the capacity of the condenser are in parallel and hence add directly. This gives a new value of capacitive reactance to the complete circuit; if the line reactance is 1000 ohms and that of the condenser 500 ohms, the two combine in parallel to give an equivalent reactance of 333 ohms. To bring the whole circuit back to resonance it is necessary to increase the capacitive reactance; that is, the capacity must be decreased. This is indicated in Fig. 3-C, where the "negative" capacity of the second condenser is in parallel with the original condenser. This means, simply, that the capacity of the tuning condenser must be decreased until the resultant capacitive reactance in the circuit is restored to the original value of 500 ohms; this is necessary because the inductive reactance has not changed. The capacity of the condenser is simply decreased by an amount equal to the shunt capacity added by the line. When the circuit is thus re-resonated the difference in capacity between the two condenser settings is equal to the line capacity, hence the reactance of this difference in capacity is equal in absolute

value to the line reactance. In summary, if it is necessary to *increase* the condenser capacity to retune to resonance when the line is connected, the line is inductive; if it is necessary to *decrease* the condenser capacity the line is capacitive. There is obviously a limit in both directions to the compensation possible, since the condenser capacity cannot be increased beyond its maximum capacity (although shunt condensers could be added in parallel) nor decreased below its minimum capacity.

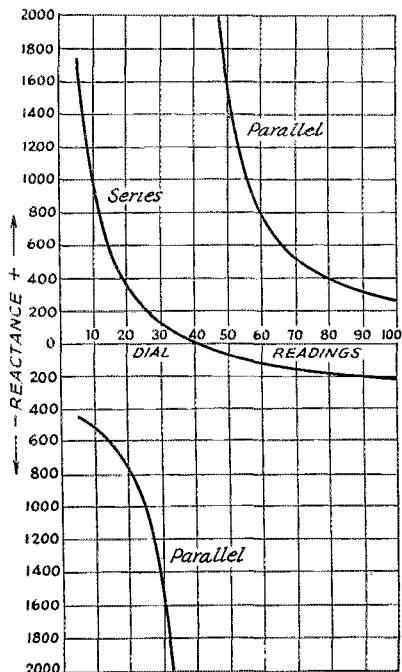


Fig. 4

It is convenient to calibrate the condenser in terms of these reactances so that the line reactance can be read directly from the condenser settings. In the experimental work which led to the results described later, the condenser whose synthetic capacity calibration curve is shown in Fig. 2 was used. This condenser resonated at 30 megacycles (with an 11-turn coil constructed as previously described) when set at 40 on the dial scale. Using this dial setting as a reference point, the difference in capacity between various other settings and the reference setting was found from Fig. 2, and the corresponding reactance calculated to obtain the curves marked "parallel" in Fig. 4. For example, at 40 the capacity is 14.4 $\mu\text{fd.}$ while at 60 it is 21.3 $\mu\text{fd.}$; the difference, 6.9 $\mu\text{fd.}$, represents a reactance of 770 ohms. Since the setting at 60 represents higher capacity than the setting at 40, the line reactance is inductive and the calibration curve is accordingly plotted above

the reference line in Fig. 4. Settings lower than 40 are plotted below the line to indicate capacitive reactance, which is usually considered negative. When the difference in capacity is very small the reactance is very high, and would be infinite at 40 on the scale; that is, when connecting the line makes no difference in the tuning of the circuit. The curves of Fig. 4 have not been carried beyond 2000 ohms.

In the region where series tuning is used (when the input reactance of the line becomes too low to permit compensation by the parallel-tuned circuit), the line is connected in series with the tuned circuit and hence may be represented as a reactance in series. This is shown in Fig. 3-D, where the line has an inductive reactance of 100 ohms. The equivalent inductive reactance therefore is 600 ohms, and to resonate the circuit the capacity reactance also must be changed to 600 ohms. That is, the capacity of the condenser must be decreased, since its original reactance was 500 ohms. The difference between the reactance at the new setting and that at the old setting must be 100 ohms (note that this is *not* the reactance of the difference in capacity). If the line has a capacitive reactance of 100 ohms, as at E in Fig. 3, the reactance of the condenser must be changed to 400 ohms so that the total will equal 500, the value required for resonance. This requires an increase in capacity, with the difference in the reactance at the old and new settings equalling 100 ohms. Thus with series tuning the condenser capacity must be increased when the line is capacitive and decreased when the line is inductive, the opposite of the case when parallel tuning is used.

A reactance calibration for series tuning also is included in Fig. 4. It was constructed by calculating the reactance for the capacities represented by various condenser settings and then taking the difference between the reactance at a particular setting and the reactance at the reference setting of 40. Settings below 40 represent an inductive line reactance and settings above 40 a capacitive line reactance.

Measurements with series tuning are less reliable than with parallel tuning for the reason that the actual capacities effective in the circuit are not known accurately. Stray capacity and distributed capacity of the coil both have an effect on the resonant frequency, and cannot readily be calculated or estimated. On the other hand, when parallel tuning is used the measurements are based only on the *difference* in capacity between two condenser settings, and such a difference can be measured with considerably more accuracy even though the calibration curve is an assumed one.

When the measurements and calibration curves have been completed, the line reactance can be plotted from the data and curves in terms of length of line, measured from the tuned circuit

to the shorting bar. The resulting curves should resemble those of Fig. 5, taken by this method. The parallel and series curves do not quite coincide, for the reasons just mentioned. The solid portions of the parallel curves represent regions in which measurements were possible, while the dashed parts are interpolated. Assuming that the parallel curves are more nearly correct than the series curves, the latter are useful for indicating the *shape* of the parallel curve in the regions where measurements were not possible with parallel tuning. The series curves could be made to coincide with the parallel curves by assuming a small additional capacity acting in parallel with the tuning condenser, an assumption which is justified by the fact that stray and distributed capacities do exist. This additional capacity would have to be of the order of only 1 or 2 micromicrofarads to bring the curves of Fig. 5 together.

As shown by the curves, the reactance of a short-circuited line is inductive and very low when the line length is small (in terms of wavelength). As the line length is increased the reactance increases until the length is a quarter wavelength (indicated at B in Fig. 5) when it is infinite. At this point the line may be connected directly across a parallel-tuned circuit without affecting its resonant frequency. Series tuning cannot be used in the quarter-wavelength region because it is impossible, with practicable components, to compensate for the large reactance introduced in series with the tuned circuit. As the line length increases beyond a quarter wavelength the reactance becomes capacitive — i.e., the line acts like a condenser — starting at a very high value of reactance and decreasing to zero when the line length reaches a half wavelength. At this point (A in Fig. 5) the line acts like a short-circuit, viewed from the input terminals, hence parallel tuning cannot be used. With series tuning, however, the resonant frequency of the tuned circuit itself will not be affected by connecting the line in series. Beyond a half wavelength the line becomes inductive again, and if the measurements could be continued it would be found that the behavior on succeeding quarter wavelengths is the same as on the first two quarter wavelengths.

Since a quarter-wave short-circuited line has infinite reactance at its input terminals, such a line can be connected across any circuit without affecting its tuning. By considering the line represented in Fig. 5 as a short-circuited quarter-wave line in series with an open-circuited line, the same curves also indicate the behavior of an open-circuited line. Then any length of line greater than $\frac{1}{4}$ wavelength is equivalent to an open-circuited line $\frac{1}{4}$ wavelength shorter than the actual length. For example, if the short-circuited line is 10 feet long, it is equivalent to an open-circuited line having a length equal to 10 feet minus $\frac{1}{4}$ wavelength, so far as input re-

actance is concerned. Consequently the reactance characteristics of an open-circuited line will be the same as though the origin of the line-length axis in Fig. 3 were shifted to the right a quarter wavelength — that is, to point B. An open-circuited line shows capacitive reactance when less than $\frac{1}{4}$ wavelength long, zero reactance when exactly a quarter wavelength long, and inductive reactance when more than $\frac{1}{4}$ but less than $\frac{1}{2}$ wavelength long.

When the line is terminated in a resistance instead of being open- or short-circuited, the behavior of the line is determined to a considerable extent by the value of the terminating resistance. For values below the characteristic impedance of the line, the reactance varies somewhat in the fashion of the short-circuited line, while for values higher than the characteristic impedance the reactance variation goes through reversals similar to those which occur on an open-circuited line. If the termination is reactive as well as resistive the reactance variation also depends upon the amount and kind of reactance in the termination.

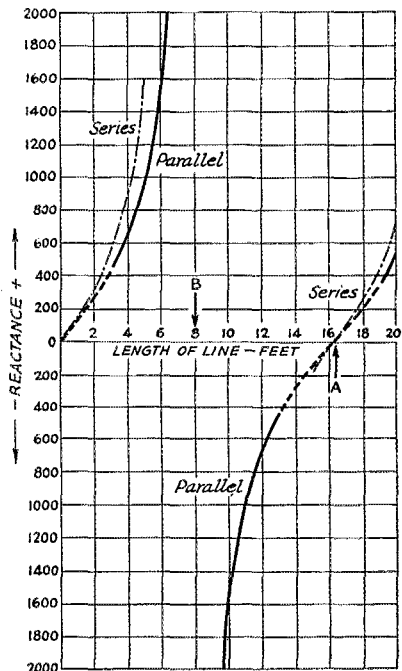


Fig. 5

In most radio applications the termination, which is usually an antenna, will be practically resistive only. If a line is used for tuning purposes (that is, for intentionally introducing reactance into a circuit) it will be short- or open-circuited.

(Continued on page 86)

★ BOOK REVIEWS ★

Electrical Fundamentals of Communication, by Arthur L. Albert. Published by McGraw-Hill Book Co., New York City. 554 pages, 6 × 9; illustrated. Price, \$3.50.

There is a temptation, at least for this reviewer, to misread this title as "Fundamentals of Electrical Communication." The actual title emphasizes the difference between Prof. Albert's latest book and the more abundantly represented field of texts in which the accent is on "communication" rather than "electrical." There are of course many introductory electrical texts, but most, if not all, are written primarily for the industrial and power field. This one is for the worker who intends to specialize in communication.

The first part of the book — a little more than half the total space — is concerned with the fundamentals of electronics, direct current circuits, inductance and capacitance and the associated magnetic and electric fields, and alternating currents. Except for the fact that communication applications are foremost, this is familiar — and essential — ground in electrical texts. The remainder is devoted to circuit networks used in communication, bridge circuits, wave propagation, vacuum tubes and their applications, and electro-acoustics.

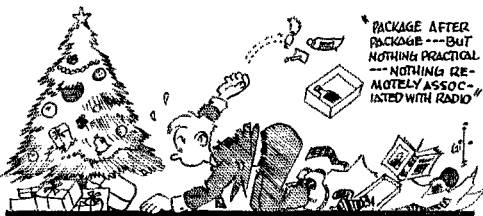
The treatment throughout is essentially practical, and the text is written in readily understandable fashion. While higher mathematics is avoided, the use of vectors and complex notation in dealing with alternating currents is explained in the section devoted to that subject. A feature which appears useful is a concise summary, at the end of each chapter, of the principal ideas introduced in that chapter. Also accompanying each chapter is a list of review questions and a set of problems. A five-place table of natural trigonometric functions is given at the end of the book.

A.C. Calculation Charts, by R. Lorenzen. Published by John F. Rider Publisher, Inc., 404 Fourth Ave., New York City. 19 text pages, 146 full-page charts, 9½ × 12; in two colors. Price, \$7.50.

Certainly anyone at all conversant with radio publications has at one time or another seen reactance charts. In the size in which they are usually presented, such charts are chiefly useful in determining the order of magnitude of the reactance of a given coil or condenser since, to make a full-range chart of reasonable size, the scales must be compressed to the point where there is considerable uncertainty in the second significant figure.

In this volume the author has applied the microscope to such charts and produced a series which can be read to about the same accuracy as an ordinary slide rule. The range covered is as follows: frequency, 10 cycles to 1000 megacycles; reactance, 0.01 ohm to 10 megohms; inductance, 10 μ h. to 100,000 henries; capacity, 1 farad to 0.0001 μ fd. Each chart covers one logarithmic cycle, and 72 of them are required to give the complete range. Another group of 72 gives suscep-

(Continued on page 106)



“. . . Of Mice and Hams”

A “Hey, Marge!” Story

CHRISTMAS is rapidly approaching and you suddenly recall a plan which you mapped out on December 26th last year. Your mind races back over the happenings of that season and you recollect that you did not receive one solitary practical gift. You recall opening package after package containing slippers, ties, socks, shirts, gloves, toilet articles, a book, a subscription to the *National Geographic* — but nothing remotely associated with radio.

You greeted each package with gleeful appreciation, marked by ejaculations such as: “Just what I needed,” “Wasn’t Aunt Sophie thoughtful,” and “You certainly know how to pick appropriate gifts.” Ah, the irony of it!

This year things will be different and you promptly lay the groundwork.

When the family is all assembled for the Sunday afternoon gabfest and it’s your turn to speak, you lead with: “Gump Radio Company down on Water Street has a microphone in the window — and that is just the exact type I’ve been looking for.”

Profound silence greets this remark and you wonder whether you overdid it. After all, you don’t want four or five mikes and everyone has the appearance of making mental note of the article, name and location of the store. So you follow through with: “Of course, when the much-depleted budget is reinforced there are one or two other things I really should get, such as a new B40 tube. I have always preferred B40 tubes. B40s get out when nothing else will.”

That will do for a starter and you bide your time.

The following Sunday sees another family gathering and, when occasion permits, you remark: “Every time I pass Gump’s Radio store down on Water Street I imagine that microphone is just waiting for me to come in and get it.” Later you add a comment to the effect that, since you have been pushing your present B40 tube so hard, it looks like it will have to be replaced by another B40.

You decide that the job is as good as done and it now becomes simply a matter of leaving a bulletin describing the mike and another describing the B40 about the house in conspicuous places where they are sure to be seen.

Come Christmas and the chances are a thousand to one that you will not receive one solitary practical gift. You will open package after package containing slippers, ties, socks, shirts, gloves, toilet articles, a book, a subscription to *National Geographic* — but nothing remotely associated with radio.

— Whit, W3IBX



STRAYS



RSGB News

Kjeld Kjeldseth, LA7S, of Grefsen, Norway, has succeeded in reaching Great Britain and is now serving with the Norwegian Free Forces.

The recent announcement that Squadron Leader Royce Clifford Wilkinson, G4HW, holder of the Distinguished Flying Medal and bar, had been appointed to command the top-scoring squadron of Fighter Command will have been read with pleasure by his many amateur friends. Joining the RAF as an apprentice 12 years ago, Royce made RAF history last year when he jumped from Flight Sergeant to Flight Lieutenant overnight. It was in recognition of his brilliant achievements in France and during the Battle of Britain (when he was the only NCO to lead a squadron), that he was awarded his DFM. This honor was followed later by the award of a bar to the medal, by which time his personal bag had risen to nine "kills" and many "probables." Since being granted his commission he has served as a Flight Commander of the American Eagle squadrons, and it was while fulfilling those duties that he was shot down over enemy territory. Later, he made good his escape back to England. His squadron has more than 230 "kills" to its credit.

From G5OV it is learned that XZ2DY, after escaping safely from Burma, is now a Captain in the Indian Army in the Signals Branch.

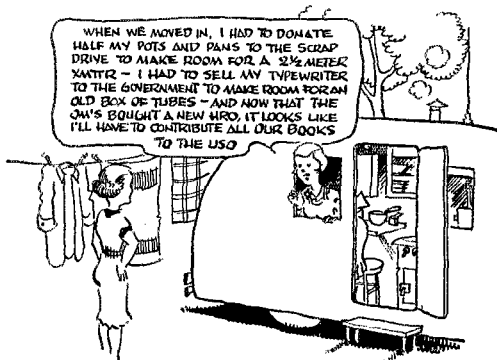
W6LWP, W7DRF, W7HOJ, W8WGI and VE5OR recently attended RSGB meetings in London.

G8QH reports hearing a contest recently on 7 Mc. Ds and HAs were hard at it swapping numbers!

Cracking of the binding of *QST's* after hard usage can be prevented entirely by placing one-inch-wide strips of Scotch tape around the binding at the top and bottom of the cover. — W9SQZ.

Heating elements that are almost as flexible as silk are now being produced by Clarostat. The units, which may be of any length from a few inches to several feet, are insulated with flexible glass. Wattage ratings of from 1 to 4 watts per body-inch are obtainable, and units may be operated up to temperatures as high as 750° F. Since they may be bent into any shape and jammed into tight spots, the units find ready application in temperature-controlled ovens for crystals and the heating of aviation and marine instruments.

To protect power lines, engineers have plotted probability curves from accumulated data to show how often thunderbolts are likely to strike. These charts show that every 50 miles of power line will be hit by lightning an average of 50 times a year, and each stroke will have a voltage of between 20 and 30 million volts. — *Ohmite News.*



My husband and I are both hams and have read many issues of *QST*. Since we are trailerites, the above cartoon is no exaggeration. My shelves and cupboards are full of radio parts! — *Martha Lee Bishop Moats, W8FVL.*

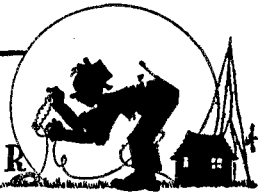
In these days of conservation and preservation, it might be of interest to those meticulous amateurs who trim up odd soldering jobs with a magneto file or some other small-cut file, and who find that the file fills with solder, that the solder can be readily removed by soaking the file in lead solvent such as is used by riflemen. After using the solvent the file should be brushed briskly with a stiff-bristled brush. — *W8VD.*

The "J. C. Owens, jr." of Los Angeles who was listed as lost in the Battle of Midway (shown recently in *Life* magazine in connection with "The Squadron That Didn't Come Back") was W4GWU. He worked 10 meters here and was one swell guy. — *W4MS.*

Seven out of the nine districts were represented by hams on the ill-fated aircraft carrier *Yorktown*. — *W8JQE.*



HINTS AND KINKS FOR THE EXPERIMENTER



THE MODEL-T FORD AS A SOURCE OF EMERGENCY POWER SUPPLY

EMERGENCY power supplies are of particular interest at this time. Some years ago, I found that a Model-T Ford magneto would deliver 125 watts of power in addition to power for the ignition. A Fordson tractor also is equipped with a similar magneto.

With the engine running at a speed equivalent to about 20 m.p.h., the frequency is about 90 cycles, but this frequency seems to work well enough with 60-cycle transformers. In connection with the magneto, I used a 10-volt filament transformer as a step-up transformer to obtain an output voltage of approximately 115 for use with standard a.c. equipment. Connections to the 10-volt winding may be made between the terminal on top of the fly-wheel and the frame of the car or tractor.

Many hams residing on farms still have these Model Ts in service. Others may be picked up for practically nothing at almost any automobile junk yard.

A few tips on starting the Model T may be worth while. The first thing to do is to clean the timer thoroughly with kerosene. Clean the spark plugs, brighten up the coil contacts, blow out the gas line and crank her up. — *Chas. W. Carter, W9EZZ*

HINT FOR BATTERY-OPERATED CODE-PRACTICE OSCILLATOR

IN using battery-operated code-practice oscillators, it is a common headache to find the filament turned on after not using the oscillator for several days. To minimize this possibility, we use an old-style filament-lighting jack for the headphone connections. Thus the filaments are automatically turned off when the 'phone plug is removed. For those who have been born since 1920, the diagram of connections is shown in Fig. 1. — *Fran Beck, W9DB*



Fig. 1 — Diagram showing connections to filament-lighting jack. Terminals marked "X" go to the headphone circuit, while those marked "Y" are connected in series with one side of the filament.

B.C. AUDIO AS CODE-PRACTICE OSCILLATOR

FIG. 2 shows the circuit of an audio oscillator which may be easily applied to any b.c. receiver having transformer coupling to the output tube. The arrangement makes an excellent code-practice oscillator and, for the busy person wishing to build such an oscillator with a minimum of parts, this may be the answer.

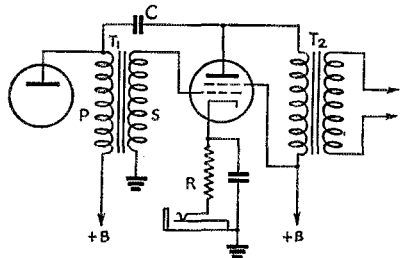


Fig. 2 — Circuit connections showing how the audio end of a b.c. receiver may be converted to an oscillator for code practice. T_1 and T_2 are the input and output transformers, respectively. C may be varied from 0.01 $\mu\text{fd.}$ to 0.1 $\mu\text{fd.}$ for best tone. R is the usual cathode resistance.

The alterations required are very simple. The connection between the output-tube cathode resistance, R , and ground is opened up and a closed-circuit jack for the key inserted. The only other addition necessary is the connection of a condenser of 0.01–0.1- $\mu\text{fd.}$ capacity between the plates of the last two audio tubes. The pitch of the oscillator tone may be varied by changing the value of C . If desired, a switch may be placed between C and the plate of either tube so that the feed-back may be cut out for normal operation of the receiver. If the circuit fails to oscillate, it will be necessary to reverse connections to either primary or secondary of the input transformer, T_1 . This reversal should not affect normal operation of the receiver.

In receivers employing resistance coupling, the input transformer would have to be added. — *Henry N. Fones, ex-W4GYV*

CLUTCH FOR AUTOMATIC POWER TUNING

I WAS much interested in Henry Rice's article, "Power Tuning for the Amateur Trans-

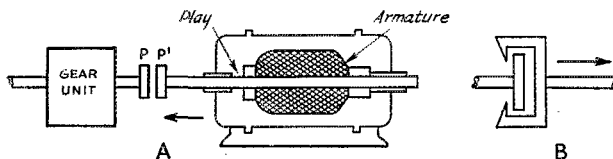


Fig. 3 — Clutching arrangement suggested by W8WJX for use with automatic power transmitter tuning. Choice between the types shown at A and B will depend upon the direction of thrust in the motor used.

mitter," which appeared in the June issue of *QST*. The editor's footnote inviting suggestions on clutching systems prompted me to suggest one arrangement which should work satisfactorily.

The idea is shown in the sketches of Fig. 3. When the motor is turned on, the armature not only rotates but the internal magnetism also exerts a force along the line of the shaft. If the shaft is not protected against thrust, the armature will be drawn toward one end or the other of the frame. This action may be used for clutching as indicated at A. In some motors removal of a washer may be sufficient, while others may require grinding or filing at the proper place. Too much thrust should not be permitted, however, since there may be danger of the armature hitting the frame.

Since the magnetic forces are removed when the current is shut off, the shaft should return to its normal position. Sluggish disengagement can be overcome by mounting the entire unit at an angle.

The clutch plates, *P* and *P*¹ should be made of materials with a relatively large coefficient of friction. Rubber- or leather-faced discs should be suitable.

In case the thrust is in the opposite direction, the alternative arrangement shown at B might be used. — *Maurice E. Werner, jr., W8WJX*

AN APARTMENT STATION

PERHAPS SOME of our young married hams will recognize in the accompanying photographs a means of solving the rather important question of how to make a ham rig fall within a bride's idea of what an attractive apartment living room should look like.

One picture shows the appearance of the station as the bride wants it. In other words, the rig itself

can't be seen. In fact, the only inking the casual observer gets of what is hidden within are several years' issues of *QST* appearing neatly on one of the top shelves.

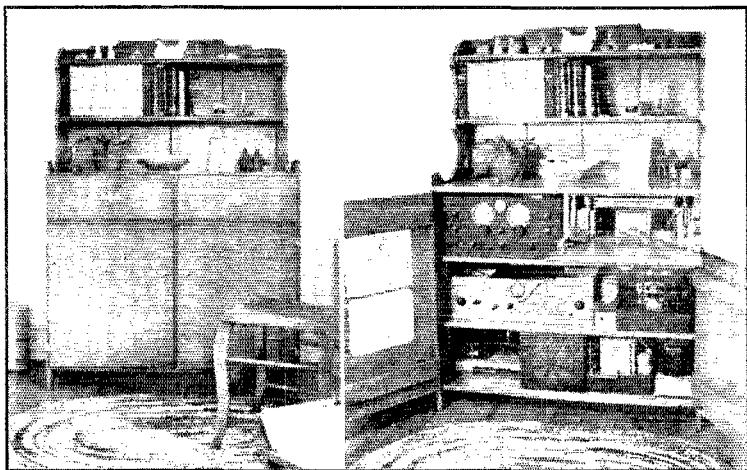
Open the doors and — presto chango! — it's a ham station with plenty of room for haywire if needed. Note that what appears to be a drawer on the right-hand side is actually a clever drop-front desk, which provides sufficient room for comfortable operating, either 'phone or c.w. There are also shelves for log books, message blanks, etc., and pigeon holes for QSL cards and other ham necessities. The "drawer" on the left is strictly phony; it is actually part of the door with a groove on the front for the sake of appearance.

There's plenty of room on the shelves inside the cabinet, since they both measure 40 × 20 inches, and a communications receiver fits nicely above the rig on the left-hand side.

Below, in the present lay-out, are all the components necessary for a 100-watt c.w. rig, including separate power supplies for each stage, plus the loudspeaker for the receiver.

The enclosure was built to specifications by a cabinetmaker, while the writer contributed the design and the finishing. Made of rock maple and finished with a maple water stain and wax, it makes a mighty attractive piece of furniture. Of course, the *XYL* approves heartily of the idea.

As fate would have it, the cabinet was installed here at W2FTX on December 7th, and not a peep has come out of it yet. But at some future time it will be called upon to speak its piece. However, in days like these when most of us can do nothing but let dust accumulate on the old rig, this cabi-



Not a fifth-columnist's lay-out, but the results of a deep-dyed plot to get around the *XYL*'s objection to ham gear in the living room.

net idea might be a worth-while project. It preserves harmony in the home and will give the OM something to figure out and plan in his spare time. — *Richard M. Smith, W2FT*

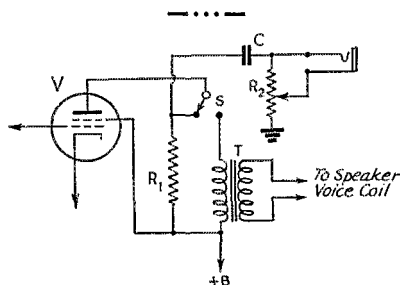


Fig. 4 — Where a receiver has no provision for headphones, they may be connected as shown in the diagram.

- C — 0.05 μ fd.
 R₁ — 8000 ohms
 R₂ — 0.1-megohm potentiometer
 S — S.p.d.t. toggle switch
 T — Output transformer in receiver or on speaker

HEADPHONE CONNECTIONS

At our shop we have had numerous calls to install headphone connections for the sick and others who want interchangeable headphone and loudspeaker operation. The circuit which we found to be the best is shown in Fig. 4. While a single-pole double-throw toggle-type switch is shown, an equivalent-type 'phone jack switch which automatically disconnects the speaker-to-'phone circuit and vice versa can be used. The parts required are one 8000-ohm, 2-watt carbon resistor, one 0.05- μ fd., 600-volt tubular-type capacitor, one 0.1-megohm potentiometer, one s.p.d.t. toggle switch and a single-circuit jack. The potentiometer controls the volume in the headphones and can be mounted in an accessible place on the rear of the chassis with the jack and toggle switch. — *Robert Javelin in The C-D Capacitor*

LISTENING ON 600 METERS

SOME of the gang who like to take a listen on 600 meters may be somewhat disappointed with the results. Here at WPDO we have an NC200 which just covers the distress frequency of 500 kc. With the receiver connected to an average antenna the results were very poor. Even when the 2808-kc. transmitting antenna was used very little improvement was noticed. Signals picked up greatly, however, when a series-tuned circuit was added in the ground lead. This consisted of a 3-inch coil of 75 turns and a 4-gang condenser from an old t.r.f. b.c. set with all sections in parallel.

Reception at night is excellent. I have heard Argentine coastal stations at good strength. No interference is experienced from local b.c. stations

nor from the 250-watt police transmitter operating in the same room. The importance of a tuned antenna for receiving on the low frequencies is well known to some of the older gang, but some of the younger fellows may not be as well acquainted with the point. — *C. Belwin, W8LVV*

In a recent note in *QST*, you suggested listening on 600 meters. Your suggestion regarding the use of a i.f. converter is fine, but, not wishing to build one, I thought I would try the use of parallel condensers to pad the main tuning gang of my RME-69 communications receiver to get response at the lower frequencies. In my case, it worked out great. Small fixed condensers are connected with clips, since the leads are easy to get at and can be taken out just as easily. — *Bert Brown, W9FS*

ELECTROLYTICS IN A.F. CIRCUITS

HAMS experimenting with audio-frequency equipment may be glad to know that it is possible to use electrolytic condensers practically anywhere that paper condensers are normally used, even in resonant circuits where accuracy is not too important.

When a high-capacity, high-voltage condenser is needed for coupling from the plate of an audio-amplifier tube to its load, it is quite feasible to use an electrolytic condenser of suitable capacity and voltage rating as in Fig. 5-A, provided that

(Continued on page 84)

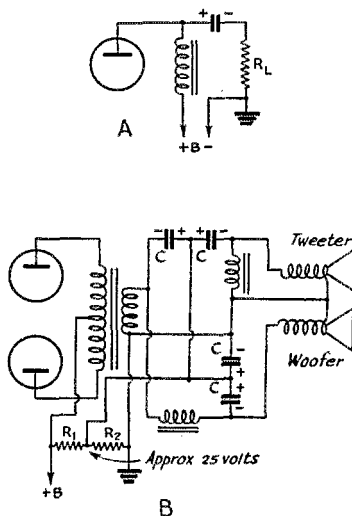
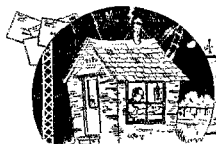


Fig. 5 — Audio circuits using electrolytic condensers. (A) Coupling audio tube to resistance load. (B) "Woofer-tweeter" cross-over circuit. In this instance, R₁ should be 100,000 ohms, R₂ 10,000 ohms and condensers labeled C are 50-volt electrolytics.



CORRESPONDENCE FROM MEMBERS

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

THE "COURSE" BECOMES A BOOK

5120 Westbury Ave., Montreal, P. Q.

Editor, *QST*:

Be sure and add my name to the long list of fellows interested in having your *QST* radio course made available to them in book form.

Before I noticed your suggestion put before us fellow readers, I had thought seriously of writing you and making the suggestion myself. However, you beat me to the draw and I most certainly hope that all of us will make it worth while for the ARRL to have the course go to press.

I might mention that I sort of committed myself recently in regard to the course in book form. During a QSO with a few of the boys I began discussing the long-awaited-for radio course now running in *QST*. I added that it would be a very good move on the part of the ARRL if they were to bring out the complete lessons in book form. "Do you think they would do that?" they asked. "Why, of course!" I replied. "I'll bet you anything that good old *QST* won't pass that idea by."

So there you are! And there I was. Sort of promising for something I couldn't do! However, it looks as though I've a chance of easing my embarrassment. To make things even better, I want to be one of the first to have my name put on the long list of those interested in obtaining your radio course in book form.

My heartiest congratulations on the very FB job you are doing for the ARRL and the boys in the services. . . .

— *Floyd G. Gribbea, VE3LR*

240 Graham Ave., S., Hamilton, Ont.

Editor, *QST*:

George Grammer's course is the berries! By all means, publish it in book form if possible. Gosh — why wasn't it published about two years before the war? Hi! — *H. Richardson, VE3HT*

Ft. Hancock, N. J.

Editor, *QST*:

Again *QST* has hit a "bull's-eye." Of course it's George Grammer's "Radio Fundamentals."

Since I have been called back into active duty (February, 1941) many of the fellows I have had to "strike" for radio never even went to a radio school. In trying to help them along, the *Handbook* comes in handy. Now *QST* has solved my

problem, because the experiments are more instructive.

I would like this course in book form, and am looking forward to its being published. . . .

— *L. R. Chinelli, W8WCQ, RM1c*

2912 Bayswater Ave.,

Far Rockaway, L. I., N. Y.

Editor, *QST*:

Here's my vote for putting George Grammer's superlative radio fundamentals course in book form.

— *William Brown, W2IBK*

Central College, Pella, Iowa

Editor, *QST*:

By all means, please do issue George Grammer's "Course in Radio Fundamentals." It is an excellent course, and I need it for use in a special defense radio course which I am teaching at Central College. . . . We use the *Handbook* as our text. . . .

— *Wayland W. Osborn, W9RRG*
Director, Teacher Education

22 Paulison Ave., Ridgefield Park, N. J.

Editor, *QST*:

W8WMQ's letter in September issue of *QST* hit the nail on the proverbial head. Sure, you reproduce Mr. Grammer's "Course in Radio Fundamentals" in book form and you'll have something — and so will we. That fellow certainly has whipped a cake together with all the ingredients. When a radio man looks at this outline he is sharply jarred to the things he doesn't know about in radio. Little things, seemingly, we thought we knew, but somehow seemed to escape us. A book of the complete course printed by you, and the ARRL *Handbook* in conjunction, will provide excellent training for anybody interested in radio. Too many of us hams weren't much enthused about radio theory, fundamentals, and the whys and wherefores of the game. We simply never had the time — what with hanging out the wash, and general oping around. . . .

Before closing, just an orchid to you and the fellows who make *QST* possible. The magazine now is better than it ever was. It certainly fills the hours we aren't operating in, and too, providing us with a wealth of info we never before dreamed of. . . .

— *A. Jack Ross, W2NXC*

West Lafayette, Ind.

Editor, *QST*:

I wish to congratulate you on the excellent articles by Grammer on the fundamentals of radio and really think that there are many like myself who are acting as instructors in various radio courses in defense training, etc., who would welcome this series in book form.

I have used the Defense Edition of the *Handbook* in courses 3-16, 3-20 and 3-21 of the ESMWT courses, and know that if this series by Grammer was available in complete form it would be a valuable addition. — *H. R. Evans, W9EJV*

98 Inglis St., Halifax, N. S.

Editor, *QST*:

I think it would be an excellent idea to bind the completed series of George Grammer's "Course in Radio Fundamentals." . . .

May I add my congratulations to "GG" for the excellent job he is doing. The articles more than double the value of *QST* — and that is saying a lot, in view of the high standard you are maintaining. . . .

— *Arthur St. C. G. Grant, VE1EP*

Aberdeen, S. Dak.

Editor, *QST*:

George Grammer's radio fundamentals course in *QST* is a fine job. I would like to see it put into book form and added to the list of League publications. I am teaching Junior Trainees in a Signal Corps school, and such a book would be a big help. — *Merten Hasse, W9DKJ*

EDITOR'S NOTE. — The scores of readers who wrote favoring publication of "A Course in Radio Fundamentals" as a booklet will be glad to see the announcement, elsewhere in this issue, that it is now available in book form.

COMPOSITE RIGS FOR THE SIGNAL CORPS

2717 Granda Drive, Lemay, Mo.

Editor, *QST*:

In the November issue of *QST* I saw where an amateur had sold his rig to the Signal Corps, even though it was a composite rig.

I also sold my composite rig to the Signal Corps. This transmitter of mine was rated for continuous service at 300 watts input, both 'phone and c.w., and was mounted on a standard relay rack.

Normally the Signal Corps only buys commercially-built transmitters, but the four main reasons why they purchased my composite rig were brought out by the lieutenant who inspected it. The first was that the chassis units were connected with a neatly-laced cable, and all connections were on plugs and sockets. This might

not be required if the connecting terminals were well-marked and the cable coded.

The second point was that the transmitter was of rugged construction and lock washers were used on all bolts. This is necessary so the rig may be shipped anywhere and arrive in good mechanical condition.

The third point brought out was that the rig used standard plug-in coils in all stages, which would permit them to use it on any frequency desired.

The fourth point is that I had a neat and complete ink diagram of the entire rig, showing connection cables, etc., also a complete list of all component parts, showing their value, make and type number if any. . . .

The lieutenant making the inspection stated that a rig with these four main points could be put in the hands of less-experienced personnel and they would not have difficulty in operation or maintenance. Another good point is to give a brief description of the operation of the rig, with all meter readings for both 'phone and c.w. operation.

With the scarcity of commercial rigs at this time it might be well for the amateur who desires to sell his equipment to check up and see if it meets the above requirements. If not, it would probably take very little work to bring it up to these standards. — *H. W. Bourell, W9IXE*

2125 Spring Garden St., Philadelphia, Pa.

Editor, *QST*:

Regarding W9LQY's surprise that the Signal Corps wanted his rig, I'd like to say that they are very anxious to get radio equipment of any kind — commercial or homemade.

I decided that my rig was doing no good in the attic, so I telephoned the radio section at the airport at Bridgeport, Conn., and offered my complete transmitter to them — 300 watts, c.w. They said they would be very glad to accept it and they came over for it in two hours. I gave them the transmitter, all my radio parts, some spare tubes and a 3-element 10-meter beam.

The staff sergeant examined my amateur license and wanted to know all about ham radio, then told me he was studying to get an amateur license. He invited me to come over to the airport and see their radio room, so I did. While there, I was introduced to 2nd Lt. Kleinhaus, W2HPZ. They later sent me a letter, saying the rig was on the air and working well and that they used the spare parts to build a transmitter for instructing the students there.

So . . . the Signal Corps *does* want homemade rigs, both for use and for student instruction. . . . — *Julian E. Greenbaum, W1LIG/S*

EDITOR'S NOTE. — The official Signal Corps' policy is that there is no demand, in general, for

homemade transmitting equipment. As W9IXE points out, only the best-constructed transmitters are even considered for purchase by the Signal Corps, which has no over-all policy in making such purchases. Transmitters such as W1LIG/3's were purchased through the local command's own initiative. The fact remains that homemade rigs are *not* in general demand at this time. It is therefore presumably useless to register homemade transmitters with the ARRL Apparatus Bureau.

NAVY TECHNICIAN SCHOOLS

495 Summer St., Boston, Mass.

Editor, *QST*:

Since I am a First Class Radio Technician and a graduate of a radio matériel school . . . I was interested in the article, "The Navy Trains Radio Technicians," in November *QST*.

I noted credit was given to the Balaban and Katz Radio Matériel School, 190 North State Street, Chicago, as being the first to start instruction. That is not true. Classes at the Chicago preliminary school were started on January 12, 1942, whereas schools of the same type at Noroton Heights, Conn., and Los Angeles, Calif., were opened on or about December 1, 1941. In fact, when the advanced school . . . opened on February 16, 1942, ninety per cent of the students were graduates of either the Noroton Heights or Los Angeles schools. The first class from the Chicago school arrived . . . sometime in June, but I will say that they were later recognized as having gained the most from their preliminary training as compared with other schools.

I have learned a great deal in the Navy so far and when it's all over I'm going to build a really fine-business u.h.f. rig.

— Harold L. Gilgen, RT1c

EDITOR'S NOTE. — All information contained in the article, "The Navy Trains Radio Technicians," came from Navy sources, and the article itself was checked by all Navy Department bureaus concerned. The Chicago school was first among the seven existing primary schools. Those at Noroton and Los Angeles were temporary schools, since discontinued.

MORE SLANTS ON "QRR OFF MALAYA"

Somewhere in Northern Ireland

Editor, *QST*:

Have just finished reading the article, "QRR Off Malaya," in the September issue. Hats off to W5EDX — boy, it had the cold chills running up and down my spine! It made me realize how much we all owe to amateur radio and just what it means to have the association of others who have had the same privilege.

May I quote an example of what it has meant to me. I recently was given a five-day furlough and took that opportunity to visit some of the cities of Scotland, namely Edinburgh and Glasgow. One day while strolling through an exhibition of the RAF I heard the sound so familiar to a DX hound's ear — dar dit ditditdar. I must admit that, in my anxiety to reach the room from which the sounds came, I was a bit rude and did push some people a bit impatiently. Nevertheless, I reached it without causing an international situation. There I spotted a speaker on a table along with several keys, and a bunch of RAF men all studiously copying code. Upon reaching the table I inquired if there were any hams present. Getting a negative answer, I asked if I might take the key for a moment. I sent a CQ and breathlessly signed my call once. May I say here and now that I didn't intend to create a civil disturbance — but, so help me, I darned near caused a riot. In just one minute I had more hands to shake than I had ever seen. First was GM6XI, he being the closest one to me; next came ZL1NW, GM6FN and several others whose calls I neglected to write down. . . .

From then on this ham had one of the most enjoyable times of his life. May I add that we of the "W" fraternity have much to learn from our fellow-hams on this side of the pond when it comes to making a lonely ham forget his loneliness. I was immediately accepted as one of them, and nothing was too good for me. Needless to say, from then on my stay in Scotland was much pleasanter than I had anticipated and I thoroughly enjoyed myself. Hats off to you who helped to make it so.

Last but not least may I add my congratulations on the swell job *QST* is doing in helping the national war effort and in enabling those of us in the service to keep in contact with the others who are scattered to so many points of the globe. Keep it up, and when this thing is over, who knows — maybe some of us will once again be able to sign "73 tnx OM es gud nit."

— Capt. Joel M. Genung, W9TYE

Bliss Electrical School, Washington, D. C.

Editor, *QST*:

. . . I would like to put in my two bits worth in regard to "QRR Off Malaya."

Mr. Owen J. Dowd, W2JHB, seems to think that that very interesting article will cause complacency among America's young men — those who read *QST*, at any rate. America's young men are not that easily influenced into complacency. Does Mr. Dowd realize that a friendly greeting when passing on the street will build more morale among our men in uniform?

I read the article and enjoyed it. It did *not* make me think that the Japs are "good boys" — the memory of last December 7th is still vividly

in my mind. I am one of Uncle Sam's bluejackets — just another swab-jockey to Mr. Dowd.

So much for that. Thank you very much for the article on the Navy's RTs. I will find it inspiring when the math and theory get to crowding me. . . . — *L. Lyle Underwood, Sealc, RT*

TORPEDOED

San Gabriel, Calif.

Editor, *QST*:

. . . You may be interested to know that the vessel upon which I was serving as radio operator was torpedoed by an Italian submarine in the Atlantic, half-way between Africa and South America.

We first felt a bump as if from a log, which was evidently a dud torpedo. After this the submarine surfaced and started shelling us. Fortunately for me, the sub's gun crew evidently mistook the signal halyards leading to bridge for the antenna lead-in, as nearly all the shells hit the midships section while I was doing my stuff. Getting no answer to SSSS messages, I had to jump over the side and swim about 150 feet to my lifeboat. The submarine continued shelling us for some time, but, failing to sink the ship, used a second torpedo which sank her by the head in about four minutes.

We attempted to sail for the South American coast for 32 days, but adverse currents actually set us 400 miles to the eastward toward Africa. Finally we were picked up by a Norwegian motor-ship. . . . We were taken to a West African port and put up at a Seaman's Relief Camp. Later four of us — the captain, second officer, an assistant engineer and myself — were flown to the United States by the U. S. Army ATS.

Incidentally, our distress signals were heard by ships as far as the East Coast of Africa. All 38 members of the crew, with the exception of our chief engineer, were rescued. The No. 2 lifeboat was picked up on the 23rd day and those men taken directly to New York. The chief died in the lifeboat of illness and exhaustion.

It was certainly a time when I would have given my whole voyage pay for a little portable-mobile ham rig in the boat!

— *Norman H. Finley, W6BFK*

THINGS TO THINK ABOUT

924 S. Pennsylvania St., Denver, Colo.

Editor, *QST*:

. . . I have an idea the ham game will be vastly different when the big fracas is all over. On the other hand, I visualize a short period of adjustment when the whole works will be just about as it was last December 7th. Remember the big opening when the lid was finally taken

off the last time? Spark signals from hell to breakfast, although plenty of the fellows had had their first unforgettable taste of c.w. in the various branches of the services. There were actually fellows then who thought that things would go on as they always had before.

I hope that, when things are readjusted, there will be some means of recognizing and rewarding those hams who are willing and able to achieve a higher than ordinary degree of technical and operating excellence. I don't mean that license requirements should be made tighter so the newcomer has a tougher time of it; quite the contrary. Let's encourage the newer fellows all we can, but once they are in there should be a constant push behind them to improve their operating ability and technical skill. I think the breakdown of the whole ham game into the chaotic, ragchewing mess it was just prior to "the Great Lull" was largely due to a topheavy distribution of interest toward 'phone operating and simple ragchewing. After some months of cooling off, I still feel that a certain percentage of operating time should be spent at the key and mill — not at the mike. And the holder of a license should have to show that he had made some technical progress since the last license examination. Limited tenure for the lower grades of licenses would automatically upgrade every ham who managed to survive.

Just things to think about. . . .

— *B. P. Hansen, W9KNZ*

FROM A BRITISH PRISONER OF WAR IN ITALY

P.G. No. 78, Posta Militare 3300, Italia

Editor, *QST*:

As a former keen subscriber to *QST* and a member of the RSGB, I am very anxious to know what the ARRL is doing in these times of enforced inactivity in amateur radio. Among those of us unfortunately captured during the Greek or Libyan campaigns, there are in this camp several licensed hams who are members of the radio societies in their respective countries, including a "kiwi" who owned the two calls ZL1DR/1FW, G3BP, G4LB and myself, G3CO. We were each of us serving in our respective army signal units and were brought together nearly a year ago on arrival in Italy. Although not members of the ARRL, all of us were regular readers of your first-class magazine and we miss its interesting articles and technical information. We are keeping the flag of ham radio flying as best we can, and many are the fascinating ragchews and discussions that have helped to relieve our monotonous existence. G4LB is also running a class which numbers about twenty potential recruits to our cause after the war. We hope to get an Italian-published book on commercial receivers which includes tables of

(Continued on page 78)



GEORGE HART, WINJM
Acting Communications Manager

CAROL A. KEATING, W9WWP
Assistant Communications Manager

WERS Rules Changes. In accordance with suggestions made by ARRL and OCD and in view of the fact that experience in handling applications has demonstrated that certain points need clarification, FCC on November 6th made several changes in the wording of certain Sections of the Rules Governing Stations in the War Emergency Radio Service. The changes are not radical and have no effect on FCC's policy in handling applications. They merely have the effect (1) of making the Rules more easily understood, and therefore more readily complied with in making applications, and (2) of adding privileges to stations in the service. The substance of the changes may be summed up as follows:

(1) Applications for station licenses must be signed by the highest official of the applying municipal government, or by some person authorized to do so in a statement signed by the highest official which must be submitted with the application.

(2) Receipt of possible orders from the U. S. Army Defense Command must be provided for. This can be done in one of two ways: (a) direct wire connection with the nearest point having access to such orders (the district warning center), or (b) maintaining a listening watch on a key broadcasting station. Of the two methods, we recommend the former as probably the most reliable. If the applicant is a municipality in which a district warning center is located, receipt of such orders is almost automatically provided for. If the applicant is not a d.w.c. city, provision for the necessary wire connection with the d.w.c. must be made. It is further suggested by ARRL and OCD that a *supplementary radio link* be maintained between the d.w.c. and the licensed municipality, so that orders from the Army can still be received in the event of line failure or overload.

(3) Communication is now permitted with United States Government stations *if required*. This would include such services as Army, Navy, Coast Guard, Marine Corps, Weather Bureau, Civil Aeronautics Authority, etc. Note that such authorization is given *only* where it is required for coöperation or coördination of civilian defense activities.

(4) Tests are now permitted during both the Wednesday and Sunday periods for the *first three months* of the life of any WERS station license, after which tests may be held only during the

Sunday period. This is, of course, in addition to drills held during practice blackouts, alerts, mobilizations, etc. The Wednesday and Sunday periods remain as they were published in the original Rules, except that the Nov. 1 date no longer applies. The extra test period will provide new licensees more time in which to get their networks organized.

The actual textual changes in the Rules follow. We suggest you annotate your copy of the original Rules (see page 12, July *QST*) accordingly. New wording is in boldface type.

SEC. 15.2. Civilian Defense stations. — The term "Civilian Defense Station" means a station operated by a **municipal government** for emergency communication relating directly to the activities of the United States Citizens' Defense Corps or other equivalent officially recognized organization.

SEC. 15.61. Eligibility for station license. — Authorizations for civilian defense stations will be issued only to **municipal governments**, such as cities, towns, counties, etc.

SEC. 15.62. (a) (4) Methods to be used in monitoring, supervising, and controlling the operation of all stations for which license is requested, including method of compliance with Restricted Order No. 2.

SEC. 15.64. Communication with other stations. — Within the scope of service permitted under Sec. 15.63 and during tests and drills, civilian defense stations may be used to communicate with other stations in the war emergency radio service, with stations in the emergency radio service (police, forestry, special emergency, and fire stations), and with **United States Government stations**, in those cases which require coöperation or coördination of activities. Transmissions not directed to a specific authorized station are prohibited.

SEC. 15.75. Tests. — The licensees of civilian defense stations are permitted to make such tests as are necessary for the purpose of maintaining equipment, making adjustments to insure that the apparatus is in operating condition, training personnel, and perfecting methods of operating procedure, *Provided*, That such tests shall be conducted only during the following periods:

(a) Tests may be conducted by individual stations during the three months' period immediately following the date on which the respective station license was first granted, in accordance with the following schedule:

(Table same as that in original Rules for period prior to November 1, 1942)

(b) Tests may be conducted by individual stations during any period of the respective station license, in accordance with the following schedule:

(Table same as that in original Rules for period subsequent to November 1, 1942)

WERS Application Discrepancies. In addition to the above changes, which in themselves clear up certain points of discrepancy in WERS license applications, FCC has pointed out, in a

memorandum of October 26, 1942, that there are several other outstanding reasons why applications have been returned. They may be summed up as follows:

(1) The radio aide should sign the station license application (Form 455) at the bottom of page 5 and his acceptance of appointment on page 2 of Form 455-A. The reference made to "Communications Officer" on the former applies to State Guard applications, which are made on the same form.

(2) The general operating procedure must be described in detail, in the form of a supplementary statement to go with the application. Particular attention should be directed at the method of identification of stations as prescribed in Sec. 15.42.

(3) The source and distribution of the equipment is required in another supplementary statement. The *source* is the individual or individuals, or the company from whom the equipment was obtained. *Distribution* is the usual area of operation of each unit.

(4) Technical data: Item 6(g) should show the frequency band over which the transmitter may be tuned by specifying approximately the highest and lowest frequencies in kilocycles. Item 8(a) should show the street and number, city and state, and the maximum height of antenna above ground for each fixed unit. Item 8(b) should describe completely any conditions which seem to obviate the necessity for painting and lighting antennae structures, such as low height, height of surrounding buildings or natural obstacles, isolated location, etc.

(5) Each application must be accompanied by a map showing the exact location of each unit proposed to be operated under the jurisdiction of the licensee, including the usual area of operation of portable units. We suggest you mark the spot with an X and jot down the number of the unit so located, as well as the name of the public building in which it is installed. A dotted line will do nicely to show the usual area of operation of portable units. Remember that in applications for an entire district warning area, maps must be submitted for all sections of the warning area covered by the application.

(6) Be sure to fill out completely all jurats and affirmations. Many applications have been returned because this was not done properly.

(7) An informal reply to a Commission request for more information on an application is not sufficient. Amendments must be submitted in the same manner as the original and with the same number of copies. This is in accordance with Sec. 1.74 of the Commission's Rules and Regulations.

(8) Operator-permit applicants must hold a valid license or permit of any class issued by the Commission, and must have complied with Order No. 75 (see p. 18, August 1940, *QST*) as to fingerprints, proof of citizenship, etc.

(9) Operator-permit applications must be submitted through the station licensee. Applications submitted by individuals without first passing through the hands of the licensee will be returned without action.

(10) Operator-permit applications will not be considered until the respective station license has been issued. It is perfectly proper to submit Forms 457 *with* the station license application (not before) or anytime thereafter.

(11) The radio aide must sign all Forms 457 being submitted by individuals intending to operate stations under his jurisdiction. He is not eligible to sign such forms unless he has been certified to the Commission by the station licensee on Form 455-A.

(12) Your WERS operator's permit is valid only for the operation of stations under the jurisdiction of the station licensee with which you are affiliated.

(13) A radio aide, even though properly certified by the licensee, is not authorized to operate any WERS station until he has properly filled out and submitted Form 457 and received his WERS operator's permit.

OCD still requests that whenever possible applications should be made by a municipality in which a district warning center is located. This is not required by the rules, but we continue strongly to urge this method of licensing. It has the advantages of ease in compliance with Restricted Order No. 2 (requiring provision for reception of orders from the Army Defense Command) and of extension of the use of each individual operator's permit to the entire warning area rather than to just his own municipality. Licenses are being issued to individual municipalities to expedite organization of WERS but the basic OCD set-up is still by warning areas.

However you are applying, submit your application in thoroughly correct form *the first time*, and thus save yourself and FCC some time and trouble in correspondence.

WERS Licenses Granted. Here are some interesting statistics on WERS licenses granted up to November 11, 1942. No doubt by the time this appears in print many more will have been added. As of that date 53 station licenses had been issued in 20 different states. A total of 529 operator permits have been issued. Of the station licensees which have received operator permits (35, making an average of about 15 permits per station licensee), New York City leads with 68, Stamford, Conn., comes next with 47 and Lawrence, Mass., is a close third with 45.

The names of the licensed municipalities follow: Culver City, Calif., Pacific Grove, Calif., San Mateo County, Calif., Oakland, Calif., Manchester, Conn., New Haven, Conn., Norwich, Conn., Stamford, Conn., Macon, Ga., Fort Wayne, Ind., Ashland, Ky., Lake Charles, La., Baltimore, Md., Baltimore County (Towson, Md.), Bel-

Honor Roll

The American Radio Relay League War Training Program

Listing in this column depends on an initial report of the scope of training plans plus submission of reports each mid-month stating progress of the group and the continuance of code and/or theory classes. All Radio Clubs engaged in a program of war radio training are eligible for the Honor Roll. Those groups listed with an asterisk teach both code and theory. Those listed with two asterisks teach theory only. Others conduct only code classes.

- *Advance Radio Club, Jonesboro, La.
- *American Women's Voluntary Services, New York, N. Y. and San Francisco, Calif.
- *Bloom Township High School Radio Club, Chicago Heights, Ill.
- **Central Commercial and Technical High School Radio and Television Club, Newark, N. J.
- Central New York Radio Club, Syracuse, N. Y.
- *Central Oregon Radio Klub, Bend, Ore.
- *Detroit (Mich.) Amateur Radio Assn.
- *Federation of Long Island Radio Clubs, Jamaica, N. Y.
- *Iowa-Illinois Radio Club, Burlington, Iowa
- *Norfolk County Radio Assn., Norwood, Mass.
- Pierre (S. Dak.) Amateur Radio Club
- Richmond (Ind.) Amateur Radio Assn.
- Rock Springs (Wyo.) Amateur Radio Club
- *Spring Valley (N. Y.) Communications Class
- Sunrise Radio Club, Hollis, N. Y.
- *Tucson (Ariz.) Short Wave Assn.
- *Walnut Hills High School Radio Club, Cincinnati, Ohio
- *West Phila. (Pa.) Radio Assn.

mont, Mass., Cambridge, Mass., Easton, Mass., Fall River, Mass., Lawrence, Mass., Lowell, Mass., Newton, Mass., North Adams, Mass., Gothenburg, Nebr., Portsmouth, N. H., Kearney, N. J., Millburn, N. J., Milltown, N. J., Rutherford, N. J., South Plainfield, N. J., Metuchen, N. J., Watchung, N. J., New York City, Troy, N. Y., Westchester, N. Y., Greensboro, N. C., Akron, Ohio, Piqua, Ohio, Dayton, Ohio, Allentown, Pa., Ashland, Pa., Haverford, Pa., Lower Merion, Pa., Marple Township, Pa., Montour County, Pa., Coventry, R. I., Cranston, R. I., East Providence, R. I., Newport, R. I., Kingsport, Tenn., Corpus Christi, Texas, Cuero, Texas, Roanoke, Va., Springfield, Vt.

The issuance of so many licenses in such a widely scattered area is encouraging, but it is only the beginning. On November 11th there were 98 more applications pending action before the Commission; by this time there are probably many more both issued and pending. Nice work, gang! Although receipt of station license is only one of the first steps in WERS organization, we have made a good start. Let's keep going, and be all ready for the Japs and Heinies.

SCM Nominations Wanted. Members of sections in which the SCMs' terms of office have expired are requested to get up nominating petitions and send them in to Headquarters. An active SCM is needed in each Section to head up activities. If you are in a Section that has had no report in *QST* for some time, it is up to you to see that an eligible and active man is elected to report your Section Activities monthly. See December *QST*, page 75, for a list of Sections for whom nominating petitions are needed. Bring the

matter up at your next club meeting and get a petition in before the deadline given.

Staff Addition. We are pleased to welcome to the CD staff Miss Carol Keating, W9WWP, who commenced her duties as Assistant Communications Manager the first of December. A crack c.w. operator of the good old days when we were all on the air, W9WWP needs little introduction to the members of ARRL.

BRIEFS

Correcting information previously published (p. 108, November *QST*) and adding some submitted by W7BG, we arrive at the following schedule of time signals:

<i>Time, EWT</i>	<i>Approx. Freq.</i>	<i>Station</i>
12:00 NOON.....	9135	NPM
3:00 P.M.....	12125 & 12450	NPM
8:00 P.M.....	9200	NPM
9:00 P.M.....	12125 & 12450	NPM
11:00 P.M.....	9250	NPG
12:00 MID.....	9125	NPG
Hourly (except 12 Noon and 12 Midnight).....	4390, 9425, 12630	NSS

Here's an early-bird schedule for you fellows who used to pound brass during the before-dawn hours. WCKY in Cincinnati (1530 kc., 50,000 watts) is presenting "The Ham Club" for a half hour every morning beginning at 5:00 A.M. EWT. The program will act as a clearing house and unofficial "parent" for WCKY ham listeners. No messages will be transmitted, of course. At that hour and power, it should be possible to hear WCKY almost anywhere in the country.

During a recent forest fire of vast proportions in Northwest Colorado, several hams from the Signal Corps school at Steamboat Springs were called upon to handle radio communications for the Forest Service. 'Phone was used from the base camp to the fire line, but c.w. was necessary from base camp to the Forest Supervisor's headquarters due to the distance away from the fire and the large amount of

traffic. Operation was with Forest Service equipment on Forest Service frequencies, the hams being attached to the Forest service as fire guards for emergency duty. Hams taking part were W7s GDB, GZI, HLA; W9s QDC ZDZ.

ALBERTA—VE4

From W. W. Butchart, 4LQ:

Quite a number of Edmonton hams will be on the air again shortly as part of Edmonton's ARP communication system. It looks like a good scheme if the telephone system fails—as well it might in the case of a raid. The u.h.f. gear is being assembled by the boys at present. It will be completely independent of the city power lines (using battery and vibrator-pack supply in most cases). Some of the boys interested in this work are 4EA, 4HM, 4VJ, 4XF, 4HF, 4BW, 4NU, 4AH and several others whose names and calls are lacking at this time. More on this venture next month, boys. In the meantime, keep up the good work.

Minnie Nichols (4WE?) has just returned from Eastern Canada, where she took a commercial operator's course. She is now on the staff of CATL, radio branch, working at the same place as 4NU, 4HF and 4ATH.

From 4BW and 4VJ we hear simultaneously that 4XA has done pretty well for himself in the RCCS. He left last spring for Kingston to qualify for a commission. He topped the class, even beating varsity grade, and is now on the instructional staff at Kingston. Gerry Williams, who left at the same time as Jack, is with Base Ordnance at Ottawa as far as we know.

4EA is exhibiting some gorgeous sunsets taken on Kodachrome. He is rapidly amassing a nice collection, and some of his Autumn scenes are superb. Roy just seems to have the knack of being at the right place at the right time! 4HM has acquired a Kodak projector for showing his transparencies. He has a nice bunch of flower pictures taken out at Oliver last September.

We saw 4AKK on First Street the other day in tow of a pretty nice-looking femme. Of course that isn't news to you guys who know Bob! How ya doing, Robert? You will be glad to know that 4ADD has been granted his commission in the RCAF. He is now P.O. Art Craig. Here's wishing you lots of luck, Art. Latest word on 4AEV is that he has been shipped East to Trenton for re-muster.

4XE's YF gave us the low-down on Dot, 4VO, recently. She says that girl has more doggone guys on the string than she knows what to do with! But does that deter our Dot? Not on your cat-whisker! And Dot, by the way, carries on correspondence with a whole flock of the Calgary gang overseas and scattered all over the continent.

We don't want to rush you fellahs, but 4BW and 4LQ have arranged a sked for Xmas morning of 1943! Here's hoping that we'll all be back on the air by that time. But it's going to take some doing, just the same.

4BW thinks that the QRM on the 75-meter 'phone band would be quite sweet music to his ears that he could easily overlook 4HM's, 4EA's and 4LQ's QRM during a QSO with 4GM! And that's saying a lot, if you guys have ever listened to 75 in the city on a good night!

So long for this time, gang; see you next month.

The Month in Canada

NOVA SCOTIA—VE1

From L. J. Fader, 1FQ:

WELL, the Army finally got hold of me. I tried to get in the Air Force, but without success. So here I am with the RCCS, down here in Sydney on a course. . . . I have run into a few of the Cape Breton boys down here. . . . After this course is finished I don't know just where I will be, but as long as I am around this part of the Maritimes I will try to gather up as much dope as possible on the gang. . . .

I have been spending a lot of my time out calling on Reg Rogers, 1CR. He has disposed of the majority of his equipment to the local broadcast station. They have one of his rigs in use on the 49-meter band, and the other is being used on 1280 kc.

Archie MacPhail, 1JA, is one of the instructors at the school here. He is also a member of the RCCS now, having transferred from the Cape Breton Highlanders. Joe Mullins, 1DR, is also with the RCCS, stationed in Newfoundland. He was one of the popular signals heard on the 20-meter 'phone band.

Stan Appleton, 1DM, is still around this part of the country. Stan is an employee of the Mines Safety Appliance Co. and covers the Maritimes and Newfoundland inspecting the lighting systems used in the mines.

George Craft, 1JC, of the Caribou Gold Mines, recently paid Robin Peach a visit. George used to be the holder of a VE5 call, and has been in this part of the country for about four years now. He and 1BH are very close friends.

Will say 73 for now and hope to be able to dig up some more for the next issue. Season's Greetings to the gang.

QUEBEC—VE2

From Lin Morris, 2CO:

CONDOLENCES of the Quebec Division go out to CGM Alex Reid, 2BE, whose wife passed away suddenly on November 2nd.

2MR is with the RCCS in the reserve army. Recent visitors to Montreal include 2DR, 2HP and Doug Jarvis, ex-2DB, who is a member of the "Short Snorters." Congrats to Lt. Joe Kelly, 2DE, on the arrival of a junior YL op.

A landmark for many years, 2CM's mast has been taken down. 2OQ is with the Air Observers Training School at St. Jean, P. Q. 2CO is a sub-lieutenant (RCNVR, Special Branch) stationed in Ottawa.

Seen but not heard; 2AX, 2HW, 2BF, 2CM, 2JJ, 2JS is now located in Halifax.

ONTARIO—VE3

From Len Mitchell, 3AZ:

2QB writes that, having regard to the recent war news, it seems he should be getting the old transmitter dusted off and the crystal washed. He was recently in Brockville and managed to 'phone most of the gang there.

3SA is back from overseas and is at his old job. We learn with regret that he is not terribly well and would appreciate a visit from any of the gang who happen to be in Ottawa.

MANITOBA—VE1

From Art Morley, 4AAW:

A stir of news is beginning to come through, but more is needed.

4ABP, who is in India with the RCAF, sends an interesting picture of himself as a snake charmer. He's taken it up as a hobby in his off-duty time. Several have left for places unknown, among them 1DS, who spent some time with a Flying School at Dauphin. 3QW is now at Gimli. 2F1P has left Carberry for some spot on the West Coast. G2UF turned up with the RAF at Weyburn.

4LV tells me that ZL1TX is learning to ride a horse up near Dauphin, but to date the horse has had the best of it! 3AFH turned up again, this time at Regina. 4ACO is at present stationed in Winnipeg with the RCAF, taking a Signal Officers course. 4ACP has received a commission as pilot officer and is also with the Signal Branch.

4MD is a sergeant WEM, stationed at Yorkton. Along with him is 4AKO, who is also a WEM but as a flight sergeant. 3ACR is also a flight sergeant WEM but is stationed at Saskatoon. 5AGZ was spotted at Prince Albert just finishing his elementary flying. 2BS was recently promoted from sergeant to flight sergeant. 4CV is with DOT.



{ Number one hundred seven of a series }

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Correspondence

(Continued from page 72)

characteristics of all the American and Continental values; this would be a great help to us. The Red Cross regulations seem to bar technical books on radio communication and we are therefore rather handicapped by lack of reference books and can no longer keep abreast of new developments. Apart from these and similar diversions, we look to the arrival of mail and parcels to cheer our spirits. On behalf of the ham community, I should welcome any news of the wartime activities of the League. . . .

In conclusion, I need hardly say how much we are all anticipating the day when the air will be again open to our signals and when we can look to renewing our former acquaintance with friends in the U.S.A. We hope for a period of even closer collaboration than in the past. . . .

— Jack B. Kay

A MOTHER WRITES

23 Fort St., Fairhaven, Mass.

Editor, *QST*:

. . . I feel I should like to tell you how much good your magazine has done for my sons, and to thank you for your fine work.

My second oldest boy (Thomas Bradford Barnes, known to all as "Brad") started making crystal sets when he was about 9 years old. As he progressed to the short waves he became interested in your magazine, and for the last several years it has been one of my Christmas presents to him. He enlisted in the Army in October, 1940, in the Signal Service Corps. He passed the examination for Officer's Training School at Fort Monmouth, and upon graduating was assigned for further training. He is now a second lieutenant and has been "somewhere" for over a month. He is now 26 years old.

Two of my other sons have followed along with him in making sets at home. The youngest boy, Frederick, enlisted in the Air Corps in July, 1941, and is now a corporal and has the title of technical base radio inspector at the age of 21. Another son, Herbert, is about ready to sign up with the Navy and is only waiting to hear how he has made out on a radio examination. . . .

So you see I feel your magazine has been a big factor in their lives. . . .

— Cecelia Barnes

ON A LITTLE PINK CARD

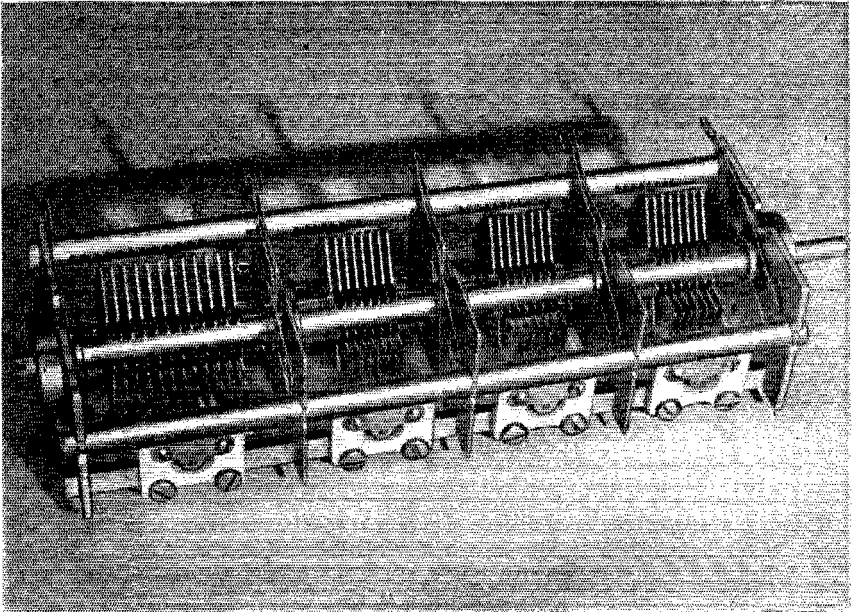
4036 N. E. Hassalo St., Portland, Ore.

Editor, *QST*:

It is with a great deal of pleasure that two hams tell you of the arrival of a potential third. The little new YL will early learn code and get a ticket, we promise.

(Continued on page 80)

SMOOTH ACTION

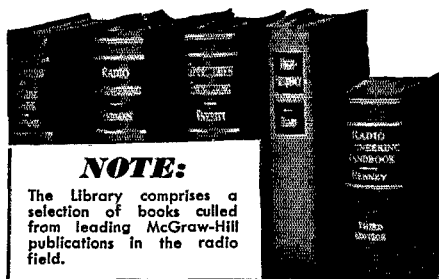


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The OM is on Signal Corps duty at Nome, Alaska, and the KYL journeyed to the old stampin' grounds in Oregon for a conference with ol' Doc Stark. She hopes to leave in November for Nome, where she will be pushing traffic for CAA while keeping house and juggling three-cornered pants on the side. Something tells me the OM will have to be educated!

Once Mars is down and out we will have a real story to tell to all of hamdom—the story of what the hams in the Territory have done, and are doing every day, to guard this vast, rich land. And our part in this story is one to fill our hearts with pardonable pride and joy.

We are eagerly anticipating resumption of activity, particularly DX, and hope that time is not too far in the future.

73 to the staff at QST, and to all our ham friends everywhere.

— Mary B. Davis, K7ENU

AMBITION

1227 Exchange St., Emporia, Kans.

Editor, QST:

I would like to express my sincere appreciation for the swell work you fellows at Headquarters are doing. I only hope the other hams realize the necessity of the ARRL organization and an ever-growing membership. You see, I got my ticket in 1940, when I was fifteen, and had just got that delicious taste of real ham spirit in my mouth when—wham, Pearl Harbor came along!

I never had the chance to work that "real DX" the older hams talk about. My greatest ambition is to work some of that foreign DX, and in order to do that we'll have to win the war. Of course, I realize that this is a very insignificant incentive besides the real issues of the war, but I assure you it is the thing I'll be fighting hardest for! I am trying to learn a little radio before I enter one of the armed services. I got my Class A ticket in August and am studying for a 2nd class commercial ticket while working under a restricted permit at KTSW. I hope to get into some type of war work when I finish high school in January or else go to a naval or maritime radio school.

I look forward to post-war amateur radio with a hopeful heart. I have really got the "radio bug." And I believe it is only through the medium of a united amateur organization, as is the ARRL, that we can look forward to a happy amateur radio future after the war. I look forward very much to working some 75- and 20-meter 'phone. In fact, the minute the amateurs are reinstated, I'm going on a QSO marathon that will last a week!

As to QST, it's the best radio magazine going, in my estimation, and it gets better with each new issue. I count the days until it comes to my house!

— Dale E. Bush, W9OU



WE all write to our sons, husbands and other close relatives who are serving in the Armed Forces. But how about our neighbor's son or husband or the fellow we used to work with? They, too, like to receive news from the home front. By all means, write and when you do, make it *cheerful and encouraging*.



A letter a day speeds Victory.

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Please give us as much advance *direct* notice as is possible—also be *sure* to put both your *new* and your *old* address on the letter or card (not the envelope).

Splatter

(Continued from page 16)

neighbor likes to dish out, or the melange of misinformation that fills the air in most every Pullman smoking room—or the more pernicious “news” to be heard on the s.w. b.c. band, particularly that from the “neutral” countries.

The press and radio are spreading this warning from OWI so thoroughly that there seems no particular point to dwelling on the general phases in *QST*. The only reason we mention the subject at all is because of that last source for such rumors—the most dangerous and treacherous of all—short-wave broadcasts.

QST's readers probably do as much, or more, listening to the provocative high-frequency ranges as anyone. In itself, that's all right; we'd encourage rather than discourage it. It's all right only as long as we do no more than listen, however. The minute we repeat what we hear we endanger both ourselves and our country. If it's non-public information, we violate the law and make ourselves liable for severe penalties. If, on the other hand, we relay broadcast propaganda from Axis or occupied or superficially-neutral sources, we're playing the enemy's game. The undermining of our morale by the spreading of false rumors supplied by such broadcasts is one of the enemy's most powerful weapons.

So keep the gleanings of your dial twistings to yourself, and rely on the press and broadcast news for conversational topics. You may be less sensational at the next how-to-win-the-war-fest, but it's better to be a safe patriot than a sensational saboteur.

... —

While we're on the general subject, let us repeat another warning sounded before in these pages. It concerns the all-too-common fault of indiscretion in discussing secret information in public—particularly technical information of the type that hams, because of their widespread association with secret radio developments, naturally possess. With no intention of eavesdropping, conversations may be overheard that make the hair curl, the participants apparently oblivious of bystanders in the earnestness of their discussion. Not only are civilians guilty; the same carelessness has been observed on the part of uniformed Army officers. Whether in uniform or mufti, however, the crime of the unbuttoned lip is equally heinous.

Remember, this is war. Men are dying out there—some of them, perhaps, because of a loose tongue back home.

Be a clam, ham.

Do You Know the DIELECTRIC STRENGTH of Your Insulation at 250°C?

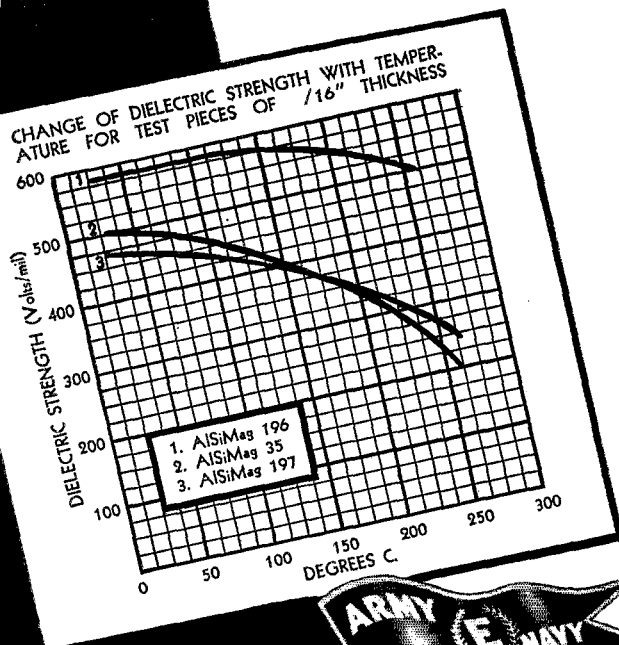
DIELECTRIC strength of ALSiMAG ceramic compositions at varying temperatures is among the many physical characteristics given in Property Chart No. 416.

Frequently it is very difficult for the designing engineer to get information as to detailed characteristics of an insulating material which he wishes to employ in his design. Therefore, American Lava Corporation took great pains in an effort to furnish such information in Property Chart No. 416.

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Gives Complete Physical Character-
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AWARDED JULY 27, 1942

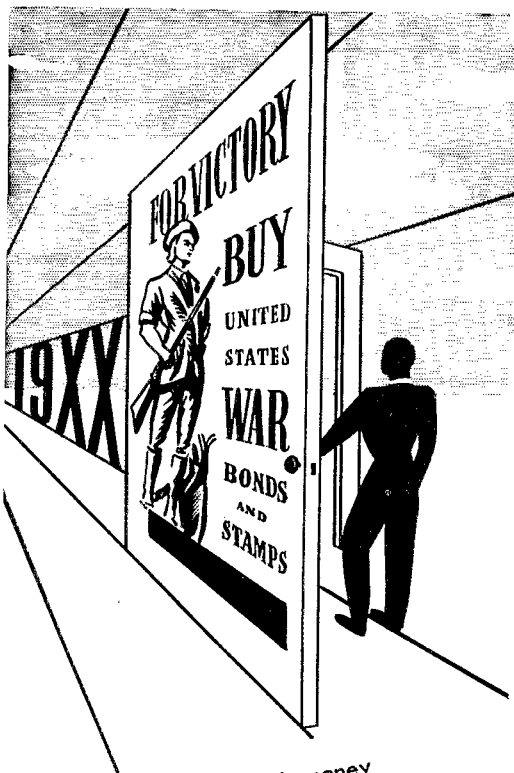


ALSiMAG

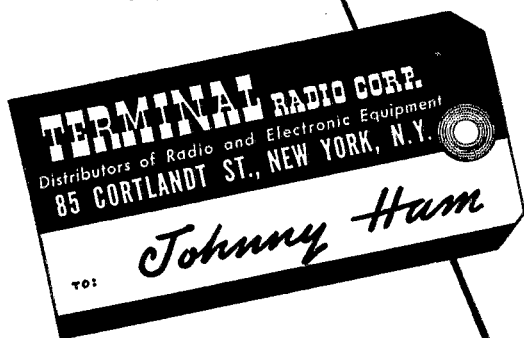
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AMERICAN LAVA CORPORATION

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When your War Bond money comes back—plus!—you'll be sitting pretty. In 19XX, manufacturers will market communications wonders that we can only dream about now. (You hams in the services are getting a hint, though!) Until then, factories produce for war, TERMINAL helps move it to war, and we all buy Bonds. But in 19XX you'll have the cash and TERMINAL will have the gear ready for a shipping tag made out in your name.



IF YOUR COPY OF QST IS LATE—

Bear with us and the nation's transportation systems. We are both doing our best — *QST* is being printed one to three days earlier each month to help keep deliveries up to schedule—but unavoidable wartime delays sometimes do occur. So if *QST* is late, just be patient — it's on the way.

Straight from the Shoulder

(Continued from page 68)

end will sound like four skeletons on a tin roof around the first of June."

Sometimes, when a mobile radio unit is on the move, areas of radio interference, noise, static, and atmospherics are encountered that make it extremely difficult for an operator to hear radio signals over the bedlam in his receiver. Realizing radio's limitations, the Signal Corps admits that all an operator can do then is to "do your damndest to pick signals out of the hash."

That's language Americans understand.

Hints and Kinks

(Continued from page 68)

the load, R_L , is capable of carrying the slight leakage (approximately 0.1 ma.) current of the condenser. The plate voltage of the tube supplies the polarizing voltage for the condenser and, of course, the load R_L must have continuity in order to provide a d.c. path to ground. The voltage rating of the electrolytic condenser is chosen the same as for a paper unit, i.e., the sum of the d.c. plate voltage and the peak audio voltage. I have used such an arrangement for a year with entire satisfaction.

More recently, when designing a cross-over filter for the 15-ohm voice-coil circuit of a "woofer-tweeter" combination, I needed some high-capacity, low-voltage condensers but could not obtain suitable paper units. By using the arrangement of Fig. 5-B, I was able to build a filter network which worked as well as one could desire. In this circuit, two electrolytics, each of twice the capacity required, is used in place of each condenser needed. Polarizing voltage is supplied from the voltage-divider circuit consisting of R_1 and R_2 . The leakage current of the electrolytic condensers is so slight (approximately 0.1 to 0.2 ma.) as not to affect the other components. Although the cross-over filter has been in use only a few days at the time of writing, I believe the condensers will hold their capacity well enough, since I have measured the capacity of hundreds of similar condensers after three months to two years of service and have found the capacity to have remained substantially the same. — B. C. Barbee, W2MWX

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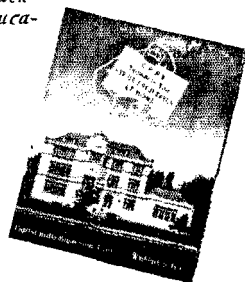
H. B. Seabrook, Station CJOR—39-29-12

"I have been helped by the course far beyond my expectation and the lessons have been particularly timely for me."

—K. M. Hollingsworth, General Electric Co.—42-9-5

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In the fall of 1895, Wilhelm Konrad Röntgen discovered that rays of mysterious properties could be developed under certain conditions during passage of electrical current through a vacuum tube. These rays, accordingly, were termed X-rays.

Equipment for the practical utilization of X-rays has been developed most rapidly until today, the X-ray has lost much of its mystery. Every school boy knows how X-rays can pierce the human body to locate broken bones or imbedded objects; he automatically associates the X-ray with the dentist, the doctor and the hospital.

Not widely known, however, is the fact that the X-ray is a powerful tool in many industrial processes. In the manufacture of quartz crystals, for instance, the X-ray provides the only rapid precise means for determining and checking the angle at which the crystal blanks are cut from the raw quartz—an all-important quality to the operating characteristics of finished oscillating crystals. At Bliley, X-ray machines are in continuous service checking and rechecking to assure maximum performance from the finished product.



BLILEY ELECTRIC CO., ERIE, PA.

A Course in Radio Fundamentals

(Continued from page 63)

ANSWERS TO QUESTIONS IN INSTALLMENTS 7 AND 8

If no answer is given, it is to be found in the appropriate *Handbook* section or in the description of the experiment or experiments accompanying that Assignment.

Assignment 27:

Q. 14 — 6.7 $\mu\text{fd.}$; 45 $\mu\text{fd.}$ less minimum capacity of bandspread condenser.

Q. 15 — 7.52 to 9.2 Mc.; 6.02 to 6.8 Mc.; 4.6 to 4.91 Mc.

Q. 16 — 3.34 to 4.07 Mc.

Q. 18 — 44.2 $\mu\text{fd.}$; 32.2 $\mu\text{h.}$

Assignment 28:

Q. 4 — 13,085 kc., 13,995 kc.; images, 12,630 kc., 14,450 kc., respectively.

Q. 12 — 4455 to 8455 kc.

Assignment 31:

Q. 15 — 120 cycles; 50 cycles.

Q. 22 — 50,000 ohms; 50-5 henrys (minimum); 50-10 henrys for optimum inductance at full load; 5.7 $\mu\text{fd.}$ with minimum inductance, 4 $\mu\text{fd.}$ with optimum inductance.

Q. 23 — 886 volts.

Q. 24 — 1215 volts r.m.s. each side c.t.; 455 va.; No. 27.

Q. 30 — Between ground and 100-volt tap, 10,000 ohms; between 100-volt and 250-volt taps, 5000 ohms; between 250-volt tap and end, 1150 ohms. Power dissipation, 1, 4.5, and 4.9 watts in respective bleeder sections; 10.4 watts total.

Assignment 32:

Q. 14 — 17.5 feet.

Assignment 33:

Q. 5 — 65.5 ft.; 93.6 ft.; 37.4 ft.

Q. 6 — 14,400 kc.

Q. 9 — 52 feet.

Q. 17 — 447 $\mu\text{fd.}$

Assignment 34:

Q. 5 — 95.5 ohms.

Q. 6 — 517 ohms; 433 ohms; 215 ohms.

Q. 9 — 90.1 amp.; 1000 volts; 50 volts.

Q. 10 — 5150 ohms; resistive; 70 ohms.

Q. 11 — 234 ohms; with $\frac{1}{2}$ -inch tubing, 1.76 inches center-to-center spacing; with $\frac{1}{4}$ -inch tubing, 0.88 inches center-to-center spacing.

Q. 14 — 0.42 db.; 2.79 db.; 0.038 db.; 0.254 db.; 9 per cent, 79 per cent.

Q. 18 — 0.68 $\mu\text{h.}$, 190 $\mu\text{fd.}$; 0.91 amp.; 547 volts.

Q. 21 — Series; parallel.

Q. 24 — L, 66 ft.; C, 17.3 ft.; E, 20.8 ft.

Q. 26 — 7.15; 1.19 inches; 57.5 ft.; 28.7 ft.

Assignment 35:

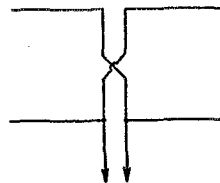
Q. 4 — 407 ft.

Q. 5 — Resonant frequencies: 3600 kc.; 7380 kc.; 11,170 kc.; 14,970 kc.; 18,750 kc. Harmonics of 3600 kc.: 7200, 10,800, 14,400, 18,000 kc.

Q. 10 — 312 ft.; 48 degrees.

Assignment 36:

Q. 6 — Diagram below.

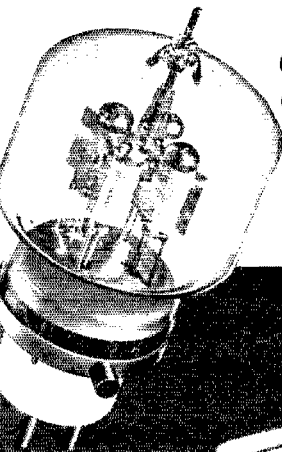


(Continued on page 88)



A date with Destiny

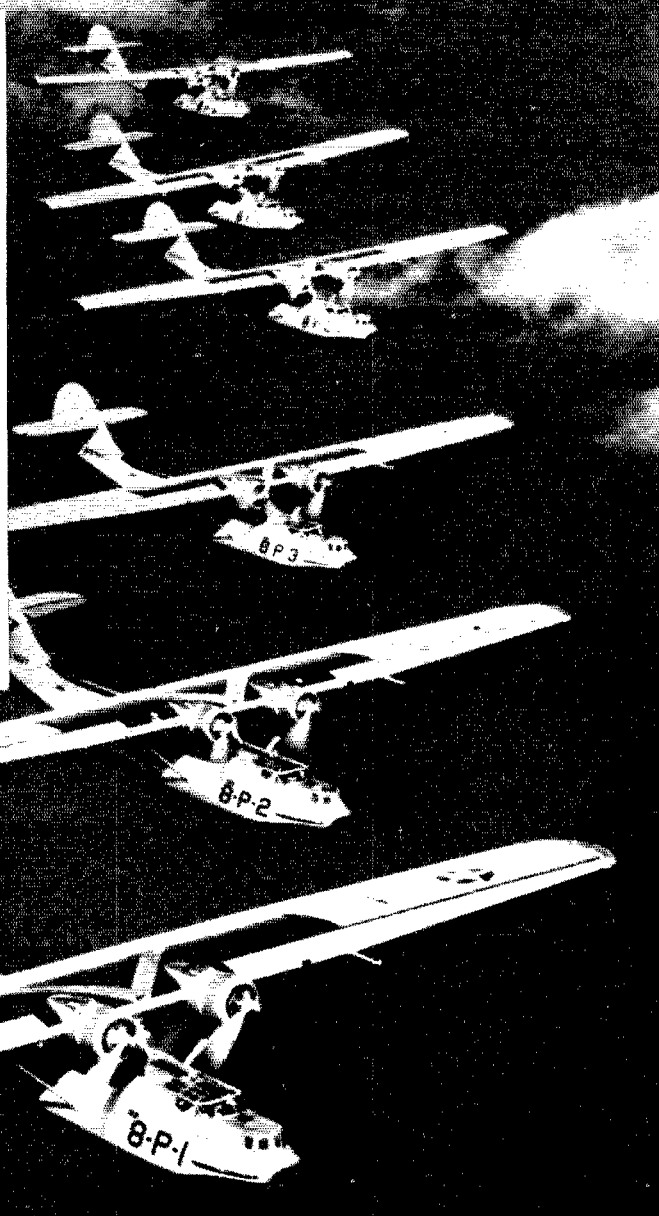
These two modern weapons of battle ...the electronic tube and the bombing plane ... have an important date with post-war industry. In the days to come Eimac tubes, like the airplane, will help achieve the better way of life for the common man.



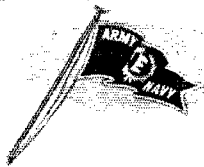
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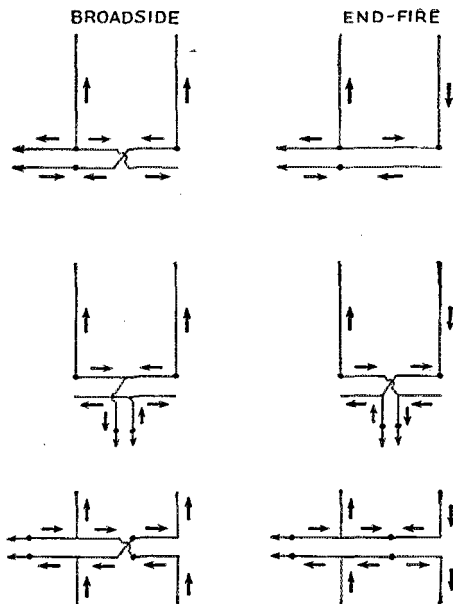
ELECTRONIC EQUIPMENTS AND TEST UNITS

OXFORD-TARTAK RADIO CORP.

3911 S. Michigan Ave., Chicago, Ill.

(Continued from page 86)

Q. 7 — Diagram below. Dots show points where current reverses.



Happenings of the Month

(Continued from page 53)

- Pittsburgh: Some time in February, May, August and November.
- Portland Me.: Mar. 24*, and Sept. 22*.
- Portland, Oregon, 805 Terminal Sales Bldg.: Fridays and Saturdays at 8:30 A.M.
- Reno: Apr. 13* and 14*, Oct. 14* and 15*.
- Roanoke, Va.: Apr. 3 and Oct. 2.
- St. Louis: Feb. 13, May 8, Aug. 14, Nov. 13.
- St. Paul, 208 Uptown P. O. & Federal Courts Bldg.: First and third Saturdays of each month.
- Salt Lake City: Mar. 23* and Sept. 26*.
- San Antonio: Feb. 20, May 22, Aug. 21, Nov. 20.
- San Diego, 307 Customhouse & Courthouse Bldg.: By appointment.
- San Francisco, 328 Customhouse: Mondays and Saturdays at 8:30 A.M.
- San Juan, P. R., 322 Federal Bldg. (P. O. Box 2987): Thursdays at 8:30 A.M.
- Savannah, 208 Post Office Bldg.: By appointment.
- Schenectady: Mar. 15* and 16*, June 15* and 16*, Sept. 15* and 16*, Dec. 15* and 16*.
- Seattle, 808 Federal Office Bldg.: Fridays.
- Spokane: May 3* and Nov. 6*.
- Syracuse, N. Y.: Some time in January, April, July and October.
- Tampa, 203 Post Office Bldg.: Where code test required, by appointment only; Class A without code test, daily.
- Wailuku, T. H.: Aug. 5.
- Washington, D. C., 410 International Bldg., 1319 F. St., N. W.: Daily except Saturday.
- Wichita: Mar. 19 and Sept. 17.
- Williamsport, Pa.: Some time in May and November.
- Winston-Salem: Feb. 6, May 1, Aug. 7 and Nov. 6.

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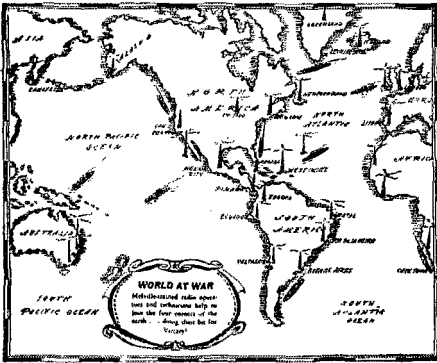
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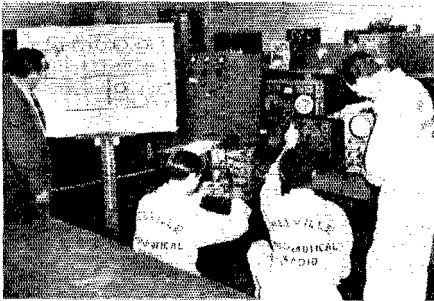
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Civil Air Patrol

(Continued from page 51)

on their own and in cooperation with OCD's WERS on 2½ meters. There is cooperation, too, with state and local police and state guard radio elements. Each area is developing its own experience, which gets shared through the entire organization so that a unit in Maine will benefit from something that was first tried in Oregon.

You fellows who are champing at the bit for something to do with the knowledge you have gained from long years of operating experience in ham radio can be of service to your country. Get in touch with your nearest CAP squadron, which you can locate through your local airport. See what the boys are doing, and — if the spirit moves you, as it is more than likely to do — sign up. You'll find opportunities for wartime service, make new friends and gain valuable new experience which it will be good to have not only during the war but in the post-war period of civil aviation development which is bound to come as soon as the peace is won.

"Traffic Cop" Transmitter

(Continued from page 41)

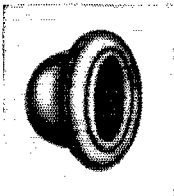
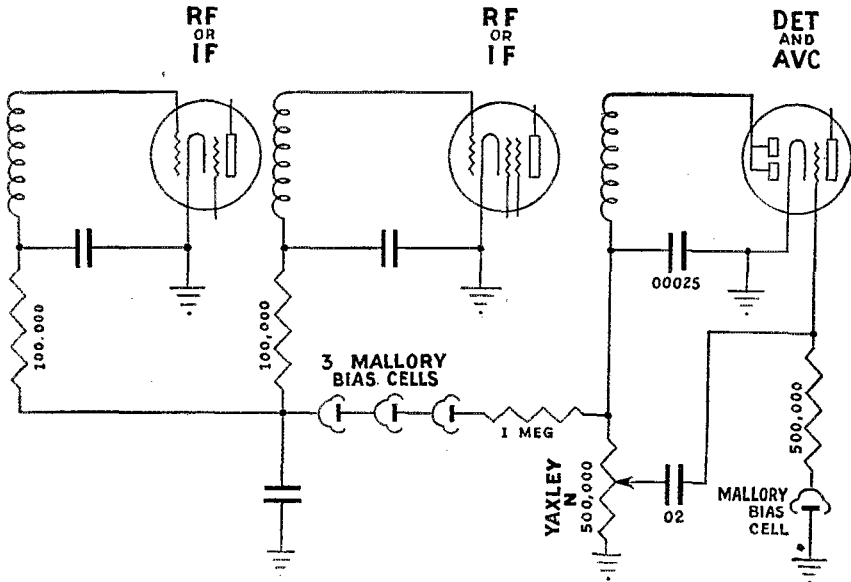
serted in the positive high-voltage lead to the oscillator will limit the input to a safe value. S_2 should be open so that plate voltage will be applied to the oscillator only. The amplifier filaments should be lighted, however. With proper crystal and coils in place, the key may be closed and C_1 tuned for resonance. If B_2 does not light, resonance may be determined by touching one end of L_1 with a neon bulb. The neon bulb will show maximum glow at resonance, while B_2 , if it lights at all, will be dimmest at resonance. If desired, a 60-ma. bulb may be temporarily substituted at B_2 for this preliminary tuning. With the oscillator tuned, full plate voltage may now be applied. The key should not be closed for prolonged periods to avoid damage to the tube. With the bias pack in operation, C_1 should then be further adjusted slightly for maximum grid current as indicated by B_3 . If the oscillator is functioning properly, B_3 should light to more than normal brilliance, indicating a grid current in excess of 60 ma.

Tuning C_2 through resonance now with the oscillator running will doubtless cause a flicker in B_2 . The neutralizing condensers should then be adjusted, bit by bit in equal steps, until the flicker disappears when C_2 is tuned through resonance. If a more accurate indication of neutralization is desired, a 60-ma. dial light may be connected across a turn or two of the output link winding, L_3 . The neutralizing condensers should then be adjusted until the test lamp shows no indication at any position of C_2 .

To lower plate voltage for preliminary tuning of the amplifier, the plates of the 816 rectifiers should be connected to the 525-volt taps supply-

MALLORY TECHNICAL DATA SHEET

Grid Bias Cells



The above schematic diagram shows two methods of using Mallory Grid Bias Cells. Bias for the first audio stage is obtained by connecting a bias cell in series between the grid-lead and the chassis. Three Bias Cells in series with the AVC bus provides minimum bias for the RF and/or IF tubes. Note the simplification of wiring and the elimination of cathode resistors and their by-pass condensers. Because all cathodes are at ground potential, heater emission, or cathode heater leakage will not introduce hum. This type of construction especially is valuable

in series heater type AC, or AC-DC receivers. The circuit is also recommended for high-gain systems because of the improved stability and absence of regeneration.

The diagram does not show the simplest of all methods of using bias cells—simply connecting them in series between the tube grid and the grid lead. The shell connects to the tube grid, the black button to the grid lead. No by-pass is required for audio circuits. When used for R.F. the bias cell should be by-passed with a small mica or tubular paper capacitor.

Ask for Form B-303 giving complete technical information on Mallory Grid Bias Cells.

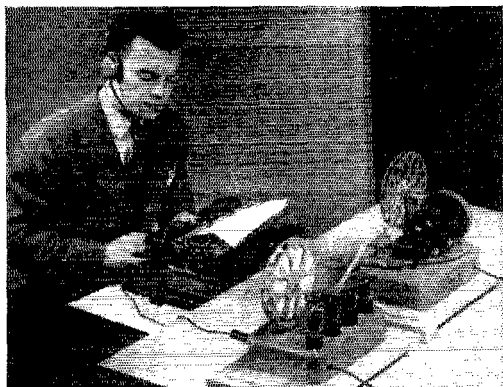
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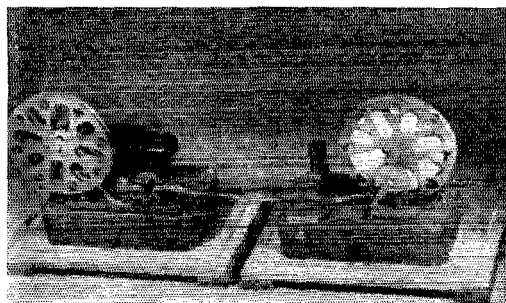


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AYERS AUTOMATIC CODE MACHINES

711 Boylston Street

Boston, Massachusetts

(Continued from page 90)

ing the 5Z3. Before closing S_2 , be sure that the bias pack is turned on. With plate voltage applied to the 809s, a reading of plate current should be obtained on the milliammeter when the key is closed. On adjusting C_2 for resonance, the plate current should dip to a minimum. The bias supply should now be shut off and plate voltage applied to the 809s. With the key open, a small amount of plate current should flow. This value of plate current should not vary as C_2 is turned through its entire range. If any change is noted, or if the plate current suddenly rises to a high value, it is an indication that neutralization is incomplete and the neutralizing condensers should be readjusted very slightly until the fluctuation in plate current disappears.

The plates of the 816s may now be placed on the high-voltage transformer taps. With the bias supply turned on, closing the key should result in a plate-current reading higher than before — much higher if C_2 happens to be tuned off resonance. The key should be closed for only brief periods until C_2 has been tuned to resonance indicated by minimum plate current.

A 150-watt lamp bulb may now be connected across two or three turns of the antenna-coupling link winding. With the key closed, retuning C_2 should result in lighting the lamp. With the lamp load, the minimum value of plate current at resonance will be higher than with the amplifier unloaded. The number of link turns across which the load lamp is connected should now be varied until the minimum plate current at resonance is 200 ma. This indicates rated loading and, under these conditions, the 150-watt lamp should light to full normal brilliance.

With plate voltage applied, the value of grid current will decrease somewhat as the amplifier is loaded. There will also be a fluctuation in grid current as C_2 is tuned through resonance whenever plate voltage is applied. With the amplifier fully loaded, the grid current should not fall below 50 ma. In other words, B_2 should be at almost full normal brilliance with the amplifier loaded and operating. C_1 should always be kept tuned for maximum grid current.

If the plate of one amplifier tube shows color, while the other remains cool, it is an indication that the excitation is unbalanced. This calls for an adjustment of the value of C_6 . If the plate of the tube whose grid is connected to the same end of L_1 as the plate of the 6L6G shows color, the capacity of C_6 should be increased, while color in the other amplifier tube would require a reduction in capacity. In either case, the value will not be critical within 10 or 20 μfd . and the value of C_6 specified should be satisfactory in most cases.

Of course, we can't use our transmitters during the war. However, the writer has found that the construction of a simple unit, such as the one described, makes an interesting project for odd moments. It keeps one's hands and mind in contact with the game and provides an excellent safety valve for a pent-up desire to get back into ham activity.



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AMATEUR ACTIVITIES

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Jerry Mathis, W3BES—3HQE is now captain of a man-of-war operating out of Canal Zone. That's great news, Charlie. He sends his regards to the local ORS gang. IKG has left us to go to NYC with the FCC. Mr. Redfern, formerly of NYC, is our new R. I. It is reported that Phila. has applied for its WERS license for six transmitters. Apparently there was some delay due to the application being returned for minor corrections. We can look forward to Phila. joining the ranks of WERS any time now. 3KT's application for a commission in the Signal Corps has been accepted and he will leave shortly for Fort Monmouth. The Frankford Radio Club gang certainly is sorry to lose him for the time but the country's need is greater than the club's. In normal years we would all be asking the other fellow how he made out in the S.S. Contest. 3DGM is still alive and well but working his head off on government work for the Sun Ship Co. We also met up with another of the ORS gang, 3IKW, who is still stationed at the Navy Yard. He is now CRM. The new officers of the West Phila. Radio Assn. are: pres., 3JMZ; vice-pres., Harmon DeWitt, no call; treas., 3HEK. Their course in radio for women is up to 10 WPM so far and they are enthusiastic about it. 8PUZ is pvt. at the 301st Tech. School Sqdn., Flight 544. Keesler, Miss. 8BFF is pvt., Co. D, 1st Signal Training Btn., S.C.R.T.C., Red Bank, N. J. 3DRQ, starting as private, has rated advancement every pay day and is now instructor sergeant with a couple of bars. FB, His brother is also in the Signal Corps going great guns. 8RJI is at Ft. Smith, Mass.; 8UWQ at Canal Zone; 8WNT with FCC at Laurel, Md.; 8TLE also with FCC at Wash., D. C. Due to shortage of radio operators, 3LN is looking to wired wireless to serve Chester County. 3TIZ is EC and radio aide for Montour County. Their application for WERS license has been filed. 8ATF is radio aide for Ashland and 8BLT for Schuylkill County. 8TIZ states that Lycoming County has a defense signal school and many of the students are trying for ham tickets.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Hermann E. Hobbs, W3CIZ—ASE is with the Signal Corps working with the Air Corps stationed at Bangor, Maine. According to BAK, AXP is now the proud father of a three-weeks-old son. CDQ has 5IKC and 9JTX as visitors recently. She reports that at a recent club meeting there were five YLRL members beside herself: 5IKC, 9JTX, 3AKB, 9WWP and 3JSE. 8MHM is still at Bliss Electrical School and wishes to be remembered to his old skeds. Montgomery County is planning emergency networks using both u.h.f. and wired wireless under the direction of William H. Blair. Perry Wightman, chief of WERS in Prince Georges County, has announced a County Radio Service and urges all amateurs to get in touch with him.

SOUTHERN NEW JERSEY—Acting SCM, W. Ray Tomlinson, W3GCU—Asst. SCM, ZI. Regional EC in Charge of Emergency Coordination, BAQ. Emergency Coordinators: Atlantic City, EFM; Camden, KW; North Plainfield, OGU; Vineland, GMY; Somerville, EBC. Have gleaned some news from various sources this month, so here goes. Regional Coordinator BAQ has just returned from an extended tour of duty as civilian radio engineer for the Signal Corps, which took him as far north as Alaska. Asst. SCM ZI recently returned from an inspection tour for the same branch of the service which covered duty with a large defense plant having units in Bridgeport, Schenectady and Syracuse. Our ex-SCM, CCO, is now stationed in Indianapolis and may be addressed at Troop Carrier Command, Hotel Severan, Stout Field, Indianapolis, Ind. Les says it is cold in that neck of the woods but he is fine and has added some avoiddupois to his formerly lean rack, and would appreciate letters from the gang in the Section. GRW was last heard from in British West Indies and is now somewhere on the Atlantic in convoy. Paul is doing duty as radio op in Unk Sam's Merchant Marine. ITS just recently became the proud papa of a brand new YL. JKH is now Pvt. Gerard A. Baldauf, 32075157, 17th Co., 2nd Std. Rgt. Tng. Grp.,

A.F.S., Barracks 33, Ft. Knox, Ky. Gerry's home town is Pleasantville, N. J., and he would like a word from the boys. ARN has enlisted in the Navy and is now radio technician stationed at Bainbridge, Md. Eddie Peters, who holds one of the new ham tickets carrying no call, has also enlisted in the Navy as apprentice seaman, and is training at Newport, R. I. HTJ is still at Eastern Aircraft. GPS has left for duty in Uncle Sam's Signal Corps, reported for duty Nov. 13th. GFS is also sporting a brand new YL, Jeannie. ITU is another of the DVRA gang who has rallied to the colors; Dave enlisted in the Signal Corps and recently reported for duty. Ralph Ladd, 3KA-4CK, former director of DVRA, is now with CAA in Chicago as radio engineer. EFM is now with a radio manufacturing plant in Baltimore, Md., as radio engineer. ZI has just been promoted to radio engineer in the Field Division of Signal Corps General Development Labs., and is on the road more than at home. We are all in deepest sympathy with BYR, having just learned of the death of Mrs. Braidwood recently. Vic will be remembered as the famous top trunk line station, and old stand-by NCS for the NJ Section Net. He was last heard from in Orlando, Fla., where he is doing duty as radio technician with the Signal Corps. GNU has been promoted to chief instructor at the new trainee radio school at Long Branch, N. J. Doc hangs his hat behind the door at 27 West Broadway, Long Branch, N. J., in case you birds recover from writer's cramp! CCC's family is going strong for the service. His oldest son, Blair, signed up with the Coast Guard as radio op, and the youngest boy is now in the Air Corps. Eddie is doing watch at NBM, Amagansette, L. I. ASQ reports further progress with the Hamilton Twp. WERS program, having several complete units ready to go, including a crystal-controlled job for use at the control center, which Dal expects will incorporate a 2 1/2 superhet for receiving. Well, fellas, this is the works for this month. We are trying hard to keep the ball rolling and will greatly appreciate news from all parts of our Section. Let's have it, no matter how trivial it may seem to you. Until next month, 73.

WESTERN NEW YORK—SCM, Fred Chichester, W8PLA—STA is now in the United States Navy. BAZ is one of the radio instructors at Syracuse University. Central New York Radio Club has opened a new fall code class with an initial registration of 35. BAL is the instructor. Application for WERS station license has been made to FCC by the City of Syracuse. In the meantime 60 civilians are undergoing weekly class training in WERS operating procedure. CYD, as WERS shop supervisor in charge of building radio equipment, has received offers of 200 discarded radios from Syracuse citizens. Newspapers and broadcast stations made the appeal. JZT has left Alfred University and is doing ceramic work in Fostoria, Ohio. USX is communications officer for the CAP and is teaching a course in radio. He is also taking a course in aerial navigation. ELK is acting as assistant communications chief in the CAP. LMQ is contemplating entering the Army very soon.

WESTERN PENNSYLVANIA—SCM, E. A. Krall, W8CKO—We are sorry to report the death of Art Wrigley, AKJ. He died November 2nd after a long illness. Although not active on the air for a few years, he was known to many amateurs of the Section through his connection with the Cameradio Co. Wik, KWA, gets to town occasionally and seldom fails to call and asks to be remembered to the gang. 3HAL is working on strategic radio work and wishes to pass regards to the W. Pa. AARS members. Somewhat of a record was made when a letter was sent to RTU, radio officer on the Saratoga, and an air mail answer received within eight days. BEN met with an unfortunate auto accident and suffered a broken thigh bone. By this time he should be on the road to recovery. Code classes are the vogue of amateurs these days. Quite a few people are interested in learning the code and theory, but the majority ask themselves what good it would do them. We relate the story of "ham" radio to them, the wonderful friendships founded over the air, what has and is being done with radio, the strategic value of knowing the code and the probable future of Amateur Radio, with the ARRL backing us up with real representation at Washington. With correct presentation of the subject, interest is aroused and four out of five become associated with a class. Aviation cadets are enthusiastic about learning, for it is a requisite of their training; and there is no better way of retaining a good fist. WERS is still hanging fire in the Section. Many seem worried over the frequency allotted. A bit of advice from one in the know advises that nine tenths is in the antenna. Your SCM is still fishing for more reports. Season's greetings to all.

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CENTRAL DIVISION

INDIANA — SCM, LeRoy T. Waggoner, W9YV — Biggest news of the month is that Fort Wayne has granted its WERS license with the call letters JGV. Congratulations, Fort Wayne! YDA is teaching radio at the Signal Corps radio school in Indianapolis. NNA recently graduated from Officer's school at Fort Monmouth. ZFR is back on his feet after a recent operation. The Richmond Amateur Radio Association is sponsoring code classes at all hours of the day and half of the night. Small groups at odd hours permit the training of more people as prospective WERS operators. SNF is teaching code and procedure at the Air Force school in Chicago. TRN is OCD communications officer at Goshen. EKR and EMQ have built deluxe lecher wires and SS meter for checking WERS transmitters. DDT has finished a freq-meter. Anderson is one of many Indiana communities with WERS applications in to the FCC. DNQ was needed in war industry more than in the Army so was given temporary rating as enlisted reserve to assist former employer. LPQ hopes to train class for restricted permits to augment WERS operating personnel in Sullivan, RFD, EC for Linton, was recently released from Veteran's Hospital at Hines, Ill. A speedy convalescence, Grover. ZYK is getting excellent cooperation from city fathers at Mishawaka. ETH and GOX sold some equipment to the armed services. EOC has been pretty busy with "white tests" as communications coordinator for Bicknell. How about that WERS class, Tony? The Richmond Amateur Radio Association is seeking ARRL affiliation. New officers of the Fort Wayne Radio Club are SWH, pres. and communications manager; UUN, vice-pres.; YQV, sec-treas.; and UKV and BKJ, trustees. NKB has been getting the glad hand lately at OCD offices in Michigan City. EGQ informs that Gary has applied for WERS license. The Indianapolis Radio Club is being crowded out of its quarters by the war effort. Search is being made for space for the duration. YZQ, stationed at Corpus Christi, says that the Navy equipment would make a ham turn green with envy. Many Indiana communities have applied for WERS permits. ECs have written in to say that everything is in readiness when the good word comes back from Washington. Operators have been schooled in WERS procedure, equipment has been completed and tested insofar as conditions permit, and all anxiously await the starting signal. I predict that in the very near future, 2½ will sound like RM Nitel! Remember? 73, Roy.

MICHIGAN — SCM, Harold C. Bird, W8DPE — FX would like to see ARRL start code proficiency runs again on WIAW. Claims the commercials speeds vary too much for satisfactory code practice. We all would like to see this. AHV reports holding meetings every two weeks all through the summer although attendance was not large. It has now begun to pick up. They are teaching code and theory. They have everything all set for WERS and have applied for license. It was returned for technical information but has been corrected and now is in for reconsideration. He also reports PXF, former member of the old Chair Warmers Club, passed on August 25th after an extended illness of more than ten years. They are having their ranks thinned by the Army and Navy. The Oakland County Radio Club held a meeting recently and are getting their equipment together for WERS. They are also building new equipment and hope to apply for license as soon as approved by the state commander who is cooperating to the fullest extent possible. Saginaw Valley reports that they are making progress in their locality and are receiving good cooperation from the city officials. The Detroit Amateur Radio Association are still running their code and theory schools and are planning on opening more. They also report the birth of a daughter to BIU. AFAllen asks in his column in a local paper for the boys to send in their activities. This is all the information I can gather this time. Please send in your activities to help keep this column going. 73. — Hal.

OHIO — SCM, D. C. McCoy, W8CBI — Springfield: EQN has been appointed as Emergency Coördinator. Additional personnel is being trained for restricted radio 'phone licenses to build up the emergency radio communication facilities of Springfield, due to the large losses of amateurs to the armed forces and industrial war activities. Springfield amateurs that are left are all engaged in some sort of civilian defense activity. Cleveland: AVH reports that application for WERS license is being made for Cleveland and vicinity by Cuyahoga County, so that all municipalities in the area can come under the same set-up. A number of portable

mobile units will be licensed and necessary fixed stations will be added at a later date at report centers and district warning centers. AVH has been appointed radio aide for this organization with DS and LVS as deputy radio aides for the East and West sides of the county respectively, with the Cuyahoga River acting as dividing line between these two sections. Chief operators are being appointed for report centers and these men are busy organizing their own units, registering operators and building equipment. All amateurs in the Cleveland area are urged to contact the deputy radio aide for their section of the County and arrange to participate in the WERS activities. Cincinnati: TQS reports that WERS license application for this area is being made under the name of the County, for the same reasons as given above for the Cleveland set-up. WNS reports that the Walnut Hills High School Radio Club has 15 enrolled in a theory course using the defense edition of the ARRL *Handbook* and the instruction outline furnished by the League. A new 5-place code practice table has been constructed and is now in use, providing for code practice by either hand or machine. Youngstown: Application for WERS license for about 50 units for the Youngstown area has been sent to FCC. TAD reports that detailed work involved in preparing these papers is terrific (you said it!). Toledo: ESN announces a new series of radio classes to prepare for licenses; also code instruction to prepare for Army, Navy or Air Corps service. Dayton: FCC has asked for additional data on the Dayton WERS application, which has been supplied. We hope our license will be forthcoming shortly. Progress is being made on construction of equipment, several portable-mobile units being ready for installation in cars as soon as the license is granted. Equipment for master control station is under construction. Mobilization tests have been conducted for radio personnel by telephone, and total available men have been notified within 12½ minutes. Minor organization changes are being made to conform to the new Ohio State WERS plan recently issued. DMN is getting the educational program lined up. The City schools have provided improved quarters for this year, allowing 20 student-operating positions to be set up permanently. Civilian Defense Council is providing clerical help which will relieve instructors of much detail. The problem of loss of amateurs from the Dayton organization is being met by more effective use of experienced instructors by combining various educational activities, so that ground school training for glider pilots, training for WERS operators and a course for high school students preparing them for radio work in the armed forces are being coordinated to reduce much duplication of effort. Students who graduated from last year's code classes will be given the opportunity to act as assistant instructors in this year's program. SID has been appointed Emergency Coördinator for Preble County. TEB has enlisted in the Air Corps. WI has moved to Detroit, where he is now engaged in war radio work. OVL, CED, ex-CFW, ENH, GER, IBQ, JPQ, CDR, LCO, OJF, SXT, TLM, TMC, VHN, UOD, VWC and AZH are all at Wright or Patterson Fields, "Keeping them Flying" in one form or another for the Air Corps. RMB and MFB are reported at Scott Field. IBM is "somewhere in the Pacific area." MZQ is reported to have enlisted in the Army. VAY has another deferment. The new WERS plan for the State of Ohio has been carefully examined by the SCM. It is a good one. Much credit is due our former SCM, AQ, and AVH for their part in its preparation. Copies of this plan, with some suggestions from your SCM, will doubtless be in the hands of all active Emergency Coördinators by the time this is published. Copies of the plan have already been mailed to all local defense councils in the State. This plan calls for 53 WERS areas in the State. Only 28 of these are covered so far. We, therefore, have a sizable organization job to do. Placing this plan in the hands of local defense councils should pave the way for excellent relations between local amateurs and these defense councils, and should stimulate interest in the service which amateur radio can render to each community in case of enemy action. A golden opportunity is offered to the amateurs in Ohio to serve. Let's take advantage of it. Emergency Coördinators, contact your local defense councils if you have not already planned for a WERS set-up in your area. Other amateurs, do the same and get organized. I hope by the time my next monthly report is to be made, we will have a much better showing than 53 per cent of our territory covered. 73. Dan.

WISCONSIN — SCM, Emil R. Felber, Jr., W9RH — The Milwaukee Radio Amateurs Club invested in five \$25 war bonds. DJC, the treasurer, is now in the Signal Corps at Fort Riley, Kansas, and RH has taken over his

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post. The Club had a bowling party November 27th and 30 members attended. Chairman was VD. Correction: The MRAC meetings are still held every Thursday evening at 8:00 P.M. in The Public Museum, Trustee's Room, West Wisconsin and 8th St. Visitors welcome. The club's WERS program is being taken up by the City Common Council and results should be known by the next report. LJU replaces DJC as a club director. JWN, RMLc, visited with HRM and folks in Milwaukee after an absence of two years. DTK paid a visit to ANA at Lamesa Field, Texas, and had a ride in a glider. ANA said when power leaks aren't too bad he can hear Chicago BC stations in the middle of the day, a distance of well over a thousand miles. He also would like to hear of more boys looking into wired wireless. The club made a few recordings at the last meeting and are sending them to its members in the services. IZQ is a warrant officer at the U.S.N.T.S. located at Corpus Christi, Texas. Lt. Cmdr. J. F. Wyman is at Norfolk Naval Hospital, Portsmouth, Va. VDY is with Raytheon at Wattertown, Mass. VJB is teaching for the AACTS at Brookley Field, Mobile, Alabama. AXR is getting help from ARRL for a transfer to the Signal Corps. RSR is doing Signal Corps "hamming" at Drew Field, Florida, and sends 73. UKR is interested in the carrier-current project and would like to know of anyone else in the vicinity of Sparta who is interested in same?? Attention hams upstate — please send me more news. 73. — *Emil*.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, P. H. Schultz, W9QVY — NLF is now an aviation radio man, second class, in Florida. He is instructing cadets in radio and communication procedure. KHP is now sergeant at Ft. Meade. IQX and IWU have joined the Navy and are under instruction for radio technicians. EC appointments have gone out to several in the State but could use a few more in order to get good coverage. Please send in your reports and I will see that they are submitted to Headquarters. As yet have had few reports from men in actual service. How about some more?

NORTHERN MINNESOTA — SCM, Armond D. Brattland, W9FUZ — WUQ is in the Signal Corps and going to school in Kansas City. EHM was transferred to Denver and after further training has now been raised to a position with the service in New York. A number of the fellows would like your present address, Bob. A card was received from KET which appears to have been a long time on the way and judging from the place from which it was received Joe is doing some salt water brass-pounding. KMT holds membership in ARRL again and is transmitter operator for WDSM. He also takes a hitch as control room operator and announcer and is making good use of the training he had with a ham milke. Had a letter from JBZ who is now sgt.-instructor in Army Air Forces radio school at Scott Field where he has been stationed for 22 months. LIH is taking electrical eng. course and working part time as operator at WHLB. He also teaches a code class of Army and Navy Air Corps reservists. YLA is 1st lt. in Air Corps somewhere in India. RTN is in Signal Corps at Camp Crowder. QPZ is 2nd lt. in radar located in New Jersey. HQW is Navy operator. DOS is radio technician with Navy. KSC is in Army radar service. YEQ is located at Camp Crowder, Mo. ICU has received a promotion and is still at Monmouth. BHY is now captain on CAP Wing Staff as communications head. During this past month have received a nice bunch of cards and letters. Some added a bit of news about different members of our "big family" and some did not, and others were too modest to say much about themselves. I wish to thank you all for the news, and if I do not answer or my answer is belated, remember it is not because I do not wish to answer. Pour in the news. Remember, fellows, that some day, and we hope it is not too far away, we shall want to muster our forces again and get back on the air, so keep up your membership in ARRL and send in all the material you can to keep QST going in good form. Some of the letters received from fellows in the armed services from various parts, who delight in receiving even the smallest bit of dope about some buddy someplace or other who is also doing his part, leads me to believe that the little extra time and effort is worth while. As far as possible, I am keeping a list of addresses received and I shall supply them on request. Present address is 198 Lakeshore Drive, Glenwood, Minnesota. Luck to you all and 73. — *Army*.

DELTA DIVISION

ARKANSAS — SCM, Ed Beck, W5GED — Ex-CIU visited in Little Rock for several days again recently, looking for talent. BM has made his home in Little Rock for the termination of his job. HLW finally came through with an overdue account of things in that he is doing all he possibly can under the circumstances. AY is supervising the construction of a brand-new station from the ground up, and is ably assisted by PX. FXO is still conducting a hunt for a phono pick-up that will meet his requirements. BCZ has returned to his former stamping ground and the local gang is very glad to have him back in their midst. GNV really gets around on his new job and we find that his last jaunt took him about 1000 miles from his home base. ECM has changed positions and is applying his talents to aircraft radio. FPU has evil intentions on a recording set-up which he recently ran across. JHL has stored everything anticipating active duty in the Army. Just a reminder to those of the gang located in the far off parts of the world, if you will drop an occasional card to us, it surely will help a lot. At this time your SCM would like to express his most sincere season's greetings to every one of you, and if you guys are going to send any, BE SURE AND WRITE YOUR REPORTS ON THEM, HL 73. — *Ed*.

TENNESSEE — SCM, James B. Witt, W4SP — DDJ says that serving the Tenn. Section has been a pleasure and as retiring SCM it is his desire to express a deep appreciation for the many friendships formed by contact with the amateurs of our State and wishes for an early return of peace so that we may again chew the rag via amateur radio. The Knoxville Communications Club is working with the OCD on the WERS setup. As your new SCM I wish to say hello to the gang and would sure like to see more reporting each month. Fellows, get those reports in. Let me hear from you.

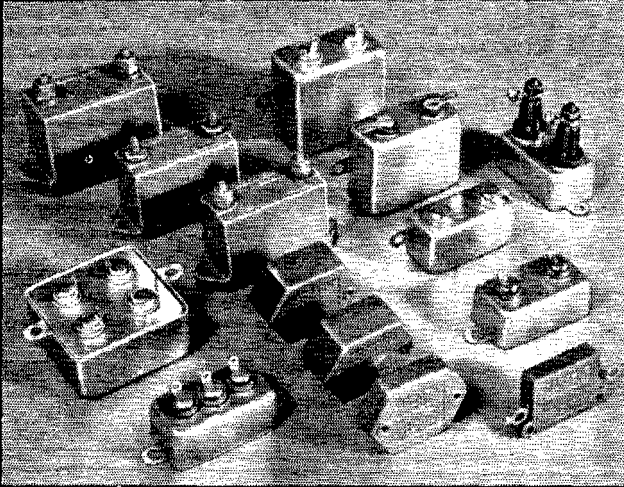
HUDSON DIVISION

EASTERN NEW YORK — SCM, Robert E. Haight, W2LU — JDB, of Spring Valley, reports progress with director of civilian protection for Rockland County, also for village of Spring Valley. Spring Valley Communications Class is making steady progress. Eleven students remain in the class; 8 of these take both code and theory, while others take only code. One member has been lost to the Navy and one to the Army. LA, LC and LU are on active duty with U. S. Navy Communications at Com. 3. Your SCM extends to all members of Eastern N. Y. Section his best wishes for a Merry Xmas and a Happy and Prosperous New Year, and may we soon be back on the waves. 73, W2LU.

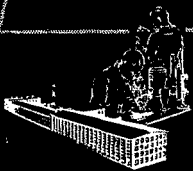
MIDWEST DIVISION

IOWA — SCM, Arthur E. Rydberg, W9AED — QVA reports that the Iowa-Illinois Radio Club is still continuing with its weekly theory and code classes so they may stay on the QST Honor Roll. WTD, communications officer for Burlington CAP squadron, has prepared a large class for their restricted radiotelephone permits and will supervise the exams. DVP, RM2c in the Navy, was home on leave. CCE still keeping up EC work. OJD finished school in Los Angeles and is now going to radio school in Florida. For an honor award he was given a 5-tube portable, of which he is very proud. Des Moines Radio Amateurs Association's WERS work is progressing favorably.

KANSAS — SCM, Alvin B. Unruh, W9AWP — Another former KN netter is heard from — IJK is attending the Army Technical School at Sioux Falls. He says he has hopes of operating a B-17 yet! MAE reports K.C., Kans., "pretty quiet," although SPN is going into radio servicing after several years of inactivity due to illness. EYF and EVY are working in aircraft parts factory in K.C. and QVA is instructor at Signal Corps School there. KXL is in armored signal company of the Army, and was home on furlough. JRV has entered Uncle Sam's service. YCT has joined MAE as railway switchman. At Seneca, YOS is teaching class of 37 to provide WERS operators. Interest in radio was so intense that nearly all will attend code classes also. LFB, Wichita radio aide, reports WERS prospects are good; operators are attending first aid classes and otherwise getting ready. ABJ, DMF and BCY are investigating equipment for WERS. RBX has entered military service after six months as civilian radio operator in Signal Corps. RQF is also in the services after 18 months in radio department of aircraft factory. MQB is instructor of ESMWT class at Wichita. U. NQX is in charge of Wichita police communications. DMF



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is instructing a class at Boeing factory. Don't forget to drop the SCM a line on the 15th of the month. 73. — *Abie*.

MISSOURI — Acting SCM, Letha E. Allendorf, W9OUD — Thanks for all the swell letters. Looks like the Missouri hams are going lots of places and doing plenty of things. For instance, UMC has spent six months in communications work with the Army on foreign duty, Northwest Pacific division. GFF is teaching code at Scott Field. EBE is out with the K6s as civilian radio maintenance man. WJC, licensed just before the crash, is taking a three month's course in radio at St. Louis Univ. for a Civil Service rating of junior instructor. Remember JWI from Independence? His W6 call is forgotten for the moment, but as per report of last April he was at Fort Monmouth as radio instructor. HIC and HCL went to Calif. last September and took jobs in an aviation factory; then HCL took a wife, and a bit later a Civil Service job. HIC (now 6UTU) who is living with TOR, received a Civil Service appointment this fall and is again working with HCL as radio mechanic. HDK and TAB are also in Calif. helping to keep 'em flying. HDK is really 6UTZ now, has telegraph 2nd and class A amateur tickets and his job is testing the radio equipment for the planes while the XYL, TAB, pounds a typewriter for the company. GBJ is studying math and theory to try to get a real foundation for radio and likes to copy code on the mill since he has it under control. Then there's VZQ, now C.P.T. flight instructor at Maryville. One of his students was IIS, who is instructing an Army primary unit in Okla. WIS is not sure if he wants a job with the Navy as radio technician 2nd class, as he has something else in mind. QMD is reported back in the States after his sojourn in Africa. OUD is trying to learn line Morse; trouble is finding any to practice receiving. Ex-SRH stopped to see OWQ enroute to visit her sister OUD and mother. Thanks for all the swell letters. That's the fuel to keep the home fires burning, and it hasn't been rationed. 73, Merry Xmas and Happy New Year.

NEBRASKA — Acting SCM, Lt. Comdr. P. H. Quinby, W9DXY — HQQ appointed EC for Lincoln area — it's virgin territory, Curly, do your stuff. Others in the State are EAT, Ceresco; KQX, Potter; MLB, Gothenburg; and UEV, Omaha. AECs and prospective members, please contact nearest one for WERS organization. This is only ham activity available at present. Look at your map. If you are in an unorganized area, contact your SCM so you can get in the swim. See back copies of QST for organization plans. JBK reports QFT in Navy. Before that he worked in California aircraft plant. One day he wrote his call on plant bulletin board. Soon 256 others appeared, including all U. S. districts and two K6s. BZR in radio school in Missouri. YDZ at East Coast balloon station and now RM1c. ITM on Alaskan construction. IZR pounding brass for N.W. Airlines, Bismarck, N. Dak. QWU moved to Windy City. NENRC chain letter has returned home to Norfolk with 19 endorsements from members all over U. S., including Congressman Karl Steffan who has taught many a ham his code. UEV and GCP (from So. Dak.), now neighbors and working up wired wireless rigs. Would like other candidates to make up a full-fledged Omaha round table. Sounds like old times. UFD is doing hush-hush stuff. VIG on civilian job for Signal Corps. YNA moved into cold storage. QMA teaching code in Omaha. EAT looking into WERS possibilities of Nebraska Ordnance Plant. YDC lost his wife and GDB his father. Our sincere sympathies, fellows. LGY going into Air Corps. KMV has taken off for parts unknown. GXZ building aviation radio in East. KEB is in the Navy. JZG now in Army. LRF going in for 100-watt PA work. LEF wants first option on it after the war to modulate a peanut whistle. GCS away on maneuvers. Brainard's BCL trouble located. It was YCG and LEF squirting ground currents from a Ford coil. They confessed. Their 2 1/2 meter jobs are pining for action. Gang, you've got a new SCM. Roy Olmsted, W9POB at Wauneta was declared elected without opposition. Nebraska is back in the running. Roy's got what it takes to get the job done, but you'll have to pass him the ammunition. Now get in there and pitch on the 15th. 73. — *P.H.Q.*

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — Our sympathy to family of Harold L. Johnstone, FY, of West Haven who recently passed away after a prolonged illness. Harold was one of our pioneer hams and former member of "GB." LGJE, formerly of K5AF and K5AX who was very active on 7 and 14 Mc. during the good old days, writes he is now with CAA Comm., National Air-

port, Washington, D. C., and would like to renew old acquaintances. MGC, one of Conn.'s leading traffic men, former net control station for both Nutmeg and AARS nets, is now at M.I.T. Dormitories, Cambridge, Mass. All regular members of the 75 meter phone "Charter Oak" net are now engaged in WERS work: EAO, State RA; KDK Hartford DRA; ON, Putnam DAR; HXL, Groton RA; LUH, Stamford RA; and KNM, Milford RA. Newly appointed DRAs are: DBM, Middletown; ON, Putnam; KYQ, Willimantic; ALW, Norwich and Samuel A. Oliva, Danbury. Asst. SCM CTT writes that Stamford Warning District, WJQA, has had considerable success in its tests to date. Results have been given high praise by CD officials. DJC reports Manchester has been issued license under call letters WJQS and now awaiting receipt of opr. licenses. New Haven Warning District has been issued license under call letters WJLH. Operator licenses have also been received and stations will be on air during next test period. Other warning districts have forwarded their applications to Washn. and will probably be licensed and on the air before next issue. Many of the towns in the warning districts are conducting examinations for restricted radiotelephone permits to build up the WERS personnel. Keep the news coming in, boys. We know all have been very busy with WERS activities, etc., but things will soon be back to normal again.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr., W1ALP — A few more new ECs: HSB for Norwood and NPZ for Weston. NNH is in the Signal Corps. Some more hams working in Boston in the Signal Corps: DIU, CPL, MXG, IUO, AAH, DSO, AMT and ASD. LAR went to school in Baltimore but was recently inducted. DIU received both 1st class commercial phone and telegraph tickets. LID going to school in Phila. JBY is now in the Navy at Great Lakes Training School. LVR is working in Penn. We hear that Joe Mullen, ASI, is now a it, and is at Newport, R. I. BMO writes that he is now a commercial photographer and would like to hear from some of the old gang. AIT is now a it. in the Air Corps. MNK moved to Roxbury. KPX working at the Navy Yard. DNL now working with RCA in Boston. Ben L. Toy and John G. Budharis both received class B tickets. AKY, MBX, IYU and BIO now teaching radio in Boston: JKR working in Cambridge. We hear that KVP is with the Navy and teaching down in Texas. Two more hams that now have XYLs are FCR and HQY. HTP has moved to Calif., now working at a B.C. station. A meeting was held on October 23rd at the Mass. Public Safety Committee rooms to talk over WERS work and the following hams were present: FWS, ALP, IHA, DIR, DMG, BB, BDU, LJT, JLK, KTG, GGE, JYA, LOS, HPC, JGQ, AJW and many others. The Norfolk County Radio Assoc. is conducting a school in the public library, Norwood, Mass. Instruction in radio laws is given, to help civilian defense personnel obtain 3rd class permits. Code and theory is also taught to a class of 10 jr. high boys in the hope that they will get ham tickets. The classes are being conducted by HSB and CAW under the supervision of AGR. HTR is still in Hawaii. JOE back in Boston for a while. Your SCM would welcome any news from hams in this Section, also about hams away from home. A post card before the 16th of the month would be appreciated. The hams in Newton, Belmont and Lowell have been able to get their WERS licenses for their own towns only. AHP, who is radio aide for Fall River, Somerset, Swansea and Westport has applied for WERS license and hopes to have it soon. He has a class of 60 people taking the 3rd class exam. A Merry Christmas to all the hams, wherever you are.

NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTJ — We were very glad to have word this month from BN. Paul is now a code instructor with the Air Corps and doing fine. A new WERS has been established at Portsmouth under the call of WJSP. We understand that seven operator permits have been granted and that the boys have four Abbott TR4s at their disposal. MXO is now in the Army. Had a surprise 'phone call from MZV who was home on leave recently. Also ran into MIP who was enjoying a short visit with his folks. Our Norma, MUW, who has been the heart-throb of many hams during the period she has held her license, has now joined the ranks of XYLs, having been married to none other than Joe Moskey, JMY, on November 14th. We wish for them the very best of luck, and to Joe we offer hearty congratulations. HFO was an usher at the wedding! CUZ is radio aide for Portsmouth. ITF is keeping busy experimenting with u.h.f. ATE is now a lieutenant with the Navy. IDY just celebrated another



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birthday! JEH is working for CNX at Concord. FYH has enlisted in the Army and is to be in the Signal Corps.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — A nice letter from LJZ, who comes to Barrington from Vermont, offering to do what she can in civilian defense. FB and welcome to Rhode Island. East Providence, Cranston, Coventry and Newport now have WERS licenses. Drills are taking place and enthusiasm is high. EX has left WEAN for new job, training in Boston, and expecting to maintain theatre equipment, probably around New Haven.

VERMONT — SCM, Clifton G. Parker, W1KJG — CBW has recently returned from a trip to League Headquarters. A fine letter from Paul, KOO, indicates he is radio-man second class and now at the Boston radio station, Truro, Mass., as an operator. KTB also sends in fine letter in regard to his studies at the Signal Corps School, Camp Murphy, Florida, and speaks of meeting many amateurs in the services. JRU and XYL paid your SCM a visit while on a trip from Connecticut recently. The Burlington Amateur Radio Club at its annual meeting elected LWN of Burlington as pres., Clyde D. Holloway of Essex Jct. as vice-pres. and NLO as sec.-treas. for the ensuing year. Dick Evans of Essex Jct., one of our new ops who received his ticket since December 7th, has left for Tennessee to serve as a flying cadet. NLO is radio aide for WERS in Burlington with LWN and IQG serving as assistant radio aides. MCQ has returned from the Veteran's Hospital and is eager for a chance to do some "hamin'" again. I would like if possible to have each amateur in the Vermont Section, upon reading this, send a letter or card giving the name, call, branch of service and address, if known, of each amateur in their vicinity now serving with the military or naval services of the country or engaged in radio work along similar lines that our record for this Section can be brought up-to-date. Thus far, the following are listed as in military or naval service: AHN, LYD, KUY, KTB, KOO, ND, AEA, LRL, KDB, KVV, KXY and GKX; and in allied services: GAE, JRU, FPS, KJR, BNS, CGV and EKV. There are doubtless quite a few more but let us make sure they are all listed.

NORTHWESTERN DIVISION

MONTANA — SCM, Rex Roberts, W7CPY — Great Falls has its WERS set-up all complete and it only awaits FCC approval to function. HEM is in the Naval Reserve as radiotechnician 2nd class. ABT has moved his transmitter from the historic spot in the bay windows of the first floor to the basement. Doc, your shack won't look like home to us hams any more. BOZ is home from school for R.I.

OREGON — SCM, Carl Austin, W7GNJ — EC: JN. A card from BGM says that BBI is with G.E. at Schenectady, and will soon have an XYL. Tom is an "office man" at present, and likes the work fine. Says ham experience is a great help in his work. As usual, Tom is doing outside work also, namely teaching Elec. Eng. for Purdue University defense classes. EDU reports WERS activity coming up soon. FNS, now at Lexington, Ky., says he has passed officer's training, but cannot describe type of work. He misses the western climate. GTW now near Fairbanks, Alaska. K7ENC reports being in charge of an Alaskan radio station. FHX made the annual deer hunt with success. GSI, of KBND, experimenting with auto-alarms. HVX, secy. of CORK, reports 3 students working for commercial telegraph; Club now has 4 code oscillators, and have purchased 24 headsets, also have a Telex machine coming; Mrs. Sheldon passed 13 w.p.m. code test after 9 weeks training; CORK stole Instructograph keying principle for one of their tape keyers, and it works FB. 73.

PACIFIC DIVISION

EAST BAY — SCM, Horace R. Greer, W6TI — EC: QDE; EC u.h.f.: FKK; Asst. EC u.h.f.: OJU; OO u.h.f.: ZM. Wednesday evening, November 18th, at the Hotel Leamington, Oakland, the ARRL East Bay Section meeting enjoyed a splendid talk by Mr. L. C. Rayment. EE, the WERS radio aide, announced that Oakland has received their call, KFMY, and asked all those who have not already done so to get in touch with him at OCD, City Hall, during daytime or at his home at night, who are interested in WERS. The following were present: EY, AHG, MPL, QAZ, KTI, USO, EE, SFT, ZM, TI, JEE, F. Arnberger, L. Rayment, F. Keller and part of ZM's Mills College radio class the Misses Rita Burt, Margaret Gleare, Mitz Woodward, Jane McVeigh, Jane Murnen, Betty McBain, Ann Stitt and Francean Campbell. The Mills College radio class

is every Wednesday and Thursday evening. RGQ is now a major in the Marine Corps. We are all pleased to hear that good old Ed Handy of ARRL is now a lt. col. in Army, and we of East Bay hope he gets another promotion soon.

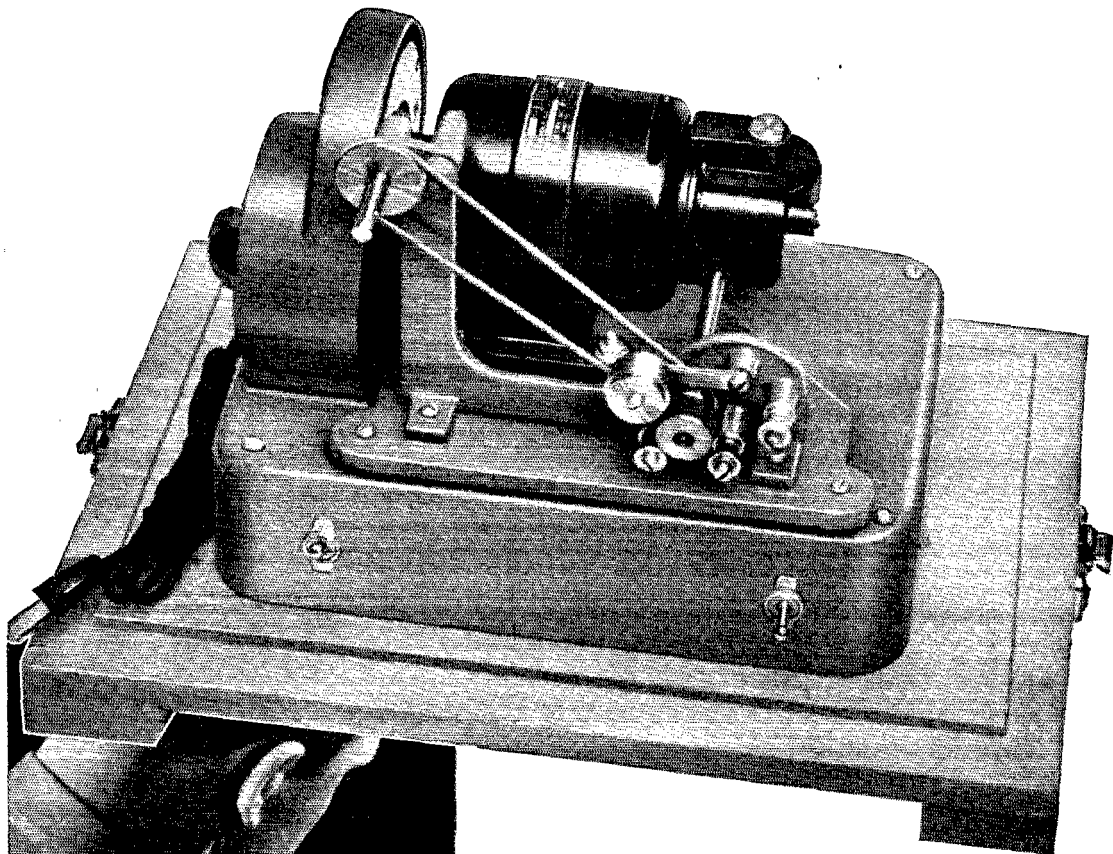
ROANOKE DIVISION

VIRGINIA — SCM, Walter G. Walker, W3AKN — Your new SCM is now W3AKN. I wish to thank my fellow hams for the privilege bestowed upon me in being elected SCM of Virginia and hope to fulfill the office to the best of my ability. IEX has been transferred by the Navy to San Francisco. NE is now in Merchant Marine as a radio opr. on a tanker sailing between the West Coast and the Far East keeping the Yanks supplied with the aviation gasoline needed. HWJ has been nominated for Roanoke Division Director. ICZ is planning ahead for the better days to come when the hams again are allowed to get on the air. 4BC is now a Major in the Army Air Forces at Langley Field, Va. HJW and IIF are govt. radio inspectors in the Newport News shipyard. MT, GSV, EWX, AJA and many more W3, W4 and other call area hams are doing a swell job building fighting ships for our Navy in the Newport News shipyard. BEK, EMM, CHE, PK, DGG and other hams in the Norfolk and Portsmouth area are now in govt. work at the Norfolk Navy Yard or the Naval Air Station. It is with deep regret that I announce the death of Epia, the daughter of AJA. We all extend sympathy to you, Carl, NT, RZ and several of the other Norfolk boys too old to draft are still with the Virginia Electric and Power Company. II and JNX are now with FCC in their Washington office. The Peninsula Radio Club received a telegram from Lt. Col. Guy Rockey, HZU, who is now on the offensive with our forces near Australia. Guy sends greetings to his old ham friends and wishes he could be with us. GGI is now a sgt. at Boca Raton, Fla., where he is an instructor in the radio school. Your SCM welcomes news from Virginia amateurs. Let's try to keep the Va. Section news alive, fellows, for I personally know that QST is news from home to many of the fellows who have left to help the cause. I know they will appreciate hearing how the fellows back home are getting along. 73.

WEST VIRGINIA — SCM, Kenneth M. Zinn, W8JRL — Due to many of the members in the armed forces and others engaged in various activities, it was decided at the last meeting of the Huntington Radio Club that the club would hold no more regularly scheduled meetings but shall be kept alive and on record by special meetings called by the president, secretary or treasurer. The Mountaineer Amateur Radio Association has decided to hold their meetings the same way, but both clubs will still be affiliated with ARRL. KXC has enlisted in the Signal Corps. DMU and EHA are working in the Westinghouse plant at Fairmont. KWI is now located at Lakehurst, N. J. OLV, formerly of Beech Bottom, is now living in Akron, O. DYB is now second lieutenant in Signal Corps, located at Fort Monmouth, N. J. LCN entered the Navy as a radio technician, second class. BTV is now located in Pittsburgh recruiting office. DFC has a swell job with the Virginian R.R. TPO is teaching in the Signal Corps school at Montgomery and VKC is going to school there. UJK is back in Matoaka after working for the Navy at Norfolk. EWM is communications man for Appalachian Elec. working with wired wireless all the time. UOW is electrical engineer for Appalachian. UEN is in the Navy radio school in Tacoma Park, Md. VPO is service man for Montgomery Ward in Beckley. VKF got some book learning and first class fone and second class telegraph tickets; he is now working at WHIS in Bluefield. Your SCM is very much pleased with the reports from the boys this month. Keep it up, boys. 73. Ken.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Stephen L. Fitzpatrick, W9CNL — SPU has moved to Oakdale, California. He hopes to be back in Colorado after the war. QYL says there is no ham activity in Paoli. Since the radio repairman left, QYL services all the BCL sets. HCP is still in Belmar, New Jersey. His brother, FPG, visited QYL the latter part of August. He is a tech. sgt. in radio. QDC has been quite busy of late, going to school at Steamboat and also operating radio at the Forest office; spent 16 nites on radio during the last fire. He also reports that he got married. CAA and CNL won the best attendance award from the AAROD, which is a year's membership in ARRL. KHQ is planning on a new circuit for his transmitter. If you have news to swap, please drop me a postal. 73.



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protects the sturdy AC/DC motor . . . the oversize brushes and commutator . . . the die-cast, dynamically balanced fly-wheel. Only oilite bearings are used. Another innovation is the hub holding the take-up reel. The arm-like arrangement can free the wheel if the slip requires rewinding or if the operator wishes to maintain constant speed and, at the same time, save the paper slip when not actually recording.

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SOUTHEASTERN DIVISION

ALABAMA — SCM, Lawrence J. Smyth, W4GBV — Was very happy to receive a page long letter from CIU Tnx for the dope, and hope the HY75 works all okay for you in the new h.f. rig you got there. Just received a letter from the State Civilian Defense Headquarters and we are one step nearer to getting something started on h.f. for civilian defense work. You fellers that are not in the armed service, how about dropping me a line on this and let's get something started. Sure glad to hear from FAZ and sorry you are not still in Alabama but know you are doing your bit as aircraft radio mechanic at your station along with your friends EEZ, FFI and FDE. The Alabama boys know these fellers and I know they are glad to hear from them. Your card, ELX, was sure appreciated and you are certainly an EC that I am counting on; how about that dope on local activities as promised? APJ says he is still here at WMPM and to tell the fellers it "won't be long now." Hate to see him leave here but know that he is anxious to get in the swim. FUM now a lt. in the Army; let us hear from you, Dupree. FVK stationed at Moody Field. ERM now in radar training. DGS, our ex-SCM, reports from his station that CYU, EVI, AWM and AHO now in the Capitol City doing things in radio; also that DRZ is now a lt. in the Navy. AGI now a capt. GOX, I know you are going places in radio in Wisconsin. CQY, former EC of Geneva County, now major in the Army Artillery Corps. After talking with a few fellers I find that through neglect they have let their ARRL membership expire and are getting their copy of QST off the stand so it's not a case of no interest but probably, like all of us right now, just too busy to attend to the matter. Fellers, let's keep our membership in force and one of these days all this will be over and all of us will want to catch up on our brass-pounding and rag-chewing. DVJ, now a lt. in the Signal Corps, was a visitor of yours truly at WMPM this week. 73. — Larry.

EASTERN FLORIDA — Acting SCM, F. C. Fassett, W4BYR. We have just seen first FCC transmitter seal, as received by RQ, Clearwater. Chas. Crowley, Jr., Chas. Cox, Glen Fugitt and Alan Houghton have just received B tickets. Crowley, Sr. still running code classes and continuing instructions for 20 restricted fone exams. AKA is plant supervisor at WSUN. AYW (formerly 3HAO) is operator at WSUN. ABL recently took unto himself a wife. DES writes that his weight is now 192 pounds. FKB is working with DVO at Mex. Pet. HGJ left Tampa police department for Navy. EMF is flight radio op. for EAL. Boyle of Sanford sold his HT-1 transmitter to Army. We saw CNV, Decatur, Ga., and DUS, Chattanooga, in WPBeach recently. BRB is running Atlantic Marine Radio (crystal service) in WPBeach. FTJ is with Thorow in Miami. AWO is with RMCA, Galveston, Tex. OZ, of Tampa police, showing off a new junior op. EFE, late of Tampa police, now flight radio op. for PanAm-Grace Airways. ACZ, DCF and GZ are lt., tech. sgt. and op. respectively in FDF. ACZ also functions as communications coordinator for District A. Dade County has filed WERS with KK in charge. KK also in charge of local casualty station. HKJ is with PAMSCO. MD is tech. sgt. with FDE. CZX is with Intercontinent Aircraft. CWX is lt. in AF based at Sioux City, Ia. ES is associate eng. with Navy in Miami. BN sez he missed his license renewal date and has been doing tall scratching. DQO is with Navy. BT is with Wirefoto in Atlanta. CWW and FPS are civilian radio instructors in 4th Army Service Command. QW is still with Navy in Miami. Virden of Orlando is with FCC in Washington. AJG is attending Army school in Illinois. DWI is building 112-Mc. WERS gear. ASE also building 112-Mc. equipment. Paul Moore is op. at WLOF. GVC is picking up his code speed via mill practice. Your scribe thanks all who contributed reports.

WESTERN FLORIDA — SCM, Oscar Cederstrom, W4AXP — John Venters, student at Gallup's Island Radio School, has been home visiting his family here at DeFuniak; he paid AXP a visit and paid a fine tribute to the school, saying they really taught you radio. Lt. K. P. Tompkins, officer in charge of Aviation Radiomen School at N.A.S., has taken up Radar in addition to his other radio accomplishments. He already holds commercial 1st class and class A amateur tickets. FJM and BJF have lent their gear to the Fla. Defense Force. EGO is Section's newest daddy; he has joined the FDF. GTJ has combined his BFO and BC receiver and done a swell job of it. ICU is doing fine at government radio school. GQF sold her transmitter. ECB, our blind op., is in radio work. Happy New Year and 73. AXP.

SOUTHWESTERN DIVISION

ARIZONA — SCM, Douglas Aitken, W6RWW — Phoenix reports that they are still awaiting authorization for their WERS set-up. Women have largely taken over operation of the Highway Patrol Radio System, due to the fellows going into service. TVU has joined the Army. QLZ is at Ft. Bliss and FZQ at Randolph Field. TYD is in the Marine Corps. QAP, SLO, UEH and UFF are all with Consolidated. Tucson Short Wave Assn. continuing their regular meetings, and after the last one staged a Weiner roast with "foam" on the side, in conjunction with their YLs and XYLs. TJH and GS report large code and theory classes, with 6 of the YLs being able to take and send 25 w.p.m.! GS had trouble with his conscience when he saw 200 6L6 tubes in a pile at an airbase. MLL has been confined to bed for the last month. NRP nearly blew his rectifiers when he came out of the show the other evening and found a note from PKGNR in his car, and then couldn't locate him! He wants the FK to drop him a line if he sees this. RJN is now with PAA. HBR and UKB are now attending Naval radio schools in Texas colleges. The gang will be sorry to hear of the passing of MUP in October. HRH was in Nogales recently. 73. — Doug.

LOS ANGELES — SCM, H. F. Wood, W6QVV — Hi, gang, I started to write this several times and each time stopped because it looked like we might have something definite about the license for the Los Angeles area for WERS. I understand now that it has been approved by the city and is about ready to go to Washington, so be patient and we'll get there yet. I personally am just as anxious as you are to get started. Have been making the various control centers in the area on drill nights and they are working out very well, but there certainly is a need for the service we can give, so get your gear ready and you'll be hearing from us soon. TRD is a lt. in Signal Corps now. SGX, when last heard from, was at Camp Crowder. ON of Baldwin Park says that they have fourteen hams lined up for WERS work in that vicinity with FFN as coordinator and that their applications have gone in for approval by FCC. There have been several communications from hams ready and willing to help out and we appreciate getting them. They are being kept on file and when the individual applications for stations or operators are sent out, you will not be overlooked, so keep on sending in. Merry Christmas and a Very Happy and Prosperous New Year. May each of us do our part to hurry that day when we get the green light from FCC, and may it come in 1943. — Ted.

WEST GULF DIVISION

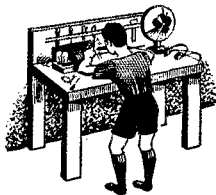
NORTHERN TEXAS — SCM, N. R. Collins, Jr., W5IAU — IAU wishes to express his appreciation for his election as SCM. I will carry on to the best of my ability. KO entered the Army and resigned his EC for the Plainview district. IWE is in the Signal Corps at Camp Crowder, Mo. JEB is in Abilene working for the State Board of Education. ILJ is in Rosewell, N. M., on a radio job. ESC is at the American Air Lines Radio School in St. Louis, Mo. GOB has completed his radio course at Texas A & M and is now on duty with the fleet. The Dallas Amateur Radio Club has started new code and theory class with IUA and FQY teaching. FKP is with the CAA at Love Field in Dallas. ALA and FKM are operating the Army station at the Lockheed Plant, with JJK, a YL, as relief operator. Other amateurs at Lockheed are HQN, JGX, ETU. CY is in Ohio again for Northern American. IAU wishes to thank CY for his cooperation. Last but not least, please keep your reports coming.

NEW MEXICO — SCM, J. G. Hancock, W5HJF — Another CQ has been answered by 5ZU/5ZM; this time it was Mendelsohn's Wedding March, in Washington, D. C. ENI is now stationed at Fort Rodman, Mass., and is playing lots of chess. JWA made a cool 98 on his code aptitude test while still in boot camp, and is worried because he didn't make 100 plus. FSP is keeping the stuff going for the 8th Corps Area after a month's special instrument repair training in New York. The code practice table that JWA and HJF built for Eastern New Mexico College won honors of being the best in this Naval District; it is used to teach pre-flight Naval pilots the code both by sound and by blinker. The instructor was also trained by JWA and HJF. A few reports have come in expressing satisfaction at seeing a New Mexico line in QST again. We will have a line every month possible, but we are badly in need of reports. Please, fellows, let us hear from you. Let's keep New Mexico in there just as we have kept our share of operators in the service. A Merry Christmas, a Happy and Victorious New Year.

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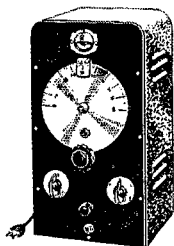
REMEMBER THE BROWNING-DRAKE TUNER?



During your early days in radio, Browning was there with a piece of gear that stirs many a fond memory among *QST* readers. As has always been the case with Browning equipment, that famous tuner: (a) worked well, and (b) was priced within reach of the thousands of home set-builders who wanted it.



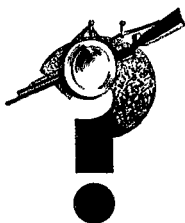
KNOW THE BROWNING FREQUENCY METERS?



These popular items fulfil the early standards of Browning apparatus: they do the job well, at a price within easy reach of police radio, emergency fm and am stations, and others who need them. Custom-built and hand-calibrated for specified frequencies, they check frequencies within any five bands. War users should write for full details.



WONDERING WHAT'S AHEAD FOR YOU?



We're not, as far as radio goes. Right now Browning, in common with everyone else in the industry, is concentrating on winning the war. You can be sure this experience in designing and manufacturing special devices will enable us to put out even better equipment after the war. Browning, as always, will be with you then with *good* gear.



BROWNING
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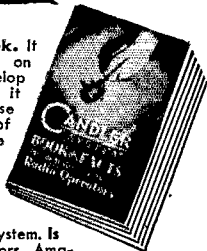
Send for this **FREE 52-page Book**. It shows that "crack" operators rely on something besides practice to develop their high speeds and proficiency; it explains the "knack" of sound-sense and sound-consciousness—the secret of speedy sending and receiving. Once you acquire these mental processes, reading code becomes almost second nature to you; just as the swing rhythm of a dance band becomes automatic to musician and dancer.

Champions endorse the Candler System. It is used in training Commercial Operators, Amateurs, and Radiotelegraph Specialists in Signal Corps, Navy, Marines, Coast Guard, Naval Reserve, Airlines. Wherever the fastest and most efficient operators are found, there you will find Candler trained men.

If you want **s-p-e-e-d**, if you have any difficulties in operating technique, if 40-50 and more w.p.m. seem fantastic speeds to you—send for this revealing book now. It's yours without cost or obligation. Simply send your name and address.

CANDLER SYSTEM CO.

P.O. Box 928, Dept. 4-A, Denver, Colorado, U. S. A.
(Room 55), 121, Kingsway, London, W.C.2.

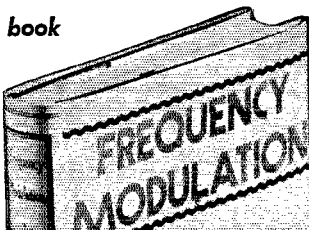


FM FUNDAMENTALS AND PRACTICES

given in this new book

Now August Hund, writer of widely-used radio engineering books, has prepared this thorough, dependable text to aid you in handling specialized problems of designing and working with frequency modulation apparatus.

Just Out! Hund's



FREQUENCY MODULATION

375 pages, 6 x 9, 113 illustrations, \$4.00

This is an engineering treatment of frequency modulation, covering both basic principles and the design of commercial apparatus. The phenomena and features of frequency and phase modulation are described in a thorough approach that includes comparison with customary amplitude modulation, following which applications in FM transmitters, receivers, auxiliary apparatus, and antennas are fully discussed. The use of tables and curves to simplify design is emphasized.

10 DAYS' FREE EXAMINATION

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Send me Hund's Frequency Modulation for 10 days' examination on approval. In 10 days I will send you \$4.00 plus few cents postage or return book postpaid. (We pay postage on cash orders.)

Name.....
Address.....
City and State.....
Position.....
Company..... QST 1-43

Book Reviews

(Continued from page 64)

tances over a similar range. With each chart is a set of scales giving ohms, mhos, squares and square roots for the range covered by that particular chart. By successive use of the charts and scales, a.c. circuit problems can be readily solved. Phase angle is shown by a separate chart which gives the angle in terms of the Q of the circuit, while Q values from about 0.11 to 9 are given in the remaining chart.

Coordinates in each chart are printed in green and the reactance, etc., curves in red, which makes for easy reading. A transparent straight-edge is provided.

Handbook of Technical Instruction for Wireless Telegraphists, by H. M. Dowsett and L. E. Q. Walker. Published by Iliffe & Sons, Ltd., London, England. 664 pages, 5 X 8; illustrated. Price, 25/9 by mail.

This is the seventh edition of a book which in the radio field probably has no equal for longevity, the first edition having been published in 1913. As its title indicates, it is a training manual for marine radio operators, providing a thorough theoretical course for a radio operator's certificate, the English equivalent of our commercial license. In addition, it contains much material on the design and maintenance of marine radio equipment, including—in addition to various types of transmitters and receivers—direction finding apparatus, depth sounding, sound-reproducing equipment, auto-alarm devices, and lifeboat sets. Although considerably reduced compared to former editions, information about spark transmitters is included, there evidently being still some spark outfits in use on shipboard.

American readers probably will find the descriptions of English sea-going equipment of most interest, although of course the theoretical part of the book is equally useful in any country. The continuing popularity of the book is an excellent indication of the value of its contents.

—G. G.

The Future of Television, by Orrin E. Dunlap, Jr. Published by Harper & Brothers, New York City. 194 pages (including topical index), 5½ X 8½; illustrated. Price, \$2.50.

One of broadcasting's more prolific publicists, Mr. Dunlap, for many years radio editor of the New York Times and at present manager of RCA's publicity department, now contributes his second volume on television. In timing, at least, it is a logical effort, for in the future we shall undoubtedly speak of the "pre-war" and "post-war" eras of television, and the war interim in commercial television development affords a convenient lull in which to summarize the progress to date. This Mr. Dunlap does, vividly and entertainingly, at least insofar as the commercial and entertainment aspects are concerned; his book is essentially non-technical, although there is a chapter which "explains" the mechanics of television in lay language. Of slight value to the technician, *The Future of Television* will doubtless prove useful to anyone concerned with the business aspects of television.

—C. B. D.

At the Chicago Schools

(Continued from page 29)

And that's about the story on the Coliseum. Oh, yes—we should take a look at the North Hall and the South Annex, too. These are actually separate rooms attached to the main arena. The North Hall is used for general assemblies, orientation (that's a word the Army uses to mean that everybody gets together to be told what

Product of
UNITED
Skills in Electronics



UNITED" electronic power tubes cannot be spun out on swift, automatic assembly lines. The painstaking manufacturing of these sensitive devices requires the skill of human hands.

Here at the "United" Plant, incredibly accurate hands perform under a system of personal supervision by electronic engineers. One by one, the steps of forming and fitting the stems, leads, plates, grids, wires and rods combine to produce transmitting tubes of such flawless precision that they consistently win top rating for performance. Never before were the hands of craftsmen and the brains of scientists so superbly "United" in advancing the scope and purpose of electronics.

Consistent technical advances in tubes, now required for war, some day will be more readily available to you for radio communication, physiotherapy and industrial electronics. Remember to look for "United" on the tubes.



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★ The Army-Navy "E" Pennant now flies over the Clarostat plant. It is visible evidence that Uncle Sam is well pleased with the all-out war production efforts of Clarostat workers, engineers and management. It is his way of saying, "Well Done." And to you it means not only maximum support of your war efforts, but a pledge of continued Clarostat service, production and reputation in the peace to come.



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MICROWAVE TRANSMISSION

By J. C. SLATER

Professor of Physics, Massachusetts Institute of Technology, 310 pages, illustrated, \$3.50.

Deals with

such problems as:

- attenuation in rectangular wave guides
- composite wave guides and the avoidance of reflection
- radiation and absorption of energy by a simple antenna
- effect of reflectors and other devices for producing directed beams, with problems of diffraction
- coupling of coaxial lines and wave guides

For all who are interested in the problems of transmission through hollow pipes and coaxial lines—this book brings together the developments in the field and presents them in a sound, understandable explanation of the distinctive characteristics of microwaves and a discussion of the use of Maxwell's equations as a means of handling the problems of transmission line design. Problems are treated both from the standpoint of conventional transmission lines and of Maxwell's equations.



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Send me Slater's Microwave Transmission for 10 days' examination on approval. In 10 days I will send \$3.50, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

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Company QST-1-43

they're to do next), and the like. In the South Annex the prospective radioman-bombardier is taught something about telephone procedure, aircraft identification and other odds and ends useful in his trade.

Old Broadcast Receivers Go to War

Before we leave the Coliseum there is one more spot to visit — the basement. There, in the half-lighted expanse, we see an amazing sight. Over an area of several thousand square feet are laid out row upon row something like nine thousand defunct broadcast receivers — all contributed by the citizenry of Chicago and vicinity in response to a well-publicized local newspaper and radio campaign. The sets range from Radiola III-As to fairly modern all-wave sets. There are elaborate consoles that originally cost well up near four figures and kitchen-built Remler and Bremer-Tully kits of the middle '20s. There is even an ancient Signal Corps VT receiver of World War I vintage.

To their owners these sets were so much useless junk, but to the Air Forces they are an invaluable source of parts and training units. No matter how defunct the set, it has some part in the training plan. Those that are completely useless are stripped and the parts mounted on bread boards as examples of typical components — variable condensers, by-pass and filter condensers, resistors and so on. Those with usable parts are also stripped and the parts used by the students to assemble oscillators and similar experimental gear in the labs. And those that can be made to function with a little work are preserved intact as typical trouble cases on which the students can try their trouble-shooting skill.

The same practice is also followed in other schools, but nowhere have we seen a collection of old sets to equal that in the basement of the Chicago Coliseum — and they're still coming in!

Bidding Capt. Sherman and his crew a grateful farewell, together with our escort, Lt. Alan Brentano, we board a Wabash Avenue trolley back to the 8th Street Theater. From there it's only a block or so to the Stevens. Of course, the students march the distance back and forth between the hotels and the Coliseum; it would take a Paul Bunyan street car to hold one of those class groups. But we feel it our duty to conserve rubber heels, and so we ride.

RM Training at the Stevens

Back at the Stevens, we get a look-in at the radio-mechanic training — RM — which occupies the other half of every student's day. As in all the Air Forces schools at the present time, students at Chicago are trained as combination radio operator-mechanics, spending half their time in each branch to emerge a well-rounded ROM.

What does a radio mechanic in the Air Forces have to know? Well, first of all he must have a complete knowledge of the operation and tuning



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TO DELIVER MORE TUBES!

Whether it be for the Armed Forces, Civilian Defense, Defense Training, Police Radio, Diathermy or Radio Broadcast Stations—you can depend on Taylor Tubes to deliver the goods.

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 Happy New Year

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**PRECISION
RESISTORS**

Super DAVOHM

Recommended for use in exacting equipment where accuracy, stability and dependability over long periods of time are of prime importance. Accuracies from $\pm 1\%$ to $\pm 0.1\%$ are available.

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PRICES AND LITERATURE UPON REQUEST

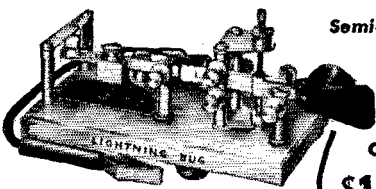
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Semi-Automatic
Key

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\$13.95

This easy-working Genuine Vibroplex Lightning Bug is an exceptionally fine key that's TOPS in sending performance, at a low price that need not keep any one from owning a truly fine radio key. Striking new design. Many advanced features not to be found in any other key, contributing to easier, better, longer-lasting sending satisfaction. Never tires the arm.



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Standard black crackle base. Polished chromium machine parts. Precision construction. DIE CUT contact and main spring. 3/16th contacts. Circuit closer, cord and wedge.

The "Lightning Bug" model is also available in DeLuxe finish with the sensational PATENT JEWEL MOVEMENT for only \$17.50. Enjoy sending at its easiest and best. Order a Vibroplex to-day! Specify model. Money order or registered mail.

Write for FREE catalog of Standard and DeLuxe Vibroplex keys priced from \$9.95 to \$19.50.

THE VIBROPLEX CO., Inc.
533 Broadway New York, N. Y.



(Continued from page 108)

of all standard Air Corps equipment. He must be able to install the equipment and put it into operation. He must be able to recognize components and understand their performance and functions. He must be able to perform standard inspections and do prescribed maintenance work. And he must be able to shoot bearings, plot fixes, and perform a few other little specialties like that.

To put it simply, he must have a thorough practical knowledge of radio equipment. The course the student mechanic receives is designed to give him just that. Primarily it is intended to be practical. There is relatively little theory involved; in fact, no textbooks as such are used (although the average trainee usually provides himself with a copy of the *Handbook* just to do a little background reading). Apart from a couple of Signal Corps publications on electrical and radio fundamentals, the prescribed training literature consists almost wholly of instruction books for the apparatus under study, supplemented by mimeographed circuit diagrams, trouble-shooting data, etc. Even in theory instruction the examples shown are from circuits actually employed in standard equipment, with all the proper values given. At lectures the actual equipment under discussion is always displayed — whether it be a collection of typical components on a parts board or a complete aircraft installation.

The RM course is divided into seven basic sections. The first covers electrical fundamentals. The second and third are on transmitters and receivers respectively. In the fourth two specific types of aircraft equipment are dissected and analyzed. The fifth section covers interphone installations in aircraft, followed by study of two additional types of standard aircraft equipment. The final phase covers installation, technical orders, inspections, wiring diagrams and a study of the airplane itself.

Learning all that in a few weeks' time — plus operating, too — requires an intensive training schedule.

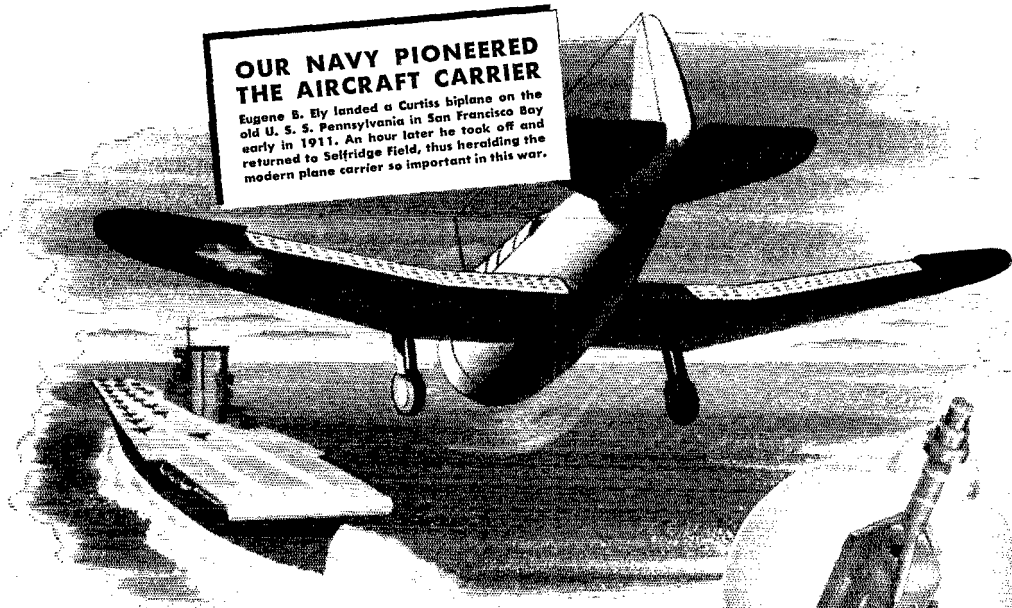
To keep the classrooms occupied every hour of the working day the Chicago schools operate in two shifts per day, with three sections in each shift. For in the first shift, the day starts at 5:15, 5:30 and 5:45 respectively for the three sections, while for the second it is 7:00, 7:15 and 7:30 A.M. This staggering of arising time permits similar staggering of class periods. Thus Shift A has RM from 7 to 10 A.M. and RO from 1 to 5 P.M., while Shift B has RM from 10 A.M. to 2 P.M. and RO from 5 to 9 P.M. The instructor's day, therefore, is from 7 A.M. to 2 P.M. in the case of RM and from 1 P.M. to 9 P.M. for RO. Either way, it's a good day's work!

Our curiosity leads us to inquire a little further into the actual shape of a student's day, and a couple of lads oblige by listing their daily schedule. One is in Section 1 of Shift A and the other in Shift B's Section 3, representing the two extremes. Here is how it works out:

PIONEERS...in war and peace

OUR NAVY PIONEERED THE AIRCRAFT CARRIER

Eugene B. Ely landed a Curtiss biplane on the old U. S. S. Pennsylvania in San Francisco Bay early in 1911. An hour later he took off and returned to Selfridge Field, thus heralding the modern plane carrier so important in this war.



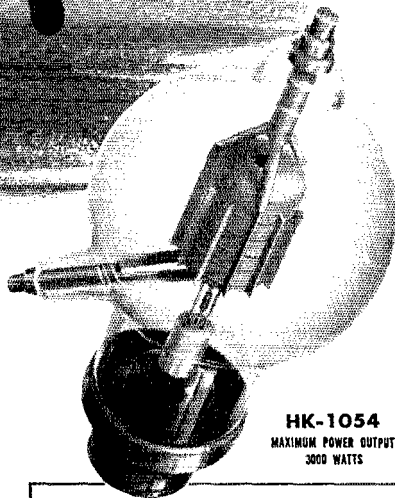
GAMMATRON BUILT THE FIRST TANTALUM TUBE

Heintz and Kaufman engineers designed the first tantalum tube in 1928 to provide the ruggedness and reliability needed in marine transmitters. Today nearly 30 Gammatron types, with power ratings from 50 to 5000 watts, are engaged in handling America's wartime communications.

By now tantalum is recognized as the ideal element for plates and grids. It has the lowest gas content of all metals, gives up this gas readily during the pumping process, and then acts as a powerful absorbent for any gas released during operation.

Tantalum construction explains the remarkable ability of Gammatron transmitting tubes to withstand tremendous overloads without producing free gas which would cause filament emission failure.

Our electronic engineers are now pioneering remarkable new types of tantalum tubes for the service of America at war . . . and some day for the world at peace.



HK-1054
MAXIMUM POWER OUTPUT
3000 WATTS

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GAMMATRONS...OF COURSE!

Peace on Earth —
through Victory
Good will toward Men —
of good will

Let us all work together
Toward that happy day
When our Christmases and New Years'
Will again be Merry and Gay

73,
Bill Harrison

FOR VICTORY



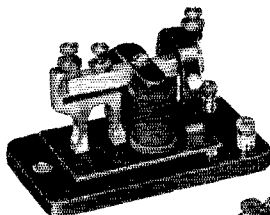
FOR VICTORY



HARRISON
RADIO CORPORATION
NEW YORK CITY

SIGNAL TELEGRAPH Instruments

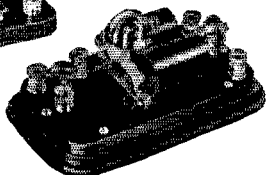
SIGNAL Wireless and Telegraph Instruments are playing an important part in the war effort. Constructed according to exacting specifications, they are used in many branches of the service and are recognized for their high quality and dependability.



No. 112-S Sounder



J-38 Key



SW-37 Relay

SIGNAL ELECTRIC MFG. CO.
MENOMINEE, MICHIGAN
Established in 1892

(Continued from page 110)

	A-1	B-3
Up	5:15	7:30
Breakfast	5:45	8:00
Class	6:45-10:05	
Exercise		9:15-10:15
Class		10:50- 2:10
Exercise	10:05-11:05	
Dinner	11:20-12:00	2:10- 2:50
Class	1:55- 5:15	6:00- 9:20
Supper	5:15- 6:00	9:20-10:00
To Bed	9:15	11:30

All of the day's activities are interleaved to make constant use of the facilities available. When one shift ends a classroom period, another is ready to take over in the same room. The sequence of the day's activities, too, is varied between the shifts, so that facilities such as those for recreation will be available to all with maximum convenience. Meal times, too, are arranged so that one group eats while the others work or play; the mess halls are always busy.

Speaking of mess — at the Chicago schools, it's good! That's true of all Army training camps, of course; and this is no exception. Excellent food, well prepared, in wide variety — and all you can eat and more. One officer confided that he often eats with the men by preference; the food is so much better!

The quantity of food served at a single meal period is fantastic. In fact, it is a remarkable spectacle just to see the thousands of men who occupy the B-19 mess at a single setting. An interesting sidelight is that when the Army took the place over the original hotel dining rooms were used for classrooms; they were too small for mess halls, and the large ballrooms were used instead.

During our visit we met a number of the men responsible for the successful development of the school from nothing to full operation on its present vast scale in so short a time. Among them were Lt.-Col. Carl Swyter, the capable officer in charge of training at the school, and Major Harold A. Evans, in charge of the RM training. Brig.-General Arnold N. Krosstad, commandant of the school, wasn't there — but from what we were told the biggest part of all in the success of the organization must be attributed to him.

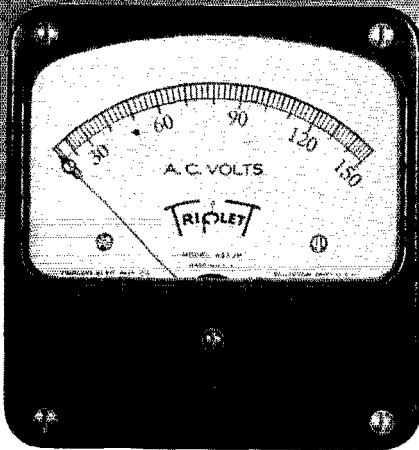
Those we did meet, officers and enlisted men alike, convinced us that the extraordinary accomplishment of the Chicago schools in creating a successful training unit from a standing start in the space of a few brief weeks is no one-man show. It was accomplished only by everyone working together, from commandant to lowliest student, with every bit of energy and enthusiasm he possessed.

The job is under way, now. The important thing is to keep it going — to make it even bigger and better, if that is possible. That means qualified students and qualified instructors. The Army Air Forces need every man eligible for military service who can operate or maintain radio equipment. They also need every man — and woman, too — who may not be eligible for military duty and not now required in other vital war work but who can teach radio or be taught how to teach radio. And if you fit into either of these classes, they need *you!*

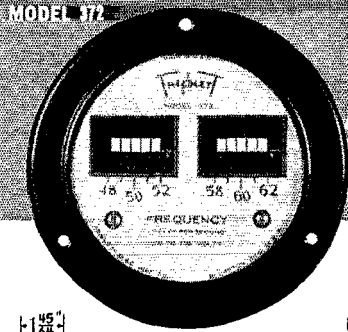
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NEW *Combat Line* INSTRUMENTS

THESE PHOTOGRAPHIC REPRODUCTIONS ARE HALF SIZE

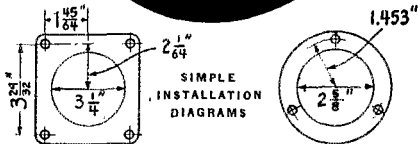


MODEL 437-JP

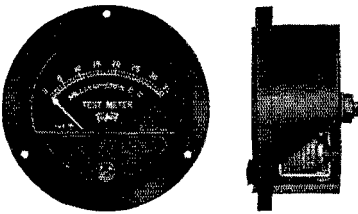


Model 437-J P

Model 372



Maximum Service in Minimum Space TRIPPLET *Thin Line* INSTRUMENTS



Precision performance by new *thin* instrument with *standard* Triplet movement housed in either metal or molded case. No projecting base; wider shroud to strengthen face; simplified zero adjustment; balanced bridge support; metal bridges at both ends; doubly supported core. For "Precision in limited space" write for Triplet Thin Line Bulletin.

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New Answers to specialized needs of War; Production Speed-up and Standardization; Performance under the Stress and Vibrations of Combat Service.
Model 437 J P—A rectangular line of meters to meet dimensions shown (see diagram). Wide-open scale for maximum readability. Complete coverage AC-DC Voltmeters, Ammeters and Wattmeters. Magnetic or static shielding provided on order. Molded Plastic Case for maximum protection in high voltage circuits. Pivots, Jewels and other component parts designed to meet severe vibration requirements.

Model 372—Frequency Meter—"All-American make" Vibrating Reed Frequency Meter. Maximum readability by grouping of Reeds. Range-Frequency-Voltage to meet specific requirements. Protected against excessive panel vibration. In standard 3 inch mounting or on special order in any cataloged Triplet Case.

A WORD ABOUT DELIVERIES

Naturally deliveries are subject to necessary priority regulations. We urge prompt filing of orders for delivery as may be consistent with America's War effort.



THE TRIPPLET ELECTRICAL INSTRUMENT CO., BLUFFTON, S. C.

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Write, telephone or telegraph us description of communications receivers, transmitters and parts, you will be paid cash immediately without bother or red tape.

We also have a store at 2335 Westwood Blvd., West Los Angeles, Calif.

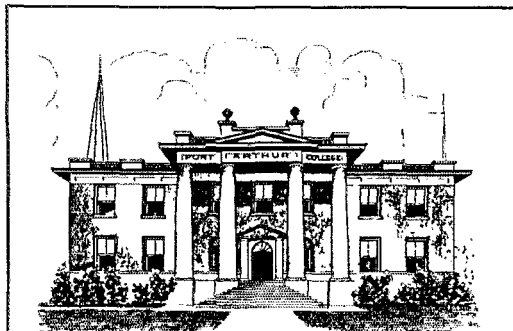
COMPLETE STOCKS

★ We still have large stocks of receivers, 2½ meter equipment, meters, tubes, transformers, resistors, condensers, panels, chassis, and radio parts of all sorts. We sell and rent code teaching equipment. Your orders and inquiries invited.

HENRY RADIO SHOP BUTLER, MISSOURI

"World's Largest Distributor of Communications Receivers"

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



Founded in 1909

Thirty-three years' experience teaching Radio Communications. Entrance requirement, high school graduation. If interested in further details, write for Bulletin R.

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Write for Circular CD

• Radio Remote Control Equipment for Models and Industry

1942 Edition of The Radio Control Instruction Manual, 25c postpaid

RADIO CONTROL HEADQUARTERS, INC.

P. O. Box 214

Deal, New Jersey

Standard Frequency Transmissions from WWV

The standard frequency service of the National Bureau of Standards station WWV has been extended to include another carrier frequency (15 megacycles). Temporary equipment is still in use while a new transmitting station is being built.

The broadcast is continuous at all times day and night from 1-kilowatt transmitters, and carries the standard musical pitch and other features. The radio frequencies are:

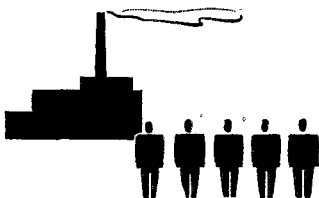
- 5 megacycles (= 5000 kilocycles = 5,000,000 cycles) per second
- 15 megacycles (= 15,000 kilocycles = 15,000,000 cycles) per second.

The standard musical pitch carried by the broadcasts is the frequency 440 cycles per second, corresponding to A above middle C. In addition there is a pulse every second, heard as a faint tick each second when listening to the 440 cycles. The pulse lasts 0.005 second, and provides an accurate time interval for purposes of physical measurements.

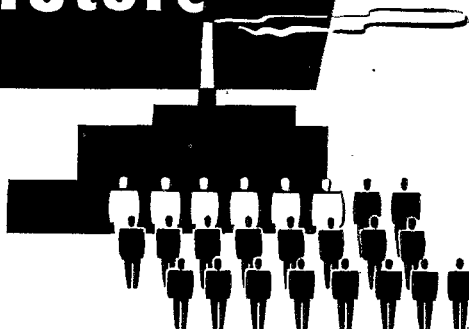
The 440-cycle tone is interrupted every five minutes for one minute in order to give the station announcement and to provide an interval for the checking of radio measurements based on the standard radio frequency. The announcement is the station call letters (WWV) in telegraphic code (dots and dashes).

The accuracy on the 5- and 15-megacycle frequencies, and of the 440-cycle standard pitch as transmitted, is better than a part in 10,000,000. Transmission effects in the medium (Doppler effect, etc.) may result in slight fluctuations in the 440-cycle frequency as received at a particular place; the average frequency received is, however, as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.0000001 second. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the seconds pulses and marked by the beginning and ending of the announcement periods, are accurate to a part in 10,000,000. The beginnings of the announcement periods 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; this adjustment does not have the extreme accuracy of the time intervals, but is within a small fraction of a second.

The service from the temporary transmitters will continue for some months. It will be continuous except for such breakdowns as may possibly occur because of the use of temporary apparatus. As rapidly as possible the Bureau is establishing a new station to provide more fully than in the past standard frequencies reliably receivable at all times throughout the country and adjacent areas.



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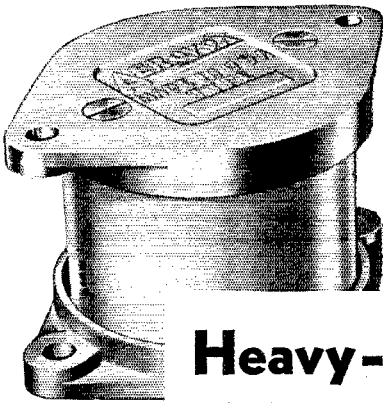
For military reasons, there are many things we cannot tell—facts that would give aid (not comfort) to the enemy—figures from which Shickelgrueber et al could get an idea of American radio and mobile equipment production. We can tell you that in slightly over two years we have expanded our floor space to four times the former amount (our own buildings, not rented space), the number of employees to ten times, and dollar production to fifteen times. All of this additional capacity is being used to produce the same type of parts we have always manufactured—tube sockets, insulators, plugs and jacks, inductors, condensers, and similar items. It is being used to produce war material exclusively.

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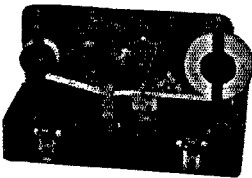
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At Scott Field

(Continued from page 26)

shooting experience in conjunction with their RT training, as well. The instructors plant bugs in the equipment and the students are required to locate and correct the faults — again a far tougher job in an actual aircraft installation than on the workbench.

When the student completes this realistic finale to his classroom work, he is about as well equipped both as a radio operator and technician as any man without actual field experience can be. Supplementing his classroom work he has spent a number of hours in the "projection room," viewing training films (made right at Scott Field), which not only complement the lectures by his instructors but take him out in the field to see how the work is done under service conditions.

During the last week or two of his stay at Scott Field he is given a final polishing up. In RT he wires up equipment, takes field units out into the open and sets them up, and so on. In RO he is drilled in tactical procedure, given a little blinker practice and his training otherwise rounded off.

Assignment to Active Duty

The last stage of his training completed, the trainee is ready for assignment to active duty.

Where will he go? Well, that depends on a number of factors. First, of course, is the showing of special aptitudes on his file sheet — that comprehensive record of his every scholastic and personal characteristic from the day he first walked onto the field. Perhaps he's a natural-born operator and a lousy mechanic — or maybe it's just the reverse. In either case the answer is simple; he is assigned to the duty for which he is best fitted. For, although in the Air Forces every man must have both technical and operating training, his duty is primarily one or the other.

On the other hand, he may be equally excellent, good or indifferent at both. (We'll assume he's probably excellent or good, because less than a third of any class of trainees fail to achieve a good degree of proficiency.) Then the assignment may depend on which branch happens to require personnel most at the moment.

If he becomes a mechanic, he can expect to stay on the ground — at least most of the time. He may be part of the ground crew of a bomber, or a member of a field-base unit. He may accompany a command unit, or be stationed with a headquarters maintenance crew. He'll probably travel far — and by air, too — but when he gets to where he's going he'll stay on the ground.

If he looks like an operator, on the other hand, the choice lies between aerial and ground work. Here the deciding factor may be something quite apart from his radio ability. For, as we have said, the radio operator of a bomber crew must also be a gunner — a crack gunner, able to shoot it out with the best of the enemy. This is Lt. Kuhns' department. To find out if he has what it takes to be a gunner, the student takes preliminary training in gunnery at Scott Field. This training is entirely voluntary, but the post of aerial gunner is

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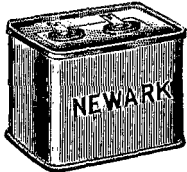
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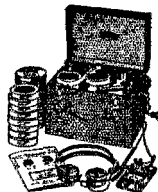
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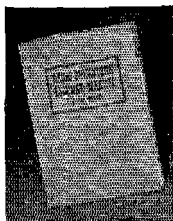
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(Continued from page 116)

the one that most of the students seek and a large percentage of every class sign up for the course. He may apply for this training as early as a month before graduation, if he feels he can qualify.

If he has the kind of a brain that short-circuits mental processes in an emergency and relays reactions from the senses to the muscular system instantaneously, if he has a good eye and steady nerves, if his physical condition is superb and he displays the proper personal traits — well, then he'll be picked for flight duty as a radio-gunner.

That's the top-priority rating. Those who don't qualify for it become ground operators or maintenance mechanics (a few of the best of the latter may be shunted to lab or research work). They go direct to active duty, with ratings anywhere from private first class to staff sergeant, depending on their record and ability.

The operator-gunner has five weeks more of training ahead before he goes to war, however. These five weeks are spent at one of the three Air Forces gunnery schools, where he learns how to shoot, first with .22 rifles on miniature ranges, then with toy machine guns that shoot pellets or the "magic-eye" guns of the amusement palaces, and finally with the real thing against ground and aerial towed targets. When he completes the gunner course, he will receive a rating as staff sergeant, flying status.

Whatever their ultimate assignment, these radio men of the Army Air Forces — those who keep unremitting vigil on the ground as well as those who ride the skies — know that they have acquired a valuable skill in a difficult art and are using it in the most important job in the world.

Life At Scott Field

Before we leave, let's take a closer look at some of the other aspects of life at Scott Field. The students don't work all the time, of course; they eat and sleep, and also play a little.

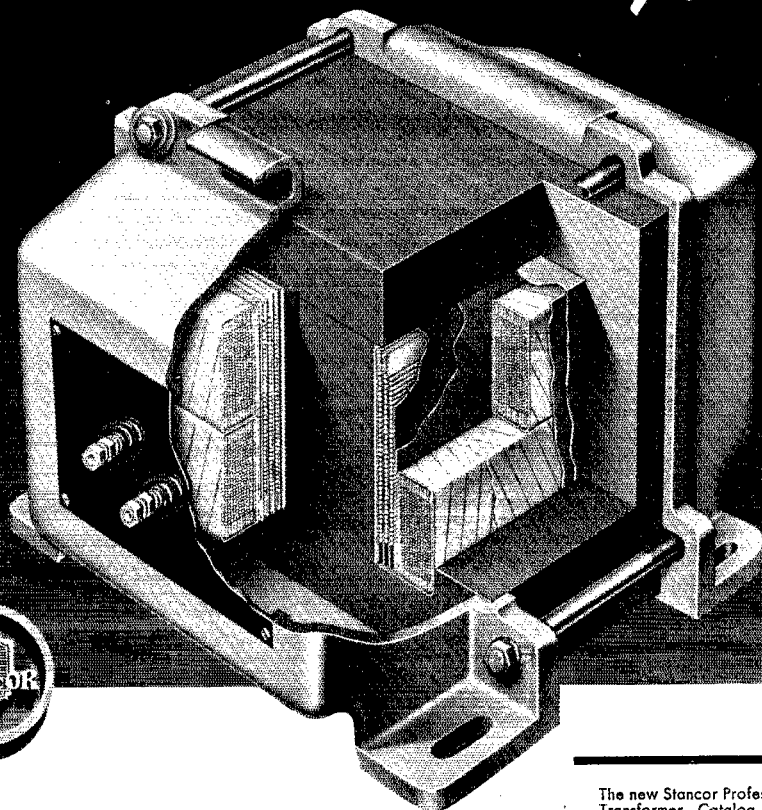
Early in our tour we learned about the four areas into which the field is divided, and how the Second and Third were actually complete duplicate schools — each independent and autonomous, except for the fact that they do the same job in the same way. In each area there are RFD (radio fundamentals division), ARD (aircraft radio division, advanced training) and ROD (radio operating division) buildings.

The students in each area are divided into squadrons, which are kept constantly up to strength by replenishments from among new arrivals. Every student is assigned to a squadron when he comes to the post, and in it he remains during his stay. There are six squadrons per area, in addition to a permanent company which has its own quarters.

Each area has its own post exchange, and its own recreational facilities in the way of clubrooms and playing fields, day room, pool room, bowling alleys, etc. Each area has its own medical facilities, and even its own theatre and chapel. It conducts its own administrative functions, such as the issuance of passes. In other words, the student can fulfill all his needs within his own area.

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(Continued from page 118)

In the Third Area, each squadron also has its own mess hall. The Second Area has a new general mess which serves all of its squadrons, however. And what a place it is! If you can imagine a restaurant capable of feeding 6000 persons *per hour*, that's it. They are fed well, too. The mess officer takes as much pains with his menus as the chef in a large high-priced restaurant. "I'd say that 95 per cent of the men eat better here than they ever have before in their lives," Lt. Kuhns declared. After seeing the meals being served and the way they are prepared, we are inclined to agree.

Night Shift

Every effort is made to provide the men with comfortable and agreeable surroundings, on the theory that a man can't be a good student if he isn't happy. Take the night shift, for example. Since Scott Field operates 24 hours a day, there must be a "dog watch"; it can't be avoided. To make it as painless as possible, however, the men who get that shift are assigned to it permanently; there's no weekly shifting around with consequent disruption of routine. Their schedule is arranged to make their lives as nearly normal as possible, and their rest periods are safeguarded. The mess halls operate 24 hours a day for their convenience; the "graveyard" shift has dinner at 1:30 A.M. Recreational facilities are open to them the day and night around. Their sleeping quarters are segregated in isolated barracks remote from the day-shift activity and guarded by "Quiet — Men sleeping" signs.

Since the school operates seven days a week while the students have a six-day week, the "free" day must be rotated. This is done by staggering the daily schedules of each pair of squadrons. Every area has two squadrons on the night shift and, of course, two on each of the other shifts. Reveille for the three shifts comes respectively at 5:20 A.M., 11:00 A.M. and 4:30 P.M. In the case of the first shift, classes are from 7:00 A.M. to 3:00 P.M. — minus an hour for lunch. At 4:00 P.M. they have calisthenics and supper is at five.

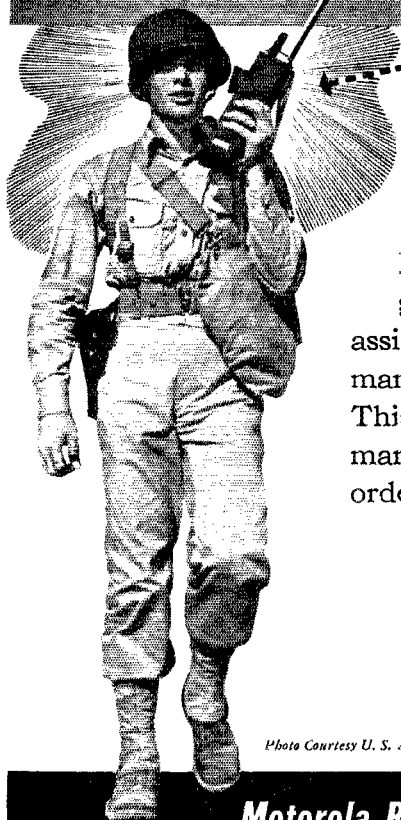
The rest of the time is free, to be spent in study or sports, or perhaps the movies — or even working around the barracks. Each student looks on his own barracks as home; they plant flower beds, build trim white picket fences around the grounds, and erect signs bearing the names they have chosen for them. These range from the ridiculous to the sublime.

The squadron day-rooms are, of course, supplied with current books and magazines. In addition to popular literature, students have access to a well-stocked technical library containing a large list of radio and electronic books as well as bound volumes of all the radio journals.

Apart from motion pictures, reading and intersquadron sports competition, there are other miscellaneous amusements and activities — such as the 48-piece Scott Field Air Corps band. Every member is an enlisted student on the post, and when he goes off to rehearsal he has not only his instrument but his notebooks and lab manuals under his arm.

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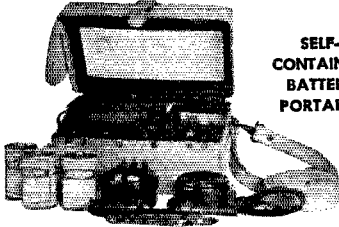
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(Continued from page 180)

Taps are never blown at Scott Field. One reason is because of the several shifts; another is found in the way the school is run. As far as possible, the trainees are allowed to live their own lives. Men on the day shift are expected to be in bed not later than 10 p.m., for example, but it's not compulsory. Again, there is very little routine drilling; the men are required to march to and from classes, and stand a few formations now and then just so they won't forget what they learned in basic training, but that's about all. "The emphasis is placed on student instruction rather than on military niceties," according to Lt. Kuhns.

Of course, the student must merit these privileges to secure them. Such regulations as are imposed are ironclad; infractions are rigidly punished. The guardhouse doesn't lack for use, and workcrews of men who have lost partial privileges doing groundkeepers' duty as a result are not an uncommon sight!

The issuance of passes off the post is based on the scholastic performance of the individual student. A given average grade entitles a man to a pass for a given length of time. For example, an 85 average gives him two days a week off — his regular free day plus one school day. On top of that he gets a certain number of evening passes. A lower average limits him to the free day alone. Those at the bottom of the list receive no days off or evening passes until they show improvement.

Physical Drill for All

While military drill is kept to a minimum, there is one activity no one is allowed to slight. That is calisthenics. Every enlisted man on the post is required to put in one hour a day at some form of athletic activity, every non-flying officer 3 hours a week and every flying officer 6 hours a week. There are no exceptions and no excuses; physical exercise is absolutely compulsory for every man able to be on his feet.

This activity is widely varied. It ranges from setting-up exercises and running the obstacle course to boxing and touch football. Every squadron has its own boxing ring and football field, and there is strong intramural rivalry.

Major-General Walter R. Weaver, chief of the Technical Training Command, under which Scott Field functions, says that his Air Forces radio men must receive as much toughening as infantrymen or artillerymen. And they do — the physical instructor sees to it that every man is physically fit. On the other hand, radio men are too valuable to have lying around a hospital with broken bones, so they avoid the "rough" sports and stick to such games as touch football, baseball, soft ball and volley ball.

This toughening process shows its worth when the men see active duty — as has already been demonstrated. A number of the men trained at Scott Field during the two years of its operation as a radio school have already seen active service. There are Scott Field alumni right now in the Southwest Pacific, in England, in Africa and the Near East. Tales of their deeds are already be-

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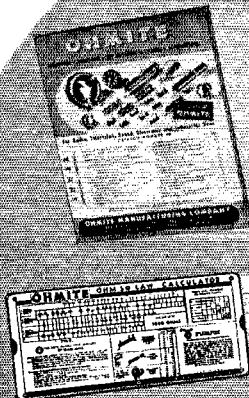
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(Continued from page 123)

ginning to filter back; tales like the one of Corporal Patrick Norton, who, lowered by ropes under his bomber, dangled head down in mid-air over the Pacific until he could close the bomb bay doors, which had been jammed by machine-gun fire during a scrap with a Jap, so that the ship could make a safe landing. Some day there will be many of these tales to tell.

The men at Scott Field are emphatically not run-of-the-mill soldiers. Every one has displayed either special aptitude or experience; each has been selected with care. "Harvard, Yale and Notre Dame graduates sit side by side in classrooms with men who have bettered their education from correspondence courses and home study," we are told.

Instructors' School

When we finally drop Lt. Kuhns back at his office we feel that we have a comprehensive picture of the post, at least from the standpoint of the student and the instruction he receives.

But there is one side of the picture we do not have — that of the instructors. And so we look around some more and ask more questions.

It takes a highly competent staff of instructors to train the kind of radio men the Air Forces need — a staff numbered not in dozens or scores but in hundreds. Many of those instructors, perhaps most of them, came from the ranks of amateur radio. You've seen the periodic pleas for Air Forces instructors in the "U.S.A. Calling" pages of QST. Here again the hams have played a vital part.

But not all are amateurs. Some had not even had appreciable prior radio experience. These came from Scott Field's own instructors' training school, originally set up when the great expansion began. Located in one of the spread-out white-painted frame buildings in the First Area near the main gate, in this school the men who were to train the students to come were themselves trained.

We said "men." We should have said "men and women" — for one of the notably farsighted innovations of the Scott Field staff was the realization that qualified women instructors could teach radio as well as men, and that the looming manpower shortage would make their services indispensable.

That is why there were some thirty or forty women in the class of student instructors which began training last September. Among them were housewives, school teachers, college students — and a liberal sprinkling of YL hams. Mrs. Carrie Jones, W9ILH, was among them, as was Mrs. Leta Bush, W9DBD, president of the YLRL. There were other members of the St. Louis YLRL chapter, and still others from remote points — too many to list in full.

They asked no special privileges — only the chance to prove their worth. And they proved that they could take it. A number have husbands or sons on active duty with the armed forces on foreign soil. Ranging in age from a scant 20 to



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Rimlock's superior stiffness, uniform diamond size, rigid bonding and extremely fast, free and cool cutting all combine to produce an excellent, smooth surface finish of high accuracy and parallelism. This is particularly true when used on the Felker DI-MET Quartz Cutting Machine with Hydraulic Retardant.

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If you're interested in longer blade life, faster cutting, constant uniformity and excellent surface quality, there's one sure answer—choose RIMLOCKS!

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To Our Readers WHO ARE NOT A.R.R.L. MEMBERS

APPLICATION for MEMBERSHIP

AMERICAN RADIO RELAY LEAGUE



Administrative Headquarters:
West Hartford, Conn., U. S. A.

194

AMERICAN RADIO RELAY LEAGUE
West Hartford, Conn., U. S. A.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose \$2.50 (\$3.00 in foreign countries) in payment of one year's dues*, \$1.25 of which is for a subscription to *QST* for the same period. Please begin my subscription with the..... issue.

THE CALL OF MY STATION IS

THE CLASS OF MY OPERATOR'S
LICENSE IS

I BELONG TO THE FOLLOWING
RADIO SOCIETIES

Send my Certificate of Membership or
Membership Card (indicate which) to
the address below:

Name.....

A BONA FIDE INTEREST IN AMATEUR RADIO IS THE ONLY ESSENTIAL REQUIREMENT BUT FULL VOTING MEMBERSHIP IS GRANTED ONLY TO LICENSED RADIO AMATEURS OF THE UNITED STATES AND CANADA. THEREFORE, IF YOU HAVE A LICENSE, PLEASE BE SURE TO INDICATE IT ABOVE

[*The dues are \$2.50 per year in the United States and Possessions. All other countries \$3.00 per year]

(Continued from page 124)

gray-haired maturity, in qualifications from no more than an alert mind and an earnest will for service to a dozen or more years of amateur operation, almost without exception they have successfully pursued the 8-hour-a-day training course. Some of the more advanced are already teaching at Scott Field; others will soon be taken on there or at another of the Air Forces schools.

The instructor-training school itself was recently transferred from the field to the venerable halls of St. Louis University, but the training goes on. When the student instructors complete their course—in other words, when they advance from their present \$1620 Civil Service classification to the P-1 class at \$2000 per year—they will come back to Scott for briefing in the specialty they are to teach, and then they will go to work.

More Instructors Needed

But even these, added to the present corps of instructors at the field, are not enough to meet the growing needs. A new class of student instructors begins every Monday, but still it isn't enough. The turnover in the present staff, as military instructors are called to field duty and eligible civilians are drafted, is too great. More help is needed, particularly from the III-As, the IV-Fs—and particularly the YLs.

"We are hopeful that qualified women will come to us for training," Col. Wilson told us. "Also here is a chance for the physically incapacitated to do their bit—they can be even more helpful and useful here than many of our able-bodied men, who would then be released for active duty."

The rest of the story is told in "U.S.A. Calling" (p. 35, this issue). If you are qualified and available, you will know what to do. If there is doubt in your mind about your qualifications, write to John D. Lynch, the civilian chief instructor at Scott Field. Mr. Lynch asked us in particular to pass on that word; don't pass up a chance to serve just because you aren't sure.

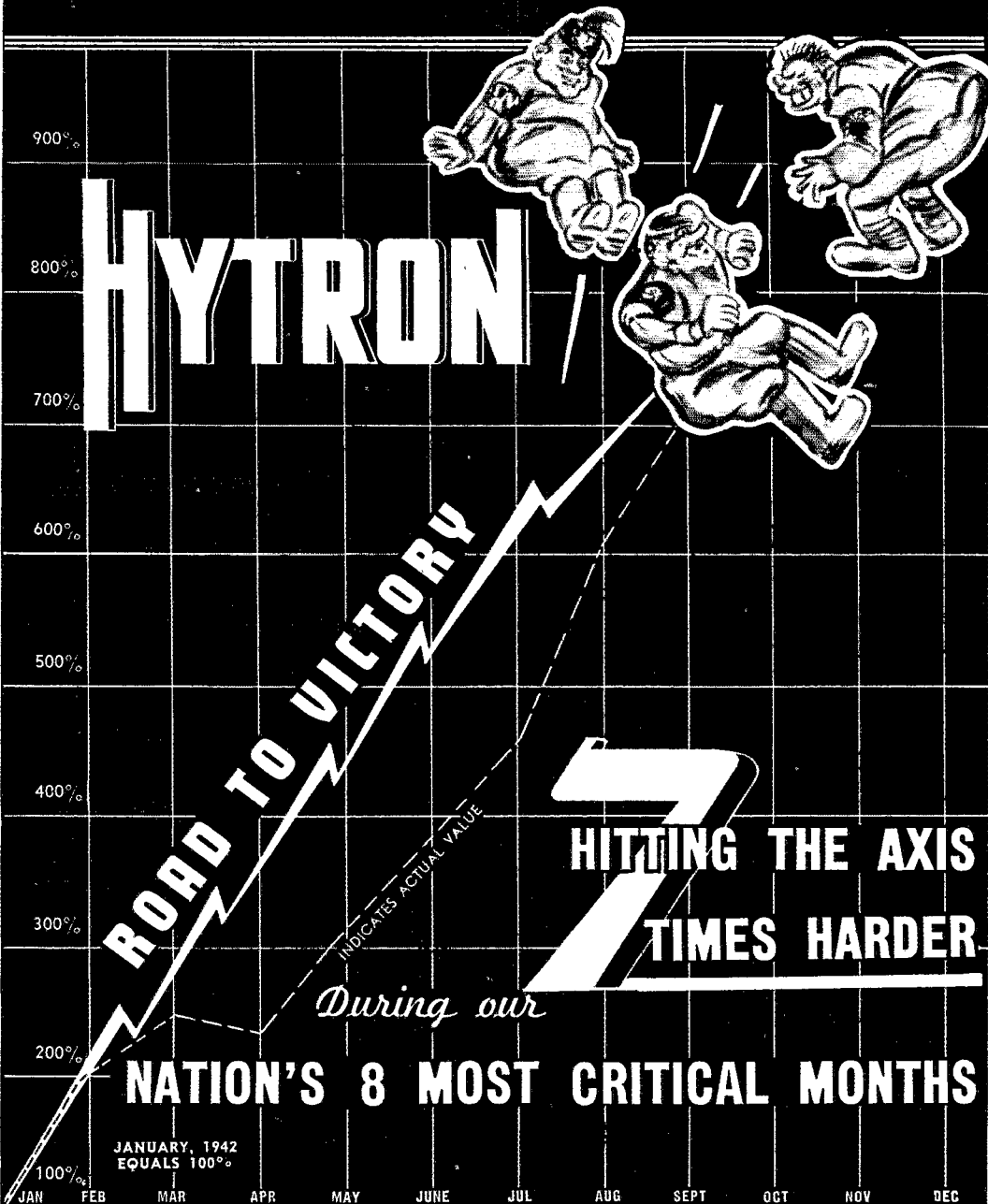
For that is what it is—an opportunity to be of service, *great service*. The men in the Air Forces, perhaps above most branches, realize the value of competent instructors. They know that every time a pilot outmaneuvers a Focke-Wulf or a Zero, it is the remembered voice of his instructor that tells him what to do. And when a radio technician deep in a South Sea jungle or on Africa's sands locates an obscure fault in a transmitter that balks when there's an urgent message to be sent, it is really the training he received back in school that does the job.

There's a passage in a recent publicity release from Scott Field that seems to fit here:

"To-day when dispatches flash into American homes of American triumphs on the Coral Sea, at Midway, in the Aleutians, the officers and permanent personnel of Scott Field nod understandingly.

"They know alumni of their 'university' are out there, too, winning that all-important battle of communications."

WAR PRODUCTION SHIPMENTS



HYTRON CORP., Salem and Newburyport, Mass.

... Manufacturers of Radio Tubes Since 1921 ...



THE RADIO AMATEUR'S HANDBOOK

"the all-purpose volume on radio"

Text,* data book, operating manual—it is all these and more. As a text it is probably more used in radio schools and colleges than any other single volume. As a practical constructional handbook, it stands in a class alone. As an operating manual, it provides information available from no comparable source.

STANDARD EDITION

Geared to war needs, the 1943 Edition of THE RADIO AMATEUR'S HANDBOOK is the largest ever published. In addition to the established features it includes a comprehensive 50-page chapter dealing with the vitally-important War Emergency Radio Service plus other new material—all added without sacrificing the essential information in previous editions which made the HANDBOOK the world's most valuable and widely-used radio book. Retained is the highly successful treatment of fundamentals which was an innovation of the 1942 edition. Stripped to essentials, the theory and design sections cover every subject encountered in practical radio communication, sectionalized by topics with abundant cross-referencing and fully indexed. An ideal reference work, the 1943 Edition also contains all the constructional information on tested and proved gear which has always been the outstanding feature of the HANDBOOK.

\$1 IN CONTINENTAL U.S.A., **\$1.50** ELSEWHERE

SPECIAL DEFENSE EDITION

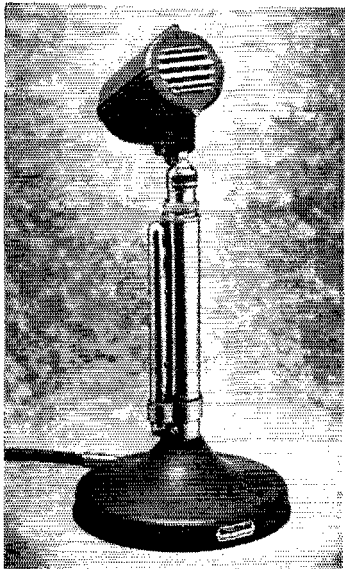
This edition of the HANDBOOK is designed especially for use in radio training courses. It eliminates those portions of the regular edition which are not useful for instruction purposes and has added chapters on mathematics, measuring equipment and code instruction. The first chapter covers the elementary mathematics necessary for the solution of all formulas and interpretation of graphs appearing throughout the text. A four-place log table is included in the Appendix.

\$1 POSTPAID ANYWHERE

*The book "A Course in Radio Fundamentals" is based on the text of either of the above mentioned editions of the HANDBOOK — PRICE 50¢

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West Hartford, Connecticut, U. S. A.



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it has certainly kept me
from getting lonely!



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(6) A special rate of 7¢ 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 7¢ 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 15¢ 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

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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.

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USED equipment wanted. We pay highest cash prices for communications receivers, transmitters, equipment. Bob Henry, W9ARA, gives you the best deal whether you buy or want to sell. Write, telephone, telegraph description. Cash paid immediately. Henry Radio Shop, Butler, Mo.

We still have large stocks of communications receivers, transmitters, tubes, mica condensers, meters, transformers, code machines, Vibroplexes, radio supplies of all sorts. Your inquiries and orders invited. Henry Radio Shop, Butler, Mo., and 2335 Westwood Blvd., West Los Angeles, Calif.

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WANTED — Amaranid S tube — preferably in good condition. Box 704, Granville, Ohio.

FOR sale: radio receivers and equipment, including RCA Model 17, National SW3 and SW5, Grebe CR8, Browning-Drake. Want National 45A, NC80X, HRO Jr., Howard 436A. Lock Box 208, Pawtucket, R. I.

WANTED: Rider II, IV; sell or trade Triplett 1231 oscillator, 1210-A tube checker. Cran Baldwin, Arthur, Tenn.

WANTED: Vibroplex bug. Write condition, model, cash price. Stanley Linn, 923 E. Chestnut, Yakima, Wash.

SELL: NC-200 to highest cash bidder. Six months old, excellent condition. Arthur Ritchie, 40 Summit St., Orange, N. J.

FOR sale: Meissner deluxe shifter — perfect shape. 40-10 coils, \$38.50. W9BVF, 126 W. Vaughn St., Ironwood, Mich.

OSCILLOSCOPE and other radio parts wanted for cash. Send list with prices to John Hart, 1123 Broadway, New York, N. Y.

WANTED: 3" oscillograph, signal generator, volt-ohm-milliammeter. Have cash. Write details to V. K. Dunlap, W9OAM, 1139 S. 24th Ave., Bellwood, Ill.

WANTED: Triplett 66H meter or similar; cathode ray oscillograph; VT voltmeter; low price ham receiver; consider purchase of complete rig at reasonable price. K. Hollingsworth, 2313 Turner Ave., Schenectady.

TRANSMITTER: special rack and panel, 250 watt phone, 500 watt c.w. Complete with tubes, coils, xtls, and remote control cable. For full description, schematic, photographs, and parts list see eighth edition Radio Handbook pages 363 to 368 inclusive. \$400 net f.o.b. San Diego, Calif. D. P. Trim, W6QKI, 4205 Kansas Street.

WANTED — spark coil 6 volt primary. Give full data. W1BB.

WANTED: code recorder and tape puller. State price and condition. Geo. Britting, 30 Academy Ave., Middletown, N. Y.

WANTED: McMurdo Silver Masterpiece 6 receiver. Write giving condition and price. Have NC-44-AC like new for sale or trade. Wm. Anderson, 1011 N. Stevens St., Rhinelander, Wis.

SELL Bliley crystals all bands except ten. W8KJ.

LIQUIDATION — No fair offer refused. Complete HRO perfect condition with 23 megacycle preselector noise limiter, Teleplex machine, Genemotor dynamotor 300 volt 100 milliamps, twin vibrapack 400 volt 300 milliamps, two Gammatron 354C, two Eimac 100TH, 35Ts, two brand new RCA 828s, RCA 814s, 872s, 203As, 211s, UTC one kw. plate transformer, modulation transformer, 60 watt public address system two twelve inch Cinaudograph loudspeakers, two Rotary Array Service beam rotators, miscellaneous meters, parts. W2CUZ, Whittemore, 36 Masterton Rd., Bronxville, N. Y.

WANTED: Hallicrafters SX24, SX25, SX32, or SX28; also 110 d.c. to 110 a.c. converters. Airmail description and price. Spot cash. Ed Tilton, 105 Windsor, Berkeley, Calif.

GOOD news: crystal units are available to those qualified to supply a priority of A-1-J or higher under Preference Rating Order P-133, P-130, P-129, etc.; investigate. The WPB M-146 certification is also required. Prompt service and reasonable prices on Edison type E62 and E64 low drift units. Eidson's, Temple, Texas.

PATENT and sell your idea. Some radio manufacturer may want your practical idea to improve his peace-time product. Complete patent procedures now so you may negotiate with manufacturers when industrial production is again our primary aim. Send for free 48-page, illustrated book about patents, sale of inventions and other valuable information for men with practical ideas. Write today. Victor J. Evans & Co., 777-A Merlin Bldg., Washington, D. C.

WANTED: to replace the Westons and Jewells who went to war with one square faced 0-50 d.c. milliammeter of Triplett or Simpson manufacture, preferably 2 1/2 inch size. Will pay amateur net price if meter is in good condition. W8ROM, Brighton, Mich.

WANTED: Amplex rotary complete for ten or twenty. Cantor, 944 East 24 St., Brooklyn, N. Y.

OPERATOR wanted — with first or second radiotelephone license for regional Columbia station. Good working conditions, low living cost, fine climate. KROOD, El Paso, Texas.

IN stock for immediate shipment Mac No. 200 keys, \$22.25; Mac deluxe Signatone code practice oscillators, \$11.85; Henry Radio Shop, Butler, Mo.

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FRIENDS

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A HAPPY NEW YEAR
And 1943 Victory for Our Country
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Now Available!

"A COURSE IN RADIO FUNDAMENTALS" ^{By} **GEORGE GRAMMER**

In Book Form

THE MATERIAL in this volume was prepared in response to the demand for a course of study emphasizing the fundamentals upon which practical radio communication is built. It originally appeared serially in QST and so great was the enthusiasm with which it was received that it is now published under one cover. The course is equally as valuable for those studying at home as for the teaching profession, many members of which have found themselves in the (to them) new field of radio technician training without the benefit of a planned course, nor the time to put in to thorough preparation.

It has been said by the planners of military and pre-service training for radio technicians and mechanics that their objective is to provide, as nearly as possible, the practical experience possessed by the radio amateur with a background of basic fundamentals. The objective in preparing this course, therefore, was to accent those principles most frequently applied in actual radio communication. "A Course in Radio Fundamentals" is a study guide, examination book and laboratory manual. Its text is based on the "Radio Amateur's Handbook" of 1942 or subsequent editions. Either the special edition for war training purposes or the Standard

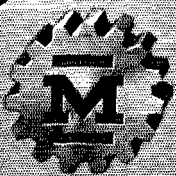
Edition may be used. References contained in the "Course" are identical in both editions.

The material is divided into thirty-six study assignments. With each assignment there is a series of questions designed to bring out the most significant points in the text. When problems of a mathematical nature are included, the answers are given at the end of the book. In cases where more than routine methods are required, the complete solution is given. Where feasible, experiments accompany each assignment to best illustrate the principles being studied. Anyone undertaking the course may be assured that, if he follows its precepts literally and exactly, performs the experiments and examines himself honestly with the test questions, he cannot fail to learn the principles of radio and will be well equipped to undertake specialized and advanced training in any branch of radio communications or electronics. Instructors using this material may be confident that their students will receive thorough training in the essential fundamentals of radio.

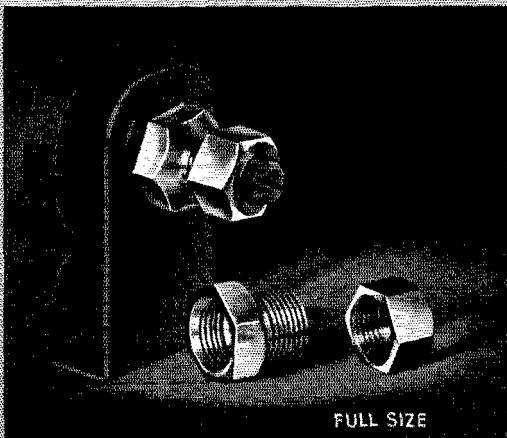
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Via *Air X*

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THAT TELL A STORY

A continuous stream of material going forward daily (many times including Sunday) tell the story of the effort being made by each and every member of the RADIO SHACK. The gear must get out, and to where it will do the most good. Victory must be earned and with it will come the reward of getting together again with our old and new "ham" friends.

The **RADIO SHACK**
167 WASHINGTON ST., BOSTON, MASS., U.S.A.

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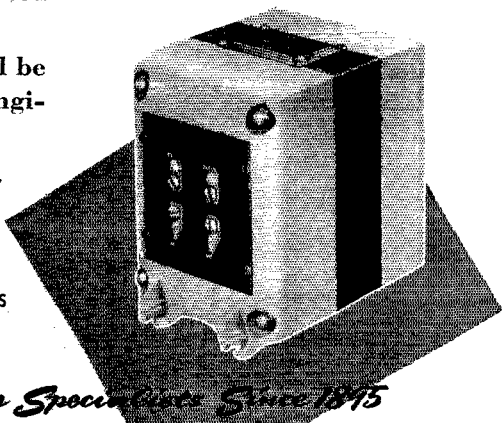
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We are proud that THORDARSON helped win the first two, and now our 47 years of experience has gone "all out" to help win this war! THORDARSON research engineers are working 'round the clock . . . constantly seeking new methods for greater transformer efficiency.

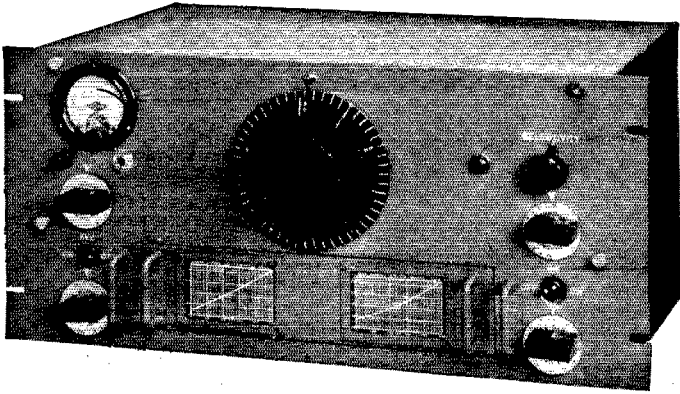
When we have won this war and returned to our normal industrial life . . . THORDARSON engineers will be in possession of priceless knowledge which will be incorporated in THORDARSON products.

Your transformer problems will be welcomed by THORDARSON engineers . . . let them help you!

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Transformer Specialists Since 1895



IF THIS WERE AN OFFICIAL ARMY OR NAVY PHOTOGRAPH . . .

If this were an official Army or Navy photograph it would be on the restricted list, with publication prohibited. Actually it is from the National Catalogue published before the war. Yet basically the receiver is the same. True, it is now built to government specifications rather than the amateurs'. There are new refinements that we cannot even tell you about, but which make it a better receiver than the one you have known. But basically it is still the same receiver.

When you turn to it after the war as to an old friend, you will find that it looks different, performs better and handles more easily. Yet you will find that it is still designed and built in the tradition that made a receiver engineered for peace meet the rigorous demands of war.

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RCA Transmitting Tubes have frequently been cited for outstanding performance under severe overload conditions—but that isn't what counts now. Service—as many hours of it as you can possibly get—is the all-important thing.

Actually, almost all of the important rules for tire conservation find a close parallel in the job of making Transmitting Tubes last longer.

Just as tires should be rotated from wheel to wheel, from spare to active, so should tubes be interchanged. Tube spares should be used from time to time in order to guard against deterioration.

Just as proper, specified air pressure will add much to tire life, so does operating tubes in strict accordance with specified conditions and conservative ratings provide the best assurance against premature failure.

Just as slower driving and careful handling are important tire conservation mea-

sures, so it is important to avoid unnecessary strains on tubes. As pointed out previously, as little as 5% reduction in filament voltage of pure-tungsten-filament types increases life 100%!

Another way of making an easier schedule for your tubes is to keep them cooler—by reducing plate voltage and dissipation, and by additional air cooling even beyond what may be specified. Still another way is by reducing filament voltage to 80%, whenever feasible, during standby periods.

Just as wheel alignment has an important bearing on tire life, so does the performance of related parts have much to do with tube life. For instance, properly designed smoothing filters are essential to obtaining optimum life from mercury-vapor rectifier tubes.

In short, these are the days when tube handling and operation are dictated by the necessity of obtaining every possible hour of tube life—just as is true of tires. Care in this direction—far above what you might consider giving in ordinary times—will pay worthwhile dividends.



TRANSMITTING TUBES

RCA Manufacturing Company, Inc., Camden, N. J.