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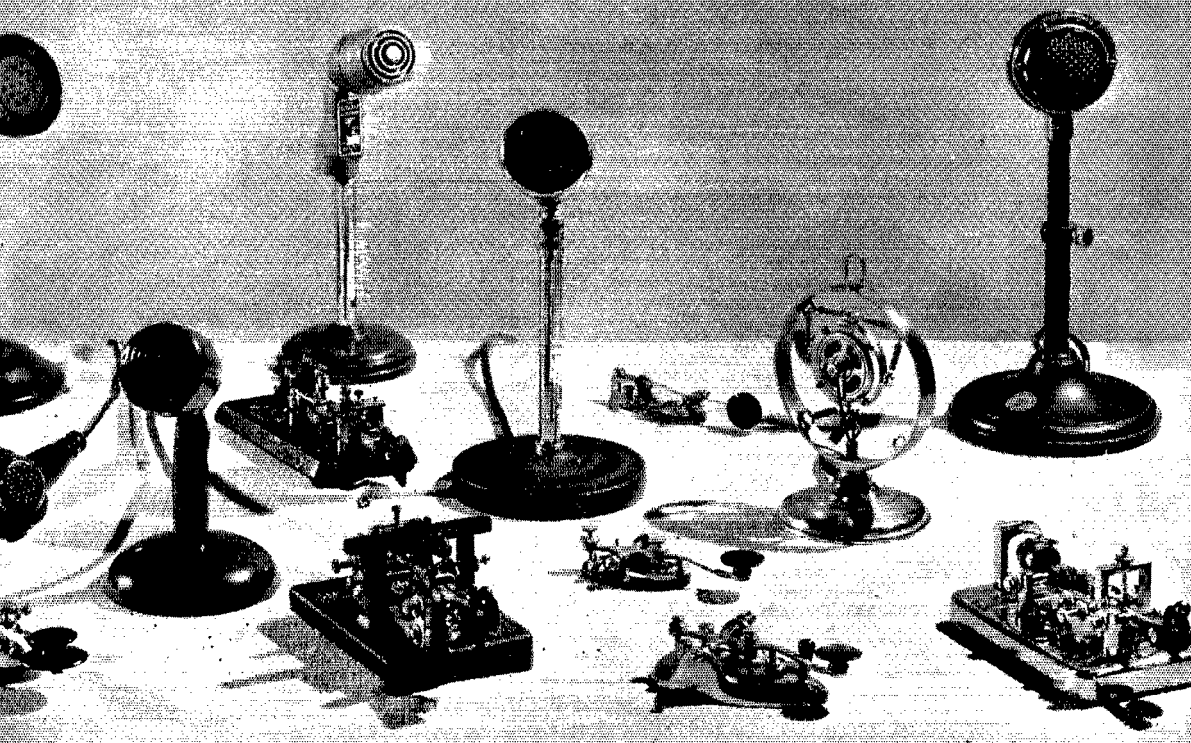

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MAY 1944

VOLUME XXVIII

NUMBER 5

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OFFICES

38 La Salle Road
West Hartford 7, Connecticut

Subscription rate in United States and Possessions, $2.50 per year, postpaid; all other countries, $3.00 per year, postpaid. Single copies, 25 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925. Additional second-class entries to cover sectional editions authorized March 20, 1935.

QST *devoted entirely to*

AMATEUR RADIO

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

CONTENTS

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

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

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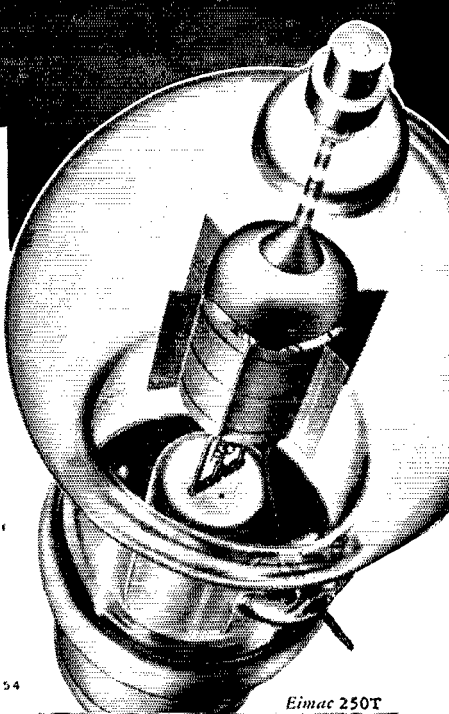

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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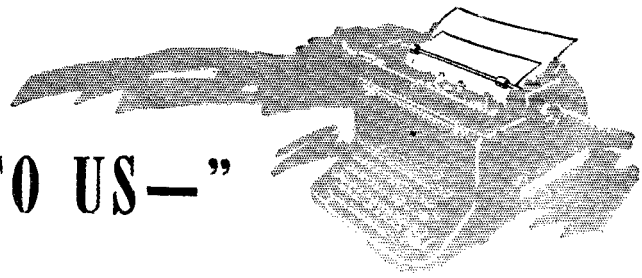


"IT SEEMS TO US—"

MORSE AND US

THIS month marks the centennial of Samuel Morse's demonstration of the first practical electric telegraph and, with it, of the code which with minor modifications has come down to us today. Congress pauses in its wartime duties to dedicate a plaque to his memory in the Baltimore building which constitutes one end of the famous "What-hath-God-wrought?" circuit. The whole communications world pays homage to his memory.

There are lessons for all of us amateurs in the example of Sam Morse — whose middle initials, by the way, were FB. He was a pioneer American inventor in the best tradition. He was fascinated with the idea of the newly discovered phenomenon of electromagnetism when it was first explained to him by a Columbia College professor. In 1832, during a lull in his painting activities, he was explaining this new electromagnetism to friends and remarked, "If the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted by electricity." Struck by his own thought, he went to work on it and in a few days produced drawings of his first design. There followed years of heart-breaking development before he succeeded in making the idea work, during which time he was reduced to such poverty that he made his own castings at the expense of the common necessities of life. Only the vision of a great contribution to mankind sustained him. Finally, in 1836, he had it, and the following year he showed its operation to some friends over a circuit of 1700 feet of wire. At the same time he applied both for a patent and for a Congressional grant that would permit its conclusive demonstration. Although the committee of Congress promptly reported favorably, it was not until 1843 that Congress itself acted and appropriated funds. Construction was immediately begun on a line from Washington to Baltimore, and on May 24, 1844, twelve years after the conception, the immortal demonstration occurred — with the results that the world so well knows today. Thus the Congress, honoring the Morse centennial on May 24, 1944, honors also an earlier Congress' recognition and support of him a century ago.

His was the first successful telegraph, the first successful code, and from his work has flowed many of the marvels of today's communications structure. It will interest you to know that what Morse built for his first use of code was a recorder or printer. He figured from the first that the message had to be seen to be understood. But the operators who used the apparatus soon learned to read the message by the clicking of the recorder armature against its stops — which was faster because it left the eyes and hands free to write. In short order this aural reception became the favored method and of course it led straightway to the sounder — and then, by stages, to our own aural reception of Continental in radio today.

It seems to us quite appropriate that this month should also be one to commemorate in the history of the American Radio Relay League. It is the thirtieth anniversary of our founding. For it was in May of 1914, in the four-months-old Radio Club of Hartford, that Hiram Percy Maxim, its first president, launched his own new idea of a nationdede relay league — a concept which by a constant process of regeneration has developed into our amateur structure of the present day. There is no time these days for amateurs to make a formal celebration of their anniversary. It is sufficient to record the simple fact. After all, old as we think we are, we were seventy years behind OM Morse.

WATT POWER—A REPORT

IN OUR Correspondence department last month we published excerpts from representative letters which reached *QST* as a result of our invitation, a few months back, to join the discussion of whether or not it seemed advantageous to have a lower power level in postwar amateur operation. An interesting and stimulating discussion it was, too, and we hope you read it.

We have just completed a tabulation and analysis of the arguments adduced pro and con in this discussion. We started this for our private information, with the vague idea that there might be some sort of a statistical basis for seeing which side seemed to have the better of the argument. But a striking fact was immediately manifest: for practically every point advanced on either side, some sort of rebuttal is to be found in a letter on the other side. The majority of these arguments are not capable of statistical or engineering proof,

and the relative weight to be attached to them will vary widely with the position of the observer. Although we assume that every letter we received was independently conceived and written, it is almost as though the product was the organized effort of two teams of debaters. So much are we impressed by this parallelism that we have decided to summarize here, for your inspection, the major points that have been made pro and con, using the same numbering system for each.

First the points made by those in favor of reduction — whose proposals, by the way, where they named a figure, averaged 275 watts:

1) Getting maximum performance with low power develops greater skill. Unlimited power stifles ingenuity and emphasizes only the power competition. High-power hams generally buy ready-made rigs and don't know how to build good equipment themselves. With cheaper equipment after the war, the trend toward manufactured kilowatts would only increase.

2) Lower power would result in better technique. Rigs would be designed for maximum performance, not for maximum input. Equipment would operate within reasonable limits, with better-quality signals.

3) The emphasis would be placed on efficient antennas, resulting in more experimentation and development. Kilowatt owners aren't inclined to experiment.

4) High voltages are more dangerous. Lower power would promote safety.

5) Reduced power would intensify future development of transmitters, antennas, receivers, tubes, parts and circuits. Better designs, greater flexibility, more diversification.

6) Interference would be lessened. Local QRM increases in direct ratio to power but distant signal strength does not. Even kilowatt stations have QRM from other similar stations while they themselves are receiving. Lower power would reduce blanketing and key clicks both to amateurs and to other services. The large number of new postwar hams will make interference intolerable unless the limit is reduced.

7) Performance is not significantly increased by using high power. Power must be multiplied five or six times for noticeable improvement. It is more profitable to improve the antenna. With that, 100 watts will work anywhere. Reliance on power does not develop good operating practices. There will be greater participation in our contests if the power competition is removed.

8) High power is useful only to overrun another kilowatt station. Power is only an easy way out. Receiver selectivity and beamed power are more important to reliability.

9) Limiting power to give equal opportunity for all is democratic procedure. Returning soldiers won't be able to afford high power to combat QRM. The present limit places the emphasis more on a "fat purse" than on ability. With power reduction each man would put in the same; what he got out would depend on his true skill as an amateur.

10) Don't worry about the industry's loss of sales of high-power gear. Hams would still spend about the same amount. And constant experimentation and refinement in search of maximum performance would develop new and better components, of value to the whole art.

11) Postwar public relations would be improved by reducing power. The possibility of increased b.c.i. from the greater number of postwar hams is a threat to the future. More and cheaper parts are likely to accentuate this danger from an increased number of kilowatt stations. New public b.c. services after the war will impose further need to minimize b.c.i. possibilities.

Now for the thoughts of the men who favor retention of the kilowatt limit:

1) Greater skill is developed by work with high-powered gear. Power limitation limits ham experience. High-power experience is of more value to Army and Navy and the radio art as a whole; notice the relative backwardness in military communications of nations with lower amateur limits. With a lower limit, more amateurs could afford to buy manufactured rigs of maximum permissible power, thus reducing home building — which is where one gets the "know-how."

2) High-power equipment forces the acquisition of better technique. Receiver-type practices won't do; haywire, sloppy design and inefficiency cannot be tolerated with high inputs.

3) Higher power is necessary for amateurs whose locations do not permit them to install elaborate arrays. (And competition in expensive antennas does not differ much from competition in expensive watts input.)

4) High power is not less safe, may even be safer. The realization of potential danger induces caution. Low voltages kill, too.

5) Future developments by amateurs would be limited by a lowered power level, particularly in types of transmitters most useful to the armed forces and other services. Future discoveries may even make increased amateur power more desirable than reduced power.

6) Interference would not be greatly lessened. There is no significant difference in QRM between high and low power on modern selective superhet receivers. Blanketing and key clicks can be as bad from low power as high; correct adjustment is more important than power. QRM from increasing population has always seemed to threaten the future, yet we have always survived. Technical advances always supply the answer. In fact, QRM has been the necessity mothering most amateur developments. Better techniques will be developed to overcome postwar QRM.

7) Under many conditions of vital amateur operation, as in traffic handling (particularly transpacific) and in emergency work, performance would not be adequate without having the kilowatt available.

8) Even if the limit were lowered there would be no real change in operating conditions, because similar ratios would still exist between "high-" and "low-" power stations.

9) Limiting all to a common level is not democratic; it is some kind of an un-American "-ism." Democracy means equal opportunity but not a "share-the-wealth" plan. Our boys overseas are fighting for free enterprise. Nor are all the kilowatt stations owned by "fat purses"; many are built by comparatively poor lads. Even with equal power, such factors as location and antenna space would still introduce inequalities.

10) The amateur equipment market would be reduced in volume if the power limit were lowered, and the industry would suffer. Thereby the nation would lose part of its valuable wartime

industrial reservoir, particularly of manufacturers equipped to make high-power gear, such as tubes. And we would lose industry support.

11) A lowered power level would be politically disadvantageous. We'd have dissension in our own ranks, splitting us open. Giving away one right would open the door to attack on others.

At this point you are probably of the opinion that the arguments brought forth do not enable anybody to settle anything. That gives us the opportunity to state anew that they were not intended to settle anything. Despite our presentation of the matter purely as one on which discussion should be interesting and profitable, many of the letters indicated that the readers thought our initial editorial was a statement of prospective ARRL policy and that the League and *QST* were definitely and literally proposing power reduction. We have endeavored to say with all the clarity we command that that was not the case and that the idea didn't even originate with us. Instead, it was a recognition of the very strong feeling frequently expressed to us by a considerable number of competent and thoughtful amateurs, and one on which it has certainly seemed desirable to sound out your sentiment, without partisanship or bias on our part. Not that it would matter if this journal were biased on the subject, for ARRL decisions are made by the Board of Directors, not by the *QST* staff, and one of the most potent factors in the whole ARRL system of organization is that it provides a mechanism whereby it is the wishes of amateur members which get translated into League policy.

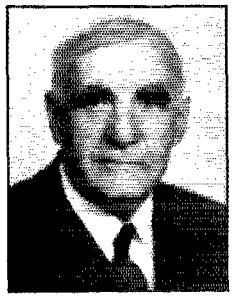
Well, now, bearing in mind that the opinions of the *QST* staff cannot decide anything and that there has never been likelihood of changes in such matters until the boys come home, even if we think we want change, what do we think has been established as amateur sentiment by our survey? Nothing too conclusive, we suspect. The engineering considerations do not get very carefully examined in such a discussion as this. The discussion did not embrace any great percentage of the membership, and particularly of that important segment now overseas. It wasn't even intended to be a poll, of course; it was just a good ragchew on an interesting subject. We doubt that any final conclusions can or should be drawn from it. As a preliminary opinion, however, it can be pointed out that statistically the proponents of the kilowatt have the edge, three to two in terms of number of letters received, three to one in terms of the number of individual signatures. And, while you must evaluate the arguments tabulated above in your own appraisal of their validity, there's that significant fact we mentioned previously: for every argument that the proponents of power reduction put up, the "defenders" have a rebuttal, and most of them make good common sense. In other words, no unchallengable and imperative reason for reducing power exists. Nor, to our mind, is it likely to come into being until some one is able to offer conclusive proof, on a hard-headed engineering or technical basis, that practical amateur operation would be improved by the adoption of a lower power level.

K. B. W.

Dr. Eugene C. Woodruff, W8CMP, 1871-1944

DR. EUGENE C. WOODRUFF, W8CMP-W8CIK, past-president of ARRL and formerly Atlantic Division director, passed away at State College, Pa., at the age of 73.

His death was caused by heart failure. He had been under medical care since December, but in recent weeks he had been progressing toward recovery and was making plans to accept an invitation to attend the 1944 ARRL Board Meeting in May. On March 20th, however, he collapsed of heart failure while on a routine visit to his doctor's office.



Dr. Woodruff was the second man ever elected to the presidency of ARRL. Then dean of the ARRL Board of Directors, having represented the Atlantic Division since 1925, he succeeded our founder-president, Hiram Percy Maxim, upon his death in 1936. Amateur radio and the ARRL remained his great love and major interest until his death.

A well-known educator and inventor, Dr. Woodruff was revered and honored not only in amateur circles but throughout the electrical engineering world. A detailed picture of the unique and full career that made him a legendary figure is given in the Hamdom portrait of him presented in the March, 1938, issue of *QST*.

In W8CMP's passing amateur radio has lost not only an illustrious leader but a staunch and devoted comrade and an ardent adherent.

Fundamentals of Magnetic Recording

Basic Operating Principles of Wire and Tape Transcribers

BY D. W. PUGSLEY*

THE principle of magnetic recording was first invented by Valdemar Poulson, a Danish scientist, in 1898. The public was first introduced to this new art in 1900, when Poulson demonstrated his "Telegraphone" at the Paris Exposition of that year.

*Receiver Division, Electronics Dept., General Electric Co., Schenectady, N. Y.

As its name implies, magnetic recording consists of impressing on a suitable medium a magnetic force which will leave a record on that medium. If the amplitude of this magnetic force varies in unison with speech or music, then the record left on the medium will vary likewise. Both Poulson and the numerous investigators since him have generally used one or the other of two fundamental types of mediums for magnetic recording — steel tape or steel wire. Both have their advantages and disadvantages, some of which will be discussed later.

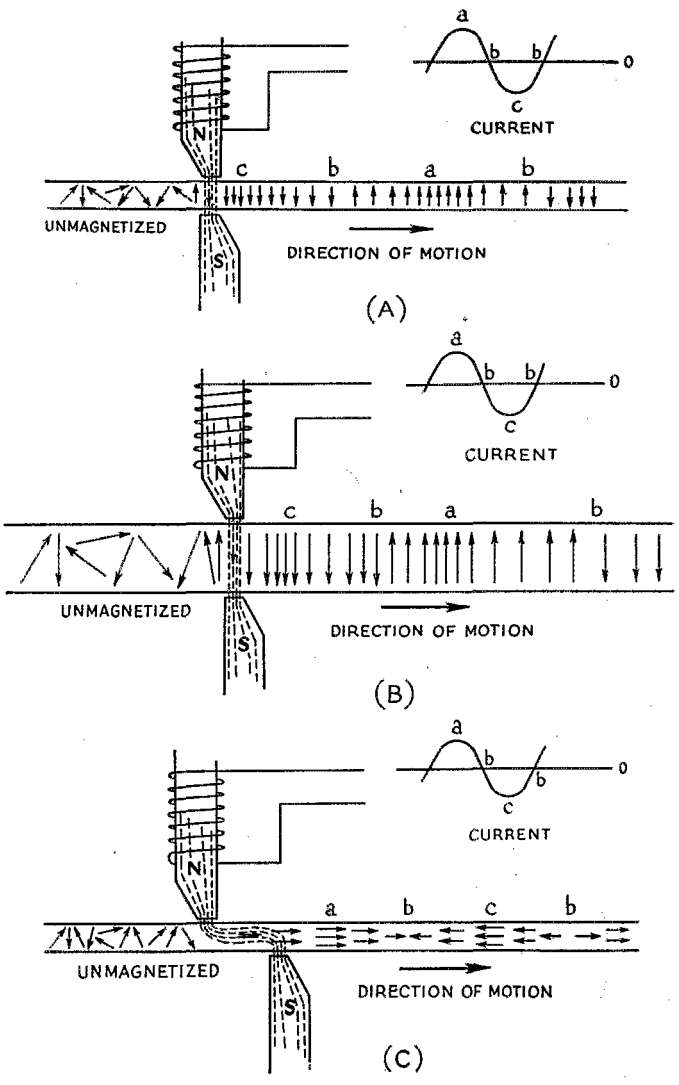


Fig. 1 — Sketch illustrating three methods of magnetizing tape or wire. (A) perpendicular, (B) transverse and (C) longitudinal. In (A) the edge view of the tape (shown viewed from the top) is greatly exaggerated.

When using a tape, any of three methods may be used for magnetic recording — perpendicular, transverse, or longitudinal. Simple diagrams illustrating each of these three methods are shown in Fig. 1. In Fig. 1-A the perpendicular method of magnetization is shown. It may be seen that the two magnetic poles are so placed in relation to the tape that the tape is magnetized with lines perpendicular to both the flat faces of the tape and to its direction of motion. Since the flux in these poles is in phase with the current in the coils, the magnetizing force exerted on the tape is in phase with the current in the coils. If the amplitude of this current varies in unison with speech or music, the force exerted on the tape will vary likewise.

Since the steel tape is magnetic, the tiny molecular particles in the tape, represented by the arrows, will line up with this magnetizing force. Furthermore, as the tape passes out of the field between the poles a large number of these molecular particles will remain lined up. It is this property of a magnetic material of retaining some of its magnetism after removal of the magnetizing force that makes magnetic recording possible. The bunching of the arrows is used to indi-

cate the relative strength of the magnetism left in the tape. The arrows are bunched close together at a spot which was passing the poles at the instant that the flux in the poles, and therefore the current in the coils, was passing through a maximum either above or below the zero axis. The arrows will be pointing downward at points along the tape where the current was below the zero axis, and in an upward direction at points where the current was above the zero axis. The letters *a*, *b*, and *c* represent corresponding conditions for the current and the magnetism in the tape.

Transverse recording, shown in Fig. 1-B, is exactly the same as perpendicular recording except that the magnetizing force is exerted parallel to the flat face of the tape, although still perpendicular to the direction of motion.

Longitudinal recording, shown in Fig. 1-C, differs from the previous two methods in that the magnetizing force is directed parallel to the direction of motion. Thus the magnetic pattern is left as indicated. This is accomplished by displacing the poles slightly, as shown in the same sketch.

When using wire as a recording medium, longitudinal recording is the only successful method that can be used, since otherwise the wire would have to be prevented from turning on its axis to prevent distortion when the record is being played back. For instance, if the wire turned through 180 degrees, arrows which should be pointing upward would be pointing downward. It is practically impossible to prevent wire from turning, although this is relatively simple with a flat tape.

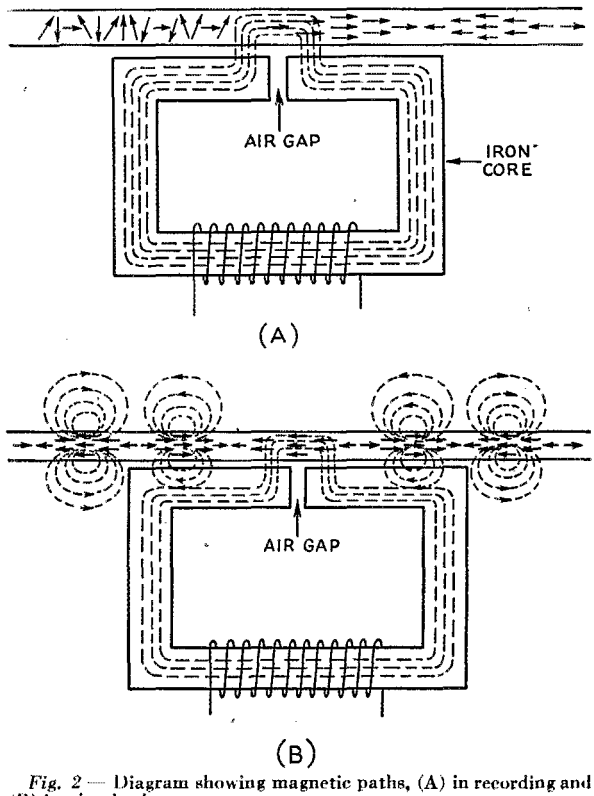


Fig. 2 — Diagram showing magnetic paths, (A) in recording and (B) in play-back.

Play-Back

After a record has been impressed upon the wire or tape, the process must be reversed to reproduce the record. That is, the magnetic impressions left on it must be used to produce electric impulses which can be amplified and eventually used to excite a loudspeaker. Fortunately, in some cases, the same magnetic structure used for recording may also be used for play-back. In the new General Electric wire recorder, a type of recording head is used which may also be used for play-back purposes. A diagram illustrating the principles of both recording and play-back with this type of head is shown in Fig. 2. As may be seen from Fig. 2-A, during recording the current in the coil sets up a flux in the iron core which follows the core until it comes to the air gap. Magnetic flux likes to follow the path of least resistance, and since it is much easier for it to travel in iron or steel than in air, it travels around the air gap, through the steel wire, and back into the core. Thus the wire is magnetized longitudinally.

During play-back, the previously magnetized wire has flux lines (which are magnetic force lines) surrounding it as shown in Fig. 2-B. When the molecular magnets of the tape are passing in the air gap, the flux lines find it much easier to travel over the longer path around through the iron core than through the air gap, which offers greater resistance to the passage of magnetic lines. Consequently, they pass through the core, as shown. These lines must necessarily "link" the coil, and thus an electrical voltage is induced in the coil. The resulting voltage may then be amplified by means of an ordinary audio amplifier and used to excite a loudspeaker.

In recent months there have been indications of widespread amateur interest in magnetic-wire recording. The magnetic recorder, although old in principle, in application is essentially a wartime development. Now used largely for military purposes, it promises to have important civilian uses after the war. In this article, in addition to a discussion of the basic principles involved, the author includes a brief description of a current production-model recorder and play-back unit.

The General Electric magnetic recorder. The puller mechanism and the recording and erasing heads are at the top, while the controls and play-back speaker occupy the lower portion of the panel.

The GE Recorder

Having explained the basic principle involved in magnetic recording, a complete system such as used in the General Electric wire recorder may now be shown. Fig. 3 shows a block diagram of such a system. During recording the switch is turned to the "record" position, marked *R*. The following sequence of events takes place. Sound impulses are picked up by the microphone, converted into electrical impulses, fed into the amplifier, amplified, fed into the recording head, converted into magnetic impulses, and then impressed on the wire.

During play-back, the switch is turned to the transcribe position, marked *T*. The magnetized wire passing through the head now sets up magnetic impulses in the cores. These are amplified by the same amplifier used for recording, and then fed to the loudspeaker which converts them to sound impulses.

During both the recording and play-back processes the drive motor is used to turn the reels, which unwind the wire from one reel, pass it through the head, and wind it up on the other reel. Before the recording can be played back, it is necessary to rewind it on the first reel. Otherwise the speech or music would come out backwards, which would sound very weird. This is the only processing necessary after recording.

The high-frequency oscillator shown in Fig. 3 is connected to the recording head during recording. The purpose of this oscillator is to reduce distortion which would otherwise be present. The actual functioning of this oscillator is beyond the scope of this paper; suffice it to say that, by using this oscillator, a much more faithful recording is obtained.

In Fig. 3 there is also shown an "erase" coil. This coil is used to remove any previous record which may be on the wire just before recording. Thus a "double exposure" is impossible. Erasing is accomplished by subjecting the wire to a relatively high-frequency field, about 30,000 cycles per second. This completely disarranges the molecular magnetic particles, destroying any regular pattern and leaving the molecules disarranged, as shown ahead of the recording head in Fig. 1-A.

A machine incorporating all of these functions is shown in the photograph. This unit is approximately 12¾ inches by 13½ inches by 10½ inches, and weighs about 45 pounds.

The wire used is only 4/1000 of an inch in diameter, comparable to a human hair. Because of its small size, approximately two miles (11,500 feet) can be wound on a spool only 3¾ inches in diameter and 1¼ inches thick. This length of wire is satisfactory for a recording of speech lasting a little over an hour. This illustrates one advantage of wire over tape, in that a given length of recording will occupy less volume than tape. Another advantage is that the wire may be easily cut and sections spliced in for "dubbing in" if desired. The splicing is accomplished simply by annealing the ends to be spliced with a match or lighted cigarette and tying a simple knot.

Now that methods of overcoming its shortcomings have been largely worked out, this system of recording may soon be a strong competitor of more conventional methods in a variety of applications.

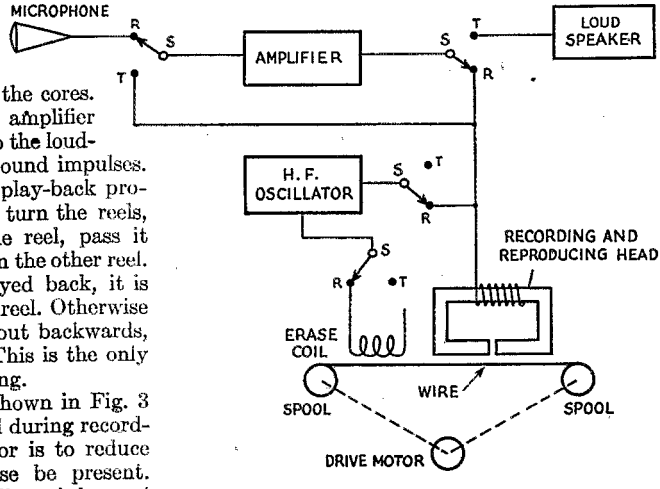


Fig. 3 — Block diagram of a wire-recorder system.

Building WERS Transceivers In the School Shop

A Construction Project for School or WERS Groups

BY C. IRVIN METZGER,* W8FER

Many high schools have added courses in radio theory and operation to their curricula in response to War Department requests. This article describes how one resourceful instructor developed a relatively simple laboratory project for students in such courses. At the same time the author points to the school shop as a source of supply for WERS organizations needing additional portable receiving and transmitting equipment.

WHEN a sufficient number of manufactured units or of already-built composite rigs is available, the equipping of an adequate WERS system presents little difficulty. In a community where little or no suitable existing equipment is to be had and few skilled amateurs remain at home to do the building, however, the production of the relatively large number of units ordinarily required is distinctly a problem.

In the case of WKYU — the Altoona, Pa., WERS organization — this problem was solved by setting up the construction of a standardized simple WERS transceiver unit as a useful work project for senior-class students taking radio and electronics courses in the vocational department of the senior high school.

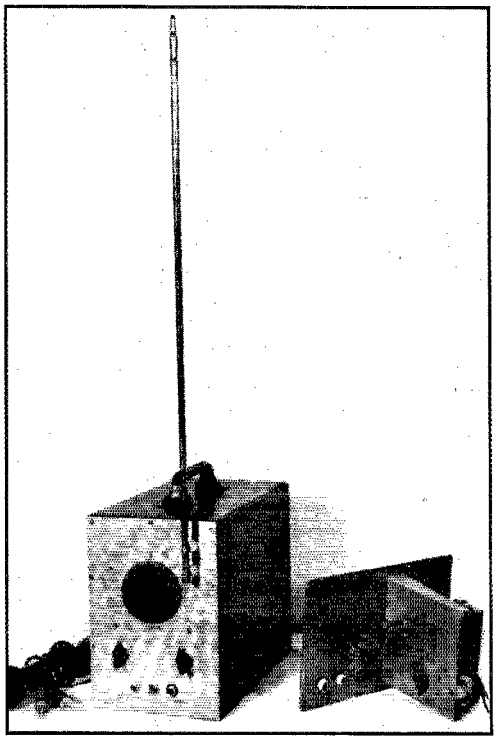
Two advantages resulted from this arrangement. First, the students had an interesting and worth-while laboratory project to work on in conjunction with their training, one which served a more tangible purpose than the traditional assembling, tearing down and re-assembling of stock parts in lab demonstration set-ups. Second, the completed units after construction could be loaned to the City of Altoona to supply the required WERS equipment.

Such an arrangement may well be the answer to a similar problem in other communities. Details as to how it was worked out may be of interest to other school vocational departments and training groups associated with WERS.

The first requirement in laying out such a program — assuming that the facilities and the trainees are available — is to develop a standardized design for the unit which is to be constructed. In establishing this design, both electrical and mechanical details should be kept as straightforward as possible.

*Instructor of Radio, Altoona (Pa.) School District, Altoona, Pa.

The unit being built in the Altoona schools is a battery-operated transceiver using two 6-volt tubes. It has a self-contained power supply and is built into a convenient carrying case with a handle. An adjustable rod antenna is mounted on the case. All controls are grouped on the front panel and all components except the batteries are mounted on the rear of the panel or on the attached tube shelf. The panel- and tube-shelf assembly is easily removed for servicing. A detachable side plate gives access to the batteries. The design lends itself well to construction by quantity production methods in the school shop, using student labor throughout and requiring no tools or machines other than those generally found in such shops.



The completed "mass-produced" transceiver. The volume control is at the left and the change-over switch at the right, beneath the tuning dial. Along the bottom edge, left to right, are the microphone jack, the "battery-saver" switch, and the headphone jack. The chassis from a disassembled unit is shown at the right, illustrating the arrangement of parts.

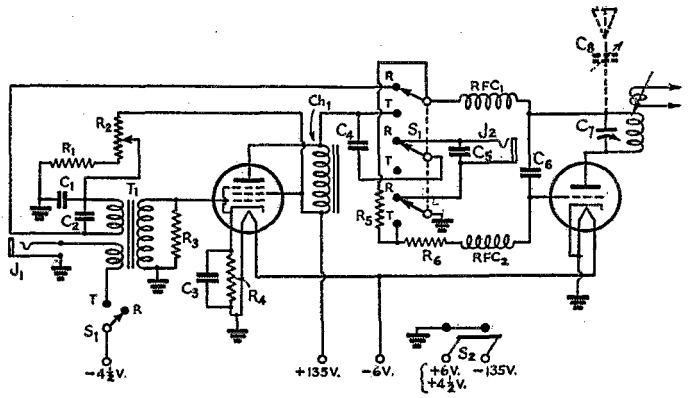


Fig. 1.— Circuit diagram of the standardized walkie-talkie unit designed for construction as a student work project.

C_1, C_4 — 0.25-μfd. paper.
C_2 — 0.00025-μfd. mica.
C_3 — 10-μfd. 25-volt electrolytic.
C_5 — 0.01-μfd. paper.
C_6 — 0.0001-μfd. mica.
C_7 — 2-plate midget variable (15 μμfd. max.).
C_8 — 15–30-μμfd. trimmer.
R_1 — 100,000 ohms, 1 watt.
R_2 — 150,000-ohm potentiometer.
R_3 — 250,000 ohms, ½ watt.
R_4 — 500 ohms, 1 watt.
R_5 — 1 megohm, ½ watt.
R_6 — 2,250 ohms, 1 watt.
S_1 — 4-p.d.t. rotary wafer switch.
S_2 — D.p.s.t. toggle switch.
T_1 — 3-winding transceiver transformer (Thordarson T-72A59, Stancor A-3833; or see text).
L_1 — 3 turns No. 12 bare copper wire, ½-inch inside diameter, ⅝-inch long.
L_2 — 1 or 2 turns No. 12 wire.
L_3 — 10- to 12-henry choke, 40 ma.
J_1, J_2 — Single-circuit jacks.

Circuit

The circuit, shown in Fig. 1, is that of a conventional ultraudion oscillator, plate modulated. A 6J5 is used as the oscillator and as a self-quenched superregenerative detector. A 6G6 power pentode serves as the modulator as well as the audio amplifier for reception. By making changes in socket and wiring, other types of tubes may be substituted for the 6J5 such as the 76, 7A4, 6P5 or 6L5. The 6L5 was used in some of the units in order to lower the filament current drain. Similarly, a 6K6G or a 41 may be used in place of the 6G6G.

Change-over of the circuit from receiving to transmitting is accomplished by a 4-p.d.t. switch, S_1. Although a CRL No. 1450 rotary wafer switch was used in the model unit, two d.p.d.t. toggle switches may be substituted. The levers may be ganged so that both switches operate from a single control. In the "receive" position one set of contacts opens the microphone circuit, while a second set shifts the 6J5GT plate return from the modulation choke to the interstage primary of the three-winding transformer, T_1. A third section of the switch has a grounded rotor contact which shorts out the receiving grid leak, R_5, when transmitting. If the headphone jack frame is insulated from the chassis (an unnecessary precaution in this circuit), this portion of the switch serves to restore the ground when in the "receive" position. A fourth set of contacts on S_1 opens the "hot" side of the headphone circuit during transmission.

The positive sides of the filament-supply and microphone batteries are grounded to the chassis through one side of a d.p.s.t. toggle switch, S_2. The other side of the switch grounds the negative plate-battery lead to the chassis. Such a switch is sometimes called a "battery saver" since its purpose is to open these leads when the unit is not in use, preventing battery drain through the voltage dividers.

The use of as low a value as 1 megohm for the receiving grid leak, R_5, makes stabilization of the detector easier, but usually at the cost of some loss in sensitivity. For units which are to be used only over short distances and favorable paths this is permissible, but the receiver's sensitivity can be improved by the substitution of a 2- or even a 5-megohm grid leak. In such a case, if the superregeneration sounds rough and "birdies" are heard a little patient experimenting with the value of the by-pass condenser, C_2, usually will help to stabilize the circuit.

Construction

The steel cabinet, 7 × 10 × 12½ inches in size, is formed from one piece of 18-gauge sheet iron in the school shop and joined by spot welds. An opening is left in the right side of the cabinet to permit access to the battery compartment. This opening extends over approximately seven-eighths of the side area and is covered by a detachable side plate which is fastened with self-tapping screws. A metal or plastic handle is attached to the top of the cabinet.

The panel, folded chassis and oscillator-tube bracket in the model were made from scraps of sheet aluminum, ranging from 1/16 to ⅛ inch in thickness, found in the shop's stockpile. Sheet iron or other metals may be used instead of the aluminum. The tuning-condenser mounting is made from sheet polystyrene or the best alternative h.f. insulating material available. Hard rubber from old radio panels is fairly satisfactory. Exact dimensions and layouts for these parts are given in Fig. 2.

If the drawings shown in Fig. 2 are enlarged to full size they may be used by the students as drilling templates.

The panel, chassis and oscillator-tube bracket are assembled with machine screws, while the panel is fastened to the cabinet with self-tapping screws. The insulating tuning-condenser mounting plate is fastened to the rear of the panel by means of two 1½-inch 8-32 machine screws which pass through ½-inch diameter spacers 1¼ inches long.

The shaft of the tuning condenser is coupled to the tuning dial by means of a short bakelite extension and a ¼-inch CRL shaft coupling. Such insulation is necessary in order to prevent the

deleterious effects of hand capacity in tuning. The best method of mounting the tuning condenser is in an upside-down position. The tank coil may then be soldered directly to the terminal lugs on the condenser.

Here, and elsewhere in the r.f. circuit, pains must be taken to keep all leads as short as is physically possible if optimum performance is to be secured.

If the midget tuning condenser has more than two plates, it should be stripped down to have only one stator and one rotor plate. This will provide approximately the capacity range necessary to cover the 112-Mc. band. The turns of the tank coil should be spaced to center the band in the tuning range.

The r.f. chokes are made by winding about 50 turns of No. 28 or No. 30 enameled wire on the outside of old ceramic-type resistors of high resistance value (anything above 0.1 megohm). The ends of the windings are soldered to the metal tips of the resistors. Another method of constructing the chokes is to cut pieces of ¼-inch hard-rubber or bakelite rod to a length which will accommodate the 50 turns. Each end of the form is drilled to pass a short piece of No. 18 bare wire. The ends of the choke winding are soldered to these leads, anchoring the winding and making it possible to mount a choke by means of the heavier leads.

Two types of antennas are provided for in the design — a half-wave vertical or a half-wave dipole. A vertical rod which can be adjusted to a length of approximately 48 inches is mounted on stand-off insulators on the panel. This rod is coupled to the grid end of the tank coil by means of a 30-$\mu\mu$fd. padding condenser. A variable coupling link of one or two turns of No. 12 wire is also provided in case it is desired to use a center-fed dipole antenna.

Substitute for Transceiver Transformer

The three-winding transceiver transformer used to couple a single-button microphone and a detector plate circuit to a single grid may prove hard to procure. In that case an old audio interstage transformer, such as the Acme A-3 or the Pacent transformers found in old Sparton and Zenith receivers, may be adapted to the present need. Such transformers have plenty of space between the windings and the core. A microphone winding consisting of approximately 80 turns of No. 30 enameled wire is evenly wound in one layer over the original windings, and the ends anchored with tape. If the re-wound transformer develops a "howl" upon installation, reversal of one set of connections should remedy the trouble.

No claim to originality is made for the design of this unit, as details of similar transceivers have been covered in many published articles. We feel that the object is accomplished when such a project is presented to classes of pre-induction students for the purpose of stimulating added interest and to demonstrate the use and construction of v.h.f. apparatus. It has been found that those of our students who hold WERS permits participate in the network drills of WKYU with added zeal when they can see the results of their own handiwork in service.

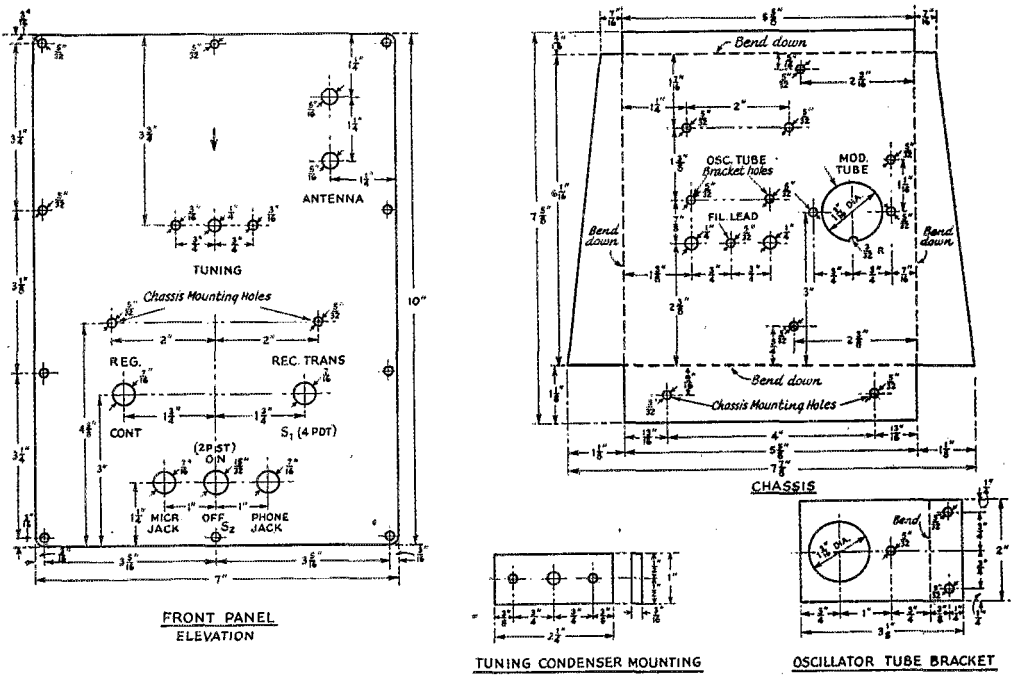


Fig. 2. — Layout drawing of the panel, chassis, oscillator tube bracket and condenser mounting plate.

HAPPENINGS OF THE MONTH

NAVY NEEDS OFFICERS

THE Navy continues to have a need for officers for general sea duty and many other classifications. In general, applicants should be physically qualified, should have college degrees, or at least two years of successful college work, plus a minimum of five years of progressively successful business experience.

Of direct interest, however, to scientific personnel is the fact that the rapid expansion in Navy surface vessels, aircraft and submarines has intensified the need for officers to be trained in engineering work in connection with ultrahigh-frequency electronics apparatus and sound equipment. The Navy now has openings in radar and other billets for qualified engineers in the following categories: electrical, radio, physics, and electronics. Men who hold degrees in other types of engineering and who have made above-average scholastic records in physics and mathematics (through calculus) will be considered. Electrical or radio experience is desired, but is not necessary.

Men commissioned as radar officers are given the Navy's pre-radar course at either Harvard, Princeton or Bowdoin (5, 4 or 3 months, respectively), followed by 4 months of radar and sound at the Massachusetts Institute of Technology. Upon graduation, these officers are assigned to responsible positions having to do with research, design, construction, or maintenance of the Navy's radar, radio, and sound equipment.

Qualified engineers should apply for commissions at the nearest Office of Naval Officer Procurement. These offices are located in the principal cities throughout the United States.

BOARD MEETING

THE ARRL Board of Directors will hold its annual meeting in Hartford on May 5th. Generally the Board has a considerable list of items of business ahead of it at this time of the year, and it has the Headquarters publish the list in May *QST* with the invitation to members to write their opinions thereon to their respective directors. As we go to press with the May number this year the list is practically barren — except for the item that everybody knows is in everybody else's mind: planning for postwar resumption.

Aside from that the only item on the docket at this moment is a proposal sponsored by the President to amend the prohibition in the Constitution against the compensation of directors in such manner as to permit paying the President a salary. Specifically, it is proposed to amend the last sentence of Paragraph 2 of Article IV of the Constitution to read: "Directors shall serve without compensation from the League, except that the President may be compensated for special assignments for such periods and in such amounts as may be authorized by the Board of Directors." The reason for this proposal is that it is believed possible that the Board's postwar planning committee might deem it in the best interests of the League for the new president, whoever he may be, to be in position to give his whole services to the League in Washington, beginning with the end of the war, in connection with the restoration of amateur frequencies.

A president and a vice-president are to be elected this year, for terms of two years, taking office at the end of the meeting.

Your director's name and address appear on page 6. You are invited to write him your opinions and any suggestions you may have for the benefit of the craft.

AP BUREAU FINISHED

THE ARRL Apparatus Bureau, after a two-year job of making amateur apparatus available for urgent government needs, has completed its work and has been discontinued. No further registrations of amateur apparatus will be accepted.

During its life the bureau was instrumental in moving the contents of a great many amateur stations to fighting fronts where apparatus was desperately needed and, later in its life, in similarly aiding the training schools and laboratories of the nation. It was this bureau, too, which gathered in several thousand of your milliammeters for Uncle Sam at a time when none was available from any other source, with the League acting as banker and paymaster for the Signal Corps for a while. There were quite a few thrills in the life of the old ApBu. We remember the day when an Army communications officer from Alaska called us by long distance and urgently asked whether we could suggest where he could lay hands instantly on several dozen so-and-so receivers. We could and did: while he stayed on the wire we dictated the addresses of hams who had registered such receivers with us for precisely this kind of use. Planes were flown after those receivers; the shipment was assembled on a bomber, and they were shot to Alaska. It was about five days later that the American public was first informed that the Japs had invaded the Aleutians, so we knew then just why that gear was needed up there in a hurry!

The job is finished now, but the Apparatus Bureau has helped to leave a trail of American ham gear in our outposts all over the world.

STAFF NOTES

THE Headquarters has a new Acting Communications Manager. George Hart, W1NJM, after two reprieves from his draft board to ac-

complish essential jobs in putting WERS on a firm basis, including the writing of his manual thereon, finally received his greetings from FDR and has reported in the armed forces. He hopes to serve in AACS.

Carol A. Keating, W9WWP, assistant communications manager since late 1942, is our new Acting CM. She is the first YL to serve on the Communications Department staff, although not the only one at Hq. Licensed since 1936, she has a Class A ticket, operated 80, 40 and 20 c.w. She was YLRL's first vice-president and activities manager. Her personal activities included earning WAS, RCC, ROWH, a Public Service Certificate for flood work, and a sheepskin from the University of Illinois. Her present-day activities include operating at WMHC-1, Hartford's WERS control, and spinning an HRO at home to keep tabs on things.

Lillian M. Salter, as Communications Assistant, will be CAK's aide. As to her know-how, if you will look over the letters and bulletins you've received from the CD, you will find LMS on them for the last 14 years.

George Hart, by the way, has the unique status of being the only man ever to occupy all of the chairs in the CD. He was successively second op at W1AW, its chief, an aide in the department, assistant communications manager and, for the past year and a half, the Acting ditto.

Which reminds us to make another mention of his recent addition to our list of publications, *A Manual for the War Emergency Radio Service.* Have you seen it? It has the practical low-down on WERS organization, administration, procedure and drills. Although it carries a nominal price of ten cents, we'll be glad to send a copy without charge to any ARRL member participating in WERS.

Finally, we announce a new face at Hq.: Cyrus T. Read, W9AA, has joined us as assistant secretary for postwar matters. He has been an active amateur since shortly before World War I, obviously beginning at a quite tender age, and was first in line at the Chicago office when licensing was resumed after that war. We are getting a boot out of the fact that, having lent so many of our own staff to the wartime radio industry, we now have one case where the situation is reversed: Cy is on leave with us from Hallicrafters. As you can imagine, his desk is a busy place these days. Included in his duties is heading and running a Hq. publicity department whose aim is to build up favorable public opinion of amateur radio, based upon appreciation of the radio amateur's contributions to the national welfare, particularly his wartime service.

ARE YOU LICENSED?

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

THE AMATEUR'S WAR RECORD

WE beg again for the record of your wartime radio sevice, to give us a statistical background for the defense of the amateur postwar position. If you're an amateur using your radio talent in uniform, in the Civil Service or other essential government service, or in radio industry wholly devoted to the war effort, we need the simple information on your activities that you can conveniently supply on the blank printed on this page — or readily produced in its essentials on a post card. Won't you, please?

Special appeal to amateurs in fighting outfits, training schools, government war agencies, and war industries: It would be immensely helpful in this important job if you could find the time to make up a list for Hq. of the hams who are serving with you. We shall no end appreciate it. It won't take long and it will definitely help! Of

AMATEUR WAR SERVICE RECORD

Name

Present mailing address

Rank or rating

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

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

SERVICE

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

course no confidential dope is wanted but merely the kind of data shown on the blank, to enable us to make an entry of the basic facts on the Headquarters records. Could?

CHIEF ENGINEER

THIS photo of George P. Adair, formerly W5AMT, FCC's new chief engineer, reached us just too late to accompany our introduction of him to you in this department last month.

George says he first began to shift his principal interest from fishing to electricity about 1913 when he fell heir to a couple of practically dead dry cells, the mysteries of which intrigued him no end. By 1915 he had pretty well settled on radio as the specific branch of electricity that interested him most. And then one thing just led on to another. . . . He writes: "May I wish the best of luck to the amateurs. I am certain that when the amateurs are permitted to resume their normal activities they will again be among the leaders in the development of radio as they have been in the past and as they are now in the many war jobs with which they are connected."

NOTICE TO MEMBERS DISCHARGED FROM THE MILITARY SERVICES

THE requirement of continuous membership in the League for eligibility to ARRL offices has been waived for members serving in the uniform of the United States. See particulars on page 24 of *QST* for July last. Those desirous of taking advantage of this arrangement are asked to claim the right when renewing membership, stating the beginning and ending dates for their military service.

ARRL Calling!

TECHNICAL EDITOR-WRITER

QST's editorial staff has immediate need for a highly qualified amateur with experience in both technical and editorial fields, one who can write literately and lucidly, who can edit capably and sympathetically, and who can design and construct model radio apparatus. Ability to work either on original projects or under direction is desirable, as are intelligent curiosity, amenability to working as a member of an organization, and keen interest in amateur radio. He must be draft-exempt and not now employed at his highest skill.

Applicants should write, stating age, education, experience, present and previous employment, family and draft status, physical condition, and minimum salary. Examples of previous technical or other writings will be helpful.

Address: Editor, *QST*, 38 LaSalle Rd., West Hartford 7, Conn.

★ SPLATTER ★

OUR COVER

IF YOU can look at a melange such as appears on the front of this issue and remark philosophically, "Well, I suppose they're trying to be artistic," and then say no more about it, you're a person of wit and wisdom and we admire you.

If, however, you're the kind who says, "What in hell is *this* supposed to mean?" — well, to you we can only say that it's supposed to be an attempt to use varied forms of microphones and keys as a source-theme depicting amateur radio communication. And if you don't agree — well, be tolerant and judge the issue by what's on the inside rather than on the outside.

...—

FOOTNOTES

IN SUPPORT of the above recommendation, we present forthwith the stellar group of authors you will meet on the inside:

First alphabetically, if not gastronomically, there is **Dr. Jasper P. Burp,** the noted electronic entomologist, whose light if not enlightening discourse begins on p. 41. We feel it our duty to explain that Dr. Burp's paper was forwarded to us by his assistant and collaborator, D. J. Campbell, of 3245 Audubon Place, E. St. Louis, Ill., accompanied by the following note: "While searching my attic for data regarding the type of parachute used in the Civil War, I ran across the enclosed manuscript. It appears to have been written by the eminent scientist, Dr. Jasper P. Burp, in collaboration with D. J. Campbell, his assistant. Knowing of your interest in such matters, I decided to submit it to you at your usual rates. I am awaiting your reply. (All packages will be soaked in oil before opening.)". . . .

Next comes a more practical if a less colorful educator — **C. Irvin Metzger, W8FER-ex-W8DNK** (p. 13), who has been in radio since the days when it was a thrill to listen to Arlington time signals and press on 2500 meters. Active in amateur radio ever since, both 'phone and c.w., he is now radio aide for the City of Altoona and Blair Co. WERS—WKYU. For the past ten years he has been teaching radio and electronics in high school, and at present is training pre-induction students. In the recent past he has been teaching Signal Corps classes, made up of students sent to the school from Signal Corps depots. Before entering the teaching profession W8FER was connected with a local Philco radio jobber as field service engineer, and before that he was in the automotive electrical servicing business with the same firm. One point he clears up is that the Horse-Shoe Radio Club, of which he is an active member, is named for the famous horseshoe curve

(Continued on page 94)

A High-Fidelity Peak-Limiting Amplifier

A 50-Watt Audio Unit for Speech or Recording

BY C. W. MOORHOUSE,* VE5US

Although proponents of high-fidelity have in the past frowned upon volume compression in audio amplifiers, the practical advantages to be gained by its use are many. In recent years it has found almost universal application in broadcasting stations. In this article VE5US describes a peak-limiting amplifier he constructed after selecting the best features of several recent designs.

Most prewar amateurs have been able to continue to satisfy their appetites for radio during the past few years because they have had the opportunity to jump into communications branches of the armed services or into radio industry. There they can still carry on almost as before, with the added satisfaction that they are playing a vital part in the war effort. Their positions enable them to keep in touch with the latest developments and, quite often, with other hams likewise engaged, with whom they can talk shop and compare notes. Those of us who for one reason or another have been left behind are not so fortunate. The doors guarding the many new and interesting applications of radio are closed to us. The radio clubs where we used to swap ideas have almost vanished. All of us must depend more than ever upon radio periodicals for ideas as well as for news of our former associates.

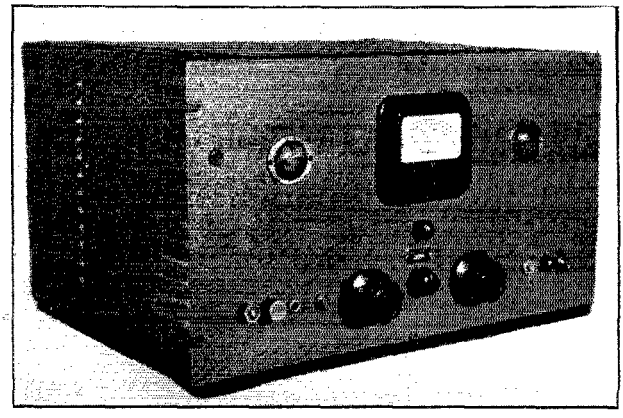
For those of us who still have the opportunity, these days and nights when we cannot operate provide a good chance to rebuild for the future. Almost any project aimed in this direction will prove interesting, but if it has a wartime application as well, so much the better. At the present time there seems to be considerable interest in high-fidelity audio amplifiers for use in recording, record playing and p.a. work. Since an amplifier of this type can be designed to serve also as an excellent speech amplifier and driver or low-power modulator, it makes an unusually attractive project. If a ham-station audio system is already available, little work need be done in most instances to convert it for wartime use.

The design of the amplifier shown in the photographs is based upon ideas gleaned from a study of previous *QST* articles as well as current commercial designs. It has a power-output rating of nearly 50 watts — ample for good recording or driver service with some reserve. Provision has been made to take care of such wide variations in signal-input levels as those delivered by low-output microphones and high-output phono pick-up heads. A system of volume compression, adjustable at the panel, is included, along with a heavy-duty power supply for good voltage regulation. Measurements of frequency response have shown it to be flat within 1 db. from 30 cycles or less to over 10,000 cycles. The circuit diagram is shown in Fig. 1.

Output Stage

Naturally, the design of such an amplifier should start at the output end, following a decision on the power-output level desired, since the gain necessary from preceding stages will depend upon the output-stage driving requirements. While triodes are usually preferred where the utmost in high fidelity is desired, they require a relatively large driving signal. In this particular case, they have the additional disadvantage that the only available tubes of reasonable size (2A3s) would have to be paralleled to obtain the desired output. To avoid these difficulties, 6L6G beam

*Chilliwack, B. C., Canada.



The peak-limiting amplifier is designed to be mounted in a standard relay rack. In the lower left-hand corner are two low-level microphone-input connectors, the high-level or phono-input jack, and the input gain control with screwdriver adjustment. The two large knobs are for the master gain control and limiter threshold adjustment. The a.v.c. switch is controlled by the small knob at the center and an extractor-type fuse mounting is above it. To the right are the inverse feed-back control (screwdriver adjusted), power pilot lamp and power switch. The "magic eye" limiter indicator is above to the left, while a dummy bezel has been placed to the right to balance the panel.

tetrodes were finally selected. Tubes of this type require less than half the driver power for more than twice the output obtainable from a pair of 2A3s. The performance of the 6L6Gs is very nearly as good as that of triodes when inverse feed-back is applied to compensate for the usual rise in voice-coil impedance at high frequencies when speaker output is used. To regain the high frequencies when the unit is used as a modulator, the feed-back circuit may be cut out. The glass type was chosen because insulation break-down troubles were experienced with some of the metal types. No doubt 807s would be better if continuous-service operation is contemplated.

The condensers, C_{14} and C_{15}, were inserted to eliminate a high-frequency parasitic oscillation. An open-line secondary output transformer showed as much as 100 volts of parasitic signal, measured with a compensated volume indicator. In some cases only one condenser will serve to eliminate the trouble. Battery bias is used so that the stage may easily be operated under Class-AB_2 conditions when maximum output is not required. While the plate meter is shown connected permanently in the output-stage plate circuit, a switching arrangement could, of course, be used to check other circuits with the same meter.

If the amplifier is to be used as a high-level driver, it would probably be best to make the output connection directly across the plates of the 6L6Gs rather than across the 500-ohm line. Adequate shielding would be required. However, a pad could be inserted between the 500-ohm line and the primary of the Class-B grid-to-line transformer if this connection is preferred. This would provide greater flexibility and prevent overdriving the Class-B stage.

Driver and Speech Amplifier

Since it is always desirable to have some reserve driving power available, a pair of triode-connected 6F6s was chosen for the driver stage. Although a single tube might suffice, the two-tube arrangement maintains symmetry. While a transformer with a ratio of one to one might be preferable for T_2, priorities made it necessary to use whatever was available. The one used has a ratio of 2.7 to 1 and a primary impedance of 4000 ohms, and it seems to do an entirely satisfactory job. It is not a transformer of the cheapest variety, however.

Attention next was turned to the stage driving the 6F6s. In a design described in September, 1943, *QST*, 6K7 pentodes were used with transformer coupling. This arrangement was tried

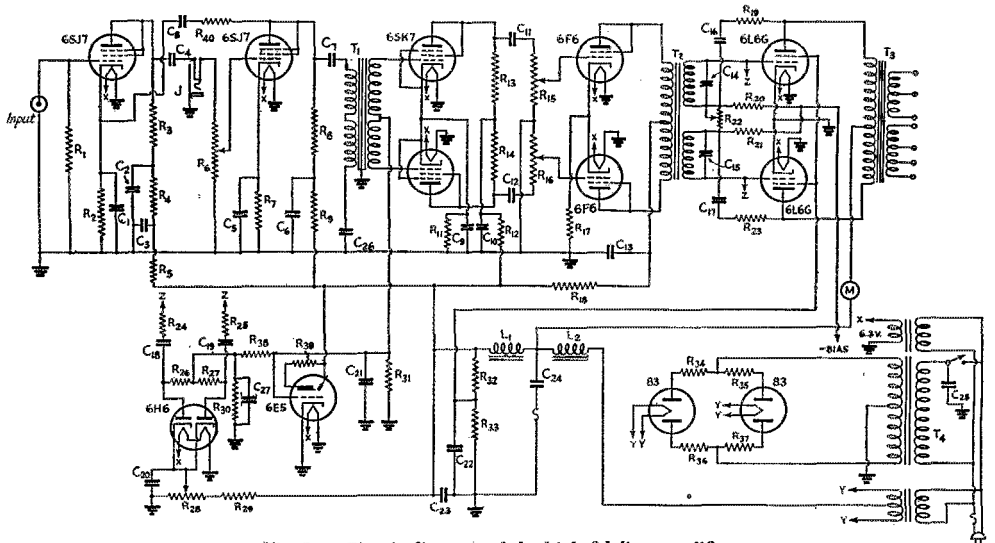


Fig. 1 — Circuit diagram of the high-fidelity amplifier.

C_1 — 0.005-μfd. mica.
C_2, C_3, C_{10}, C_{24} — 8-μfd. electrolytic.
C_4, C_{11}, C_{12} — 0.05-μfd. paper.
C_5, C_{13} — 40-μfd., electrolytic.
C_7, C_8, C_{16}, C_{17}, C_{18}, C_{19}, C_{21}, C_{25} — 0.1-μfd. paper.
C_9 — 10-μfd. electrolytic.
C_{14}, C_{15} — 0.0003 μfd. (10 μμfd. to 0.005 μfd. mica. Use lowest value which will suppress parasitic).
C_{20} — 1-μfd. electrolytic.
C_{22}, C_{23} — 16-μfd. electrolytic.
R_1 — 2 megohms, ½ watt.
R_2, R_{11} — 1000 ohms, ½ watt.
R_3, R_{13}, R_{14}, R_{26}, R_{27}, R_{29}, R_{31}, R_{38}, R_{40} — 0.1 megohm, ½ watt.
R_4, R_8, R_{19}, R_{23} — 50,000 ohms, ½ watt.
R_5, R_9, R_{12} — 10,000 ohms, ½ watt.
R_6 — 500,000-ohm volume control.
R_7 — 2000 ohms, ½ watt.
R_{15}, R_{16} — Dual 500,000-ohm volume control.
R_{17} — 400 ohms, ½ watt.
R_{18}, R_{20}, R_{21} — 5000 ohms, ½ watt.
R_{22} — 100,000-ohm potentiometer.
R_{24}, R_{25} — 0.2 megohm, ½ watt.
R_{28} — 50,000-ohm potentiometer.
R_{30}, R_{39} — 1 megohm, ½ watt.
R_{32} — 5000 ohms, 50 watts.
R_{33} — 20,000 ohms, 50 watts.
R_{34}, R_{35}, R_{36}, R_{37} — 50 ohms, ½ watt.
L_1 — 15-henry, 300-ma. smoothing choke.
L_2 — 300-ma. swinging choke.
J — Closed-circuit jack.
T_1 — Push-pull interstage transformer, ratio 1:2.
T_2 — Class-B input transformer, ratio 2.7:1.
T_3 — Class-B output transformer; variable ratio to match speaker voice coil, recorder head, 500-ohm line, etc.
T_4 — Power transformer, 400–0–400 volts, 500 ma. with 6.3- and 5-volt filament windings (see text).

initially but was finally discarded in favor of triode-connected 6SK7s. In addition to the fact that most 6K7s were found to be microphonic, the gain with the pentode connection was greater than that required and a very well shielded transformer was necessary to prevent feed-back. Resistance-coupled pentodes will work fairly well if a high supply voltage is available. The push-pull arrangement is desirable to reduce audio content in the compression-control line. The first two stages consist of triode-connected 6SJ7s with resistance coupling. Since plenty of gain was available, it was possible to take advantage of the many benefits of inverse feed-back over these stages. To accommodate input signals of widely differing levels, the first stage may be eliminated by plugging into the jack in the input circuit of the second stage. When both stages are in use, the gain control, R_6, prevents any possible overloading of the second stage. It is set with a screwdriver for any particular input level and not adjusted thereafter unless a device delivering a larger input signal is used.

Rear-top view of the peak-limiting amplifier, showing the general arrangement of components. The power-supply equipment is at the rear and audio the units are toward the front of the chassis.

The input-tube cathode resistor, R_2, was carefully selected from among several available, since resistors of certain brands sometimes cause excessive hiss. The value of C_1 was chosen to increase the highs by reducing the feed-back voltage at these frequencies.

Compression

For some years engineers and others frowned upon any attempt to limit or compress the output from the record players and theater amplifiers. They argued that this would tend to detract from an accurate reproduction of the original rendition of music or speech. Instead of compression, the use of expansion was advocated. However, the consensus in recent years seems to be turning in favor of compression. In 1938 the writer installed a simple suppressor-type limiter in several small theater amplifiers with marked success. To the average listener the use of compression seems to produce a smoother type of reproduction, and loud passages are not so jolting. Noise is not greatly affected, but the average level can be increased with the result that far better intelligibility can be obtained. In home recording and record playing a compressor will prevent overcutting and also will eliminate the necessity for jumping up to turn down the gain during loud passages which might wake the infant or bring the cops. When used in connection with a 'phone transmitter, a much higher average percentage of modulation is possible without overmodulation but with accompanying improvement in intelligibility. Compressors have come to be considered almost a "must" in the broadcast field.

In the limiter circuit the signal taken from the grids of the output stage is rectified by the 6H6. The rectified voltage is then applied as additional bias to the grids of the push-pull 6SK7 stage. As the signal at the grids of the 6L6Gs increases the bias on the 6SK7s also increases, and the gain of that stage is thereby reduced. In the reverse direction, the gain of the 6SK7 stage increases again as the signal in the output stage decreases. This action would tend to hold the output signal level constant were it not for the fact that an adjustable bias, obtained from the voltage divider comprised by R_{28} and R_{29}, prevents current flow through the 6H6 until the signal exceeds some selected value. Therefore only the stronger signals are compressed. It is obvious that the rectifier must be linear in respect to frequency; otherwise certain frequencies would not be compressed in proper proportion to others and distortion would result. The simple 6H6 twin diode was found to be linear over the entire audio scale and at the same time to be capable of handling a fair amount of a.f. voltage. The final frequency run showed that 8 volts would lower the output-stage level 3 db. and that this voltage was linear with frequency. A maximum of 14 volts of a.v.c. can readily be made available.

The 6E5 serves as a limiter indicator. When the limiter is cut out of the circuit the 6E5 may also be used to indicate over-excitation of the push-pull 6SK7 stage, since the "eye" will close whenever grid current flows in that stage.

Construction and Adjustment

The power supply was designed to have as good voltage regulation as possible consistent with weight. The transformer is a heavy-duty model with a rating of 500 ma. and is used in conjunction with a choke-input filter. Either one or two Type 83s may be used as the rectifier. Fuses of ½-ampere rating are connected in series with the filter condensers to protect the remainder of the power supply should the condensers break down. If a single-unit transformer is not obtainable, separate filament transformers may be used.

(Continued on page 76)

Practical Applications of Simple Math

Part I—Bias Calculations

BY EDWARD M. NOLL,* EX-W3FQJ

Although complicated mathematical expressions are often seen in connection with theoretical developments of radio circuits, many of the practical problems encountered may be solved by the use of relatively simple forms. In this series, the author illustrates through the use of typical examples how a level of math within the grasp of any amateur may become a definite aid in the solution of many of the every-day radio problems which confront him.

THE average amateur is apt to have an innate fear of mathematics. The sight of voluminous formulas, complex notation and expressions involving the calculus often dazzles him to the extent that he is sometimes reluctant to attempt an understanding of even the simplest of mathematical computations. Consequently, he neglects the very practical applications of the mathematics he already knows or could easily grasp. A thorough understanding of these simple mathematical applications in vacuum-tube circuits will bring an understanding of the more advanced forms a step nearer. Furthermore, these relatively simple manipulations suffice for the larger percentage of practical circuit computations.

While the radioman may already understand the basic principles of algebra and trigonometry, too often he may be able to utilize that knowledge only on a strictly textbook basis because he has not been shown how to reduce his knowledge to practice by explanation and typical illustrations. Many pages have been written on the derivation of formulas and their purpose and use, but in many cases the angle of attack has omitted practical examples and adequate explanation. The latter, however, are of considerable value to the practical radioman, since they not only close the gap between mathematics and practical application but also bring about a more complete understanding of any circuit.

In this first article of the series, therefore, the application of Ohm's Law and simple mathematics to various circuits commonly used for obtaining grid bias will be discussed.

In the following examples, it is assumed that vacuum-tube amplifiers are used which are adjusted for Class-A operation, so that no current flows in the grid-cathode circuit. Receiver r.f. and i.f. amplifiers as well as Class-A audio stages are adjusted for this type of operation. Therefore, the grid resistor, R_g, serves only as a means for applying the biasing voltage to the grid without short-circuiting the tube input. Its purpose is the same as that of the grid choke in any parallel-fed grid circuit, and it does not contribute to the biasing voltage applied to the grid because there is no current flow through it.

Also, it should be pointed out that a true electrode voltage is the voltage measured between any selected electrode and the *cathode*, and that the resulting polarity is in respect to the cathode. Therefore, the grid-biasing voltage is the d.c. voltage measured between grid and cathode and not the voltage between grid and chassis or ground. In many applications the latter voltage will be zero.

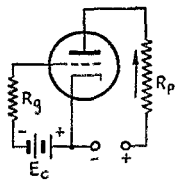


Fig. 1

Following the most common convention, current is assumed to flow from positive to negative and from a positive electrode to the cathode within the tube. Actually, the direction of the current flow makes no difference insofar as calculations are concerned, provided the same direction is assumed for any related series of calculations.

No calculations are involved in determining the grid bias in the circuit of Fig. 1, since it is obvious that it is determined simply by the voltage of the battery. There is no current flow through R_g, and so it does not contribute to the biasing voltage.

In Fig. 2-A, plate current flows through the cathode resistor, R_k, as indicated by the arrows, so that there is a voltage drop between cathode and grid, making the cathode positive in respect to the grid. The grid, therefore, is negative in respect to the cathode. The voltage drop across R_k depends upon the product of its resistance and the current flowing through it. The current flowing through R_k is the same as the plate current flowing through R_p. Thus $E_c = I_p R_k$.

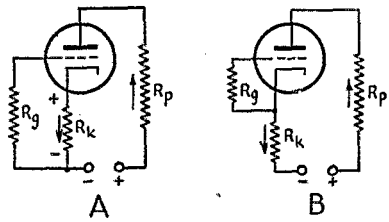


Fig. 2

* 117 S. Woodlawn Ave., Clifton Heights, Pa.

Example: $I_p = 4$ ma. $R_k = 1500$ ohms
$E_c = (0.004)\ (1500) = 6$ volts

Although the same voltage drop is developed across R_k in Fig. 2-B, it does not appear between grid and cathode and therefore the bias is zero in this instance. In the circuit of Fig. 3, the grid is returned to a tap on the cathode resistor. The voltage drop across only that part of the resistance included between cathode and grid is applied as bias.

Example: $R_1 = 800$ ohms. $R_2 = 700$ ohms.
$I_p = 4$ ma.
$E_c = (0.004)\ (800) = 3.2$ volts

In the circuit of Fig. 4, the screen current, I_s, as well as the plate current, I_p, flows through the cathode resistor, so that these two currents must be added together in determining the voltage drop across R_k.

Example: $I_s = 1$ ma. $I_p = 6$ ma. $R_k = 800$ ohms
$E_c = (0.001 + 0.006)\ (800) = 5.6$ volts

It is obvious that simple cathode-resistance biasing cannot be used in cases where complete

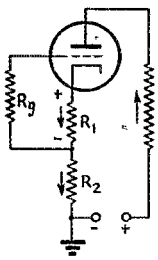


Fig. 3

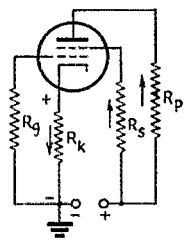


Fig. 4

plate-current cut off is desired, because a cessation of plate current would mean that no bias would be developed across the cathode resistance. To make cut-off bias possible, the circuit of Fig. 5 is sometimes used. In this case, the current flowing through R_k is the sum of the plate current and the current flowing through R_b. If plate current ceases, a voltage drop is still developed across R_k by virtue of the current flowing through R_b. The equivalent circuit is shown in Fig. 6. R_{pt} represents the sum of R_p and the internal plate resistance of the tube.

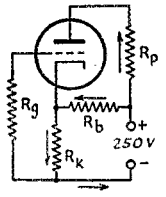


Fig. 5 — (Equivalent circuit is shown in Fig. 6.)

Example:
$E = 250$ volts. $I_p = 4$ ma. $R_b = 50{,}000$ ohms.
$R_k = 1000$ ohms. What is the biasing voltage developed across R_k?
$E_b = I_b R_b$
$E_k = I_k R_k$
$I_k = I_p + I_b = 0.004 + I_b$
$E_k = (0.004 + I_b)\ (1000) = 1000 I_b + 4$
$E_b = 50{,}000\ I_b$
$E = 250 = E_b + E_k = 50{,}000\ I_b + 1000\ I_b + 4$
$51{,}000\ I_b = 250 - 4 = 246$

$$I_b = \frac{246}{51{,}000} = 0.00482$$

$E_b = (0.00482)\ (50{,}000) = 241$
$E_k = E - E_b = 250 - 241 = 9$ volts

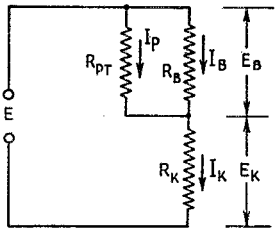


Fig. 6

Fig. 7 shows a circuit which is sometimes used in certain volume expansion-compression circuits. The grid is returned to a positive point (in respect to the ground) on a voltage divider connected across the "B" supply. The biasing voltage applied to the grid is then the algebraic difference between the voltage drop across the cathode resistor and this positive voltage.

Example:
$I_p = 10$ ma. $R_k = 800$ ohms. $R_1 = 50{,}000$ ohms. $R_2 = 1000$ ohms.
The current through the voltage divider, $R_1 R_2$, is given by

$$I_{vd} = \frac{250}{50{,}000 + 1000} = 4.1 \text{ ma.}$$

Since no current is being drawn from the junction of R_1 and R_2, the voltage across R_2 is then
$(1000)\ (0.0041) = 4.1$ volts positive *in respect to ground.*
$E_k = (R_k)\ (I_p) = (800)\ (0.01) = 8$ volts.

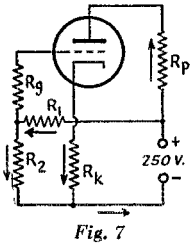


Fig. 7

Therefore, the *cathode* is 8 volts positive in respect to ground. Since the grid is 4.1 volts positive in respect to ground while the cathode is 8 volts positive in respect to the same point, the grid must be $8 - 4.1 = 3.9$ volts *negative* in respect to the cathode.

In Fig. 8, a common cathode resistor is used for two tubes, the plate currents of both tubes therefore flowing through R_k.

Example: $I_{p1} = 2$ ma. $I_{p2} = 5$ ma. $R_k = 800$ ohms.
$E_k = (0.002 + 0.005)\ (800) = 5.6$ volts.

If both grids are returned to negative "B," this same bias will be applied to both grids. If, however, one of the grids is returned directly to cathode, the bias on this grid will be zero while the other grid will have a bias of 5.6 volts.

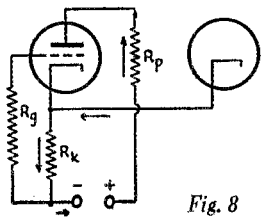


Fig. 8

IN THE SERVICES

SOMEHOW we can't seem to leave this department alone. Every month there pops up what we think is a better idea for the mode of listing, or a thought for an additional section, or a long list of hams in some research lab — and so we run them just as they are and the columns thusly take on a new air. This month, in response to many queries, we're segregating the OMs in the Navy into three different categories. After much discussion we compromised on Navy — Aeronautics as the proper caption for those in naval aviation. By thus setting up this new heading we eliminated Navy — Sea and Foreign Duty, and the amateurs previously falling in this section will be listed elsewhere with foreign duty replacing their address, thereby covering censorship stipulations. We're sure more names should be under the new caption, but because we're uncertain we've left them under Navy — Special Duty. In the future we'd appreciate it if you'd definitely indicate whether or not you're in naval aviation. Can do?

ARMY—GENERAL

1AWX, Bent, W/O (jg), Camp Cooke, Calif.
1MXV, Cavalier, S/Sgt., Ft. Banks, Mass.
1NEA, Klumbis, address unknown.
2EJI, Wooding, Cpl., foreign duty.
2LCB, Mickey, Lt., address unknown.
2LIQ, Campbell, 2nd Lt., Pueblo, Colo.
2MSX, Mostek, address unknown.
2MTE, Hackert, Cpl., address unknown.
2MVT, Ritzmann, Pvt., Manchester, Conn.
2NKM, Bonazza, T/5, foreign duty.
ex-3AEZ, Jones, Camp Hood, Texas.
3BBF, Dunaja, Pvt., Ft. McClellan, Ala.
3FFF, Phillips, Lt., Washington, D. C.
3FSZ, Hillman, T/4, Camp Gordon, Fla.
3GYU, Nagy, S/Sgt., Baltimore, Md.
3ICT, Brigham, T/Sgt., Baltimore, Md.
3JHD, MacDaniels, T/4, foreign duty.
3JQL, Freshwater, T/Sgt., foreign duty.
3NZA, Howland, Capt., Ft. Bragg, N. C.
4CUT, Heard, Pvt., North Camp Hood, Tex.
4HMN, Miller, Capt., foreign duty.
5CIJ, Adkins, S/Sgt., foreign duty.
5JLW, Lampl, Major, Washington, D. C.
6BRO, Hill, Sgt., foreign duty.
6FOQ, Brown, T/4, Ft. Bliss, Tex.
6HTJ, Hickman, Sgt., Camp Callan, Calif.
6TJI, Thomas, W/O (jg), Ft. Worden, Wash.
7ACA, Thompson, Major, Santa Barbara, Calif.
7IEZ, Watson, T/4, foreign duty.
8NNK, Eiseman, S/Sgt., foreign duty.
8SQP, Wilson, Sgt., Camp Polk, La.
8SYW, Komatoskas, T/Sgt., White Sulphur Springs, W. Va.
8UID, Twardzik, Pvt., Auburn, Ala.
ex-9BOT, Medziak, 2nd Lt., McKinney, Tex.
9CME, Soderholm, 2nd Lt., foreign duty.
9CNM, Powers, Lt., foreign duty.
9FIB, Haenle, Pvt., address unknown.
9FKD, Dickensheets, T/4, foreign duty.
9GIW, McCormick, Cpl., Arlington, Va.
9HOV, Roberts, Pvt., address unknown.
9KYJ, Kinos, Pvt., Camp Beale, Calif.
9MOL, Knirko, Cpl., address unknown.
9PSN, Reiter, W/O, Ft. Bliss, Tex.
9RDD, Kubera, Sgt., foreign duty.
9VWP, Reidl, Pvt., Camp Davis, N. C.
9VYZ, Grace, Pvt., San Diego, Calif.
9YTS, Matonis, M/Sgt., foreign duty.
9ZAM, Vacala, Sgt., foreign duty.

Operator's license only:

Felix, Sgt., foreign duty.
Nilsson, Sgt., foreign duty.
Rothschild, Sgt., Ft. Sill, Okla.
Safran, Cpl., foreign duty.
Silver, Cpl., Granby, Mass.
Varga, Sgt., Camp Gruber, Okla.
Uzzell, Capt., address unknown

NAVY—SPECIAL DUTY

1JMT, Jenard, RT2c, Miami, Fla.
1KCU, Stairs, ART1c, Chicago, Ill.
1MCG, Patacchiola, RT1c, Bronx, N. Y.
2LVD, Bozzay, ART2c, foreign duty
2LVR, Dubinsky, RT1c, address unknown.
2MYX, Dickie, RT3c, Treasure Island, Calif.
2NPH, Oddo, ART1c, Corpus Christi, Tex.
2NPZ, Whittaker, S2c, St. Simonds Island, Ga.
2ZNR, Mellor, ART3c, Corpus Christi, Tex.
3ITP, Lesser, RT1c, foreign duty.
ex-4CXO, Hall, RT1c, Bainbridge, Md.
4DGD, Files, RT1c, Bainbridge, Md.
4EMP, Brown, RT1c, foreign duty.
4HIV, Pierce, RT1c, foreign duty.
5AQW, Wolfe, ART1c, Atlanta, Ga.
5AVM, Redfearn, CRT, address unknown.
5EDE, White, RT3c, Treasure Island, Calif.
5IVT, Davis, ART1c, foreign duty.
5JHP, Platt, RT2c, foreign duty.
5JLQ, Stidham, RT1c, foreign duty.
5JTZ, Neff, RT2c, foreign duty.
6FJD, Lafferty, CRT, foreign duty.
6GGZ, Canter, S1c, Houston, Tex.
6NAW, Baker, CRT, address unknown.
6SZA, Negrete, RT3c, Treasure Island, Calif.
6TWO, D'Aoust, ART1c, foreign duty.
6ULX, Clayton, ART1c, Tillamook, Ore.
7GCG, Elder, RT1c, Farragut, Idaho.
8DAF, Kirschner, RT1c, Bainbridge, Md.
ex-8UQR, Glass, Lt. (jg), Brunswick, Me.
8UZM, Stroh, RT1c, foreign duty.
8VOW, Cole, ART2c, Corpus Christi, Tex.
9AYV, Kullman, ART2c, Whidbey Island, Wash.
9BP, Butler, ART1c, Philadelphia, Pa.
9BPT, Legel, RT, foreign duty.
9CXM, Kline, CRT, Boston, Mass.
9EPY, Werner, ART2c, Olathe, Kans.
9LAY, Diem, ART2c, Corpus Christi, Tex.
9LQF, Metcalf, ART1c, foreign duty.
9NNP, Wales, ART3c, Corpus Christi, Tex.
9NXX, Ciciora, ART3c, Corpus Christi, Tex.
9SSR, DeRose, ART3c, Corpus Christi, Tex.
9VLP, Polk, RT1c, foreign duty.

Operator's license only:

Beach, CRT, foreign duty.
Cook, ART3c, Corpus Christi, Tex.
Cooper, RT1c, foreign duty.
Cormier, ART1c, Oak Harbor, Wash.
Day, RT3c, address unknown.
Guasco, ART2c, Corpus Christi, Tex.
Langelo, RT1c, foreign duty.
Malmborg, RT1c, foreign duty.
Parnell, A/S, Chicago, Ill.
Wilson, RT3c, address unknown.

Recent news items may give you an inkling as to the action these OMs saw before this chance get-together in mid-Pacific. *Left to right:* Capt. Clyde DeVinna, USMC, W6OJ; RE F. O. Smith, USN, W8RKV; Lt. Comdr. Jack Vogelman, USN, W6CJY; Lt. Comdr. W. H. Kozacko, USN, W1NS; Lt. (jg) J. P. Foster, USN, W5HNW; Comdr. G. G. Calhoun, USN, ex-W7IL.

NAVY—AERONAUTICS

2KKH, Sullivan, Ens., foreign duty.
3IWY, Crawford, ARM1c, Miami, Fla.
5JJY, Williams, Ens., Ft. Lauderdale, Fla.
9JDZ, Sinift, Lt.(jg), foreign duty.
9TWI, Egbert, Lt.(jg), Norfolk, Va.

ARMY—AIR FORCES

CAPT. D. WESLEY CORRELL, who has held the amateur call W9FY since 1915, is now serving with a reconnaissance squadron on an island in the South Pacific. Despite the fact that his own mike is packed away in moth balls, the Captain says he hasn't missed a day of radio. The only difference is that now he's "barking into GI mikes."

1MWZ, Koon, Sgt., foreign duty.
1NJM, Hart, Pvt., Keesler Field, Miss.
1ZZC, Wickens, Pvt., New Orleans, La.
2BEZ, Offringa, Major, Godman Field, Ky.
2CEJ, Mays, S/Sgt., LaJunta, Colo.
2EAM, Brown, D., Pvt., Scott Field, Ill.
2HPK, Brown, L., Pvt., Scott Field, Ill.
2MFC, Lephakis, 2nd Lt., New Haven, Conn.
2NSR, Roberts, Pfc., Ft. George Meade, Md.
3HWK, Liebrecht, Pvt., Sioux Falls, S. D.
3ICI, Wardwell, Chanute, Ill.
5FWE, Briggs, M/Sgt., foreign duty.
5FXU, Kendrick, Capt. Almagordo, N. M.
5ILJ, Butler, Cpl., Kelly Field, Tex.
5IXP, Smith, T/Sgt., Langley Field, Va.
5JAY, Hodges, Sgt., McCook Field, Neb.
5JDV, Pleasant, 2nd Lt., Bradley Field, Conn.
5JPU, Haubold, Pfc., Maxwell Field, Ala.
5JTX, McCreary, T/Sgt., address unknown.
5KAD, Vidrine, Sgt., foreign duty.
6CQT, Nettleton, Lt., foreign duty.
6DWP, Hansen, Pvt., Truax Field, Wis.
6JRK, Moore, A/C, Seymour Johnson Field, N. C.
6MEN, Stambuck, Truax Field, Wis.
K6MVV, Stremlin, Capt., Pueblo, Colo.
7CYC, Ingraham, Capt., Chicago, Ill.
7IEY, Dspain, T/Sgt., Brigham City, Utah.
8CZY, Kinsey, Major, Bolling Field Annex, D. C.
8DND, Detrick, Capt. Bolling Field Annex, D. C.
8DWB, Babcock, S/Sgt., Baer Field, Ind.
8JKN, Hallam, Lt., Maxwell Field, Ala.
8KCS, Long, Pfc., Sioux Falls, S. D.
8PWC, Kirchmyer, 2nd Lt., Peterson Field, Colo.
8QDV, Kern, 2nd Lt., Sioux Falls, S. D.
8SCS, Rutz, Valparaiso, Ind.
8SWR, Muscante, Pvt., Sioux Falls, S. D.
8TZR, Palmer, Lt., foreign duty.
8UIN, Gosk, T/Sgt., Colorado Springs, Colo.
8UXB, Mitchell, Sgt., Drew Field, Fla.
8VNV, Rutter, Pvt., Bradley Field, Conn.
8VVS, Bohlander, Valparaiso, Ind.
9AJZ, Manteufel, Truax Field, Wis.
9BWZ, Westerman, Truax Field, Wis.
9EVD, Bell, A/S, Toledo, Ohio.
9FMX, Wilkinson, A/C, Seymour Johnson Field, N. C.
9IJB, Olson, A/C, San Antonio, Tex.
9KWN, Block, Cpl., Jefferson Barracks, Mo.
9LDV, Pflug, Valparaiso, Ind.
9PBL, Arms, Lt., George Field, Ill.
9RWE, Angle, Pfc., Sioux Falls, S. D.
9WHZ, Peters, A/S, Jamestown, N. D.

Operator's license only:

Agdern, Pfc., Sioux Falls, S. D.
Crandell, Pfc., Smyrna Field, Tenn.
Duchesneau, S/Sgt., Patterson Field, Ohio.
Dupper, T/Sgt., foreign duty.
Garry, Sgt., foreign duty.
Hinderer, Valparaiso, Ind.
Hyman, Pvt., Truax Field, Wis.
Kane, Cpl., Harding Field, La.
McKinney, Lt., foreign duty.
Schwartz, Cpl., Salt Lake City, Utah.
Smith, Pfc., Pocatello, Idaho.
Stewart, Cpl., Salt Lake City, Utah.

NAVY—GENERAL

WHEN the Draft Board pointed its finger at John T. McLin, W5JDR, with its irresistible come-hither attitude several months ago he soon found himself at College Station, Texas, with S1c replacing the Mr. Then and there he took up his pen and added his name to our roster.

His is an example to be followed. Those same fingers are continuously reaching out and beckoning (?) more and more hams into the service of Uncle Sam. We need each and every one of those QMs on file here at Headquarters if we're to attain that 100 per cent goal. Be sure *you* register!

1IUQ, Zilinsky, S2c, foreign duty.
1JTG, Lillie, Ens., Chicago, Ill.
1MNC, Hartley, S2c, Bainbridge, Md.
1MTV, Goss, S2c, Washington, D. C.
2ARO, Dowd, foreign duty.
2ITD, Taber, Ens., Norfolk, Va.
3EHX, Horanzy, RM1c, address unknown.
3FVO, Killion, ARM1c, address unknown.
3GHJ, Kean, S1c, foreign duty.
3GKS, Zaltek, RM1c, address unknown.
3GPZ, Smith, ARM1c, address unknown.
3IYW, Freeland, Ens., foreign duty.
3JFB, Reiter, ARM2c, foreign duty.
3PR, Horne, Comdr., foreign duty.
4AKP, Herman, PhM3c, Great Lakes, Ill.
ex-4BZC, Taylor, RM3c, foreign duty.
4EUC, Mitchell, ACRM, foreign duty.
K4FEC, Foley, Lt., Washington, D. C.
4IEZ, Cleveland, RM, Chicago, Ill.
5HXA, Murray, Dallas, Tex.
5JIZ, Pulley, Dallas, Tex.
5OJ, Jones, Lt., foreign duty.
6AHN, Mason, Lt., San Diego, Calif.
6BEU, Estep, Lt. (jg), foreign duty.
6JUH, Johnson, Lt. (jg), Gainesville, Ga.
6NIL, Balli, RM1c, foreign duty.
6PEA, Lane, RM1c, foreign duty.
6QAH, Holden, RM1c, foreign duty.
6QWX, Matthews, Lt., Chicago, Ill.

When Melvin H. Stricker, W9RHA, posed for this awe-inspiring picture in his flying togs he was an aviation cadet at Sheppard Field, Texas. According to a card received by 4IE recently, he is now taking pre-flight pilot training at San Antonio, Texas.

A/C D. D. Duva, W1NEA, looks pretty happy up there in the cockpit and he says he really loves to fly — "though there's nothing to compare with pounding brass on 40-meter c.w." "Dom" is at advance flying school, George Field, Lawrenceville, Ill., now and hopes to get his silver wings by early June. Good luck, OM!

6SNU, Newton, RM3c, Corpus Christi, Tex.
6SQK, Gleim, RT2c, foreign duty.
6STN, Benafel, CRM, foreign duty.
K6UQH, Ambrose, ARM1c, foreign duty.
6WF, Slater, Lt. Comdr., foreign duty.
7GCQ, Shahan, Ens., foreign duty.
7ILC, Beck, S1c, Great Lakes, Ill.
7ISV, Panchot, RM3c, Whidbey Island, Wash.
8FYH, Sikorski, RM2c, Norfolk, Va.
8MVY, Walawender, SF2c, foreign duty.
8ORM, Henderson, RM2c, foreign duty.
8PUM, Williams, RM1c, foreign duty.
8RRO, Rhein, CRM, foreign duty.
8VNT, Miller, S2c, Bainbridge, Md.
8WKA, Yocubik, RM3c, foreign duty.
ex-9BSF, Wachel, RM1c, foreign duty.
9CLT, Chase, WRE, foreign duty.
9IRO, Gatzke, S1c, foreign duty.
9JZH, Johnson, RE, foreign duty.
9KFG, Walker, S1c, Great Lakes, Ill.
9KTK, Burke, CRM, foreign duty.
9NUK, Robinson, RM2c, foreign duty.
9OUY, Behnke, A/S, Evanston, Ill.
9SBW, Finlay, Ann Arbor, Mich.
9TMB, Beckman, SoM3c, foreign duty.
9ZPG, Dwyer, Lt.(jg), foreign duty.

Operator's license only:

Baechler, WRE, foreign duty.
Cook, RM3c, foreign duty.
Cormack, Lt., Miami, Fla.
George, Y3c, foreign duty.
Graham, ARM2c, foreign duty.
Henderson, ACMM, foreign duty.
Quigley, S2c, foreign duty.
Rice, RM3c, foreign duty.
Seidle, foreign duty.
Sulser, ARM1c, foreign duty.
Troe, S1c, College Station, Tex.
Zinna, RM1c, foreign duty.

ARMY—SIGNAL CORPS

WE ARE sure W9CPP will be happy to learn that his rig is putting out a good signal for Uncle Sam. Sgt. Raymond King, W7HAK, overseas on an important mission, writes that the "first rig we put on the air, to my surprise, had the call letters W9CPP on the lid." "We" included a group of six radio operators "picked" to accompany 7HAK, four of whom also were hams.

1CDZ, Favre, Pvt., Camp Crowder, Mo.
1HQO, O'Connell, Cpl., Petaluma, Calif.
1IRT, Dudley, T/Sgt., Camp Polk, La.
1JGB, Lemoi, Pfc., Ft. Monmouth, N. J.

1JIG, Moran, M/Sgt., foreign duty.
1JKK, Thompson, foreign duty.
2BLK, Maywald, Lt. Col., foreign duty.
2FBP, Russell, S/Sgt., foreign duty.
2FPC, Lockwood, Pvt., Ft. Monmouth, N. J.
2GYN, Stewart, S/Sgt., Camp Polk, La.
2JGG, Raynor, M/Sgt., foreign duty.
2KXM, Sheer, Pfc., Orlando, Fla.
2LCZ, Gottlieb, Sgt., Camp Crowder, Mo.
2NON, Whiteman, S/Sgt., foreign duty.
2OCZ, Ashburn, Pvt., Aberdeen Proving Ground, Md.
3BGN, Kimble, Lt., foreign duty.
3BJT, Holston, Lt., Camp Hood, Tex.
3BUV, Moore, Lt., foreign duty.
ex-3CIX, Sabaroff, T/Sgt., foreign duty.
3DGK, Kriebler, Pvt., Camp Crowder, Mo.
3EZG, Wilder, Capt., Camp Hood, Tex.
3GJQ, Scibal, Ft. Monmouth, N. J.
ex-3KV, Waters, Pfc., Camp Murphy, Fla.
ex-4BJA, Williams, Sgt., foreign duty.
4BVE, Hinshelwood, 2nd Lt., Truax Field Wis.
4DLI, Bottomley, T/3, foreign duty.
ex-4EIN, Smith, Cpl., Ft. Monmouth, N. J.
4FHO, Hazel, T/3, foreign duty.
4HAN, Cobb, S/Sgt., foreign duty.
4HEK, Murphree, Pvt., Camp Crowder, Mo.
K5AJ, Henson, Lt., Ft. Monmouth, N. J.
5DYJ, Smith, Lt., foreign duty.
5GXA, Block, Cpl., Camp Pickett, Va.
5HVT, Humphrey, Lt., Hammer Field, Calif.
5ITK, Thomas, foreign duty.
5IWE, Hennington, Cpl., foreign duty.
5IWM, Munn, Pvt., foreign duty.
5JCU, Magness, T/Sgt., foreign duty.
7IPD, Van Blitter, Pvt., Camp Crowder, Mo.
7IQP, Chamberlain, T/Sgt., foreign duty.
8MRP, Phelps, Ft. Monmouth, N. J.
8NDR, Mason, T/Sgt., foreign duty.
8OLM, Ziglinski, Lt., Camp Cooke, Calif.
8SMX, Dimasi, 2nd Lt., Ft. Monmouth, N. J.
8SNM, Gehrke, Pfc., Ft. Monmouth, N. J.
8TPV, Bradley, T/4, foreign duty.
8VKY, Lamppert, Pfc., foreign duty.
8WSN, Hathaway, Sgt., Bronx, N. Y.
9CVD, Ligman, T/Sgt., foreign duty.
9DDB, Rukavina, Pfc., Ft. Monmouth, N. J.
9DMN, Martin, T/3, foreign duty.
9GBZ, Hartneck, Lt., foreign duty.
9GEY, Hindman, T/4, foreign duty.
9ILU, Shepherd, Pvt., Ft. Monmouth, N. J.
9KRD, Sherman, Cpl., Ft. Monmouth, N. J.
9LFM, Brolin, S/Sgt., Indiantown Gap Military Reservation, Pa.
9LTN, Koeller, 2nd Lt., Camp Hood, Tex.
9NZU, Janssen, Pfc., Ft. Monmouth, N. J.
9QMC, Ross, T/5, foreign duty.
9TIH, Boots, T/Sgt., Indiantown Gap Military Reservation, Pa.
9UEI, Peterson, T/5, foreign duty.
9UIQ, Krakis, 2nd Lt., foreign duty.

We surely won't need to tell you where Clifford B. Hyatt, W3IVM, is, but we will mention that he is a resident maintenance supervisor with the CAA. He also is ex-8TDC and 2JPE.

Lt. Robert L. Shimek, W9CEL, was commissioned out of Fort Monmouth OCS and now is on overseas duty. An ARRL member since 1925, he has contacted hams in every state of the Union as well as Canada, Central America and several South American countries. He mentions that he constructed his ham station largely from articles appearing in *QST*.

9WYC, Delosky, T/3, Fresno, Calif.
9YPF, Overlin, T/3, foreign duty.
9ZSE, Fairchild, M/Sgt., foreign duty.

Operator's license only:

Boiko, Pvt., Ft. Monmoutn, N. J.
Michaylytza, Sgt., foreign duty.
Valiasek, Pvt., Ft. Monmouth, N. J.

CIVIL SERVICE

1FWS, Macdonald, SC, radio repairman, Milton, Mass.
1ILO, Milnes, FCC, radio operator.
1IKT, Rice, FCC, Mobile, Ala.
1JSV, Hall, radio engineer, Weymouth, Mass.
1NOP, Clay, SC, radio maintenance, Grenier Field, N. H.
2CIZ, Richman, FCC, monitoring officer.
ex-2FMX, Schreiber, Dayton, Ohio.
ex-2GQP, Miller, chief engineering aide, Dayton, Ohio.
2HUU, Bernard, Navy Dept., radio mech., Norfolk, Va.
3AHZ, Beaver, SC, radio engineer, Ft. Monmouth, N. J.
3JAU, Bozarth, Navy Dept., inspector, Philadelphia, Pa.
3HPU, Downer, SC, radio engineer, Washington, D. C.
4HAH, Ollendorf, FCC, radio operator.
4HZI, Davis, assistant radio engineer, Tallahassee, Fla.
5GRF, Norris, SC, Dallas, Tex.
5HRB, Sherman, CAA, aircraft communicator, foreign duty.
6AWN, Moorhead, CAA, aircraft communicator, foreign duty.
6INS, Adcock, Navy Dept., inspector, Portland, Ore.
6KA, Nikirk, AAF, inspector, Pasadena, Calif.
6LDP, Lampel, San Diego, Calif.
6MKW, Compton, FCC, monitoring officer.
6PNM, Russell, AAF, instr, Marana, Ariz.
6RZC, Bendesen, instructor, address unknown.
6SFW, Sadler, Port Orchard, Wash.
6SOB, Buchanan, aircraft electrician, Davis Monthan Air Base, Ariz.
6STK, Sinclair, address unknown.
6TQT, Kochenderfer, address unknown.
6TTP, Hamari, AAF, radio repairman, Hill Field, Utah.
6USC, Buchanan, aircraft electrician, Davis Monthan Air Base, Ariz.
7AIJ, Greene, SC, Schenectady, N. Y.
ex-7AUZ, Chorlian, New York, N. Y.
7DSY, Jefferson, SC, radio mechanic, foreign duty.
7EQN, McVay, SC, inspector, Roscoe, Calif.
7FTA, Booth, CAA, Seattle, Wash.
7GBS, Shropshire, CAA, aircraft communicator, foreign duty.
7ICC, Sharpe, SC, address unknown.
7INC, Shropshire, CAA, aircraft communicator, foreign duty.
7ITZ, Booth, CAA, Seattle, Wash.
K7JCT, Stanyar, FCC, monitoring officer, foreign duty.
8AJL, Hull, SC, inspector, Jackson, Mich.
8AZH, Eldridge, engineer, Dayton, Ohio.
8EUY, Collins, NRL, Anacostia, D. C.
8FQM, Balch, FCC, North Olmsted, Ohio
8GWE, Wolford, Philadelphia, Pa.
8HIP, Babbington, radio instructor, Scott Field, Ill.
8HTF, O'Donnell, Wilkinsburg, Pa.
8IYN, Hadel, SC, radio engineer, Detroit Field Station, Mich.
8JAJ, Bengent, SC, radio mechanic, Luke Field, Ariz.
8KF, McShaffrey, SC, Wright Field, Ohio.
8MCB, Ryan, SC, radio engineer, Detroit, Mich.
8MFW, Brehm, radio opr., Ft., Thomas, Ky.
8NEM, Touranjoe, aircraft mech., Rome Air Depot, N. Y.
8PFP, Powell, SC, engineering aide, Wright Field, Ohio.
8TPI, Maher, SC, radio engineer, foreign duty.
8UQG, Nemick, SC, Dayton, Ohio.
9AFS, Werk, instructor, Truax Field, Wis.
9ANB, Sharpley, instructor, Truax Field, Wis.
9APS, Catlin, SC, inspector, Schenectady N. Y.
ex-9BEX, Karlow, instructor, Truax Field, Wis.
9BPN, Otto, radio inspector, St. Louis, Mo.
9BSS, Schlaugat, instructor, Truax Field, Wis.
9BWZ, Westerman, instructor, Truax Field, Wis.
ex-9CLL, Reeves, radio engineer, Philadelphia, Pa.
9CPB, Elliott, AAF, instructor, Sioux Falls, S. D.
9CTD, Federman, instructor, Truax Field, Wis.
9DZU, Brickey, St. Louis, Mo.
9EAZ, Barnard, SC, radio repairman, Mobile, Ala.
9ECK, Kronauer, instructor, Truax Field, Wis.
9EIG, Gillette, radio mechanic, Rome Air Depot, N. Y.
9EPT, Mathews, radio repairman, Crane, Ind.
9EVQ, Weeks, CAA, aircraft communicator, Dickinson, N. D.
9FDK, Pound, CAA, aircraft communicator, foreign duty.
9FTH, Harmer, instructor, Truax Field, Wis.
9GAQ, Reese, engineer, Wright Field, Ohio.
9GRE, Solga, FCC, assistant monitoring officer.
9GWJ, Dunklee, instructor, Truax Field, Wis.
9HBS, McConnell, Wright Field, Ohio.
9HGG, Mussel, instructor, Truax Field, Wis.
9HKJ, Dale, radio repairman, Crane, Ind.
9HKL, Herzfeldt, instructor, Truax Field, Wis.
9IIA, Pearce, instructor, Truax Field, Wis.
9JLL, Lamoreux, instructor, Truax Field, Wis.
9JTZ, Tupper, instructor, Truax Field, Wis.
9KJH, Wright, CAA, foreign duty.
9KNB, Hirt, instructor, Truax Field, Wis.
9LET, Bellinger, SC, tech. engr., Chicago, Ill.
9LIL, Elm, engineer, Lexington, Ky.
9LLO, Vought, instructor, Truax Field, Wis.
9LVX, Strand, instructor, Truax Field, Wis.
9MOZ, Reber, CAA, Kansas City, Mo.
9NVJ, Bauer, instructor, Truax Field, Wis.
9OKM, Chandler, FCC, Grand Island, Neb.
ex-9OYQ, Holmes, instructor, Truax Field, Wis.
9PYO, Devine, AAF, instructor, Scott Field, Ill.
9QGR, Bayer, instructor, Truax Field, Wis.
ex-9QOH, Cuda, AAF, instructor, Truax Field, Wis.
9QYH, Schaaf, instructor, Truax Field, Wis.
9RFD, Dale, radio repairman, Crane, Ind.
9SFZ, Murphy, MIT, Wakefield, Mass.
ex-9SUB, Hansen, engineer, Dayton, Ohio.
9SYV, Collins, instructor, Truax Field, Wis.
9TBB, Kammar, NRL, Anacostia, D. C.
ex-9TSX, Schwartz, AAF, instructor, Truax Field, Wis.
9UNH, Wheaton, instructor, Truax Field, Wis.
9UXB, Powers, radio opr., Gasconade, Mo.
9VCN, Farwell, instructor, Truax Field, Wis.

9VSO, Vahovuis, instr., Truax Field, Wis.
9YUH, Holloway, physicist, BuStands, Washington, D. C.
9ZHY, Forte, SC, instructor, Camp Crowder, Mo.
9ZIE, Mahoney, AAF, instructor, Truax Field, Wis.
9ZRX, Scheberle, SC, radio serviceman, Proving Grounds, Ill.
9ZVI, Nagel, SC, radio tech., Dayton, Ohio.

Operator's license only:

Doak, NRL, radio mechanic, Sacramento, Calif.
Fergen, AAF, instructor, Sioux Falls, S. D.

CANADA

A. C. JEBB, VE4TJ, a technical radio instructor for the Radio Artificer Branch of the Royal Canadian Navy, has earned personal mention in this section this month. Not only has VE4TJ been an amateur for 12 years, an ardent DXer, and very much interested in photography, but he is a poet as well. The poem which follows accompanied his letter and a likely list of OMs for our roster. We think it's FB!

The Radar Man

If you should see upon the street
A man equipped with dipole feet
And a family of curves trailing behind,
He's a Radar Man with a micromind.

His eyes take on a neon glow,
His ears extend to a yagi beam,
His mouth becomes another pulse gate,
And his heart pumps blood at a video rate!

With microseconds and microwaves
And microvolts he fills his days.
And thereby, in the course of time,
He develops a micromind!

This Radar Man, with the passing years,
Attains infinite impedance between the ears,
And finally succumbs to a heavy jolt
When he gets what he thought was a microvolt!

The doctor looked up from his microscope,
Turned to his colleagues and softly spoke.
"No single trace of a brain can I find —
He's a Radar Man with a micromind!"

Comes this month, too, the listing of a small number of the Canadian amateurs in so-called 100 per cent war radio work. This is a more or less hit-or-miss segment accumulated mainly by means of individual AWSRs. We're holding until two months from now a list of OMs all working together in Toronto.

RCN

2LU, McKimmie, Sub/Lt., St. Hyacinthe, Que.
2NQ, Lore, Sub/Lt. foreign duty.
3AKO, Oke, Sub/Lt., Montreal, Que.
3AWR, Anderson, RA5, Ft. William, Ont.
4ACM, Purkis, L/Tel., address unknown.
4AJB, Jackson, L/Tel., Winnipeg, Man.
4AJE, Thorne, PO/Tel., Winnipeg, Man.
4AMK, Anderson, RM, address unknown.
4AX, White, PO/Tel., Winnipeg, Man.
4FG, Wilson, L/Tel., Halifax, N. S.
4MN, Kepner, PO/Tel., Esquimalt, B. C.
4UD, Hale, L/Tel., Esquimalt, B. C.
4WK, Milne, PO/Tel., Winnipeg, Man.
4XY, Spears, L/Tel., Esquimalt, B. C.
5AAI, Jackson, PO/Tel., address unknown.
5AAR, Pease, address unknown.
5ACA, Clements, L/Tel., address unknown.
5AFM, Johnson, Sub/Lt., address unknown.
5BA, Wicks, TO/Tel., Vancouver, B. C.
ex-5IW, Dall, Tel., Esquimalt B. C.
5RB, Sellick, Tel., address unknown.
5UL, Watson, L/Tel., address unknown.

RCA

1KS, Hesler, OME, Debert Military Camp, N. S.
3AEF, Campbell, Sgt., Camp Borden, Ont.
3AQC, Elliott, Signalman, Barriefield, Ont.
4HQX, Stunden, address unknown.
4QB Shearer, Sgt., Patricia Bay, B C.
4WB, Bailey, Sig/Sgt., Prince George, B. C.
5AAO, Bird, address unknown.
5ARY, Thompson, address unknown.
5FU, Mitchell-Dwelly, address unknown.
5JC, Casilio, address unknown.

Operator's license only:

D'Altroy, Pte., foreign duty.

RCCS

3APF, Blackhall, Cpl., Ottawa, Ont.
5AIV, Pye, R., Cpl., address unknown.
5EP, Smith, WO2, Vancouver, B. C.
5KZ, Streater, Sgt., address unknown.
5RM, Bayell, foreign duty.

Operator's license only:

Armstrong, Signalman, Ottawa, Ont.
Pye, J., Cpl., address unknown.

RCAF

1IZ, Redding, F/Lt., St. John, N. B.
1LY, Waugh, F/O, Westmount, Montreal.
1NC, Ganong, AC2, Montreal, Que.
2AF, Miller, F/Sgt., Montreal, Que.
2KF, Couture, F/Lt., foreign duty.
3AAA, Booth, F/Sgt., foreign duty
ex-3ABD, Long, Cpl., Yarmouth, N. S.
3ABK, Lovell, AC2, Montreal, Que.
3ADR, Reid, F/Lt., Toronto, Ont.
3AEE, Naylor, P/O, address unknown.
3AEQ, Flintoff, AC1, Montreal, Que.
3AHJ, Jackson, F/O, Halifax, N. S.
3AIP, Pynn, address unknown.
3AKS, Perritt, AC2, Montreal, Que.
3ARR, Amendola, F/Sgt., Vancouver, B. C.
3ASZ, Andrew, AC2, Montreal, Que.
3AUF, Mart, F/Sgt., Coal Harbour, B. C.
3AUU, Jones, F/O, Boundary Bay, B. C.
3AYA, Overall, address unknown.
3FL, Hanna, LAC, foreign duty.
3EG, Liddle, Sgt., Nova Scotia.
3GV, Strangleman, F/O, foreign duty.
3HI, Potts, F/Sgt., foreign duty.
3UW, Woldraim, AC2, Montreal, Que.
3YD, Pellow, Sgt., Ottawa, Ont.
4AFB, Squarebriggs, LAC, address unknown.
4APQ, Vernon, WO, address unknown.
4AQQ, Heidebrecht, address unknown.
4CL, Card, F/O, Coal Harbour, B. C.
4HW, McKenzie, F/Lt., Ottawa, Ont.
4JU, Saunders, F/S, Vancouver, B. C.
4OC, Whitman, F/S, Prince Rupert, B. C
4SO, Williams, F/O, Sydney, N. S.
4SP, Clark, address unknown.
4VC, Tigert, Sgt., Prince Rupert, B. C.
5ACE, Macaullay, foreign duty.
5ACR, Fuller, F/Lt., Prince Rupert, B. C
5ADO, Berg, address unknown.
5AIM, Scroggie, Sgt., foreign duty.
5CB, Brown, Sgn/Ldr., Vancouver, B. C.
5EC, Cooper, Sgt., foreign duty.
5HH, Clark, address unknown.
5PT, Thomas, LAC, foreign duty.
5PX, Dixon, LAC, foreign duty.
5QF, Jackson, address unknown.
5SM, Chapman, address unknown.
5WF, Fitchett, address unknown.

RAF

ex-2AG, Jarvis, foreign duty.
5JL, Arnaud, RO, Montreal, Que.

CIVIL SERVICE

1BE, Biddiscombe, Moncton, N. B.
3NA, Pretty, radio tech., Winnipeg, Man.
5KC, Miller, Dept. of Trans., Crescent Valley, B. C.

100 PER CENT WAR WORK—INDUSTRY

1DC, Horne, Halifax, N. S.
1GC, McLeod, Maritime Tel. 6 Tel., Halifax, N. S.
3ABM, Cowan, Trans-Canada Air Lines.
3AST, Brooks, chief engineer, CFCO.
3DI, Campbell, London, Ont.
4AFB, McGill, Trans-Canada Air Lines.
4MK, Cahoon, Trans-Canada Air Lines.
5ADV, Williamson, address unknown.
5AES, Spence, Pinchi Lake, B. C.
5AFL, Wheeler, instructor, Vancouver, B. C.
5AU, Blackwood, Trans-Canada Air Lines.
5EO, Goode, Trans-Canada Air Lines.
5EU, Murphy, Trans-Canada Air Lines.
5FY, Craig, instructor, address unknown.
5HU, Sharpe, radio division, CPA.
5KU, Deakin, Trans-Canada Air Lines.
6AT, Beardall, CFCO.

A group of Canadian amateurs on active military duty assembled in Winnipeg, Manitoba, for this picture. *Left to right, front row:* P/O Naylor, VE3AEE; W/O Vernon, VE4APQ; F/Lt. Gwinn, VE3IX. *Back row:* F/Lt, Smith, VE4CS; P/O Gartshore, VE2OL; F/Sgt. Mills, VE1MF; P/O Sellers. VO1T. Both 3IX and 4APQ previously have seen overseas duty.

A Portable Power Supply for WERS

Using A Motorcycle Storage Battery with a Vibrator Pack

BY FREDERICK A. LONG,* EX-W8NE, EX-W8BSL

The principal problem connected with hand-portable WERS equipment is the design of an economical and durable portable power supply. In this article the author suggests a solution by operating a vibrator-pack supply from a midget motorcycle-type storage battery.

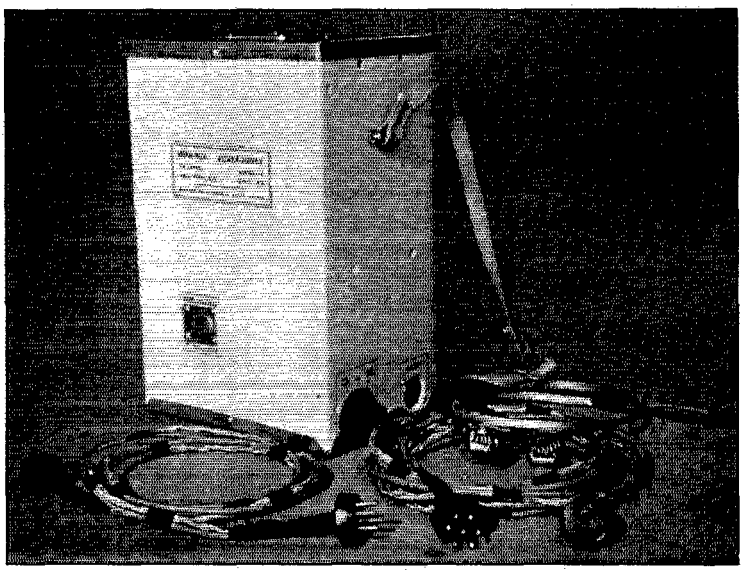
THE valuable experience with hand-portable (sometimes called handie-talkie) transmitter-receiver units in WERS operation in New York City has demonstrated the many advantages of units of this type. The principal drawback to their more frequent use has been the problem of power supply. Although reliance is usually placed upon batteries of the dry variety, every WERS operator will agree that a power supply of this type leaves much to be desired. In the first place, dry batteries are both hard to get and expensive. In the second place, their useful life is quite limited. This has led to a natural reluctance by many to take advantage of an otherwise extremely useful form of equipment.

However, the problem is not insoluble by any means. A power unit which is at once portable and satisfactory can be designed. The unit shown in the photographs was conceived for just such a purpose. Because it permits the use of transmitting tubes of higher power rating, the potentialities of the hand-portable unit may be increased to a point where it needn't take a back seat for any WERS mobile unit. A portable of this type seems to be the direct answer for operators who don't have automobiles in which to mount mobile units. Moreover, WERS units are frequently needed in locations inaccessible to cars.

In planning the supply, we decided to aim at the mark of a power unit to deliver a consistent 300 volts at 100 ma. for plate supply and 6 volts at 2 or 3 amperes for filaments. Obviously, the vibrator pack was the best prospect, although it requires a substantial source of primary power. A little scouting around proved that the 25-ampere-hour motorcycle storage battery was the best solution to this problem. After this decision had been reached, the rest of the job was comparatively easy. All that remained was to get the battery and pack together in a conveniently portable package. The pictures show the result.

The unit will do its job for several hours at a stretch and then the battery can be brought back to full charge overnight with a trickle charger. Starting from scratch, it can be built for around twenty dollars. Of course, it won't mean that much cash in every case, because almost every ham has at least some of the parts on hand. The chief item of expense is the battery. The size used in this unit will cost about ten dollars.

*Assistant Radio Aide, New York City WERS, 46-41 Forest Drive, Douglaston, L. I., N. Y.



The completed handie-talkie power supply with long and short connecting cables.

Construction

First, a box was built as shown in the sketch of Fig. 1. The sides are made of quarter-inch Presdwood, although plywood would have done almost as well. They are held together with glue and wood screws. Triangular-shaped strips are placed in the corners for strengthening and also to help support the battery shelf. Transcription-disk aluminum was used for the top and bottom, but here again plywood might be substituted if

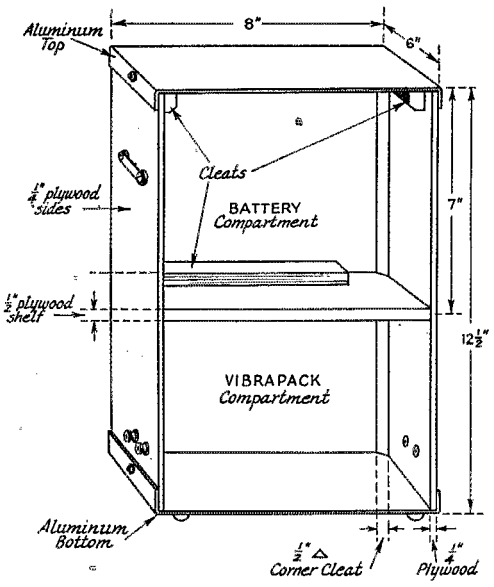


Fig. 1 — Constructional sketch of the box for the power supply for hand-portable WERS units. Inside dimensions are given throughout.

more substantial material is not available. The aluminum ends are bent over as shown in Fig. 1 and fastened in place with machine screws.

The shelf is made of half-inch plywood and is inserted 7 inches from the top to divide the box into two compartments and provide a mounting for the battery. It is held in place by wood screws through the sides of the box. All cracks, including those around the shelf, are sealed with glue, both to keep the weather out of the box and to isolate the battery and vibrator-pack compartments so that electrolyte and acid fumes from the battery will not seep into the lower enclosure. This is important not only to prevent corrosion of vibrator parts but also to eliminate the danger of an explosion should an accumulation of gas be ignited by vibrator sparking.

When the box is completed, the battery is held rigidly in place by one pair of wood cleats fastened in the upper corners of the battery compartment and another pair to the shelf. Rubber feed-through grommets, just large enough to accommodate the battery leads, are sealed with Duco cement in holes drilled in the shelf. The wires, in turn, are cemented into the grommets. This further assures the isolation of the battery and pack compartments.

Holes are drilled in one side of the box near the bottom for mounting a power-output socket and a toggle switch. A pair of binding posts for an external battery is mounted on the other side. On each side near the top an anchorage for a carrying strap is fastened. The anchorages consist of short pieces of quarter-inch metal tubing or rod mounted with machine screws and spacing washers. Various types of carrying straps can be devised to meet requirements. I found that the harness from an old fishing creel filled the bill superbly. Rubber bumpers, available at any hardware store, can be Duco-cemented to the bottom of the unit to supply shock-absorbing feet.

After the box is assembled, it should first be given a coat, inside and out, of heavy white-lead paint. When this coat is thoroughly dry, a finishing coat of Duco enamel of a color to suit the taste may be applied. Light French-grey is a good color. It dresses up the unit very professionally and drives away the "homemade" appearance so characteristic of some ham-built gear. This may sound like a minor point, but it should be borne in mind that this is ham equipment which will often be on display. Good-looking equipment plays no small part in the impression which the public forms of us. In WERS we and our equipment are on exhibition far more than at any previous time in our history.

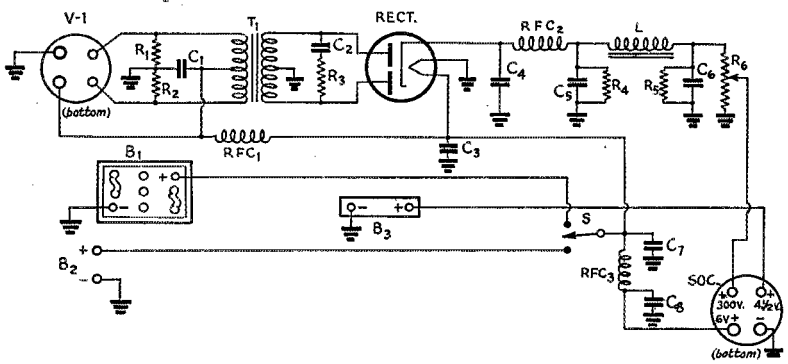


Fig. 2 — Circuit diagram of the vibrator power supply.

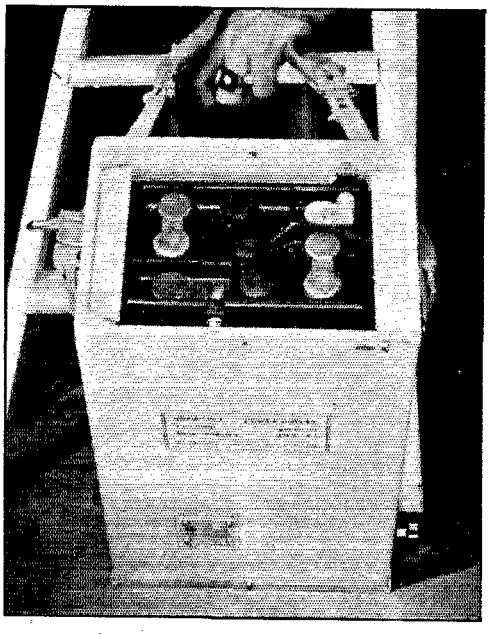
C_1 — 5-μfd. 50-volt dry electrolytic.
C_2 — 0.007-μfd. 1600-volt paper.
C_3, C_4 — 0.5-μfd. 600-volt electrolytic.
C_5 — 8-μfd. 600-volt electrolytic.
C_6 — 16-μfd. 600-volt electrolytic.
C_7, C_8 — 250-μμfd. mica.
R_1, R_2 — 100 ohms, 1 watt.
R_3 — 5000 ohms, 1 watt.
R_4, R_5 — 1 megohm, 1 watt.
R_6 — 50,000-ohm 25-watt variable.
B_1 — 6-volt 25-ampere-hour motorcycle-type storage battery.
B_2 — Terminals for external 6-volt battery.
B_3 — 4½-volt dry "C" battery.
S — S.p.d.t. switch, 10-ampere rating.
SOC — Wafer socket.
T_1 — Power transformer, 6-volt c.t. primary, 350–350-volt 100-ma. secondary.
V_1 — Vibrator (Mallory No. 325 or equivalent).
V_2 — Type 84, 6X5 or OZ4 rectifier tube.

Vibrator Pack

It so happens that a Radiart 4200-DF vibrator pack was used in this particular unit, but a home-made pack constructed to fit into the same space may be designed to work equally well. A suggested circuit is shown in Fig. 2. It is quite similar to the one described in *QST* for February, 1944.[1] In the construction of such a unit space can be conserved by using small dry electrolytics for filter condensers. By connecting them in series or parallel as required, the desired capacities and voltage ratings easily can be obtained. If ½-watt 1-megohm resistors are connected in parallel with each condenser unit they will help to reduce peak-voltage surges and also to equalize the voltage division across condensers connected in series.

No. 12 flexible rubber-covered ignition wire, which may be obtained at most Sears Roebuck stores, is recommended for all primary and filament wiring to insure against excessive voltage drop. A short cable of this wire in the form of a twisted pair with large clips at one end and large spade terminals or tips at the other makes it possible quickly to connect the unit to an external battery — the one in your car, for instance. As an alternative, a single conductor shielded with flexible braid may be used with the braid serving as the grounded side. The same kind of wire may be used for the 6-volt leads in the output cable, while smaller conductors may be used for the 300-volt and 4½-volt leads. The shield on the cable will serve as the ground side. I found it of advantage to have two such output cables — a short one for use when carrying the unit and a long one (about 20 or 25 feet) to serve when the power unit is left in the car while operating the hand portable within a short radius of the supply.

[1] Long, "A Handie-Talkie for $1538.77," *QST*, February, 1944, p. 32.



Top view of the portable power supply with cover removed, showing the motorcycle storage battery.

The complete unit weighs about 20 pounds. Most operators won't find this too heavy to carry for an hour or more at a stretch, although it should be possible to set it down from time to time when opportunities permit. Therefore, it is advisable to make the short output cable of sufficient length to permit such operation and yet not long enough to be a handicap in walking around.

To reduce vibrator sparking to a minimum, it may be necessary to experiment with different values for C_2. The hash-filter circuit composed of C_7, C_8 and RFC_3 may not be needed and it is suggested that the circuit be tried first without these components. In stubborn cases of vibrator noise, it may be necessary to change the values of C_7 and C_8 to remove the last trace of hash.

It will be noticed that a separate 4½-volt battery for the microphone is shown in the circuit diagram of Fig. 2. The reason for this is that the mike cannot be operated from the storage battery without a fairly complicated filter system to keep vibrator hash out of the carrier. The extra microphone battery is well worth its few ounces of weight.

With a power supply like this, it becomes possible to build a hand-portable unit which will serve in almost any capacity. An output power of several watts is available. HY615s or similar tubes are a good choice. With the hand portable described in the February, 1944, issue of *QST*,[1] using HY615s in the detector and oscillator positions and a 6J5 driving a 6N7GT audio, consistent S9 QSOs have taken place over a radius of ten to twelve miles in competition with a dozen stations operating on the same spot frequency. The power input to the oscillator could be run up to 5 watts without a worry about the power supply giving out. As a matter of fact, after a continuous two-hour session, a hydrometer test of the battery showed it still to be very close to the full-charge mark. After this discharge, an eight-hour run on a one-ampere trickle charger easily brought the battery back to full charge.

The supply shown in the photographs may be classed as a heavy-duty unit. If power requirements are less — say 250 volts at 50 or 60 ma. for the high-voltage supply and 6 volts at 1 ampere for filaments — a smaller unit can be built along exactly the same lines. The use of lighter components, such as transformer, choke, battery, etc., will reduce both the weight and size greatly. For instance, I believe that an 11-ampere-hour motorcycle storage battery, which is less than half the size of the Willard used in the unit described here, is still obtainable from Sears Roebuck by mail. The cost of building the smaller supply will be somewhat less, too.

WERS can use more truly portable units, as more than a year of experience has proved to us here in the New York City area. Power supplies designed toward this end will go a long way toward reaching this objective.

★ BOOK · REVIEWS ★

Graphical Constructions for Vacuum Tube Circuits, by Albert Preisman. Published by McGraw-Hill Book Company, New York. 237 pages, 5 × 8½. Price $2.75.

In the words of the author, this book is designed to fill a gap in the literature on vacuum tubes, viz., graphical constructions. Analytical methods usually employed by engineers and scientists sometimes result in unwieldy mathematical manipulations. Thus it becomes the purpose of the book to show both methods, stressing the advantages of the graphical method for the solution of certain problems.

The first chapter is devoted to explaining the problem and showing how non-linear circuits are analyzed by the use of power series equations. Specifically treated are the Taylor, Maclaurin and Fourier series and their applications and limitations. The limitations inherent in these methods make it desirable to consider a wider application of graphical methods.

As an introduction to elementary graphical constructions, the author discusses thermionic vacuum tubes as non-linear resistances. The subjects covered include methods of producing emission, equations involving emission from various types of cathodes, Child's law, amplification factor, variable-μ tubes, tube parameters and equivalent circuits. Then the principles of graphical constructions are given, starting with two linear resistances in series as an example. This is followed by a discussion of the same circuit using non-linear resistances. Graphical determinations of static and dynamic characteristics are explained. Voltage amplification, power output, calculation of distortion, plate efficiency and the effect of variations in the load impedance are also covered.

Having thus set the stage, the author goes into various specific applications of graphical constructions. He treats in detail of circuits with reactive leads, balanced amplifiers, detection and feed-back circuits. Under each heading many types of circuits are discussed fully, both from the graphical and analytical angles.

The book is not offered as a substitute for mathematical analysis, and a knowledge of this method is essential to an understanding of the subject. It is not a book for beginners but rather for advanced college students and practicing engineers. Some of the material has appeared piecemeal in various books and publications, but never before to our knowledge has an attempt been made to gain serious recognition for this method by bringing it into one volume. Clear enough for students and complete enough for engineers, it should prove an excellent addition to any electrical library. As vector analysis is to alternating current, so will graphical constructions be to electronics once their advantages are known to the profession.

Maintenance and Servicing of Electrical Instruments, by James Spencer. Published by The Instruments Publishing Company, Inc., Pittsburgh. 256 pages, 4½ × 8¼. 1944.

Before the days of priorities, when a meter went bad the customer was warned not to try to repair it but instead to send it back to the factory. When war came the props were knocked from under this principle from several directions — few qualified men were left in factory repair departments and almost none on the outside, and those who were left were badly needed in the production departments.

This little volume by the foreman of the Instrument and Relay Department of the Meter Division of Westinghouse is an attempt to promote the war effort directly by offering information on meter servicing to military personnel and indirectly by making it available to the people in plants serving the military. It includes the required information on meter theory and construction as well as on testing and calibration.

The author lists a minimum set of tools needed by every meter service shop and then goes into the general requirements for meter servicing. He explains such mechanical and

(*Continued on page 76*)

★ ★ ★ ★ ★ ★ ★ ★

Gold Stars

MAJOR HUGH S. GLASSBURN, W9FFZ, 31, was killed in an airplane crash which occurred near Olympia, Wash., August 24, 1943.

W9FFZ became interested in amateur radio while in high school. During his spare time he worked at A.T.&T.'s test station near Des Moines, later doing full-time radio work for the company. He then joined the Des Moines police department, becoming its chief operator and supervising the installation of a new police radio system before leaving for military duty.

A second lieutenant in the officers reserve, W9FFZ requested active service in 1940 and entered the Air Corps at Chanute Field, Ill. He served for several months in the communications division, at the same time earning his pilot's wings. He then was transferred to Alaska as communications officer assigned to establishing Army Airways Communications System stations throughout the territory. After successfully completing this work Major Glassburn was promoted to regional control officer, and it was in the performance of his new duties that the crash occurred causing his death and that of the pilot.

LT. FREDERICK C. HARRINGTON, USNR, W9WDR, lost his life while serving as radio officer aboard the aircraft carrier U.S.S. *Wasp* when it was sunk in the South Pacific on September 15, 1942. At that time he was reported "missing following action," and a year later he was officially declared dead.

An active amateur, W9WDR constructed his own equipment, constantly rebuilding and improving it and experimenting with new gear. He was very much interested in working DX and had won recognition for his service in Midwest flood emergencies. W9WDR's keen interest in amateur radio led to his joining the Naval Communication Reserve, in which organization he served for six years before volunteering for active duty early in 1941. After a brief training course at the Officers' Communication School at Noroton Heights, Conn., Lt. Harrington was assigned to the *Wasp*.

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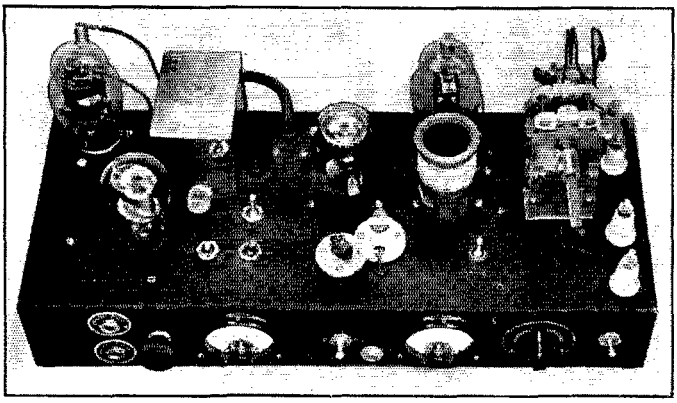


A utility rig for 'phone, c.w. and p.a. use, all operating from 6-volt d.c. supply. The audio section is at the left, the HY65 high-frequency section is in the center (set up for operation in the 7-Mc. band) and the HY75 v.h.f. section is at the right.

A Battery-Powered Camper's Combination

A Versatile Radio Transmitter and P.A. Amplifier

BY HOLLIS M. FRENCH,* WIJLK

IN ANTICIPATION of a summer vacation in the Adirondacks, this rig was built in the month of June, under the Gemini — the sign of the Twins. According to astrology, natives of Gemini are apt to exhibit a dual personality and are noted for versatility.

This equipment combines a radio transmitter and a public-address amplifier. It will serve as a stand-by transmitter for the fixed station or it may be divorced from the a.c. power mains and hooked up along with a storage battery, vibrapack and windcharger for use in a wilderness cabin. On its highest-frequency range it may be operated from the car storage battery as a mobile or emergency rig.

The output of the audio portion of the circuit may be fed into a magnetic speaker and used as a p.a. system for political stumping, selling corn plasters, or preaching revival sermons in the *al fresco* manner. If an audience tires of oratory, a phonograph pick-up may be plugged in and ears soothed with the dulcet melodies of Spike Jones and his City Slickers.

The purpose of the design is to include on one chassis equipment to cover as many bands and serve as many purposes as possible, and at the same time to introduce every possible economy in current drain. On a vacation trip, or in responding to an emergency call, reduction in the number of separate pieces of equipment to be carried and conservation of primary-current sources are prime considerations.

Low-drain quick-heating filament-type tubes are used throughout, and a selective switching system provides for heating only those filaments required for a specific purpose. Either of two r.f. sections may be operated independently of each other and of the audio section. If the audio section is to be employed as a phonograph amplifier or as a p.a. system, both r.f. sections are switched off. Serving as a modulator, it may be switched to either r.f. section. During stand-by periods between transmissions all filaments are switched off.

*Assistant Technical Editor, *QST*.

"You can't take it with you" applies to most of the gear accumulated by the average ham who yearns for speech as well as code transmission. Here is a low-powered economical combination which can be sneaked in among the pots and pans when packing for a summer expedition into the wilderness. Low-drain quick-heating tubes simplify the power-supply problem, conserving space and weight. All speech and r.f. components are assembled on one small chassis.

Audio Section

As shown in Fig. 1, the circuit is simple and straightforward — in spite of the seven switches! The audio section consists of a 6A4 speech amplifier, triode-connected, and a HY31Z dual triode Class-B output stage, transformer coupled. Satisfactory speech quality is achieved with the "F-type" single-button carbon microphone, and by its use the first step in economy of cost and operation is assured.

A double-button microphone transformer is used, with the microphone circuit across one half of the primary and the jack for phonograph input across the other half. The phonograph pick-up used is an RCA magnetic type, the so-called "cobra head." It was found that the microphone transformer provided a reasonably good match for this pick-up. The center tap of the primary is grounded, as well as the frame of the phonograph input jack and the negative side of the microphone battery of 1½ or 3 volts.

Some difficulty was experienced in finding a suitable output transformer for the HY31Z. A compromise was effected by adopting a UTC CS34, which is designed to couple push-pull 46s or 59s to a 3500- or 5000-ohm load. Improved performance might be expected if a transformer especially designed for the HY31Z had been available.

In order to utilize the audio section as a p.a. amplifier without adding another output transformer for coupling a dynamic speaker, use is made of a magnetic speaker of excellent quality, salvaged from an old RCA b.c. receiver. The impedance of this speaker is approximately 5000 ohms. When in use it is plugged into tip jacks, J_1, in the 5000-ohm leads from the output transformer.

Although not properly a part of the rig, mention is made here of the fact that, in order to provide for electrical reproduction of recordings through this amplifier in locations where absence of 115-volt a.c. precludes the use of an ordinary electric phonograph, a portable victrola with a spring motor is used. The acoustic reproducer and sound chamber were removed and the "cobra head" magnetic pick-up substituted, with leads and plug to connect with the phonograph-input jack on the rig. Of course, 6-volt phonograph motors are available and the use of one would dispense with the necessity for cranking up the "Armstrong" motor, but such a motor could be used only at the cost of added drain upon the storage battery.

LOW-FREQUENCY COIL TABLE

(All coils for the HY69 section are wound on Hammarlund 1½-inch diameter plug-in forms.)

1.75 Mc. — L_1 — 64 turns No. 22 d.s.c., close-wound.
L_2 — 10 turns No. 22 d.s.c., close-wound over bottom end of L_1, mica insulated between layers. A loading coil will be required in the antenna ground lead, its size depending upon the length of wire used as a Marconi antenna.

3.5 Mc. — L_1 — 30 turns No. 18 s.c.c., spaced to fill 2 inches.
L_2 — 8 turns No. 22 d.s.c. close-wound over bottom end of L_1, with sheet-mica insulation.

7 Mc. — L_1 — 14 turns No. 16 s.c.c. spaced to fill 1¼ inches.
L_2 — 6 turns No. 22 d.s.c. close-wound over bottom end of L_1, with sheet-mica insulation.

14 Mc. — L_1 — 6 turns No. 16 s.c.c. spaced to fill 1¼ inches.
L_2 — 4 turns No. 22 d.s.c. close-wound over bottom end of L_1, with sheet-mica insulation.

Considerable care must be taken with filtering and shielding the power supply if good audio quality is to be attained. Grounded center-tap resistors should be placed across all tube filaments. These precautions are most necessary when this amplifier is powered with a genemotor; otherwise "hash" will appear in the output, which will mar the quality of musical reproduction. This tendency practically disappears when a well designed vibrapack is used in place of the genemotor. Oper-

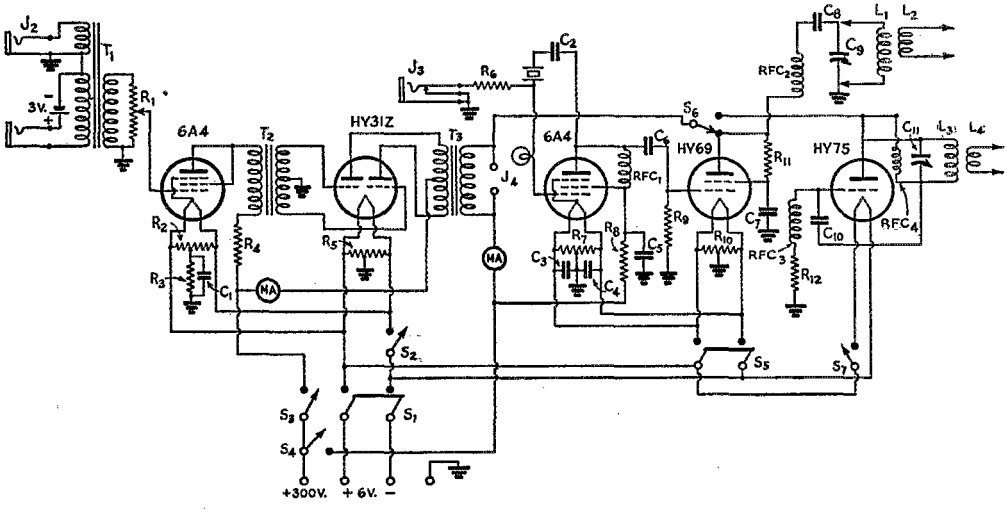


Fig. 1 — Circuit diagram of the portable combination modulator-transmitter unit.

C_1 — 5 μfd. 25-volt electrolytic.
C_2, C_5, C_7, C_8 — 0.002-μfd. mica.
C_3, C_4 — 0.01-μfd. 400-volt midget paper.
C_6 —250-μμfd. mica.
C_9 — 90-μμfd. variable (National TMS-250, double spaced; see text).
C_{10} — 100-μμfd. mica.
C_{11} — 35-μμfd. midget variable (Hammarlund HF-35).
R_1 — 0.5-megohm variable.
R_2, R_5, R_7, R_{10} — 50-ohm center-tapped filament resistors.
R_3 — 1000 ohms, 1 watt.
R_4 — 5000 ohms, 10 watts.
R_6 — 25,000 ohms, ½ watt.
R_8 — 7500 ohms, 10 watts.
R_9 — 20,000 ohms, 1 watt.
R_{11} — 10,000 ohms, 10 watts.
R_{12} — 5000 ohms, 1 watt.
L_1, L_2 — See coil table.
L_3, L_4 — See text.
RFC_1, RFC_2 — 2.5-millihenry pie-wound chokes.
RFC_3, RFC_4 — v.h.f. solenoid r.f. chokes (Ohmite Z-O).
J_1, J_2 — Midget open-circuit jacks.
J_3 — Midget closed-circuit jack.
J_4 — Dual tip-jack.
S_1, S_5 — D.p.s.t. toggle switches. (S_1 is heavy-duty type.)
S_2, S_3, S_4, S_7 — S.p.s.t. toggle switches.
S_6 — S.p.d.t. toggle switch.
B_1 — 60-ma. dial lamp.
T_1 — Double-button microphone to single grid transformer.
T_2 — Interstage audio transformer, single plate to push-pull grids.
T_3 —Class-B output transformer, 5000-ohm primary to 5000-ohm secondary.

ation from either type of power converter is satisfactory when the audio section is used as a modulator.

R.F. Sections

Two independent r.f. sections are provided, one for the ordinary communication frequencies and the other for v.h.f.

In the low-frequency section, provision is made for crystal-controlled 'phone or c.w. output in the 20-, 40-, 80- and 160-meter amateur bands, using an HY69. A separate unit with an HY75 provides a modulated-oscillator signal in the 112-Mc. band.

A 6A4 is used in the Pierce oscillator circuit, which eliminates the necessity for a tuning control in this stage. Although the output is small it is entirely adequate, since the HY69 used in the final amplifier is a beam tetrode with very modest requirements as to grid drive.

The oscillator is keyed by the self-blocking method. Admittedly, some may have difficulty with this arrangement, particularly with certain crystals. Insertion of an r.f. choke in series with the key and the grid leak may be required. Possibly a better arrangement would be to tie together the center-taps of both the 6A4 and the HY69 and insert the key in series with this common lead and ground.

Parallel feed in the HY69 plate circuit simplifies the insulation problem for C_9, which must be mounted beneath the chassis.

The luxury of two small d.c. milliammeters adds a bit to cost and weight, but the r.f. meter furnishes a tuning indicator that is most convenient in a rig with which it is expected to shift operating bands frequently, and a constant rough check is given against over-modulation and carrier instability by the meter in the Class-B modulator stage.

V.h.f. section of the transmitter, showing the arrangement of parts and method of coupling to the antenna.

The v.h.f. section, comprising an HY75 triode and its associated tuned circuit, operates as an independent unit. Substantially, this is the high-C oscillator described by W1JEQ in *QST* for November, 1941, and was added to this rig after Pearl Harbor in order to adapt it to WERS service. It is provided with its own separate antenna-coupling circuit, and may be modulated by the HY31Z when the s.p.d.t. switch, S_6, is thrown to the v.h.f. position and the filament switch, S_7, is closed.

Before the v.h.f. section was added, its room on the chassis was occupied by a 500-$\mu\mu$fd. variable condenser which was used to tune random lengths of wire for an antenna for the lower frequencies. With the return of operating privileges on these frequencies, the big condenser will come back; however, it will then occupy a new mounting on the end of the chassis. The 112-Mc. transmitter has proved to be too valuable a section of the rig to dispense with it.

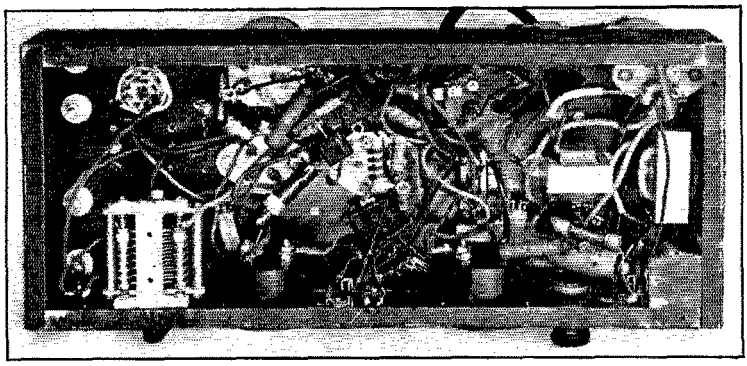
Construction

A standard 7 × 17 × 3-inch steel chassis was laid out so that the audio section occupies approximately one-third of the available space. Socket holes for the HY31Z and the HY69 were made large enough to pass the bases of those tubes, and the sockets are underslung, supported 1 inch below the chassis top by bolts and spacers. This was done both to shorten plate leads and to limit the height of projections above the chassis so that the rig may slide into a shelf compartment in a carrying case which also houses a 30-watt genemotor, a microphone, and other accessories. Another advantage in this type of mounting is the better appearance resulting from making the tubes appear to be all of the same height.

The sockets for the two 6A4s, the HY75 and the low-frequency tank coil are mounted flush with the top of the chassis. Other components mounted topside are the modulation transformer, T_1; the crystal socket; a miniature lamp socket for the dial lamp which is used as a fuse in the crystal circuit; five of the seven toggle switches; the output tip jacks, J_4, for the audio circuit; the two sets of porcelain stand-offs for attaching feeders for v.h.f. and lower-frequency antennas; and the tuning condenser and bracket, the coil, r.f. chokes, the grid condenser, C_{10}, and the grid leak, R_{12}, for the HY75.

On the front side of the chassis, left to right, are mounted the phonograph and microphone jacks, J_1 and J_2, one above the other; the volume control, R_1; the modulator plate-current meter; the filament switch, S_5, controlling the oscillator-amplifier section (6A4 and HY69); the keying jack, J_3; the final-amplifier plate-current meter; the tuning dial and knob for C_9; and the filament switch, S_7, for the HY75.

The phono and microphone input transformer, T_1, is mounted below at the left end of the chassis. In the left front corner of the under side is mounted a single flashlight cell, in series with the jack spring of J_2 and the center tap of the mike transformer. This provides sufficient voltage for



Beneath the chassis of the versatile portable rig. The microphone-battery mounting is in the lower right-hand corner, the mike transformer just above it, and the interstage audio transformer to the left of that. Low-voltage leads from the input cable go direct to the heavy-duty stand-by switch.

a *good* carbon microphone. If the operator feels that he must have more current through his mike, it is up to him to find room for the additional cells. It should be pointed out, however, that more mikes have been ruined by excessive voltage than any conceivable "gain" in audio can compensate.

Next to T_1 and just behind the 6A4 speech amplifier socket is the small driver transformer, T_2. This transformer is one originally designed to couple the plate of a Type 30 tube to the grids of a Class-B 1J6G. It is not an ideal transformer for the job, but it serves the purpose. If the day ever comes when a matched set of transformers is available for the Class-B HY31Z in this circuit, a change will be made.

The master filament switch, S_1, is a d.p.s.t. toggle switch with a 10-ampere rating and is mounted to the right of T_2. Between it and the front of the chassis are switches S_2 and S_3, controlling, respectively, the filament and plate voltage of the audio 6A4 and the HY31Z. At the rear of the chassis, behind the 6A4 oscillator socket, is a s.p.s.t. switch, S_4, which controls the plate and screen circuits to the 6A4 oscillator and the HY69. To the right of the coil socket is S_5, a s.p.d.t. switch which changes the high-voltage connection from the 6A4-HY69 circuit to the HY75 v.h.f. oscillator.

The tuning condenser for the HY69 plate circuit, C_9, was originally a 250-$\mu\mu$fd. single-spaced unit. It was disassembled and double spaced, using as many of the plates as could be strung on the studs with the new spacing. This resulted in a double-spaced variable condenser with seven rotor and eight stator plates. The capacity is in the neighborhood of 90 $\mu\mu$fd., which is sufficient for the 160-meter band. Best performance, however, is obtained in the 20- to 80-meter bands.

All coils except that for 112 Mc. are wound on 1½-inch Hammarlund plug-in forms, to the specifications given in the coil table. The antenna-coupling coils are wound directly over the lower ends of the tank coils, with thin sheet-mica insulation between the windings.

The 112-Mc. coil is wound with 2 turns of No. 12 enameled wire, ⅞ inch in diameter, and is soldered directly to the terminals of its tuning condenser, C_{11}. The antenna-coupling coil is a single turn of No. 12 enamel wire supported from stand-off insulators to which the feeders are attached, and it is spaced about ½ inch from the tank coil.

A shielded four-wire rubber-covered cable with a four-prong plug at the outer end is used to connect the power supply, whether vibrapack, genemotor or a.c., to the unit. This cable should not be longer than necessary and the wire used for filament leads should be as heavy as possible. When using a 6-volt d.c. primary source, the same precautions must be exercised with respect to vibrapack or genemotor leads, if full output and normal operation are to be realized.

Although only one brief summer was available for use of the lower-frequency bands with this rig, its performance was so satisfactory that it constitutes one of the major motives in the builder's mind for working for an early end of the war! Meanwhile, it has been doing its bit in WERS operation on 112 Mc.

Strays

Teaching radio in Signal Corps schools has offered many and varied experiences. Recently, while I was explaining to a student the ease with which problems could be solved with the ARRL *Lightning Calculator*, another student came up and looked over my shoulder. Apparently quite intrigued, he asked, "What are you doing? Calculating lightning?" While not placing too high an estimate on his IQ, I assumed he was kidding, and answered, "Yes." Several minutes later, with a bewildered expression on his face, he said, "Aw, I don't see what you want to know about lightning for," and strode away. — *W9QQL.*

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Copper-covered steel wire for high frequency communication lines has been developed and found as efficient as solid copper wire. — *Science News Letter.*

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Feeling low? Try tuning across the broadcast band at midnight and listen to the stations signing off with their various versions of the Star Spangled Banner. You'll be glad that you're an American.—*W1KKS/6.*

When Spring Comes to Pine Notch

Seed Potatoes, CQs, and a Mite of Hard Cider

BY "SOURDOUGH"

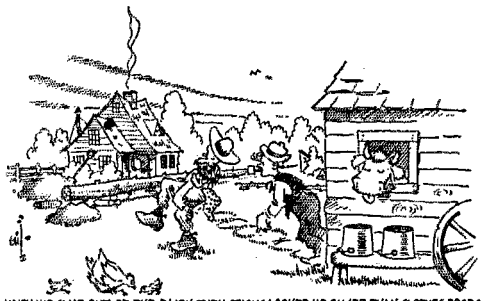
You take a feller who is snowed in at a cabin up in the woods. He knows spring is sure to come around and that winter lasts only just so long, but he'd sure be a plush-upholstered tenderfoot if he stopped chopping firewood on that account.

That's the reason I don't hold nohow with these fellers who get right up on the radio or in the newspapers and say — pretty near to the day — when this war is going to be over. Calculate it's better for a feller to see spring in with a couple of cords of good hickory left over than to get friz up because winter didn't end quite as quick as he thought.

Just the same, there's no harm in a feller scheming about his spring planting during the winter, and I don't see any reason why we can't do a little gentle prognosticating about postwar planning now — so long as we don't get uppity about it.

One thing is sure as sure can be. There's going to be a whole raft more fellers who will want to get on the air. Since they will be returning servicemen, it would be a sorry day if they didn't get their licenses and get them quick. QRM was nothing funny before the war, but it looks like it will be considerable worse after the war unless we all help.

There ain't much doubt but that after the war the run-of-the-mill ham will be a much better technician and a helluva lot better operator than we had before. Guess he'll demand that the guy on the other end of the circuit does his stuff, too. Can't imagine a feller who'd been running a command-post radio station under fire would cotton too good to the umphy iddly tiddly pop PSE QSL QSL OM BEST WISHES ES 73 AND BE SURE QSL CUL, etc. *ad nauseam*, stuff that we used to get. Them guys who spent forty minutes calling CQ and twenty-three seconds signing are kinda apt to get their ears pinned back by the ex-topkick who had been waiting through it all with an ever-increasing impatience which in no way improved his temper. Might be apt to modernize the old Wouff Hong and use a bazooka instead.



WHEN WE CAME OUT OF THE DAIRY THEM STICKS LOOKED NO BIGGER THAN CLOTHES PROPS

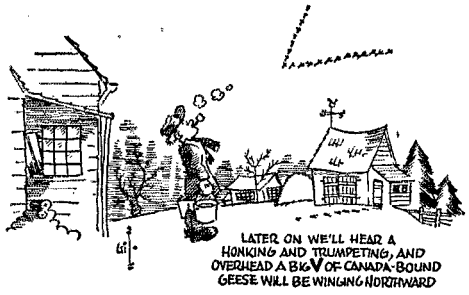
It's pretty clear that operating will be better. That will make a lot of difference, to begin with. Then, too, fellers who have a good grounding in what makes what go are sure to have things lined up and pulling a lot better than some of us did. I'll bet there'll be a helluva lot less standing waves and key clicks and spurious harmonics than there was before.

For one thing, I betcha there will be more and bigger masts a'sprouting when the boys get going again. Putting up a stick is like taking your first swim in the spring — it's easy once you get up the dander to dive in. Remember when I put up the first sticks when we first moved into the Notch back in the rotary spark days. Got me a couple of nice pines and peeled 'em. Left 'em out all winter and got 'em dried and seasoned pretty good. Come spring we hitched on to 'em and drug 'em up to the house. We got the holes dug and then took a look at those poles. Laid out on the ground they looked about a mile long and tons heavy. We considered a while and then retired to the dairy for a mite of cider. I picked a jorum that had been around long enough to gather some authority and we duly reduced its contents to zero. When we got back to the job them sticks looked no bigger to us than clothes props! An hour later and there they wuz — sticking straight up, with the guy wires all set to tighten.

Now it seems like these Signal Corps fellers stick up a couple of those hundred-footers before breakfast and take 'em down after supper to move on with the advance. Then these here SeaBees — why, them fellers take a bulldozer to level out a couple Jap pillboxes and then, without changing gear, they rip and tear an airstrip outa some lousy jungle in the time it takes me and a team of Percherons to plough half an acre. Don't reckon that a sixty-foot tower with an array on top will bother them fellers any more than cutting a chew of tobaccer off the plug — and maybe some of 'em might like to come up one Saturday and finish off some of them jorums that are getting a mite old. Guess, too, they would cotton to some of Martha's chicken pie and shortcake. Could be that they might give an old guy a hand with settin' that telephone pole that got left around when the power lines went through here.

After all these years, Martha and me understand each other pretty good. Guess we don't have many secrets we don't both know about.

But, being a woman, Martha likes to put one over on the old man sometimes. Last night she was just a'bubblin', and I figgered she figgered she had one on the old man. Course a feller don't



take no notice of things like that for a while — otherwise it spoils their fun. So this morning at breakfast I just dug my nose deeper in the newspaper than ever. Finally she couldn't stand it any more and come out with the story.

Seems like we men always get the credit and figger we're the only ones. (You married fellers know the rest; as for the bachelors, what they don't know won't hurt 'em.) Well, Martha was over to Tamarack Flats yesterday afternoon to see Cyrus' mother. She said it was something about the Four-H club, but I reckon it was mostly to have a bit of gossip — a healthy-enough amusement, if not carried too far. Cyrus has a sister. Why, seems like only yesterday that red-headed, pig-tailed, freckle-faced little monkey of a gal was fishing our creek and pinching our apples and behaving generally like the good healthy country kid which she was.

Martha likes to work kinda slowly into her secrets — like I allus eat the pancakes fust and save the sausage for last. Cyrus' sister joined the WAC a while back. 'Course, I knew that. Now she's got to be a sergeant. Didn't surprise me worth a toadstool, either, 'cause she's a right smart, hard-working gal.

Then Martha gets to her climax. (It climaxed me so much I had to admit it, too!) Darned if that kid didn't get her promotion because she had passed a code test at thirty-odd words a minute, — and there was fifty more in the class like her!

I remember hearing a lot of modulators being pushed and a lot of would-be Sinatra tones being used when one of the YLs would send out a pretty little CQ back in the old days. Romance was in the air. Perambulating peaveys! Imagine the day when some feller with his head spinning and his forehead sweating from *just* keeping up on a red-hot whiz-bang QSO looks up in the call book and finds that the OM with the lightning fist and the sure-shot mill ain't no OM at all but a red-headed YL out in Tucson or Ketchikan, or even Stoke Poges or Canberra!

Well, the wood pile outside the kitchen door still gets heaped up every day. The nights are still powerful cold, and setting in front of the fire you burn your toes and freeze your neck — but that don't mean spring ain't a'coming. Later on we'll hear a honking and a trumpeting, and overhead a big V of Canada-bound geese will be beating their way north to their summer place in the subarctic. When we see that we'll all kinda heave a big sigh and go down in the root cellar to check the seed potatoes.

This evening after milking there was another noise overhead. It was like all the bull fiddles in the world tuning up. We run out to have a look and there was the biggest formation of four-engined bombers I ever see pourin' northward. They were in V formation too — just like the geese. I betcha when spring comes this year them Nazis and Japrats go down into *their* cellars for something besides seed potatoes.

Prisoners of War

The following amateurs are reported being held as prisoners of war by the Japanese:

W7DVA, Ens. Ralph E. Cook, USNR, Butte, Mont.

VE5SP, R. W. Acton, Victoria, B. C.

Missing in Action

W3IKG, Alvin T. Friend, of Phillipsburg, N. J., is reported to have been missing following action which occurred in North Africa on November 26, 1943.

Silent Keys

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

W1APH–ex-W11PB, Thomas E. Marchant, jr., Boston, Mass.

W1KCE, Capt. David G. Raub, Air Corps, Nantucket, Mass.

W2IB, Thomas V. Geoghegan, Clifton, N. J.

Ex-W3IW, Alfred R. McGonegal, jr., Washington, D. C.

W4DYA, Melrose D. Hail, Oneida, Tenn.

W5HZT, Lt. Edward R. Downie, Air Corps, Austin, Texas.

W6JJ, A. E. Eldredge, Oakland, Calif.

W7HIF, Elwood Walter Smith, Olympia, Wash.

W8CMP–W8CIK, Dr. Eugene C. Woodruff, State College, Pa.

W9BNC, Capt. William H. Graham, Air Corps, Omaha, Neb.

GM2TQ, Capt. Alexander Cattenach, Kirkton, Grantown-on-Spey, Morayshire, Scotland.

GM6ND, F/O Robert Miller, RAF, Denny, Stirlingshire, Scotland.

New Antenna Mast Designs

Easily Erected Antenna Supports with Ham Possibilities

BY THOMAS A. GARRETSON,* W2ASB

BEFORE the war very few firms produced masts suitable for ham use. Most of the concerns engaged in the manufacture of radio masts confined their attention to the relatively huge structures used as broadcast-station towers. The war, however, has brought about a demand by the military services for comparatively light-weight antenna supports which may be erected in a small space with an inexperienced crew in a minimum of time and yet be sufficiently substantial to withstand all sorts of weather. Some of these supports fall well within the ham category. Not only are the masts themselves interesting, but the unusual technique of raising them with little effort is something which can readily be applied to almost any homemade mast.

The accompanying pictures show various stages in the erection of a 90-footer called the "Speed King," which is manufactured by the Harco Steel Construction Co. of Elizabeth, N. J. Masts of the same type are produced in heights ranging from 25 to 200 feet. A 40-footer can be assembled and erected from scratch by two inexperienced men in 20 minutes, or a 50-footer in half an hour. The 90-foot stick takes five men only an hour to put up, while the 200-footer can be made ready by the same gang in two hours.

The mast shown in the photographs weighs 350 pounds, including an eight-foot cross arm at the top. Extensive tests have shown that it will withstand a wind velocity of 125 m.p.h. under normal weather conditions and up to 100 m.p.h. with a three-quarter-inch coating of ice.

For military purposes, all of the material as well as a complete set of accessories for erecting the 90-foot model are packed in three 11-foot boxes occupying a space of only 12 cubic feet. Such a compact arrangement is possible because the mast sections are telescopic. The accessories include four sets of three guy wires with suitable ground anchors, an erecting boom with fittings, and a hand-operated winch for raising the mast after it has been assembled on the ground.

*105 State St., Perth Amboy, N. J.

In response to the specialized demands of the military forces, attention recently has been focused on the design of light-weight semi-portable antenna supports. Not only will the construction of the two types described in this article be of particular interest to amateurs, but the unusual method developed for raising and lowering masts up to 200 feet in height with a minimum of time and effort should be of value when the day comes to put up that postwar stick.

Erecting the "Speed King" Mast

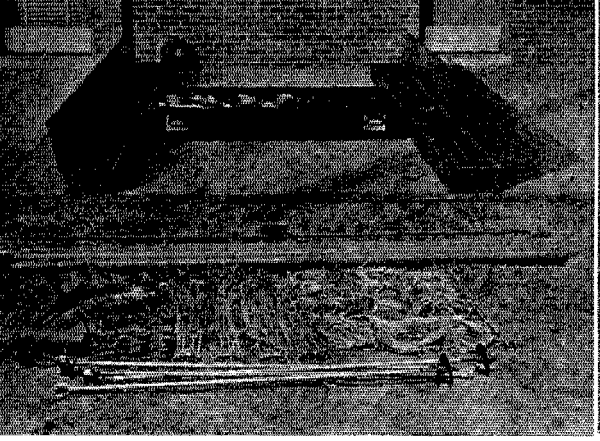
The job of putting the mast up is quite simple. At the spot selected for the base a special L-shaped socket, hinged to a base plate at the angle, is placed. It is anchored in position by means of several heavy steel pins which are driven into the ground through holes in the base plate. The first or bottom section of the mast fits into one end of the L while the erecting boom fits into the other end. The length of this boom is approximately one-third the height of the mast. The telescopic sections of both the boom and the mast itself are locked securely in extended position by means of special wedge fittings which make the joints as strong or stronger than any other part of the mast. No bolts whatsoever are required.

In the preliminary work preceding the raising of the mast, the boom is assembled first and attached to the hinge. The winch then is fastened in line with the boom at the rear-guy anchorage and the raising cable is attached to the end of the boom. Also at this time one end of each of the three guy wires should be connected to the end of the boom. Next, one or two sections of the mast are inserted vertically into the other end of the L socket so that sufficient leverage is provided to swing the boom into a vertical position. The remainder of the mast sections are then added as the mast lies along the ground. An interesting point is that the mast is so designed that the tubular section of largest diameter comes at the center, the mast tapering slightly toward both top and bottom.

When the mast is completely assembled, the spots for the guy-wire anchors are located. The two side anchors are placed in exact alignment with and 40 feet from the base of the mast. The bottom ends of the anchor rods are fitted with "self-drilling" cutters so that they may be "screwed" into the earth using a piece of pipe as the "twister."

The side guy wires are then fastened to the mast where fastenings are provided and these sets as well as the rear set are tightened up with turnbuckles. Since the bottom of the mast is fixed in its position and the guy-wire anchors are placed in such a position that the distance from the anchors to the mast remains the same throughout the raising, the guy wires will remain tight at all times and thereby eliminate any tendency for the mast to sway or buckle while it is being raised.

All that now remains to be done is to crank up the winch and watch the mast go up as the boom is pulled down. The winch will be effective until the outer end of the boom is low enough to permit the five men to push it the remaining distance to



The photograph above shows all of the materials, including accessories, for the construction and erection of two 90-foot Harco masts. One set of components is packed in the boxes at the rear while the other set is shown in front, unpacked and ready for assembly. In the foreground are the self-drilling guy-wire anchors.

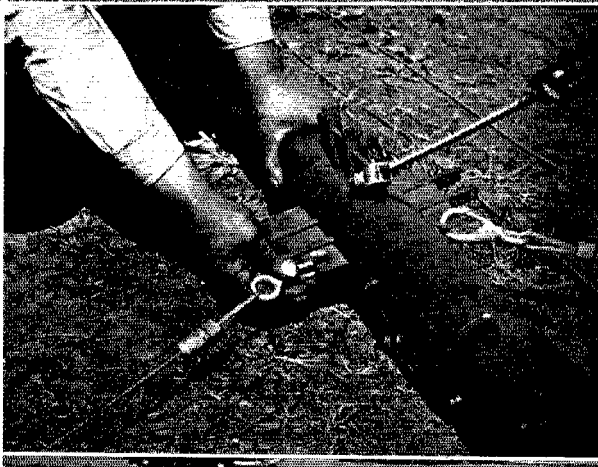
The raising procedure is illustrated by the photographs in the panel at the right. At the top one of the crew is mounting the tubular L-shaped hinged socket for the mast on the base plate, which has been anchored in the ground by means of long steel pins. The base of the mast fits into one opening while the hoisting boom slides into the other.

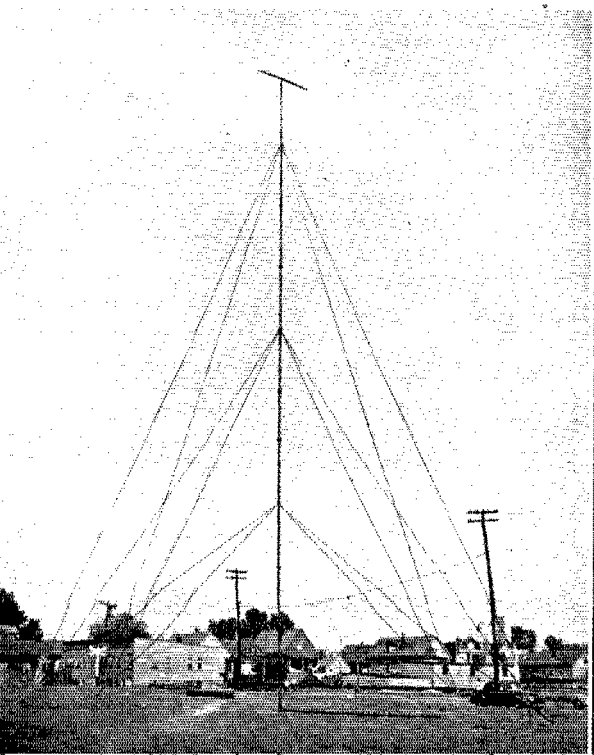
Immediately below is a view of a joint between two mast sections, showing the wedge clamps and the guy-wire fastenings.

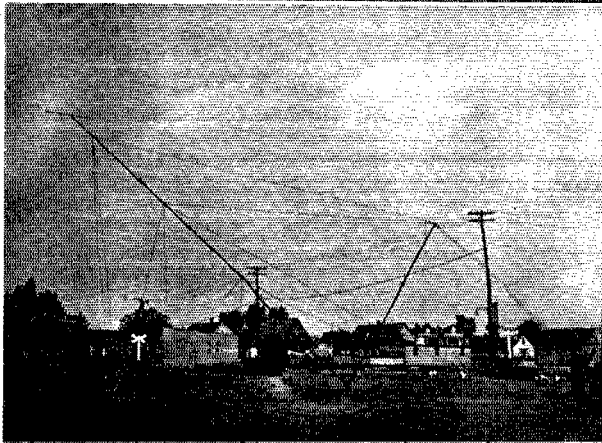
In the next photograph two of the five-man crew are seen getting the hoisting winch ready for operation. The tail piece extending to the rear is fastened securely to the anchorage which has been prepared for the rear set of guy wires.

As seen at the bottom of this panel, the mast has been partially raised. As the winch pulls the boom down, the mast is brought up into position by leverage. The rear set of guy wires keeps the mast from buckling while the two sets of side guys prevent sway.

In the final photograph (below) the mast is shown completely raised, ready for service. A 90-foot support like the one shown can be erected in one hour with a crew of five men, and lowered in two minutes.







the ground. The front set of guy wires then may be fastened in place. Before the boom is removed, the rear set of guy wires is detached and shifted to the permanent anchorage 40 feet behind the base of the mast. The boom may be stored away against the day when the rope breaks and the mast has to be lowered so that the halyards may be replaced — a relatively easy job, since the mast may be lowered in two minutes!

Insulated fittings are available so that the mast itself may be used as a vertical radiator. An insulator may be inserted at the center as well as at the ground if center feed is desired.

A Plywood-Tube Mast

Another mast, similar in design but made of hard plywood is being produced for the Signal Corps and Air Forces. It is supplied in heights of 50 and 75 feet. The 10-foot sections are in the form of tubes 10 feet long with a wall thickness of $\frac{3}{8}$ inch. The stock is composed of thin veneers of hardwood permanently bonded together with plastics in high-pressure "cookers."

The sections are joined together by split-sleeve couplings which have an outside diameter of 5 inches and a $\frac{1}{2}$-inch wall. These couplings are split into two semi-cylindrical parts which may be drawn together to clamp the joints tightly.

A method similar to that described in connection with the metal model is used to raise the plywood mast. A crew of three men can erect the mast and have the radio gear operating within 30 minutes. Disassembly time is even faster. Once erected, the mast is braced in position by two sets of three guy wires each which run out to a radius of 13 feet. Two types of guy-wire anchor are supplied. One type is a long peg simply hammered into the ground, while the other, designed for use in loose soil, resembles a huge corkscrew.

The weight of such a mast is, of course, considerably less than that of similar metal types. Plywood sections sufficient for 150 75-foot poles can be packed into a single trailer truck. Complete sets can be loaded into transport planes by the dozens and flown to their destinations.

Masts of either type described will be particularly attractive to the ham who finds it necessary to move his residence every year or so, since he can load up the mast almost as quickly and conveniently as he does his other household goods.

ON THE VERY HIGHS

CONDUCTED BY E. P. TILTON,* W1HRG

THE global nature of World War II finds our armed services coöperating with those of other countries to an extent which has no counterpart in previous experiences of America at War. In our Navy Yards, for instance, the ships of the British, French, Russian and other navies are common visitors. Personal relations, on the whole, are most cordial; but out of the mutual inability to speak the other fellow's language some amusing incidents occasionally develop.

A certain Russian ship which put in at one of our ports recently was having trouble with the audio system used with its sound-on-film projector. Some of our technicians, eager to demonstrate their friendship, offered to be of assistance.

The schematic diagram and the components were lettered in Russian, and some of the symbols were a bit odd. The parts were strange to American eyes and the circuit something of a mystery, but eventually the trouble was located and corrected. Starting up the gear brought forth from the speaker a torrent of very authentic sounding Russian speech. Our boys were well pleased — surely here was a worthy contribution to Russian-American relations!

But when the Russians were called in to listen it was obvious that something was amiss. The disapproval on their faces was all too evident. "Good?" asked one of our men, somewhat worried. A Russian shook his head and tried to explain what was wrong. After much arm waving and futile attempts at English he stepped up to the equipment, reversed the reels, started the gear, and stepped back to listen. Smiles wreathed the Russian faces, though what came out of the speaker sounded about the same to us. "*Now* good!" was the Russian comment, and everyone was happy.

—•••—

We didn't think much of the method used by civilian technician W5DFZ for testing fuses aboard ship (moistening the fingers and applying them to the fuse blocks), and we said so. But Harold assured us that his system was quite okay. "Sure, this is the way my uncle used to check 'em. Of course, he's dead now!"

*c/o La Concha Hotel, Key West, Fla.

Hams in Combat

The "Hams in Combat" story originally scheduled for publication in this issue unfortunately had to be withheld at the last moment for censorship reasons, since clearance could not be obtained before going to press. There being insufficient time for preparation and approval of alternative material, no "Hams in Combat" section appears in this issue.

However, *QST* still wants stories of hams in active war theaters — for immediate publication in this section, where feasible, or to be held confidential where security considerations so require.

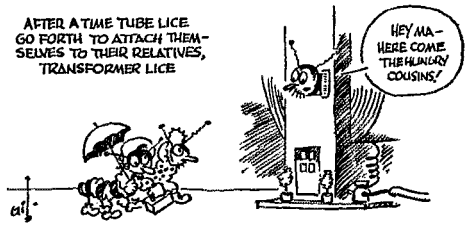
Do *you* have a story of war service to tell — either your own or that of someone you know? Then write us a letter giving full details, including photographs, clippings and other substantiating data where available. If your story is published in *QST*, you will receive a $25 U. S. War Bond. Please indicate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

Lice, Liberty and the Pursuit of Parasites

A Report on Certain Species of Electronic Vermin

BY JASPER P. BURP, SC.D.*

ARE you troubled with poor reception of radio programs? If so, perhaps your radio is infested with tube lice.[1] These husky insects have been causing much trouble for some time. I remember back in 1789 there was a great epidemic of this species. It was so serious that no radio receivers were operable for many years afterwards — more than a century, in fact. These interesting creatures seem to reproduce in cycles of nine years. Next year we are due for another cycle of these parasites. Therefore, manufacturers of radio receivers, in an effort to stamp out all parasites troubling radio reception, have incorporated parasitic suppressors in circuit designs.[2]



Tube lice have a very interesting life history. They hatch from eggs laid in the electrolytic procrastonator of a transmitter. When young they thrive on the electrolyte of the procrastonator, decreasing its homo-di-ephetic action, of course. After a time they go forth and, being unable to find subsistence, attach themselves to their close relatives, transformer lice.[3]

The transformer louse is a juice sucker. Its nourishment is obtained by sucking the juice from transformers. Many times I have observed a transformer louse greedily devouring watt after watt, without indigestion. If this is allowed to go on for a few months the transformer becomes hysterical, and the resulting hysteresis loss is astounding. This species occasionally adds variety to its diet by indulging in magnetic flux, washing it down with eddy currents. Normally, the lice eat balanced diets of positive and negative electricity. This fact can be used to advantage if you wish to exterminate the parasites. To cause malnutrition, all you have to do is install a direct-current transformer. The larger female lice will then devour positive electricity while the hen-pecked males are left only the inferior negative values. As one now carries a positive charge whereas the other carries a negative charge, there will be a fatal discharge between the two if they happen to come close to one another. After the mating season [4] there will be no more transformer lice to trouble you.

At the end of the dry season, the transformer lice attach themselves to the larger ether maggots.[5] These worms ride the waves of ether to your set. Along the way they devour much ether, to satisfy the huge appetites of the two parasites. Once arrived at your set, the ether maggot either dies because of lack of ether around the compensator or, if your set is of the sealed-beam type, the worm is repelled by electrostatic induction of the diclinic appetizer. However, if you take the above precautions, the transformer lice will do little damage. In fact, they will die of starvation if your set is of the transformerless a.c.-d.c. type.

This leaves only the harmful tube lice. These lice have an exceedingly keen sense of smell, and can detect bits of vacuum over great distances. By using this gift they can easily locate a grid leak in one of your tubes. Once having located such a leak, they hang around and lap up the drops of vacuum that ooze out. After the first mouthful they become intoxicated with delight, and actually squeeze inside the tube through the grid leak. At this point they destroy the normal characteristics of the tube by lining up in chain-like arrangements to form additional grids.[6]

One good remedy is to lift carefully the vacuum from the tube and soak it in kerosene for a few hours. This gives it a bad taste and thus drives the vermin away.[7] Sometimes one will get

(*Continued on page 78*)

THE ETHER MAGGOTS WITH TRANSFORMER LICE ATTACHED, RIDE THE WAVES TO YOUR SET.

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* Professor of Bioelectronics at Northeastern University of the South — "the place where you get a head."

[1] *Species Tubus Pediculosis*, of the family *Taurus Jactus*.

[2] An early application of this strategy was the introduction of the suppressor grid in receiving tubes.

[3] *Species Transformus Pediculosis*, of the family *Taurus Excretus*.

[4] The exact date of the mating season can be found by the use of the formula

$$T = \frac{(S-K) \times (S+K)}{2/4\ (Hx\ \pi \times 2.865)}\ ^{25.26} \times K^2 + S - S$$

where S = your social security number.
K = equilibrium constant.
H = humidity factor.

[5] *Aether Vermis*, related to radio gremlins.

[6] A tube which has become infested with these destructive insects is commonly known as a lousy tube.

[7] While you are in the tube, you might as well oil any rusty grids which may be causing squeaking sounds, scrape the algae from the atomizer, adjust the wave bender, and chase out any gremlins.

Television in K6 Land

Experiences with a Ham-Built Camera-Modulator Unit in Hawaii

BY JOHN F. SOUZA, JR.,* K6PHD

"Like the thrill that comes with that first unforgettable DX contact" is the way K6PHD describes his reactions when he saw for the first time an image on the screen of the television camera-monitor built by a group of K6 hams. In this article he points out some constructional improvements in the camera-modulator described in an earlier issue of *QST*.

A TELEVISED PICTURE might seem commonplace to the many who are fortunate enough to be living in localities where television programs may be tuned in with the nonchalance that comes with familiarity, or to those who have been able to view this phenomenon in laboratories or at public showings. Here in Hawaii, however, the story is a little different. Except for a very few who have been able to accomplish this feat by a trip to the mainland, the entire population, including most hams (whoever heard of a ham with enough dough for a trip?), have yet to see what an actual televised image looks like.

With a ham's curiosity, which is quite a factor to take into consideration, it was decided even under the existing circumstances to do something about it by constructing Jim Lamb's camera-modulator unit as described in the October, 1940, issue of *QST*.[1]

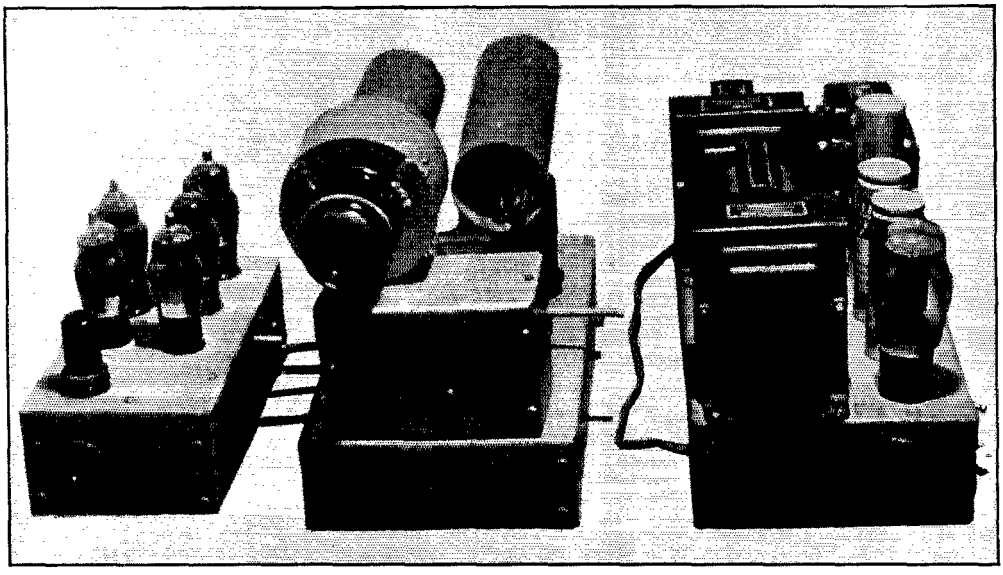
Sometime in August of 1941, with sleeves rolled up and fingers crossed, the gang here, consisting of K6AYD Tam, FAZ Katahara, THA Sone, QLG Kalehawehe and yours truly, stripped the decks for action. The result was that an exact replica of Lamb's unit was built. The different units were farmed out to the several boys for construction since our homes are scattered throughout the island, making it impossible for us to get together for a sufficient length of time to complete the project in one place. It might be said at this time that K6AYD was the only one of the gang who had the pleasure of witnessing television while a student at RCA Institute, and full credit for the success of this venture is hereby given him.

The Fun Begins

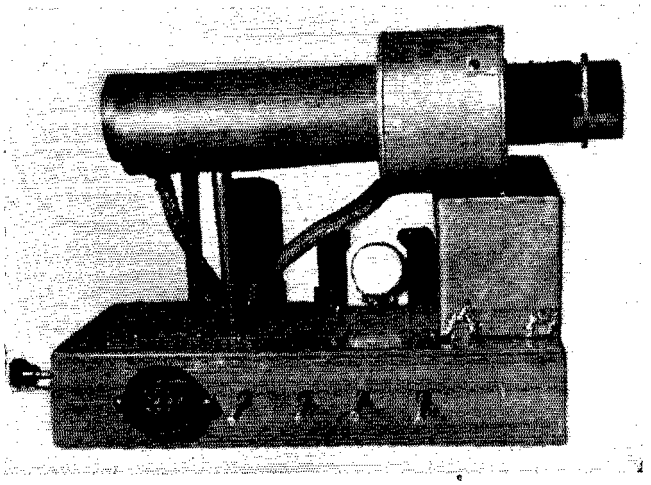
To say that the fun had just started then would be a gross understatement. After completion of all units, they were hooked up and the set turned on for the first time. Although our anticipation was running very high, the immediate results were not very satisfactory. In fact, no sort of picture, outside of a few optical illusions, could be picked up. A very thorough check of all circuits was made and, as might be expected, a few minor errors in wiring were found and corrected. This proved conclusively the theory that it is advisable always

* Wailuku, Maui, T. H.

[1] Lamb, "Television Camera-Modulator Design for Practical Amateur Operation," *QST*, October, 1940, p. 11.



The complete camera-modulator combination and its power supply, assembled and in operation.



Side view of the camera-modulator unit built by the K6 gang.

to check thoroughly any type of equipment before "firing" it up, a practice which to my knowledge is seldom followed by most hams.

With hope revived sky high, the rig again was turned on. The results of all this extra labor were gratifying, as a faint picture now could be picked up on the monitor. This picture, nevertheless, left much improvement to be desired.

Before anything else could be accomplished, December 7th burst upon us, turning the red light on all activities. With all energies turned to more important things, television was shelved for the duration — or so we thought. Those hams who have experienced total black-out restrictions like those we underwent here in Hawaii after Pearl Harbor will understand how long a night can be, so it isn't surprising that, since usual hamming was out for the duration, interest in our television experiments was revived.

Shielding the Video Amplifier

In October of 1943 whatever parts of the original units could be scraped together were dusted off and activity resumed. Attention first was focused on the video amplifier. With the "ike" bias at the most negative position, the video gain could be turned up with no sign of instability. However, decreasing the bias would cause instability and produce a signal which would black out the raster on the monitor.

Since it was apparent that stray pulses affecting the final picture were being generated, the first two stages of the amplifier were put into individually shielded compartments. This arrangement put the 6J7 grid cap just below the collector ring, thereby eliminating the short shielded line to the 6J7 grid. An 1851 was substituted for the 1852 in the stage following the 6J7, since this arrangement provided better circuit isolation. This put the 6J7 at a higher level, making the grid lead to the 1851 direct and short.

Front view of the camera-modulator unit with front shield and lens removed, showing the alterations which were made in the original design.

The front end of the original video shield was cut off and a larger shield, 4 inches in diameter and 3 inches long, was installed. This provided about an inch clearance all around the collector ring, reducing the capacity between the ring and the shield to a minimum.

After these changes had been made the video amplifier appeared to be very stable. The front cover of the enlarged "ike" shield was designed so that it could be removed to facilitate installation of the collector ring and 6J7 grid connections. With the pick-up removed and the front cover replaced, a 10,000-cycle tone from a signal generator fed to a test prod inserted into this opening would produce a clean signal which would tend to overload the amplifier whenever the prod was brought closer than about one-half inch from the grid. With the test prod in this position, the output as measured with an output meter was 25 volts. The 10,000-cycle output signal was found to be excellent as checked on a 'scope.

The "ike" bias resistor, R_2 in *QST*, was next removed, with the result that the bias range was increased, thereby providing smoother control. The polarity of C_{20} was found to be reversed as shown in the diagram, so this also was corrected.

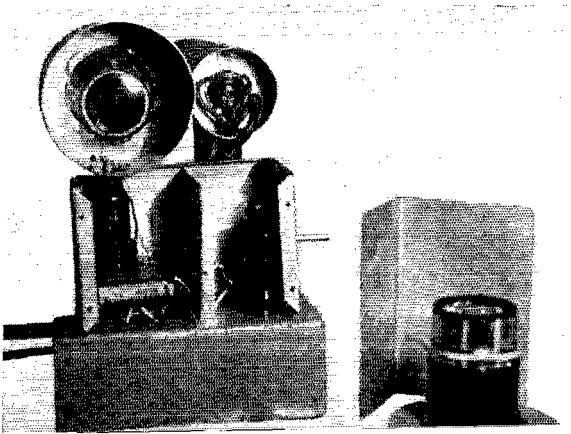
With all these changes incorporated, pictures of very good definition were obtained. What improvement, if any, could be attributed to the reduction in the ring-to-shielding capacity of the "ike" is not known, since no picture with sufficient definition for examination could be obtained when using the original 2½-inch shield.

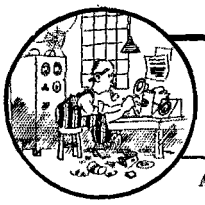
Reduction of Glare

Reduction of glare from the photoflood lamp while viewing the finished picture was accomplished by tapping off the vertical, horizontal and video signals from the camera and feeding them into a 3-inch 'scope in an adjacent room, which made viewing much more pleasant. Apparently this simple arrangement had no adverse effects upon the image.

Our original intention was eventually to put a

(*Continued on page 78*)





EXPERIMENTER'S SECTION

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

PROJECT A

Carrier Current

I WOULD like to report an experiment with low power to the fellows who are trying their hand at c.c. communication. When the distances covered fail to meet expectation, experimenters often seek to overcome discouraging results by increasing power. To you fellows who have been tearing your hair over continued failure, I say just use a 6L6 oscillator or final, with 450 volts on the plate, and you will get results as good as or better than those obtainable with higher power.

In fact, using a 1N5G tube which doubled for receiving and transmitting, I had a successful QSO with a fixed station at a distance of six good-sized city blocks. The power used was only 0.023 watts — 45 volts at 5 milliamperes. This is not a freak or a miracle. It shows how unimportant power can be. One-watt transmitters and single-tube receivers can be used with consistently good results for a radius of ten blocks.

After this discovery, I reduced power on my regular rig and found that the signal was greatest when the light in my room just barely blinked with the keying. The rest of the high power used before must have been consumed chiefly in boosting the line voltage in the house.

We now have four permanent c.c. stations in Cleveland, and we have had over 150 successful QSOs since July, 1943. The greatest distance worked is about one mile. Frequencies between 130 and 150 kc. have been used. Three besides myself have been faithful members of our network. Their names and c.c. calls are: Ralph Evanick, WWBUD; Zenon Zmijewski, WWZZ; Donald Hronek, WWDON. I am using the call WWACE.

We are stressing what we believe to be the chief object of wired wireless communication for amateurs — to train operators under conditions which approach as nearly as possible actual radio operating conditions. C.w. is the only type of emission in which we are interested.

Any interested person who lives in the southeast section of Cleveland is invited to get in touch with me by mail. — *Arthur Erdman, W8VWX, 12908 Hoy Avenue, Cleveland, Ohio.*

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Reasoning from the fact that the impedance of a 230-volt line is higher than that of a 115-volt line, one experimenter found that much improved results were obtained when the c.c. signal output was coupled to the 230-volt line.

In order to isolate the signal voltage from the house wiring and any appliances shunting the line, as well as from the meter, heavy r.f. chokes were placed in each side of the 230-volt line.

Coils which will resonate at approximately 150 kc. when parallel-tuned with 0.005-μfd. condensers may be wound with 72 turns of No. 12 enameled wire on a 3½-inch diameter form. If variable condensers are used, some latitude is provided for changing frequency.

If the light and power company offers no objection to this method of coupling the c.c. signal strength may be doubled at a distance of one-half mile, according to this investigator, who remains modestly anonymous.

— • • • —

I would like to know of anyone else in my district interested in carrier-current transmission. — *John D. Wilson, 214 N.W. 31st St., Oklahoma City, Okla.*

— • • • —

I am starting to build the 25-watt 6L6 transmitter described in the 1944 *Handbook*. I would like to hear from anyone in the vicinity of Buffalo or Snyder who is also interested in c.c. — *Adrian F. Richards, 50 E. Chateau Terrace, Snyner 21, N. Y.*

— • • • —

I am now an ardent experimenter with wired wireless and am building a transmitter with the coöperation of a friend. Keep up the good work in the Experimenter's Section of *QST*. — *Morgan Gibson, 6427 Kimbark Ave., Chicago 37, Ill.*

— • • • —

I have built the transmitter and converter for c.c. described in the March, 1942, *QST*, and would be glad to contact interested experimenters in my vicinity. — *Benjamin J. Hummel, W8PCQ, c/o Weather Bureau Office, Woodward, Pa.*

— • • • —

I would greatly appreciate hearing from anyone in Southern California interested in carrier-current transmission. — *Alvin Floris, 128 E. Artesia St., Artesia, Calif.*

— • • • —

I would like to hear from anyone in my vicinity interested in c.c. I now am using a Hartley oscillator as a transmitter. Later, when the necessary equipment is available, I am planning to build a larger rig.

I am having trouble with my receiver, as I cannot obtain a 6C8G tube or any substitute for it. — *Arnold Abrahamson, 126 E. 20th St., Long Beach 6, Calif.*

"Patrolling the Ether"

New M-G-M Movie Short is Dedicated to "Unsung Ham Heroes"

Scheduled for national release the latter part of May, the Metro-Goldwyn-Mayer two-reel special, "Patrolling the Ether," depicts the work of the RID — the FCC's Radio Intelligence Division — in policing the air lanes. A realistic dramatization of an exciting spy hunt, all amateurs will want to watch for it at their local theaters because the hero is a ham and because it is

"Dedicated to America's unsung heroes of the ether — who before Pearl Harbor were amateur radio operators, and today are giving their technical skill and their lives to America's war effort."

A brief synopsis of the story sequence follows:

Above — A proficient radio ham, young Phil Curtis (Richard Crane) is invited to join FCC's Radio Intelligence Division by RID man Bill Beck (Don Curtis). Phil's mother (Connie Gilchrist) seems to approve. *Left* — Beck and his new assistant set forth in a cruising mobile unit, under orders to locate a hidden enemy transmitter which has been sending information concerning the departure of an American convoy to a Nazi underseas fleet. *Right* — The signal emanates from a remote section of the city. Leaving the car, the RID men trace its exact location by a pocket detection device called the "Snifter," an important accessory of the RID.

Right — The "Snifter" leads them to the entrance of a cemetery. Soon they hear the footsteps of a woman walking toward one of the graves. Bill Beck follows, cautioning Phil to guard the entrance. When Beck does not return, Phil enters the cemetery. At the grave where the woman was seen he accidentally presses the tombstone. To his amazement the top of the grave swings back, revealing a well-equipped radio room below. The transmitter has been hastily wrecked, and Phil's flashlight picks up the dead form of Bill Beck.

Lower left — But the enemy signals continue. At RID headquarters it is learned that somewhere within the city limits the foreign agents are on the move in a radio car. Another RID mobile unit plots the general location and direction of travel of this car. Several mobile units, including Phil's, close in. The occupants of all cars in the indicated area are examined. Among the group is a taxi, empty except for its uniformed woman driver. Phil, studying her face, suddenly realizes that she is the mystery woman from the cemetery.

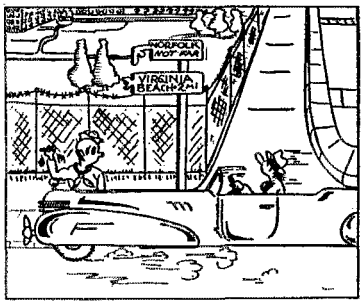
Right — Supposedly a taxicab driver, Hazel Brooks actually is a confederate of the enemy group. She gets away in the cab, but Phil and a heavily armed associate start in pursuit. After a running gun battle the cab is wrecked and the girl is killed. The picture ends with the Nazi subs lured into a trap set by American destroyers and bombers.

FLEET SERVICE SCHOOLS

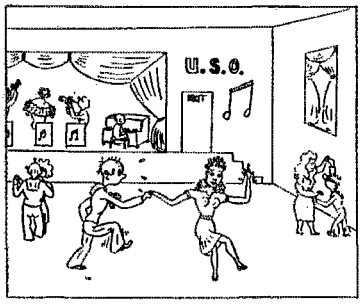
VIRGINIA BEACH, VA.

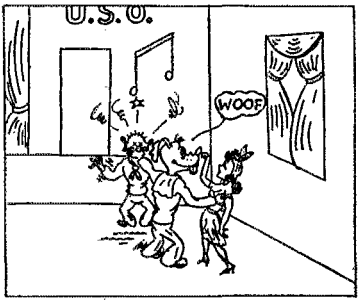
Part II — *(Continued from April issue)*

by Pat Hoch



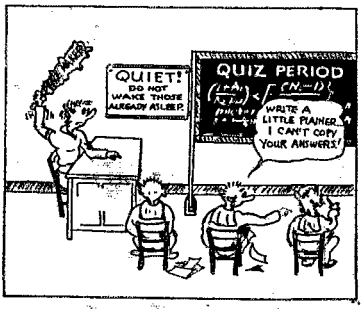
I stand out in front with about fifty others, anxiously awaiting my first trip to the big city. Transportation facilities are marvelous . . . busses every hour, and plenty of patriotic citizens to share a ride. The first bus rolls by like a greased piece of lightning. Oh, well — I can still get a ride with one of the local citizens. After standing around half an hour and doing everything but a hit-and-run act, I decide to walk.

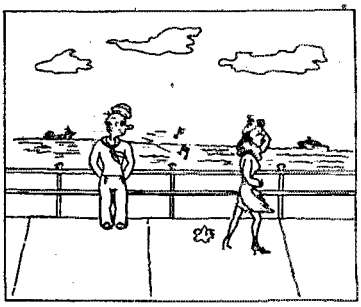


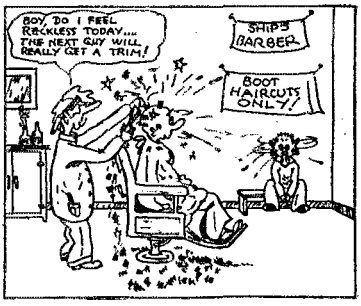


There's plenty to do — swimming in the ocean, walking up and down the boardwalk, playing bingo, dancing, and a big USO house. I'm strictly a "USO Sailor," so I amble down to give it the once over. There's a dance going on, so I think I'll find some nice little Southern gal that would care to dance a couple of numbers. Everything goes along smooth; I actually get to dance ten steps. Then, "Pardon me, mate — here's where I take over." Oh, well. You can't say I didn't try. . . .

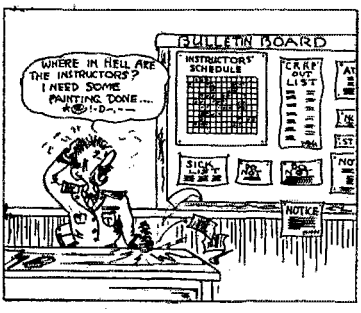
Monday it's back to the races again and I work up a new sweat. On Tuesday it's another inspection with some added gold braid. Plotting is my main worry now and I'll be damned if it makes any sense. . . . Room inspection Wednesday, and by now I'm convinced it's impossible to keep everyone happy. Some of the things are beginning to clear up, though. The marks are beginning to improve, too. At the end of the second week I don't mind the instructor breathing down my neck while I'm qualifying.

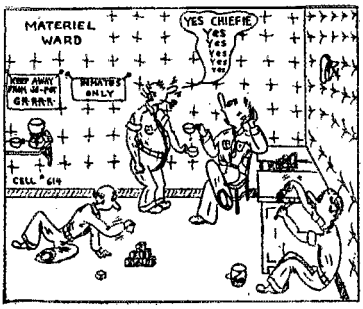




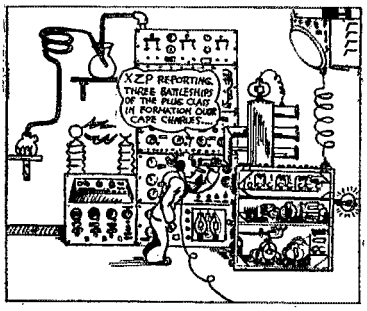


Liberty the second weekend is on Sunday, a nice *quiet* day, not like the liberties spent in New York or Philly or Chicago. Another day of knocking around, trying to find something special to do. Girls are scarce and much in demand, so there is no fun for me. . . . Back to school I go. Plotting is still a muddle . . . how does it tie in with my job, anyway? New gear to study, more "passouts in review," captain's inspection, room inspection, air-raid and fire drills. Study, study, study — that's all I do.

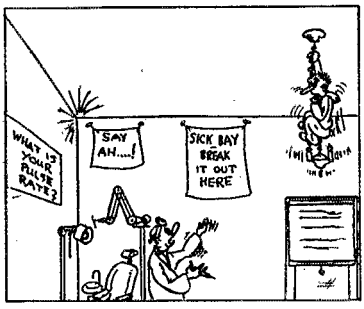


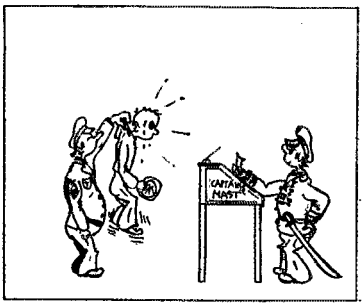


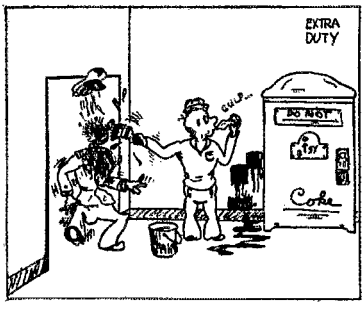
Well, I'm rounding the final bend in the course, but there's still plenty to be done. I'm called up to sick bay; my medical records have been lost and I'll have to take my shots all over again. Oh, me! They shoot me full of everything they can get their hands on — typhoid, yellow fever, tetanus, etc., etc. I'll be so sick they'll have to carry me away. . . . Then Captain's Mast is held, and I'm down for everything in the book . . . dirty whites, no watch mark, shoes not shined, dirty skivvy shirt, non-regulation socks.



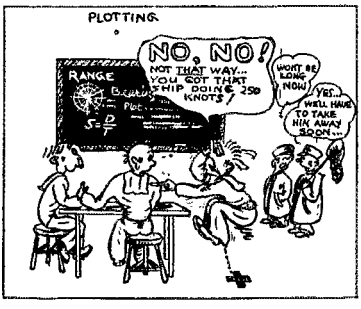
It's my first offence and I'm let off easy with only 95 hours of extra duty! The brig isn't quite completed and I haven't been paid in over three months, so all in all it isn't so bad. I'm told to report to the Master-At-Arms Shack six times a day. My first assignment is to paint the entire lower lobby. All goes well until I try combining painting and drinking cokes. During the process, I find myself applying a coat of paint to the officer in charge! . . . Looks like I'm to spend the rest of my naval career working out extra duty. . . .

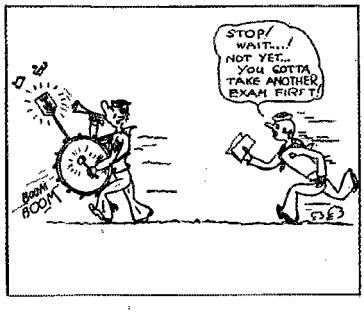


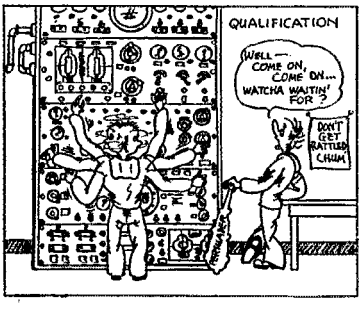




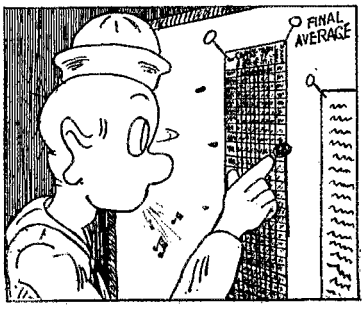
I'm still having trouble with plotting. The first week it wasn't so bad; all I had to remember was my three formulas for speed, distance and time, plus the fact that *C* plus or minus *D* equals *M* plus or minus *V* equals *T*. But now I'm so confused that the very thought of going to sea frightens me half to death. Someone dared me to snap a pair of parallel rules while the instructor wasn't looking, and there I made another big mistake. Now I'm to sand the tops of all the tables in the plotting rooms.







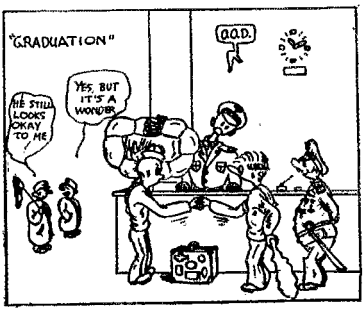
. . . Well, I can count the hours now. Tomorrow is the final day. All that's left is to qualify on a couple pieces of equipment. I actually believe some of these instructors were born with a grudge against the world. If a person had six arms and four pair of eyes he still couldn't cover all knobs, dials, meters, buttons and switches in the time allotted. Of course, I'm always the first one picked to qualify on new equipment, thereby giving the rest of the gang a good laugh.



In the middle of the night I'm practically shook out of my sack. "Have your gear loaded on the truck out front in ten minutes!" Outside of packing my sea bag, rolling my hammock, holding field day in the room, pressing my blues and eating chow, I've got nothing left to do.

Then someone starts the scuttlebutt that our grades have been posted, starting a mad scramble. I finally fight my way up to the bulletin board. The passing mark is 62.5. My final grade? Yep — 63!

The End



STRAYS

Ingenious as is the wire recorder described on page 10, it can't do everything. Quoting Robert M. Yoder in the February issue of the *Rotarian*, it "can't do the recording job one fellow wrote in about. Writing on the letterhead of a well-known insane asylum, he asked to buy or borrow one of the new sets, with a good supply of wire, as soon as possible. Said he needed something like that to take down the voices he has been hearing, and show up a lot of cynics who have doubted him. 'Lots of people don't think I hear these voices at all,' he complained."

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Dr. Albert Hoyt Taylor, ex-9YN, Chief Physicist of the Naval Research Laboratory, on March 28th received one of the two first awards of the Medal of Merit, in recognition of exceptionally outstanding services in his discovery and development of radar. Secretary of State Hull presented the medal to Dr. Taylor on behalf of President Roosevelt.

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One of the Signal Corps' famed mobile field headquarters radio sets, formerly an SCR-299 but now an SCR-399, has accompanied Gen. Sir Bernard L. Montgomery to England from Italy and North Africa. Named the "Golden Arrow" after the famed London-Paris boat train, the set was furnished by the U.S. Army Signal Corps to Gen. Montgomery, who used it in his campaigns in the Mediterranean theater.

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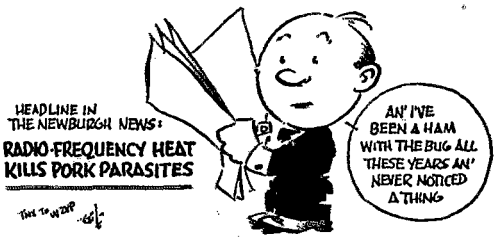
Hospital patients at Ft. Monmouth, N. J., are learning code reception and transmission or improving their speed while recuperating. Inaugurated as part of the reconditioning program, classes have been set up in the hospital and are attended by soldiers from all of the wards. The men are for the class 100 per cent.



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A speedy, economical process for food dehydration which for the first time reduces the moisture content to 1 per cent has been developed through use of r. f. energy. — *Science News Letter.*

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Five days before the first contingent of troops left England for the invasion of North Africa, a British firm began turning out batteries to replace those which had run down in American-made transceivers stored at the Signal Supply Division in England. At the end of those five days new batteries had been completed for the 11,500 Signal Corps handie-talkies requested by Gen. Eisenhower for the invasion.

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The new Signal Corps lip microphone employs tiny washers made of glass fibers bonded and pressed into wafer-like mats. They remain resilient and exert even pressure on the metal diaphragm of the mike under combat conditions.

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If dial cable slips, place a thin strip of adhesive tape around the dial pulley. — *R. T. Ackley.*

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A student in one of my classes asked me if I was a ham before the war. When I replied that I had been, another fellow asked me what my call was. From the back of the room came a long, low wail — the call of the wolf! It surely did bring down the house! — *W2MRK.*

The next generation of hams prepares to carry on. *Left to right:* James and John Moran, twin sons of W1BJU, aspire to become c.w. ops (even if their headphones are on backwards), while the junior operator at W9AVY takes over on 'phone. Helen Marshall, daughter of W1KFN-W2OCC, presumably plans to hold down the technical end as she studies the exam questions.

The war has accelerated research in the field of phosphorescents, the tiny crystals which convert invisible radiations to visible light. Some phosphors are so sensitive that currents smaller than one hundred-millionth of an ampere will excite discernible luminescence, whereas similar materials in coatings as thin as tissue paper can withstand high-voltage electron bombardment of sufficient intensity to crack an underlying Pyrex glass disc. Practical applications of phosphors are found in television kinescopes, fluroescent lamps, oscilloscopes and "magic eye" tuning indicators.

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A new recorder developed by Fonda Corp. of New York City provides eight hours of recording on a 350-foot cellophane tape. The endless ribbon of cellophane passes over a ring of idler wheels at a speed of about 40 feet per minute. One loop runs over a felt bed where the stylus embosses a groove of constant depth, modulation being applied laterally. The tape is one inch wide and accommodates 60 adjacent grooves. Permanent gem points, producing no shavings, are used for both recording and play-back.

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An "electronic ear," called the "Sonotest," is now being used in ordnance plants to test shell cases for the 20-mm. automatic cannon used in fighter planes and on warships. The sound caused by dropping shells on an anvil is picked up by a microphone and fed through a series of tubes. Perfect shells have a different vibration frequency and will ring longer than damaged ones. Relays light green indicator lamps if the shells are good and red if they are imperfect.

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Workers in General Electric's Schenectady plant, who built the powerful propulsion units and other vital electrical apparatus for the battleship U.S.S. *Missouri*, witnessed by television the launching of that ship in New York City. The telecast, the first ever made of an event so closely connected with the war, was picked up on receivers installed in the turbine shop at GE.

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Steel mills in this country are now producing more than 250,000 tons of steel a day, half of which must come to the mills as iron and steel scrap. To maintain increased production American scrap should be fighting — not rusting.

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The dry battery industry produced the equivalent of 3,750,000 radio battery packs during 1943, 98 per cent of which went to farmers living beyond electric power lines.

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Scientists and engineers are conducting experiments that promise the transmission of radio waves bearing the aroma of coffee, the perfume of the rose, the salty tang of the seashore, and many other scents. — *Broadcasting.*

Brain Storm

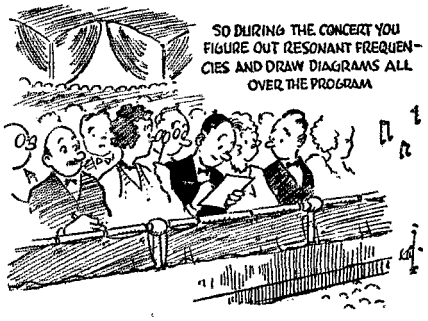
A "Hey Marge!" Story

BY A. W. WAYNE*

(*With apologies to W3IBX*)

IT ALL starts when a friend of yours takes you out to the airport for some "technical advice." After getting home it's like walking into a blitzkrieg. The XYL cuts loose with everything but the kitchen sink. The Sunday dinner was ruined; the steak was burned to a crisp — and it was all your fault. To make things worse, the Smiths are coming along in a few minutes to take you to the afternoon concert. Oh, those Joneses are a bore, you say. But it isn't the Joneses; it's the Smiths, she says. Well, what's the difference, they're both boring, you say, and so is the concert. That's all right, you don't have to sit next to them, and anyway the concert will do you good, she says.

Out at the airport you had tried to fix a transmitter in a private light plane. The guy who designed it had good intentions, but that's as far as they went. The thing was a hunk of junk. It could not be heard in the tower from the north end of the runway, 1500 yards away. So during the concert you figure out resonant frequencies and draw diagrams all over the program, while the people around you think you're squirrel bait.



When you get home you have a bite to eat and go to work. For the next two or three hours you slave, sweat and swear. Five ideas are dreamed up and then discarded. Finally you get an inspiration that is foolproof. Then the engineering starts. Little refinements are added here and there until you decide that the best laboratories in the world could not have done better. It's your masterpiece! It is perfect — absolutely perfect.

You draw it on a clean piece of paper and then make another drawing with a straightedge, triangle and scale. Now that it's designed, you wonder just how much it will cost. You reach for the latest "Gyppo" catolog, open it and read: "Everything in this catolog requires an A-1-J or better priority."

Hey, Marge! What picture are they showing at the Strand tonight?

*1421 Federal Way, Salt Lake City, Utah.

HINTS AND KINKS FOR THE EXPERIMENTER

MOUNTING A CRYSTAL HEADPHONE FOR MICROPHONE USE

MANY 'phone operators have found that the Brush crystal headphone when used as a microphone affords more satisfactory voice quality than some commercial crystal microphones. The quality is crisp, cutting through interference with ease.

Fig. 1 shows a mounting which may be easily constructed and is attractive in appearance. The materials needed, besides the crystal headphone, are a "bullet-shaped" bicycle headlamp shell, a 2-inch length of threaded ⅛-inch (inside diameter) pipe such as may be found in many electric light fixtures, with lock nuts and washer, simple wood turnings for the base and pedestal, a 5- or 6-foot length of shielded rubber-covered cable, a 3-inch square of wire screen or a tea strainer of suitable dimensions, and some cotton batting. Construction and assembly are clearly indicated in the diagram.

The bicycle headlight shell may be salvaged or bought from a bicycle or auto-supply dealer. One excellent type has a chrome-finish rim on a satin-aluminum body. The original mounting clips are removed and a ⅜-inch hole is drilled to admit the threaded pipe. If a suitable tea strainer is not available, a square of wire screen is formed by laying it over the lamp lens on the concave side and forcing it to shape with the fingers. When it is shaped and trimmed it is substituted for the lens in the rim.

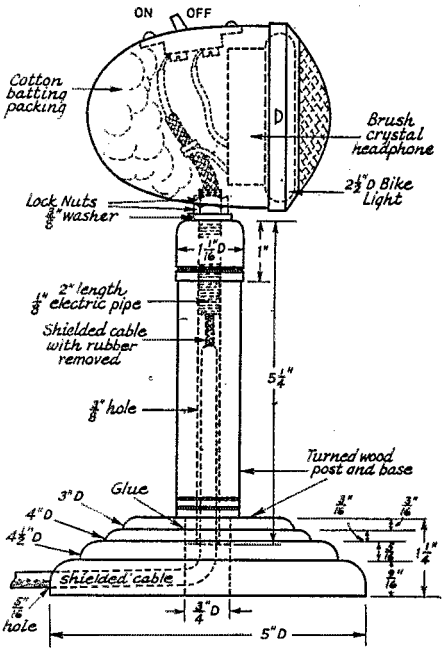


Fig. 1 — Details of a homemade microphone mounting for use with a crystal headphone unit.

The base and pedestal are formed on a wood-turning lathe and bored as shown in the drawing. They are glued together and finished with aluminum or chrome lacquer. The threaded pipe is screwed into the top of the pedestal.

About five inches of the rubber covering is removed from the shielded cable which is threaded up through the pedestal. Connections are made with the terminals on the headphone, the shielding being used as one lead. Sometimes better results are obtained after reversing the connections. If the bike lamp has a switch installed in it, this switch may be used as a stand-by switch for the microphone.

The inside of the shell is packed with cotton batting behind the headphone and around its edges to kill cavity resonance. Care must be taken to make sure that the headphone does not rattle in the shell.

A similar homemade microphone mounting was described in the September, 1939, issue of *QST*. A Chevrolet 1926 cowl light was used as the shell in that job, and the pedestal and base were made from an electric light fixture, using the canopy, lacquered tubing and threaded insert. — *Carleton E. Beck, 64 Morrow Ave., Lockport, N. Y.*

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CONVERTING SHIM BRASS TO SPRING BRASS

WHILE experimenting with the construction of parts for a transceiver, I discovered a handy kink. "Shim" brass, although normally too soft for use in leaf-type switches or as a vibrator reed, can be work-hardened into a passable substitute for spring brass. A strip of the shim brass is cut to a width about ⅛-inch greater than that required for the finished part. A piece of ¼-inch rod is gripped firmly in a vise. Both ends of the brass strip are grasped firmly by pliers and the strip is drawn back and forth over the rod. About 18 "cycles" are applied to each side of the strip in this manner. Then 1/16-inch is clipped off each edge of the strip. This gets rid of the little cracks which appear during the drawing process. If not removed, these would lead to failure of the piece if used as a vibrator reed. Shim brass of 0.01-inch thickness is relatively plentiful. Spring brass? Unh-unh! — *Gurdon R. Abell, jr., W2IXK.*

USING THE SUPERREGEN AS A CODE PRACTICE OSCILLATOR

ANY WERS transceiver or superregenerative receiver can be converted into a code-practice audio oscillator by the simple method indicated in Fig. 2. If a loudspeaker is included in the unit, the arrangement will be admirably suited to code-class instruction work. The only parts required are a small paper or mica condenser and a key, connected between the juncture of the grid leak, the choke and ground. In many transceivers the grid-return lead is above the chassis and readily accessible for connecting the key circuit by means of an alligator clip. If the bottom of the grid choke isn't accessible, the system usually will work with the condenser connected directly to the grid of the detector tube. However, the connection shown in the diagram is preferable.

If a transceiver is used the switch must be in the "receive" position, of course. The superregeneration control must be advanced beyond the point of superregeneration until the keying is clean and solid. With careful adjustment, smooth keying without clicks or thumps can be obtained.

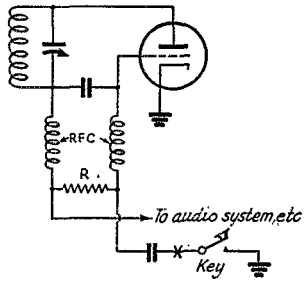

Fig. 2 — **Circuit diagram of method for converting a transceiver for use as a code-practice oscillator.**
C — 0.001-μfd. to 0.005-μfd. paper or mica.
X — Point at which a fixed or variable resistor may be inserted for tone control.

The frequency of audio oscillation may be changed by changing the capacity at *C*. With one transceiver a 0.001-μfd. condenser produced a tone of approximately 1000 cycles, while a 0.005-μfd. condenser reduced the signal to a 60-cycle buzz. A 15,000-ohm variable resistor in series with the condenser and key at "X" will provide a convenient wide-range control. The lower the resistance, the lower will be the tone. For some unexplained reason, insertion of this resistance enables the regeneration control to be used as a tone control over a limited range of frequency. A fixed resistor of 3000 ohms at "X" will permit a range covering the lower frequencies, while one of 15,000 ohms will shift the range to higher frequencies.

The audio oscillations generated in the detector modulate any receiver radiation, so that no antenna should be connected to the transceiver when it is being used for code practice. Since audio oscillation ceases when superregeneration is stopped, this method cannot be used for tone modulation during transmission. — *Walter E. Bradley, W1FWH.*

AIR VENT MAKES HEADPHONES MORE COMFORTABLE

IF A small hole of about No. 50 drill size is pierced through the side of each cap of a pair of headphones, as shown in Fig. 3, an appreciable increase in comfort is secured for the wearer.

Fig. 3 — **Headphone cap with vent drilled through the side to equalize air pressure for comfort.**

The vents serve to equalize the air pressure between the 'phone diaphragms and the ear diaphragms. They are small enough so that no additional outside noise is admitted through them, nor is there any noticeable acoustic leakage through them. The effect is to eliminate that drumlike sound and to relieve the stuffy feeling that comes from wearing headphones for long periods of time.

This "operation" has been performed for about 20 hospital patients who wear 'phones in bed. All report a big improvement in comfort. — *B. P. Hansen, W9KNZ.*

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SUPPORT FLANGES FOR HOLDING STANDARD RACK UNITS

A RECENT visit to a military station disclosed a handy gadget to facilitate mounting and removal for replacement or servicing of single units in standard-rack installations. Two simple flanges, as shown in Fig. 4, are permanently attached to the rack, either by flat-headed screws or rivets or by welding them on. These provide surfaces for holding a chassis or cabinet, which is slid onto or off the flanges, without the necessity of holding the unit in place while panel screws are being inserted and tightened. Thus one man can install heavy equipment which would otherwise require the aid of another.

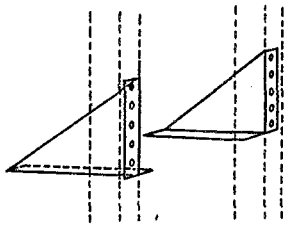

Fig. 4 — **Simple flanges attached to a standard rack make for easier handling of heavy units.**

The flanges are of very simple design and any ham could make them up from scrap sheet metal. If it is desirable to avoid any projection of the flange supports on the front of the rack, they may be mounted behind the front edge of the channel or attached at the rear of the rack members by drilling the necessary holes. — *C. B. D.*

A TWO-WAY INTERCOMMUNICATING SYSTEM

BELIEVE it or not, there is a "Little Rock" in the central Pacific ocean which boasts a modern intercommunication system. The circuit diagram of the "Mechanical Rat," as we call it, is shown in Fig. 5. I designed it and built it from such parts and tubes as were available for our use. While I am not at liberty to disclose the specific types used, the principle and the circuit are in no way restricted, and it will operate with the tubes and constants shown in the diagram.

The 5-inch permamag speakers serve also as microphones. We are using only two, although a larger number can be employed by connecting them through a single-pole multi-throw switch as indicated in the diagram. The transformers, T_1 and T_2, are identical output transformers, although the impedance match at the input end of the circuit no doubt would be better if a transformer with a higher-impedance primary were used.

If, as in our GI version of the circuit, all fixed resistors are of 1-watt rating, it becomes necessary to parallel two of them for the filter resistor, R_9. A 200-ohm and a 300-ohm resistor were used in parallel at this point in the original model. The circuit values given are not to be considered ideal in each case, as this was a rush job and, since the system is in constant use, we have little time to experiment with it. The gain and fidelity are sufficient for our purposes.

Some economy would result from replacing the present power supply with a half-wave rectifier circuit and an *RC* filter. The tubes would be a 45Z5 rectifier, 12SJ7, 12SF7 and 50L6. The heaters could be connected in series without any need for a dropping resistor.

If the equipment is to operate in the field of a transmitter, it is best to shield the lines to remote stations of the system. Otherwise, distortion is apt to appear. — *Pfc. William H. Hull, APO 457, c/o Postmaster, San Francisco.*

CHANGES IN NC101X RECEIVER FOR WARTIME USE

SOME owners of NC101X receivers may wish to extend the frequency coverage to other bands during these times when ham bands are on a lease-lend basis. The 19- and 31-meter b.c. bands as well as frequencies adjacent to the 80- and 160-meter amateur bands offer interesting listening. Additional use may be made of a receiver of this type by the proper installation of a phonograph jack so that advantage may be taken of the excellent audio quality to be found in these receivers.

The 20-meter range can be trimmed easily to cover from 15 Mc. to 15.65 Mc. without any sacrifice in tracking or sensitivity. The 19-meter short-wave broadcast band included in this range really roars through. Ankara (Turkey) and Leopoldville (Belgian Congo) come through like locals in Miami, Florida. The 15-Mc. signal of WWV serves as an excellent marker for the low-frequency end of this range.

By trimming the 40-meter range, the frequencies between 9.1 and 10 Mc. can be covered readily, using the 10-Mc. WWV signal for locating the high-frequency end of the new range. The 31-meter broadcast band is very much alive, and throughout the winter and early spring is dependable from afternoon to early morning for real DX.

The 80-meter range may be tuned to cover from 3715 to 4700 kc. This band includes several AACS and Navy stations which will provide good mill code practice. The band may be shifted slightly higher if desired. A calibrated signal generator is useful in spotting this range if the operator is not familiar with the frequencies of

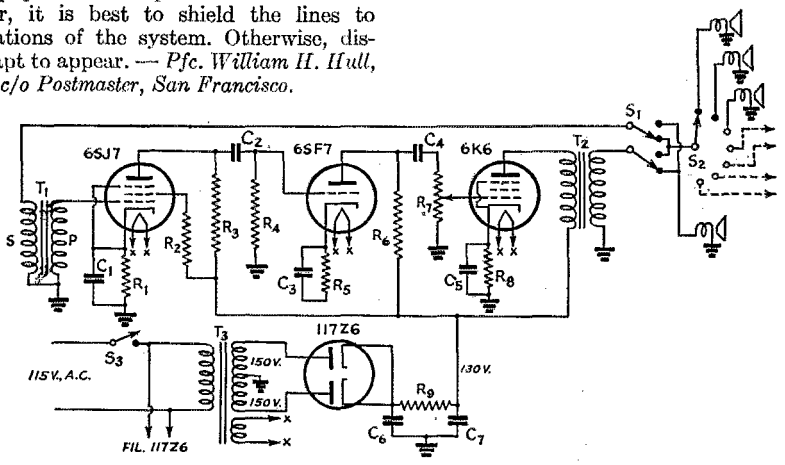

Fig. 5 — Circuit diagram of the GI two-way intercommunication system.

C_1, C_3, C_5 — 0.1-μfd. paper.
C_2 — 0.05-μfd. paper.
C_4 — 0.01-μfd. paper.
C_6, C_7 — 40-μfd. 150-volt electrolytic.
R_1 — 1000 ohms, watt.
R_2 — 47,000 ohms, 1 watt.
R_3, R_4 — 100,000 ohms, 1 watt.
R_5 — 3300 ohms, 1 watt.
R_6 — 15,000 ohms, 1 watt.
R_7 — 0.5-megohm potentiometer with switch.
R_8 — 3200 ohms, 1 watt.
R_9 — 120 ohms, 2 watts.
S_1 — D.p.d.t. switch with spring return.
S_2 — Multi-point rotary wafer switch.
S_3 — S.p.s.t. switch on R_7.
T_1, T_2 — Identical output transformers to match 6K6 to speaker.
T_3 — Midget power transformer, 150 volts each side of c.t.

the government stations, although any short-wave b.c. receiver may be used for cross-checking signals if a generator is not available.

If domestic broadcast-band coverage is desired, a little more difficulty is encountered in altering the 160-meter range for that purpose. Small 100-$\mu\mu$fd. mica padding condensers may be soldered in parallel with the regular padders and still allow sufficient clearance for replacing the catacomb cover. Obviously, not much of the b.c. band can be covered with the original main tuning condensers in the 101X. When the low-frequency end of the new range was set on the local-station frequency of 1360 kc. it was found that the receiver would tune slightly past 1540 kc. The tracking was excellent and the sensitivity good. Cross-country reception was possible after sunset.

As for the 10-meter band, I have trimmed and retrimmed this range without hearing anything of interest aside from a few harmonics of local c.w. stations. I am marking time until the local supply house comes through with three more padders for use in this range.

Some owners may wish to install a phonograph jack. I have seen and heard a number of weird circuits applied to this receiver, but found that the most satisfactory method is to break the second-detector grid return at the soldering lug and bring this lead out through a closed-circuit jack.

While the NC101X becomes a useful wartime receiver when realigned as described, I am nonetheless looking forward to the day when I can rip out all the extra padders, crank the circuits back on the ham bands and, with ears in xtal position, start fishing for those VKs again. — *William R. French, W2NYC/4.*

—•••—

IMPROVISED SOLDERING TORCH

IF A BLOWTORCH or spirit lamp is not available for a heavy soldering job, an excellent Bunsen burner can be improvised for use on the kitchen gas range. An empty vegetable can of a size which will make a snug fit is inverted over a gas burner. A small hole is punched in the end of the can, the gas turned on, and a match applied at the hole. A pencil point of hot blue flame will result which will heat any job that can be moved to the burner and make it ready for the solder in jig time. — *Frank Keefe, W1MTP.*

—•••—

TENSION FOR BUILDING SPACED FEEDERS

IT IS always a headache to pull up a pair of long wires and to hold them even in length and in tension when building spaced feeders. I have hitched one end of the wires to a solid support and the other end to the front bumper of the family car. By backing the car slowly, the wires can be pulled tight and even. When they look about right, the brake is set. The line is then ready for attaching the spreaders. If you're inclined to have a heavy toe on the gas pedal, however, take it easy. — *Owen Shepherd, jr., W1IJ.*

TEST TERMINALS IN H.F. OSCILLATOR GRID CIRCUIT

IN ORDER to secure optimum performance in a superheterodyne receiver, it is important that the correct output be maintained from the high-frequency oscillator. There are various reasons why the need may arise for checking this

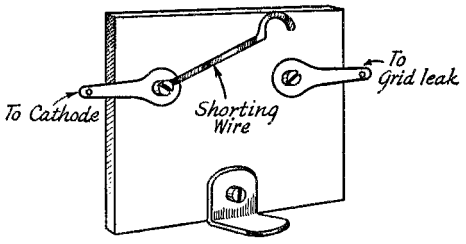

Fig. 6 — A simple method of installing test terminals in a high-frequency oscillator grid circuit. Normally closed, the link is opened when measuring grid current.

value. Circuit changes or the addition of another set of coils furnish examples. For those of us who do not own a vacuum-tube voltmeter, perhaps the best method is to measure the oscillator or injector grid current. Recommended grid currents are listed in the tube manuals. Ordinarily this test involves unsoldering the grid leak. Fig. 6 shows how terminals may be installed in the receiver to facilitate such measurements. — *Gordon Crayford, Lacombe, Alberta, Canada.*

Strays

To clean a volume or tone control on your receiver, pour carbon tetrachloride over the outside of the control, using enough so that the fluid will get inside. Turn the control through its complete rotation several times. Repeat if necessary. Most controls can be made as good as new by this treatment. — *Harris Adams.*

—•••—

A new method of solderless wiring in making terminal connections, engineered by Aircraft-Marine Products, Inc., employs a simple device resembling a pair of pliers. Pressure on the handles of the tool crimps the strands of wire into a homogenous mass, resulting in a perfect connection without the necessity for heat. This method provides foolproof connections even by unskilled workers and it may be employed where space is too cramped to permit the use of a soldering iron.

—•••—

A terminal connection for electrical wiring, which has insulation bonded to the terminal so that no insulation sleeving is required, has been developed by Aircraft-Marine Products, Inc., in connection with solderless wiring. In addition to making possible visual inspection of the connections at all times, the invention will provide great savings in labor and material.

CORRESPONDENCE FROM MEMBERS

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

IT KEEPS THEM HOPPING

Somewhere on the Italian Front

Editor, *QST:*

. . . One has to be in a foreign country, isolated from all contact with civilization as we have known it and denied the freedom of the air, to really appreciate what a magazine like *QST* means to hams in general. *QST* keeps us posted on the latest happenings in the radio world, and has proved invaluable on several occasions in helping this section iron out bugs in our GI equipment. Those hams who happen to be in the services will appreciate that statement.

We are four — four hams who by chance (or design) have been thrown together in this armored field artillery battalion. . . . I, W9FMB, was originally an "ol' sogger" in the infantry, stationed at Jefferson Barracks, Mo., where formerly I was on the air on 10, 20, 40, 75 and 80 meters, both 'phone and c.w., using generally, except on 10-meter 'phone, Herb Cooley's call, W9CIQ, the old "Come in Quick" station. . . .

Came the days of the armored force, and my infantry regiment was the first to be assigned to an armored division, the "Old Ironsides Division," formed at Fort Knox. From there I was transferred to this artillery outfit as communications chief. I was extremely fortunate in finding two more hams, Roy P. Benson, W9NJC, and Joe Eberhart, W3DNF. We three were the backbone of the radio maintenance of this battalion. Since coming overseas in 1942, I was fortunate enough to secure the services of Thomas Hoar, W2FRA, and the four of us run the maintenance for the entire battalion. If you think that a battalion has a small number of radios, guess again. This is an armored artillery battalion, and practically every vehicle has a radio of some type and in some cases two or three. That it keeps us hopping is putting it mildly.

For those who haven't had the dubious pleasure of pounding brass and scraping the old soldering iron for Uncle Sam, this is the way that maintenance is handled (theoretically). The operator is required to service and maintain his set. That little job is called first echelon maintenance. It includes changing tubes and fuses and being darned sure that the antenna is on and that all connections are made. The battalion electrician (one only on the T/O), is charged with the second echelon maintenance, which means that he can take off the top of the cabinet, solder loose connections, burnish relay contact points, repair broken cords, tune and adjust the f.m. sets . . . change crystals and install sets. All other repairs are lumped under the heading of third and fourth echelon maintenance. The Signal Crops provides trained technicians who are allowed to perform third echelon maintenance at higher headquarters. All fourth echelon maintenance is performed at bases. . . . We are equipped in the way of tools to perform just those functions and no others, and are given no spare parts other than tubes and fuses and a few brushes for the various types of dynamotors.

Now here is where the rub comes in. Being highly mobile combat troops, we *can't* just yank a set out of a vehicle and go rolling blithely along to the Signal Corps repair-truck location. In the first place, that takes too much time; secondly, the roads are too crowded; and in the third place, there never was a real ham who'd do that in the first place. So, Roy, Joe, Tommy and I begged, borrowed and stole enough additional tools to do what we needed to do, did the same for a small stock of spare parts, cajoled the CO into allotting us a half-track and a peep and built an armored radio maintenance vehicle (which we keep not too far from our position). We packed a few tools in the peep, and, with one of the ham technicians, I roll merrily from battery to battery doing what can be done in the field. What we can't get done in that manner, we take back to the maintenance half-track and there take care of the 2nd, 3rd and 4th echelon repairs ourselves.

Just why we are able to do this is obvious to any ham. What we aren't issued we improvise or manage for, and that isn't all "moonlight requisitioning," either. There are always casualties among vehicles, and when we pass one we exercise the age-old privilege of "salvage" when we can. That is strictly legitimate, as any parts pirate will attest. Now this all can be traced back to "bad" habits learned as hams when things weren't come by so easily, and when a rich Uncle Sam wasn't paying the bills for our rigs. . . .

We notice with gratification that *QST* is keeping up the fight on behalf of the hams who are in the services. I was unable to renew my ticket and was heartsick at the thought that I might lose my call or my operator's ticket or both. Keep fighting for us guys over here and you'll earn our undying gratitude.

If there are any brother hams who would like to QSO by mail, drop a letter to any of the undersigned [1] and we'll be glad to correspond. . . .

— CWO John W. Harrington, W9FMB
— T/Sgt. Roy P. Benson, W9NJC
— Sgt. Joseph F. Eberhart, W3DNF
— Cpl. Thomas J. Hoar, W2FRA

[1] Under censorship regulations *QST* is unable to publish complete overseas addresses. Letters may be sent c/o ARRL Hq. for forwarding.—EDITOR.

ON THE JOB

89-30 134th St., Richmond Hill, L. I., N. Y.
Editor, *QST:*

The real truth of how many of us gradually and unnecessarily are forgetting we are at war with an unpredictable and resourceful enemy was impressed on my mind today when I reported at our precinct station for our regular WERS Sunday drill period.

Police stations are never very pleasant at any time, and today the halls were dim and empty as I approached the control center. All was silent, with only a solitary light glowing in this great center, its many booths empty and lifeless.

Of all of our dozens of wardens and their assistants, who was on guard? Not one, and it seemed that no one cared. There were the usual police personnel in the station proper, but no members of the air-raid warden service were in evidence.

I'm very happy to relate that all of our WERS operators were on hand, however. W2JSV and our YL op. reported as usual, and I was proud to hear the operator at Control in Borough Hall commend all of us on the greatest turnout that he could remember.

This spirit will continue, as the amateur does not get tired of rendering service. If there is nothing else to do, he finds some way in which to improve the service of the outfit of which he is a member. I am sure that I am speaking for the amateurs who are still at home when I say we will be at our transmitters when other services are easing up on their responsibilities.

— *John J. Evans, W2ONA*

HAM INGENUITY

c/o Fleet P. O., San Francisco, Calif.
Editor, *QST:*

. . . My unit is one that services patrol planes. Our unit and the patrol unit have several men who repair, maintain and operate ordinary — and extraordinary — radio equipment.

It is an established fact that in the shops and in the air the hams are by far the most valuable men in the entire radio section. Their ingenuity under all manner of trying conditions is far above heights approached by personnel without ham experience.

The man with ham experience thinks nothing of using a piece of aluminum from the plane to repair a condenser that has been shot out. The resulting condenser has an unholy appearance — and heavenly operation. Lives are saved. Apparently there is nothing that the ham cannot do when it comes to improvising gear to replace that lost due to operations, or any other reason.

A partial list of the hams associated with this group includes: W7HPM, W7GYH, W5IYZ and W6INS. There are a few others at advance bases, but I do not have their calls. I am not doing active radio work due to my present responsibilities, but in this position I can help the radio gang clear up their problems better than if their executive were not sympathetic to such problems. . . .

— *Lt. E. B. Babbitt, USNR, W9QDQ*

INDEPENDENT TESTIMONY

Somewhere in the Arctic
Editor, *QST:*

. . . Like thousands of other men, I have become a radio addict by necessity rather than choice, but . . . I would like to add my testimony to that of many others in saying that the remarkable development and operation of the wartime radio services would have been impossible without the pool of men with amateur experience. . . . Surely several years would have been required to train men with equivalent ability.

— *Lt. R. W. Blake, Officer in Charge*

WARTIME QSL'S

748 Glenview Rd., Glendale 2, Calif.
Editor, *QST:*

. . . The point of this letter is war QSLs — those QSL cards exchanged since December 7th. There is still a big thrill in receiving a QSL from the postman and it is perfectly possible, even now. All that is necessary is to carry a good pencil wherever you go. Whenever you come across a suitable place, write your call with "QSL, OM?" after it. The first time I tried this I hardly expected a card. But when I again visited the place where my call was written, there was printed under it "W6TOW." I sent him a card and received my first war QSL. After two years, I again get a QSL!

I propose to have a running contest to see who can get the most war QSLs and the best DX. The rules are simple. You can print only *your own* call. (No fair writing down Johnny's and having him do the same for you.) No fixed contacts allowed; that is, you can't tell another ham where you wrote your call so he can find it easily. No QSLs count that were obtained by disobeying the rules in any way. (This means you can't paint your call in red letters three feet high on the side of the city hall.) You actually have to get the other fellow's card before it counts. Just seeing his call isn't enough. . . .

Best score to date: Tied for first with one apiece are W6TOW and W6ULE. Let's see if you can do better!

— *Frank Williams, W6ULE*

A POTENTIAL HAM

13 Chandos St., Keighley, Yorks, England
Editor, *QST:*

QST continues to arrive in good shape and up to the present time I have not lost a single copy thanks to the Navy on convoy duty. . . .

. . . During a recent flight, BRS5687, who is in the RAF, stopped at a small place in the Belgian Congo. There he found a Belgian going over the 1936 edition of *The Radio Amateur's Handbook*. Although he could not read a word of English, the Belgian was trying to glean what he could from the diagrams. Enthusiasm — and a potential ham in OQ5 land for postwar DX!

— *H. Beadle, G8UO*

CONTRAPOLAR COMMENT

163-18 Jamaica Ave., Jamaica, N. Y.

Editor, *QST:*

It was with great interest and gusto that I perused Sgt. Wildenhein's "The New Contrapolar Frequency Spectrum" in March *QST*. It was indeed a masterpiece of theoretical and factual (?) *dolce far niente!*

Some three years ago Johnnie Slack, W2DGJ, and I conducted some interesting if not bizarre experiments in Queens County. Of course, some of the boys in this county will naturally discount whatever emanates from the environs of St. Albans (that's where we live), but that is to be expected. At any rate, if you will but consider that DGJ is famed far and wide for the "Slack Beam" and DKH modestly admits to be the originator of "Roth's Theory of Alternative Cyclic Misbehavior," you will appreciate the fact that anything can happen to us. . . .

It was while DGJ was catnapping a little more than three years ago that he awoke with a tremendous start. His OW at that time thought that the OM had awakened to eat. Ninety-nine times out of 100 that would have been a correct surmise, but this was the 100th time. DGJ had a terrific idea. He immediately contacted DKH on 2½ meters. To insure secrecy, we used i.c.w. at 8 w.p.m. That's pretty fast on 2½.

Slack's idea was fantastic. It appertained to the isolation of any alternation starting from 1 cycle up to infinity. That sounded like pure Sanscrit to me, but when he assured me that just before he awakened he actually had seen the apparatus in operation at my home, I became interested.

The way it works out with us, DGJ thinks 'em up and I make 'em. . . .

The apparatus was simple enough. In the main it consisted of — on second thought, we'll keep it to ourselves.

Suffice it to be said that one night we successfully isolated the 230 megaälternation on 2½ meters in St. Albans. Suddenly bedlam broke loose. W5s, 6s and 7s pounded in on that portion of the band in the vicinity of 115 Mc!

Naturally, we could not keep this to ourselves. But, although we told every ham who would listen to us, the scoffers could not be convinced!

Nevertheless, DGJ and I have the rig working right now, and whenever WERS is on we have no difficulty in hearing sigs from any part of continental U. S. A.

Some of you may wonder if we have developed a transmitter employing the same principle. With due modesty we must admit that we have, but the truth of the matter is that we finished it on that infamous day in December, 1941. Restrictions being what they are, we haven't made any attempts to try it out. We are actually afraid to turn it over to the local WERS, because the transmitter's signal is bound to cause interference at any point on the East Coast. . . .

DGJ, who has beautiful handwriting, will answer all inquiries that are addressed to us in good faith.

— *Louis H. Roth, W2DKH*

25 West Broadway, New York, N. Y.

Editor, *QST:*

. . . I thought you might be interested to look at a very similar piece which I did in 1910 in *Modern Electrics*, in the June issue of that year.

While of course I did not use alternating current, the ideas of the two articles seem to parallel closely.

— *Hugo Gernsback*

EDITOR'S NOTE. — Mr. Gernsback's article reporting the 1910 discovery of contrapolar current under the designation "ultraelectronicity" is reproduced below.

NEWS FROM MARS

By O. U. Mars-Eline

(Marisian correspondent of the "Screech")

An important and far-reaching invention has just been made by Professor Spif Marseroni, the famous inventor of the "Telewirltransport," the founder of the "Interplanetarian Food Co.," the "Interplanetarian Remembering Co.," etc., which the writer reported in the February, 1909, issue of the "Screech."

Professor Marseroni calls the product of his new invention Ultra-Electronicity.

Ultra-Electronicity is the reversal of common electricity and many hundred strange phenomenae have been produced by means of the new fluid.

Professor Marseroni had the queer idea to reverse the apparatus and instruments usually used to produce or conduct the common electricity. For instance he took the ordinary insulated wire and reversed it, i.e., he took a cotton thread and ultra-insulated it with wire.

Thus we have single and double copper covered thread or string.

All the binding posts on his apparatus are of wood, of course, or fibre or hard rubber, etc., while his ultra-insulators are of metals.

An ultra-magnet is shown in the sketch. The core is of hard rubber or wood, the coil heads H of iron, brass or tin. The ultra-insulated thread T is wound on the core as usual.

If now ultra-electronicity is connected to the threads a and b the core becomes electronicimagnetical, i.e., the armature A (of hard rubber or wood, etc.) is repulsed, not attracted. You see everything is reversed.

Professor Marseroni's ultra-battery is made as shown in sketch. A hard rubber plate and a wooden plate are inserted in dry glass dust. The jar is of metal so that the ultra-batteries cannot become ultra-shorted by ultra-contact.

This ultra-battery when large enough is quite powerful and if the two leads are brought in ultra-contact a small explosion occurs, instead of a spark of an ordinary battery.

The surprising part, however, is that when the leads of an ultra-battery are ultra-shorted, they do not become hot, but become extremely cold, and if the leads so ultra-shorted are wrapped around a metal tube filled with water, the latter will freeze in a few seconds.

Consequently ultra-electronicity cannot be used for heating, only for freezing. Thus Professor Marseroni conducted sad-irons which freeze the laundry, curling "irons" (made of hard rubber) which freeze the curls, etc., etc.

If one takes hold of the bare strings of a powerful ultra-battery, an extremely pleasant cooling sensation is experienced, not an unpleasant shock.

If the ultra-current, however, becomes under 500 ultra-volts, the effects are fatal, as the person is frozen so rigidly in less than a second, that it takes hours to thaw him or her out.

The government is already utilizing this method to ultra-electronicute persons condemned to death. The freezing death is said to be very pleasant and devoid of pain. At least this is asserted by the spirits of persons so executed.

An ultra-lamp is made by "freezing" a thin glass filament in the open air. The thin glass filament when passed by a strong ultra-current becomes so terribly cold that it emits a pure white light, which is very pleasing.

"THE SPIRIT'S STILL THERE"

c/o Fleet Post Office, New York, N. Y.
Editor, *QST:*

. . . W2MBD's letter in October *QST* has inspired me to go still further with the topic: "The spirit's still there." It so happens that W2MBD and I are on ships very much alike, have operated in the same ports, and the chap he mentions in his letter introduced himself to me in the same manner.

W2MBD and I met in rather an odd manner. Sitting beside him while riding on a bus at a foreign base, I happened to mention coming from Long Island. That was all he needed. "Are you a ham?" was the beginning of a nice friendship.

This is only one of the many times I've bumped into hams all the way from Ireland to South America. Recently, while my ship was in a Navy yard, the old ham spirit bloomed again in all its glory. A radio matériel officer, in the shack on a routine inspection, spied my old QSL card displayed there, and asked: "Who is W2HJE?"

The question brought about a conversation that proved the two of us to be old buddies from 40-meter days. We often had worked one another, but had never met personally.

Space in your columns is the only factor that limits my relating the numerous times the old card on the bulkhead has started welcome and warm conversations with otherwise aloof military officers. Do you blame me for wanting to agree with W2MBD that "the spirit's still there"?

As I go into my tenth year as a ham, I realize more than ever that there is nothing like amateur radio and the ARRL. All of us fellows in the services look to you at headquarters to keep both of them going until the time comes again when we can pound brass because we want to keep that sked with the fellow on the opposite coast, and not because the CO wants us to get through to the beach.

Keep up the good work, and keep *QST* rolling to the men out here.

— *Eddie B. Frye, RM1c, W2HJE*

POSTWAR EXPERIMENTATION

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

There has been a goodly amount of crystal-gazing of late in an effort to prophesy the nature of the postwar amateur station. Most of these efforts have been directed toward describing the operating end of the station, the transmitter, receiver, etc.

The building end of the business, and the accompanying shop practice of the ordinary amateur are, I believe, due for a few changes too. Since the trend of modern practice is to place more of the important parts of a circuit *inside* the "bottles," and since, due to the inherent nature of amateurs, it never will be possible for manufacturers to build precisely what each amateur may want, I foresee the time when amateurs will carry their "home-brewing" to the interior of the glass envelopes. That will require new tools and expanded techniques.

Let us see what that will entail: First, a glass lathe. This could be purchased complete, or could be an attachment to an existing lathe. Possibly it may be homemade from some bicycle sprockets and other junk. Second, some blast-lamp arrangements. They will be as cheap and common as soldering irons. Third, a vacuum system. This will be much simpler and less expensive than the production jobs because of the smaller necessary rate of evacuation. Fourth, an assortment of envelopes, metal-glass seals, cathode and cold electrode structures. These will be purchased as we now buy resistors, condensers and other small hardware. Fifth, miscellaneous materials such as wax, phosphor material, photo-electric and getter materials. These will be kept on the same shelf where we now keep coil dope and soldering paste.

So it can be seen that, with little additional equipment and material, the amateur will extend his experiments to the other side of that thin glass wall, a territory which, to date, has been forbidden ground. No longer will he gaze in helpless rage at a broken filament in the "bottle" he gave up smoking to buy. He will set boldly about the business of repairing it, confident of being able to get it working once more.

Since I have prophesied this much, I am going to go just a bit further. I foresee some of the most ingenious and important advances in electronic technique as the result of turning amateurs loose on the inside works of tubes. It happened outside; now let's get inside and turn things upside down!

— *Gurdon R. Abell, jr., W2IXX*

EXPERIENCES OF A K6

c/o Postmaster, San Francisco, Calif.
Editor, *QST:*

Just finished reading "Report from K6" by Hugh Rea, K6OTH, and enjoyed it very much. I am unable to be very specific, but will try to give you a brief résumé of what has happened to this K6. . . .

In October, 1941, having just returned from San Diego, my orders came through for a tour of duty at Guam, M. I. . . . I left dear ole K6 on a transport just about ten days before the attack on Pearl Harbor. I didn't quite reach Guam, thank heaven, because when the news of the blitz came through we changed course and, though we didn't know it at the time, headed for Australia. . . . Well, it wasn't a pleasure cruise from then on. Watches were doubled and all the necessary wartime precautions taken. Merchant ships in the same convoy, which had stood out like white ghost ships in the moonlight, became a dull, dark gray in a matter of a few hours. In my fifteen years of service I had never before seen ships receive such quick paint jobs. . . .

Eventually we reached Australia and as we entered port we were given a welcome fit for a

(Continued on page 78)

OPERATING NEWS

CAROL A. KEATING, W9WWP
Acting Communications Manager

LILLIAN M. SALTER
Communications Assistant

Changes in Typical Element One Answers. It has recently been called to our attention that several of the suggested answers to typical examination questions for the restricted radiotelephone permit, as they appear in the reprints of the article "Training Auxiliary Operators for WERS" (pages 48 and 49 of October, 1942, *QST*) and on pages 36 and 37 of ARRL's *A Manual for the War Emergency Radio Service*, are in need of revision to insure an applicant of full credit when using them on an examination paper.

It is suggested, therefore, that students (radio aides and WERS-trainee instructors also please note) use the following answers to the questions as a basis of study hereinafter for restricted radiotelephone permit examinations.

On FCC Rules and Regulations

***Q.* State at least two classes of stations which cannot be operated by the holder of a restricted radiotelephone operator permit (13.61).**

A. 1) Standard broadcast stations.

2) Ship stations licensed to use telephony for communication with coastal telephone stations.

3) Coastal telephone stations or coastal harbor stations other than in the Territory of Alaska.

4) Television stations.

5) Any station employing A-1 emission.

***Q.* State at least two classes of ship stations which the holder of a restricted radiotelegraph operator permit is prohibited from operating (13.61).**

A. 1) Any ship telegraph, coastal telegraph or marine relay station open to public correspondence.

2) Any ship station licensed to use telephony for communication with coastal telephone stations.

3) Any radiotelegraph station on a ship compulsorily equipped with radio.

4) Standard broadcast stations.

***Q.* What is the holder of a radiotelegraph or radiotelephone first- or second-class license, who is employed as a service and maintenance operator at stations operated by holders of restricted operator permits, obligated to post at the stations? (13.75).**

A. His operator license, or a verified statement from the Commission (form 759) in lieu thereof.

***Q.* How may corrections be made in a log? (2.57).**

A. Only the person making the original entry shall strike out the erroneous portion, and he must initial the correction made and indicate the date of correction.

***Q.* Under what conditions may a station be operated in a manner other than that specified in the station license? (2.63).**

A. Any station licensee, except amateurs, may, during an emergency period when normal communication facilities are disrupted, use such a station in a manner other than specified, provided (1) that as soon as possible after the beginning of such emergency use the FCC in Washington, D. C., and the Inspector in Charge of the district in which the station is located are notified concerning the nature of the emergency and the use to which the station is being put, and (2) that the emergency use of the station shall be discontinued as soon as substantially normal communication facilities are again available and the Commission in Washington, D. C., and the Inspector in Charge be notified immediately when such special use of the station is terminated. The Commission may at any time order the discontinuance of such service.

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. Others conduct only code classes.

*Adirondack Amateur Radio Association, Gloversville, N. Y.
*Amsterdam (N. Y.) Radio Club.
*Cuyahoga Radio Association, Cleveland, Ohio.
*Radio Construction Code and Theory Club, Holtville, Calif.
Tucson (Ariz.) Short Wave Assn.

Illegal Operation. The New York *Times* for March 5, 1944, carried a story about the arrest by the FCC of Frederick A. Turner, who was charged with illegal operation of a radio transmitter. The *Times* quoted Louis E. DeLaFleur, monitoring officer in charge of the radio intelligence division of the Federal Communications Commission, as saying that "hams" are "the kind of people who won't obey rationing regulations," and that ama-

teur radio operators are among the first sought out by enemy agents and several have become dupes for them. According to the story, he also said that Turner and other "hams" have been interfering with war radio channels generally and, in particular, have prevented police emergency war messages from coming over clearly.

Such sweeping charges against all radio amateurs could not be allowed to go unchallenged, and we immediately took steps to uncover the truth of the situation. The New York *Times* has long been friendly towards amateur radio and Mr. DeLaFleur himself is an old-time ham — W8AU. It turned out that the objectionable parts of the story were due to the fertile imagination of an ill-informed reporter. The facts of the case were presented to Mr. Kennedy and Mr. Gould of the *Times*' radio department, with the result that the following retraction appeared in the April 5th issue:

RADIO AMATEURS PRAISED

FCC Official Notes Aid in Arrest of Unlicensed Operator

Louis E. DeLaFleur, monitoring officer in charge of the radio intelligence division of the Federal Communications Commission, did not liken amateur radio operators to "the kind of people who won't obey rationing regulations," as reported in *The New York Times* on March 5th in connection with the arrest of an unlicensed operator.

That person, Mr. DeLaFleur said yesterday, might be so defined, but he added that he specifically had refrained from casting any reflections on the amateurs as a body. He noted that it was amateurs who were instrumental in bringing about the arrest of the unlicensed operator in question.

Mr. DeLaFleur also described as incorrect a statement attributed to him that several amateur operators had "become dupes" of enemy agents. Nor did he imply, he said, that amateurs had interfered with war radio channels or that "several of them" were facing arrest.

Radio Class Questionnaires. In December we sent out questionnaire forms to all known radio clubs which held or are holding code or theory classes in conjunction with the ARRL War Training Program. These clubs totaled approximately 900. Out of this number only 92 reports were received; 22 forms were returned by the post office because of incorrect addresses.

This makes a pretty sad-looking percentage on which to base any claims for postwar amateur frequencies on the basis of service rendered to the nation by radio instruction, so we're making an appeal to you interested amateurs to run down some of these statistics of your club, whether active or disbanded, and send them in for tabulation. We'll be glad to send the questionnaire to anyone who requests one, or to any club representative who has mislaid the first questionnaire.

We know it's tough to dig up this dope in many instances, because club officials may have moved away or because club records may have been lost, strayed or stolen, but we'd even appreciate receiving estimates. Every little bit helps, and we want to use every possible worth-while item to help us regain those good old bands. So what say, gang, are you with us?

Club Bulletins to Members in the Armed Forces. Of late we've been receiving quite a few club bulletins and papers, published by local radio clubs and sent out to their club members in the armed forces at home and overseas. They seem to be the answer to a serviceman's prayer, judging from the comments some of the boys send back after receiving them. As one club put it: "We are trying, in our small way, to bridge the gap between ourselves and those men in the services, and to furnish them their only source of news of the gang 'back home.'"

These bulletins are splendid morale-builders because oftentimes they are a medium to convey those little humorous remarks about members of the local groups which cannot find their way into *QST*'s pages under Amateur Activities, because of space limitations. (We'd like to offer this as a suggestion to SCMs who have been grousing about the editorial "cuts" their reports have been taking at our hands.)

Our hats are off to the hardworking staff members of these bulletins for the swell job they are doing in maintaining the tie with home that our boys need!

Petticoats in CD. As it must to all able-bodied men, draft came last month to George Hart, leaving the Communications Department with a 100 per cent feminine population. Speaking for the entire population (both of us), I'd like to pledge to you our sincerest efforts in carrying on the affairs of CD. We certainly miss our former acting communications manager, and it will be no mean task to continue the splendid work he has done. With your help, gang, maybe we can do a passable job, at least!

— *C. A. K.*

BRIEFS

The first amateur get-together and hamfest in the Chicago area since Pearl Harbor will be held on Saturday, May 13th, in the Bal Tabarin Room of the Hotel Sherman. Under the auspices of the Chicago Area Radio Club Council, this meeting is being sponsored by the Chicago area manufacturers and distributors for the benefit of amateurs still on the "home front" and those in near-by service camps. The tentative program includes the showing of some of the latest films dealing with wartime radio, a speaker from ARRL headquarters, and an exhibit by the Signal Corps and Navy of captured enemy radio equipment as well as some of our most modern communications gear.

The Rochester (N.Y.) Amateur Radio Association resumed regular meetings on March 28th following an enthusiastic vote of approval at a recent hamfest.

From "Diallist," writing in the February, 1944, issue of *Wireless World*, we borrow the following helpful information: "Curious to find how many folk whose profession or trade is electricity in one of its many applications do not know how to touch a conductor about whose liveness there is any doubt. Of course, the best of all methods is not to touch it at all; still, there are times when we have to. Nine people out of ten will apply the fingertips. Then, if it does happen to be 'hot,' the muscles of the hand and forearm contract and next instant the hand is holding on to it with a vice-like grip. I had quite a business the other day to free a radio mechanic who was firmly and agonizingly attached to a source of 300 volts d.c., for there was almost no room to squeeze past him and get at the switch. If you are in any doubt and must touch, do so with the *backs* of your fingers. The muscular contraction which closes the hand then automatically removes them from the live conductor and there cannot be any gripping."

WERS of the Month

Gary, Indiana

"If you've got what we want, we'll back you 100 per cent. If not, we'll forget about it, and no hard feelings!"

This challenging statement, made to us by C. A. Boughner, Director of Civilian Defense for the City of Gary, Ind., was all we needed to spur our efforts. Things began happening immediately.

We already possessed a WERS license under the call WKMR. We had eleven station units, built after much tribulation on the part of a small body of amateurs led by Victor Christman, W9WEU. Now we enthusiastically went ahead with the design and construction of more transmitters and receivers, making antenna installations and creating volunteer classes to train new operators. The radio aide was made a Civilian Defense staff member; this proved of immeasurable benefit, since the locations of antennas and sites were always chosen by the CD staff.

The set-up originally provided for a central control and seven sub-control centers in which we were to set up our fixed stations. The balance of our units were to be used as portables or portable-mobiles. However, by September, 1943, it became necessary to modify our license to include several new units. Since we stressed portable-type units, the new modified license listed 23 licensed units for WKMR, all portable with the exception of the central control and the official monitoring station. (The duties of the latter are to monitor all transmissions and report off-frequency operation or improper operating procedure immediately.)

After experimenting with various types of antennas, including "J" and folded doublets, the half-wave "Y"-matched antenna, made from rods welded into a rigid unit and fed by an open-wire transmission line, was selected. An example of the experimentation necessary occurred at the control station. Although 100 feet of ⅝-inch coaxial cable was used at first to feed a half-wave vertical dipole, we were forced to discard it in favor of the "Y" match because of difficulty in keeping moisture out of the transmission line.

From our first class of 23 volunteers we secured 14 licensed operators. Immediately the test periods and drills took on more life. Limitless praise is due these volunteers, who served with enthusiasm, and also our small group of amateurs, who spent many a Sunday erecting antennas or constructing equipment. Since the third-class operators were not qualified to do this work, the technical jobs were done entirely by the amateurs.

Our first operation, begun in March, 1943, was not entirely satisfactory. The components for many of our units were extracted from old radio sets which had been collected in scrap drives. Since all of the units were of composite construction, bugs developed. In addition, our operating procedure was crude.

W9MVZ, radio aide of WKMR, Gary, Ind., is shown operating from the roof of the control station during the first WERS drill to be held by the unit.

Today, however, we look back with some satisfaction on the progress that has been made. Now our WERS units efficiently serve 110,000 people in an area of 100 square miles. Communication between all units and the control is entirely satisfactory, and in some instances are little short of phenomenal. Tests have been held with WKHY, 12 miles away, and numerous Chicago units (WHHI) are heard consistently. Arrangements are now under way to schedule tests with these stations. We have a total of 28 operators operating the 23 composite units, and more operators are being trained to operate the units now under construction.

Special mention for their work in connection with WKMR goes to W9MTL (assistant radio aide), W9EGQ (associate radio aide), W9WKN, W9WWG, W9JZA and W9FIC. They have devoted much of their time and energies to making a "finished product" of WKMR, but they all unite in saying, "We wouldn't have missed it for the world!"

— *Charles F. Reberg, W9MVZ*
Radio Aide, WKMR

BRIEFS

Contrary to public opinion of late, the CAP is as busy as ever and is growing in activity by leaps and bounds. The original work of the Patrol — the anti-submarine patrol — was taken over by the Navy in September, 1943. Since that time the original CAP Patrol Bases have been closed down, and are now engaged in other activities. The first Patrol force at Atlantic City is now located at Hadley Field, N. J., and is engaged in tow-target work for the anti-aircraft batteries. The Southern Frontier Commanders have expressed their appreciation of the work being done by the CAP Border Patrols. Other Patrol forces are now engaged in courier service, which is the carrying of small parts for the Army.

The work within the State Wings has been accelerated because of the training needed by cadets who have enlisted in the Army Air Forces. Although enlisted at age seventeen, these cadets are not inducted until they attain their eighteenth birthday. During that year they are assigned to the CAP, which gives them rudimentary instruction in radio, navigation, meteorology and military training. The Army Air Forces has assigned the CAP over three hundred A-3 type planes of the Aeronca or Taylorcraft type, designed for artillery observation. Cadets are given rides in these planes, but are not given any flying instructions.

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Inspired by recent examples in these pages, W9GQO sends the following engineering definitions, coined by students at the Lexington (Ky.) Signal Depot:

Core loss — Finding a worm in a half-eaten apple.
Q — Chinese pigtail.
Peak limiter — Window shade.
Short-wave band — Where amateurs transmit.
Broadcast band — Where you receive them.
Multipliers — Rabbits.
Sine — Something with "No Smoking" written on it.
Cosine — What your friend wants you to do to his note.
Load — What you carry out of a beer joint.
Load matching — Two fellows carrying out the same amount.
Storage battery — Spare pitcher and catcher.
Stacked arrays — Crooked cards.
Feeders — Soda straws.
Twisted pair — Groan-and-grunt wrestlers.
Surge — Kind of suit.
Selective fading — An exclusive crap game.
Speed regulator — Highway patrolman.
On the beam — Where termites congregate.
Colpitts — Lots of 'em in Pennsylvania.
Negative feed-back device — Slot machine.
Diode — One of the quintuplets.
Revolving field — What a drunk sees at a ball game.
Torque — Resident of Turkey.
Scratch eliminator — Soap and water.
Heising — A kind of glass.
Broadside — Directional characteristic of little girls who eat too much candy.
Hysteresis — What women go into when they can't get their way.
Tangent — Man with sun-baked epidermis.

Extra! Staten Island Shelled; WERS To the Rescue

THE accidental firing on February 5th of a rapid-fire antiaircraft gun aboard a United Nations freighter anchored in New York Harbor brought out 250 air-raid wardens to search for the 56 unexploded shells which were believed to have landed on Staten Island. After four hours the lack of adequate telephone communication in this residential center was felt, and the city's Director of Civilian Defense ordered out the WERS equipment.

At the specified time, seven WERS portable-mobile units were assembled; each car had a pack set or walkie-talkie for use in territories where cars could not go. WNYJ-181, a unit activated by a 6-volt storage battery and one which could easily be taken from the car in which it was installed, was designated as "operations headquarters station", and was located in the basement of an apartment house at the sector quarters of the air warden service. Assignments were then given to the other six portable-mobile units, and each was sent to cover a section of territory in the zone in which the search was being conducted. An air-raid warden was assigned to each portable-mobile unit to direct the operators in each of these sections, since many of the operators were not familiar with the neighborhoods involved.

Each time a shell was discovered, a report was sent immediately to operations headquarters via WERS. Army personnel then were sent to the location to remove the unexploded missile. Other traffic, pertinent to the work, was handled in an efficient manner.

The police precinct headquarters unit was one of the fixed stations used. Another was a fixed unit located on the highest point in one of the sections, which served as a relay station in many instances. Since there are more dead-spots per square mile in the Staten Island area than there are anywhere else in New York City, communication on 2½ meters was impossible at some locations. By moving the portable units a few inches to a few feet in some cases, however, it was possible to establish normal 112-Mc. communication.

The operators who were called upon to participate in this emergency, and who did such a splendid job, were: W2NH, W2FDV, W2CYN, W2MYS, W2BO, W2BGO, Gill, Bauman, Rocklein, Zucker, Crowley, Wahlquist, Capper, Cornell, Farkas, Fulshaw and Ochs.

This was the first time the CD-WERS of New York City was called upon to participate in anything other than testing periods or official drills. This workout was definitely successful — each operator conscientiously applied himself to the job at hand, and the traffic was moved quickly and without QRM. In addition, this demonstration served to familiarize officials and local citizens with the work that WERS is organized to do. It dispelled the idea existing in some minds that WERS was just composed of a "bunch of radio amateurs letting off steam in an endeavor to get back on the air." By this work, CD-WERS was proved to be a service that every community should possess.

— *W2BGO*

BRIEFS

Horatio A. Gray, radio aide for WJSU of Fall River, Mass., sent in the cover marking of a battery received by his gang from the OCD recently. The date of manufacture stamped on it was September, *1492*. He wonders if it was intended for use in the rig on board the *Santa Maria!*

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Morris Dorsey, 442 Cherokee Ave., S. E., Atlanta, Georgia, writes: "I think I've hit upon an idea that should be in use by everyone who gets *QST* regularly. About two or three months ago I started mailing a clipping from *QST* to each of several of my ham friends in the armed services. To one ham in England I sent a clipping from Operating News, to another in the Southwest Pacific I sent complete chapters of 'Who Killed the Signal?', Splatter, It Seems To Us, Strays, Hints and Kinks, etc. I've even sent ham-ads that were appreciated, if the replies I've received via V-Mail are to be believed! Every one of the fellows 'over there' has expressed a desire for me to continue to send them these clippings . . . and I will! I'll admit that the carrying out of my idea plays havoc with back copies of *QST* but, when you think of the great sacrifice these fellows are making personally, what sacrifice is there in 'cutting up' the current issues of a magazine?"

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A real candidate for the "hard-luck ham of the year" is Wilfrid E. Rogers, VE3ANB, c/o General Delivery, London P. O., Ontario, Canada. He was burned out of house and home while working as a postal clerk during the Christmas rush. The fire occurred at midnight — he lost clothes, a collection of good books, many new and valuable metal and wood-working tools, and all his ham gear. The latter consisted of a six-foot rack and panel transmitter, an RME receiver, oscilloscope, frequency meter, crystal microphone, six volumes of *QST* in binders, and $100 worth of new equipment bought just before war was declared.

VE3ANB also lost some 250 or 300 QSL cards, and would greatly appreciate receiving duplicate cards from any of the stations that he worked on 160- or 75-meter 'phone from November, 1937, to August, 1939. Whatsa, OMs? How about giving a fellow ham a "lift" in getting back his treasured QSLs?

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In a recent election, the following were elected the new officers of the Young Ladies' Radio League:

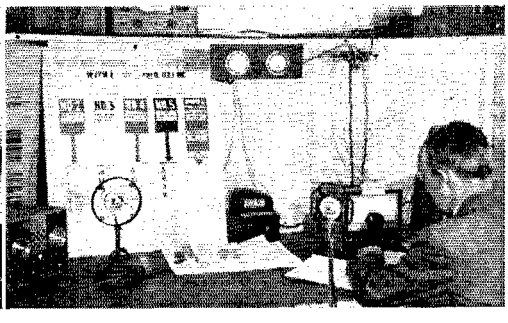
President — W1FTJ, Dorothy W. Evans, Box 312, Concord, N. H.

Vice Pres. — W3CDQ, Elizabeth M. Zandonini, 3633 Everett St., N. W., Washington 8, D. C.

Secretary — W9ZTU, Mickey Marglin, General Delivery, Fort Knox, Ky.

Pub. Chairman — W8TAY, Anita C. Bien, Route No. 4, Box 110, Chagrin Falls, Ohio.

Editor — W5FJW, Judy Caraway, Box 497, Monroe, La. (Home QTH: 3069 Gordon Ave.)



Left — A view of the rural sub-control station, WJTW-15, which is responsible for contacts with rural fixed stations and portable mobile units in the area. Equipment consists of an HY75, Class-B modulated, for a transmitter, and a superregenerative receiver. Ed Morris, a future ham, is operator in charge of this station. *Right* — The main control station of Dayton's WERS set-up, WJTW-1. Equipment consists of a modulated long-lines oscillator as the main transmitter, a calibrated superregenerative receiver as the main receiver, an Abbott TR-4 auxiliary transmitter and receiver to be used on battery power supply in case of failure of city current, an Echophone EC-1 receiver to monitor the local police station, and a small broadcast receiver to monitor WLW. The operator shown is W8LCO.

A sketch of "Company Street" in New Guinea, made by W2LJJ.

"Company Street" in New Guinea as sketched by S/Sgt. Kenneth A. Grossman, W2LJJ, is reproduced above. W2LJJ's six years of ham radio experience helped him to attain the rank of staff sergeant and radio repair chief of his outfit, and now his other hobby of pencil-sketching is helping his parents — W2JDG and W2JZX — to gain a better idea of his surroundings at a Southwest Pacific base. Truly, W2LJJ is a man possessed of worth-while hobbies!

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The Hamfester's Radio Club recently reelected all the 1943 officers for 1944. In a survey made February 1st it was found that there are 270 active members of the Club, of whom 186 are hams and 115 members of ARRL. Of the 83 members in active military service, 29 now are overseas. No figures are available as yet on the number in WERS.

The Month in Canada

MARITIME — VE1

From L. J. Fader, VE1FQ:

EARLY in January I left home, supposedly on draft for overseas and, after spending four weeks in a transit camp, was sent up here to the signals training center for another four weeks of drill, etc., and am now waiting to start on a maintenance course.

The Halifax Amateur Radio Club had a get-together one night last week, and while I haven't had any full details on the meeting, I understand they had quite a representative turn-out, including a number of boys in the services from other parts of Canada who happened to be stationed in and around Halifax. Lt. Gordon Phelan, RCNVR, a former member of the club, was instrumental in organizing this meeting.

Have just heard that Fred White, 1FL, and his wife, Iris, are the proud parents of a junior op which arrived the early part of last year.

1HB, George Howell, who is in the RCAF, is now stationed somewhere in Saskatchewan. 1IE, Harley Richardson, from Grand Manor Island, is a sergeant in the RCAF and is serving overseas.

QUEBEC — VE2

From Lt. L. G. Morris, VE2CO:

MACDONALD, 2FO, and McAteer, 2EM, paid a flying visit to Ottawa from their Washington headquarters. The gang keeps moving around. Oke, 2AH, is now at Moncton, N.B., while McKimmie, 2LU, came to Ottawa from St. Hyacinthe. McKenzie, 2MW, is a flying officer with the RCAF and has been posted to St. Hubert, Que., after having been on the East Coast and at Rockcliffe, Ont.

Flight-Sergeant Ernie Miller, 2AF, is back in Canada, having been overseas with the First Canadian Squadron since 1940. 2AF, who before the war was employed at Price Bros. mill at Kenogami, met many hams in England. At one station there were no less than 15 of the faithful, and at one time enough were gathered to hold a full-fledged hamfest. Ernie at present is posted to No. 21 R.D., Moncton, N.B. Another returnee from England is Lt. Gordon Yull, 2GE, who went across in the latter part of 1942. He currently is located at Dundern, Sask.

ONTARIO — VE3

From Leonard W. Mitchell, VE3AZ:

WE HEAR on reliable authority that 3EG, Sgt. Liddle of the RCAF, was married about a year ago and is now stationed in Nova Scotia. 3AD, WO2 Bill Michael, was married in British Columbia six months ago and still is stationed there. 3FB, Flt. Lt. Bob Sangster, also took the plunge in January, 1943. Bob now is stationed at Winnipeg. 3AGI, Norm Irwin, recently has been promoted to the rank of air commodore.

ALBERTA — VE4

From W. W. Butchart, VE4LQ:

4ZI forwarded a clipping which notes that Boyd Clark, 4SP, of Picture Butte, has returned to this side of the water after three years overseas with the RCAF. SP will be remembered as the chap who experimented with indoor directional antennas, compressed arrays, etc.

4PZ, Vic Rowe, of Barons, now with the RCAF in Montreal, has been batching since his wife became a victim of appendicitis.

4AEN, Geo. Marion, of Edmonton, returned to his old haunts on leave. As noted before, he is with the RCN as an R.A., and he now has gone to Halifax for posting.

A letter from 4IN, Bill Lawrie, of High River, informs us that he has been down East for an administrative course and that the trip temporarily cost him his commission. I have an apology to make to Bill. I classified him as a WOG (wireless operator, ground) in this column a month or two ago. Bill tells me that he is a WEM (wireless electrical mechanic), and that for my information, "a WOG is a WEM with his brains knocked out." He further elucidates that all a WOG does is pound brass! Humblest apologies, Bill. On his way back to the coast Bill saw 4GD, Jim Smalley, of Calgary, and 4AEV, Norm Lockhart, of Vulcan, on a one-day stopover in Calgary.

The NARC held a get-together a couple of weeks ago, and while atmospheric conditions would not permit the gang to look through the big telescope at Varsity as originally planned, they had a good time at the home of 4WH, Hilda Hughes, of Edmonton. 4EA, Roy Usher, of Edmonton, showed several very good movie films belonging to Ciné Club members. Among those present were: 4EA; 4VJ, Ken Angus; 4WH, Hilda Hughes; 4HJ and his XYL; 4HM, Chas. Harris, and his YF; 4KK, Bert Fowler, and his XYL; 4YX, Cec. Cable, and 4LQ.

4ATH, Stan Mitchell, of Edmonton, now works as a lab assistant over at Varsity. 4NU, Gordie Sadler, of Edmonton, missed the get-together as he was busy tracing down trouble in one of CATL's numerous transmitters. 4BW, Ted Sacker, of Edmonton, has organized a magicians' club here in Edmonton. The club boasts a dozen or so members, and they have been helped in no small measure by Capt. Baker and Sgt. Harmon of the U. S. Army Air Forces. The Club recently was presented with a charter.

4HM's daughter, Betty, has just returned home on furlough after completing her course at St. Hyacinthe, Que. Wren Harris is now a qualified wireless operator.

4IN forwarded a list of hams he has bumped into on the Coast and elsewhere, and the following are some of the VE4s: 4RT, Al Earle, of Acme, now at I.T.S., Edmonton; 4AJF-4GH, Sgt. R. Kirkby, of Calgary, now at Prince Rupert; 4VC, Sgt. H. Tigert, of Candle Lake, Sask., now at Prince Rupert; 4OC, F/S J. W. Whitman, of Swift Current, also at Rupert; 4JU, F/S A. J. Saunders, of Moose Jaw, Sask., now at W.A.C. Vancouver; 4QB, Sgt. L. Shearer, of Saskatoon, Sask., now at Patricia Bay, B.C., and 4GX, Adrian Lawrence, of Medicine Hat, now O/S with RCAF. Thanks a lot for the list, Bill.

AMATEUR ACTIVITIES

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — 1KRL writes that he has taken up permanent residence in our section. He has served in the Navy since 1940 and has received a medical discharge. 3GYV is safe in Italy, as of this writing. 3HYT sent in two fine letters and wants to learn the whereabouts of 3IKW. If anyone knows, please notify us. 3GHM is in Mo. after spending some time in Ariz. 3JBC is finishing his field tests in Tenn. and expects a 30-day furlough soon. The Easton WERS works into Reading and Allentown regularly. During a recent test a few Philadelphia stations also established contact with the Allentown group. 3FMZ tried to get WERS going in Lancaster, but no luck. 3HFD is on the prowl for a new QTH where he can plant a few rhombics. 3BES is also looking for a good location but will settle for an 80-meter Zepp and a rotary beam. 3JKC is putting the finishing touches on his postwar rig. We hear 3AOJ is at Ft. Monmouth. 3FMV is rebuilding his speech equipment. 3IXN has located a new QTH where he can have plenty of operating room and space for low-frequency antennas. The gang in the Abington section are going great guns on wired wireless. The boys in the services really insist on news in this column. Please send your dope along for them. 73, *Jerry*.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Hermann E. Hobbs, W3CIZ — PV has passed his second class radiotelegraph and telephone exams. WERS No. 3 Control Center operates on Sun. on 112 Mc. The following hams visited the Washington Radio Club: 4IGQ, 4FRE, 4GPW, 1LPZ, 5JYZ, 5FDV, 6QIE, 8CL, 3FKD. The club meets at C.R.E.I., 3224 16th St., N. W., on the second and fourth Sat. of each month. 73.

SOUTHERN NEW JERSEY — SCM, Ray Tomlinson, W3GCU — Asst. SCM, Ed. G. Raser, W3ZI; Regional EC for Southern N. J., technical radio adviser for N. J. State Defense Council and N. J. state radio aide for WERS and radio aide for Hamilton Twp. WERS, ASQ; radio aide for Hillsboro/Branchburg Twps. WERS and EC for Somerville and vicinity including South Branch, ABS. Radio Aide ASQ reports a special test program of Hamilton Twp. WERS held Mar. 1st before several officials. Mr. Fogg recently gave a very enlightening talk before several members of the Mercer County Firemen's Assn. regarding WERS. The Hamilton Twp. organization is now conducting routine tests each Sun., as well as Mon. and Wed. evenings, to educate new permittees. There have been several new applications for operator permits. Radio Aide ABS reports routine tests with Hillsboro/Branchburg Twp. WERS each Sun., Mon. and Wed. Stan also reports that six more operators passed the restricted 'phone exam and have applied for WERS operator permits. Some trouble has been encountered with reradiation from a TR-4 at Hillsboro Control Center and a superhet is now under construction for service in this location. An interstate relay test was conducted on Mar. 3rd, during which it was learned that Hillsboro Control can relay to Hamilton Twp. Control. Hillsboro Control consistently receives stations located in Livingston and Morris Counties. Hamilton Twp. also reports maintaining skeds with units 7 and 9 of WKXQ consistently. Communications Chairman C. H. Jenkins, VX, reports Westville ready to make FCC application for WERS license. This organization has four RCA transceivers rewired for 6-volt operation, some of which are to be revamped for 1.5-volt filaments for walkie-talkie operation. Mr. Jenkins states that they are anxious to "get going" in Westville. The Control transmitter is an a.c.-powered combination transmitter-receiver with press-to-talk operation which will be powered during emergencies with storage battery/vibrator pack. This set-up has been greatly hampered by shortage of personnel and equipment. A special gathering of Hamilton Twp. WERS members, wardens and other Civilian Defense members was held Mar. 10th at which State Aide Dal Fogg gave a talk, after which the sound film, "Crystals Go to War," loaned by Reeves Sound Labs, N. Y., was enjoyed. IOW may be addressed: M/Sgt. A. Constantino, APO 832, c/o Postmaster, New Orleans, La. Tony sports around with a pet baboon, which he has promised to bring with him on a furlough soon. GEV has been reported as being in base hospital, following action in many major engagements. S/Sgt. George Brown, former DVRA member, is now flight sergeant radio operator aboard a C-47 transport. Geo. was home recently recuperating from an operation for hernia. FBZ has been reported as being a private in Unk Sam's Army. HWT has obtained CPO rating. Tony is with Naval Air somewhere in England. IET is USCG Keeper Ret., 12 Sixth St., Rehoboth Beach, Del. IIC reports that he now has a new YL. INF, of the old S.N.J. ORS net, can be reached by mail as follows: Cpl. Carl Miller, Co. X, 800th Tng. Regt., Camp Crowder, Mo. Carl has been an instructor in code and traffic at the Central Signal Corps School for the past year. Carl also tells us that the former QTH of 9OUD, NCS for the old T.L. B, is only 22 miles from his camp; also that he has acted as projectionist at theater Nr. 5 in camp. Ed Beemish, formerly of Beemish & Marotte, stuck out his neck again; he bought himself a nice local radio repair business. The SJRA is going in for wired wireless. One of the rigs was demonstrated at the last meeting of that organization and met with much enthusiasm. The staff of the *DVRA News* has announced that this little paper has been dedicated to our former amateur radio buddies who are serving in the armed forces, and is being mailed to every amateur radio operator once a resident of Trenton or vicinity, whose correct address is known, and who is now serving in those forces. If there is anyone who should be receiving this paper, of whom no information is on hand, a postal card to the editor, Ed. G. Raser, ZI, 315 Beechwood Ave., Trenton, N. J., will receive prompt attention. Please send us immediately any change in your status or address. 73 to all.

WESTERN NEW YORK — SCM, William Bellor, W8MC — We hear that the Syracuse CAP squadron has formed a WERS unit using 115.2 Mc. The Syracuse State Guard is also toying with the idea. The Utica State Guard already has a small WERS unit of its own. TKP is with the 17th Signal Service at Wash. CP has left WSYR to go with Western Electric. The Rochester Amateur Radio Association, following a most successful hamfest, has enthusiastically decided to return to a regular schedule of meetings with the old officers. The Monroe County-Rochester WERS unit has received its license following its initial application, with the call WHNH. It is starting with 18 units and 26 operators; MC is radio aide and DFN is technical committee chairman. Thirty additional units are already in the offing. 9VGC beat me to it and dropped me a letter before our notice of him got into print last month. 73, Bill.

CENTRAL DIVISION

ILLINOIS — Acting SCM, George Keith, jr., W9QLZ — ZEN has been promoted to RM1c and is still stationed in the Chicago area. His address is John M. Vasicak, RM1c, Chicago Radio, Dundee Rd., Northbrook, Ill. BIN reports from Texas that he has made "sharpshooter." His address: Pvt. Chas. H. Perdew, Co. C, 141st TDTB, 5th TDTR, TDTRC, North Camp Hood, Tex. ODT reports that the Will County WERS is getting underway with the call WJYH. Twelve operators are standing by with four more ready to take the restricted 'phone exam. KPC, one of the kingpins of the Joliet club, is waiting for a call from the Navy. For news of ILH and ICN we are indebted to 6RBQ. SCM San Francisco, who scooped the Ill. section news in March *QST*. TSS is on the last lap of his instrument training at the Shell Refinery in Wood River. LVE is a s/sgt. on the West Coast with duties as radio operator on a B-26. MAG, S3c, a naval radio operator, is based in the Gilberts. UAK, of Jerseyville, is a member of the Coast Guard Reserve stationed at Alton. UZU is working in the power house at Western Cartridge Co. and JPT, his XYL, is raising chickens at their homstead, Radio Farm. BLL is still at Alton, up to his neck in police radio and new antennas. VZG is in the Coast Guard at New London, Conn. GDZ is working for the Signal Corps at the Crosley Radio Corp. Barney wants to know what has happened to WIV, VSY, KTA and KSZ. Lt. ALU passes along the news from his "Island Paradise," where he is in an AW Bn. LIM writes from Calif. stating that he misses the old 56-Mc. activity with the Chicago gang. He would like to hear from some of the boys. His address: Frank Grey, Box 363, La Mesa, Calif. LIG reports that he is in charge of all intercom. radio, etc., at the Senica Shipyards, building LST boats. Correction: JTX/3 is not a WAVE and since the OM's (FIN) transfer to the Naval

Air Station at Jacksonville, Fla., she is no longer at the Naval Air Station where she was employed under civil service. Remember the record set by the Starved Rock Radio Club in March, 1941? This year the record was only 50 per cent as good. TAY says his is a girl while ex-IEP/8TBP announces a boy. Keep the news coming, gang. 73, *Geo.*

INDIANA — SCM, Herbert S. Brier, W9EGQ — Gary WERS had a simulated emergency Mar. 5th. An emergency call was received at 2:20 P.M. A transmitter was in operation from the scene in 17 minutes, and the operator had to travel 3 miles to reach it. Portable units were set up in two hospitals. A total of 11 units were in contact with Control in less than 30 minutes. Fifty-nine messages on official OCD forms were handled in approximately two hours. T/Sgt. MKM is back in the States after 17 months in the Aleutians; he won $100 from Hallicrafters for his article on the SCR-299. KBL works with high-power transmitters, and goes to Columbia U. in the evening to learn more about transmission lines. PUB is ARM2c assigned to a bombing squadron. MPR is located in "the most God-forsaken place in the whole world," where they pass the time fishing and swimming. WXG is CRT at Radio Matériel School, San Francisco, where all the instructors are hams. ILU is at Ft. Monmouth. EHT is at a Navy school in Conn. YWE is working in a Signal Corps station in Chicago. HUV was thrown for a loss by a tractor and is cursing some broken ribs. AB is having trouble with the man-power shortage. Operators of Mishawaka WERS are being drafted. The idea of using f.m. with superregen. receivers has been given up. UYP is flight testing planes at Wright Field. SNF, at Sioux Falls, S. Dak., is teaching radio pro half the day, and studying theory the other half. UMK was home on leave for the first time in 14 months. He is an embryo navigator. TBM operates in the Fort Wayne WERS regularly. SWH is so busy that he can no longer spend any time with WERS, but his wife now has a license and takes his place. EGV is busy repairing receivers, and studying Spanish and mathematics. YMV is working as a machinist in San Francisco while waiting assignment to a ship. NZZ is now at Peru. "My new job is pure telegraph, sorta on the relay principle." I have the addresses of many of the Ind. gang in the services. If you want any, drop me a card. Keep those reports coming. 73, *Herb.*

MICHIGAN — SCM, Harold C. Bird, W8DPE — 8MV has returned to his post after a short furlough. 8SLJ, a former QMNer, has returned from overseas duty. Lt. 8DWC is home after a trip overseas. 8UQR is said to be down in Tex. on radio work. 8FTW is still working radio teletype at a local post. 8CYX reports pounding brass with a local ham via ground current. 8JD is working for the Wayne County sheriff's department. 8UXS saw Tom a few weeks ago and he reports working extra for SP in Lansing now to help out. 8AJC shows up from Kalamazoo way. 8SHS writes us from Italy and wants to say hello to all the Mich. gang. He says he met F3RR while over there. He also reports meeting 9NKY, who is sparks on a ship. Sam Martin writes that he is having trouble receiving his *QST*, and thinks someone is making a touch somewhere along the line. Sam says, "My congratulations to you fellows and the ARRL for the fine job being done in WERS. We over here can say only, FB and carry on, as we are looking to you fellows to insure a great future in ham radio." 8NOH writes us from a hospital bed, but reports it is nothing serious. 8IHR reports he is taking high-speed training now and wants to pass along his regards to all the gang. 8UGR sends his report via recording. Capt. 5KBI sends in a very nice report and says he carries on a regular QSO with 8NOH. His regular QTH is: Capt. Keith O'Connor, APO 451, c/o Postmaster, Shreveport, La. Capt. Keith says he has a jr. operator, and a thousand plans for the new rig. Lansing is carrying on with regular WERS drills. A new EC was appointed recently in Flint and we should be hearing from there soon. Detroit is busy with new equipment. Grand Rapids is still carrying on with the usual tests. WERS operators in Pontiac are still conducting school and have about 25 students ready for element one. Code work is also progressing very nicely among the more advanced class. The usual tests are being carried on and new installations are going in. Let's see some more of those letters from you fellows in the services. Lots of luck and 73, *Hal*

OHIO — SCM, D. C. McCoy, W8CBI — A circular letter has been sent to each EC, radio aide and affiliated club in Ohio regarding a meeting to be held for discussion of the future of amateur radio and WERS. To date the number of replies has been disappointing, although the majority are in favor. Until more returns are received decision on the meeting will be withheld. The attention of all ECs and affiliated clubs is called to George Hart's editorial in March *QST* regarding SCM reports. REC is now in Brownsville, Tex., as flight operator for Pan-American Airways. QC is in Texas with Pan-American Airways. WXB/K7, ex-9INU, would like to hear from the gang. His address is: Richard F. De Ford, CAA, Sitka, Alaska. *Cleveland:* West Side Deputy Radio Aide AXQ announces the appointment of QYH and TMD as district aides. DS is busy promoting Wed. night activity to keep interest at a high level. OCD batteries have been delivered and issued with a noticeable difference in speech quality of many units. Sixty students are enrolled in the Cuyahoga Radio Assn. code classes. Election of officers of the CRA places QV as pres., PZA as secy., EBJ as treas., AVH, PWY and DS as directors, and DS as program director. *Columbus:* QQ reports that the WERS gang is busy working on antenna problems trying out half-, full- and multi-wave antennas. QQ made a trip to Zanesville with State Communications Coördinator Don Park in the interest of WERS. The Columbus gang says the ARRL book on WERS is a "honey." *Cincinnati:* The Queen City Emergency Net elected PNQ, pres.; TEJ, vice-pres.; Edna Liebman (LSPH), secy., and MFP, treas. Standing committee appointments will be ratified by membership at the next regular meeting. The "Net" bulletin, *The Listening Post,* is scheduled for monthly publication in the future. New members are solicited. An amendment to the constitution is proposed which would entitle WERS operators to become full voting members. New members recently added are John H. Bedel, John N. Wolking, Leonard H. Smeltzer and Charles H. Michael. TQS is busy with paper work for renewal of WERS license. *Dayton:* WERS activity continues. OCD batteries have been received and some distributed. The reorganization of the supervisory group placing a deputy radio aide in charge of each subcontrol area has resulted in improved operation. Several p/m units have been rebuilt with marked improvement in performance. A new long-lines transmitter at No. 15 using p.p. HY75s with Class-B modulation has improved performance. RHG has a new long-lines job ready for WJTW-28 as soon as an RK34 can be found. DMN has finally received his gasoline allotment which will allow him to work closer with the rural fixed stations. TYH is leaving Dayton for Miami to operate with the airlines there. VHN has left Dayton for the Southwest. IBQ has passed his physical for the Navy but has been granted another deferment. OVL and RHH have built up frequency meters as shown in Dec., 1943, *QST.* These instruments are highly recommended to all WERS operations. The OCD battery supply solves the power supply problem for these meters. Butch Stouder is busy getting the bugs out of a new m.o.p.a. transmitter for WJTW-5. Hal Jones is working on a duplicate of Butch's job. Red Cross headquarters is being moved to a new location where an excellent high antenna can be erected. AGR has been appointed deputy r.a. in charge of No. 2 area. LJ, RHH and CBI have been doing a lot of traveling lately. The latter will be busy "shuffling papers" for renewal of license until due date April 1st. IX is reported by his XYL as still in the South Pacific. Lt.(jg) Charles Deger died of pneumonia contracted in the line of duty with the Navy in the South Pacific area. While never licensed, Charlie was deeply interested in amateur radio and spent much time before he left for college at CBI or QDI. *Greenville:* John Dunn reports over the telephone that he has passed his physical. WERS operations have been fairly satisfactory. The OCD battery allotment has been particularly helpful and is expected to allow several contemplated units to be finished and put in service. *Canton:* Word has been received from Henry Clark that WERS license has been granted with the call WHNE. *Akron:* Inspection of the Akron WERS system by the state and local OCD officials was conducted Mar. 17th. Through the grapevine we learn that the inspection was successful and a good demonstration was put on by the gang there. Those of you who have not sent in your tickets for renewal, please do so, and where a report is due, don't forget it. 73 to all, *Dan.*

WISCONSIN — SCM, Emil Felber, jr., W9RH — Excerpts from MRAC bulletin No. 3 follow: VWG is the proud father of a baby girl. Pfc. John Deisinger was home on furlough. Ed Thornely read a letter from Dr. Lee DeForest describing his job and radio experiments with the Johnson Service Co. of Milwaukee in 1900. GVL gave a chalk talk on a single tube channel analyzer. TUJ and NYL

of Waukesha, were club visitors. H. Devendorf, our WERS secy. regaled us with highlights of early wireless days. EEL and RUF have been attending meetings. 2nd Lt. KFB, in the AAF, was a visitor. OUB, an operator at WISN, also called and reported he was on double duty because of shortage of help. JPS, ACRM, USNR, has become the proud papa of a 9-lb. YL. Several of the boys wrote in and were quite upset about the club's meeting place having been shifted. We now meet on the second floor, east of the elevator, in the Conference Room. It is really a swell set-up — much better than the old room. On Mar. 1st NY, CDY, RSA and HPZ, put a few of the WERS rigs on the air with a vertical J antenna with Zepp feeders and the first test QSOs of WFMI resulted. The signals also were heard through the city by HRM, LAD, GVL and RSA. More installations are to be made in the next few weeks. CCD remarked, "If the boys in the services are only half as glad to get our bulletins as we are to receive their letters, we will consider the continuance of our club well worth while." Capt. JWT, USMCR, former secy., broke his long silence by giving us a resumé of his activities which boiled down to: Quantico, Harvard, M.I.T., married to a swell Wis. girl, Corpus Christi, San Diego, airplane crack-up, hospital for many months, and now recuperating and instructing in Calif. And to top it all off the proud papa of a baby YL. Capt. Fred F. Seifert, ex-EFX, transferred to the East Coast. SYT is now in N. Y. Donald Merten has left for overseas as a special consultant for the AAF. Comdr. DTK is still functioning as DCO in one of our Naval districts. Capt. FY sent greetings to all from the S. W. Pacific via V-mail. ESE is still at the radio station at Port Washington. Pfc. Gilbert W. Rink, Signal Corps, has been shifted to the East Coast. Paul J. Ripple has been inducted into the Army. Cpl. Frank J. Detzek was at home and a visitor at the club. Sgt. Bernard A. Kellner sent in his ARRL application. T/4 ANK writes that he is back in the States after being in the East for some time. RE T. C. Kercher, USN, in the European Theater, writes us that he has met many hams from other countries. Ray P. Charney, S1c, sends us a fine letter from Australia. HRM is editor of the club bulletin and has received most of the letters and information in this report. Sgt. DIJ has just received a medical discharge and has arrived home. ZVO, radio instructor at Truax Field, announces the arrival of a new jr. operator. 73, *Emil*.

DAKOTA DIVISION

NORTHERN MINNESOTA — SCM, Armond D. Brattland, W9FUZ — OOK is now located at Camp Young, Calif., and recently favored FUZ with a visit. WUQ reports from the Caribbean area where he is with a signal section. There are four amateurs in the same outfit, including SYG. WPR is now in England. LSN is still radio instructor at Sioux Falls, S. D. MPI is located in Los Angeles and paid a call on FUZ. A lengthy letter from ZWW in the AACS, APO 825, c/o Postmaster, New Orleans, comments most favorably on DeSoto's splendid article in Feb. *QST*. He also reports that he met UN, who is now a captain. RPT, MTH and BHY made some flight tests with WERS equipment in an unshielded ship for the Civil Air Patrol and discovered that even through terrific ignition noises satisfactory communication was maintained up to about 7 miles. Meanwhile one of the St. Paul squadron's ships entirely shielded and bonded is being groomed for WERS equipment for emergency and regular CAP missions. Surplus Army Air Force material is now being released to the Wings and should help in the construction of units. The Minnesota Wing has 11 units registered. The procedure used is that of the Air Forces. FUZ is out somewhere as chief operator on a new Liberty ship. Mail addressed to him as SCM will be forwarded to BHY, 1487 Breda, St. Paul, who will send in material to be inserted in this column. 73, *Army*.

SOUTH DAKOTA — SCM, P. H. Schultz, W9QVY — My faithful correspondent from Platte sends in the only news for this month. Say, gang, why not dig out your Mar., 1944, issue of *QST* and read the article on SCM reports appearing on page 64. Let's keep *some* news coming from all of you. LLG and LMC are still at Eagle Butte. It was OQQ and not QQQ who was mentioned in the Feb. issue; he and the XYL hope to return to So. Dak. after the war. IYN was at the Air Base in Sioux Falls until recently; now he is with Western Electric in N. J. CMJ is still on a farm near Chamberlain just waiting for a return to the air. TNU, also of Chamberlain, is on the Pacific Coast as radioman in the Navy. TOV taught radio at a school in the East for a time but his present whereabouts are unknown. ZAL is just itching to get back on the air and try out that new Class-A ticket. As for the net or nets which have excited so many around these parts, it is WERS and on 2½. It should help to keep up interest especially where two or more hams are in evidence. Perhaps you who are isolated can find an interested friend or so and put in a bid for WERS in your community. 73, *Phil*.

MIDWEST DIVISION

IOWA — SCM, Arthur E. Rydberg, W9AED — The Linn County Radio Club has the honor of being the first WERS licensee in Iowa. The call is KGIL; six units are licensed and more are being built. The operator permits haven't come through yet. ZQL has been elected chairman of the activities committee following the resignation of BCC. URK, Des Moines radio aide, advises that all preliminary steps for a WERS license are being completed and the Des Moines group is looking forward to WERS work in the near future. UAD is in So. America. OCG is in Africa. CCE has moved to Anamosa. EMS, PNT, BAL, UYW and AED are attending ESMWT communications course at West High School in Des Moines. UYW is going to Italy for OWI. TGK visited OLY recently. If you don't see it here, it's because your SCM hasn't heard from you. 73, *Art*.

KANSAS — SCM, Alvin B. Unruh, W9AWP — TYV, SP(v)3c in the Navy, was home on furlough while on the way to Hawaii. KSY is a captain in anti-aircraft artillery in Calif. VQG, formerly RM, is also a captain, present QTH unknown. VWU, an AAF first "looey," is still piloting B-26s and was in Italy and England. GHI is now chief operator at WIBW and KCKN, and lives in Topeka. ICV repainted his boat and claims the lake looks better every day. TPF, a lt. (sg), is stationed at Pearl Harbor. Fred Baker, prominent in Topeka USNR and ham circles, is a lt. comdr. He recently completed some schooling at Annapolis. YYW is SP(v)3c in the Navy, and is stationed in Hawaii. QQI was accepted for the Army. WKA and a number of others were "quiz kids" when the RI made his biannual visit. BCY, ZUY, AWP and 5HHF are at Boeing-Wichita. REB maintains police installations at KGPZ in his spare time. Let's have some news. 73.

MISSOURI — Acting SCM, Mrs. Letha A. Dangerfield, W9OUD — QDQ sent a V-mail letter saying that he had heard from KG as a result of a letter we forwarded to Keat, and he would like a word from HIC, HCL and DDX. NSU's assistance with income tax reports turned out well financially and resulted in offers of three bookkeeping jobs. RHA is apt to start another war front if he vocalizes those items about Texas being the only state where you can stand knee deep in mud and have dust blowing in your face. CZU, ex-8QQK, has learned to read and write Danish; incentive — a Danish YL, object — matrimony. WIN is an instructor at CAA in K.C. and is interested in his other hobby of photography. CWT has been teaching code and theory free to all comers three nights a week at his home in Appleton City. Seventeen of his boys are now with the armed forces. LUE is in the intelligence section of FCC. YKK is operator in a lighthouse at Ketchikan, Alaska, after going through the Aleutian campaign as an operator on a Coast Guard cutter. Others licensed since Pearl Harbor have no calls and are scattered in many parts of the world. HGB is confined to his home with a broken hip, result of a basketball game. Jim Harvey, RM2c, is off to sea again after a period of schooling in Norfolk, Va. 4HLN sent a little poem which explained all the things he couldn't mention. BMS is on the day shift at the Henry crystal plant. OUD is willing and eager to hear from the gang. Answers guaranteed. Lots of luck and 73 to all of you.

NEBRASKA — SCM, Roy E. Olmsted, W9POB — A very nice letter was received from UHT, who is serving as dental instructor at Iowa U. Strictly on the level, Doc has taught the professors a few new tricks in dental mechanics — he has perfected a method of extracting a bad tooth, cleaning and repairing it, and then replanting it in the same excavation again. EAZ sends a card to say hello to EKP, WZB, JCB and others along the Platte Valley. Ray is serving in the Signal Corps in applied electronics at Brookly Field in Ala. Another FB letter from ZFC states that he has just returned to McClelland Field after a furlough at Omaha. He advises that most of the Omaha gang are in military or radio service and the only ham inspiration he got was from taking a peek at the rig and firing up the SX24. QGE who entered the Army from advanced ROTC at N.U.,

is taking special training somewhere in the Carolines; his QTH, is unknown. OHU, operator for CAA at the Lincoln Air Base, goes to Hayes Center as chief. UDH called at this station while I was absent and left a note saying he has just harvested a new crop of prune juice. YOP is en route to the States from Alaskan service for CAA. KPA is also in Alaska as operator for PAA, and expects a furlough later in the spring. There is no truth in the current rumor that Clint will return with a bride. I have had a long report from EAT-KGLZ at Ceresco, in which he states that he has been appointed radio aide under Mr. Rhodes, state defense head. The 7th C.A., through its communications officer, Major Pirsch, is offering all possible help. There is going to be a determined effort to contact every interested amateur who is at home and urge his participation in WERS on the basis of county and district nets. I am very much in favor of this system for our state and hope every one of you will write to Darold and offer your services at once. He will give you the dope as to territory and organization and may be able to help your district personally. It will be a big help when we want to resume civilian hamming to have such a record of war service. CU on 112 Mc.! — *Pop.*

NEW ENGLAND DIVISION

MAINE — Acting SCM, G. C. Brown, W1AQL — All EC certificates for the Maine section have been endorsed and the slate is clean for another year. However, there are a lot of towns and cities without an EC, and since this is a fine way to keep up your interest in the game, why not check up on your community and drop a line to your SCM for the dope on building up the list of ECs for the old Pine Tree State. HZI is still working for the Central Maine Power Co. in Rockland. IVZ is RM1c in the Navy at Winter Harbor; also KAG of Framingham, Mass. is among the brasspounders there. A fine letter was received from FQ in England, where he is in command of a Signal Supply Depot. What say, fellows, let's have a few letters telling of the activity and whereabouts of the rest of the Maine gang. Good luck and 73.

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — KIF, formerly of Guilford and East Haven WERS operator at WJLH-55, sends 73 from the Pacific where he is now in the Seabees. Jim Wilcox, formerly of Branford and operator at WJLH-46, as well as being GB's 26th club member in the armed forces, sends 73 from Chicago where he is attending Naval radio school. DDX, chief radioman and Edw. Deak, S1c, GB members, were recently in town on furlough. Matthews, WKAO-48, advises that 1MDO, located in the vicinity of New Guinea, writes that he experiences great pleasure in reading about WERS activities in *QST*. DBM, Middletown radio aide, reports active WKNQ units in Cromwell, Durham, Middlefield, Middletown and Portland, with application in for units in Haddam and East Hampton. The gang is experimenting with antennas and superhets. KXB, district radio aide of WFJA, Torrington, is working 12 to 14 hours a day and still finds time for WERS activities; he is ably assisted by Eddie Toloski. CTI, ex-SCM of Conn. and Norwalk radio aide, writes that everything is working smoothly in the WJQA district. JQK, Hamden's efficient radio aide for WJLH, is recuperating from a recent operation. Walter sure is doing a fine job with a consistent operation of 12 out of 13 units for all Wed. and Sun. drills since licensed. KAT and ex-SF, radio aides for Guilford and Branford respectively, are also deserving of much credit for the attendance of their operators. Both KAT and AKG, Shelton radio aide, are conducting code classes prior to WJLH test periods. After trying about every antenna possible, IJ, radio aide, of Madison, WJLH-61, has ended up with a 4-over-4 which is certainly putting a healthy signal into WJLH-1. Inter-district WERS test periods held every Mon. night are proving very successful with all districts participating. Traffic is handled very expeditiously between WJQA Stamford, WKAO Bridgeport, WJLH New Haven, WKOB New London, WJTR Norwich, WKNQ Middletown, WKWG Waterbury, WKJA Torrington and WMHC Hartford. Regular and alternate routes have been established between all points. EEM, Waterbury radio aide, was a recent visitor at WJLH-1. By the time this is in print, we will have lost our Acting Communications Manager, George Hart, NJM, to the armed services. Our very best wishes for lots of luck to a swell fellow who has done a grand job for ARRL. Let's all give Carol Keating, 9WWP, his successor, our continued cooperation.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — MEG reports that he was honorably discharged from the Signal Corps and is now working at Valpey Crystal Corp. LZW received a letter from MME, who is now in India. KKV is working on the West Coast. LAD is now working for Holtzer Cabot Elec. Co. and has a new QTH in Brookline. LJN passes along some news about the hams from Plymouth: DFY is working as a civilian at Pearl Harbor. CUY is in the Navy on the West Coast. LHB is in the Army. KUJ is in the Navy. Some more hams working at M.I.T. are: NDI, NAD, NOX, ZAC, MYE, LJN, GND, ex-9JRI, 9VEP, 9CB, 9COF and ex-1DQG. KCP now is a lt. in the AAF and is in Calif. KVQ is still going to Northeastern in Boston. DDM is very busy in the State Guard and now is a 1 . Your SCM received a V-mail from BTL, who is somewhere in the South Pacific; he says he made his 1st lt. rating before leaving the States. MMI was married a few months ago. MJE writes that she just got home after being in Va. and Washington, D. C., for three months; she says she met 9TKH and 9TKI while there. Her OM, KON, is stationed at New London, Conn. I don't know if anyone else has thought of it in this way, but all of these reports for any of the sections really are a diary for future use. More news is wanted for this column. The South Shore Amateur Radio Club held its third meeting at the Quincy Y; the following members were present: AKY, ALP, CCL, CPD, CPB, CT, DIR, FWS, IHA, IS, KJD, WK, HGJ, MD, DPI, ex-DDO. EHT gave an interesting talk. MMC is going to school at Tufts. J. J. Barbato (LSPH) is RM1c at New London, Conn. LZB is in the Army and is now at Miami, Fla. HTA is still working at Eastern Co. KQJ is building 2½-meter and f.m. receivers. We are sorry to have to report the death of APH, ex-IPB. KDF reports that WERS in Boston is going along fine. They have six stations going, with more to come on as they go along. NBE is the new EC for the Roslindale-West Roxbury section. AYH is working in Cambridge. IB and ex-DDO are working at General Radio. NIR is still working for the FCC. Ex-UG is now working at Harvard. Rodolph E. Lareau (LSPH), Fitchburg radio aide, devotes one night a week to work at station WEIM. Dick Kilson (not Jilson, as reported in April *QST*), who was a member of LVS, a radio club in Brockton, has gone into the Navy.

NEW HAMPSHIRE — SCM, Mrs. Dorothy W. Evans, W1FTJ — GIJ is experimenting with carrier current transmission. OE is dividing his time between police radio and servicing sound equipment at Army camps. JCA writes that he was home recently and had a chance to look up some of the old gang. He is planning a super ham shack for after the war. We understand that ATE has his feet on U. S. soil again. News comes to us that CME and IVU got together for a chin-fest recently. A nice article appeared in the paper about the fine work that ITF is doing in Northwood. Our hearty congratulations, George and Blanche! How about more news, fellows?

VERMONT — SCM, Burtis W. Dean, W1NLO — BD has just finished building a 2½-meter transceiver and has started on another. FRT and NDL are training operators for the CAP, not the SG as stated in Apr. *QST*. FSV is RM3c in the Navy, and when last heard from was somewhere in the Pacific. KUV was home recently and now is stationed in Tex. BNS is working for the CAA in Pittsfield, Me. GAE has been promoted to senior radio engineer for CAA and has moved to 616 Ave. "H," Billings, Mont. KJG expects to report for induction about the first of May. Park will continue to act as state radio officer for the WERS for the duration even though he is in the Army. GAN, HLH and LWN journeyed to Rutland recently to take their physicals but we understand Uncle Sam isn't ready for them yet. AVP has redecorated his shack and installed new lights; he reports that he is the only ham left in Rutland. IQG was home for a few days and expects to move his family to Cambridge, Mass. LML and family have moved to Malden, Mass. Sorry to see in March *QST* that 2JHB was listed among the Silent Keys. He was employed by Colonial Airlines at the Burlington Airport and more recently at La Guardia Field, N. Y. C. 2MBS, chief engineer at WEEI in Boston, visited HPN, NLO and Ed Rybak (LSPH) at the official opening of the new WCAX studios. Keep those FB letters and cards coming, gang, so Vermont will continue to be represented. 73 and CUL. — *Burt.*

NORTHWESTERN DIVISION

OREGON — SCM, Carl Austin, W7GNJ — HKI is still feeling a little under the weather and is moving to his beach home for the summer. The Grants Pass High School has a class of 45 studying code under the direction of ex-

9CZP. GOF discloses that he is RT1c on a submarine. Stuey likes the duty FB and says he just missed meeting HSL, who is also on a boat. HSL and GOF went to radio school together. HSL was one of the few Oregon hams who could copy 40 w.p.m. on a mill before Pearl Harbor. CZJ, with Press Wireless, says there are plenty of radio parts available in Chicago. He says the job he is working on is dual diversity, telephone dial bandswitching, electric motor driven, and the job stands over six feet high. IEJ, in Hawaii, sends money for two years' membership and two Handbooks. ENC/K7, who is in the Aleutians, says it is a swell place for windchargers but still not too bad. Capt. FNS is still at Lexington, Ky. The local members of CORK are teaching code to a class of 25 CAP pilots. Sorry there were so few reports this month. 73, *Carl.*

WASHINGTON — SCM, O. U. Tatro, W7FWD — A WERS license under the call KFEY has been issued to Mt. Vernon for 8 units, 2 of which are reported to be in operation and have been heard R5 and R9 at Everett and Mukilteo by KNEV units 2, 16 and 17. Arrangements are now under way for 2 or more units to be located on Whidby Island which will provide continuous coverage over the northwestern portion of the state. HDC has been appointed radio aide for Seattle, whose license is still pending. HWG is the proud papa of Catherine Ann, 6 lbs. 12 oz., who arrived at Olympia, Mar. 8th. RT reports that a jr. operator, John Paul, jr., 8 lbs. 4 oz., arrived Feb. 17th at Seattle. HMJ graduated from Treasure Island and is now at San Bruno, Calif., "fixing radios and stuff" in a communications unit and has charge of maintenance of the main radio station. JCS is located in Va. and says, "Sure wish I could run my little junk-box portable." IJZ, after 8 months at Gallups Island in the merchant marine, is now in the Navy as RM2c, stationed in Me. but going to school at Wash. and then Chicago. AJC is doing radio maintenance work for the Airways in Alaska. CWY, chief engineer of a veneer plant in Ore., was a recent visitor and is interested in HF heating. HTH, ex-Acting SCM, has left Camp Swift and is now at State College, New Mex., finishing basic electrical engineering, and will then take the advanced course. Belated reports from Yakima disclose that 40 or more hams recently gathered there for their annual ham dinner; they ate ham, thus keeping up their ham interest. 73, *Tate.*

PACIFIC DIVISION

NEVADA — Acting SCM, Carroll Short, jr., W6BVZ — Greetings, gang. I'd very much like to hear from all former Nev. hams and also from those still in Nev. IAJ just finished pre-flight training in the East and is now an aviation student at Santa Ana, Calif. TKV, CPO in the USCG, has been transferred to the Naval Hospital at Ft. Worth, Tex., after seeing action in the Pacific. PAQ was a recent visitor in Boulder City. He is a warrant officer in the Navy and has seen service "down under." JQX was pfc. at West Lafayette, Ind., when last heard from. Also in the services from Boulder City are HJZ and OPP. BVZ, PGD, PZY and QNV are radio operators for the Bureau of Power and Light of the City of Los Angeles at Boulder City. MRT is the communication equipment maintenance man for the same concern. QNV is about to enter the Navy. PZY is servicing radios when not operating. GSB and QXH also work for the Bureau, but as powerhouse operators at Boulder Dam.

EAST BAY — SCM, Horace R. Greer, W6TI — EC, QDE; EC u.h.f., FKQ; Asst. EC u.h.f., OJU; OO u.h.f., ZM. BEZ is at Bell Lab., N. Y. NZJ is at Long Beach. LCG is now at Mare Island. QWX is in the Navy in Chicago. DMY is with Westinghouse, N. Y. DDO is with Pacific Tel. & Tel., San Francisco. KZF was home on a short leave from the Army. JJ passed away Mar. 4th, and his many friends will miss him. OJW will soon complete two years as radio engineer at Eatontown Signal Lab; he has a 4½-months-old YL named Sandra. GEA also reports a new daughter, Ann Ayres, born Mar. 12th. Mar. 16th another WERS meeting was held at the Oakland City Hall. EE reports everything under control and would like to see you all down to Police Court No. 1 on the third Thurs. of each month at the Oakland City Hall. ZM is now back in the shipyards. Another day closer to victory. — *TI.*

SAN FRANCISCO — SCM, William A. Ladley, W6RBQ — EC; 6DOT. Ensign 2GAR is attached to the Twelfth Naval Dist. QA is on duty with Pan-American. On Sat. evening, Mar. 18th, the Bay Counties amateurs, representing all amateur radio groups and clubs around the Bay area, held their long-planned banquet at the Whitcomb Hotel in San Francisco. To say it was a success is putting it mildly. Some 175 amateurs, many with their wives and friends, attended and from the opening gong at 7 P.M. until after 11, one and all enjoyed a program consisting of a talk on the "Elements of Wave Guides" given by Dr. Karl Spangenberg of Stanford, U., movies of the actual Japanese attack on Pearl Harbor and another on electronics. The hour between 7 and 8 was given to the registering of all in attendance and to a general get-together. At 8 a three-course sea gull dinner (better known as chicken) was served, after which the speaker of the day took over. It was not only gratifying but most encouraging to note the real spirit of enthusiasm that prevailed. Believe it or not, gang, I even noticed some of the dyed-in-the-wool 'phone men buying a snifter for their old c.w. rivals. In summing up the get-together, in general it left the definite feeling that it's good to meet old friends and good to meet some of the boys from the other clubs. More of these meetings will be held as time goes on and let us hope it will result in closer coordination and cooperation between all amateur clubs and groups toward the unison that will be so sorely needed when we are hoping that our frequencies will come back to us. We've a job to do, hams, and it can only be accomplished if we band together solidly and put our dollars and brains in a common jackpot for a common cause. The following were present, plus some who failed to register in their excitement: BAY, EBL, RFP, EX, Mr. & Mrs. 9YQS, MAX, LBJ, MZ, FGP, AER, NHW, SZ, GPB, NZY, GKO, OYF, JTE, IUZ, CLS, SZ, Mr. & Mrs. AMO, Mr. & Mrs. CIS, Mr. & Mrs. HB, Mr. & Mrs. RRR, QD, Mr. & Mrs. CHE, Mr. & Mrs. UF, Mr. & Mrs. BET, Mr. & Mrs. OMC, DVB, 9ICN, 9ILH, BAX, Mr. & Mrs. RBQ, WN, 1NHN, Mr. & Mrs. SFT, Mr. & Mrs. BBT, LOZ, BWZ, EI, JTL, CBS, Mr. & Mrs. BKT, 6LSPH, KNH, TGH, MVQ, KFQ, LXA, GTI, PVV, DHV, FBW, MHZ, DDO, QUE, SF, EJA, HHM, 1JCI, 9YBX, JWG, BTF, BXB, AEX, NGV, THZ, RNG, OAE, NVO, Mr. & Mrs. DSV, LCF, CFK, LXW, NKP, TBK, NNF, RCG, NJM, NQJ, HTR, JW, Mrs. EX, AFU, CPI, WYS, 7PI, VKO, MVU, NJQ, ZM, EY, ALH, AAU, AKB, DZZ, BAX, Mr. & Mrs. USR, Mr. & Mrs. KZP, SC, Mr. & Mrs. DVW, LV, CYP, and W. H. Rowland, Carl Tucker, Karl Spangenberg, Lt. T. J. DeLa-Saux and wife, D. Elaine Rockwood, F. E. Gillmeister, Bob Ogg, Ruby Kammerer, Bernice Amendt, Mrs. W. H. Rowland, Grace M. Armond, Chris S. Andersen, Mary K. Dunlap, Grace Brinkman, Kenneth Solomon, Thomas R. Tieher, L. H. Kettinger. CIS is back in S.F. and is taking a short course at T. I. before leaving for the So. Pacific. Ken wants to be remembered to all section members and to thank them for the support he received while he was SCM. A letter received from M/Sgt. Lou Letendre, better remembered as K6TMM of Fort Shafter, T. H., before Pearl Harbor, advises that both he and K6UJO, now a chief warrant officer, are still in the Islands. JWF's address now is: S/Sgt. Frank Johnson, 520th Base Hdq., Sqd. A.A.B., McCook Field, Nebr. SPC's address is: Geo. D. MacIntosh, APO 639, c/o P.M., New York, N. Y. Sgt. IPH writes a fine descriptive letter of his wanderings. His new address is: APO 650, N. Y. C., N. Y. LLW is back at the old lettuce stand in Salinas and advises that QDN, of the CCN-SFN traffic network, is radio operating in Alaska. His address is: Edw. Goranson, c/o Alaska Communications System, Box 219, Anchorage, Alaska. 1HNH is a WAVE with the rating of RM3c. Her address is: Norma Schaal, RM3c, USNR, WAVE Barracks D, Treasure Island, San Francisco, Calif. Report has it that the son of ZS is taking pilot training in the South. SDT's address is: Ens. Vic Battani, USN, c/o Fleet Post Office, New York City, N. Y. 9YMV, ex-SCM of Ind., is temporarily located in S. F. awaiting assignment as radio operator aboard ship. LeRoy is a warrant radio electrician in the U. S. Maritime Commission. RBQ has returned from an Eastern trip and was entertained by 9EKY and 1SZ while in Boston. Both of these hams are doing a big job for Raytheon, and so is By Goodman. Ens. KB6ILT, formerly of Guam, is in town from the 13th Naval Dist. enroute to Tokyo. ZF is now in Asheville, N. C. RH may be addressed: 1st Lt. W. B. Overstreet, N. E. Sector SAS PIAAF, Presque Isle, Me. Radio Aide Gino Pera called a monthly meeting of all WERS members on Mar. 8th. Movies of the old S. F. Radio Club were shown by KJ, ex-9YQS gave a talk on high frequency antennas and DOT addressed the group on the proper operating procedure for WERS. The following members were present and a good time was had by all: KJ, CPW, FK, DAV, THZ, AOJ, TMV, CVP, LFZ, LES, EQA, KNH, NJW, ATY, NQJ, DOT, CWH, EVI, WS,

PRR, KZP, NPT, JQC, JKN, 9YQS, Ken Child, Ralph Abry, G. Gleghorn, R. Thille, W. Allen, H. Mandler, K. Schildt, Frances Drake, Frances Jessun, Theresa Bonzani. Come on, gang, drop a card once each month with news of yourself or of others. Also drop a card to those in the services whose addresses are listed in this column. 73, *Bill.*

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — We are indebted to CAY and FXU for this information. Commander CQ was relieved by Capt. 9UZ from duties at Charleston for duty overseas. FQV is in the USNR studying dentistry. FPH is an M.D. now doing intern work in Pa. EJE has been commissioned a lt. (jg) in the USNR. HEI is a s/sgt. in the Marine Corps located in the So. Pacific. BFB is chief radio operator with SASL. BMR is a radio instructor in the Navy. DST is a supply clerk in the Army; EIZ is also in this branch of the service. DSY is still with CAP. FUU has radiotelephone 1st class. DLX is an electrician at Manteo. EYF and ALD are at Morris Field. BX and BXB are in war work. FUA has taken up woodcraft for the duration. HUJ is in a b.c. station and BXF is printing. Glad to hear that CLB has recovered from a very serious operation. HJY is still copying press. We had a visit from Major DW, Roanoke Division Director, the other day. He is with the State Selective Service Board, and was out looking for some 1As or 4Fs. It is understood that the Charlotte Club is still active in WERS. Please send along any news of the gang. Uncle Sam has been whispering to us, and we might be gone before long. 73, *Buck*

ROCKY MOUNTAIN DIVISION

COLORADO — Acting SCM, H. F. Hekel, W9VGC — UPT reports that the Pikes Peak Radio Association members are scattered all over the world: Pres. EHC, 1st lt. in the Signal Corps, is en route from one place to another. WYX reported that EHC visited several of the gang in Denver on Mar. 5th while on a lay-over for a few hours. Vice-pres. UPT is a civil service mechanic in Bisbee, Ariz. Address Secy-treas. MMI, pfc., at: APO 7458, c/o Postmaster, San Francisco, Calif. Sgt. FBF's address is: APO 885, c/o Postmaster, New York, N. Y. T/Sgt. YLT is at Hq. Tr. 10th Cav., Camp Lockett 16, Calif. EGH is now a W4, address unknown. MGA's address is unknown. James Simpson, operator license, is still in Colorado Springs. REU is back from T. H. and is now with R.C.A. Comm., Inc., San Francisco, Calif. AYV and HMY are in the Navy. WAJ is flying between Denver and San Francisco as a radio operator. The only dope on NBK and CBE is that one is in the Navy and the other is in Calif. on a war job. Many of you who worked 4GFH may remember his protege, Hope "Cellophane" Plummer. She now holds tickets for 'phone 2nd and telegraph 2nd, WERS operator WNYJ-32, and was endorsed for Class A amateur Oct. '43. She graduated from Melville Aero. Radio School Oct. '43. She admits that 2HDL had a lot to do with it. JVJ from Carbondale, Ill., is now in Denver as instructor in radio. 1st Lt. DTA, who was piloting a Flying Fortress when he was shot down over Bremen, Germany, was awarded the Air Medal. Presentation was made to his mother, Mrs. Anna Noordewier, at Ft. Logan, Colo. on Feb. 22, 1944. He is now a prisoner of war in Germany and was cited for exceptionally meritorious achievement in five combat missions over enemy-occupied Europe. Ed got his start in radio attending the class instructed by WYX. Upon entering the services he was sent to Lowry Field where he graduated as a pilot. QYT, on his first vacation in four years, is visiting in St. Louis, Mo. The AAROD officers for 1944 are: pres., ESA; vice-pres., FXQ; secy-treas., CAA. The Bell Radio Club officers were held in office for another year. J. E. Lindsay, operator license, is now a paid-up member in good standing in the Electron Club. William D. Davis, the son of BJN, and a gunner on a Flying Fortress, was killed when his ship crashed somewhere in Brazil Feb. 28, 1944. All BJN's friends extend their deepest sympathies. BQO is still conferring with officials whose signatures are required by the FCC to activate 36 units for WERS. TRR is in charge of frequency measurement and setting, construction and installation. Three students of the Colo. U. radio class, Burr Betts, LSPH, attending a radio school at Camp Roberts, Calif.; and Harvey Tatum and Raymond Hall, at the Navy Training School, Farragut, Idaho, were members of the Colo. U. radio class. Their instructors at C. U. were BQO, CAA, TRR and YXU. The AAROD bought another War Bond during the last drive. TFP is nationally known as "Fish" Markwell; complete details may be found in a recent issue of *Telephone Worker.* BQO had a 'phone QSO with VDV at Tacoma Pk., Md. Jack is still in radio at the Naval Training School there. 73, *by Heck.*

SOUTHEASTERN DIVISION

WESTERN FLORIDA — SCM, Oscar Cederstrom, W4AXP — Lt. Blevins, of the Aircraft Radio Dept., is back on the job after an operation. Lt. (jg) Ludwig is pleased to see the growing demand for his pocket-size communication manual. Irwin, who owned Irwin Radio Shop in Pensacola, and a ham, is the latest addition to the gang in the communication training department at NATC. He will pinch hit as shop foreman for AXP while he undergoes an operation at Pensacola Hospital. Irwin has permission to install a communication training set-up at Pensacola Trade School. This school is for Army Auxiliary Corps Cadets training classes. The old-timers of the gang all were recommended for P3 ratings. McMullen, lt. (jg), is in training for the time being at Corpus Christi. The Old Maestro will be out of circulation for about a month if all goes well and no complications set in. While Capt. Beckham and Ewart Sconiers are not hams, their outstanding deeds have been the pride of the section. Now Capt. Beckham is missing in action over Europe. He was leading ace with 18 Jerries to his credit in that zone. We await definite word of him with hope. Sconiers died in a German prison camp. The section salutes these heroes. A nice letter was received from ARM2c Chaney, who was a co-worker with AXP at Soufley Field. 73, *The Old Maestro.*

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, H. F. Wood, W6QVV — GVU, now a lt. col. and signal officer, APO 528, c/o Postmaster, N. Y., writes that he has seen little or no news in this section from the boys overseas and would like to hear from any of the gang. RNN writes that RNQ and SMG were in town recently on furlough from Alaska and attended a meeting of the Inglewood Club. QIL, now RT2c, dropped in and said hello; he is now at Norfolk, Va. EKM has had his hands so full, he broke one of them. His daughter had an appendectomy recently, but is back to normal once again. SEZ is just entering the Navy and USB is now stationed in So. Calif. The Club is still going strong and they have had several interesting movies. MSO says that KGIC is holding regular weekly drills and that the Inglewood WERS group recently participated in a CDC incident drill in which telephones were assumed to be completely out and all communications were handled by our group in a very successful manner. They now have 18 units in the group and have received the renewal of their license. AM says his 6-element antenna works fine on the 113-Mc. superhet; he also reports that RO has a beautiful power supply. Regular workouts are being held by KGWE and RO has a fine organization at that point. We hear that the Los Angeles County groups are holding their drills regularly. Los Angeles City is still waiting for its license to be modified so that the entire group of some 130 units may participate. Dot Williams and Rudy Jepson recently participated in quiz programs as one of the weekly features of the CDC broadcasts over KMPC and got for themselves $5 worth of War Stamps. Walt Matney had a recent very narrow escape when he was caught in his car in some flood waters during the "unusually heavy fog." ESX's eldest son, Dick, is now attending OTS in the Carolinas in the communications division, so there will be another ham in the not too distant future, I betcha. SSU bumped into Ralph Click on the Island recently and they had a gabfest there. PPW reported by landline that he is feeling fine again and working hard. We rather imagine MFJ and UQL are pretty busy boys now. MDQ is back home from Africa and now is feeling pretty fair. His address: T/Sgt. Geo. Leber, Co. R, 840th Sig. Tng. Bn., Camp Kohler, Calif. Good luck to all. 73, *Ted.*

ARIZONA — SCM, Douglas Aitken, W6RWW — OAS pinch hit this month for TBR, his XYL, the regular Salt River Valley correspondent. TBR has been busy with a dog show, and took a first and two seconds for her dogs. George reports rather fully on WERS, and says that they had to discard low-impedance feed lines in favor of open-spaced lines, and are now having good signals over the area they cover, with much improvement coming from locating

(*Continued on page 70*)

DANA BACON once remarked to us that most technical articles in *QST* contributed by amateurs start with an apology, as if the writer felt embarrassed at his presumption in putting his thoughts on paper. The opening paragraph reads something like this: "There have been many articles in *QST* in recent months on compact transceivers, but none of them have told how to build a transceiver into a snuff-box. Since many hams have old snuff-boxes lying around we thought somebody might be interested in how we built our new portable rig into a snuff-box here at W1 — at a cost of only $1.19. Hi!"

This is usually followed by a very interesting article. We like that kind of article. We like the author's modesty, and we like the way he writes in plain English. Compare it to the opening paragraph of the high powered author who begins this way: "From a consideration of the work of Snickelfritz [1], Jellybean [2], and Belch [7, 8, 9] it is evident that further investigation is indicated in respect to certain aspects of the installation of transceivers in enclosures of high-Q, and we are justified in concluding that further data should be accumulated on enclosures of this character, as ably pointed out by Whiffletree [14, 15] and Gust [16, 17]." His "enclosure of high-Q" looks just like grandmother's snuff-box, though it has been turned out in a machine-shop and gold plated.

Now, we do not mind the author's little conceits but we do wish he would write the article so we can understand it. He never says "1 watt," he gives it in decibels above a reference level. His magnetization curve for the audio transformer (yes, he has lots of curves) is plotted in "oersteds." We forgot what an oersted was long ago, and we do not care much about knowing now. However, it sounds like hot stuff, so we look up "oersted" in the International Critical Tables and find that it is a unit of reluctance having the dimensions $\epsilon l t^{-2}$. That is just dandy. We try the ARRL Handbook and draw a blank (apparently George Grammer does not know what an oersted is, either). We finally discover, in the Standard Handbook, that an oersted is a gilbert per centimeter, and Hudson's Manual says that a gilbert per centimeter equals .495 ampere-turns per inch. So he was talking about our old friend ampere-turns all along! Now that that is squared away, where were we?

Well, we were saying that we like the articles in *QST*. They are written by men whose language is as forthright as their thinking. They are written so that even an engineer can understand them.

W. A. READY

Amateur Activities

(Continued from page 68)

transmitters on higher ground. By so doing they've had complete success up to 18 miles distance. ROP has been ill and we all wish him a speedy recovery. FZQ is still in Tex. It is rumored that NEL and MAE, after much practice in a quartet, have been offered jobs as train announcers. LSK has been experimenting with f.m. and has had much luck on a dummy antenna. NGJ had to discard his superhet in favor of superregen.; it seems that the WERS self-excited oscillators are too broad to follow with a close-tuning superhet. REJ dropped in on the SCM while on furlough between camps. QLZ, now discharged from the Army, expects to resume Army service as a civilian instructor. A nice letter was received from Jerry Johnson, RM3c, who is somewhere in the Pacific. UNY passed away in Feb. at the Great Lakes Naval Training Station. He was a member of the Tucson Short Wave Assn. and of the ARRL. The Tucson gang keep up their code training classes, with a new one of 20 just starting. GS reports the ham gang in Tucson are staging another of their "foam busts," with TJH, USC, GS, IGC, TXM, OWX, TPP, OZM and SLO among others in attendance. I would still like a line from you fellows scattered around the world. 73, *Doug.*

WEST GULF DIVISION

NEW MEXICO — SCM, J. G. Hancock, W5HJF — Francis Gormley (LSPH), an officer of the administrative staff of the New Mex. State Guard, is our new EC. One of those unfortunate fellows who failed to get his ticket before Pearl Harbor, Lt. Gormley is a real ham enthusiast and a live wire and should be a valuable man in our organization. CSR, a 1st lt. in the Signal Corps, is enjoying a 30-day furlough at home in Albuquerque after two years in the African theater. GSD paid me a nice visit while home; George will graduate from Calif. Tech. this fall. JWA is back in action in the Southwest Pacific and had a swell rag-chew with 8OYN in New Guinea. A nice report on the Santa Fe and Las Vegas gang was received from GXL, who is chief operator at KFUN in Las Vegas. Dell built KFUN and also spent a year instructing in theory and code at Signal Corps' schools. HDN is with the FCC Intelligence Division at New Orleans. DYV, with the Navy, is still in Port Arthur. JZT is as busy as ever in the Soil Conservation Service. HPZ is still with Las Vegas High School; he handled the code work for a considerable time at the beginning of the Naval Aviation Cadet training program at Highlands U. BKD is chief operator at the Chickasha, Okla., police station. I'm going to expect that promised monthly report and I sincerely hope it is contagious with more of the gang, but who could kick this month? 73, *Jake.*

BRIEFS

When the Cahokia Amateur Radio Club of East Saint Louis, Ill., held their annual election recently, the following took office: W9ECD, president; W9WPC, vice-president; W9EBX, secretary and treasurer; and W9NMY, sergeant-at-arms.

—•••—

QST scores again! Looking over the list of SCMs in a recent issue while recuperating in a veteran's hospital, W2OCH noticed the name of Robert E. Haight, W2LU, of Scotia, N. Y. Taking a chance on finding him to be the same man as an old pal of his at NPN in Guam in 1920, W2OCH wrote W2LU and discovered that he was. They had lost track of each other when one was transferred to Cavite and the other to San Francisco, years ago.

—•••—

"According to the *New Yorker*, much of whose contents we enjoy but do not believe, one of the lifeboat transmitters pictured on *Electronics*' September cover was shipped to someone around New York City for some experimental work. The office secretary opened the bundle, and seeing the handle of the radio transmitter, gave it a couple of good whirls, as who wouldn't? Within a short while, they got a call from the Coastal Command, who wanted to know who the hell was lost at sea on lower Madison Avenue."

— *Electronics*

Electricity in Ancient Egypt

Was Alexander Volta the first man to construct a galvanic battery, or did the ancient Egyptians employ similar cells 2000 years before his time? Was electricity first discovered and applied to practical uses in comparatively recent times, or were its principles understood and first put to use several thousand years ago?

These questions are raised by recent discoveries indicating that the ancients not only knew of electricity but understood how to make and use it. This assumption, based on the discovery of what appear to have been electrolytic cells in ruins near Bagdad, Tel'Omar and Ktesiphon, is reported by David O. Woodbury in the January, 1944, issue of *The Technology Review,* edited at the Massachusetts Institute of Technology.

The first of these cells, brought to light in 1936 by Wilhelm König of the Iraq Museum, was a pottery jar about six inches high. Inside it was a copper cylinder closed at the bottom with a soldered plate. Within this were the remains of an iron rod, eaten down to a point at its lower end. Traces of asphalt around the neck indicated that the two metal parts had been supported concentrically but insulated from each other. Later four similar jars were discovered, three of which proved to have the same kind of copper cylinder although no iron electrodes were present. Iron and bronze strips were found near by, however, suggesting wires used to complete an electric circuit.

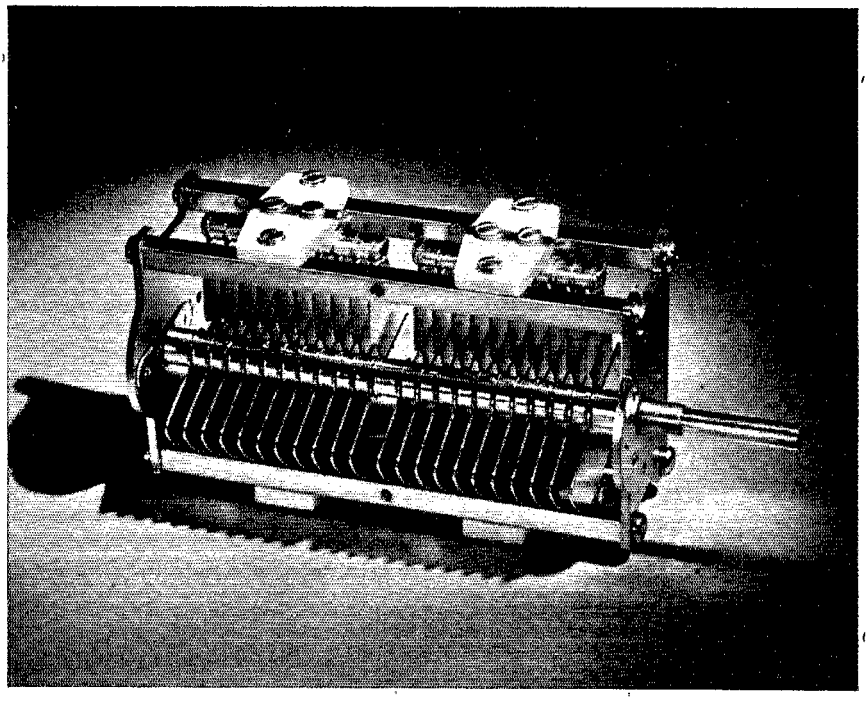
At the time of the discovery the significance of the jars was not understood. Data and drawings of the device were taken to Germany in 1938 and thereafter several articles were published regarding it. Consensus was that the relics were an ancient form of the galvanic battery devised by Volta, but were assigned a period some 2000 years before his invention.

Substantiating this conclusion, ancient Parthian bowls and vases of copper, plated with gold and silver, are to be found among the same ruins. Hitherto no one had discovered how the plating could have been done. Circumstantial evidence indicates that it was accomplished by means of these electrolytic cells.

Other cells were found with objects of the Sassanian period, which would date them back at least to the time of Christ. Even greater antiquity may be established, as objects in that region were plated with gold and silver as long as 4000 years ago.

The first news concerning the discovery was brought to America by an expatriated German scientific writer, Willy Ley. The facts he reported came to the attention of Willard Gray, an electrical engineer at General Electric's Pittsfield plant. Mr. Gray built an exact duplicate of the ancient device, using copper sulphate as an electrolyte, and found that the cell operated perfectly.

WHEN PEACE COMES



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

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

5.0 Mc. — Continuously, day and night.

10.0 Mc. — Continuously, day and night.

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

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

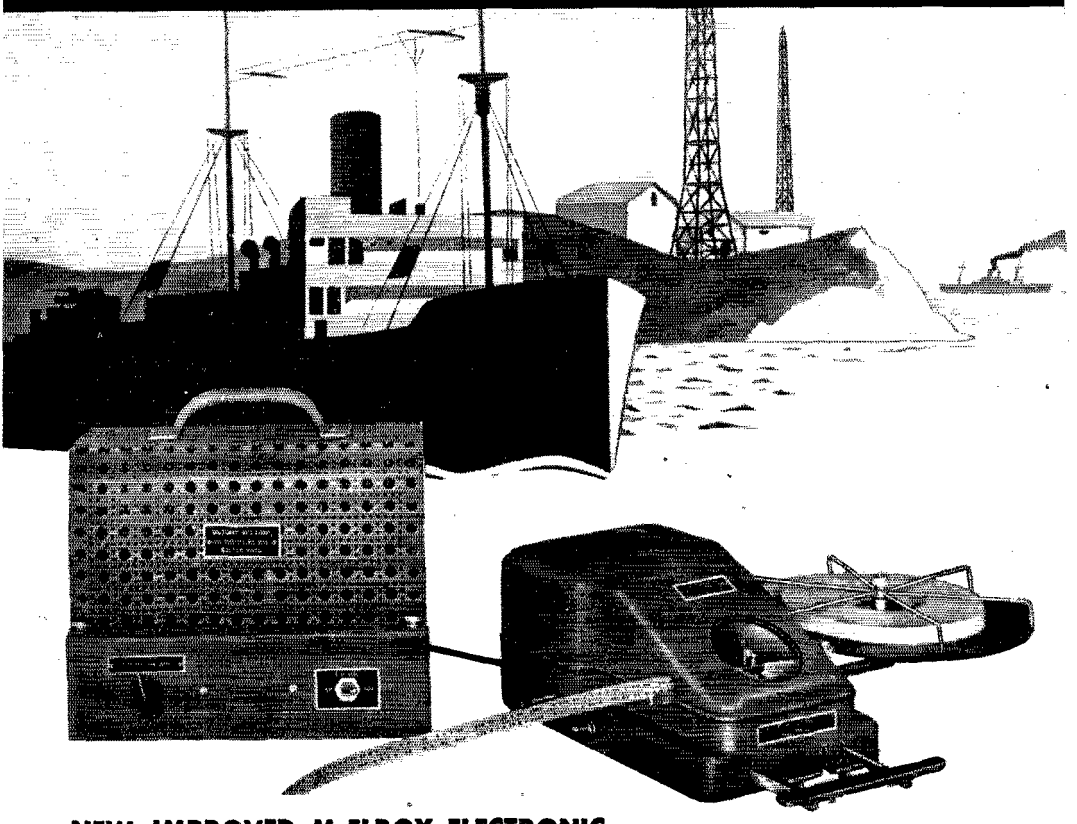
The audio frequencies are interrupted precisely on the hour and each five minutes thereafter, resuming after an interval of precisely one minute. This one-minute interval is provided to give the station announcement and to afford an interval for the checking of radio-frequency measurements free from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

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

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

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

For every ship and marine station!



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CODE TAPE PERFORATOR PFR - 443 - A

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SHIP-to-SHIP
SHIP-to-SHORE
POINT-to-POINT

Entirely mechanical, the PFR - 443 - A not only improves the efficiency of transmission but confines human error to minimum. Comprising two units—the Keying device and Electronic mechanism—this Perforator can be operated by anyone with a basic knowledge of dots and dashes. Those with experience can easily maintain an accurate speed of more than 40 words per minute in all Morse combinations assigned to the Russian, Turkish, Arabic, Greek and Japanese alphabets and languages. Sending is automatic . . . tapes are clean and precise. Time, expense, and even lives, may be saved. The PFR-443-A has aroused more than usual enthusiasm. May we send complete details?

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WE CREATE...DESIGN...BUILD...WE ARE NEVER SATISFIED WITH MEDIOCRITY

KEEP IT UP...BUY MORE AND MORE WAR BONDS

High-Fidelity Amplifier

(*Continued from page 21*)

The amplifier components are mounted on an enclosed rack-size chassis 13 inches deep. The general arrangement of parts may be seen in the photographs. The power-supply components are placed along the rear edge of the chassis while the amplifier tubes and transformers occupy the front part. Tube sockets are submounted and all wiring, resistors and fixed condensers are underneath. All ground connections are brought to an insulated terminal and a single connection is made between this terminal and a point on the chassis where hum is reduced to a minimum.

Limiter action was checked by applying a sine-wave signal from a Clough-Brengle 79D signal generator at the phono-input jack. A volume-indicator meter, flat within ½ db. was placed across the resistance-loaded 500-ohm output line. A level of plus 34 db. at 1000 cycles was chosen as the reference level. The limiter threshold control, R_{28}, was set to reduce this level to plus 31 db. The master gain control, R_{15}-R_{16}, was then increased to regain the 34-db. reference level before the frequency run was plotted.

It might be well to include a word about the balancing of push-pull stages. Instead of measuring individual plate currents, the plate-to-plate differential voltage was measured in each stage with a vacuum-tube voltmeter and then tubes which showed the least difference were selected and numbered for future reference or replacement.

Although various refinements, such as high- and low-end compensation or suppression, dual-channel mixing, etc. might be added, they did not seem sufficiently important to be included in this unit.

Book Reviews

(*Continued from page 31*)

electrical adjustments as end play, balancing, correcting the magnetic field and others. A.c. ammeters and voltmeters, wattmeters, frequency meters, synchroscopes, power factor and reactive factor meters are considered. Damping principles and methods are also treated.

In the final chapter, M. F. Behar, editor of *Instruments*, explains the design and construction of pivots and bearings, giving information on the materials used and the essentials of cleaning, inspecting and replacement.

The book was written by a man on the job for others on the job, and should be very useful for those engaged in maintenance, calibration; testing and application of measuring instruments.

— *T. A. G.*

Lice, Liberty and Parasites

(*Continued from page 41*)

caught underneath a watt clip or in a wave trap. It will then emit a series of faint noises, sounding very much like loose wires on the voice-coil assembly of a loudspeaker, until it perishes.

After considerable research, I have found that the only way to exterminate these pests is to tune in station ——.[8] The reason this treatment works is because it takes a louse to catch a louse.

[8] Insert the call letters of the most pedicular (i.e., *lousiest*) broadcasting station in your vicinity.

Special purpose
CERAMIC TUBULAR CAPACITORS

In addition to our standard type tubular capacitors Centralab is prepared to furnish SPECIAL PURPOSE Capacitors for radio frequencies (high and ultra-high frequencies) for both transmitter and receiver circuits.

Our extensive laboratory and engineering facilities make possible the production of special types some of which are illustrated here . . . to meet the need of circuits that cannot be serviced through our standard tubular capacitors.

We invite correspondence where special capacitors are indicated.

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Division of **GLOBE-UNION INC., Milwaukee**

Producers of Variable Resistors • Selector Switches • Ceramic Capacitors, Fixed and Variable • Steatite Insulators.

Television in K6 Land

(Continued from page 45)

signal on the air by the addition of a suitable transmitter and receiver. In fact, all parts necessary for the construction of a receiver using a 3AP4 black-and-white tube were on hand and construction contemplated, but the components were sold early in the war as replacement parts because of the critical shortages existing in the local service field at that time.

The fulfillment of our ambition actually to put a signal on the air for the first time in Hawaii will have to await the return of those good old days. In the meantime, all energies are dedicated to the hastening of that day and the thrill of tuning in a real ham television signal.

Notwithstanding all the energy consumed and the headaches involved, I feel justified in saying that the final results were worth all of and more than the effort which was expended, and the thrill of "peaking" up that first picture on the monitor, faint though it was, can be compared to that unforgettable moment which comes only once to each ham when, in the haze of QRM, he touches up the old receiver a hair's breath to pull in his first DX contact. Can more be said?

Correspondence

(Continued from page 57)

king. People lined the banks cheering and waving American and Australian flags. Later, on shore, to say that the Aussies are very hospitable is putting it mildly. We were treated as though we had already won the war and saved Australia from enemy invasion. . . .

I spent approximately seventeen months in the Southwest Pacific, mostly in Australia, Java and the Fiji Islands. . . . During this time I had been transferred from the transport to another ship for duty. We, the dozen or more of us who had been ordered to Guam and the Asiatic Station, had been assigned to different ships in the Asiatic Fleet. We were no longer "war orphans," and we all had a job to do.

Some of those boys will never return. They were assigned to ships lost in those first few months of 1942. They were good radiomen, and I know that they were on the job and doing it well.

I also had the experience of being reported "missing in action" which caused the folks at home a bit of worry and confusion. This was cleared up later and branded as "bum dope" by my appearance in person at the old homestead for a week's visit. . . .

— R. D. Johnson, CRM, USN, K6NSD

BEST SPOT IN THE ARMY

23rd Army Airways Communications System Sqdn.,
Peterson Field, Colo.

Editor, *QST:*

When I first came to Peterson Field, we had a control tower with one transmitter and four re-

Sound Ideas . . .

Sound ideas! On the drafting board . . . in practical engineering . . . in production "know-how". These form a strong union out of which come many Electro-Voice developments. And the latest of these is the Model T-45 "Lip Mike" . . . a noise-cancelling Differential Microphone.

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(Continued from page 78)

ceivers. The transmitter was homemade from junk parts and had an input of about thirty-five watts. The parts and the building used were furnished by a major here who is a radio engineer and a ham. . . .

I was a private at the time as was Frank Gornick, W9UVR. I had a number of parts in my junk, so Gornick and I built a . . . 120-watt rig. . . . We used this rig for eight months, trippled our traffic, and were made a Class-A station.

We now have three large GI transmitters and five receivers. We guard three frequencies and two more on request. We have a new tower installation, too. . . . W9UVR is maintenance man and I am non-commissioned officer in charge.

I helped put in all of the new equipment and had a good time, too. The installation engineer was a first lieutenant and a ham.

Since coming to this field a year ago I have met more hams than I thought were in the U. S., some of them flying ops., some of them in tactical units and some ground ops. Also, there is the outfit I am in, the 23rd Army Airways Communication System Sqdn. It's the best spot in the Army! We have some crack operators here . . . and three WACs who are radio operators (good ones, too) and one in the control tower.

The hams in the services surely are doing their part. . . . Some of those poor devils will never come back. I know that the League and the government won't let those brave men die in vain. We have got to have our old places back, our old rag-chews, our old troubles in making her work on 40. . . .

— *S/Sgt. Harold E. Dutton, W5IUK*

"BACKER-UPPER"

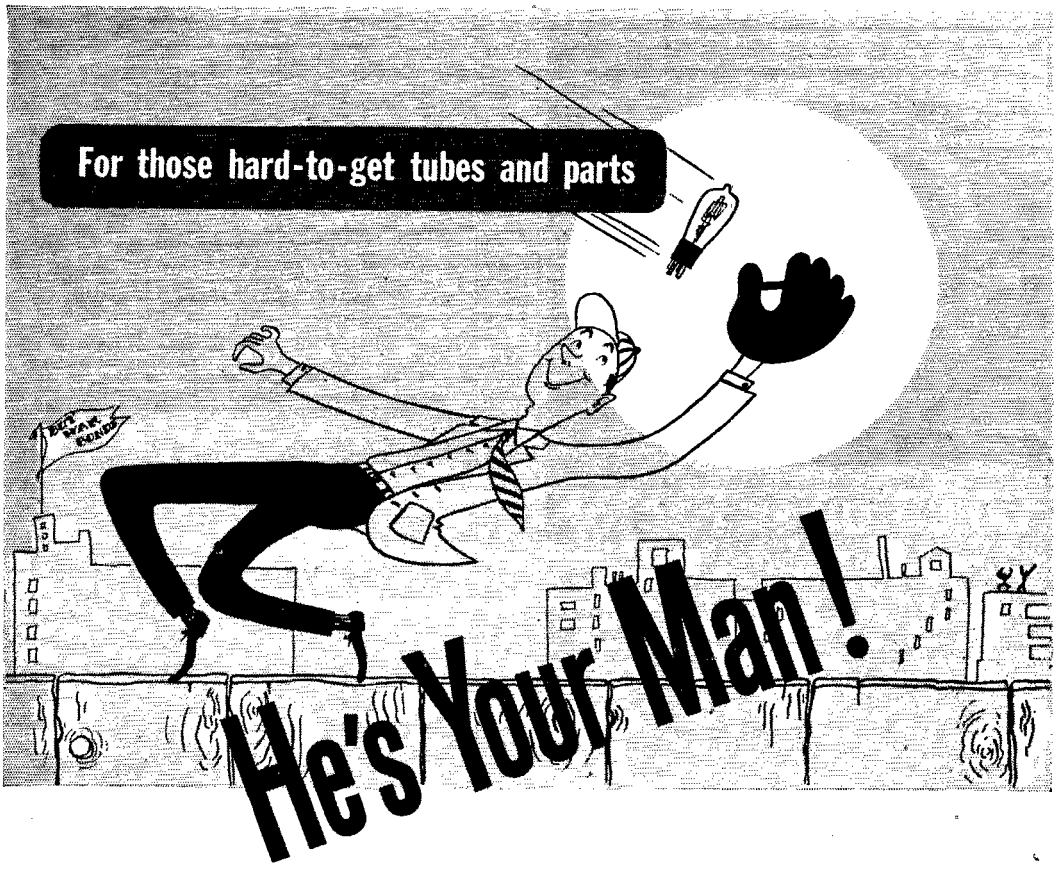
9 Peters St., Cambridge 39, Mass.

Editor, *QST:*

This is the first time that I have written to tell you exactly how much I think of the great work the League is doing and I know will continue to do after we clean up the Axis. Although I am a Class-A licensee and a commercial op, I have no ham call and haven't put a signal on the air as yet. However, I get a feeling of pride from being an amateur and a greater feeling of pride from being a member of your organization. I look with keen interest for the arrival of *QST* each month, and I read it from cover to cover.

The fellows who have no calls will appreciate getting back on the air just as much as the pre-Pearl Harbor boys. Every loyal amateur should — and I know most of them are — supporting the League by subscribing to *QST*. After all, if we ever want to get back on the air again we must have something to back us up, and the League is the backer-upper. You fellows will remember what trouble we had getting on the air after the first war. Every amateur should read "Two Hundred Meters and Down" if he really wants to find out about our difficulties in 1918. So, back

(Continued on page 82)



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

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RCA

RADIO CORPORATION OF AMERICA

★ The Magic Brain of all electronic equipment is a Tube and the fountain-head of modern Tube development is RCA

(*Continued from page 80*)

up the League and get back on the air in the shortest possible time after this war is over. . . .

— *Donald Kadish*

HE WANTS A RING

P. O. Box 277, Quantico, Va.

Editor, *QST:*

I have just completed reading Ralph J. Kempton's letter in December *QST*, and I heartily agree with his opinion that a good ring should be made available to all hams through the ARRL.

Pins and buttons are not allowed to be worn by those in the services, but a ring is not objected to. It would be an excellent means of identifying brother hams in the armed forces; better than any kind of a hand sign, I believe. I have longed for some sort of identifying insignia that I could wear, and I believe all other hams in the services will agree with me. Let's have their opinions. . . .

— *Corp. Murray Ehrlich, W2MXW*

"I'LL NEVER FORGET THE KEE BIRD"

Engineering Div., U. S. Signal Corps, 730 Commonwealth Ave., Boston, Mass.

Editor, *QST:*

Have just finished reading Major Hunt's story, "The Wail of the Kee Bird."

I, too, have seen these wonderful birds, talked with them, eaten with them, and drunk with them. Mind you, I said "drunk with them" — hi!

The only thing I don't like about these damn birds is that they get too friendly. Why, one night (a hectic night, and one I will never forget!) along about two in the morning, a flock of these birds came into my barracks, woke me up, threw me out of my GI bed, put on my clothes — parka, boots, snowshoes, and the whole bloomin' Arctic equipment — and paraded up and down the barracks for an hour or so. It was terrible! They really tore the place apart. Then one of them socked me on the chin and left me there on the floor.

When I awoke I looked around the room, but they had gone. My Arctic equipment was still in the barracks and they had left everything in order. But what hell they raised while they were there! . . .

Yes, I'll never forget the Kee bird — up in the Frozen North.

— *Wm. J. Cummings, W1CMG*

TAKE MY ADVICE

937½ 9th St., Santa Monica, Calif.

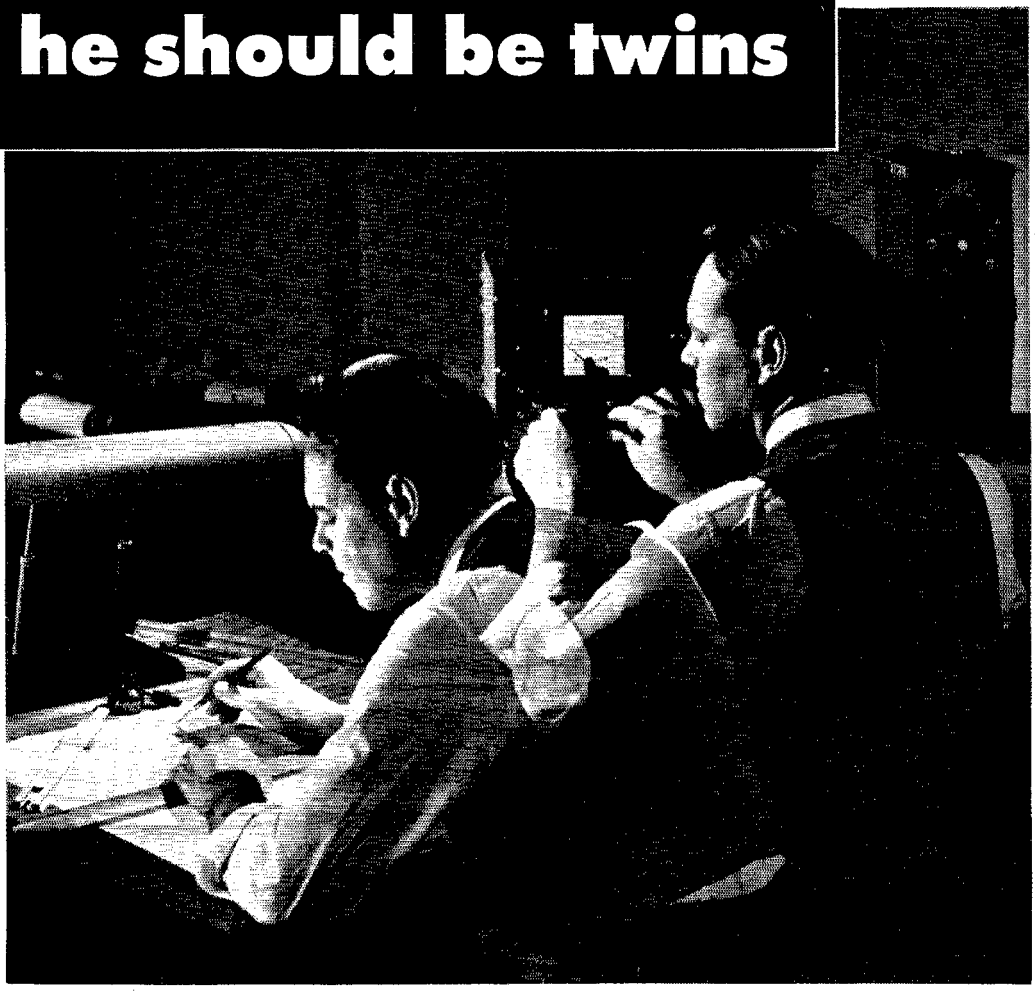
Editor, *QST:*

. . . Although I have two years of E.E., the selling point in obtaining my radio jobs has been the possession of an amateur license.

I received my Class-C license in June, 1942, and from July to January, 1943, I worked as

(*Continued on page 84*)

he should be twins



The electronic engineer is one of the hardest-working men contributing to the war effort today. His highly specialized training and knowledge is not easily or quickly acquired. His skill calls for many years of constant application. Because the demand for experienced engineers and designers jumped so greatly after Pearl Harbor, each one virtually has been doing the work of two men.

Raytheon is proud of its engineers and their great contribution to the war effort . . . and Raytheon is proud of its part in furnishing electronic tubes and equipment that meet all requirements of stamina, "Plus-Extra" quality, and complete dependability under the most severe wartime demands.

ARMY-NAVY "E" WITH STAR
Awarded All Four Divisions of Raytheon
for Continued Excellence in Production

RAYTHEON

DEVOTED TO RESEARCH AND THE MANUFACTURE OF TUBES AND EQUIPMENT FOR THE NEW ERA OF ELECTRONICS

RAYTHEON MANUFACTURING COMPANY
Waltham and Newton, Massachusetts

(Continued from page 82)

instructor at the Army Signal Corps civilian school at Ashland, Wis. Entered the Navy and spent eleven months in Air Corps radar training, only to be handed a medical discharge in December. Returning to civilian life, I went to work for Douglas Aircraft as a line radio mechanic, and started to work for my commercial ticket. After three months at Douglas I finally got located in my present position as radio operator for Press Wireless at Hollywood, Calif. At present I'm located in their receiving station and, as any ham would be in such a position, I'm in my glory.

Now a little advice to those who are still in the services. If you want to make a future of radio operating in civilian life, start working for your commercial ticket now. There will be expansion after the war and jobs, but why not be ready to go the minute you get out?

Yes, through amateur radio an avocation became a vocation in my case, and I want to thank ARRL for all the help it gave me in educational and practical publications, without which I would have been lost. As for *QST* it isn't the biggest, but it is the best.

— *Robert M. Bruder*

PAW'S IDEAS

701 Jefferson Ave., Jeannette, Pa.

Editor, *QST:*

The first editorial in April *QST* surely put the light on a very serious problem; namely, hams tearing apart government equipment as if it were their own. As the editorial points out, now is no time for mistakes and spoiling what we have already gained. The officers know you boys understand that a cat now may keep his normal supply of whiskers and that cats' tails are not used as antenna poles. However, they also want their rigs to be ready for instant transmission and not in a thousand pieces. . . .

Let's not make any mistakes so a certain ole man with a big-league chew can say, "What ever happened to them thar hams?"

May I suggest that some of our hill-billy hams send a couple of jugs of mountain dew ("Sourdough" can send some of that cider which was a mite bit on the hard side) to those fellows in Washington? With city stuff taxed so high, this gesture should keep them on our side. That's Paw's idea on the matter anyway.

— *Walter C. Downes, W8UVD*

A LITTLE CREDIT, PLEASE

3180 QM Serv. Co. LAPE, Wilmington, Calif.

Editor, *QST:*

A letter from W5NT in the March issue of *QST* describes a secret communication system used by the Japs in the Southwest Pacific.

I was in a radio Army course before America entered the war and thought of and drew up plans for the same system described as being used

(Continued on page 86)

(Continued from page 84)

by the Japs. I showed it to the Army officer who was the instructor, but he just smiled as if it was a fair idea and said nothing. The only difference in my plan was that I used two receivers without feeding the output into a common amplifier. This American deserves a little of the credit for that idea for the benefit of our ham brotherhood.

I finished three courses in radio — operating, repairing and radar — but as is apt to happen in the Army I have landed in the quartermaster service. . . .

— *S/Sgt. Edward S. Porter, W4GAG*

FINE BUNCH

No. 4 Base Sig. Unit, R.A.F., B.N.A.F.

Editor, *QST:*

Since I have been overseas in FA and have met a number of W hams, I feel I should drop you a line.

I have been a regular reader of *QST* since 1937 and with the exception of two or three copies I have every one up to the time I left England in September. My wife informs me that they are still coming across, but I have requested that she keep them for me so that when we all return to the days of peace I shall be able to sit down in the shack and read them. One of the joys of life was to receive my copy of *QST* together with the *Handbook*.

In my capacity as a signals officer, I have met a number of the officers and men of the Army Signal Corps, including a number of hams from W1, 2, 7 and 8 and they are a fine bunch of boys.

From the equipment used by them I am getting some good ideas for the ham rig that I intend to build when we are back on the air.

So until then, keep the spirit of ham radio going over on your side and we will look after our end in England.

— *Frank E. Wyer, G8RY*

UGHEONICS

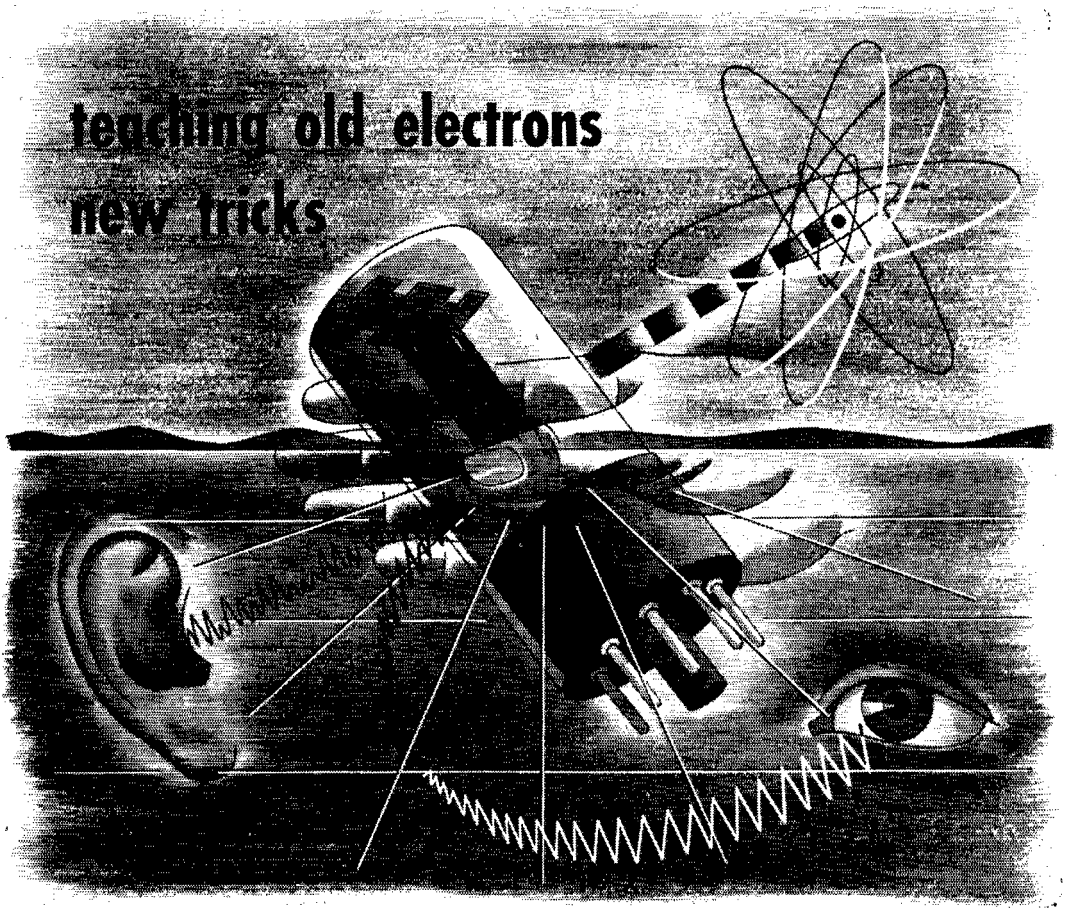
Newport News, Va.

Editor, *QST:*

It is being brought to your attention, gentlemen, that in the vast army of diligent workers in the radio field there has been a growing spirit of discontent. Yes, discontent born of the pitiful lack of enough descriptive words to adequately describe the great things that are transpiring in our art with its subdivisions of electronics, radio, etc. I have often heard this spirit of discontent expressed, particularly by those workers needing parts and not being able to get same. However, the expressions used are for the most part unprintable, so it is best they remain so here.

If, perchance, you have not been a delighted reader of past episodes in the amusing little game of word coinage (or is it carnage?), it does not matter for you have missed nothing. The Latins had a couple of words for it — *Nullus Novarum.*

(Continued on page 88)



Electrons have always been with us, since the beginning of time. But it was not until the development of radio that they were disciplined and put to work.

Now that the science of electronics has become better understood, these electrons have been taught a lot of new tricks. They have been trained to reproduce images as well as sound, to perform miracles of control in military equipment and industrial machinery. Long hours of research and development have been applied to making electronics a useful force in the fight for Victory.

Delco Radio has worked closely with Army and Navy engineers to help put this relatively new science on a fighting basis. In its laboratories, technical principles have been explored and exploited; in its engineering departments, designs have been evolved to apply these principles; and on its production lines, complete equipment is being manufactured with all the accuracy and know-how gained through Delco Radio's extensive experience as a large manufacturer of precision radio instruments.

This background of knowledge will continue to serve a useful function in days to come. It holds a promise of important improvements in peacetime radios, and significant developments in new electronic products.

Put your dollars "in action"

BUY MORE WAR BONDS

Delco Radio
DIVISION OF
GENERAL MOTORS

(*Continued from page 86*)

Nevertheless, it is with a great deal of secrecy, no little blaring of trumpets, and a great amount of fanfare that I now unveil to your startled gaze a new word — "fadeonics" [1] — so descriptive, so intimately tied up with radio (particularly 30 Mc.) and electronics (particularly when a tube burns out). For years the industry has needed this new term (-ite). Besides, it is so anti-English sounding. (Boy! Won't that please the old-guard insulationists.) It is typical Americanese — with no Greek-Latin or Russo-German complications. It is a virgin word. Oh, boy!

This new word — "fadeonics" — so aptly descriptive of our field of endeavor, has been given enthusiastic approval by billions of members of our vast industry. Upon its submission to the membership of the IRE Society,[2] 50,000 members enthusiastically voted for its immediate adoption, 78 members voted "We'll take Varga!" and 968,473 members were too busy ogling to bother with voting.

This evidence is conclusive. So rally round, boys! If you don't like the words you've been using, just kick 'em out and get a new set. . . . "How" and "Ugh" were good old Indian words once — originally true Americanese, I am told — but we don't use them now.

— Prof. Morton Q. Squeedunk, Pres., Treas. and Secy., Lexicogological and Phonetical (also C.W.) Society of America, Ltd.

EDITOR'S NOTE: The above letter was received via the agency of SCM Walter G. Walker, W3AKN, presumably a close friend of the illustrious savant, Prof. Squeedunk.

HAMS RUN TRUE TO FORM

250th Sig. Opn. Co., Camp Wood,
Ft. Monmouth, N. J.

Editor, *QST:*

I am writing to congratulate you on the swell job *QST* is doing to keep the ham spirit going. Not that the true amateur spirit needs anything to keep it alive, but it surely is a pleasure to pick up *QST* and read about the fellows and what is going on in the radio world. . . .

I have been in the Army for nearly two years and my amateur experience has helped me no end. My amateur license assured me of assignment to the Signal Corps when I enlisted, and I was considered a specialist as soon as I reached the radio section rather than a raw recruit who had to be taught the why and wherefore of all phases, from code to equipment. Thanks to transmissions from W1AW and my practice as a ham, I had a fair code speed (25 w.p.m. code proficiency certificate) and did not have much trouble picking up Army procedure.

(*Continued on page 90*)

[1] *Fadeonics* — The definition of this word will be given in *QST* at some future date. We are now conferring with our high-powered super-pressure sales department to learn just what the heck it means.

[2] I Read Esquire Society.

(Continued from page 88)

I soon was a code instructor, and then a short time later I got into the maintenance section and had a chance to see the "innards" of the GI equipment. Every day was a regular field day until I found out what made all of our sets tick — or fail to tick. The Army surely knows how to build them rugged, but some breakdowns will occur.

Since then I have instructed in theory and set operation and am now chief operator (crew chief) on one of the new SCR-399s. It is a nice job and a swell set.

Amateurs surely run true to form even in the Army. Whenever any of the boys who has been in the big fight or at any station where live traffic is handled comes back to the training sections, he always has stories to tell of how some ham was the best operator, or improvised some haywire connections and got the equipment working. A lot can be told afterward in case anyone has any doubt about what amateur radio has contributed to the war effort. . . .

— *T/Sgt. Harvey P. Mensch, W8WSW*

REGARDING THE POSTWAR ERA

1109 S. Country Club, Dr., Schenectady, N. Y.
Editor, *QST*:

It was a pleasure to receive my expiration notice for *QST* and to realize that it was necessary to renew my membership in the ARRL. In these days of paper shortages and lack of active amateur activity on the air, it is indeed fine that *QST* has been able to maintain its ever-high standards. There is certainly no better evidence of the part that the ARRL plays in the amateur field than this upholding of the amateur's pride and joy — his *QST*.

Reading over the various letters in the Correspondence section, I wonder if the "new era" of things to come perhaps has been painted too gaudily. Many hams seem to feel that once the ban is off, there will be limitless fields to investigate and revolutionary schemes to get into operation. If the truth were known, there has been very little done for our war effort that will cause any change in the amateurs' modus operandi. All of the wonderful developments that are helping our men to overcome the enemy bear little relationship to CQs and rag-chewing.

It is my belief that amateurs will benefit only to the extent that manufacturers will be capable of supplying us with better equipment at lower cost. The remarkable production records being made and broken every day by the radio equipment manufacturers must surely be reflected in a postwar array of superb equipment for the hams.

Advancements in technique of manufacture in electronic tubes will be evidenced by longer lasting tubes. A look at the joint Army-Navy Specifications for Electron Tubes will convince anyone that our armed forces are *not being* satisfied by poorly made or poorly designed tubes. The American manufacturers are working to

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(Continued from page 90)

limits that were formerly thought impractical. After the war these same manufacturers will turn their production lines toward the goal of keeping the United States on the top in the electronic industry.

The hams always played a large part as a proving grounds for the manufacturers. For that reason I believe that the hams will find the post-war era very interesting. There will be a field day of purchasing modern equipment — but there will be no startling gadgets. We shall have our receivers, our transmitters, and our antenna systems, and best of all, the privilege of using them. We hams depend upon the ARRL to preserve that last item.

— *Geo. H. Floyd Jr., W6OJK*

IT MAKES HIS FINGERS ITCH

28 Montgomery St., Poughkeepsie, N. Y.

Editor, *QST:*

Reading *QST* makes one's fingers itch: Meeting old friends, work so important you can never talk about it, maybe some things can be told after its all over. . . .

I met an old friend recently. Radio brought us together again after twenty years, but I cannot talk about our work because of the positions we both hold in this great enterprise. . . .

— *Walter S. Kalisty, W2MSL*

THANKS TO HAM RADIO

Box 364, Dresden, Ohio

Editor, *QST:*

I was employed as a radio operator by American Airlines until March 15th and now have returned to the merchant marine as a radio officer.

The major factor in my employment in the commercial field of radio is due in great part to the fact that I was active in amateur radio immediately before the war. Although I was not fortunate enough to enjoy any length of time as an amateur, it is one of my hopes to be able to return to it following the war. To me, one of the outstanding features of ham radio is the pleasure of joining thousands of others, irrespective of class or creed. . . .

— *Dayle Hall*

A MAGNIFICENT JOB

New York City

Editor, *QST:*

Because of necessary wartime restrictions, the significance of the following meeting will have to be withheld, but it is with a great deal of pride that I submit the following calls of fellow hams who were present at a banquet recently held at the Hotel Empire in New York City: W7CEG, W7AQN, W7GHD, W6TQE, W9KXD, W9WAO, W7DSR, W7IWD, ex-W3CCE and W5EII. This may give a small idea of what our gang is doing.

(Continued on page 94)

(*Continued from page 92*)

Let's keep up the good work. . . . It behooves us all to get behind the ARRL and formulate our plans for the future. Don't forget for one minute that big business has its eyes on our frequencies and unless we have proper representation in Washington we'll be left behind without our frequencies, or the most desirable ones. Let's not lose any; if anything, gain more — we've worked for them. Thank God our boys are doing a magnificent job for a wonderful country.

— *Orville Cooper, W9WAO*

THE HAM MANUAL

APO 503, Unit 1, c/o Postmaster,
San Francisco, Calif.

Editor, *QST:*

Received a copy of November *QST* and you could hardly realize how good it was to read. . . .

I have been overseas for more than twenty-two months now, the majority of that time in a combat area, and have had experience in operating and maintaining all kinds of Army equipment. I owe all of my achievements to the fact that the ham manual once started my interest in the ether waves. . . .

— *T/Sgt. James W. Spitler, W3GWV*

Splatter

(*Continued from page 18*)

of the Pennsylvania Railroad near Altoona. . . . **C. W. Moorhouse, VE5US,** is a first-class motion picture projectionist employed by Famous Players Corp., a chain operating in Canada. This is a nice job for a ham, because watching the same picture for the umpteenth time is conducive to dreaming up super-super ham gear. VE5US is an old hand at such dreaming, having obtained amateur certificate No. 1152 in 1930 along with the call VE5AK. His present call, VE5US, was heard up to the start of the war in 1939, and he was an active member of a radio club in Vancouver, B. C. Stating that he has built several commercial transmitters and a good bit of sound reproduction equipment, he adds: "My new postwar transmitter, now taking shape, is an 807 crystal into an 807 buffer into a pair of 812s in push-pull modulated by a pair of TZ40s. The latter are driven by the speech amplifier described in the article." He means the article on p. 19, of course. . . . **D. W. Pugsley** obviously is a man who makes good records — both magnetic and personal. The magnetic variety is described on p. 10. Here is his personal record: "Received B.S. in E.E. at University of Utah in 1935. Joined General Electric Co. in radio receiver engineering department in 1935. At various times have done the following: (a) Designed test equipment for radio receivers; (b) designed radio receivers and television receivers; (c) designed and built audio transmitter for low-power experimental television

(*Continued on page 96*)

(Continued from page 94)

station; (d) in charge of design of studio television equipment used in GE television demonstration at World's Fair in New York; (e) before the war was in charge of engineering of radio receivers for International General Electric Co. and will resume this responsibility after the war; (f) during the war have been in charge of design of many different types of classified electronic equipment for the armed forces; (g) taught electrical engineering at Bridgeport Engineering Institute (night school) for four years." . . . **John F. Souza, jr., K6PHD,** with modesty befitting his role as reporter of the television work of a crew of Maui, T. H., hams, supplies more information concerning the gang than about himself: "All members involved are members of the Maui Amateur Radio Club affiliated with the ARRL. Since December 7, 1941, all hamming activities have taken a back seat, but nevertheless interest and the ole ham spirit still prevail, with most of the gang planning for the time when we can again spot a little bit of DX. . . . I know of no other way to let the gang know that the K6 gang is still alive and kicking than through the medium of *QST*, for I'm positive that every one of the gang, regardless of where he is, will never miss an issue of *QST* if it is humanly possible for him to lay hands on a copy." Incidentally, it's only fair to explain that a photograph of a televised image on the screen of the monitor is missing from the article on p. 42. Unfortunately, it was unsuitable for reproduction. However, K6PHD promises some day to send us a Hula Gal by television. To which we can only respond: Does it have to be by television?

Again with us are the now-familiar by-lines of, on p. 46, **Ted Gacek, RT1c** (Splatter, April, 1944, p. 96); on p. 38, **Thomas A. Garretson, W2ASB;** on p. 28, **Frederick A. Long, ex-W8BSL;** and on p. 22, **Edward M. Noll, ex-W3FQJ** — all of whom appeared in Splatter for Oct., 1943, p. 8 — and, on p. 36, **"Sourdough"** (Splatter, May, 1943, p. 66).

...—

This seems a logical place to add, as a footnote to page 45, that M-G-M's "Patrolling the Ether" was produced by Jerry Bresler and directed by Paul Burnford, from a script by De Vallon Scott and Alan Friedman.

We might add, too, that it would be a good idea not only to check with your local exhibitor of M-G-M shorts as to when he is going to show this one, but to insist that he find a place for it in his future bookings if he has not already done so. Apart from the FCC-RID angle, it's good propaganda for the ham fraternity — authentically and skillfully done.

...—

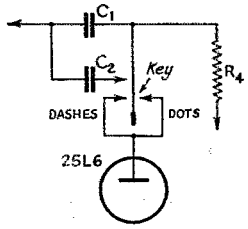
FEEDBACK

UNFORTUNATELY, an attempt at simplifying the author's circuit diagram in Fig. 2, page 17 of the March issue, resulted in oversimplifica-

(Continued on page 98)

(*Continued from page 96*)

tion. The corrected circuit, which will produce dots (as well as dashes), is shown below.



A letter from George E. Rowand, W3CUA, continues a discussion which seems to be assuming the proportions of a debate — and one in which we, frankly, are not taking sides:

"The statement made in *Feedback*, page 10, March *QST*, by W4HWS is not entirely correct, since she states that . . . 'where the north leg of a range has a magnetic heading of 360 or 0 degrees, then the N secfor is located west of, or to the left of the north beam.' The statement is correct, however, when the word 'true' is substituted for the word 'magnetic.' The following is quoted from the *Pilot's Radio Manual, Civil Aeronautics Bulletin No. 29*, published by the Department of Commerce, Civil Aeronautics Administration: 'The northern N quadrant is the quadrant in which True North lies. . . .' '. . . When the bearing of the northern range course happens to be True North, the quadrant to the west of this northern course will be the N quadrant.'

"In the article, 'Radio Aids to Avigation,' by Sgt. Peter K. Onnigian, *QST*, February, 1944, no mention was made of the above general rule which has been adopted. Furthermore, it is obvious that the drawings referred to in the article were for illustrative purposes only and, since North was not indicated on the drawings, it is not correct to assume that True North lies at the top of the page."

Strays

The abbreviation BCNU was my very own brainchild, used for the first time in a QSO with VE4OC. We used it on the air and on QSLs and it became standard language. Or did someone else think it up at the same time? — *VE4UN.*

— ··· —

An old lady complained to the local radio serviceman that she could not understand a word coming from her receiver. To his suggestion that the band switch needed turning, she replied: "No, no — don't do that. I never did care for band music." — *W4HVL.*

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.
(2) No display of any character will be accepted, nor can any special typographical arrangements, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.
(3) The Ham-Ad rate is 30c per word, except as noted in paragraph (6) below.
(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.
(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.
(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

Having made no investigation of the advertisers in the classified columns, the publishers of *QST* are unable to vouch for their integrity or for the grade or character of the products advertised

QUARTZ — direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

COMMERCIAL radio operators examination questions and answers. One dollar per element. G. C. Waller, W5ATV, 6540 Washington Blvd., Tulsa, Okla.

DUAL SPEED phono motors needed. Write VAN SICKLE. Box 1583, Indianapolis, Indiana.

WHY NOT turn your unused equipment into ready cash which may be applied towards new and better equipment after the war? Leo, W9GFQ, offers you the best cash prices for communications receivers and test equipment. Write today for large illustrated catalog. Wholesale Radio Laboratories, 744 W. Broadway, Council Bluffs, Iowa.

CRYSTALS available — all types, including 100 KC, 465 KC and 100 KC. Broadcast and Aircraft given prompt attention. Scientific Radio Products, Council Bluffs, Iowa.

PROMPT Repair Service on Meters and Electronic Instruments. Braden Engineering Company, 3317 Kenmore Ave., Dayton 2, Ohio.

USED TELEPLEXES, Instructographs bought, sold. Ryan's, Hannibal, Mo.

HIGHEST prices paid for used receivers, test equipment, bugs, oscillators. What have you? W9ARA, Butler, Mo.

IN STOCK without priority: Meter rectifiers $1.95, meters, transformers, panels, chassis, radio supplies of all sorts. Your inquiries and orders invited. Henry Radio Shop, Butler, Mo.

IN STOCK on priority: New SX-28s and SX-25s for immediate shipment. Henry Radio Shop, Butler, Mo.

RADIO TESTS — Pre-examination Tests for Radio Operators. Tests your knowledge before you appear for commercial radio operator license examinations. Avoids failures. Guides your preparation. Saves your time. Worth investigating at once. BOOKS to help you master technical radio. Practical Radio Communications, 1943 Edition, $6.00; Radio Operating Questions and Answers, $3.00; Radio Code Manual, $2.50. Postpaid. Money back if not satisfied. Write for free circulars 5Q. NILSON RADIO SCHOOL, 51 E. 42 St., New York 17, N. Y.

PREPARE NOW for tremendous opportunities in new fields of radio after the war. Training for Federal licenses. Write for particulars. AMERICAN RADIO INSTITUTE. 44 East 23rd Street, New York 10, N. Y.

WANTED: Radio Operators for merchant marine. Commercial license. Must join union. Wages, $310 to $345 monthly. Radio Officers Union, 265 West 14th Street, New York City.

SWAP your burned-out meter for new 30-volt 2 ampere Thordarson transformer. Blan, 64 Dey, New York.

SELL: 2½ meter transmitter and receiver. Separate power supplies. Per 1944 ARRL *Handbook* 1532 and 1622. Complete. Write for particulars. T. R. Parrott, 120 South 37th Street, Louisville, Ky.

WANTED: Complete Candler course. Lilienthal, South Thomaston, Maine.

FOR SALE: Jackson 660 analyzer and 420 oscillator. A-1 shape. W9BFB. John Hinegardner, Dysart, Iowa.

SELL: RCA chanalyst, Clough Brengle Model OCA oscillator, Philco audio oscillator, Solar capacitor analyzer. Superior instruments' tube tester, multimeter, utility tester. Operadio 855 amplifier. Harry Smith, 36 Vandegrift Drive, Dayton 3, Ohio.

WANTED: Broadcast coils for FBXA receiver. State price and condition. SELL: 1000 volt 400 milliampere, 110 volt a.c. motor generator or above generator alone. Make offer, Theodore H. Kemp, 20 Highwood Terrace, Glen Rock, N. J.

FOR SALE: Thermo galvanometer 0–100; 4 new 804's; 2 new 809's; TZ40's; 03A's, power transformer, parts, T55 and 838. W9KUN, Wilbur S. Felt, Wellington, Kansas.

SELL: Quantity of slightly used RCA 954 Acorn tubes at $2.25 each. Cornell-Dubilier condensers PL516–52 0.00025-μfd., 30,000-v.; PL232–51 0.0016-μfd., 15,000-v.; 272–6 0.0005-μfd., 5000-v.; 151-6H 0.01-μfd., 2000-v.; 234-6H 0.0015-μfd., 5000-v.; Sangamo Type E 0.00025-μfd., 9500-v., and two 0.0005-μfd. 9500-v. Make offer. Harms, W3COP, 215 Maple Ave., North Plainfield, N. J.

SELL: Duplicate *QST*s 1917–1935. What's wanted? H. W. Ryall, W1NKW, 72 Bowler St., E. Lynn, Mass.

WANTED: Hallicrafters SX-28, complete, with tubes and speaker. Will answer all letters. W9BPO.

SELL: Jackson testing equipment: oscillograph, Model 523, tube tester, Model 636B; test oscillator, Model 640; multimeter, Model 642; condenser tester, Model 650A. Like new. Will sell to best offer. Gus Hada, Jr., Box 5687 Oklahoma City, 10, Oklahoma.

FOR SALE: Complete 150W. 300W, 450W phone transmitters or parts. Also 2½ meter equipment, spare tubes, meters, transformers, sockets, etc. W9UFD, Leader, 3176 South 13th, Omaha, Nebraska.

SELL: HQ120X. Perfect condition, and best offer takes it. P. O. Box 52, Oberlin, Ohio.

NEED Dec. 1915 and May 1916 issues *QST*. Pay any price within reason. ALSO want old call-books and *Handbooks*. W. L. Holst, W9MD, 2553 Winnemac Avenue, Chicago, Ill.

WANTED: One Par-Metal enclosed rack ER-215, 66½" high and all sorts of television equipment, including books. W3HPO, Fred Kost, 24 Green Lane, Chester RFD No. 1, Pa.

CRYSTALS for all types of service. Economically priced. Quality crystals since 1929. *Precision Piezo Service* 427 Mayflower St., Baton Rouge, La.

McELROY complete high speed tape recorder receiving assembly. SR-900 tape recorder, TS-915 tape stand, TG-815 tape guide, SL-990 signal leveler, TP-890 tape puller. Used only few days. Cost $450. Take best offer over $300. W6ITH, Tibbetts, Moraga, Calif.

WANTED: Hallicrafter S-22R in good condition. Will pay good price. Marzycki, Ft. Stanton, New Mexico.

NATIONAL FBXA Receiver-Preselector for sale. Good condition. $45. W9GDM, Sanders, Mt. Rainier, Md.

WANTED: Metal cabinet for 19" L x 10½" H x 14" deep standard panel and chassis. Full details. W1BB.

SELLING OUT: W2BNX super DX 450 watts 4 bands transmitter; communications receiver; rotary antenna; parts, etc.

WANTED: *QST*s previous to 1921. Uzzell, 84–13 168th St., Jamaica 3, N. Y.

CRYSTALS: Prompt delivery of those dependable time-proven Eidson crystals in the 100–10,000 kilocycle range. Send for free copy of L5 catalog. New type units available at attractive prices. Also regrinding service. "EIDSON'S", Temple, Texas.

TELEPLEX A-C, D-C, audio oscillator, leatherette case, special extra tapes. $35.00. L. Carini, Wethersfield, Conn.

ARMY ENGINEER wants S29 or Ec 4. Sell Supreme 385, 955, two 954s. Sommers, 118–46 191st St., N. Y. C.

BOUND FILES of *QST* 1930–40, and unbound run for 1941, both items complete. *QST* run 1942–3, only 2 months missing. W2AUZ.

WANTED: A 35T and pair of National neutralizing condensers, NC-75 or Hammarlund N-15. State price for cash. George Christophers, 194 Lemuel Street, Fall River, Mass.

ARMY MAN wants radio books. Arthur Sullivan, 6638 Alamo St., Clayton 5, Missouri.

FOR SALE: 3 1 k.w. ham rigs, 1 ten meter. Coils for any one band, 20, 40, or 75 on other two rigs. 3" channel steel relay racks, standard chassis. No junk parts. National, Cardwell, Bud, Coto. Variable and fixed link plug-in coil. RF section only. No tube meters or power supplies included. $89 each. All letters answered. Will consider scale model railroad equipment in trade. Series 700 Lionel preferred. K. C. Horne, Nebo, Missouri.

"NO! HOGARTH ISN'T GOING NATIVE—HE'S JUST SHOWING OFF HIS **ECHOPHONE EC-1**"

ECHOPHONE MODEL EC-1

(Illustrated) a compact communications receiver with every necessary feature for good reception. Covers from 550 kc. to 30 mc. on 3 bands. Electrical bandspread on all bands. Six tubes. Self-contained speaker. 115-125 volts AC or DC.

ECHOPHONE RADIO CO., 540 N. MICHIGAN AVE., CHICAGO 11, ILLINOIS

Index to Advertisers

All of the above advertisers are cooperating with the A.R.R.L. to permit publication of an editorially adequate QST during this period of war-rationing of paper. Using less advertising space but at higher rates, they continue their customary support of QST. Some are using smaller space in each issue and some are using space only every second or third issue. Of the latter, those whose advertising does not appear in this particular issue are indicated by the ** above.

PRINTED IN U. S. A.
RUMFORD PRESS
CONCORD, N. H.

OUR ROVING PHOTOGRAPHER

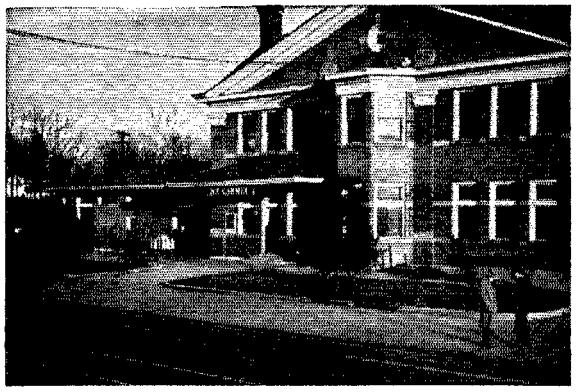
VISITS MT. CARMEL

...WHERE ELECTRONICS IS KING!

A thousand miles from New York — more than 200 from Chicago — is a little city of 7,000 that's very much in the news these days. For Mt. Carmel, Illinois, is the home of the Meissner Manufacturing Company. And Meissner's laboratories are humming with great electronics secrets, its shipping platforms busy with precious cargoes destined for the far corners of a fighting world. Meissner is *in* the news, because it's *making* news!

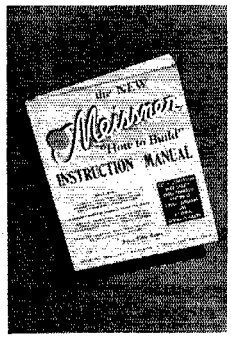
Pleasant Smile, Skilled Fingers: The whole industry's talking about Meissner's gilt-edged personnel. And here's one of the reasons why every Meissner product is a quality product.

Precision-El Is The Word: So trained and alert are the workers, so slight the turnover, that the envious in the industry are already calling Meissner personnel . . . "Precision-El" . . . and the term fits like a glove!



This Is Mt. Carmel. . . and what a station for a city of its size! But wise heads say it's a hint of big things to come as Meissner daily rises in stature as one of the world's most progressive companies in one of the world's most progressive fields . . . *electronics!*

This Is The Meissner Plant — (at least a portion of it)'— where hundreds upon hundreds of workers continue the kind of production records that long ago won for them the famed Army-Navy "E" with star.



Here's the Perfect Manual For Your School Contacts!

Yes — 168 pages of helpful, factual material — liberally illustrated with charts, radio formulae, schematic circuit diagrams, and pictorial wiring diagrams. Soundly based on Meissner's vast and unexcelled experience in this field. There's construction data on 22 kits for building radio receivers and adapter units, with operating instructions and servicing data on over a dozen complete assemblies, including F-M receivers, phonograph-recorders, and radio equipment. Ideal for beginner or advanced student.

Price, only 50c postpaid anywhere in the U.S.A. (75c in Canada.) Send for your copy today.

MEISSNER

MANUFACTURING COMPANY • MT. CARMEL, ILL.

ADVANCED ELECTRONIC RESEARCH AND MANUFACTURE

STABILITY

As PERMANENT as the North star, ALSIMAG Steatite Insulators are hard, strong, rigid... impervious to moisture... resistant to heat and cold.

The stability of ALSIMAG steatite ceramics lends rigidity and permanence to electronic circuits—affording constancy under climatic or other operating conditions.

Our Engineering and Research Staff is ready at all times to cooperate in developing the most practical design for insulators and to aid in selecting the most suitable of the numerous ALSIMAG bodies.

Today for our fighting forces, Tomorrow for the miraculous electronic devices of Peace... American Lava is pledged to this Principle: Production to the highest standards... Research to find a better product.

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

MADE IN U. S. A.

ARMY E NAVY

Army-Navy "E"
First Awarded July 27, 1942
Second Award: "Star" February 13, 1943
Third Award: "Star" September 25, 1943

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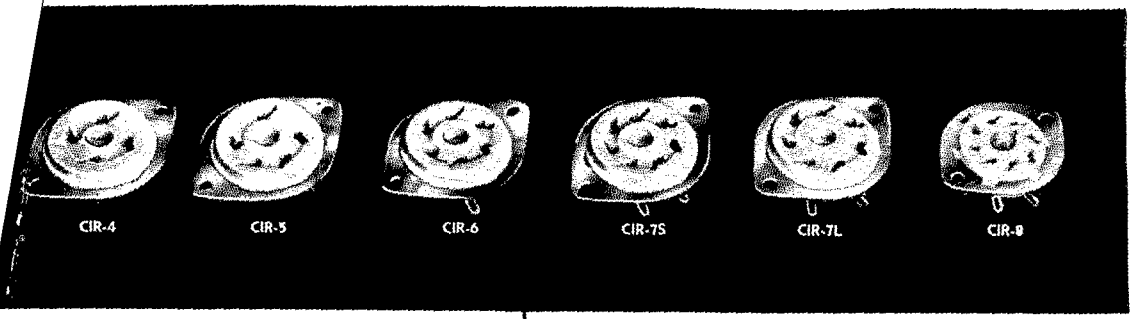
OUT OF TODAY'S RESE
TOMORROW IS ENGINE

STEATITE CERAMIC INSULATORS

CHARACTERISTICS TAILORED TO YOUR REQUIREMENTS

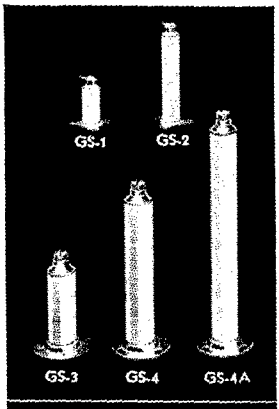
NATIONAL LOW-LOSS SOCKETS AND INSULATORS



CIR Series Sockets

Any Type **List $ .45**

Type CIR Sockets feature low-loss isolantite or steatite insulation, a contact that grips the tube prong for its entire length, and ... ring for six position mo... supplied with two meta...



GS...

GS-...

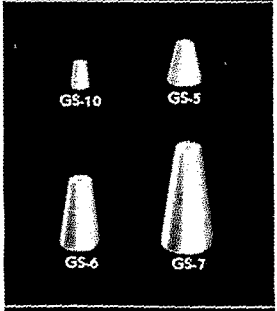
GS-3...

GS-4, ...

GS-4A...

Cylindri... standoff ... plated cap...

GSJ, (not i... A special ... top threade... diameter insu... & GS-4A.



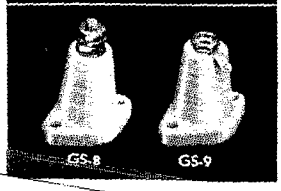
GS-5, 1¼" **List, each $ .40**

GS-6, 2" **List, each $ .70**

GS-7, 3" **List, each $ 1.25**

GS-10, ¾", package of 10 **List $ .12**

These cone type standoff insulators are of low-loss steatite. They have a tapped hole at each end for mounting.



GS-8, with terminal **List $ .90**

GS-9, with Jack **List $ 1.25**

These low-loss steatite standoff insulators are also useful as lead-through bushings.

AA-3 **List $ .60**

A low-loss steatite spreader for 6 inch line spacing. (600 ohms impedance with No. 12 wire.)

List $ .50

...steatite aircraft-...lator.

List $ .90

...oose strain in-...ss steatite.

...st, each $· .20**

...tite bushing

...f ten $ .85**

... Victron.

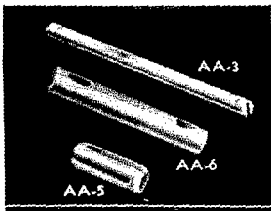
...zen $ .85**

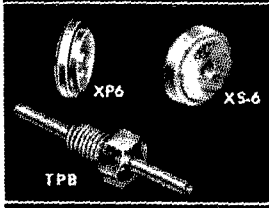
...e bush-...93 con-... diam.,

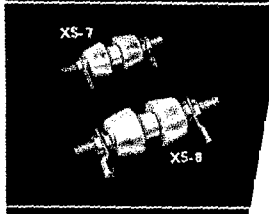
$ .55

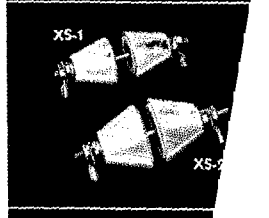
.75

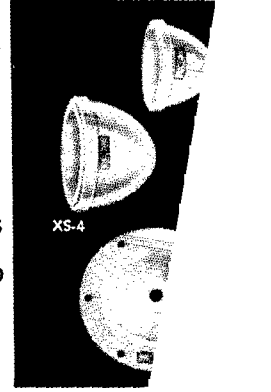
...in-...











XS-1, (1" Hole) **List $ 1.20**

XS-2, (1½" Hole) **List $ 1.35**

Prices listed are per pair, including metal fittings. Insulation steatite.

XS-3, (2¾" Hole) **List $ 6.00**

XS-4, (3¾" Hole) **List $ 7.25**

Prices are per pair, including metal fittings. These low-loss steatite bowls are ideal for lead-in purposes at high voltages.

XS-5, Without Fittings **List, each $ 8.25**

XS-5F, With Fittings **List, per pair $17.00**

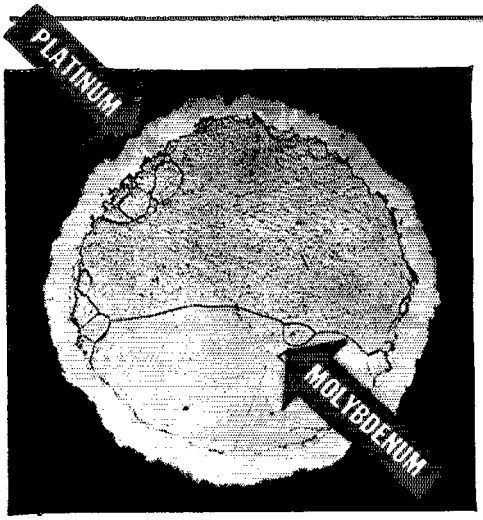
These big low-loss bowls have an extremely long leakage path and a 5¼" flange for bolting in place. Insulation steatite.

MEMO

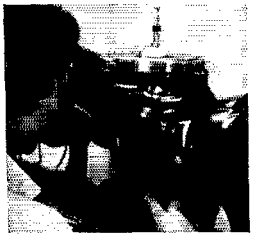
National is still your best bet for high grade parts for H.F. Communication work. Deliveries are good when orders are covered by suitable priority rating.

NATIONAL COMPANY, INC.
MALDEN, MASS.

U-H-F Tube Stability



▲ **Photomicrograph of cross-section of platinum-clad molybdenum wire, enlarged 255 diameters, developed by RCA to provide better grids for u h f tubes. The sample, taken from a tube after operating 1,000 hours at full rating, shows how the platinum sheath still protects the molybdenum core. The core shows the crystalline structure characteristic of "moly" wire which has been operated at high temperature.**



◀ **Operator making photomicrograph of grid wire. Photomicrographs are one of the methods which RCA engineers use in their continuous search for better tube performance for the ultimate user.**

PERFORMANCE STABILITY in a tube is something you normally expect and take for granted today.

But in ultra-high-frequency tubes, stability becomes a problem.

For example, a few years ago instability in an experimental u h f tube was traced to grid emission. RCA engineers knew that platinum on the grid would reduce grid emission to negligible amounts, but the problem was how to apply the platinum successfully.

The method first tried—platinum plating—did not fill the bill. There was too much uncertainty in the plating process, and the best efforts of our engineers in trying all kinds of baths, concocting new ones, developing quick test procedures, failed to solve the problem. More tests. More months. "Try other metals ... try sandwiching nickel between platinum ... try drawing it cold, then hot, instead of swaging it."

At last they had it: *a drawn platinum-clad molybdenum* grid-wire — the "moly" base for strength and heat conductivity, but sheathed in platinum to prevent grid emission. This combination worked so well that RCA's process was immediately made available to the entire industry, at the suggestion of the Services and the War Production Board.

Next time you look at an RCA-829-A, RCA-829-B, or an RCA-832-A, notice the very fine grid wires inside — wires that measure only a few thousandths of an inch in diameter. Then, think of the technical skill and "know how" required: first, to draw the original ¾-inch rod, including platinum sheath, down to so small a diameter and, at the same time, maintain a layer of protective platinum only a few ten-thousandths of an inch thick on it, then to fashion it into grids, and finally to assemble the grid inside a tube to deliver what you expect as a matter of course—*stable operating performance* throughout the life of the tube.

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RCA VICTOR DIVISION • CAMDEN, N. J.

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