

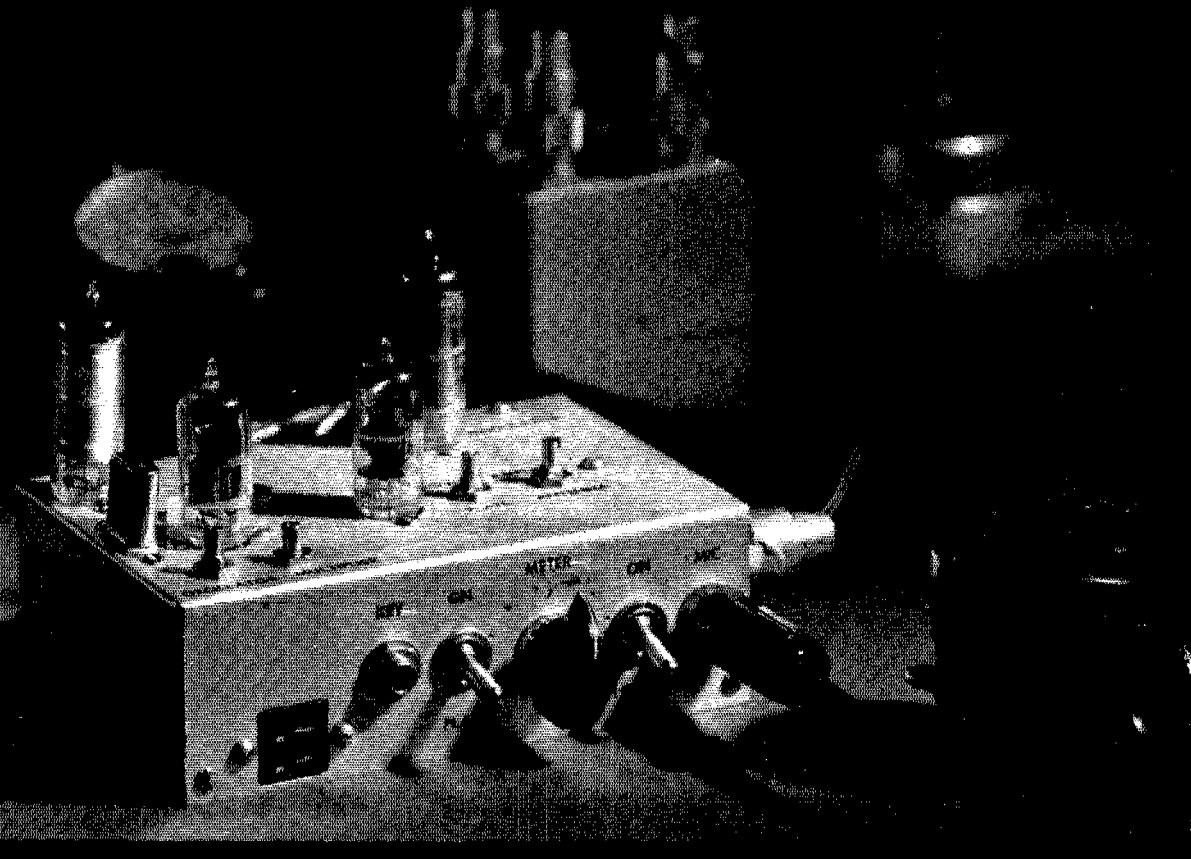
February, 1948

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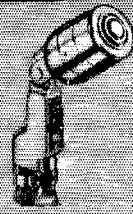
Cables: Arlab



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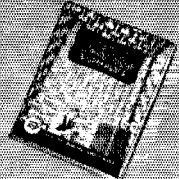
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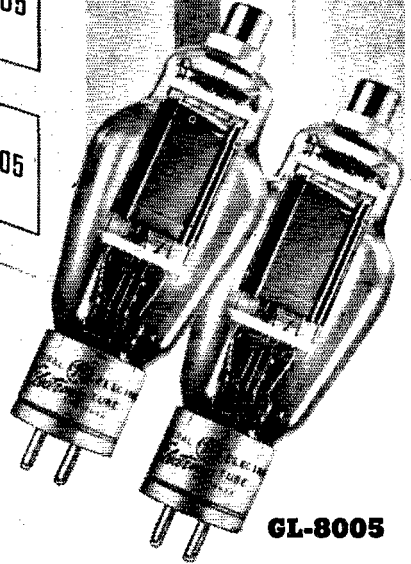
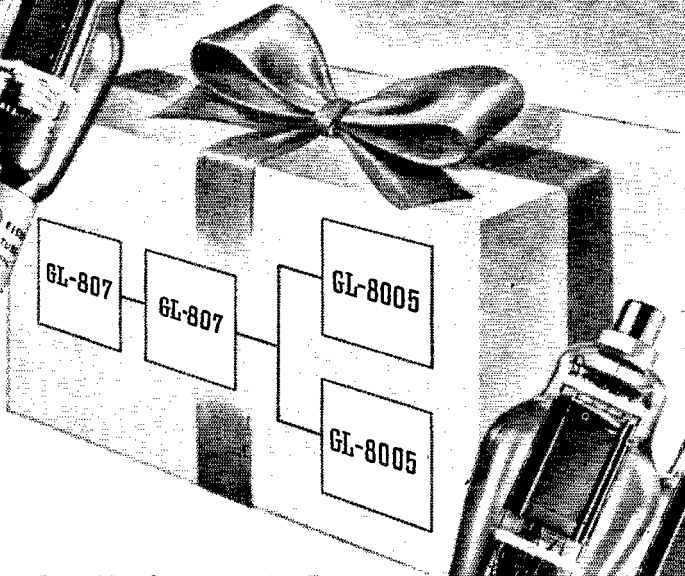
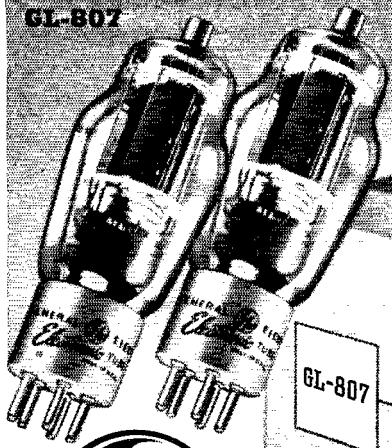


"Camel" Crystal Model 902
Dynamic—Model 601



Send for Catalog 101
Get valuable data on
today's most complete
microphone line.

GL-807



GL-8005

PLUS PACKAGE for value-seeking hams

600-w input CW! 480 w phone! . . . An economical 3-stage power line-up that will cover all 5 major low-frequency bands (80, 40, 20, 15, and 10-meter).

Here's a quartet of tubes from G.E.'s big line that sings a sweet song of watts-per-dollar value and topnotch performance. One GL-807 is employed as a Tri-tet oscillator, while the second acts as a buffer or doubler with more than ample output to drive the push-pull GL-8005 final.

Add up the cost of these four tubes and you arrive at a sum not much greater than the price of one ½-kw power triode or tetrode. And because the final is push-pull instead of a single tube, your circuit and layout are better balanced; also, second-harmonic radiation is reduced, meeting a primary need in today's ham broadcasting.

Though a simple 3-step amplification, the choice of tubes is such that no overtaxing occurs at any stage. Performance is all you

could want—the 600-w max CW input (ICAS) gives a real healthy signal, while coil changing allows operation from 80 to 10 meters, *using only 80 and 40-meter crystals.*

Ask your G-E tube distributor for prices of the GL-807 and GL-8005, also for a copy of the complete circuit design for this ham PLUS PACKAGE. It's the value story of the month; purse and performance-wise you will profit by getting the facts. *Electronics Department, General Electric Company, Schenectady 5, New York.*

Speaking of circuits . . . have you read the Jan.-Feb. special Circuit Issue of Ham News? Tells you how to apply all the popular ham tubes. Don't miss this scientific rig-builder's guide. See your G-E tube distributor for your copy!

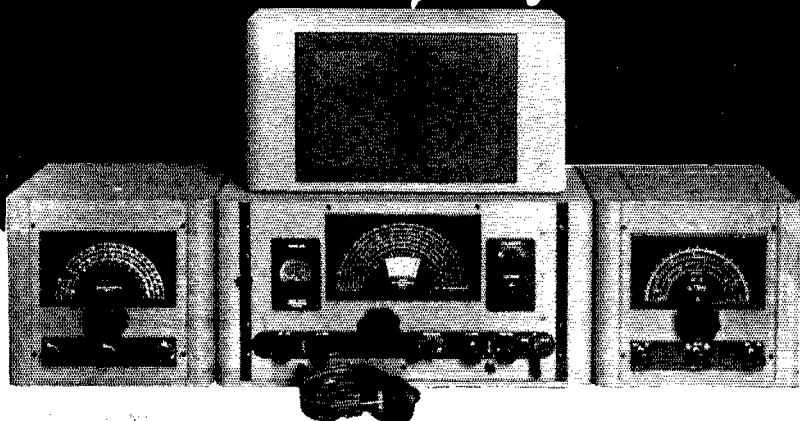
ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

161-GA2-8850

matched in appearance...

Unmatched in performance!



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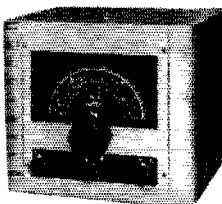


The "Boomerang" (MB-3)

The new "BOOMERANG" is a break-in device, a signal monitor, a code practice unit, and a tone modulator for MCW. It will follow the fastest bug. Self-contained power supply. All you need is a receiver with a headphone jack. Improves your QSOs 100%.

The HF 10-20 Converter

It provides outstanding and imageless reception on 10, 11, 15 and 20 meters. Output (i.f. frequency) is 7 mc. Features include provision for separate antennae, band selector switch, self-contained power supply, planetary tuning and high gain. If your receiver tunes only to 18 mc, the HF 10-20 is necessary for reception on 10, 11 and 15 meters, and will provide improved reception on 20 meters.



From two meters to reception through the broadcast band, RME receiving equipment still provides the optimum in performance.

The new DB-22 Preselector, with self-contained power supply, has an overall gain of 30 db throughout its tuning range of .54 to 44 mc. The image ratio is 50 db down with a communications receiver such as the RME-45.

The RME-45 is a piece of equipment that stays modern. It's now available with the new NBF-4 ratio detector for narrow band FM. The NBF-4 can also be used with all previous models of RME-45s.

The VHF-152 Converter was quick to set many new DX records on 144 to 148 mc. Performance is also outstanding on 6 and 10 and 11 meters. It has generous bandsread, high gain, imageless reception and self-contained power supply.

Illustrated folders on request.

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Provia 6, Illinois U. S. A.

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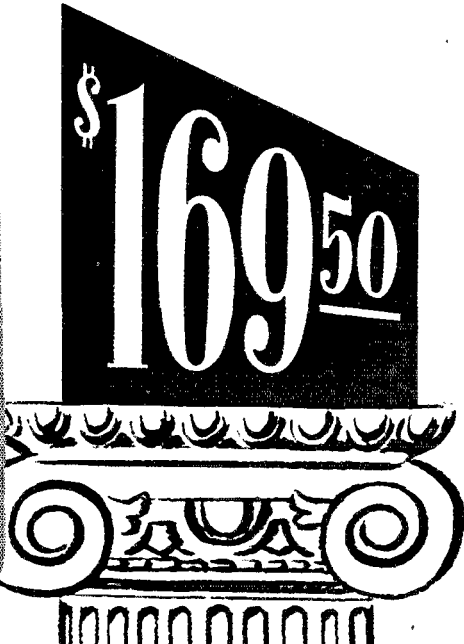
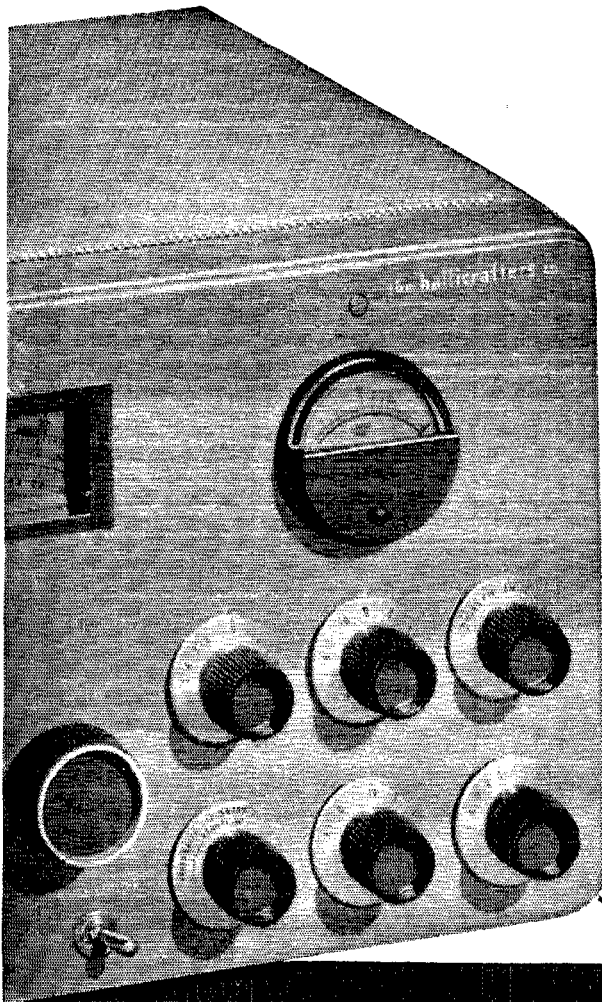
Model
SX-43

"The hottest ham performance ever at this price . . ." That's the verdict of amateurs who have had a chance to try Hallicrafters new Model SX-43.

This new member of the Hallicrafters line offers continuous coverage from 540 kilocycles to 55 megacycles and has an additional band from 88 to 108 megacycles. AM reception is provided on all bands, except band 6, CW on the four lower bands and FM on frequencies above 44 megacycles. In the band of 44 to 55 Mc., wide band FM or narrow band AM just right for narrow band FM reception is provided.

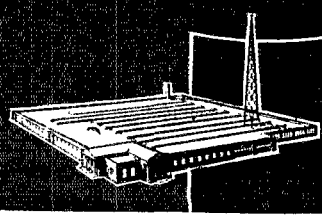
One stage of high gain tuned RF and a type 7F8 dual triode converter assure an exceptionally good signal-to-noise ratio. Image ratio on the AM channel on band 5 (44 to 55 Mc.) is excellent as the receiver is used as a double superheterodyne. The new Hallicrafters dual IF transformers provide a 455 kilocycle IF channel for operating frequencies below 44 megacycles and a 10.7 megacycle IF channel for the VHF bands. Two IF stages are used on the four lower bands and a third stage is added above 44 megacycles. Switching of IF frequencies is automatic. The separate electrical bandspread dial is calibrated for the amateur 3.5, 7, 14, and 28 megacycle bands.

Every important feature for excellent communications receiver performance is included in the SX-43.



- ALL ESSENTIAL AMATEUR FREQUENCIES FROM 540 kc TO 108 MC
- AM - FM - CW RECEPTION
- IN BAND OF 44 TO 55 MC: WIDE BAND FM OR NARROW BAND AM . . . JUST RIGHT FOR NARROW BAND FM RECEPTION
- CRYSTAL FILTER AND EXPANDING IF CHANNEL PROVIDE 4 VARIATIONS OF SELECTIVITY ON LOWER BANDS
- TEMPERATURE COMPENSATION FOR FREEDOM FROM DRIFT

- SERIES TYPE NOISE LIMITER
- PERMEABILITY ADJUSTED "MICROSET" INDUCTANCES IN THE RF CIRCUITS
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- SEPARATE ELECTRICAL BANDSPREAD CALIBRATED FOR THE AMATEUR 3.5, 7, 14, AND 28 Mc BANDS



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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in QST. All ARRL Field Organization appointments are now available to League members. These include ORS, OES, OPS, OO, and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

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EIMAC TETRODES



⊙
4-65A



4X100A



4X150A



⊙
4-125A



⊙
4-250A



⊙
4-400A



4X500A



⊙
4-1000A

•• PERFORMANCE LEADERS

⊙ THESE TUBES HAVE PYROVAC PLATES

4-65A

Tops for high power VHF mobile transmitters, type 4-65A is the smallest of the Eimac radiation cooled tetrodes. Conservatively rated at 65 watts plate-dissipation, the tube is but 4¼" high and 2" in diameter. The 4-65A is capable of operation over a wide voltage range, for instance at 600 plate volts one tube will provide 50 watts of power-output with less than 2 watts of grid drive. At 3000 plate volts a power-output of 265 watts is obtained.

4X100A

Designed for high frequency applications in which horizontal forced-air cooling would be an equipment design advantage. The characteristics of the 4X100A closely resemble those of the 4X150A except for slightly lower plate dissipation, 100 watts.

4X150A

An extremely compact tetrode of the air-cooled external anode type. Rated at 150 watts of plate dissipation it can be operated at maximum ratings up to 500-Mc. When operated as a doubler, the 4X150A is the standout answer to the STL (studio-transmitter-link) vacuum tube problem . . . excellent performance is had up to 1000-Mc.

4-125A

Forerunner of the Eimac tetrode line, the 4-125A is probably the most universally accepted power tetrode yet designed. Its Pyrovac plate and processed grids impart a high degree of operational stability, resistance to overloads and exceptionally long life. Rated at 125 watts plate dissipation, one 4-125A will handle 500 watts input with less than three watts of grid drive.

4-250A

Higher power version of the 4-125A, type 4-250A also incorporates a Pyrovac plate, and processed grids. In typical class-C operation one tube with 4000 plate volts will provide 1 kw of output power, with 2.5 watts of grid drive.

4-400A

Specifically created for FM broadcast service, two 4-400A tetrodes in typical operation, at frequencies in the 88-108 Mc FM broadcast band, will provide 1200 watts of useful output power, at 3500 plate volts, while the dissipation from the Pyrovac plate is considerably under the maximum rating of 400 watts per tube.

4X500A

A small, but high power VHF, external anode type tetrode, rated at 500 watts plate dissipation. The low driving power requirement presents obvious advantages to the equipment designer. Two tubes in a push-pull or parallel circuit provide over 1½ kw of useful output power with less than 25 watts of drive.

4-1000A

Currently the largest of the Eimac tetrodes, its pyrovac plate is rated at 1000 watts dissipation, the 4-1000A has the inherent characteristics of all Eimac tetrodes—dependability, stability, optimum performance and economy of operation. Type 4-1000A is ideally suited for high-level audio service as well as r-f applications.

Complete data on these tetrodes and other Eimac tube types may be had by writing direct.

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191 San Mateo Ave.

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Eimac
TUBES
The Power for R-F

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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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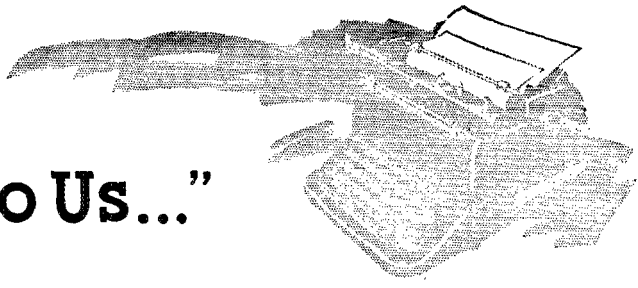
Rocky Mountain Division
FRANKLIN K. MATEJKA, W0DD
P. O. Box 212, Estes Park, Colo.
Alternate: P. Arthur Smoll, W0KVD
529 No. Nevada Ave., Colorado Springs, Colo.

Southeastern Division
WILLIAM C. SHELTON, W4ASR
527 Revilo Blvd., Daytona Beach, Fla.
Alternate: William P. Sides, W4AUP
Fleming Road, Montgomery, Ala.

Southwestern Division
HANS R. JEPSEN, W6KEI
6837 Ethel Ave., No. Hollywood, Calif.
Alternate: Arthur E. Schilferman, sr., W6CGI
1445 Raymond Ave., Glendale 1, Calif.

West Gulf Division
WAYLAND M. GROVES, W5NW
P. O. Box 586, Odessa, Texas
W5NW at Humble Pipe Line Camp, Odessa
Alternate: Jack T. Moore, W5ALA
4831 Fairway Ave., Dallas 4, Texas

"It Seems to Us..."



THE NEW LOOK

It's a funny thing, the way we have tides of consciousness about matters of technique in amateur radio. Despite our best thought processes we go for years unaware that we have grown into the ability to do a particular thing, until there is a sudden wave of thinking and doing that makes it an accomplished fact, as was the case with s.s.s.c. Or, to name the subject we want to talk about this month, until we become group-conscious that we possess the means to make some imperative improvement to deal with changed conditions and up ourselves and do something about it — as amateur radio as a group has just done in recent months in the matter of improved intermediate-frequency selectivity. It makes us wonder how many more blind spots we have in our thinking that are due to yield under pressure as the months roll on. Is there a psychologist in the house?

To us, one of the most interesting happenings in the recent history of our art is this tidal wave of thinking about i.f. selectivity that has swept over us since last summer. It probably doesn't deserve to be thought of as a psychological manifestation at all, except perhaps by professional psychologists interested in the development of group patterns of thinking. It probably is just one more case of necessity mothering invention, another step in our old and constant battle to achieve selectivity sufficient to deal with increasing congestion. But, as we see it, it started with a few isolated half-wave idea pulses that increased in number until we shortly had a d.c. stream of consciousness that has affected all our recent thinking about selectivity. We'd think it probably started with Jim McLaughlin's two articles on selectable single-sideband receivers. Obviously if we wanted only one sideband we could have much sharper receivers. That was doubtless what suggested the Q5-er to Phil Rand. More or less simultaneously, fellows were writing to us about the use of the steep slope of the 85-kc. i.f. of the BC-453-A as a lazier way of doing the same thing. And in no time at all hundreds of amateurs were thinking and talking improved i.f. selectivity and we were

well on the way to another of those formidable advances that have characterized amateur progress in the art. More recently we have uncovered an amateur worker who has been silently striving for many months to achieve the ideal c.w. receiver. He, too, has been working along these same lines, using a low i.f. and special transformers, and it is reported that his latest receiver has a pass-band only a couple of kilocycles wide at 10,000 times down. That, chums, would be a real receiver. When his work is finished we hope to be able to present his designs to you on these pages.

When a situation becomes generally painful, means to alleviate it are found and come into general adoption. In 1929, faced with the prospect of "intolerable" interference, amateur radio embraced selective audio amplifiers hitched on to autodyne receivers. When that was shortly outgrown, in the '30s, the single-signal crystal-filter receiver came along. A beautiful improvement on top of the familiar superheterodyne's i.f. system, it has remained our best for many years. Yet really there was no appreciable interference in those days, by today's standards, and so we weren't long in again reaching the place where something had to be done about it. And our point is that when everybody becomes conscious that something must be done about a situation, the ways are found available. It is also our observation that generally, as in this i.f. case, the means have been available for years, waiting; they just haven't been needed badly enough to strike the spark of realization.

It's a sad thing to have to say but there are only a few amateurs discerning enough to see what our receiver needs really are. The average ham doesn't know what he needs in a communication receiver. What he seems to quest for is BCL-quality clear-channel reception, an empty dream not attainable on any amateur frequency below 50 Mc. He asks the manufacturer for better audio, fusses about S-meter calibrations and such trivia, ignores the thing he really lacks, which is enough selectivity to deal with conditions as we find them on the air. So it is scarcely the manufacturer's fault that our receivers aren't what

they might be. The way we see it, about three-quarters of the fellows don't even care whether a receiver has a crystal filter or not, because they never use them and don't even know how to. It is at their demand — this same thoughtless search for better "quality" — that crystal filters have been made broader and broader, until finally they are at a state where we personally won't give shackroom to the present versions for c.w. work. To be sure, our receivers are more sensitive, they're stabler, and they have a much better signal-to-noise ratio. Those things are something but they are about the only respect in which receivers have improved in the last ten years. In the equally important matter of selectivity they've actually gone downhill. But that's our own silly fault because so many of us keep yakking for "quality" at the expense of satisfactory communication.

Well, as we see it, there's an end in sight to all that now. We're learning our lesson. Hundreds of us have found out what real i.f. selectivity can do when we're in distress on a crowded band. Admittedly a good crystal filter can be cranked up to where it is only a couple of hundred cycles wide, but that is not the best thing for speech and in any event is true only at its peak: if you go down ten or twenty times you find that the skirts on its selectivity curve are many kilocycles wide. That means that if there is an undesired signal about ten times as strong as the one you want and only a few kilocycles away — a common occurrence — you're in trouble. That isn't the crystal's fault; that isn't the job it set out to do; it's because the crystal isn't backed up by proper i.f. selectivity. As a matter of fact, the combination of a good receiver and a good pass-band i.f. characteristic, with its flat top and sheer flanks, itself offers the best possibility of interference-free voice reception, and without the sideband-cutting introduced by the use of the crystal. What every man needs, therefore, is greater skirt selectivity. There's a new look in curves today, fellows: skirts are longer and slimmer before they blossom out. Give yourself a break — get that new look on your i.f. skirts!

Adrian

OUR COVER

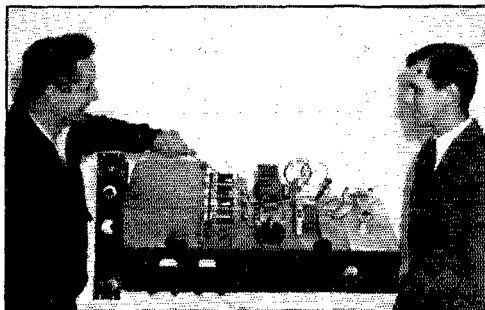
February is as good a time as any to start the groundwork on that new mobile rig you'll want for the car, comes springtime with improved driving conditions. Pictured on this month's cover is an excellent 2-meter transmitter for the mobile enthusiast — one packing many fresh ideas along constructional, antenna, and control-system lines. A complete description starts on page 21.

Strays

Instructions for the use of *Basic Radio Propagation Predictions — Three Months in Advance* (CRPL Series D), issued monthly by the National Bureau of Standards, have been prepared in the form of a separate manual which is now available as NBS Circular C465.

The purpose of this manual is to explain how the monthly predictions may be used in calculations of usable and working frequencies for radio sky-wave transmission. Maximum usable frequencies and optimum working frequencies may be computed over any path for any time of day during the month in question. Prediction charts are included for two recent months, and sample problems are given for four paths, with a discussion of differences in results because of length of path, the ionosphere layer controlling reflection, season of the year, and degree of solar activity. The pamphlet also contains other useful data, including tables, charts, and specimen work sheets.

Circular C465 may be obtained from the Superintendent of Documents, Washington 25, D. C., at 25 cents a copy. The subscription rate to *Basic Radio Propagation Predictions*, also available from the Superintendent of Documents, is \$1.00 a year (foreign, \$1.25), single copies, 10 cents each.



S.S.S.C. Rig at W6YX

Although full technical information on the single-sideband suppressed-carrier transmitter at W6YX is not available at this time, this photograph shows Dave Thompson, W6VQB, pointing out the final amplifier to Robert D. Smith, W6QUW, president of the Stanford Radio Club. As reported last month in *QST*, this station is presently on the air with amateur s.s.s.c. transmissions, and since last October the operators have been busily engaged in initiating many old-timers on the bands into the secrets of receiving 'phone signals that have had their carriers and one sideband removed. The transmitter was designed by Oswald G. Villard, jr., W6QYT, of the electrical-engineering faculty at Stanford University.

The work of the club in making the s.s.s.c. transmissions was given nationwide notice in many newspapers throughout the country, along with the activity of A. H. Nichols, W6TQK, who is also on the air with s.s.s.c. equipment.

Simplified Oscillators for 2300 Mc.

Lighthouse-Tube Gear for the 13-Cm. Band

BY A. R. KOCH,* W2RMA

• The memory of the mechanical complexity and jeweler's precision which characterized most of the microwave gear used in military applications has kept many an interested amateur from trying his hand at u.h.f. and s.h.f. communication. It is still true that equipment for the microwave bands is more a mechanical than an electrical problem, but W2RMA, who had a hand in the first amateur communication on 2300 Mc., shows here that the construction of practical cavities is not beyond the fellow who has access to a few metalworking tools.

THE lack of a suitable cavity and tuning mechanism has hindered many amateurs from getting started on the microwave bands. This was recognized in the initial tests on 2300 Mc. (July, 1946, *QST*), and since that time efforts have been directed toward simplification of both the oscillator and its associated tuning mechanism.

General Theory

At frequencies above 300 Mc. and wavelengths shorter than 1 meter it becomes very difficult to use the familiar coil-condenser techniques generally acceptable for the lower frequencies. In order to keep losses down to a minimum it is then necessary to use resonant transmission lines or cavities as circuit elements.

For frequencies above 1000 megacycles it becomes impractical to think of tubes and circuits as separate elements, but rather it is necessary to conceive of circuits with the tube as an integral part. Since wavelengths begin to get very short at frequencies above 1000 Mc. (1250 Mc. is 24 cm. or approximately 9.45 inches, and 2400 Mc. is 12.5 cm. or approximately 4.92 inches) it is possible to make practical use of the characteristics of concentric transmission lines. Between 1000 and 3000 Mc. concentric lines are more practical for amateur use than parallel lines, so they will be dealt with here.

The impedance looking into a quarter-wave transmission line shorted at the end is quite high,

* % Tube Division, General Electric Co., Schenectady, N. Y.

and this high-impedance point repeats itself every half-wave along a shorted-end line of greater length. A quarter- or three-quarter wave shorted transmission line may thus be compared with a tuned tank-coil-and-condenser which presents a high impedance at its resonant frequency.

A half-wave open-ended transmission line is sometimes used as a circuit element at microwave frequencies, because under certain conditions it may be easier to handle. The impedance looking into such a line is also high, and it repeats itself at regular half-wave intervals on an open-end line of greater length. The voltage distribution along both types of lines is shown in Fig. 1.

When a small lumped capacitance, such as is presented by a tube, is placed at a high-voltage point in a concentric transmission line, it has the effect of lowering the resonant frequency. In order to maintain the wanted frequency it is then necessary to shorten the line length a given amount depending on the size of the capacitance and the size and configuration of the line conductors. This effect is called capacitance foreshortening. Thus by inserting a small capacitance near a high-

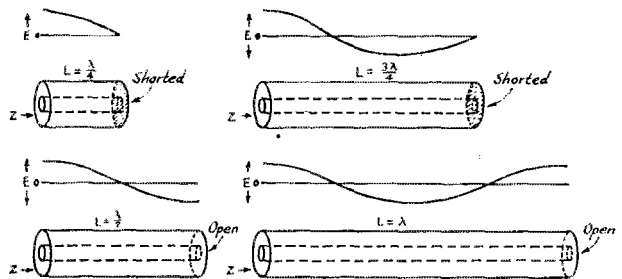
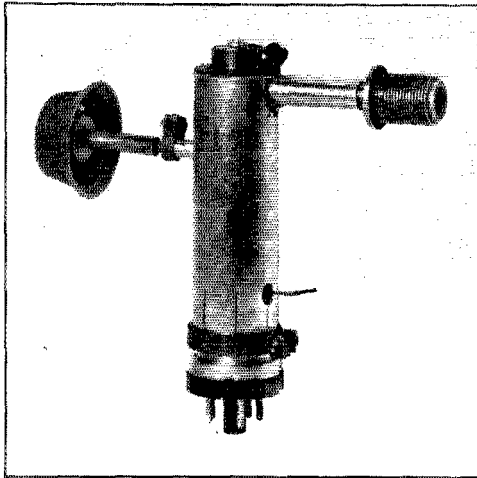


Fig. 1 — Voltage distribution along a transmission line. A high impedance is presented by a shorted-end line a quarter wavelength long, or by an open-end line a half-wavelength long. The impedance at any point is duplicated at half-wave intervals along a line of greater length.

impedance point in the line it is possible to tune over a limited range. We can see then that tube capacities have a definite bearing on the frequency at which an oscillator will operate.

Two Types of Oscillators

Two oscillators doing the same job will now be described. One uses a fixed quarter-wave grid-cathode line and a three-quarter wave grid-anode line. The other uses a fixed quarter-wave grid-cathode line as does the first, but uses an open-end half-wave grid-anode line. Both are tuned by



The three-quarter wave cavity, completely assembled. Output is taken off through the coaxial fitting at the end of the cavity, by means of a coupling loop. Tuning is accomplished with the knob at the left, which controls a small capacity plate. Details of this cavity are shown in Fig. 3.

varying a small capacitor at a high-impedance point.

The shape and size of the fixed grid-cathode cavity is such that with average 2C40 grid-cathode tube capacitance its resonant peak is around $14\frac{1}{2}$ to 15 centimeters. It is broad enough, however, to cover most of the 12.25- to 13.05-centimeter amateur band.

The three-quarter wave cavity (A in Fig. 2) consists of two compartments separated by a washer at the grid plane of the 2C40 lighthouse tube. The tube's cathode post forms the inner conductor of the grid-cathode transmission line, while the inside of the pipe forms the outer conductor. The inner conductor of the grid-anode cavity is formed by the anode and the anode-post extension. Its electrical length, including the effect of tube capacitance, is $\frac{3\lambda}{4}$. Thus by inserting

a small capacitor at a high-voltage point as at C it is possible to tune the oscillator.

The grid-cathode end of the half-wave cavity is the same as the three-quarter wave cavity. The construction of the half-wave grid-anode cavity is somewhat simpler than the three-quarter wave cavity however, and it lends itself more readily to tuning. The approximate voltage distributions for both types of cavities are shown in Fig. 2.

No tuning adjustments need to be made on the grid-cathode cavity since its Q is low enough to resonate over most of the band. Feed-back is accomplished by having a common capacitor to both grid-cathode and grid-anode sections. A thin disk of mica placed directly under the washer separating the two compartments does

the trick very neatly. Its thickness is quite important and for best results it should be from $\frac{1}{16}$ to 1 mil thick (0.0005 inch to 0.001 inch). It is now only necessary to bring in B-plus and the d.c. grid contact, and the oscillator is almost ready to go on the air.

Constructional Details

As may be seen from Fig. 3, the three-quarter wave cavity uses a brass pipe $3\frac{1}{2}$ inches long. The inside diameter is 1 inch and the wall thickness is $\frac{1}{16}$ inch. Two brass washers $1\frac{1}{2}$ inches in diameter are needed, one to separate the grid-anode cavity from the grid-cathode cavity and the other to terminate the grid-anode cavity. About the only lathe work needed is to cut the lower end of the cavity to an inside diameter of $1\frac{1}{2}$ inches for a distance of $\frac{1}{8}$ inch. The anode by-pass can be made from a sleeve soldered to a washer. It is important to keep the anode by-pass as closely fitted as possible for best performance. The clamps are formed from sheet brass, and tightened with 6-32 bolts and nuts. All other work can be done with tools usually found in the amateur's possession — a file, hack saw, a good selection of drills, and several taps. Soldering can be done with a good soldering iron or torch.

The anode post is a piece of $\frac{9}{16}$ -inch diameter brass rod drilled at one end with a $\frac{1}{4}$ -inch drill and slotted lengthwise at 90-degree intervals to a depth of $1\frac{3}{16}$ inches with a hack saw. It may be necessary to bend the edges in slightly with a vise to assure good contact to the anode. The d.c. grid contact was cut from 0.006-inch phosphor-bronze sheet, although thin sheet copper or brass may be used as well. The inside diameter of the grid contact is just large enough to clear the anode post and the outside diameter is slightly smaller than the mica piece. Be certain during operation that the d.c. grid contact does not short to the shell. If a short is found, check the mica for punctures or for possible contact on the inside of the cavity. Tuning is done with a 6-32 screw, the head of which is filed flat, forming a capacity

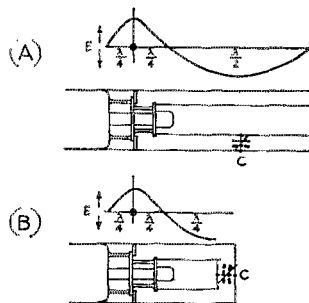


Fig. 2 — Two types of cavities for use with lighthouse tubes. A is a three-quarter-wave cavity, and B the half-wave type.

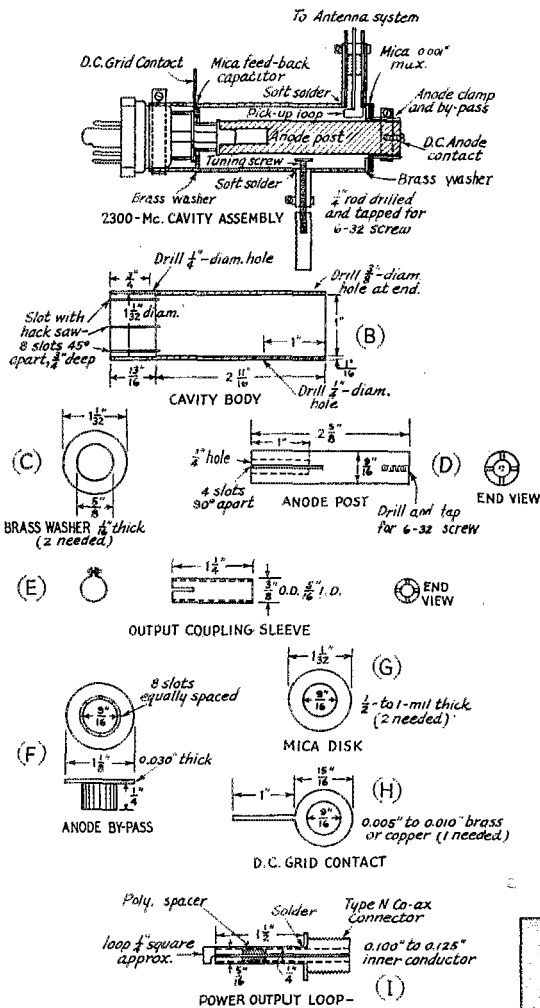


Fig. 3 — Detail drawing of the components making up the three-quarter wave cavity.

plate. The construction can be followed by referring to Fig. 3 and the break-down photograph. The end of the $\frac{1}{4}$ -inch rod which holds the tuning screw is slotted and clamped to insure a tight fit around the 6-32 screw. Rigidity and mechanical strength are quite important at 2300 Mc., so the constructor should use rigid construction wherever possible. It pays.

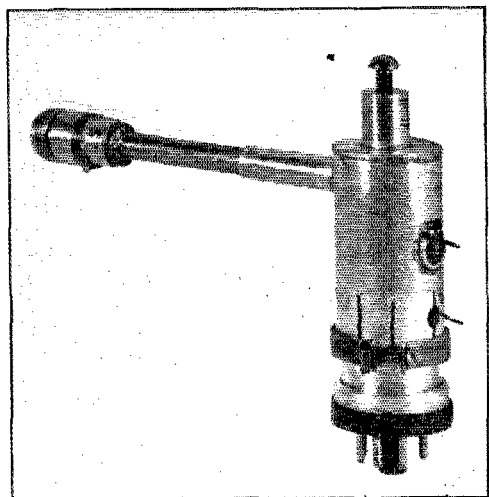
The half-wave cavity (Fig. 4) uses a 1-inch inside diameter brass pipe $2\frac{5}{32}$ inches long. Its construction is similar to the three-quarter wave cavity, but it does not require the 0.001-inch-thick mica washer and anode by-pass assembly (Fig. 3-F). A 500- μ mf. feed-through button capacitor to which is soldered a short piece of phosphor bronze is used to provide d.c. to the anode. The anode post is a piece of $\frac{1}{2}$ -inch di-

ameter brass rod $1\frac{1}{32}$ inches long. One end is drilled with a $\frac{1}{4}$ -inch drill for a distance of $\frac{3}{8}$ inch, and the other end is drilled with a $\frac{3}{8}$ -inch drill to meet the $\frac{1}{4}$ -inch hole. Four slots are then sawed in the small-diameter end for approximately half an inch, and the edges are then crimped in to form a good contact to the anode. The additional piece of half-inch brass soldered to the top washer is drilled and tapped for a 10-32 brass screw. Five revolutions of this screw tune the entire band. The constructor should prevent anode-to-shell shorts by allowing enough clearance between the screw and the anode post. If it is found that the tube does not oscillate over the entire range when the tuning screw is all the way out, file $\frac{1}{32}$ inch off one end and recheck. Follow Fig. 4 for constructional details.

Power is taken out of the three-quarter wave cavity by means of a loop at a low-impedance point, and out of the half-wave cavity by means of a capacitive probe at a high-impedance point. Care should be taken to insure that no probe movement is permitted once the adjustments are made, since small probe movement will cause large changes in frequency.

Both of the coupling systems may be maintained in position by slotting the $\frac{3}{8}$ -inch brass tubing extending from the cavity and clamping the output probe into position by means of the clamp shown in the detail drawings.

When coupling out of the three-quarter wave cavity the probe should be inserted and the pick-up loop orientated so that the



The half-wave cavity is tuned by means of an adjusting screw in the end of the assembly. Output is taken off by means of a capacity probe.

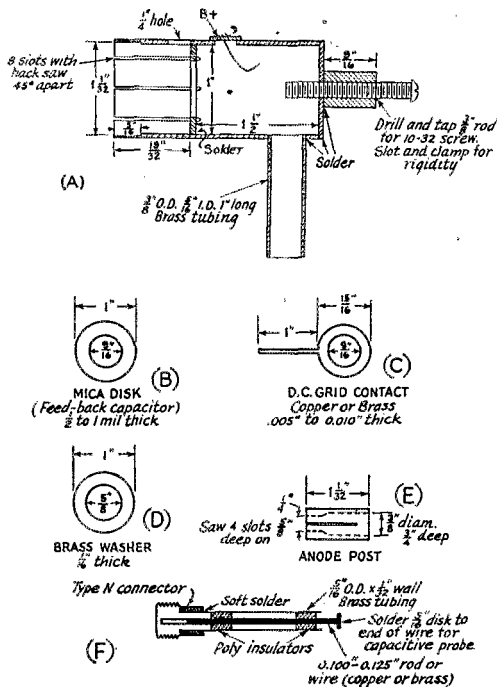


Fig. 4 — Details of the half-wave cavity for 2300 Mc.

plane of the loop is parallel to the axis of the cavity. Check the output. Now rotate the coupling loop and again check output. If the output increases it means that overcoupling existed before so that it is possible to achieve optimum coupling by proper rotation. If the output decreases when the probe is rotated, insufficient coupling exists and it will be necessary to make the pick-up loop larger. The capacitive probe is used in somewhat the same manner except that rotation is not required. Merely adjust the probe distance from the anode connector until optimum output is obtained.

Performance

A G.E. 2C40 tube will perform quite well in both the three-quarter wave and the half-wave cavities and should give from 50 to 250 milliwatts output power with proper adjustment. Because of grid-cathode capacitance tolerances various tubes perform differently with the fixed grid-cathode cavity, but the interested amateur should be able to operate in the band with either cavity. Each cavity worked well as a modulated oscillator and as a superregenerative detector, with the circuit described in July, 1946, *QST*. Several attempts were made to get the oscillator to operate as a self-quenched superregenerative detector without success. For reliable operation as a transceiver a separately-quenched oscillator is recommended. The seemingly small power out-

put is quite sizable, actually, when one considers that it is easy to obtain gains of 20 db. or more in transmission and reception. The cavities are fairly simple to build, tune, and operate, and the associated circuits such as the modulator, audio amplifier, and quench circuit are of the type with which amateurs are familiar.

Admittedly it is much simpler to get on 80, 40, or 20 meters by keying a crystal oscillator and far better results may be achieved for the amount of time and energy expended; still, operating on a band such as 2300 Mc. with equipment wholly new in concept provides a certain thrill, plus the satisfaction of accomplishing something not even dreamed of by amateurs just a few short years ago.

BOOK REVIEW

Sunspots in Action, by Harlan True Stetson, Ph.D. Published 1947 by The Ronald Press Company, New York, N. Y. 252 pages. Price \$3.50.

One of the "Humanizing Science Series" edited by Jacques Cattell, this latest book by the eminent Dr. Stetson, research associate, Massachusetts Institute of Technology, and director of the Cosmic Terrestrial Research Laboratory, Needham, Mass., is written in language anyone can understand. Though not concerned with radio effects alone, it offers much of interest to radio amateurs — particularly those of us who work the higher frequencies and are, therefore, most conscious of the vagaries of radio propagation resulting from solar cycles.

The nature and origin of sunspots, and their effects (both well established and possible) on weather, economic conditions and living things, are discussed in fascinating detail. The casual reader will enjoy these chapters immensely, and the serious radio amateur will find those portions of the book which deal with radio propagation phenomena of more than ordinary interest.

There are approximately fifty illustrations, including numerous simple charts showing correlations between solar cycles and various natural phenomena. Several pages of bibliography provide references for further study along lines of individual interest. Foreword is by Sir Edward V. Appleton, president of the International Scientific Radio Union.

— E. P. T.

Strays

The French have words for it! From *RADIO-REF*, official journal of the *Réseau des Émetteurs Français*, we quote the following pertinent injunction:

"Phone men! More than anybody else, operate your station carefully. On the quality of your transmissions depends the development of amateur radio, the defense of your rights, the continuance of your licenses and the prestige of the nation. Make your transmissions no longer than necessary. Weigh your words; others listen to you . . . and the monitoring stations, too!"

Windmill Towers

The Gentle Art of Getting Them Up or Down

BY MALCOLM B. MAGERS,* WØOJI

THE author has had so many questions asked him about his own windmill tower (which supports a dual 10-20 beam) that it seemed timely to pass along all the information on this subject that might be of interest to fellow hams. First, let us say that all forms of antenna supports have been tried here, including a tree, telephone pole, wooden tower, etc. We find the present self-supporting steel windmill tower by far the best answer to the problem.

Many hams may object and say that the expense is too great. However, a tower, complete and ready to assemble, can be purchased new for less than \$3.00 per foot. They are much less if bought secondhand, but more about that later. Freight rates are low for this class of merchandise and shipment is easy, since parts are tied compactly in bundles and are simple to handle. There are no holes to drill. If you can use a wrench, you can assemble a tower.

A self-supporting steel tower takes up little ground area, usually only a square with sides equal to about one-fifth the height, or about eight feet square for a 40-footer. There are no guy wires, so the problem of the man on a city

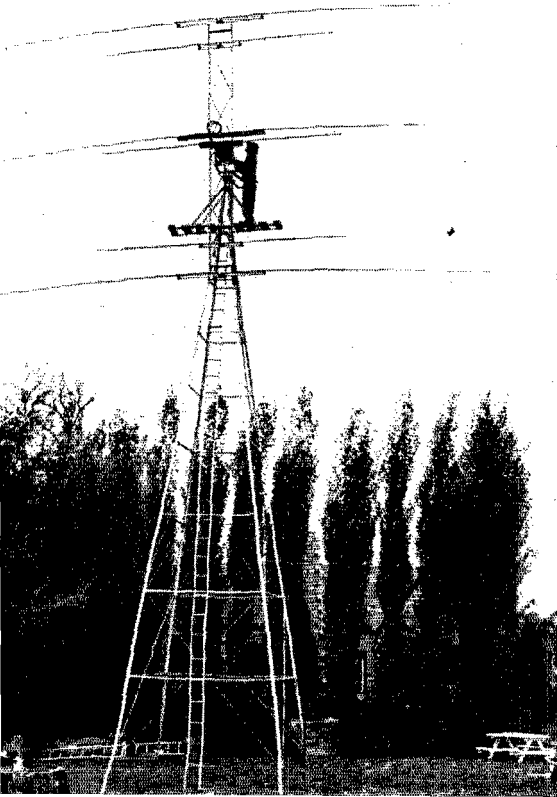
*Platte Woods, Parkville, Mo.

• In many parts of the country, windmill towers can be obtained almost for the work of taking them down and carting them away. In other parts of the country they aren't come by quite so easily. But everywhere one is confronted with the same problem, that of raising or lowering the tower with a minimum of effort and danger. Here is an article for the uninformed that shows how easy the job can be with the right "know how."

lot is instantly solved. Once in place you can consider it a lifetime investment. The writer's secondhand tower was first erected in 1902, and it is still solid as a rock after forty-five years of constant service supporting a windmill. A steel tower is sightly in appearance and will avoid "XYL trouble." Last, but certainly not least, it is absolutely safe to climb and work on. All towers have strong steel ladders to the top. You can snap yourself on with a safety belt and end your worries. An additional good point is that it is easy to bolt a "tilting head" to the top cap of the tower, thus making it possible to tilt the ends of the boom down over the ladder and make all elements quickly accessible. The ham who cannot do this has our sympathy, for elements on the end of an 18-foot boom are mighty far away. Too many hams just "let it go," and do not adjust the elements properly.

Most of the towers you will see are of four-legged construction, though you will sometimes find three-legged models. The four corner posts that form the backbone are usually of $2 \times 2 \times \frac{1}{8}$ -inch galvanized angle iron. On the higher towers of 60 feet or so they will be heavier, perhaps $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{8}$ inch. Sometimes the sections come in 22-foot lengths, but 11-foot lengths are more customary. The latter are much easier to assemble from the ground up. Towers will range in height all the way from under 30 feet to 60 feet. We have seen a few 75-footers. Parallel frames, or "girts," made of $1 \times 1 \times \frac{3}{16}$ -inch angle iron, bolt on to form cross frames every 5 or 6 feet up

◆
A windmill tower is a very convenient beam support, as WØOJI so ably demonstrates in this picture. With a tilting rotator head and a small catwalk at the top of the tower, minor changes are easy to make. But don't forget that safety belt!



the tower. Bracing wires are stretched diagonally between these frames, made of heavy twisted galvanized wires with preformed loops on the ends to fit over the bolts. Some method should be provided for tightening these brace wires after the tower is erected. One method provides an eccentric washer at one end of each wire for tightening.

Setting the foundations for a tower is simple, since four anchor posts, usually about five feet long, are provided. These anchor posts are made of heavy angle iron, rustproof, and have anchor plates bolted on the bottom end. Dig four holes 2 feet wide and $4\frac{1}{2}$ feet deep in which to set the anchor posts, level them up, and you are ready to erect the rest of the tower. Most farmers just put a rock on the anchor plates and then tamp the earth firmly in the hole. If you are raising the tower in one piece, after assembling it on the ground, leave the anchor posts loose in the holes until *after* the tower is raised. You may want to spend your money and break your back putting in concrete footings. This is all right, but it isn't necessary. Windmill towers are designed to withstand far more strain than a rotary beam can ever cause. They support a gear box (called the "head") weighing from 400 to 900 pounds, and a wheel from 8 to 12 feet in diameter, year after year, in heavy winds. The posts will not pull out. The tower won't blow down, that's for sure! But if you are skeptical, put some concrete in the hole. The cemented anchors are hard to dig up if the tower is moved.

Lowering a Tower

There are old towers throughout some rural areas of the country that can be bought from farmers (if you are lucky!). Your problem then is: How shall I get it down and moved? It is fairly easy — if you know how. There are two ways to do it. The *hard* way is to climb to the top and remove the old windmill wheel and head and throw it down to the junkman. It's heavy, I warn you. And it is hard, dangerous work. Next get a cold chisel and proceed to cut off all the old rusted bolts, and take the thing down piece by piece. *One* tower is all you will wish to take down by this method. The *easy* way is to bolt a ten- or twelve-foot piece of 2×6 timber across the base of the tower, as shown in Fig. 1, place bracing 2×4 s between the legs as illustrated, fasten the block and tackle to the tower, run the line over to the gin pole or tree, disconnect the legs, and lower the whole thing in one piece. Use rope guys to steady the tower during the process. You will be surprised how easily the tower comes down. The 2×6 prevents slipping at the base and adds a safety factor. Don't forget to dig up the anchor

posts. Once on the ground you can use a cold chisel to cut off the bolts. Thoroughly buff off all rusty surfaces and apply a good coat of aluminum paint *before* reassembling. Be sure to use new galvanized bolts. It is well also to add a drop of "No-oxide" to the threads, in case the tower is taken apart again later.

Raising a Tower

You now have the tower disassembled on the ground and hauled home in your neighbor's borrowed car trailer. The corner-post sections will

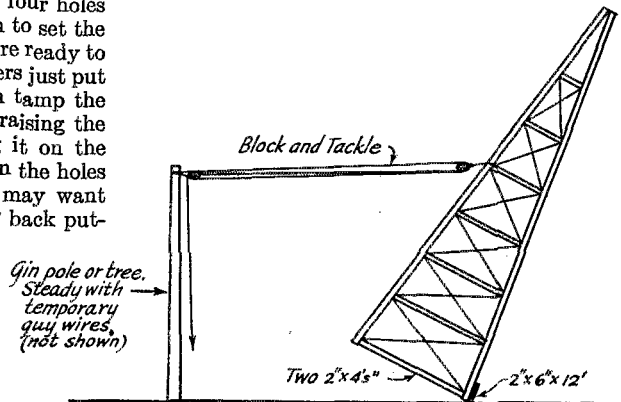


Fig. 1 — Suggested method for raising or lowering a steel windmill tower. The temporary $2' \times 6' \times 12'$ timber bolted to the base serves to steady the tower, and the two lengths of 2×4 prevent any possible buckling of the base. Temporary rope guys on either side of the tower should be used to steady the structure while it is going up or coming down. After raising the tower, the two legs nearest the gin pole should be anchored first, after which the tower can be eased back and the other two legs fastened.

not exceed 22 feet in length, and may be only 11 feet long. In any case, you can haul them. The total weight of a 30-foot tower will be about 500 pounds, 600 pounds for a 40-footer and about 1200 pounds for one 60 feet high. Strangely enough, it's much easier to erect them than it is to take them down. Again, there are two ways to do the job. First dig the holes and set the anchor posts. If the tower is being raised after assembly, leave the posts loose in the holes and tamp in dirt after the tower is up and leveled.

In assembling, start at the top and bolt the four side posts to the cast-iron cap. Note that the angle irons fit *inside* the cap. There is a hole through this cap approximately 4 inches in diameter that is handy for passing feedlines and cables. On a windmill, the pump rod works through this hole. The cap will usually have ample flange space for bolting on your mounting plate for attaching the beam head. At this point it is well to have considered your method of mounting of the rotary head, because it is much easier to drill holes on the ground. Once the first four corner-post sections are bolted on, it is as easy as playing with your son's Meccano set. Simply bolt on the cross-chan-

nel irons and place the diagonal cross wire braces over the bolts as you work toward the bottom. Now and then you see a tower with strap-iron diagonal braces. Many towers use preformed heavy twisted galvanized wires, with eyes in the ends to fit over the bolts. These tighten and adjust more easily than strap iron. With the tower completely assembled on the ground, block up the top end a few feet and attach your rotary mechanism. This is the way a windmill is raised. Bolt your 2 × 6 on the underside of the legs lying on the ground, as in Fig. 1, placing the bottom of the legs in line with the anchor posts. Level the legs with blocks if the ground slopes. Brace between the bottom of the legs with 2 × 4s if the tower has no girts at ground level. Attach your block and tackle, and up you go! But stop after the head is far enough off the ground to permit attachment of the boom and elements. Get it all over with one operation. This is much easier than dragging them up after the tower is in the air, even if you have taken our advice and rigged up a tilting head on top. Pull the tower on up, take it a little past center, fasten the two legs on the side near the gin pole, then ease it back and bolt on the other two legs. It is as easy as that. Then knock off for coffee and sandwiches for the gang! It took just 20 minutes to put up our last tower after all preparations had been made ready.

Your final job before tamping in the earth around the anchor posts is to level the tower accurately. If you desire a catwalk to work on, bolt two 1½ × 1½ × 8-foot angle irons alongside the top girt and parallel to the ladder. Across these you can bolt 2 × 8 × 18-inch planks. Then bolt four 1-inch angle irons from a point below the top of tower to the midpoint of the platform irons to serve as diagonal supports. It is easier to do this on the ground. We guarantee that you will have no fear of high places with such an arrangement.

Lack of space may prevent erecting a tower in one section. In that case first set the anchor posts and level them. Then build up from the ground, piece by piece. Many prefer this method. Where the corner posts are in short sections of 11 or 12 feet this is a simple procedure and can be done by one man working alone. With a partner on the ground to pass up the pieces, you can make fast time. The ladder goes up in sections, too. If the splices are above the points where the cross girts bolt on, you can lay planks across the girt frames to work on as you go up.

When you are finished, you will be proud of your job. In closing let us reply to the often-asked question, "Does the grounded frame of the steel tower affect the signal?" The answer is "No!" Some of the best signals on the air today come from steel-tower-supported beams.

Behind the Scenes with Your QSL Manager

ANYONE who has listened for as much as two consecutive minutes on any of the DX frequencies has heard the familiar, "Pse QSL via ARRL." Sooner or later, a card acknowledging that particular contact shows up as a coveted bit of pasteboard on the wall of some ham's shack. How did it get there?

Well, if our ham is a W2, it got there principally because Henry W. Yahnel, W2SN, of Helmetta, New Jersey, ARRL QSL Manager for W2-land, devotes a large share of his spare time in attending to the affairs of the Bureau; sorting incoming cards, matching them with envelopes sent in by his "customers" and mailing them out.

"Hank" Yahnel is thoroughly conversant with the matter of forwarding QSLs, for he was one of the first volunteer QSL managers when the present ARRL system was inaugurated, first on a trial basis in the Hudson Division in 1932, and as a permanent system for the whole country the following year. Licensed under the call W2SN since 1927, he has had his share of thrills in amateur radio, including a contact with WFA, the Byrd Antarctic Expedition, in 1930. His amateur experiences also include having been chief operator at W3USA, the station of the Boy Scout

(Continued on page 118)



Henry W. Yahnel, W2SN, does occasionally take time out from his arduous duties as QSL manager for the W2 area to do a bit of hamming, as evidenced by this view of him at his operating position.

Field Testing 75-Meter Beams

Experiences with Quarter-Wave Vertical Antennas

BY WILLIAM F. HOISINGTON,* W2BAV

EVERYTHING last summer pointed toward a field test of beams and verticals on 75 meters: the approaching vacation period, a farm in Maine with several acres of flat land, previous experience on 6 and 75 meters, and some models of a newly-developed 70-foot "buggy-whip" antenna. Five of these 70-foot verticals were made up and shipped to the farm at Isleboro, Maine. These "whips" are made of dural tubing, starting with $2\frac{3}{4}$ -inch diameter and reducing in sections down to $\frac{3}{4}$ -inch diameter. Reducing slugs machined from solid dural bar join each section, and bolts through the tubing and slugs hold the assembly together. The last section can be adjusted to make the over-all length anything from 58 to 70 feet. The weight of the entire assembly is only about 35 pounds, and it is easy to hold it all off the ground with one hand. The base mount is normally two $10 \times 4 \times 1$ -inch linen-bakelite insulators that are bolted to 4×4 uprights sunk in the ground. It is possible for one man to "walk up" the antenna into position, with a helper to hold the base end down, but this procedure is not recommended. A much better method is to use a 10- or 15-foot gin pole and some small tackle. The marvelous strength of the dural was demonstrated during the raising of these elements by shaking the structure quite violently, with no ill effects. The strongest winds during August reached a velocity of about 35 m.p.h., and they didn't flex the elements half as much.

The 75-meter transmitter used in the tests was an 815 final amplifier modulated by parallel 6L6s. There being no electricity on the farm, the station was battery powered. The transmitter was run at 30 watts input to the final amplifier; the receiver ran from "B" batteries, and included

* Guion Road, Rye, New York.

• Eighty-meter beams and the weather are two things "everybody talks about but never does anything about." Well, nearly everybody. First, the dry-ice droppers come along with their efforts to bring rain and snow. Then W2BAV spends his summer vacation trying out a number of different antennas on 75 'phone. Here are the interesting results of the antenna tests.

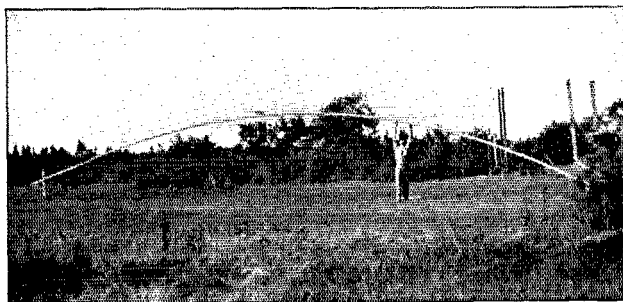
a large S-meter for making relative checks on signals.

The location of the farm is about 300 feet from Penobscot Bay, 8 miles southeast of Belfast, Me. The elevation is about 50 feet, and the soil is medium moist, with a few rock ledges. The station was installed out in the open on a large box, and was dismantled and stored in the house every night to prevent moisture absorption. Once it was left out all night, and very few stations were heard the next morning, until the receiver dried out!

A Vertical Radiator

For comparison purposes, a horizontal doublet was used. In any tests, of course, a comparison antenna is essential. Ours was connected to the equipment through one side of a d.p.d.t. switch. To testify to the use it received, the switch actually had to be oiled many times during the August tests!

From the very first, results were startlingly different with the vertical antenna. It was fed at the bottom through a 250- μ fd. variable series condenser, and was worked against a 66-foot counterpoise mounted 4 feet above the ground. The actual length of the radiator was varied, and



◆
The 70-foot "buggy-whip" antennas used at W2BAV/1 weigh only 35 pounds and can be lifted by one tall man.
◆

ran from one-quarter wavelength to almost three-eighths. An extensive ground system was first tried, consisting of three 150-foot pieces of copper braid lying on the ground. They were run out straight from under the radiator and were spaced 120°. All signals were better with the counterpoise, however, both on transmitting and receiving, and the system also seemed to tune up better.

Operation on the first day, after preliminary tests and tune-up, was started at noon, and immediately the vertical showed up as superior to the horizontal. (If we had started at night we might have cut the vertical down at once!) W2BYP/1, on Cape Cod, about 175 miles away, reported "S5 to 7 on the vertical—S4 on the horizontal." W2TJK, in Syracuse, N. Y., 380 miles away, was heard S2-3 on the vertical and S1-2 on the horizontal. But W1EKN, at relatively near-by Hampton Falls, N. H., was one S-point better on the horizontal. W1DQK, North Troy, Vt., was S7 on the vertical and S5-6 on the horizontal. Then the W2s started to build up. W2JI, at Northport, N. Y., at 4:15 p.m. was S4 on the vertical and S2 on the doublet. Maine-coast stations from Bar Harbor, Portland and elsewhere then began to build up to S9 and over, and by evening *almost all stations were louder on the horizontal antennas!* Some W2s and W3s were about equal on the two antennas.

About this time an unexpected thing showed up. W1OHY, in Portland, Me., about 100 miles away, reported a very pronounced difference in *audio pitch* on the two antennas! (This report was to become quite familiar as the summer wore on.) This might be explained by selective fading that modifies the audio characteristic. The author would appreciate comments from anyone else who has had similar experiences.

We were on again the next morning, and signal reports on the horizontal started to drop down after about 8:30 a.m. A VE3 in Niagara Falls, Ont. (over 500 miles), called and reported "S7 on the vertical, S0-1 on the horizontal!" This morning condition proved to be a regular experience; i.e., from the time signals started to drop in the morning until late afternoon, better reports and less fading were obtained with the vertical antenna. This was also true of stations near by. W1MIR, at North Haven, an island about 20 miles away, gave "S9-plus on the vertical, S7-9 on the horizontal." The report was the same from Castine, about 10 miles away.

A Two-Element Parasitic Beam

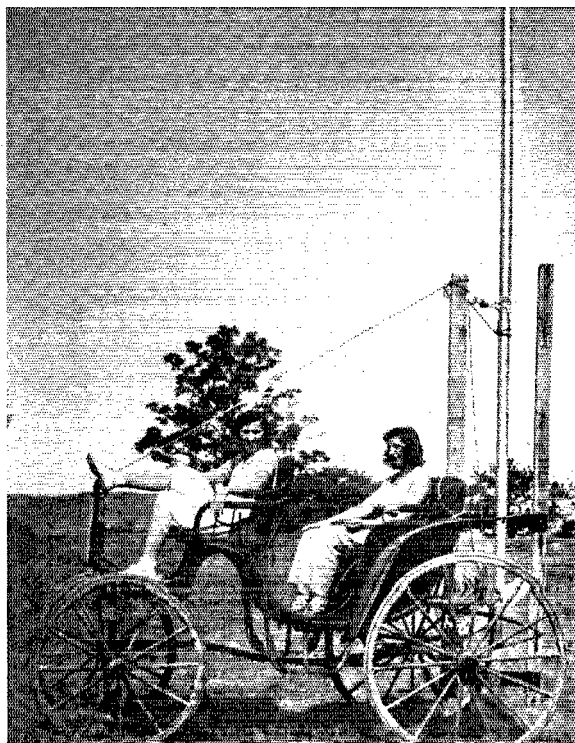
A two-element beam was tried next. To facilitate moving the parasitic element, the second

◆
To make a movable parasitic element, one of the "whip" antennas was mounted on a buggy and wheeled into place. The buggy was obtained locally.

whip antenna was actually mounted on a buggy, as can be seen in one of the photographs. This saved making a platform with rollers but, needless to say, drew considerable comment from casual and other observers. The parasitic element was tried both as a reflector and director, at a wide range of spacings, with the parasitic element tuned through, above, and below resonance. It absorbed power, and even lit a small bulb, but unlike a half-wave element, it showed no beam effects at all. So, as far as we are concerned, quarter-wave Marconi antennas *do not work* as parasitic elements. How about that, Handbooks?

Driven Elements

The next system to be tried was one using two driven elements. They were wired so that they could be driven either in phase or out of phase, by simply throwing a reversing switch. Now we got results! We could hear W2s in and around New York City, about 300 or 400 miles away, at high noon with the end-fire (out-of-phase) array. They were S2 to 3 on the vertical beam and inaudible or S1 to 2 on the horizontal doublet. Contacts were made into Massachusetts, about 200 miles away, during the daytime with reports of "S3 to 4 on the beam—couldn't find you on the horizontal doublet." Band conditions were peculiar on August 18th, and at 7 p.m. several Spanish-speaking stations began to ride in over U.S. stations at around 3850 kc., when the vertical beam was used for receiving. Four of them were copied on the beam, but they were almost completely covered when the doublet was used. This would indicate the value of a good low-angle antenna lobe for 75-meter DX. All day, every day, switching to the out-of-phase condition would



eliminate the W2s completely, by putting them in the null of the antenna.

Horizontal Beams

Next on the agenda was a reflector element for the horizontal dipole. Wire was used for the element, and it required putting up two more poles at the proper spacing to support it. Scaled-up dimensions from our 14-Mc. beam were used, and a relay was hung across an insulator in the center, to permit instantaneous checking of the signal. Without some such means for comparing the signal against a normal half-wave antenna, you might as well not try. In general, results were disappointing with this arrangement. The greatest indicated gain ran about half an S-point, with many signals showing no difference. The front-to-back discrimination was a little better, and some VE2s off the back dropped as much as $2\frac{1}{2}$ S-points.

About this time we started to get desperate on the subject of 75-meter beams. On 2 or 10 meters a reflector or director mounted the right distance from the driven element always brings marked results, but not so on 75! So another 30-foot wooden pole — it's a lucky thing these poles float loose in Penobscot Bay! — was set up to give a try to two collinear half-waves. Each half-wave was fed at the center with 72-ohm line, and both feedlines were the same length. By properly connecting the feedlines at the transmitter, it was possible to excite the two half-waves in phase. A switch disconnected one doublet and thus the other became the comparison antenna.

This beam proved to be the best horizontal that was tried. VE1JN, Fredericton, N. B., reported "One full S-unit up with the two elements." A little more oil on the switches, and W3KLE was

heard at 9 A.M., one S-point louder on the 2-element horizontal. VE1CX reported "One-half S-point up."

With time beginning to run out, two 50-foot poles were put up and comparisons were made between a 30-foot-high doublet and one 50 feet high, both fed the same way and using a switch for quick checks. What a deal! The 25-foot-high job was much better at all times, except occasionally on certain DX! The 25-foot-high antenna seemed to act like a close-spaced two-element beam pointed at the sky, where the 75-meter signals like to "hang out" during the times when the band is most in use.¹

Conclusions

1) Beams for 75 meters come hard, require a lot of space, and do not show anything like the gains obtainable at the higher frequencies.

2) Quarter-wave vertical elements do not work in parasitic arrays.

3) Quarter-wave vertical elements do work well all day long, and put out a strong signal with little fading, up to about 100 miles. For certain layer-reflecting conditions they result in extraordinary DX signals.

4) Two driven quarter-wave elements beam very well. We would like to see what two stations, both using these beams, could do in daylight over, say, a 400-mile path. Single vertical antennas at each end might show up well, since the fading should be greatly reduced.

5) A two-element horizontal parasitic beam 30 feet high shows about one-quarter S-point average gain. The effect is probably masked about 90% by the ground acting as a better reflector and shooting the signal skyward.

6) A collinear array of two half-waves driven in phase makes a fair broadside beam, with an average gain of a little less than one S-point; but it is 260 feet long!

7) Do not raise your 75-meter horizontal doublet over 30 feet!

Many thanks are due the Sea Gull Net stations of the coast of Maine for their cooperation in the lengthy tests.

¹ G. G., "Horizontal vs. Vertical — 80 Meters," *QST*, August, 1947.

◆
W2BAV/1 was set up in the field every day and brought indoors at night. This shot shows the chief operator with his first-vice-president-in-charge-of-switch-throwing.
◆



A Mobile Midget for 144 Mc.

A Crystal-Controlled Transmitter Complete with Meter Switching, Modulator, and Antenna Tuner

BY C. VERNON CHAMBERS,* W1JEQ

• Here is a package — 48 cubic inches of chassis — that even the owner of an *Austin* can find room for! But don't judge its performance by the size of the chassis because its output is nearly comparable to that of outfits many times its size and current drain. Just two tubes are used in the r.f. section and one in the modulator. A 300-volt 100-ma. supply will power the works.

IT DOES not take many hours of operating on the two-meter band to convince one that the modulated oscillator has moved out and that crystal control has taken over. Sure, there are a few signals of the old buzz-saw variety to be heard, but most of the carriers now have the order of stability that comes from the use of crystal control. Naturally, selective receivers have moved in along with the stabilized transmitter signals and, as a result, the owner of a modulated-oscillator rig just isn't going to get satisfactory results.

Though it is possible to avoid the use of expensive high-frequency crystals in the home-station rig for 144 Mc., their use in the mobile station is justified by the simplicity of design and low battery drain incurred. It is probable that by no other means can a satisfactory mobile transmitter for 144 Mc. be built and yet stay within the limitations of the standard 300-volt 100-ma. mobile power supply.

The transmitter described herewith delivers approximately five watts of stable output at a point within the two-meter band which is determined by the selection of the crystal. There are only two r.f. tubes to buy and, at current surplus rates, these cost seventy-five cents each, or less. The inclusion of a meter-switching system permits a single meter to be used for checking the plate and grid currents of the various stages, and a built-in antenna tuner and a modulator make the transmitter as self-contained as possible. A relay box for switching the antenna and the

* Technical Assistant, *QST*.

The compactness of the mobile transmitter can be judged by comparing it with the standard microphone and milliammeter shown in this view. The relay box is shown to the right of the transmitter and both units are resting on the ground-plane of the mobile system.

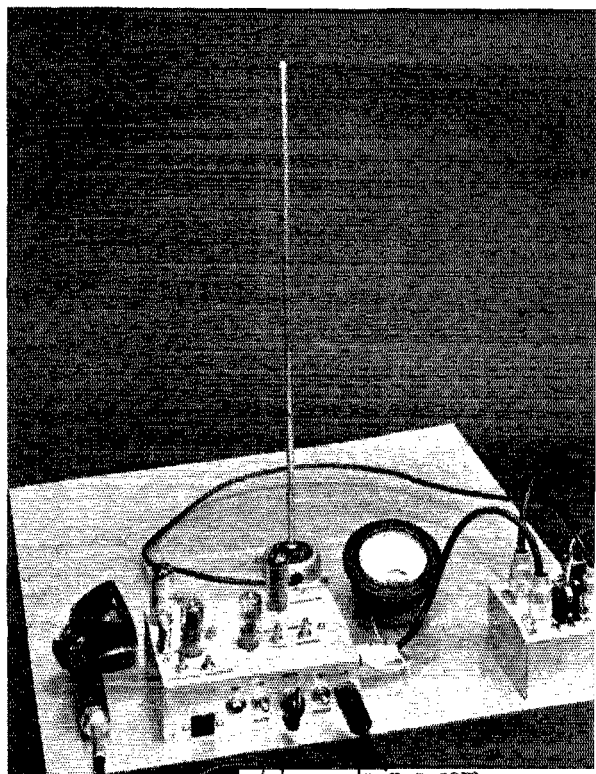
power-supply high voltage between the transmitter and a receiver is also described. In addition, the constructional details of a mobile-type antenna that is simple to construct and install are given, and Fig. 2 presents the wiring diagram of a complete mobile-station control system that cuts the send-receive operation down to the flip of a single s.p.s.t. toggle switch.

Circuit Details

The oscillator portion of the transmitter employs one section of a 6J6 twin-triode tube. The triode oscillator circuit is similar to that described recently in *QST* by W3HWN,¹ and is recommended by the manufacturer of the 48-Mc. crystals used. As mentioned by Hertzler, the loading of a high-frequency crystal oscillator is more critical than that of other crystal oscillators. Proper loading is accomplished in this case by tapping the coupling condenser down on the plate coil.

The size of the oscillator grid coil, L_1 , does not appear to be too critical but the inductance should not be large enough to cause self-oscillation when the crystal is removed. A low value of

¹ "Practical Crystal Control for 144-Mc. Work," *QST*, October, 1947.



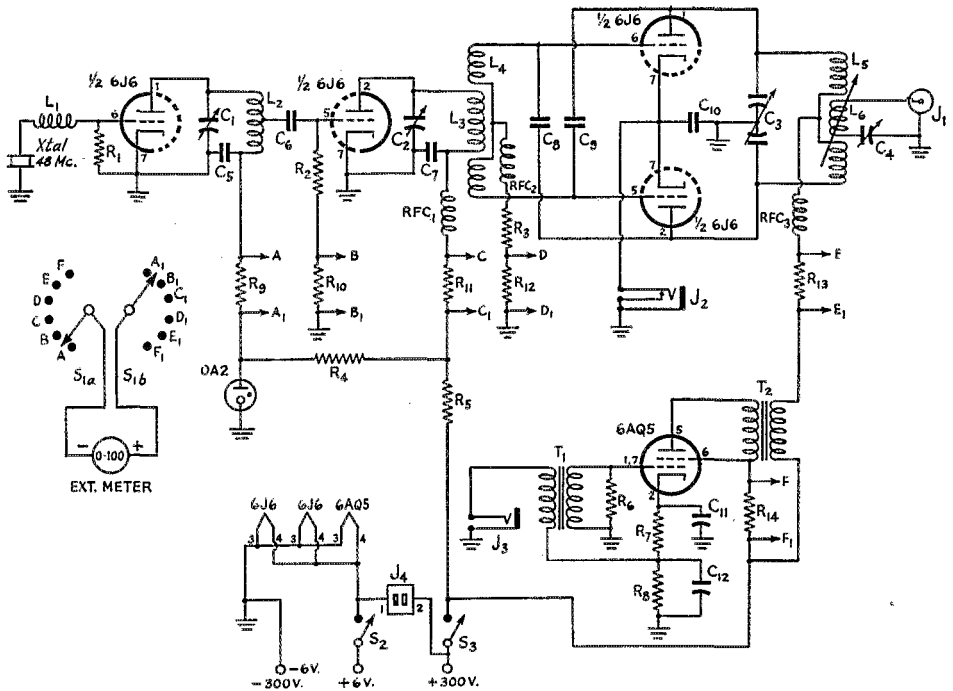


Fig. 1 — Wiring diagram of the mobile transmitter.

- C₁, C₄ — 20- μ fd. midget variable (Johnson 160-110).
 C₂ — 14- μ fd. midget variable (Johnson 160-107).
 C₃ — 8.5- μ fd. "butterfly" variable (Johnson 160-208).
 C₅ — 680- μ fd. mica.
 C₆ — 47- μ fd. mica.
 C₇, C₁₀ — 470- μ fd. mica.
 C₈, C₉ — See text.
 C₁₁, C₁₂ — 10- μ fd. 25-volt electrolytic.
 R₁ — 3300 ohms, $\frac{1}{2}$ watt.
 R₂ — 22,000 ohms, $\frac{1}{2}$ watt.
 R₃ — 1000 ohms, $\frac{1}{2}$ watt.
 R₄ — 3333 ohms, 3 watts (see text).
 R₅ — 2200 ohms, 10 watts.
 R₆ — 0.47 megohm, $\frac{1}{2}$ watt.
 R₇ — 220 ohms, 1 watt.
 R₈ — 120 ohms, 1 watt.
 R₉, R₁₀, R₁₁, R₁₂, R₁₃, R₁₄ — 100 ohms, $\frac{1}{2}$ watt.
 L₁ — 16 turns No. 28 d.c.c., close-wound, $\frac{1}{4}$ -inch diam. (see text).
 L₂ — 9 $\frac{1}{2}$ turns No. 12 enam., $\frac{1}{2}$ -inch diam., 1 inch long. Tapped 5 $\frac{1}{2}$ turns from cold end.

- L₃ — 3 turns No. 12 enam., $\frac{3}{8}$ -inch diam., $\frac{3}{8}$ inch long.
 L₄ — 4 turns No. 12 enam., $\frac{1}{2}$ -inch diam., $\frac{3}{4}$ inch long. Coil wound with 2 turns each side of center-tap, and $\frac{1}{16}$ -inch space at center for L₃.
 L₅ — 6 turns No. 12 enam., $\frac{1}{2}$ -inch diam., 1 $\frac{1}{8}$ inch long. Coil wound with 3 turns each side of center-tap and a $\frac{3}{8}$ -inch space at center.
 L₆ — 3 turns No. 14 enam., $\frac{1}{2}$ -inch diam., $\frac{3}{16}$ inch long.
 J₁ — Coaxial-cable jack (Amphenol 83-1R).
 J₂ — Closed-circuit 'phone jack.
 J₃ — Open-circuit 'phone jack.
 J₄ — Two-prong cable jack (Jones S-302-AB).
 RFC₁, RFC₂, RFC₃ — 1- μ b. r.f. choke (National R-33).
 S_{1a-b} — 2-circuit 6-position selector switch (Mallory 3226-J).
 S₂, S₃ — S.p.s.t. toggle switch.
 T₁ — Single-button-microphone-to-single-grid transformer (Stancor A-4706).
 T₂ — Modulation transformer; 10,000-ohm primary, 4000-ohm secondary; see text for connections (Stancor A-3812).

grid-leak resistance proved to be best for the 6J6 and, in spite of the low order of resistance, it was not necessary to isolate the grid from ground by means of an r.f. choke. Use of a blocking condenser between the plate coil and ground permits the condenser frame to be grounded, eliminating hand-capacitance effects and simplifying the mounting job.

One important requirement of the high-frequency crystal oscillator is that its plate voltage should be held to a maximum of about 150 volts, and the OA2 regulator tube is used for this purpose. The 3333-ohm limiting resistor, R₄, is

formed by connecting three 10,000-ohm 1-watt resistors in parallel. The actual wattage dissipation of the resistor is only a fraction above 2 watts and, as a result, the use of a large 10-watt unit is not necessary.

The second triode section is operated as a tripler, providing the 144-Mc. excitation for the final amplifier. This tripler section operates with a negative bias of approximately 45 volts developed across its grid leak, R₂. Ordinarily, the recommended bias for the 6J6 is 10 volts when the tube is working in a straight-through r.f. amplifier and a bias of 40 to 45 volts easily meets

the high bias requirements of a frequency multiplier. The plate circuit employs a grounded tuning-condenser arrangement similar to that of the oscillator and includes an r.f. choke in series with the plate-voltage lead. The plate voltage on this second section must be held down to 200 volts or so if the input rating of the tube is not to be exceeded. The dropping resistor, R_5 , should have a value of about 2200 ohms when the transmitter is powered by a 300-volt supply.

The final amplifier uses a single 6J6 in a conventional push-pull circuit. A self-resonant grid circuit is inductively coupled to the driver stage and a grid bias of 12 to 14 volts is developed across R_3 . A small r.f. choke, RFC_2 , helped boost the grid drive slightly when it was inserted in series with R_3 . The split-stator plate circuit is inductively coupled to a built-in antenna tuner consisting of condenser C_4 wired in series with L_6 . This type of tuner works well when used with the low-impedance feedlines usually associated with mobile operation.

The amplifier is neutralized by two capacitors, C_8 and C_9 , which are formed from pieces of 75-ohm Twin-Lead, approximately $2\frac{1}{2}$ inches long before adjustment. They are trimmed down during the neutralization process. The amplifier may be keyed by plugging into the cathode jack, J_2 , C_{10} serving as a by-pass for the key leads. The amplifier is normally operated with an input of 9 watts — 30 ma. at 300 volts. This combination of voltage and current presents a load impedance of 10,000 ohms to the modulator.

A Type 6AQ5 beam-power tetrode is used in the single-tube modulator for the transmitter. This tube has a rated output of 4.5 watts of audio power when set up for 250-volt operation. In this application, we have applied the full supply output of 300 volts to the tube with no apparent ill effects. The output impedance of the 6AQ5, when operated in this fashion, is somewhat below 5000 ohms. A single-button carbon microphone is used to excite the audio stage directly and inasmuch as the full microphone output is required for adequate modulation, it was not deemed necessary to include a gain control in the circuit. Cathode bias for the tube is developed across resistors R_7 and R_8 , and the microphone voltage is obtained by tapping the microphone-transformer primary in at the junction point of the two resistors.

Meter switching has been made possible by inserting 100-ohm resistors in series with the leads that ordinarily require current metering. These shunt resistors, R_9 , R_{10} , R_{11} , R_{12} , R_{13} and R_{14} , are in turn wired across the two sections of

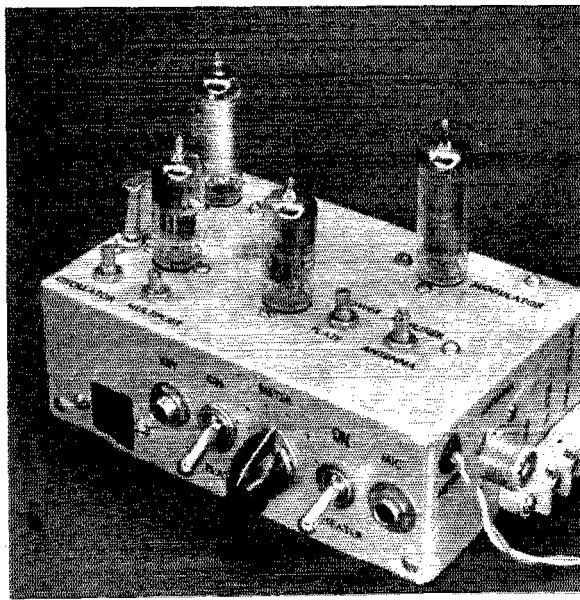
the selector switch, S_{1a} - S_{1b} . If the wiring of the meter circuit is arranged as shown by Fig. 1, it will not be necessary to reverse the meter leads as the meter is switched between the plate and grid circuits of the transmitter.

The 2-prong jack, J_4 , has been wired to the heater and plate switches, S_2 and S_3 respectively, so that remote-control switches can be conveniently connected to the transmitter. The installation of the remote controls will be treated more completely in another section.

Before going further, it is probably advisable to enlarge somewhat on the parts-list description of several of the components. The midget variable condensers used deserve first mention for they represent a new line which may still be unknown to a good many amateurs. A product of the E. F. Johnson Co., Waseca, Minn., these condensers are just what the doctor ordered for use in compact equipment. They have a rating of 750 volts r.m.s. (at 2.0 Mc.), yet they are considerably smaller physically than other currently-available designs. Conventional-sized condensers of comparable capacitance rating may, of course, be used, provided a somewhat larger chassis size is employed.

The modulation transformer (Stancor A-3812) has a primary rating of 10,000 ohms at 32 ma., and a secondary rating of 4000 ohms at 50 ma. Now, if we use the primary winding as the secondary, and vice versa, the impedance and current ratings are just what the job calls for. Furthermore, the cost is only \$1.23!

National Type XOR tube sockets were selected for the r.f. tubes because the contacts extend radially from the base of the sockets, helping considerably in the layout of the r.f. leads and components. The Type XOA sockets, used for the regulator and modulator tubes, have contacts which extend axially from the base of the socket. Both types have a small hollow tube on the underside and, because this tube is completely insulated, it can be used as a terminal point for the mounting of coils and other parts.



A top view of the mobile transmitter. Just a good-sized handful, the unit weighs $2\frac{1}{4}$ pounds.

Construction

The chassis for the transmitter measures 2 by 4 by 6 inches and is made from an 8 × 10-inch sheet of $\frac{1}{16}$ -inch aluminum stock. The end pieces of the chassis are cut to a width of $4\frac{3}{4}$ inches so that $\frac{3}{8}$ -inch tabs can be bent around at the front and rear edges, thus providing surfaces to which the front and rear walls may be fastened. To simplify the marking and drilling of mounting holes for the parts, it is suggested that these operations be completed before the chassis is bent into shape. A brief study of the front and bottom views of the transmitter will show the location of the major components, and the actual identification of many of the jacks, controls, tubes, etc., is made possible by the Millen No. 59002 decalcomania markings which have been applied to the chassis. The oscillator-tripler tube is centered on the chassis at a point $1\frac{1}{8}$ inches in from the left end, and is $1\frac{1}{2}$ inches from the front edge. The r.f. amplifier tube is to the right of the first 6J6 by a distance of $1\frac{1}{8}$ inches and the crystal socket is at the extreme left-hand end of the chassis. The center of the 0A2 regulator tube socket is $\frac{1}{2}$ inch in from the left-rear edge of the chassis and the 6AQ5 socket is $3\frac{3}{4}$ inches farther to the right; both of these sockets are centered in from the rear edge of the chassis by $\frac{1}{8}$ of an inch. For the sake of wiring convenience and short leads, prongs No. 1 and 7 of the oscillator tube socket should face the left end of the chassis, and the amplifier and modulator tube-socket prongs of the same numbers should face the front edge. Pins No. 1 and 7 of the regulator socket should face toward the rear. A National TPB polystyrene bushing is mounted just to the rear of the oscillator tube socket, and a second TPB is located $\frac{3}{4}$ inch to the right of the first bushing. The first of these bushings serves as the tie-point for connections between the tripler grid leak and meter lead, and the second is used to support the cold end of the tripler plate coil, L_3 .

The bottom view of the transmitter shows the oscillator plate coil mounted parallel to the front wall of the chassis; the hot end of the coil is soldered to the stator terminal of C_1 , and the bottom end goes to the center tube of the 6J6 socket. L_3 is at right angles to L_2 and mounts

between C_2 and the TPB bushing. The windings of L_4 are closely coupled to the ends of L_3 and the coil is mounted on the grid prongs of the amplifier tube socket. RFC_2 connects between the center-tap of L_4 and the grid resistor, R_3 , and the meter end of the resistor is mounted on the center post of the amplifier tube socket. The plate coil for the amplifier is mounted on the stator terminals of the tuning condenser, C_3 , and the plate r.f. choke is mounted between the center-tap of the coil and the meter switch. C_3 and C_9 , the Twin-Lead neutralizing condensers, are connected between Prongs 1 and 5, and 2 and 6, of the output-stage tube socket. The Twin-Lead is prepared for use by splitting the conductors apart at one end for a length of $\frac{1}{2}$ inch or so and then covering the exposed ends (except for the last $\frac{1}{8}$ inch) with spaghetti. After the condensers are soldered in place, it is wise to check the free ends to make certain that shorts do not exist between the two conductors, as direct connection between the plate and grid circuits will occur if the leads are shorted together. The output link, L_6 , is mounted between the terminals of C_4 and J_1 , and because it is a fairly rigid link, it should be correctly positioned with respect to L_5 while it is being soldered; the correct amount of coupling for most loads is had with the two coils approximately one-third meshed.

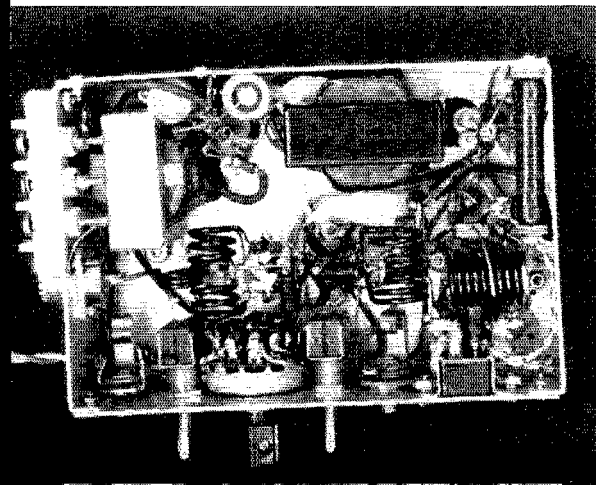
The audio-tube cathode by-pass condensers and cathode bias resistors are mounted in a vertical position at the rear of the chassis and are supported by the tube-socket prongs and a tie-point strip which is fastened to the rear wall. The voltage-dropping resistor is mounted at the rear right-hand corner of the chassis by means of a long $\frac{9}{32}$ machine screw which passes through the center of the resistor. It is advisable to cover the screw with a length of spaghetti to prevent a flash-over to ground.

When wiring to the components which are mounted on the front wall of the chassis, it is recommended that special care be taken with the insulation problem. The meter shunts are mounted on the meter-switch contacts and, as a result, high-voltage leads are grouped closely together, promoting the possibility of shorts between circuits. Use a large-size conductor between the 6-volt input terminal, the heater switch, S_2 , and the remote-control jack, J_4 , as it may be desirable at times to control the 6-volt system by means of S_2 and a large current flow must pass through this wiring.



A bottom view of the compact mobile transmitter for 144 Mc. The microphone transformer is shown in the upper left-hand corner, and the modulation transformer is at the rear and center of the chassis.

QST for



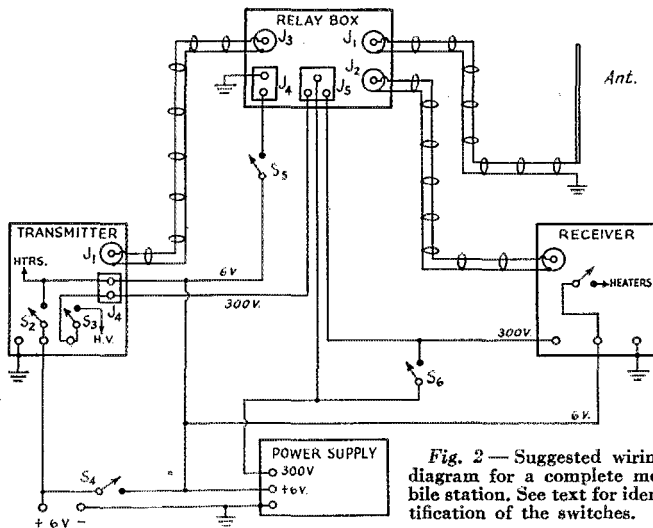


Fig. 2 — Suggested wiring diagram for a complete mobile station. See text for identification of the switches.

Testing

The crystal, the r.f. tubes, and the 6AQ5 are not plugged into their sockets during the first phase of the testing procedure. The heater supply should deliver 6 volts at 1.5 to 2 amperes, and a 300-volt 100-ma. plate supply is recommended. The regulated voltage should be checked to be sure that it is held to 150 volts, which it should be, if the regulator tube glows. Next, the oscillator-tripler tube is plugged into the socket and, after a 0-100 ma. meter has been connected to the meter lead and heater voltage applied, the plate supply may be switched on. The oscillator should deliver no output during this test. If there is an indication of drive to the tripler tube, the first section is self-oscillating, and it may be necessary to reduce the inductance of L_1 until self-oscillation stops. Next plug in the crystal and tune the oscillator plate circuit to resonance. Normal behavior will be indicated by a pronounced dip in the oscillator plate current and a tripler grid-current flow of several ma. The tripler should now be tuned to resonance with the plate current falling to approximately 10 ma. It would be well to get out the absorption-type wavemeter at this point to be sure that oscillation is at the crystal frequency, and that the tripler is actually *tripling*.

High voltage should be removed from the final amplifier before the tube is plugged in and this can be done most easily by disconnecting RFC_3 from the center-tap of L_5 . The meter should now be switched to the amplifier grid circuit and, with the exciter portion turned on, the tripler should be tuned and loaded (loading is accomplished by adjusting the coupling between L_3 and L_4) to cause a final-amplifier grid current of approximately 20 ma. The amplifier may now be neutralized by clipping $\frac{1}{16}$ -inch lengths from the

Twin-Lead "condensers," as the amplifier plate condenser is rotated through resonance. It is necessary to retune the tripler and amplifier plate circuits each time a neutralizing adjustment is made and the entire procedure — clipping and readjusting — must be carried on until the grid current is not affected by the tuning of the amplifier plate condenser. When perfect neutralization has been obtained, the grid current should be approximately 16 ma.

With RFC_3 again soldered in place, and with the meter switched to the amplifier plate circuit, power is applied and the amplifier quickly tuned to resonance. The unloaded amplifier current should be 15 to 18 ma. and if a 6-watt lamp bulb is

coupled to the output jack, it should be possible to load the amplifier to 30 ma. by proper adjustment of the antenna tuning condenser and the coupling between L_5 and L_6 . Naturally, the amplifier plate circuit must be retuned each time the output coupling is varied. After the amplifier has been loaded, it is advisable to carefully retune the driver stages and then check the essential current and voltage values. The oscillator, tripler, and amplifier plate potentials should be approximately 150, 200 and 300 volts, respectively, and the plate currents should be approximately 10, 15 and 30 ma. in the order just listed. Tripler grid current should be 2 ma. and 13 or 14 ma. is the correct amount for the amplifier.

The 6AQ5 may now be inserted and the static plate current checked. It should be 40 ma., rising to 45 ma. after the input circuit has been closed by plugging a microphone into J_3 . This rise in plate current is caused by the resistance of the microphone circuit shunting the 6AQ5 cathode resistor, R_3 , lowering the bias on the tube. The cathode voltage should be 16 volts with the microphone circuit open, dropping to 15 volts with the circuit closed. Microphone voltage should vary between 5.5 and 3 volts as the wiring of the microphone circuit is opened and closed. It is necessary to speak loudly when the transmitter is to be modulated and the microphone should be held close to the lips, a desirable condition in mobile operation. Modulation checks should be made with a lamp load coupled to the final stage.

A Control Box

Convenient and safe mobile operation requires that a single switch must do the complete job of changing from send to receive. However, a multiple switch is not recommended because it is seldom feasible to run the antenna feeder to the con-

trol position, so at least one remotely-controlled relay must be used. Our control box makes use of a d.p.d.t. 6-volt d.c. relay that is connected so as to switch the antenna and high-voltage leads when the relay is energized. The relay-coil leads are brought out to a two-prong jack, J_4 , into which are plugged the leads running to the master control switch (more about the control switch later). The center arm of one section of the relay is connected to a four-prong jack, J_5 , and the fixed contacts of the relay are tied to Prongs 3 and 4 of this same jack, for the purpose of carrying the output of the power supply to either receiver or transmitter.

The other section of the relay has its center arm connected to the antenna input jack, J_1 , and the fixed contacts to the receiver and transmitter jacks, J_2 and J_3 , respectively. Inasmuch as these leads are very short, and because they are enclosed in a shielded box, it is not necessary to use coaxial cable to complete the connections, but they should be as short and direct as possible.

Operating-Control Diagram

A block diagram of the control system for a complete mobile station is shown in Fig. 2. This hook-up calls for three s.p.s.t. toggle switches in addition to the switches usually included as parts of the receiver and transmitter units. However, it is necessary to use only one of the switches (S_5) for straight operating purposes. The other two switches, S_4 and S_6 , are used to turn on the power supply at the start of an operating period and to permit the simultaneous operation of the receiver and the transmitter for frequency checking or transmitter adjustment.

During a transmitter adjustment, the switching system is set up as follows: switches S_4 and S_6 , located at the operating position, are left open, and S_5 is closed. Now, if the transmitter is located away from the control panel — say in the rear trunk — it is possible to control the power supply and heater voltages by means of the transmitter switches, S_2 and S_3 . As long as S_5 is closed, the antenna will be connected to the transmitter

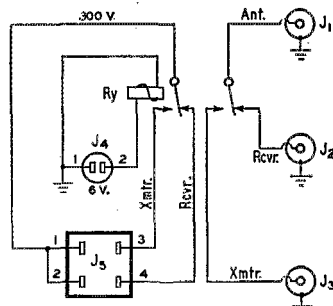


Fig. 3 — Wiring diagram of the relay box.
 J_1, J_2, J_3 — Coaxial-cable jacks (Amphenol 83-1R).
 J_4 — Two-prong cable jack (Jones S-302-AB).
 J_5 — Four-prong cable jack (Jones S-304-AB).
 Ry — D.p.d.t. relay, 6-volt, 0.06-amp. winding (Allied Control Type BJ).

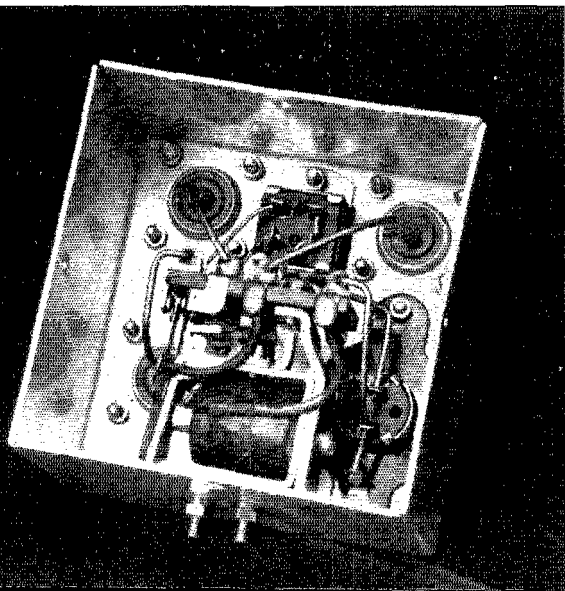
when S_2 is closed and 300 volts will be fed to the transmitter when S_3 is closed.

Switch S_2 is left in the off position and S_3 remains at the on position when the installation is finally prepared for on-the-air operation, and it is not necessary to touch these controls again even when putting the station off the air. If the receiver heater switch is turned on (this switch is usually right at the receiver), the complete system will come to life when S_4 is closed and the whole works will be off — without power of any kind with the switch open. With power applied, S_5 will now make possible the complete change-over from receive to transmit and, by closing S_6 , the two units — receiver and transmitter — can be operated at the same time (the receiver will be operating without the antenna which is actually a help when trying to monitor the transmitter signal).

A Simple Mobile Antenna

In not every family can the OM drill holes in the car roof so that a suitable antenna and feed system can be installed, desirable as a rooftop ground-plane antenna may be for mobile operation on 144 Mc. The antenna shown with the rig and control box in the first photograph can be removed from the car at will and does not require any holes for mounting purposes. Such an antenna is decidedly effective when mounted on the roof of the car; it is of whip design, providing a radiator that can't be bent out of shape every time it strikes an overhead object, and it is truly inexpensive to build.

The radiator is made from a length of $\frac{1}{4}$ -inch diameter aluminum rod which has been drilled and tapped to accommodate a $\frac{9}{32}$ screw at the



A bottom view of the relay box.

base end. Naturally, the proper length of the quarter-wave radiator will be determined by the operating frequency of the transmitter, but 19 inches is a good average.

The whip action of the antenna is obtained by using a Lord-type shock mount as a support for the rod. Fortunately, there are a number of shock mounts available on the surplus market and many of them have a bushing which will pass a $\frac{5}{32}$ screw. If this bushing is larger — perhaps $\frac{1}{4}$ inch in diameter — then it is necessary to use a large washer in between the base of the radiator and the mount, so that the rod will not slip down through the bushing when the mounting screw is tightened up from the underside of the shock mount. A soldering lug should be placed under the head of the screw before the assembly is completed, and one side of the mount should be drilled and fitted with a rubber grommet to provide a feed-through point for the feedline.

There are two methods of mounting the antenna on the roof of the car and both methods require that the antenna first be mounted on a metal plate as shown in the photographs. If the system is to be tied down to a metal roof by a pair of ski-rack straps, the base-plate area does not have to be large. An iron or aluminum sheet measuring 20 by 20 inches is a convenient size. The roof of the car works along with the plate to provide a ground plane for the antenna when this type of mounting is employed.

The second method of support uses suction cups to secure the assembly to the car top and, because the bottom sheet must serve as the ground plane for the antenna, it is recommended that a fairly large piece of metal — preferably a half-wave square — be used. Regardless of the choice of mounting, it is possible to ground one side of the feedline to the metal part of the shock mount because this mount is in turn firmly bolted to the metal sheet. Usually, the ski-strap set-up is the more satisfactory of the two systems.

The impedance of a quarter-wave antenna (approximately 35 ohms) is reasonably well matched by a 52-ohm line, and there is only one reason why that type of line has not been used with this installation — we didn't want to drill a hole to pass the line through the car body, and if you've ever been a W1, you know that this is no time of the year to be riding around New England with a window open! However, this problem was licked by using two pieces of 75-ohm Twin-Lead in parallel for the feeders between the antenna and the relay box, and between the relay box and the transmitter and receiver. The two pieces of line not only provide an almost perfect match to the antenna when connected in parallel, but they can be placed side-to-side in a casing of spaghetti tubing and run through a car window, after which the window can be cranked up tight. Needless to say, the 75-ohm Twin-Lead is of the lightweight variety.

'Phone-Band Phunnies

Round-Table Termite



This particular parasite, to reach its full and bloated flowering, must attach itself to a live and going QSO. It does this simply by setting down on the frequency of yourself and your friend and asking to be let in. Once this permission has been granted, the Termite really goes to work.

First, he takes full and complete charge of the QSO that, presto-chango, has been converted into "our little old round table." He dictates the order of transmission, invites stations on adjacent channels to join you, and insists on standing by after each transmission to see "if someone else would not like to get into this thing."

All of his transmissions — and they are frequent and lengthy — are taken up with his self-appointed master-of-ceremonies duties. He insists on briefing minutely each new sucker caught by the dragnet as to membership, handles, QTHs, etc. Inasmuch as his frantic efforts to get more and more fellows on the frequency make it necessary for him to go through this rigmarole about every five minutes, this grows a trifle monotonous to you charter members. What is worse, he will break in on any transmission to call a station within fifteen kilocycles of the frequency that sounds like a possible recruit. Obviously, the important thing to him is simply to see how many stations can be rounded up on one frequency. What the fellows say once they are in the round table does not matter.

Do you know one of these?

— John T. Frye, W9EGV

SWITCH TO SAFETY!



An Answer to N.F.M. Reception

BY L. H. ALLEN,* W4IZH

MANY AMATEURS are looking for a simple system of switching between a.m. and f.m. reception that will involve as few modifications as possible in the existing a.m. receiver — and at the same time will take up very little space in the set. The system to be described should be of value to the amateur desiring to realize the many advantages of n.f.m. reception.

One of the complaints against f.m. is that, with the common types of discriminators, it is possible to tune in a signal at three points on the dial. Also, limiting is necessary; this is because a discriminator is sensitive to amplitude changes and requires a signal of constant strength, as provided by limiting, before the advantages of f.m. can be realized. What is needed, then, is an f.m. detector that is not sensitive to amplitude changes at an audio rate. Such a detector is in existence and was fully described some time before n.f.m. was in the spotlight.¹ The advantages of the ratio detector are as follows:

- 1) It is insensitive to amplitude modulation.
- 2) No limiter is required.
- 3) Side responses are greatly reduced.
- 4) A.v.c. voltage is available.
- 5) Better response on weaker signals.
- 6) Low noise level when no signal is present.

The only disadvantage to the ratio detector is that it is somewhat harder to adjust than the discriminator. The secret of operation lies in the fact that the total voltage output of the two diodes

requires so few changes to be made in the existing receiver circuits. A ratio detector can be made into an a.m. detector simply by removing the audio by-pass circuit from across the output of the diodes (Fig. 1); thus we have a practical f.m.-a.m. detector with the system of reception being determined by the position of a s.p.s.t. switch!

Using this detector means that the regular communications receiver works practically the same on a.m. as before modification, with crystal-filter detection² of p.m. signals if desired. And since no limiter is required, the full advantage of all r.f. and i.f. stages can be utilized, including variable bandwidth features for n.f.m. reception.

Another point to take into consideration is the cost of converting a receiver. In the author's case the cost was very low since the only additional parts required were one r.f. choke, one 8- μ f.d. capacitor, a s.p.d.t. switch, a crystal diode (1N34), and a discriminator transformer. Balanced a.f.c. discriminator transformers can be obtained for most commercial i.f. amplifier frequencies.

Comparing Figs. 2A and 2B will acquaint the reader with the circuit modifications made in a well-known communications receiver, the HQ-129-X, to convert it into an a.m.-n.f.m. receiver. The output on n.f.m. will be somewhat less than on a.m. because R_1 , which is a rather heavy load, is across the total output of the two diodes in the n.f.m. position. If desired, this resistor could be left in the circuit at all times, thus equalizing the a.m. and f.m. audio outputs. A crystal diode was substituted into the noise-limiter circuit so that the detector would be more or less balanced.

The only disadvantage in using this circuit lies in choosing a proper value for R_1 . Although the value given works satisfactorily, the exact value should be determined experimentally, using a 100,000-ohm potentiometer in each receiver set-up for maximum results. The lower the value of R_1 , the better the performance from the standpoint of independence of amplitude variations. On the other hand, raising the value of R_1 increases the sensitivity. The optimum value depends on the selectivity curve of the i.f. amplifier and the characteristics of the detector transformer, and hence must be determined experimentally in each installation.

Alignment of the ratio detector is similar to the

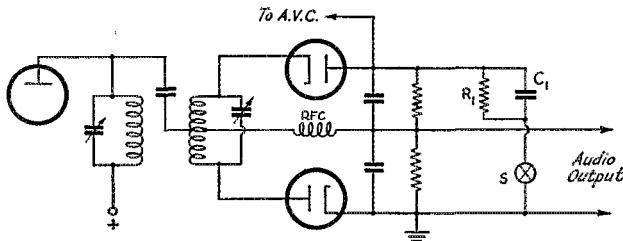


Fig. 1 — A.m.-f.m. detector circuit. With S closed the circuit operates as a ratio detector for f.m. reception; with S open the circuit is set up for reception of a.m. signals.

is kept constant, relative to a given average signal strength, by means of an audio by-pass circuit, $R_1 C_1$, in Fig. 1.

With the idea in mind of designing an effective method of modifying a.m. communications-type receivers to a.m.-n.f.m. reception, the author chose to use the ratio detector because of its advantages and, most of all, because its simplicity

* 1232 Chestnut St., Bowling Green, Ky.

¹ "A New F.M. Detector Circuit," *QST*, January, 1946.

² "Technical Topics," *QST*, March, 1947.

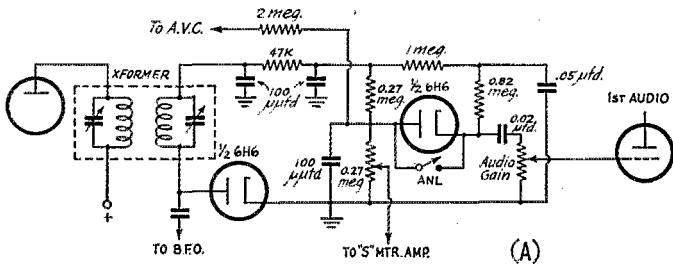
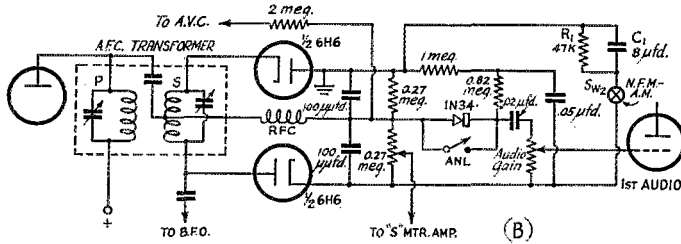


Fig. 2 — A — HQ-129-X second-detector circuit; B — Circuit revisions necessary to provide alternative a.m.-f.m. reception.



alignment of a discriminator. However, in the absence of instruments the following procedure can be used: First, tune in an unmodulated carrier and adjust the transformer primary tuning for maximum output, as indicated on the "S" meter. To adjust the secondary, tune in an amplitude-modulated signal and adjust the secondary tuning for *minimum* audio output. The a.m. carrier should be kept "on the nose" of the i.f. in this adjustment. A final check on a narrow-band f.m. signal will show whether or not the system is reasonably well balanced. When the

detector is working properly the speech from a good n.f.m. signal will sound undistorted and the audio volume will not change when the manual r.f. gain control is varied over a considerable portion of its range.

Application of the ratio detector to other types of receivers will, of course, differ in detail depending upon the particular type of second-detector circuit employed. If the fundamental circuit is kept in mind, however, it should not be difficult to arrive at a modification that will work in whatever type of receiver you may happen to have.

New Books

Klystron Tubes, by A. E. Harrison. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. 1947. 246 pages + 21 appendix pages + 3 index pages. 413 illustrations. 6 x 9 inches. Price \$4.50.

An introduction to the behavior of klystron tubes. The theoretical basis for the electrical characteristics of velocity-modulated tubes is thoroughly presented, and data on the operation of klystron tubes, power-supply considerations and microwave techniques are given.

Slide-Rule Short Cuts, by W. P. Miller, 536 "F" St., San Diego 1, Calif. Published by the author. Second edition. 15 pages. 6 x 9 inches. Price \$1.50.

This booklet is directed mainly toward short-cut methods which are especially useful to electrical engineers and radio technicians in their work.

Silent Keys

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

W1KKD, L. E. Stover, Saugus, Mass.

W1MTC, Andrew J. Kuzemka, Milford, Conn.

W2WIR, ARM Harry F. Ballman, USN

W3CAB, C. A. Briggs, Washington, D. C.

W4AL, ex-1AF-W2KAP-W4KBH, F. C. Gow, Knoxville, Tenn.

W4BNS, George W. Denhard, jr., Westport, Ky.

W4ERJ, J. M. Bradley, Watertown, Tenn.

W6HSX, H. K. Anderson, Hollywood, Calif.

W7LJQ, ARM James H. Urry, USN, Boise, Idaho

W9GKE, Albert C. Jorgensen, Milwaukee, Wis.

An Easily-Constructed Buffer and Final Amplifier

Unit Assemblies for Driver and Output Stages

BY E. E. PEARSON,* W3QY

• As pointed out in previous articles, subassembly construction not only makes the building of gear easier, but it also provides for easy modification after construction, since any desired unit may be removed with a minimum of disturbance to other stages.

The two-stage affair shown in the photographs was designed primarily for 7-Mc. operation, but by providing plug-in coils in the final tank circuit, it can, of course, be operated in any of the lower-frequency bands.

ALTHOUGH unit construction is not new, since it has been suggested by others from time to time, the idea has not been put to use as much as it seems that it should be. In the first place, anyone who has worked with aluminum knows how easy it is to drill holes or cut openings compared with performing the same operation on a steel chassis. As a matter of fact, since aluminum sheet can be bent to almost any desired conformity, much of the drilling and cutting is eliminated entirely. When the transmitter is broken down into small subassemblies, it is obvious that each is handled more easily and that parts, par-

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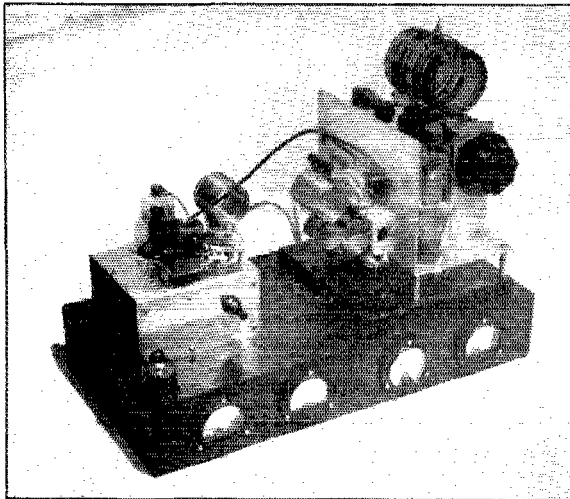
ticularly the smaller components, are much more accessible. In addition, if it is desired to modify or service one of the stages, it can be easily removed without disturbing the rest of the transmitter.

The circuit diagram of the driver-final arrangement shown in the photographs appears in Fig. 1. An 807 doubler drives a push-pull final amplifier using 812s. The 807 may be driven by a crystal oscillator or a VFO. Adequate excitation for the final may be obtained at 7 Mc. with the 807 running at 450 volts with a plate current of 30 ma. Link coupling is used throughout.

Since it was desired to key the oscillator, both stages are provided with protective fixed bias from a small 250-volt supply, as indicated in Fig. 1. Two 10,000-ohm voltage dividers are connected across the output of the supply. The grid return of the 807 is connected to one of these voltage dividers, with the tap set to provide 45 volts. The grid return of the 812s is connected at the 1500-ohm point on the second voltage divider. This provides about 30 volts of fixed bias and the 1500 ohms, when added to the 1000 ohms of R_4 , makes the total of 2500 ohms the recommended value of grid leak for the 812s.

Construction

The buffer unit is mounted on a $5 \times 5\frac{1}{2} \times 3$ -inch chassis, made from 1/16-inch aluminum



W3QY's doubler-final section. The 807 doubler at the left is link coupled to the push-pull 812 final at the right. The meters are mounted in a plywood base.

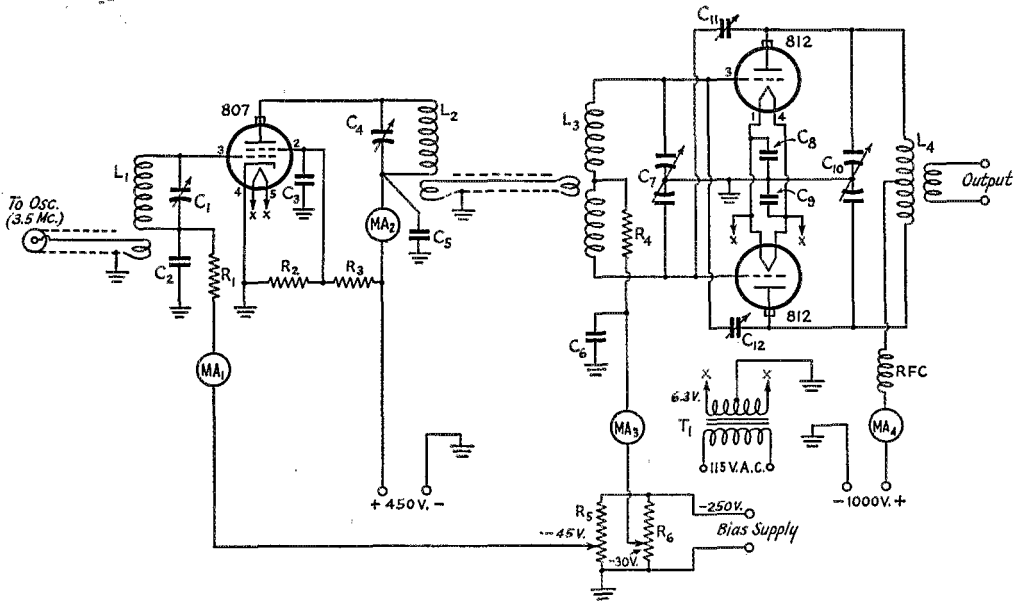


Fig. 1 — Circuit diagram of W3QY's doubler-final.

- C₁ — 50- μ fd. variable.
- C₂, C₆ — 0.001- μ fd. mica.
- C₃, C₅ — 0.022- μ fd. mica.
- C₄ — 50- μ fd. variable.
- C₇ — 140 μ fd. per section (Bud MC912A).
- C₈, C₉ — 0.0022- μ fd. mica.
- C₁₀ — Approx. 65 μ fd. per section (Cardwell MR360-BD, with plates double-spaced).
- C₁₁, C₁₂ — Approx. 10 μ fd. (Hammarlund "Star" midget, modified by double spacing 5 plates).
- R₁ — 22,000 ohms, 1 watt.
- R₂ — 20,000 ohms, 10 watts.
- R₃ — 25,000 ohms, 10 watts.
- R₄ — 1000 ohms, 10 watts.

- R₅, R₆ — 10,000-ohm 25-watt adjustable.
- L₁ — 25 turns No. 20 enamel, 1½ inches diam. (3.5 Mc.), 2-turn link on "cold" end of coil.
- L₂ — Bud OEL-40 (7 Mc.).
- L₃ — B & W 40JCL (7 Mc.).
- L₄ — 22 turns No. 12 enam., 3 inches diam., ¼ inches long (7 Mc.), 2-turn link wound around middle of coil.
- MA₁ — 15-ma. scale.
- MA₂ — 150-ma. scale.
- MA₃ — 100-ma. scale.
- MA₄ — 300-ma. scale.
- RFC — 2.5-mh. 300-ma. r.f. choke.
- T₁ — 6.3-volt filament transformer.

sheet. The 807 tube is recessed to a depth such that the internal shield comes at chassis level. Two brass brackets support the 5-prong ceramic socket at the proper level below deck.

The purpose of recessing the 807 tube and separating the grid and plate components is obviously that of minimizing coupling between these circuits. The unit has not been used as a straight amplifier but there is no reason to believe that it should not function satisfactorily in this manner.

A 5-prong socket for the 807 plate tank coil is mounted on spacers above the chassis. The tank condenser is a midget 50- μ fd. variable mounted on a bracket insulated from the chassis by a block of Vinylite. The plate by-pass condenser, C₅, is located on top of the chassis and connects directly to the rotary plates of the condenser.

The grid coil, L₁, is wound on a standard coil form which fits a 5-prong tube socket mounted on a bracket attached to the front wall of the chassis. Near this socket is the 50- μ fd. tuning condenser, which is insulated from the chassis and is pro-

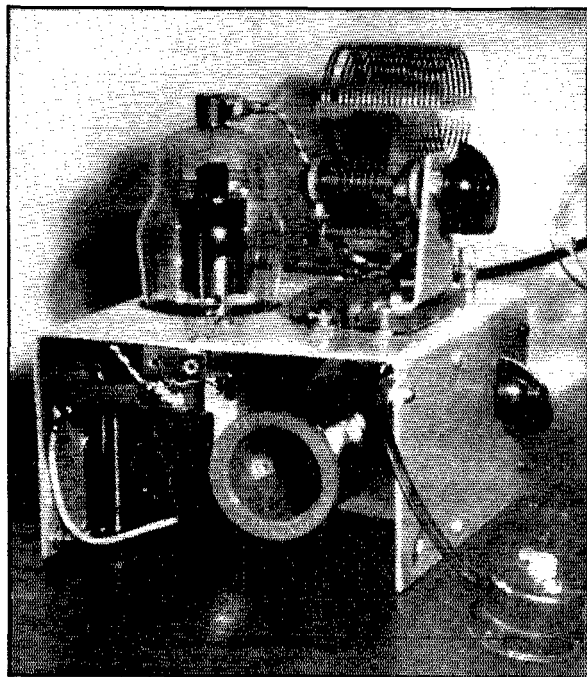
vided with an insulated shaft extending through the front edge of the chassis.

The voltage divider for the screen supply is made up of two wire-wound resistors supported on tie-point connectors. The grid resistor and other by-pass condensers are appropriately located to obtain short leads to ground. All leads to the external circuits are run to a screw-type terminal block at the back of the chassis. This construction enables easy removal of the entire unit for repairs or maintenance.

A short length of coaxial cable connects from the link winding to a small jack located external to the chassis. Excitation may be plugged into this jack from a crystal oscillator or VFO.

The Final Amplifier

The final amplifier is assembled on a structure bent from 1/16-inch aluminum sheet. It is 5½ inches wide, 6 inches high and 8 inches deep. The upright section acts as a support for the grid coil and condenser and also provides a measure of shielding between the grid and plate circuits. The



Looking at the end of the doubler unit. The input coil is underneath, shielded from the output coil on top. The bracket holding the plate tank condenser is insulated from the chassis on a small piece of sheet bakelite. The socket for the 807 is spaced below the surface so that the bottom of the plate comes level with the top of the chassis. The grid tank condenser is mounted behind the front edge of the chassis.

grid components consist of a B & W center-linked coil and a Bud split-stator condenser. The grid resistor is supported between the coil socket and a tie-point connector.

Leads from the tuning condenser go under the aluminum plate and connect to the grid terminals on the sockets. The sockets are orientated so that the grid terminals are spaced equally about the center line between the neutralizing condensers. The 812s are mounted on each side of the Vinylite plate which holds the neutralizers. The clearance between the envelopes of the tubes and the upright shield is about $\frac{1}{4}$ inch.

The neutralizing condensers are provided with long insulated shafts which extend up to the top of the shield. This permits adjustment with minimum effects from body capacitance and also provides ample insulation to prevent the possibility of shock.

The tank tuning condenser is mounted on two aluminum brackets so proportioned that the top stator terminals are at about the same level as the plate caps of the 812s. Leads between these points therefore are very short. The tank coil is mounted on two Lucite blocks attached to the condenser frame. The r.f. choke, connected to the center of the tank coil, is placed underneath the coil and is supported at the rear on a tie-point connector.

Leads from the neutralizing condensers go directly down through large clearance holes in the chassis and connect to the grid terminals on the

812 sockets. The plate sides of the neutralizers are "crisscross" connected to the lower ends of the fixed plates of the tank condenser. Here again the leads are short and direct.

The tank coil for 7 Mc. consists of 22 turns of No. 12 enameled wire spaced to occupy a length of 4 inches. The coil diameter is 3 inches. A two-turn link is wound over the center of the tank coil on blocks of Lucite.

Filament leads are of No. 16 flexible wire and these, together with the by-pass condensers, are connected to the appropriate terminals on the 812 ceramic sockets. All leads are attached to a screw-type terminal strip mounted on the rear of the assembly. Insulated plate connectors decrease the high-voltage hazard if one accidentally gets too close to this part of the rig with the power on.

To provide clearance for parts protruding at the bottom of the amplifier, the aluminum bracket is supported from a $\frac{1}{2}$ -inch plywood base by four $1\frac{1}{2}$ -inch metal spacers.

The two subassemblies are mounted on a plywood base in which the meters are mounted. The base is $9\frac{1}{2}$ inches deep, 19 inches long and $3\frac{1}{4}$ inches high.

This doubler-amplifier combination worked very well from the moment it was connected up and the spurious oscillations encountered in its rather haywire predecessor are totally absent. In addition to working well, its simplicity and straightforward design make it a pleasant thing to just sit and look at!

regional, an impossibly complex arrangement. The Committee examined the argument that 'phone stations can make a more effective employment of the portion of this band that will be used by broadcasting stations abroad than can c.w., but considers the suggestion open to question from the technical standpoint and in any event it is not yet proved that the interference will be sufficiently serious, considering propagation factors and probable broadcasting hours, to offer great difficulty to c.w. operation. After examining all the factors, the Committee concluded that it would be destructive to our interests to permit 'phone operation in this band, and unanimously recommends against it.

"14-Mc. band: In its examination of the 14-Mc. band the Committee took into account the Board's often-expressed wish to have the 'phone assignment at the high end of the band. The frequencies from 14,300 to 14,400 are not now being effectively employed by U. S. and Canadian amateurs. Although the use made of them by foreign 'phone stations reduces, to that extent, the interference to c.w. in the lower portion of the band, it is only a partial, and therefore an uneconomical, occupancy. The Committee believes that United States 'phone should go up to the high-frequency limit of the band and that this would be in the best interests of amateur radio. That is to say, it proposes that 'phone go up to 14,400 kc. until the effective date of the Atlantic City allocations, at which time the upper limit of this band is reduced to 14,350 kc., and it wishes to make it very plain that it is proposing that 'phone have the advantage of the extra 50 kc. from 14,350 to 14,400 only until that time and that it is not thereafter to be recompensed by an additional change in the band, in view of the simultaneous opening at that time of a new 'phone assignment in the 21-Mc. band as proposed below. We could put this a different way and say that we recommend that 'phone go up to 14,350 kc. and that we additionally recommend that it have the use of the remaining 50 kc. for such time as that remains an amateur allocation. Thus we propose that the U. S. 'phone assignment now be adjusted to read 14,200-14,400 kc., observing that the Canadian 'phone allocation already begins at 14,150 kc.

"21-Mc. band: Your Committee has made a study of the prospective new 21-Mc. band and has determined its opinion of how it should be suballocated in terms of today's information and conditions. Our proposal, under those limitations, is that the portion 21,300-21,450 kc. should be opened to 'phone operation in the United States and in the expectation that Canada, complying with its usual practice, would have an allocation 50 kc. wider, or beginning at 21,250 kc. We furthermore propose that this should be a Class B allocation, available to all amateurs. The provision that we have suggested for this 450-kc. band

would then involve 150 kc. for U. S. 'phone, an additional 50 kc. for Canadian 'phone, and, in our opinion, would result in the occupancy of about 75 additional kilocycles by foreign 'phone, giving an expected occupancy of 275 kc. by 'phone and 175 kc. by c.w. However, since this band cannot be made available to amateurs until the effective date of the Atlantic City h.f. allocations, presumably around September 1, 1949, we recommend that no action be taken on this matter at the 1948 Board meeting but that it go over for consideration in May of 1949, when the desirable course may be clearer.

"28-Mc. band: To complete our study, we examined the 28-Mc. band. It is our opinion that the present arrangement is working nicely and should not be disturbed. We recommend that no changes be made in the existing 'phone assignments in this band.

"In summary: The U. S. 'phone allocations in the frequencies between 3.5 and 14.4 Mc. presently total 250 kc. The recommendations of this report would increase these 'phone assignments by 150 kc., to a total of 400 kc., an increase in 'phone frequencies of 60%. We consider that it would be in the interests of amateur radio and the League to secure these changes.

"Your motion directing your Committee to study desirable 'phone assignments provided that our proposals, upon your further permission, should be published in *QST* and an advisory informative poll of amateur opinion thereon solicited for your further information in examining our recommendations at your next meeting. The Committee unanimously requests you to give permission for this publication in *QST* and the solicitation of a poll of the opinion of all licensed United States amateurs. We further propose that the presentation to amateurs in *QST* be accomplished by publishing the portion of this report that relates to 'phone assignments, and that amateur opinion be sought by means of a questionnaire form whose text we have drafted at our meeting and a copy of which is attached. The questionnaire itself omits reference to the 21- and 28-Mc. bands for reasons already stated but we contemplate that our recommendations to you on these two bands will appear in the publication of the report in *QST*.

"Concurrent with all of the foregoing there is a change that we believe should be made in our technical regulations. Much unnecessary 'phone interference is caused by unnecessarily-wide sidebands. 'Phone congestion is so severe that the frequencies should be much more nearly confined to those necessary for intelligibility than they are now. We believe that we should have a technical regulation on this subject and that, even though there is room for doubt about enforcement of such a regulation in the near future, it would result in great improvement because the

(Continued on page 118)

A Small Reactance Modulator for N.F.M.

Miniature Tubes in a Space-Saving Design

BY ARTHUR H. ELLIS,* WIONG

WHEN the urge came to add n.f.m. to the present transmitter at WIONG, it was decided that the most suitable way to go about it would be to build a small reactance-modulator unit that could be added to the present VFO and mounted on the same chassis. With this thought in mind, miniature tubes seemed to be the logical choice.

For the speech amplifier, a 6J6 was selected, a twin-triode tube with common cathodes. This tube is becoming popular in many applications: as an r.f. amplifier or oscillator-mixer for television, and as an r.f. amplifier for f.m. receivers. Since each triode is capable of high gain, the two sections in cascade give ample audio gain out of a crystal microphone. A 6BE6 pentagrid converter was selected for the reactance-modulator stage; the tube is similar electrically to the 6SA7.

The Circuit

The final circuit is shown in Fig. 1. The crystal-microphone signal is amplified in the left-hand section of the 6J6, and the audio voltage developed across R_4 is coupled through C_2 to the audio-gain control, R_3 . The output of the second triode section is developed across R_5 and fed to the grid of the reactance-modulator tube through C_4 . A choke, RFC_1 , in series with this lead is included to prevent hum modulation caused by stray r.f. backing up through the audio amplifier.

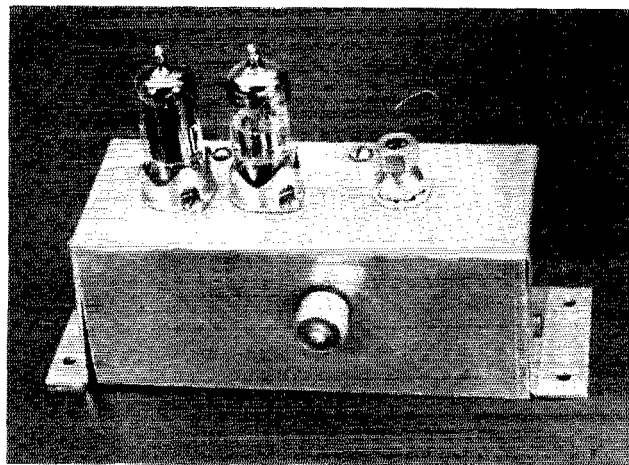
In the modulator circuit, C_7 and R_{10} are the usual by-pass condenser and screen-dropping

* 172 Lawn Avenue, Stamford, Conn.

• Here is a compact little unit that demonstrates how easily n.f.m. can be applied to your present VFO. This modulator is small enough to be sandwiched somewhere in your present frequency-control unit, and the additional current drain is quite small.

resistor. RFC_2 is used to shunt-feed the plate of the 6BE6, and $R_{11}C_5$ acts as the phase-shifting network for the modulator. R.f. voltage from the VFO tank appears across this network, and a lagging voltage is applied to the No. 1 grid of the 6BE6. Since the grid voltage lags, the 6BE6 draws a lagging plate current, and so the plate circuit of the tube looks like an inductance to the VFO tank. When an audio voltage is applied to the No. 3 grid of the 6BE6, the gain of the tube is varied accordingly, and the effective inductance in parallel with the VFO tank changes as a consequence. This in turn varies the frequency of the oscillator in accordance with the audio signal.

The amount of audio applied to the No. 3 grid is controlled by the setting of R_3 . By varying this control, the deviation of the modulated oscillator is changed. In operation, with the VFO on 3.7 Mc., the gain control is only opened about one-eighth of the way for proper deviation at 29 Mc. This will vary, of course, with the normal L -to- C ratio in the VFO tank.



◆
The n.f.m. modulator unit is small enough to be tucked away in the present VFO cabinet, or it can be mounted outside on one wall of the chassis. The tube on the left is the 6BE6 reactance modulator, and the other tube is a 6J6 speech amplifier.
◆

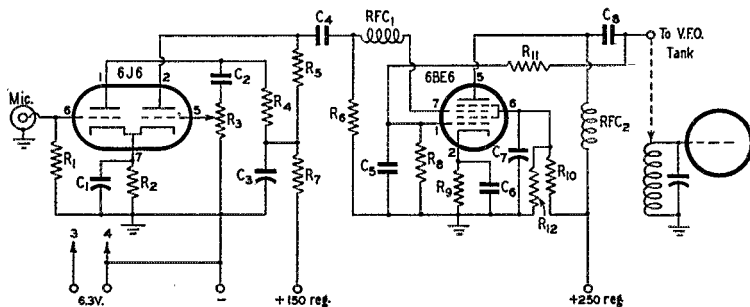


Fig. 1 — Wiring diagram of the simple n.f.m. modulator.

C₁ — 8- μ fd. 50-volt electrolytic.

C₂, C₆ — 0.01 μ fd.

C₃ — 8- μ fd. 450-volt electrolytic.

C₄ — 0.001 μ fd.

C₅ — 10 μ fd.

C₇ — 2 μ fd., 450 volts.

C₈ — 220 μ fd.

R₁ — 2.2 megohms.

R₂ — 47 ohms.

R₃ — 0.25-megohm potentiometer.

R₄, R₅ — 68,000 ohms, 1 watt.

R₆, R₈ — 0.47 megohm.

R₇ — 2000 ohms, 1 watt.

R₉ — 150 ohms.

R₁₀ — 20,000 ohms.

R₁₁ — 47,000 ohms.

R₁₂ — 0.15 megohm.

All resistors $\frac{1}{2}$ watt unless otherwise specified.

RFC₁, RFC₂ — 2.5-mh. r.f. choke.

Construction

The chassis was made from a piece of scrap aluminum and when completed it measured only $2\frac{1}{4}$ inches wide, 5 inches long and $2\frac{1}{4}$ inches deep. Lips at either end were included for securing the unit to the VFO chassis. Assembly of the complete unit was relatively simple, and point-to-point wiring was used throughout, aided by the judicious spotting of a set of tie-points. A small ceramic feed-through bushing was included to take the lead that runs to the VFO tank circuit.

The finished unit should be mounted as close as possible to the VFO tank circuit, to reduce the length of the connecting lead. The power-supply wiring is unimportant, of course, and can be laid in wherever convenient.

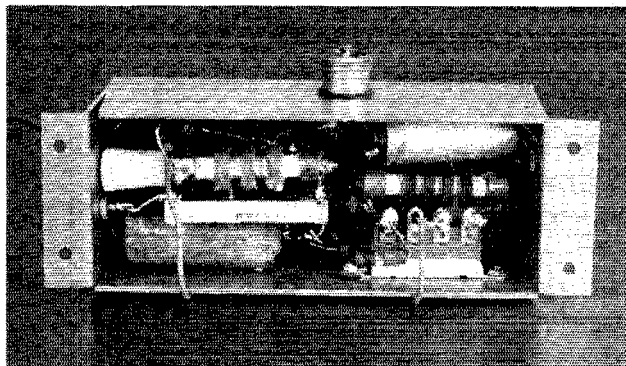
To control operation of the modulator, a s.p.s.t. switch was connected to the "hot" side of the 6.3-volt heater supply and mounted on the front panel of the VFO. The audio gain control can be set once and left that way, unless operation on more than one band is the usual thing, or possibly when a microphone of different output level is used. However, working on one band, and with one microphone, screwdriver adjustment of the gain control was considered adequate.

Operation

When the modulator is connected



This view of the underside of the n.f.m. modulator shows how all the components have been tucked away under the small chassis.



Happenings of the Month

F.C.C. CHANGES

Wayne Coy, former director of radio for the *Washington Post*, has been named by President Truman to be chairman of FCC, succeeding Charles R. Denny, jr., who resigned this past autumn.

Commissioner Ewell K. Jett, to the regret of everyone who knows him, resigned as an FCC commissioner as of the end of the year, to become vice-president and director of the radio activities of the *Baltimore Sunpapers*. President Truman immediately named George E. Sterling, W3DF, the FCC chief engineer, to be a



COMMISSIONER STERLING, W3DF

commissioner to succeed him. Jack Jett's resignation concludes 37 years of Government service in communications — in the Navy, FRC and FCC. He is the staunchest friend the amateur has ever had in Official Washington, as the *QST* record of recent years shows and as is even better known to the ARRL Board. Everyone in communications will lose something by his separation of himself from Government service. . . . The elevation of George Sterling to a commissioner-ship, duplicating Mr. Jett's history, is similarly a merit appointment, not a political one. He headed FCC's RID during the war, became chief engineer last year. Active on the air on both c.w. and 'phone, George is the first licensed amateur to serve as a commissioner. Hail!

RENEWED YOUR LICENSE?

Every amateur who had changed his address or whose location was being put in a new call area was long ago obliged by FCC orders to apply for a modification of his existing licenses, bringing with it automatic extension for five years. But

the licenses of all of the rest of us were automatically extended into 1948, to run until the 1948 anniversary of their date of issuance. Now they are beginning to expire.

If you are still operating under your old license, we want to call your attention to the need to renew in 1948. Dig out your license right now and take a look! The rules say that you must apply for renewal some time in the 120 days before expiration. We advise filing your papers two months before expiration. You get the amateur application form from any FCC office, attach your old license, and mail direct to FCC at Washington. Act in plenty of time, as you must go off the air if you do not receive your renewal by the time your old ticket expires. Don't overlook the matter or you'll be dropped from the FCC records as inactive, cited for unlicensed operation by a monitoring station, dropped by the *Call Book*, and break your continuity of licensed status necessary for certain ARRL offices. It's a good idea to put a note on your calendar to remind you as the date approaches.

REMOTE CONTROL

For some time FCC has felt that the references to remote control in §12.64 of our regulations are insufficiently explicit and detailed, and in conversations about a year ago the League and FCC personnel agreed upon acceptable principles for the regulation of this matter. No objections having been filed when notice was given of proposed rule-making, FCC finally made the following amendments to our remote-control regulations effective January 17th, to detail and clarify what is expected of amateurs:

§12.64 of the Rules Governing Amateur Radio Service is amended to read as follows:

§12.64 Location of Station — (a) Every amateur station shall have a fixed transmitter location. Only one fixed transmitter location will be authorized and will be designated on the license for each amateur station, except that when remote control is authorized, the location of the remote control position as well as the location of the remotely-controlled transmitter shall be considered as fixed transmitter locations and will be so designated on the station license. Unless remote control of the transmitting apparatus is authorized, such apparatus shall be operated only by a duly licensed amateur radio operator present at the location of such apparatus.

(b) Authority for operation of an amateur station with the licensed operator on duty at a specific remote control point in lieu of the remote transmitter location may be granted upon filing an application for a modified station license on FCC Form No. 610 or FCC Form No. 602, as appropriate, and provided that the following conditions are met:

(1) The remote control point as well as the remotely-controlled transmitter, shall be located on premises controlled by the licensee.

(2) The remotely-controlled transmitter shall be so installed and protected that it is inaccessible to other than duly authorized persons.

(3) In addition to the requirements of §12.68 a photocopy of the amateur station license shall be posted in a conspicuous place at the location of the remotely-controlled transmitter.

(4) Means shall be provided at the control point to permit the continuous monitoring of the emissions of the remotely-controlled transmitter, and it shall be continuously monitored when in operation.

(5) Means shall be provided at the remote control point immediately to suspend the radiation of the transmitter when there is any deviation from the terms of the station license or from the Rules Governing Amateur Radio Service.

(6) In the event that operation of an amateur transmitter from a remote control point by radio is desired, an application for a modified station license on FCC Form No. 610 or FCC Form No. 602, as appropriate, should be submitted with a letter requesting authority to operate in such a manner stating that the controlling transmitter at the remote location will operate within amateur frequency bands 420 megacycles or higher and that there will be full compliance with §12.64(b), subparagraphs (1) through (5). Supplemental statements and diagrams should accompany the application and show how radio remote control will be accomplished and what means will be employed to prevent unauthorized operation of the transmitter by signals other than those from the controlling unit. There should be included complete data on control channels, relays and functions of each, directional antenna design for the transmitter and receiver in the control circuit, and means employed for turning on and off the main transmitter from the remote control location.

(c) An amateur transmitter may be operated from a remote control point in lieu of the remote transmitter location without special authorization by the Commission when there is direct mechanical control or direct electrical control by wired connections of the transmitter from a point located in the same or closely adjoining building or structure provided there is full compliance with the conditions set forth in §12.64(b), subparagraphs (1) through (5).

A new §12.7 is added to the Rules Governing Amateur Radio Service to read as follows:

§12.7 Remote control.—The term "remote control" as applied to the Amateur Radio Service, means control of transmitting equipment of an amateur station from an operating position other than one at which the transmitter is in view and immediately accessible; except that, direct mechanical control or direct electrical control by wired connections of an amateur transmitter from a point located on board any aircraft, vessel or vehicle on which such transmitter is located shall not be considered remote control within the meaning of this definition.

ATLANTIC CITY DOCUMENTS

As is so often the case these days, unavoidable delays occurred in the production of the Atlantic City documents in the Philadelphia printing plant engaged by the International Telecommunication Union. The special presentation edition for delegates attending the conference was received at ARRL Headquarters in the first half of December and, acting as agents for ITU, we got them forward immediately to those who were so impatiently awaiting their receipt. It was not until December 19th that we received the main stock of books for sale to governments, corporations and individuals. Hard work over the week-end resulted in shipment to the waiting world of all the copies ordered. On behalf of ITU we now state that we have a large stock of these books on hand and are prepared to make immediate shipment. Postpaid prices are \$1.20 to govern-

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.

ment agencies, \$1.50 to all others. Specify whether Spanish or French-English text is desired.

CANADIAN N.B.F.M.

Effective December 5th, Canadian amateurs were authorized to employ n.b.f.m. in the following frequency ranges: 3850-3900, 14,200-14,250, 28,500-29,000 and 51,000-52,500 kc.

U.R.S.I.-I.R.E. MEETING

The annual joint meeting of the American Section, International Scientific Radio Union, and the Institute of Radio Engineers will be held in Washington on Monday, Tuesday and Wednesday, May 3, 4 and 5, 1948. The program will, as usual, be devoted to the more fundamental and scientific aspects of radio and electronics. The program of titles and abstracts will be available in booklet form for distribution before the meeting. Anyone wishing to submit papers for presentation at this meeting should send in title and a 100-word abstract as soon as possible to Dr. Newbern Smith, secretary, American Section, URSI, National Bureau of Standards, Washington 25, D. C. Correspondence should be addressed to the Institute office or to Dr. Smith.

"80" IN FAR EAST

FCC's authority to permit amateur operation in the 80-meter band extends westward beyond Hawaii only to our possessions lying this side of 170° west longitude, operation in that band beyond that line still being under military control. Informal information now reaches us that the frequencies 3560-3660 kc. have been cleared of military activity within the Far East Command and have been authorized for amateur operation in that area.

**SWITCH
TO SAFETY!**



Results, Eleventh ARRL Field Day

'47 "FD" Top Operating Activity of All Time!

THE Annual ARRL Field Day is many things to many amateurs. To some it provides the opportunity for a leisurely testing of portable equipment and emergency power supplies under conditions similar to those likely to be encountered in time of disaster. To others it is an operating contest to be entered into with much spirit. In addition to contending for honors in the various Field Day classifications, many clubs arrange private competitions or "side bets" with similar groups in their own or neighboring cities and states. It is the time when many of us come out of hibernation after the long winter months spent in chasing DX, pushing traffic, experimenting and otherwise occupying ourselves with the various phases of amateur radio operation. It exposes us to the fresh, clean air and health-giving sunshine [Oh yeah?—*Ed.*] so abundantly provided by Mother Nature but so often spurned by us as the indoor creatures that we have become. It is amateur radio's "Call of the Wild."

The Eleventh ARRL Field Day, held last June 14th and 15th, was all these things and more to those of us who took part. Specifically, it was the most successful "FD" yet held. A total of 2702 individuals (a minimum figure, since all reports did not list the exact number of participants) ventured afield for the annual test of portable equipment. Reports were received covering the operation of 288 FD portable stations. Of these, 197 were from club groups which had at least

2376 participants in the field, while 326 or more individuals staffed 91 portables in the nonclub category.

Field Day competition is considered to be among stations using like numbers of transmitting set-ups. Scores are listed according to number of transmitters that were in simultaneous operation at any one station. By popular request, however, some of the groups which had the highest over-all scores, disregarding transmitter classifications, will be mentioned.

For the second consecutive year, the Jersey Shore Amateur Radio Association came through with the top score. Operating W2GSA/2 on Crawford's Hill near Hazlet, N. J., a group of thirty operators made 1165 contacts, 542 with other FD stations and 623 with fixed stations, for a score of 15,724 points. Ten transmitters, each running 30 watts or less, were kept in simultaneous operation on all c.w. and 'phone bands from 3.5 through 144 Mc. Two 5-kw. gas-driven generators furnished all necessary power. Antennas for 3.5 and 7 Mc. were folded dipoles (the former a three-wire job); rotaries were employed on all other bands. A balloon-supported vertical was used during part of the operations on 3.5 Mc. In spite of careful advance installation of antennas, one of the 14-Mc. rotaries was a casualty of high winds; this unfortunate break put a crimp in the score for "20" 'phone which otherwise would have contributed more substantially to the final-score total. Operation on the c.w. bands resulted

FIELD-DAY LEADERS

Class	Leader	Participants	Call Used	Contacts	Score
<i>Club Groups</i>					
One Transmitter	South Lyme Beer, Chowder and Propagation Society	6	W1EH/1	234	7380
Two Transmitters	Wisconsin Valley Radio Association	14	W9RQM/9	518	8183
Three Transmitters	Motor City Radio Club	13	W8MRM/8	477	7857
Four Transmitters	York Radio Club	18	W9GY/9	567	8217
Five Transmitters	Los Angeles Fire Department Radio Club	28	W6QV/6	605	11225
Six Transmitters	Minneapolis Radio Club	28	W0KIS/0	637	8676
Seven Transmitters	The Metropolitan Radio Club	25	W6AOA/6	891	13778
Eight Transmitters	Ingwood Amateur Radio Club	50	W6RNQ/6	737	13031
Nine Transmitters	Society of Amateur Radio Operators	22	W6VX/6	697	14378
Ten Transmitters	Jersey Shore Amateur Radio Association	30	W2GSA/2	1707	15804
Eleven Transmitters	Palomar Radio Club	35	W6NWG/6	727	13298
<i>Nonclub Groups and Individuals</i>					
One Transmitter	W6EYH VUC OMQ	3	W6EYH/6	252	6170
Two Transmitters	W4KFC QY W8FUE W3ATC PUC	5	W3PUC/3	455	7206
Three Transmitters	W1UE W3AM BMX DF IUZ KDP W4AW UQ	8	W3AM/3	403	6498
Four Transmitters	W6ZFS JQX NYA KBD NIK	5	W6NIK/6	190	4820
Five Transmitters		20	W0JWD/0	543	6381
Six Transmitters		11	W6ERT/6	277	6791

An efficient culinary department was one of the secrets of success of the Northwest Amateur Radio Club. W9IT/9, second in the 7-transmitter club class. Al Knodell, W9TLQ, left, and Rex Munger, W9LIP, were in charge of the commissary. The pièce de résistance being served? Ham, of course!



in 649 contacts and 'phone netted 516 QSOs; 302 stations were worked on 7 Mc., 207 on 3.5 Mc., 154 on 28-Mc. 'phone, 134 on 144 Mc., 128 on 14-Mc. c.w., 126 on 3.85-Mc. 'phone, 37 on 50-Mc. 'phone, 33 on 27-Mc. 'phone, 32 on 14-Mc. 'phone and 12 on 28-Mc. c.w. A superlative showing, JSARA.

The West Coast came very close to snaring the lead in this FD. W6VX/6, operated by 22 members of the Society of Amateur Radio Operators at San Carlos, Calif., worked 697 stations to score 14,378 points for a healthy second-place position. Nine transmitters, powered by gas-driven generators, were operated simultaneously on 3.5-, 7-, 14-, and 28-Mc. c.w., and 3.85-, 14-, 28-, 50-, and 144-Mc. 'phone. All rigs were run at 30-watts-or-less input. Various forms of rotaries were employed on 14, 28, 50 and 144 Mc. and conven-

Highest-scoring station in the nonclub category was W3PUC/3, on the air from a hilltop near Falls Church, Va. Two transmitters, operated simultaneously at various times on 3.5-, 7-, 14- and 28-Mc. c.w. and 3.85-, 28-, and 144-Mc. 'phone, were manned by a crew consisting of W3ATC, W3PUC, W4KFC, W4QY and W8FUE. A small gas-driven generator provided the necessary a.c. The performance of this group is noteworthy when one observes that they made 7206 points against competition from groups some of which used as many as four more transmitters. Good going, fellows!

Runner-up in the nonclub class was, just as in the club competition, a West Coast group. W6ERT/6, with eleven operators sharing in piling up the score, made 6791 points. Operation was on 3.5-, 7-, 14- and 28-Mc. c.w. and 3.85-, 28-, 50- and 144-Mc. 'phone. Power was supplied by the usual portable a.c. generating system and inputs to rigs were kept at or below the 30-watt level. A commendable showing, OMs!

Third-place honors among the individual groups go to W3AM/4, active in the three-transmitter class from a camp on Skyline Drive in Shenandoah National Park, Va. Our hearty congratulations to operators W1UE (now W4IA), W3AM, W3BMX, W3DF, W3IUZ, W3KDP, W4AW and W4UQ, whose combined efforts resulted in a total of 403 contacts and 6498 points final score. Operations were confined to 3.5-, 7- and 14-Mc. c.w. with full break-in and VFO control of each transmitter.

Leader among the ARRL Emergency Corps groups participating was the Pole Cats Emergency Corps of the Hamfesters Radio Club. Operating W9DXU/9, fourteen individuals contributed to a score of 6750 points obtained through contacts with 438 stations.

TEN HIGH SCORES

Clubs		Others	
W2GSA/2	15804	W3PUC/3	7206
W6VX/6	14378	W6ERT/6	6791
W3FRY/3	13923	W3AM/4	6498
W6AOA/6	13778	W4JWD/8	6381
W6NWG/6	13298	W3USA/3	6282
W9IT/9	13286	W6EYH/6	6170
W2OM/2	13149	W9ERU/9	5424
W6RNQ/6	13031	W1LLX/1	5337
W6SD/6	12018	W6NIK/6	4820
W6VB/6	11340	W3EIS/3	4686

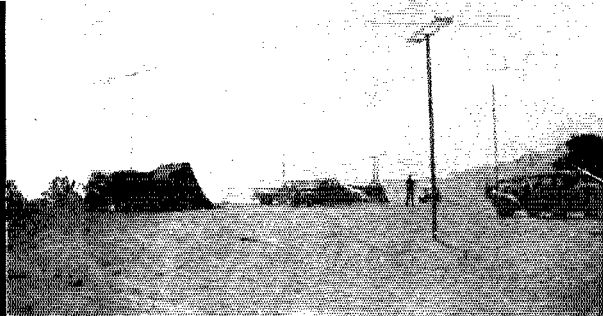
tional skywires on the lower frequencies. Will 1948 see the FD banner moving to the Land of Sunshine and Kilowatts? The orchids are on us, SARO!

Any account of a competition involving clubs would be incomplete without mention of the Frankford Radio Club of Philadelphia. Operating this year under the call W3FRY/3, at Turnerville, N. J., thirty Frankford operators, employing a combination of ten rigs set up on the same bands used by JCARA, tallied 1002 contacts for a score of 13,923 points. Like all other large groups, FRC operated all transmitters in the low-power bracket and obtained a.c. from a gas-driven generator. FB, gang!

The Suffolk County Radio Club and the Suffolk Amateur Radio Club combined forces and kept W2US/2 on the air. W2CJZ's mobile emergency unit provided one of the operating positions. A portable cabin furnished another, perhaps more comfortable but not nearly so picturesque as the old Model T!

February 1948





V.H.F.—Only

In the v.h.f.-only class, W1PCJ/1, located atop Moose Hill in Sharon, Mass., led the field. Singlehanded, PCJ hooked up with 84 stations on 144 Mc. for a score of 1206 points. The rig consisted of a TR-4 powered by 18 watts from a PE-103 dynamotor and operated from a car. A corner-reflector beam mounted on a 70-foot fire tower, and arranged with control ropes running down to the car, helped to place the signal where it would do most good.

The second-highest v.h.f. score was turned in by the U.H.F. Institute of Maspeth, L. I., N. Y. Eight operators worked two rigs, one on 144 and the other on 235 Mc., under the call W2AUF/2, from a location in their home town. On 144 Mc. a converted SCR-522, powered by storage batteries and a dynamotor, was used with a 5-element rotary beam suspended approximately 150 feet above the transmitter. The 235-Mc. layout consisted of an MOPA transmitter using a 2C34 oscillator driving an 832A, and a superregen receiver (6AK5 r.f.-955 det.-conventional audio); antenna was a 4-element array mounted on a 40-foot rotatable mast; batteries provided both filament and plate power.

Sidelights

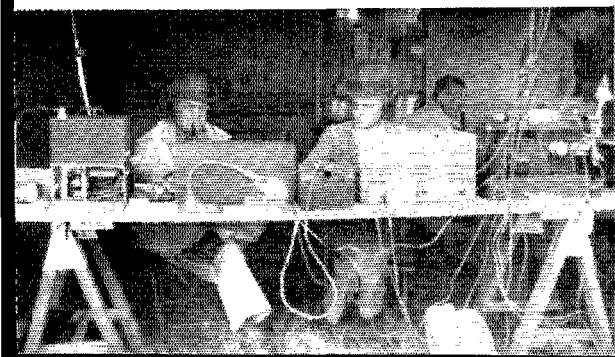
A real emergency presented itself at the Dale City, Calif., location of the San Francisco Naval Shipyard Amateur Radio Club, W6EPS/6. A grass fire which broke out on a neighboring hill-top was reported via 144 Mc. to the local fire department. Fire-fighting apparatus arrived in time to check the blaze before any real damage was done. . . . "After this session, TCRA feels qualified to handle any emergency. Organization best ever and equipment good." — Tri-County Radio Assn., W2OM/2. . . . "It was so wet operation could perhaps have been accurately described as portable-marine! Look out for us next year!" — Toledo Radio Club, W8ARF/8. . . . Carrying out ambitious plans, the Austin Radio Club, W5DLF/5, used two BC-610 transmitters

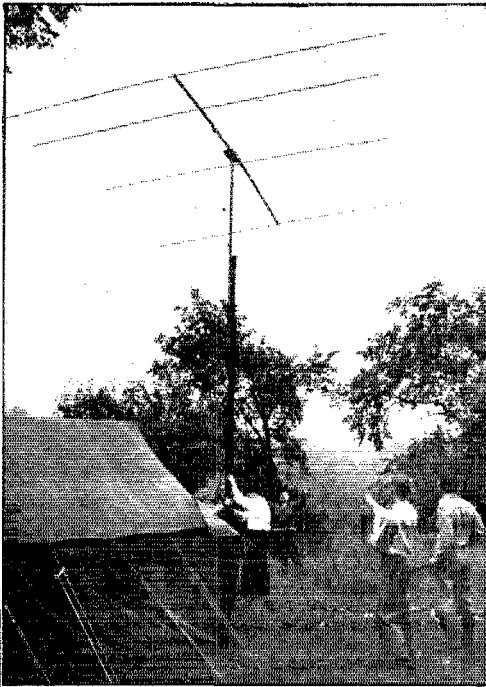
The Mike and Key Club of Santa Monica, Calif., third in the 8-transmitter club class, was well equipped with rotaries at its FD location, which from this shot appears to have been well above the surrounding country.

in addition to two low-power rigs. . . . "The weather appeared perfect until Friday evening, when a sudden downpour, which lasted 14 hours, made our participation more like real emergency operating rather than an emergency test." — Cleveland Brasspounders Assn., W8ROX/8. . . . "In spite of equipment troubles and the weather, the week-end was as enjoyable as usual, and next year's FD will be eagerly awaited to see how much better we can do in 1948." — Hamilton Amateur Radio Club, VE3BNG. . . . The KBT Radio Club of Buffalo, N. Y., had a constant reminder that we have amateur radio regulations. Their FD location was Grand Island (N. Y.)! . . . "Our club is now interested in setting up an Emergency Corps station, and possibly an emergency net, in order to make the best possible use of its Field Day equipment the year round." — Chicago Suburban Radio Assn., W9SW/9. . . . The Fort Worth Kilocycle Club, W5AA/5, was set up on Lake Worth, Texas, at Inspiration Point. The location must have had something to do with their fine score — fourth in the five-transmitter class. . . . "Five pounds of black coffee, a case of coke and assorted other liquids were among the only casualties of the outing — plus a bottle of citronella . . . the mosquitoes in this country have been known to attack B-29s!" — Radio Club of Tacoma, W7AZR/7. . . . ". . . Everyone had a wonderful week-end. It was certainly worth all the effort." — Palomar Radio Club; W6WNG/6. . . . "Without a doubt, this was the best Field Day to date." — Delta Radio Club, W5BPL/5. . . . "Conditions were excellent and we had 100% participation of our members." — Northwest Amateur Radio Club, W9IT/9. . . . "Swell time, good weather and good eats. Located 3000 feet high in Coopers Rock State Forest. Worked Nova Scotia on 6 meters." — Mountaineer Amateur Radio Assn., W8JM/8. . . . The Somerset Hills Radio Club, operating W2ZD/2 at Mountainside, N. J., made 86 contacts on 144 Mc. A "radar-type" beam with sixteen vertical elements and a plane

Typical of many of the FD operating set-ups was this main operating position of the Amateur Transmitters Assn. of Western Pa., W3OB/3. Left to right, R. M. Francis, section emergency coordinator for W. Pa., and C. G. Grossarth, W3KSR. Twenty-seven operators kept the station on the air, placed seventh in the 5-transmitter club class.

QST for





It's up! With several members assisting, a portable 28-Mc. beam antenna has just been erected at the FD site of the West Side Radio Club of Toronto, VE3JJ, highest-scoring Canadian group.

reflector was the secret of their success on v.h.f. . . . "This has been our first FD and through the experience we gained we promise a better score next year." — Michiana Amateur Radio Club, W9AB/9. . . . The Amateur Radio Transmitting Society of Louisville, Ky., W4PN/4, awarded bronze loving cups to their two high-scoring operators. . . . The Pittsfield Radio Club, W1OSA/1, constructed their own antenna masts right on the FD site. Saplings were cut from a near-by wood and lashed together to provide very satisfactory supports. . . . "This was our first crack at this annual affair, but you may be sure it will not be our last." — Central Jersey Radio Club, W2AI/2. . . . The York Road Radio Club, W3QV/3, turned out in fine style. Forty-four operators were on hand. . . . "Next year we will prepare." — Portland Sevens Amateur Radio Club, W7PK/7. . . . "We learned a lot about portable operations during this, our first participation in Field Day, and will be in there pitching next year." — Livingston Amateur Radio Club, W2NVK/2. . . .

The FD was not over for club secretaries on the evening of June 15th, even after all gear had been transported home. Theirs was the task of correlating results into a final recapitulation and submitting same to Headquarters. To all club secretaries and others who submitted the many

complete and interesting reports of Field Day operations, we extend our hearty thanks.

The 1948 FD will be held June 12th and 13th. If the many threats made by participants in the 1947 test are any indication of what may be expected, it will be an even bigger and better activity than ever! Start planning now for the Twelfth ARRL Field Day! — J. M.

CLUB GROUPS

One Transmitter	QSOs	Power*	Score
W1EH/1 South Lyme Beer, Chowder and Propagation Society ¹	234	A—	7,380
W4LBG/4 Ocean View Amateur Radio Club ²	261	A—	4,554
W1LXT/1 Park Department Recreation Radio Club ³	188	A—	3,465
W8AIC/8 Central Ohio Radio Club ⁵	169	A—	2,970
W7EMF/7 Butte Amateur Radio Club ⁶	120	A—	2,822
W3SM/3 Electric City Radio Club ⁷	133	A—	2,664
W4FLS/4 Chattanooga Amateur Radio Club ⁸	216	B—	2,610
W8HDG/8 Cambridge Amateur Radio Club ⁹	147	A—	2,484
W3ADE/3 Harrisburg Radio Amateurs Club ¹⁰	123	A—	2,331
W3EDU/3 York Amateur Radio Club ¹¹	145	A—	2,268
W2TZY/2 Queens Radio Amateurs ¹²	126	A—	2,259
W7HZ/7 Valley Radio Club ¹³	72	A—	1,877
VE3NZ/3 Scarboro Amateur Radio Club ¹⁴	121	A—	1,620
W0ZWY/0 Sioux Falls Amateur Radio Club ¹⁵	115	B—	1,428
W4LOI/4 Arlington Hall Radio Club ¹⁶	246	C—	1,377
VE2FG/2 Lakeshore Amateur Radio Club ¹⁷	50	A—	1,363
W5NDU/5 Texarkana Radio Amateurs Club ¹⁸	108	B—	1,179
VE1MA/1 Annapolis Valley Radio Club ¹⁹	64	A—	1,152
VE3AEA/3 Peterborough Amateur Radio Club ²⁰	72	A—	1,134
W3KYR/3 Amateur Radio Society ²¹	43	A—	936
W5AAF/5 Kelly Field Amateur Radio Club ²²	189	C—	915
W9BZU/9 Manacorad Club	49	A—	853
W0SHG/0 Nesho Valley Amateur Radio Club ²³	50	B—	708
W3GAG/3 The Philadelphia Wireless Association ²⁴	23	A—	675
W1HOB/1 Parkway Radio Association ²⁵	101	A—	669
VE8AK/8 Yukon Amateur Radio Club ²⁶	9	A—	648
W0QVA/0 Iowa-Illinois Amateur Radio Club ²⁷	58	B—	588
W1GDY/1 Norfolk County Radio Assn.	42	A—	576
W2UKQ/2 Clayton Radio Club ²⁸	8	A—	531

* The "power classification" used computing the score is indicated by A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 3); B indicates power over 30, up to and including 100 watts (multiplier of 2); C indicates over 100 watts (multiplier of 1). More than one letter means that at different times power inputs fell within different classifications.

Club participants: ¹ W1EH, BUD, LVQ, PEK, DX, VG. ² W4BBC, DHZ, INJ, IQL, JJJ, JMC, JSR, JWA, JZQ, KHK, KXE, R. S. Deacon, L. A. Stephenson, J. R. Wright. ³ W1EAX, LTY, MND, MSV, MVF, PQW. ⁴ W3EWR, AXT, CHV, FMZ, HVV, EOB. ⁵ Eight. ⁶ W7FLB, KVV, CJN, EMF. ⁷ Ten. ⁸ W4DCG, DUS, BEV/4, CBA, EXK, BBT, JIH, PL. ⁹ W8NBK, KVS, RVU, EB, SGF, HDG, BOY, VR, RVL, EXD, LQB, SGN, WAV. ¹⁰ W3AQC, ADE, BKH, CDY, FRS, HTO, HVE, JGW, W1MEK/3. ¹¹ Ten. ¹² W2AOD, GXC, GGN, KXG, LRI, LFI, MJO, RHN, TZY. ¹³ Six. ¹⁴ Ten. ¹⁵ W0CRY, GWH, ZRA, PHR, JLL. ¹⁶ W5IIB, W4MG. ¹⁷ W5ISU, W3MBI, W4LFU, W3DOT, W4IZG. ¹⁸ VE2ZO, UR, FG. ¹⁹ Six. ²⁰ VE1EA, KJ, MA, KR, IM, BT. ²¹ Eight. ²² W3KXP, LGG, LJI, NDE, REE. ²³ W5AAF, KYJ, MGO, JC, KHA, EVK, MTS. ²⁴ Ten. ²⁵ W3HLZ, DFJ, S. Smith, W. Ellis, Charles Antrum. ²⁶ Seven. ²⁷ Five. ²⁸ W0FSE, GQI, LAC, NLA, NYU, PJR, QVA, SWY, TLL, TMY, WNL. ²⁹ W2QBG, SCY. ³⁰ Five. ³¹ Eight.

One Transmitter		QSOs	Power*	Score	Three Transmitters Operated Simultaneously	QSOs	Power*	Score	
VEIRC	Moncton Amateur Radio Club	47	B-	531	W8MRM/8	Motor City Radio Club ⁵³	477	A-	7,857
W7TMK/7	Utah State Electronics Society ²⁹	46	B-	492	W8ROX/8	Cleveland Brasspounders Association ⁵⁷	465	A-	7,623
W2EKO/2	Watchung Valley Radio Club ³⁰	84	AB-	426	W8TQ/8	Dayton Amateur Radio Association ⁵⁹	450	A-	7,029
VE3OT/3*	St. Thomas Amateur Radio Club ³¹	59	A-	381	W2NIV/2	Schenectady Amateur Radio Association ⁶⁰	436	A-	6,561
W2RZF/2	Sidney Amateur Radio Club	26	A-	360	W6BWO/6	Orange County Amateur Radio Club ⁶¹	238	A-	5,927
W7PL/7	Pendleton Amateur Radio Club	20	A-	360	W5YJ/5	Radio Club of Oklahoma A & M College ⁶²	245	A-	5,886
<i>Two Transmitters Operated Simultaneously</i>					W3KBZ/3	Lancaster Radio Transmitting Society ⁶³	271	A-	4,554
W9RQM/9	Wisconsin Valley Radio Association ³²	518	A-	8,163	W1DJC/1	Manchester Radio Club ⁶⁴	299	AB-	4,434
W8JIN/8	Greater Cincinnati Amateur Radio Association ³³	438	A-	6,921	VE1FO/1	Halifax Amateur Radio Club ⁶⁵	262	A-	4,320
W3IKP/3	Beacon Radio Amateurs ³⁴	405	A-	6,192	W5EST/5	Bartlesville Amateur Radio Club ⁶⁶	252	B-	4,212
W1VBY/1	Candlewood Amateurs Radio Association ³⁵	255	A-	5,319	W7PK/7	Portland Stevens Amateur Radio Club ⁶⁷	...	B-	4,212
W2JC/2	Bloomfield Radio Club ³⁶	298	A-	4,800	W2NNK/2	Utica Amateur Radio Club ⁶⁸	280	A-	4,185
W8NLG/8	Detroit Amateur Radio Association ³⁷	279	A-	4,797	W8KS/8	Westlake Amateur Radio Association ⁶⁹	285	A-	4,131
W3BKQ/3	Chester Radio Club ³⁸	272	A-	4,734	W8ICS/8	South Cleveland Radio Club ⁷⁰	224	A-	3,864
W4JHK/4	Richmond Amateur Radio Club	262	A-	3,966	W8AWP/8	Wichita Amateur Radio Club ⁷¹	268	B-	3,656
W1NAZ/1	Nashua Mike and Key Club ³⁹	205	A-	3,645	W5UB/5	San Antonio Radio Club ⁷²	149	A-	3,510
W6BV/6	San Joaquin Valley Radio Club ⁴⁰	302	AB-	3,514	W8AAB/8	Electron Club of Denver ⁷³	153	A-	3,483
W3QZF/3	The Horseshoe Radio Club ⁴¹	103	A-	3,096	W9AB/9	Michiana Amateur Radio Club	256	A-	3,440
W4NC/4	Winetons Salem Radio Club	293	B-	3,042	W8WMZ/8	Fort Steuben Radio Club ⁷⁴	128	A-	3,285
W7YD/7	University of Washington Radio Club ⁴²	103	A-	2,903	W4DUG/4	Tampa Amateur Radio Club ⁷⁵	257	AB-	3,072
W2PW/2	Ithaca Mike and Key Club	215	A-	2,580	W1TQ/1	Falmouth Radio Club ⁷⁶	174	A-	2,925
W8ODJ/8	Buckeye Shortwave Radio Association ⁴³	179	A-	2,574	W8ADJ/8	Black Hills Amateur Radio Club ⁷⁷	265	B-	2,916
W9AML/9	Kickapoo Radio Operators ⁴⁴	135	A-	2,358	W3JZW/4	Capital Key and Mike Club ⁷⁸	157	A-	2,371
W6KEK/6	Richmond Amateur Radio Club ⁴⁵	95	A-	2,181	W4KZ/4	Greenville Amateur Radio Club ⁷⁹	296	ABC-	2,733
W4GTG/4	Chattahoochee Amateur Radio Club ⁴⁶	145	A-	2,178	W8ZJK/8	Central Missouri Amateur Radio Club ⁸⁰	177	AB-	2,469
W2SV/2	Sunrise Radio Club ⁴⁷	135	A-	2,106	W7JKB/7	Skagit Amateur Radio Club ⁸¹	137	AB-	2,340
W1NDS/1	Norwalk Amateur Radio Association ⁴⁸	141	B-	2,043	VE8NQ/6	Calgary Amateur Radio Association ⁸²	326	BC-	2,286
W9NR/9	The Prairie Dogs ⁴⁹	214	BC-	1,881	W9HJJ/9	Delaware Amateur Radio Association ⁸³	127	AB-	1,794
W8FT/8	Findlay Radio Club ⁵⁰	164	B-	1,728	W1AQ/1	The Associated Radio Amateurs of Southern New England ⁸⁴	140	AB-	1,785
W9OCF/9	Fairmont Radio Club ⁵¹	323	B-	1,689	W9MKS/9	The Starved Rock Radio Club ⁸⁵	116	A-	1,737
VE3WA/3	Frontier Radio Association	156	B-	1,662	W7LAB/7	Ogden Amateur Radio Operators Club ⁸⁶	96	AB-	1,679
W9KLH/9*	Chicago Radio Traffic Association ⁵²	67	A-	1,359	W2GSX/2	Union County Amateur Radio Association	184	AB-	1,677
W9UEL/9	San Isabel Amateur Radio Club ⁵³	44	A-	1,202	W2BPF/2	Raritan Bay Radio Club ⁸⁷	138	AC-	1,538
W8HQR/5	Corpus Christi Amateur Radio Club ⁵⁴	61	A-	1,107	W2RLY/2	Hamilton Township Radio Association	78	A-	1,098
W8WBY/8	Red River Radio Amateurs	153	A-	945					
W1MHL/1	Waltham Amateur Radio Association ⁵⁵	61	A-	837					
W3GL/3	Delaware Amateur Radio Club ⁵⁶	50	A-	819					

¹¹ Four. ²² W9CFT, FZC, JBF, LED, PRM, QJB, QJW, RLB, RQM, TED, VHA, Britton, Kufahl, Street. ²³ W8BOJ, JIN, LPD, PBU, POK, QBJ, RSP, VBN, UOD. ²⁴ W3ONP, DYL, ETA, FLY, HTE, IDQ, IKP, FLD. ²⁵ Fifteen. ²⁶ Nine. ²⁷ W8SCW, MGQ, QOK, GP, UGR, DPE, BIU, DOV, PUL. ²⁸ W3CSN, DGM, DYU, EOI, EYV, HFO, KBS, KEL, KMS, KYA, MQC, NDA. ²⁹ Nine. ³⁰ W6KUT, SUV, UVN, PXP, PCS, WYT, PSQ, JPU, SGH, WJL. ³¹ Thirteen. ³² W7AGE, HDC, JFS, KEM. ³³ W8AMH, BSH, BSR, DNZ, EXI, LGM, LBH, MMH, NYS, NYP, OAC, OYI, PPO, PWA, QVI, SAF, UGF, UKR, VQI, YAX, YHO, ZIP, B. Fredenburg, B. Dial, R. Handwerker, D. Brown, B. Smitherz. ³⁴ W9AMP, VPD, EHX, JPR, ZST, AJJ, CEO, BPU, JRX. ³⁵ W6NJO, KEK, QUL, LMZ, CTL, EJA, OJU, QDE, YCU, NJX. ³⁶ Fifteen. ³⁷ W4YK, AUS, BYV, CYC, EMC, EXG, GIO, GKI, MBS. ³⁸ W1LRT, MGX, PQU, MRP, PEA, MRJ, OIX. ³⁹ Six. ⁴⁰ Nine. ⁴¹ W8RPT, OCF, CYA. ⁴² W9ADF, BAN, FEX, HPG, IYP, KLH, HXE, QV, REC, NNQ. ⁴³ Four. ⁴⁴ W5CCD, PH, HQR. ⁴⁵ W1DWM, OGV, PIW, LUW, JOK, IHL, PYM. ⁴⁶ W3GL, DQZ, FDK, IQB, GGR, JDP, P. Duval. ⁴⁷ W8AYI, ROX, SRF, UDW, UWM, UZJ, UZX, VBY, VTF, ZOD, Rackow. ⁴⁸ W8CHG, FJL, LSR, OGV, ONK, PUF, PYW, RCM, RMB, YDR, YJF, UAS, ZBU. ⁴⁹ W7GP, W8ACE, AGR, DGI, FNH, CGG, IX, MGS, OVL, PTF, QUS, RHG, RHH, SXT, TQ, VAY, WXA, WYU, YEV, YNN, ZAV, ZCL, ZFM, ZJM, ZOF, ZQU, ZRD. ⁵⁰ W2ACB, BIA, EFU, FEW, FW, GTC, GTO, GYV, JZK, ZFR, NIV, PFU, PXL, QZR, RYT, TZN. ⁵¹ Seven. ⁵² W5LJW, JFY, LHP, LFN, NDD, NDO, NCN.

Four Transmitters Operated Simultaneously

W9GY/9	York Radio Club ⁸⁸	567	A-	8,217
W2AI/2	Central Jersey Radio Club ⁸⁹	588	A-	7,968
W1OC/1	Concord Brass Pounders ⁹⁰	559	A-	7,443
W6MYC/6	Pasadena Short Wave Club ⁹¹	377	A-	7,335
W9TO/9	North Suburban Radio Club ⁹²	496	A-	7,244

⁵³ Twenty. ⁵⁴ Fourteen. ⁵⁵ VE1CP, DB, DK, FB, FQ, HJ, JH, LZ, MZ, NQ, RP, RR, TH. ⁵⁶ Twelve. ⁵⁷ W7DZL, EVR, FZA, ECI, PK, BVR. ⁵⁸ Sixteen. ⁵⁹ W8KS, OZE, AIR, MQR, UKS, MXL, WXY, MXO, SCM, GAV, KNP, ZHC. ⁶⁰ Nine. ⁶¹ Eight. ⁶² Ten. ⁶³ Eight. ⁶⁴ Seven. ⁶⁵ Fifteen. ⁶⁶ Eight. ⁶⁷ W8ADJ, BLE, TZJ, YOB, SUJ, ANW, YEZ, OPS, QHX, JLS, IWE, IW, GCW, YKY, SMK, FJZ, GLA, JWC. ⁶⁸ Five. ⁶⁹ Fifteen. ⁷⁰ W8ZXX, ZZW, GEP, KHD, CKS, JHH, MIE, RMF, ROB, YKB. ⁷¹ W7JKB, JBH, FXD, JFB, LFA, LAN, FOK, CZY. ⁷² VE6GD, WG, BU, AO, TM, FK, AY. ⁷³ W9HJJ, VGD, EDU, JDW, SQD, OMD, DOK, HOG, OSA, UCT, QMN, FJN, YHA. ⁷⁴ W1AWB, AKA, AOP, CH, CPV, LAV, IQJ, BGA, IFD, JMT, ORP, J. Early, G. Mason, J. Morris, A. Olivier. ⁷⁵ Fifteen. ⁷⁶ Seven. ⁷⁷ Ten. ⁷⁸ Eighteen. ⁷⁹ Nineteen. ⁸⁰ W1BFT, AVS, CNX, AOQ, IJB, APK, AIJ, PML, LVG, JNC, MXP, EDN, PZI, PFU, EAW. ⁸¹ W6ZII, ZJI, WSO, BXL, WNQ, JBA, NKI, DK, VOD, TVG, TUQ, TCE, WYO, YQQ, TCA, MYC, KA, KNI. ⁸² W9TO, GRB, FJB, FKC, OLU, NBI, QKM, GZK, INN, JHH.

Four Transmitters Operated Simultaneously				Five Transmitters Operated Simultaneously			
	QSOs	Power*	Score		QSOs	Power*	Score
W1NKR/1	379	A-	6,887	W2CLO/2	559	A-	8,946
W10MI/1	584	AB-	6,573	W5AA/5	391	A-	7,436
W9TCK/9	519	AB-	5,829	W3RIK/3	458	A-	6,489
W8ARF/8	622	A-	5,751	W4PN/4	...	A-	6,155
W9WEN/9	337	A-	5,634	W3OB/3	457	ABC-	6,057
W2RNX/2	330	A-	5,607	W2VDJ/2	375	A-	5,994
W2AW/2	350	A-	5,589	W7DXF/7	255	A-	5,873
W2NY/2	266	A-	4,797	W9QC/9	358	A-	5,598
W2ZQ/2	298	A-	4,623	W9SW/9	381	A-	5,511
W1OSA/1	291	AB-	4,467	W7KYC/7	305	AB-	4,989
W9JZA/9	479	AB-	4,359	W3PSE/3	389	AB-	4,866
W3KJJ/3	256	A-	4,293	W2BVL/2	422	ABC-	4,644
W5MH/5	293	A-	4,194	W2QVV/2	340	A-	4,557
W3OAJ/8	245	A-	4,050	W9ALF/9	470	B-	4,440
W5CNG/5	306	B-	3,934	W5HTK/5	187	AB-	4,144
W5IAS/5	227	AB-	3,780	W7AZR/7	187	A-	4,064
W9LX/9	232	A-	3,753	W2EWA/2	356	ABC-	3,888
W5DLF/5	429	ABC-	3,456	W3VT/3	182	A-	2,520
W8RTR/8	231	A-	3,420	W9EBE/9	143	AC-	2,181
W9AKY/9	197	A-	3,303	W1LBH/1	...	ABC-	2,320
W6ZOE/6	193	AB-	2,746	W1LZI/1	120	AB-	1,278
W5HOT/5	163	AB-	2,376	W4BCU/4	37	A-	495
W7AQ/7	136	AB-	2,196				
W4LZL/4	200	AB-	2,058				
W1AGW/1	181	A-	1,950				
W3BN/3	130	ABC-	1,920				
W3MFY/3	121	AB-	1,917				
W9EMI/9	337	C-	1,887				
W7ECX/7	71	AB-	1,800				
W2NVK/2	126	AC-	1,215				
W2SUL/2	116	A-	889				
W3SGA/3	35	A-	504				

Five Transmitters Operated Simultaneously			
	QSOs	Power*	Score
W6QV/6	605	A-	11,225
W9SQW/9	606	A-	8,937

Six Transmitters Operated Simultaneously			
	QSOs	Power*	Score
W9KIS/9	637	A-	8,676
VE3JJ	576	A-	8,325
W6IK/6	381	A-	7,965
W1GB/1	408	A-	7,695
W6NAT/6	340	A-	5,711
W1CV/6	541	AB-	5,238
W7MLL/7	319	B-	4,725
W6MGJ/6	207	A-	4,415
W1JHT/1	173	A-	3,924
W3BL/3	284	A-	3,924

⁸³ W1MGS, JBK, AMQ, MHH, FSY, JMI, RY, OS, OHI, NKR, NOM. ⁸⁴ W9DXU, MRQ, DSO, GPS, HXW, FIB, TJD, YZV, KBO, FWU, UBT, LDD, ZLK, H. Wood. ⁸⁵ W1AQE, BOD, ELC, JYC, LNX, NXY, JSM, OJM, OTH, PAW, VDY, BDS, PEG, W9ZBP. ⁸⁶ Twelve. ⁸⁷ W3IWy, W8TKS, RYZ, BN, IZQ, YJZ, YGR, PCS, HSW, JEX, YEH, PNY, AVB, ZXJ, SMN, ACA, RBX, BGU, YQC, ARF, QUO, HWF, BIQ, WDL, IME, EXD, UEL, MHH, YHZ, BZD, WUF, GH, TRF, Riddle, Sanford, Schnell, Garn, Lewis, Blossom, Farrar. ⁸⁸ W9ATV, OAT, YXJ, GFX, EDK, NKU, BRI, DRB, WEN, W6YHD. ⁸⁹ W2SHEM, STU, BEQ, QKY, HX, BEQ, UEZ, RYB, QKE, RNX, W3GFQ. ⁹⁰ Twenty. ⁹¹ Fifteen. ⁹² Six. ⁹³ Fifteen. ⁹⁴ W9JZA, RJU, DUT, RHL, ULY, ZBH, MVZ, MBM, MTL, NMF, CWO, PVB, EBQ, HEI, WKN, YGH, HDB. ⁹⁵ W3KJJ, CML, VNF, LXZ, RZK, MCK, AKF, OFL, LDF, NIF, MXQ, LMC, KTC, QEX. ⁹⁶ Ten. ⁹⁷ Ten. ⁹⁸ W5CNG, EGK, IXW, JET, KHH, KUZ, LUU, MOG. ⁹⁹ Thirteen. ¹⁰⁰ W9LRN, VAM, RTY, KXD, KXE, JBT, JRB, PVO, BFN, JHA. ¹⁰¹ W5LAO, LST, HMQ, LDA, GTJ, JLZ, HK, NFG, DLF, IYU, JUZ, JMJ, LHQ, JYX, KLY, J. Long, A. Welch, J. Ford. ¹⁰² Sixteen. ¹⁰³ Six. ¹⁰⁴ Ten. ¹⁰⁵ W4HOJ, IQY, ILZ, EBQ, ILD, GQG, JAF, KFK, DDF, HPA, FEL. ¹⁰⁶ Ten. ¹⁰⁷ W3HVL, BYN, MLY, FYD, CDS, CRX, MB, HPD, BN, EWA, IZR, CCH, IQO, LRY, HKQ. ¹⁰⁸ Twenty. ¹⁰⁹ W7KHB, GJC, DHZ, ISC, LEJ, ECX, B. Johnson. ¹¹⁰ Fifteen. ¹¹¹ W9LNM, HEK, HMG, WON, YPP, TMB, HCR, AWO, LLJ, FGC, RBL, RNK, NAK, HHR, PVE, OFX, CJO, NGM, KML, FUS, MFR, HZS, WVV, WFZ, ORY, QKT, W20AA, Fischer, Conrad, Naef, Krueger. ¹¹² Twenty-two. ¹¹³ W5LIU. ¹¹⁴ Twenty. ¹¹⁵ Thirty-six. ¹¹⁶ Twenty-seven. ¹¹⁷ Fourteen. ¹¹⁸ Sixteen. ¹¹⁹ Twelve.

¹²⁰ W9SW, HCV, MWE, PGW, TQL, EUL, GZV, BGC, KZV, CIA, PNV, FCN, TKM, MNL, INM, ZSI, MAT, DZJ, F. Merlick, G. Nejedly, P. Mutz. ¹²¹ W8PSE, QQ, WRN, WRL, HAM, PGE, YBF, WZK, APC, WXN, WYH, WAB, ZCQ, ZOE, IVC, KMD, NPF, ZCT. ¹²² W2GWE, IOP, FQW, UOL, FI, RPZ, SMX. ¹²³ Fifteen. ¹²⁴ W7AEA, EHQ, GDW, KL7DC, W7LJ, FYO, GRQ, ER, FJS, BMJ, AZI, HIW, FHY, E. Svyerson, W7IBM, W. Cosby, W7AZR, W7BG, C. Osborne. ¹²⁵ W2TK, BUX, EWA, JBK, MAV, NCA, NXC, OGH, OOL, PEG, PLN, QMQ, UCC, UDY, UGL. ¹²⁶ W3VT, KDY, JSO, IQP, KRE, MRM, CBP, GWY, EKZ, HJY, AFR, CAQ, IEM, JBQ, MUU. ¹²⁷ W9EBE, FUM, VMO, RST, TUV, GBJ, DUY, HUI, EUH, BUP, MKS, GMI, JBG, AQB, ADL, W3JTW, Hankins, Evans, Fortner, Persons, Gallagher, Bakewell. ¹²⁸ Fourteen. ¹²⁹ Eight. ¹³⁰ W9KIS, EOP, DQB, PAL, ZQ, IPX, GYH, YBM, ACV, YLZ, PTW, OBM, JNC, OWK, MGY, MIM, DXK, QIO, IRO, WEF, RAG, VSG, BDI, PJP, DBC, PVQ, IRM, MBY. ¹³¹ VE3AR, AD, AWX, AHY, AYE, IZ, ACR, AEM, BB, AHX, AIB, AFY, MI, UT, APN, APG. ¹³² W1KQY, MEF, OKX, NQG, PMV, HMZ, TD, QAK, QTD, ATH, FVB, PBO, LTB, EUC, AMM, KUK, BYW, JQD, Polo, Murdock, Ingram, Kral, Lohse, Cohen, Chirnitch. ¹³³ W6NAT, CL, DYW, TLO, DFO, SGT, RCH, CNJ, RUY, MUO, QGK, KTY, RMK. ¹³⁴ Seventeen. ¹³⁵ W7VOZ, QWG, JPY, UPW, KXB, KXE, UPF, UOG, MLL, OZM, KBV, RMB, KNO, KWD, KWU, KWW, LHI, LHD, LHH, LHX, QV, JTO, KMT, LAD, JHB, KJR, SMZ, GDF, JKK, JQP, REF, DZA, RNB, JFG, ICQ, ¹³⁶ W1GVC, PWH, KAB, KXZ, KGT, ROH, OPB, APW, FG, JWY, WTMT. ¹³⁷ W5GU, DG, AXM, APG, BBS, CXE, DRE, (Continued on page 118)

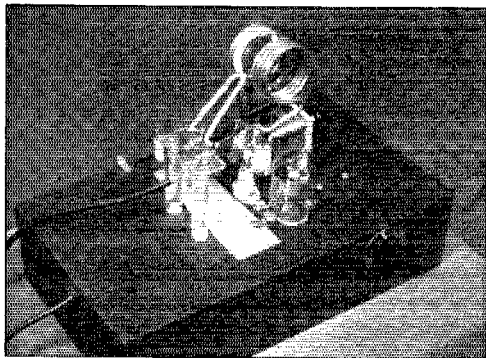
Grounded-Grid Technique at 50 Mc.

Stability Without Neutralization in a Triode Amplifier

BY FRED J. GARTZKE,* WØRSI

THE production of high power at very high frequencies has always been a difficult problem to solve. Frequencies of 50 Mc. and above are now easily reached by a series of frequency multipliers, but amplifying this signal to high power levels brings in new difficulties not found at lower frequencies. The high price of large r.f.-amplifier pentodes makes the use of the less-expensive triodes desirable if the neutralization difficulties associated with their use can be solved.

Lately a circuit employing triodes, but not requiring neutralization, has come into common use in commercial f.m. transmitters. This circuit, often called the inverted amplifier, common-grid circuit, or inverted ultraudion amplifier,¹ is now best known as the grounded-grid amplifier. The purpose of this article is to discuss an amateur application of this circuit at 50 Mc., in the hope that others will expand the ideas presented and make the grounded-grid amplifier more useful in amateur transmitter design.



A grounded-grid r.f. amplifier for 50 Mc. using a pair of 24Gs. Note the capacitance plate (center of the chassis) used to ground the grids for r.f. No neutralization is required.

Performance Characteristics

From the schematic diagram, Fig. 1, it is noted that the main difference between this grounded-grid circuit and the conventional Class C amplifier is the location of the input circuit. By placing the input circuit between the filament and ground, and by grounding the control grid for r.f., an entirely different performance is obtained from the triodes.

Neutralization becomes unnecessary as a result

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¹"The Inverted Ultraudion Amplifier," Romander, Sept. 1933 QST.

• The grounded-grid triode amplifier has much to recommend it for use in v.h.f. work, where the stray inductance and capacitance introduced by neutralizing circuits tend to reduce the over-all efficiency, particularly when large tubes are used in high-powered amplifiers. Because some of the output of the driver stage appears in the total output of such an amplifier, it is necessary to modulate the driver as well as the final stage, if amplitude modulation is employed. For use with f.m. or c.w. the grounded-grid amplifier involves no complications, and it is already finding wide commercial application for such service.

of the shielding action of the grounded grid. Elimination of the neutralizing circuit lowers the output capacitance which in effect makes possible wider bandwidth and lower tank losses. However, from three to six times the normal driving power is required, part of which appears at the output circuit. One-hundred-per-cent plate modulation of the grounded-grid amplifier alone is impossible, but by modulating the driver and amplifier together 100-per-cent amplitude modulation can be easily produced. Narrow-band or wide-band f.m., or c.w. operation of the grounded-grid amplifier, involves no complications.

Operating conditions as recommended by the tube manufacturer for an "r.f. Class C power amplifier" give excellent results and, in the particular experimental stage used, could not be improved. However, the grid current was lowered from 30 ma. (the recommended value) to 20 ma. for a pair of 3C24s (24Gs) with no effect upon the performance. The driving power needed was 34 watts or approximately 5.5 times that required for the conventional Class C circuit.

Operating conditions were as follows:

Plate voltage — 1500 volts d.c.

Plate current — 137 ma.

Grid current — 20 ma.

D.c. grid volts — 115 volts d.c.

Driving power — 34 watts

Power output — 144 watts

Efficiency — 60.3%

Because of the large driving power required, the efficiency was computed from the equation:

$$\text{Efficiency} = \frac{\text{Power output}}{\text{Driving power} + \text{D.C. plate power}} \times 100$$

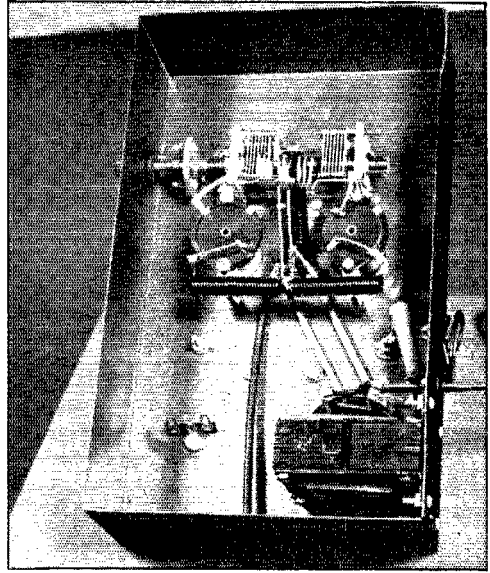
The tuning procedure is best explained in three steps:

- 1) With zero plate voltage tune cathode tank condenser for maximum grid current.
- 2) Apply plate voltage and tune plate tank condenser for minimum plate current.
- 3) With plate voltage still applied, again tune cathode for maximum grid current.

Construction

The usual care in construction of high-frequency circuits was observed (low-loss materials were used and all r.f. leads kept short) to minimize power loss and regeneration. The amplifier is constructed on a standard $10 \times 7 \times 3$ -inch chassis. The two 3C24s are mounted so that the tops of the tube bases are just flush with the chassis surface. This makes grounding leads to the grids as short as possible and provides a convenient arrangement for mounting the cathode coil. Spacing of the tubes is such that the plate tank condenser conveniently centers between them.

The grounding condenser on the grids is constructed from a sheet of 1/16-inch aluminum 1×5 inches in size, separated from the chassis by a sheet of mica. The capacitance of this condenser is about $400 \mu\text{mfd.}$ and at 50 Mc. it has a reactance of about 10 ohms. Four insulated bolts fasten the condenser to the chassis and also serve as connection points for the bias resistor and grid-current meter.



Bottom view of the grounded-grid amplifier, showing the filament chokes and input circuit.

The plate circuit is of conventional push-pull design with as high L/C ratio as mechanical design will permit. This greatly reduces the losses in the tank circuit.

The cathode coil is mounted directly to the socket terminals and is made self-supporting by the use of No. 14 wire. The driving power is coupled into the cathode coil by a two-turn link. The placement of the r.f. chokes in the cathode circuit is best seen in the bottom-view photograph.

During the operation of this grounded-grid amplifier, which extended over a period of six months, absolutely no self- or parasitic oscillations were observed. The amplifier was originally constructed as shown with the exception of the plate tank coil. A higher L/C ratio increased the efficiency of the amplifier from 50 to 60 per cent. This is one of two grounded-grid amplifiers constructed by the author, the other being operated at a frequency of 2 Mc. The absence of self- and parasitic oscillations in both grounded-grid amplifiers was a new experience for the author, who has had no such luck with the conventional Class C circuit.

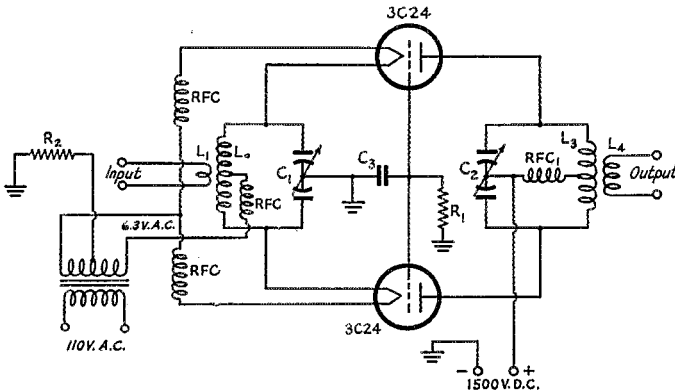


Fig. 1 — Schematic diagram of the grounded-grid amplifier.

- C₁ — 5-75- $\mu\text{mfd.}$ dual condenser, 0.020-inch air gap (Cardwell EU-75-AD).
- C₂ — 5-35 $\mu\text{mfd.}$ dual condenser, 0.030-inch air gap (Johnson 35-HD-15).
- C₃ — 400- $\mu\text{mfd.}$ condenser, see text.
- R₁ — 2500-ohm 2-watt carbon resistor.
- R₂ — 500-ohm 10-watt wire-wound resistor.
- L₁ — 2-turn link, No. 14 copper, $\frac{3}{8}$ -inch inside diam.
- L₂ — 6 turns No. 14 copper, $\frac{3}{8}$ -inch inside diam., $1\frac{1}{8}$ inches long, including $\frac{3}{8}$ -inch space in center for link.
- L₃ — 8 turns No. 6 copper wire, $1\frac{1}{8}$ -inch inside diameter, $1\frac{1}{8}$ inches long, including $\frac{3}{8}$ -inch space for center link.
- L₄ — 2-turn link, No. 12 copper wire, $1\frac{1}{8}$ -inch inside diam.
- RFC — 25 turns No. 14 enamel, close-wound, $\frac{3}{8}$ -inch inside diam.
- RFC₁ — 30 turns No. 20 enamel, close-wound, $\frac{3}{8}$ -inch inside diam.

How's DX?

CONDUCTED BY ROD NEWKIRK, * W9BRD/1

How:

Jeeves changes the water under his inverted 6L6 and shakes his head sadly. He reports a veritable rash of so-called mass-production DX QSOs breaking out on 20, and goes tsk, tsk.

He refers, of course, to the practice of some DX stations calling CQ, scanning the band for minutes, and then returning to reel off about umpteen different calls heard, perhaps adding reports. Then this procedure is repeated, etc.

Now, if said DX stations would carry through to form umpteen-way round tables the case might be overlooked. But who wants to become so involved when VQ3HJP is liable to hop over to Zanzibar for another QSO at any moment?

The question is: When is a QSO *not* a QSO? We believe there should at least be a bona fide effort to push an RST report through both ways, plus acknowledgments for same. After that, whether you want to tell the feller 73 or go jump in the lake is up to you.

One pronounced evil of the system is the resultant flock of long, drawn-out calls all over the place. For the bird who just wants to know whether he's being heard at the DX QTH, FB, but cards from stations known to practise such a business are very liable to bounce when turned in for awards.

* DX Editor, QST.



What:

Eighty: All the way from the Twin Cities, W0YCR scared up KH6FX during the SS Without even a meter on his 117L7 vest-pocket rig, W9KCY/5 QSOed KS4AH (3780) W2CAY gripes that 3.5-Mc. ZL signals sound too much like W6s and reports working PA0MA, FA8BG, G5CR, G2PL, G5LI and ZL4GA W1BPX has the situation well in hand, to say the least. Since Nov. 1st, Paul had knocked off 64 European/African stations in 16 countries, the latest including G5LI, G8JR, F9KH, ON4HC, ON4AU, PA0DC, OZ4FT, SM7JM, HB9BS, LA7Y, OK1FF, GW8WJ and GI3SL. He further reports that FA8BG has worked W5, W6, XE1A and ZL4GA. To top everything off, between 4:45 and 7:00 p.m. EST, Paul knocked off eight different Europeans. This comes close to making 3.5 Mc. look like 14! All this supertime DX on Dec. 3rd W8PVB also got in on ZL4GA, G5LI and G5CR, and adds ZL1CI (3555) Among others, W1ORP mentions grabbing G3AJO (3525) W1INF came to grips with G6ZO, NY4CM, PA0RE and PA0PN, and heard FA8IH W1AW's log shows that ZK1AM (3560) was called but not worked Dropping down from 20 to see what all the fuss was about, W4FNR stumbled onto G5NS, ON4HC and an NY4 Now over the 100-country mark, W4KFC worked many of the previously-mentioned Europeans as well as PA0FLX, G2ATM, G8JI and New Zealand. Vic got a kick out of hearing FA8BG QRMed by ZL4GA, with a flock of Europeans joining the chorus a few minutes later. Yep, 80 surely is booming this season! Let's have some West Coast 3.5-Mc. reports — things should be popping out that way by now.

Forty: Since anybody seems to have about as good an antenna as the other guy on this band, everybody is getting into the act. W9KYY's post-card report appears to have gone through the Johnstown flood, but we make out that his 60 watts raised KH6LF, ZL4BU, VK2ANN, VK3DQ, VK3HG, W5MJS/KS4 (7266) and W7AOR/KS6 (7136) The 807 of W2TQR did proud with G5GK (7040), G3AKY (7040), XE2LA (7060), OK1VW (7060), IH0E (7060), IIMQ (7041), GI4RU (7040), F3CT (7040) and CN8BI (7060) W2HMJ dallied with a few Gs and then swindled a QSO from ZD3B

(7010) Nobody is supposed to work DX from the Midwest with 807s, but W9YDP fooled the critics with OX3BG (7050), CM6AH (7050) and CM8GA (7180) W2TMI, just getting acquainted with ham bands after a Merchant Marine career, was tickled with KL7HR, VE8NB, F8SF and OZ2RS From W1DIT we learn of contacts with EA7A (Rio de Oro), PY1FW, I1PL and others on the Continent.

W8YGR's 23 watts got responses from CM2JF (7284), CM2FR (7197), KZ5ND (7195), G3AAB (7190), F8EO (7025), G4RJ (7025) and G5HH (7025) In the Windy City, W9NN joins the party with ZS1G (7070), VO2AV (7040), G6BQ (7062), G3IH (7041), G3AAE (7030), and reports nine layers of QRM over-all

W4FKE worked VK, KL7 and KS4AH (7167), which badly disturbed his concentration on filling a 3-band WAS W3JAK grabbed GM3BST, CT1HF, F8EA, F8IH, OK1FF, OZ5HQ, SM5BO, SM4ALB, SM3EP, VK5JE and HK5CR. The latter is still after New Mexico for WAS W2MEI nabbed a flock of stuff including ZS1M, G3AEV, G8HX, G3BTA, G3CAG, G3RB, SM5CF, F9IH, F3CT, KH6FG, EI9Q, D4AND, and SM8BD/plane (over Palestine). Then the docs nabbed Steady's appendix A folded dipole filled with W2KIR's 250 watts accounted for a mess of Gs, GD3UB, HB9FU, F8IH, KM6AA, F3RA, HB9EK, F8ZW, F8QL and OK1RW.

Always in there pitching, W9BRD/1 raised KV4AF/W2. (RST 338 he doesn't mention. — *Jeeves*) VE3BBR represents Canada with oodles of Europeans, G6TC, G3BUF, OK1RW, HB9AW, PA0RE, F3KH, F9IH, SM5HT, IIMQ, ZS1M, KV4AA and KS4AI. He hears UC2CD regularly but ND on raising him People are getting gay over in *Der Vaterland* — D3IRA (Hans), D7AA (Fritz) and D5AA (probably Rollo) all sporting around near 7050.

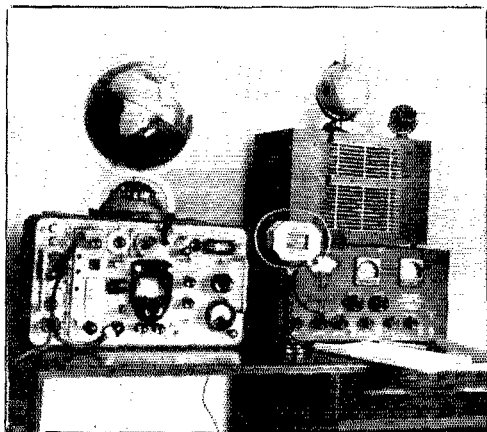
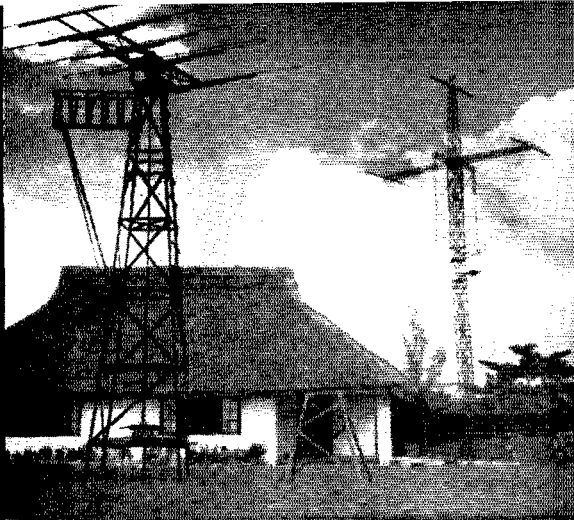
Twenty: This is the part of the spectrum where the 807s usually give way to the 810s. And then the 810s make way for the 450Ts, etc. W2GVZ, in his first contrib since 1940, denotes that he now has 81 postwar (132 all-time) and came away with UA0KQA (14,050), UD6BM (14,044), I6ZJ (14,000), GD3BBS (14,012), GC4LI (14,082), and others Back again with his 807, W2TQR knocked off lots of Europeans along with CT1A (14,130), OH5OA (14,090), OZ7HM (14,070), D4AZN (14,080), UA1BE (14,080), HB9EU (14,085), SM7IA (14,080), LA9W (14,085) and IIAKS (14,075) Out of 950 DX contacts in 13 months, W9AND comes out with 113 worked and 76 confirmed. This in addition to his SCM duties out in Illinois. His latest include YU7KX, UR2KAA, VP3JM, EP1AL, UD6AG, LX1AS, EL3A, ZM6AC and VU2DS HS1SS gave W2ITD some pleasant moments and Steve also snagged

ZD3B, HE1CE and VQ1HJP with the key and then he vocalized with ZS3F. He's up to 135 now The log of W2HAZ involved such as UG6WD, UD6AG, UA6AA, UA6IA, W2WMV/C9 and HA1KK From Wichita, W0DMF wonders about working PKPL in Java, and also got HZ1AP A look at W4BBP's letter reveals W3MWV/C9, C1DK, VS7IT, UA0PA, PK4KS, VP8AI, PK3JJ and KR9AN W6ZZ has some good stuff in KP6AB, ZS6GL, VS1CE, J2AVA, J8AAK, LA3GA, CR7BB, C7TN and HC1ES It's now 88 postwar at W8KPPL, including UC2AD (14,010), UA3BD/UC2 (14,060), UN1AA (14,100), UA1KED (14,020), UA1KEC (14,100), CN8BQ (14,050), VQ3HJP (14,050) and ET1TR (14,130) A brand new 3-element rotary netted W2GUR quick contacts with OQ5AV, OY3IGO, VP5AM, KA1HR, J2VFW, C7TN, UQ2AB, K6SBU/KG6 and J8AAW.

W6MX drops in with CR6AI (14,107), ZD3B (14,050), VP8AD (14,050), TI2EXO (14,000) and VP9E CM2SW, another CM2 we can't raise, has a few fancy ones recently added to his collection. We mean TE6AJ, RAEM/MM, SV0AD, SV0AC and OD2RY. Others: ZD4AI, VR6AA, VQ2GW, GD2FRV, ZM6AF, CR7AF, CR4AX, CP1AT, FQ3AT, YU7LX, VU2HS, HZ1AA, MD5PC, MD1D, PK7HA, VQ2DH, VR5IP, G2FDF/YI, GC8NO, GC2CNC and H18MAF. Sergio now stands at 133 with 94 confirmed Ninety-seven since February last



These three sunburned specimens have accounted for plenty of DX. Meet CM2SW, W2HUQ and W2HHF. The pix was snapped while the W2s visited Sergio last July.



VQ3EDD keeps working the Ws with the 3-watt army rig at the left of his SX25. The catch, of course, is the spectacular antennae in service. To augment the 5-element affair and the vertical diamond, both rotary, there are dipoles for 40 and 20. More power is available when necessary; for Mars or Jupiter, perhaps! The station is well manned — you'll find Eddy handling the switches and his pal Andy doing the dirty work, filling out the flocks of QSLs and doing the correspondence. Andy is hot after his ticket, though, and we may have another Tanganyika ham soon.

year have kept W9PSR well occupied. We quote UA9CH, UB5AC, CN8EG, UD6AG, UH8AA, ZE2JN, D7AA, TF3MB, TF3AB, TF3EA, PZ1L, C7HY and OH6NZ. . . . Some very neat info from W4BPD lists PK3JK (14,023), FM8AD (14,068), YT7GB (14,030), UAØPA (14,088), VS2CB (14,078), VP7NK (14,006), ZD4AP (14,050), VS6BA (14,065), SP1KK (14,120), GD2DF (14,082), ZS3G (14,043), ZS3D (14,080), CR4AF (14,016), ZM6AH (14,065), VQ8AB (14,115), EQ2L (14,122), I6AB (13,995), EA8CR (14,102) and VP8AZ (14,090). Gus also tips us off on the following frequencies: C9JW (14,097), J8AAV (14,099), J8AAI (14,102), VU2FJ (14,045), VS1AG (14,030), VS2BK (14,035), VS1CE (14,110), YA3B (14,015), VU2WW (14,043) and ZB1BD (14,034). GW3ZV dropped into Orangeburg personally and chewed the rag with Gus last November. . . . W2BLS forsook the 80-meter half-wave for a new 2-element affair and swapped reports with LU1ZA, J2AAV, J2AHL, J9ABL, UN1AO, UAØKAA, VS6AR, VU2GH, VU2LJ, KA1ABU, KA1AP, KA6FA, KG6BU, I6USA and sundry others. Carroll now has raised 124 but beats the mailman over the noggin daily for 10 tardy DXCC cards. . . . WØYCR was one of the lucky fellows to nip VQ1HJP. Bill also worked UB5KAF, ZE1JI, OX3BG and ZD4OA.

A strictly 'phone report from W2CHK accounts for VQ4NSH, VQ4ERR, MD5AM, ZE2JN, ZS1BF, ZS6GR, KH6MQ/J9, HZ1AB, J2AGA, J2ALA and J2HY5. This makes 78 on the mike for Gil. . . . It took only one short day for W9ELA to accumulate YI2AM (14,090), ZB1AH (14,100), FA8RA (14,070), UA6AE (14,000), UQ2AB (14,060), MD1E (14,100),

VQ2JC (14,098), EA7AV (14,000) and SV1RX (14,090). . . . A fine layout at W2WPJ helped to produce QSOs with EA9AA, CR7AF, ZS4BJ (Basutoland), UAØKBA, J8AAB, J5LQK, VP2GB, VP3LS, MD5SB, MD2C, GD6LA, CT1QA, YS1AC, YN1HT, UI8AA, VQ5JTW, ZB2A and VS7AP. The latter was hooked the long way around at about 8 P.M. local time, according to Ted. This Rochester feller also registers one more squawk about the deficiency of cards from U areas. . . . WØAIW has a hard time convincing us that the going out there is tough when he mentions working UD6AG, ZD1BD, ZD4AM, XZ2DY, YU7AF, YR5J, VS4VR, HS1SS, UA9CC, YR5PK, ZB1AI, YS3CW, YR5VP, CN8BC, CN8BI, UB5BG, MD1B and TF3MB. . . . WØNTA leads WØAIW by 10 with 140 countries. Vince got some of those worked by Lee and adds VU2WG, CR7AP, ZD3B, KB6AD, VQ1HJP, MB9AA, VP3TR and a mess of TFs. The WØ gang reports an excellent opening over the Pole to HS/XZ lands and made a lot of hay during the period. . . . Another of the lucky ones to hitch up with VQ1HJP was W1JLT who also gathered UAØKEB, CE2BC, OH1NN, J3AAD and J4ABA, among others. Bob is using a new 3-element rotary mounted vertical. . . . The 812s at W6BIL rolled up a logful, plus EI5G, EI4Q, C7OK, OK1LM, SM5UN, SM5IZ, SM5MP, SM3MQ, I1ADW, HB9BX, HB9FU, HB9EI, LA4P, LA5Q, LA6U, ZS4BX, ZS4T, TI4MAR, VE8NW, FA3AS, VQ8AF, VQ2DH, YR5AH, CN8EG and about 30 Russians. George reports finally received a card from Box 88, too — UA3AG/Ø. He reports that G5UB/P is QSLing, also. This is a ship station but will be nice for the file, anyway. . . . Trying out Eastern

conditions, W6JKH/2 came up with ET3A, EL3A, GD3FRV, UA9CB, HK1FU, YV1AZ, TI2CA, HH3L and KG6AD. He is curious about D5AC and TF6WB, too. Modulator work by W5ASG resulted in I1AHK (Sardinia), ET3AD, ST2GE, ZB1AL, OX3BD, MB9AG, XAMC, ZE1JX, GC2RS and ZE2JN. Then Bill plugged in the bug and traded dits with U18AE, GD2DF/A, VQ1HJP, I1AVL/I6, ZD3B and UB5KAF. W4MZ put his antenna outdoors and had some luck with C1DK, CE7AA, CR9AN and VU2GH. Nice lines from W2HMJ just made the deadline. Aug groaned loudly when his cards sent to EP2DS and EP2BU returned unopened. He couldn't get a rise out of ZD9P (14,000) but clicked with OX3ME, CN8BK, HP2CA (ship off Rio), VP5AS, EK1AA, CT1SX, ZD3B, ZS4BX, CX1DB, VP4TAA and VP9Q. These and others put him up to 115 now. One of the mainstays of the sleepless crowd, W7DXZ unloaded a lot of r.f. on people like PK1MD, PK3CK, VP4TAF, VP4TW, FA3JY, YR5VP, FT4AB, FT4AN, EQ2L, ZP6AB, FA8IH, HE1EO, UJ8AD, CT1IT, HA8Z, HA2AB, SUIJR, VQ3ALT, UB5KAA, XAFQ, XALF, FA9JB, UO5AC, UC2BB, VQ8AY, CR7VAL, ZC6AA, ZC6JK, PZ1AL, VQ1HJP and about a dozen more that would look nice in any log. Frank was stopped at 99 confirmed but is probably over the top by now.

Ten: This is the band where so many receivers get the giggles. But it's a lot of fun anyway. So thinks W5ALA, whose mellow audio lately entranced CT1LZ, J8AAA, MB9AM, OH2SE, KG6AW/VK9, VK7AJ, C1MCC and W6JIM/C1. W2GVZ wrangled with VQ5JTW (28,050) and VU2DH (28,064). W9AND wound up with VS9AN (28,060), CR9AG, C7AT, EA3Q, LX1ST, CN8BK, GC4LL, CR7AD, OQ5HR, OQ5BQ, OE7AH, CT1JS, CT1SC, FA3JY, ZE1JU, HA1FG, HA1KK, MD5DA, UH8AF, VQ2HC, XPA0PN, I1AFQ, I1MH and I1ON. That ought to keep old Illinois on the map! [No wonder you couldn't work anything there. — *Jeeves.*] Back again, W2ITD wrapped the mike around J2AMA, ZL4GS and SUIWS. W4BBP's 'phones popped off when VS6AC came back to him. Then he grabbed KG6AL before the band closed. OQ5BQ gave W0YCR his 96th. W9YDP cut one of these newfangled folded diapers and raised G6UH, G2NS and GI6YW (28,040) with

the thing hung around the ceiling. Working both the Near and Far East gave W2GMM a kick. The victims were J2IMR (29,600) and ZC6JP (28,475). Also on voice, Herb conflicted with OQ5BL and CN8BA. With 40 watts in Kilowatt Alley (28,570), W2VBQ took a beating for GM3XB, G3AVK, W2LDH/MM (Jidda, Arabia), HB9FE, TF3EA, PA0IF, VO2N, KZ5LN, HC1KP, D4AYO, ZS6JB and SUIHF. VE3AFY dug down through the diathermy and pulled out ZE1JZ on 'phone, HA2BG, TF3X, VQ4FCA, CR9AG and others on c.w. W9NLP hasn't been wasting his time with 151 postwar and 108 confirmed. Rollie reports very good conditions for Asia lately in Chicago, and reliable communication with J2AFA, J2JET and ZC6AO.

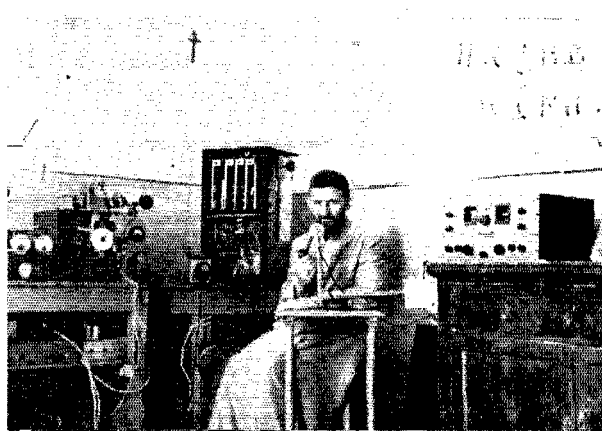
Where:

It is believed by some that rare DX stations oblige us with a cablegram collect, informing us of their mail address as soon as they go on the air. Ah, we wish 't were so. But, no, we all depend on each other for this section of the column. Don't save that QTH for your grandchildren — ship it along. Think of the transmission time saved for all when that OY8 can quit sending his mail address to each W he works! If the fellow isn't under cover we'll use it here. Now try these on for size:

AR8AB, Box 293, Beirut, Lebanon
 C1DK, Box 409, Shanghai, China
 CN8EF, Navy No. 214, % FPO, New York City
 D4AVL, 156th AACFS Sqdn., APO 61, % Postmaster, New York City
 D4AZB, 116th AACFS Sqdn., APO 61, % Postmaster, New York City
 ET1AB, Dr. Boccacatte Presso Osfredale, Psichiatrico, Alessandria, Italy
 ET3AD, Box 145, Addis Abbaba, Ethiopia
 GD3BBS, Jack Gawne, Harbor House, Porterin, Isle of Man, U.K.
 HC1ES, Charles Fuller, P.O. Box 2850, Quito, Ecuador
 HZ1AB, APO 616, % Postmaster, New York City
 KA1ABM, Capt. G. A. Murphy, jr., USMAG, APO 707, % Postmaster, San Francisco, Calif.
 KA1AQ, Lt. N. W. Harris, Hq. & Base Svc. Sqdn., 358 Air Svc. Gp., APO 74, San Francisco, Calif.
 MD5AA, (Via RSGB)
 OH2SE, Pasilla, Finland
 OX3GC, APO 858, % Postmaster, New York City
 OX3RC, (Via EDR)
 PY3DS, Caixa Postal 737, Porto Alegre, Riogrande do Sul, Brazil
 RV2, Roland Dassignies, Isle de Raiivavae, via Tahiti
 SGH2, (Via SSA)
 SHI, (Via SSA)

One of the rarest of the rare, AR8AB, Beyrouth, Lebanon Republic, Syria, has had the boys jumping up and down on 20 for some time now. Jean points out that his prefix, AR8, is that of the Lybian Republic, while AR1 represents the Syrian Republic, both independent states. He would like the complete address used. (Photo courtesy of W1FH.)

February 1948



SHQ, (Via SSA)
 SU1KM, TWA Comm. Dept., Farouk Field, Cairo, Egypt
 SU1WS, Box 360, Cairo, Egypt
 VK7AJ, 16 Romilly St., Hobart, Tasmania
 VU2EO, % QSL Bureau, 20 Club Road, Bombay, India
 W2QDO/KL7, Radio City, Adak, Alaska
 W6JIM/C1, Sig. Svc. Adv. Gp., APO 909, % Postmaster,
 San Francisco, Calif.
 W7AOR/KS6, Naval Radio Station, Pago Pago, Samoa
 XALF, P.O. Box 4044, Nairobi, Kenya
 ZD4AM, Box 8, Tafo, Gold Coast

These locations do not necessarily indicate the whereabouts of the respective stations. Thanks to W1FH, 1ME, 2HAZ, 2ITD, 2OM, 2VKQ, 3QJV, 4MZ, 5ALA, 6ZZ, 9KYX, 9NLP and SM5ZX for their contributions.

Tidbits:

G5FA was disappointed as others will be — his cards to OY7NL and PX1C bounced like a marble on a tile floor. . . . W2WMV/C9 tipped off W1DX and the rest of us to the effect that he cannot use self-addressed, stamped envelopes. He is one of the rare DX stations that QSL long before they receive matching cards. He QSLs 100 per cent, furthermore. . . . From W7DXZ we learn that the November listing of ZC6AA QTH is all wet. He is in Tel-aviv but cards go to the Egypt bureau. . . . VS7DR notifies us via W3LMA that the QSL situation is really tough. Nevertheless, as soon as possible he will oblige 100 per cent. China will be his next QTH, we hear. . . . OY3IGO remarked to W1GNE that OZ8LA is building a rig for operation as OY8LA. Guess that will give OY3IGO a chance to add another country to his list, huh? . . . OK1DR states that OK3AA is somebody being naughty; no good and cards will bounce. . . . Some wise guy on 23,346 has W7PEY (and others) hopping mad. This bird has been signing W9DRH, VP3PS, ZD2AI, FE8IB, YVIAB, etc., both 'phone and c.w., and messing up the band in general. Same voice, same fist, same frequency, and appears to be somewhere in the Great Lakes region, according to Nat. Things are tough enough without this sort of thing going on. Let's hope the bird is nailed before this goes to press. . . . PK7HA sadly announces that his area is temporarily QRT but hopes that PK7 will be back on the air before very long. So do we. During his short period of

operation, PK7HA (Biak) worked 116 countries and verified 79. Gus thanks all amateurs for their splendid cooperation and fine QSOs.

C1MCC went out and bought 500 QSLs — for \$2,400,000! Relax, men, Chinese money. W6ZZ was wondering whether to put the card on the wall or in a vault. . . . Nice note from VK4PR praises the cooperation of U. S. hams on Guam for their friendliness and hospitality. 'Course, Jim isn't operating VK4PR there, but he can be reached as follows: W. J. Rafter, Box 467, Marama, APO 264, % Postmaster, San Francisco, Calif. He's working with the USAAF and having a great time before he's due back in Australia. . . . An old DXer from 'way back, W9ABS talked a crabby landlord into allowing an antenna on his immaculate roof "for better short-wave reception." Bob figures that this wire will work better with a hundred watts or so in it. . . . W7BE, who really gets around with the Army Engineers, is now up to 123 and claims to be the only DX bug in Seattle not running a kw. He recalls about 18 years back that he and W6SA were partners in W6BC. Now they're really hot competitors! Bill is scratching his head for a 28-Mc. beam. . . . The Rochester DX Club is all set for the contest this month. W2PUD, QCP, RTX and CNT are all over the century mark in worked countries, with W2FBA and TXB breathing on their necks with 98 and 92 respectively. . . . VE3QD was one of the lucky VE boys to snatch VQ1HJP, and is now up to 145 worked postwar. . . . W6CIS wonders if his QSLs have no sex appeal or something. Ken's average is 76 out of 127. Personally, we'd like to nominate for Man Of The Year anyone who makes DXCC with 100 worked and 100 verified! Any candidates? . . . EA7AV plays with 300 watts on 10 and 20 and requests no cards be sent him direct but via ARRL or corresponding associations of other countries as that is the way he must answer. . . . Major Haas, XADW, informs us that the only legit XAs now in operation are in Trieste plus himself in Rome. His own call may change in the very near future to an 11. Lee may be reached: Major L. R. Haas, MILA, APO 794, % Postmaster, New York City. . . . LU7AI is a point-to-point com-

(Continued on page 184)



This is the elaborate set-up at G2AMJ with Geo. at the mike. At the left, a modified Collins 30J runs 150 watts, c.c. or VFO. Two HROs are used for receiving and the antenna is a close-spaced 3-element rotary, 8 1/2 feet above ground. An S27 is available to handle n.b.f.m. signals. You'll find G2AMJ in the vicinity of 23,200 and you won't have to strain your ears!

QST for

A 'Scope for the Ham Shack

Building a Versatile 3-Inch Instrument

BY ROBERT H. WEITBRECHT,* W6NRM

• In prewar years, a few hardy *OST* authors tried to sell the ham fraternity on the usefulness of that most versatile of instruments, the oscilloscope, with indifferent success. It took a forced introduction, through war work, to convince most of us that the 'scope is considerably more than a high-priced contraption, bought by the luckier 'phone men to amuse visitors. The fact that cathode-ray tubes are now on the market at prices approaching cost or less than cost makes this constructional article by W6NRM singularly timely.

NEXT to a multimeter or a vacuum-tube voltmeter, probably one of the most useful instruments in an electronics laboratory is the cathode-ray oscilloscope. Amateurs with experimental leanings are finding good instrumentation practically indispensable in these days of complex radio and electronic devices, and the benefits that are obtainable with a well-balanced assortment of tools and instruments are obvious. Much time can be saved and annoyances avoided. Accurate measurements and a clearer understanding of the functionings of particular parts of electronic circuits are facilitated.

Although oscilloscopes have been quite expensive in the past, such is not the case nowadays,
*2269 Summer St., Berkeley, Calif.

◆
Front-panel view of the 3-inch oscilloscope. The intensity control is to the left of the c.r.t. and the focus control to the right. In the top row of controls are, from left to right, slave switch, synchronizing gain, coarse and fine sweep controls, and the sawtooth switch. In the next row below are the vertical-position control, the external-internal switch, and the horizontal-positioning control. The vertical and horizontal gain controls are either side of the pilot lamp. The bottom row of switches, from left to right, are the attenuator-ratio switch, beam, power, and sweep switches. The vertical input terminals are to the left with those for horizontal input to the right.

◆

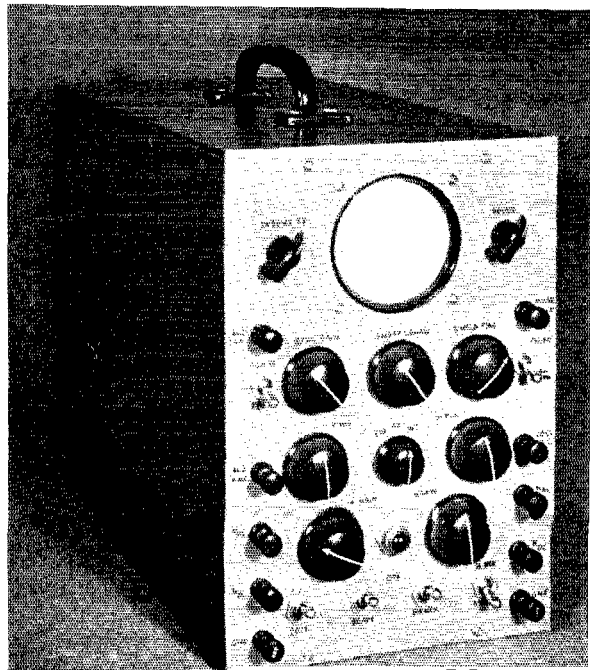
with excellent parts and tubes available reasonably on the surplus and general markets. These versatile instruments are finding increasing uses in amateur radio and other fields. Amateurs are employing oscilloscopes in such applications as modulation checking, key-click analysis and elimination, panoramic frequency-scanning adapters, testing of audio amplifiers for distortion, detection of hum on c.w. signals, and for quite a host of other uses. Thus the utility of the instrument is too well known to be discussed further.

The author feels that the time and effort spent on construction of the oscilloscope shown in the photographs and Fig. 1 has been well invested, the result being a most useful piece of apparatus.

Operating Features

The cathode-ray tube is a 3AP1. This tube, with its shield and panel mount, was purchased from surplus stock; apparently it was part of some aircraft equipment.

The horizontal- and vertical-deflection amplifiers have direct-current coupling throughout, from the panel binding posts to the deflection plates of the cathode-ray tube. The frequency response of both amplifiers is flat from zero frequency (d.c.) to over 100 kilocycles (sinusoidal waveform) and the voltage gain is 40 for each. Square-wave response is good up to 20,000 cycles per second. Extra binding posts are provided on the panel with blocking condensers for use when it is desired to pass only the a.c. component of a



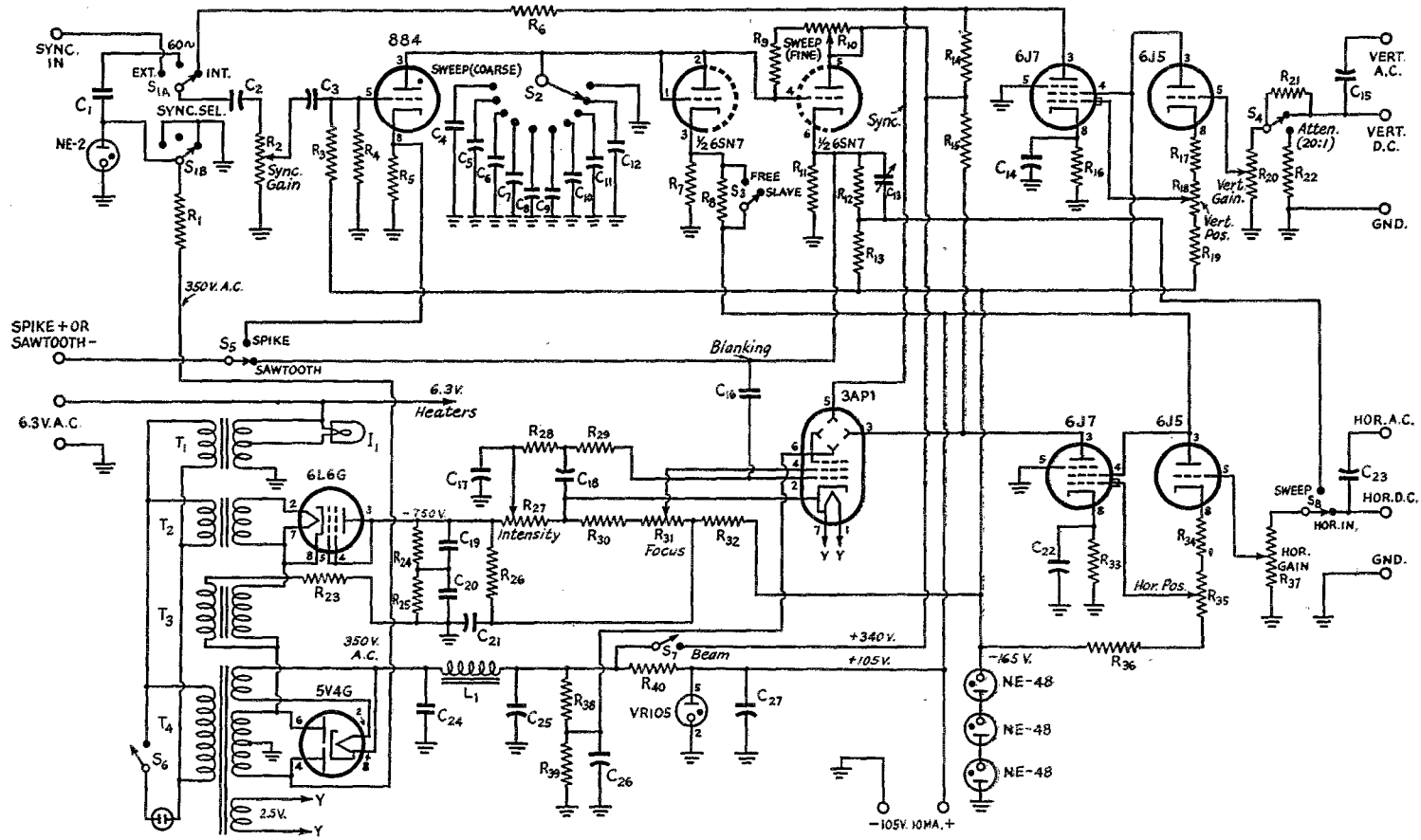


Fig. 1 — Circuit of the 3-inch oscilloscope.

signal, yet block out the d.c. As a result of the d.c. coupling, the positioning controls are instantaneous in response. There are no blocking condensers of any kind from the d.c. input to the deflection plate of either amplifier channel.

The sweep oscillator is a conventional 884 thyatron sawtooth circuit, adjustable from 2 to 25,000 cycles per second. Its output is d.c.-coupled to the horizontal amplifier through a cathode follower, resulting in a sweep that is rigidly tied to the output from the sawtooth oscillator. Provision is made for slave-sweep applications.

The synchronization switch, S_1 , has three positions: "internal," "line frequency," and "external." In the "internal" position the grid of the sweep oscillator is connected to the output of the vertical-deflection amplifier and is thus used when it is desired to "lock" the sweep to the signal frequency applied through the vertical amplifier. The second switch position provides

for line synchronization at the frequency of the line supplying power to the instrument. Since this is a pulse-generator circuit, it permits positive locking of the sweep at any frequency — either submultiples or harmonics of the line frequency. The remaining position is for connection to an external signal source when desired.

The operating voltages for all tubes are derived from a broadcast-receiver type power transformer and two small filament transformers, with additional circuits added for the c.r.t. supply. While the total accelerating potential on the c.r.t. is over 900 volts, the use of special high-voltage items has been kept to a minimum.

Connections are provided on the panel for obtaining 105 volts d.c., 6.3 volts a.c., pulse or sawtooth output, as well as the usual amplifier and synchronizing inputs. This permits external amplifiers, cathode followers, or other auxiliary equipment requiring small currents to be utilized with the oscilloscope, thus increasing the versatility of the equipment without unnecessarily increasing the weight or size.

The tube line-up from input to cathode-ray tube, including power supply, is as follows:

Vertical input and positioning 6J5
 Vertical-deflection amplifier 6J7
 Horizontal input and positioning 6J5
 Horizontal-deflection amplifier 6J7
 Linear (sawtooth) sweep oscillator 884
 Sweep cathode follower and clamper 6SN7GT
 Cathode-ray tube, 3-inch 3AP1
 Voltage regulator (+105 volts) VR-105
 Voltage regulator (-165 volts)

three $\frac{1}{4}$ -watt neon lamps NE48

Amplifier power-supply rectifier 5V4G
 High-voltage rectifier 6L6G (diode-connected)

The power requirement is approximately 65 watts at 115 volts, 60 cycles input.

Construction Pointers

The cathode-ray tube is very sensitive to external magnetic fields, so it is necessary to use care in the arrangement of components, especially transformers. Although the three-inch tube has a metal shield, the influence of a heavy soldering iron placed three feet away can be detected, so it pays to be rather fussy about parts placement and magnetic fields in general.

The instrument is built on a 15 × 7 × 3-inch steel chassis and the general parts layout may be seen in the photographs. All transformers and the filter choke are mounted under the rear end of the chassis as a measure toward keeping all magnetic fields around the c.r.t. at a minimum. A steel panel, 8 × 11½ × ¼ inches, is used at the front end of the chassis for supporting the screen end of the c.r.t. assembly, terminals, and the various controls. The other end of the c.r.t. assembly is supported by a suitably-cut-and-bent piece of duralumin sheet, thus making the whole unit rigid.

- R11 — 47,000 ohms, 1 watt.
- R12 — 1.5 megohms, ½ watt.
- R24, R26 — 4.7 megohms, ½ watt.
- R14, R15 — 0.1 megohm, 2 watts (noninductive).
- R16, R33 — 1040 ohms, 1 watt.
- R17, R34 — 4700 ohms, ½ watt.
- R18, R35 — 25,000-ohm midjet potentiometer.
- R20, R27 — 1-megohm midjet potentiometer.
- R22, R32, R33 — 0.22 megohm, 1 watt.
- R30 — 0.1 megohm, ½ watt.
- R31 — 0.25-megohm midjet potentiometer.
- R32 — 0.15 megohm, 1 watt.
- R40 — 10,000 ohms, 10 watts.
- L1 — 30-hy. 50-ma. filter choke.
- L1 — 6.3-volt 0.25-amp. lamp.
- S1 — 3-position 2-section nonshorting rotary.
- S2, S3, S7 — S.p.s.t. toggle.
- S4, S5, S8 — S.p.d.t. toggle.
- T1 — 6.3-volt 3.3-amp. filament transformer.
- T2 — 6.3-volt 1-amp. filament transformer.
- T3 — Audio transformer (see text).
- T4 — Power transformer: 350-0-350 v. a.c., 50 ma.; 5 v., 2 amp.; 2.5 v., 3 amp.

- C1 — 47-µfd. 300-volt mica.
- C2, C3, C9, C10, C17 — 0.1-µfd. 600-volt paper.
- C4 — 150-µfd. 300-volt mica.
- C5 — 500-µfd. 300-volt paper.
- C6 — 0.001-µfd. 600-volt paper.
- C7 — 0.003-µfd. 600-volt paper.
- C8 — 0.01-µfd. 600-volt paper.
- C9 — 0.02-µfd. 600-volt paper.
- C10 — 0.1-µfd. 600-volt paper.
- C11, C16, C21, C23 — 0.25-µfd. 600-volt paper.
- C12 — 1-µfd. 600-volt paper.
- C13 — 3-30-µfd. mica trimmer.
- C14, C22 — 0.0025-µfd. 600-volt paper.
- C15 — 50-µfd. 1000-volt mica.
- C17 — 0.25-µfd. 1000-volt paper.
- C18, C20, C24 — 4-µfd. 600-volt paper.
- C25 — 40-µfd. 450-volt electrolytic.
- R1, R6, R21 — 1 megohm, 1 watt.
- R2, R3, R22 — 50,000-ohm midjet potentiometer.
- R3, R26, R28 — 1 megohm, ½ watt.
- R4, R5, R22 — 47,000 ohms, ½ watt.
- R5 — 390 ohms, ½ watt.
- R7, R19, R36 — 0.47 megohm, 1 watt.
- R10 — 5-megohm midjet potentiometer.

The condensers in the sweep-oscillator tank, C_4 to C_{12} inclusive, must be of the low-leakage type, because the linearity of the sweep is dependent on the quality of these condensers. Also, it is highly desirable that the input condensers, C_{15} and C_{23} , be of similar quality, in the interests of effective isolation of the d.c. component of signals from the a.c. component. Good-quality tubular paper condensers should be satisfactory.

The tubes, terminals and controls are logically arranged for short leads and convenience in use. Well-insulated wire is used for the internal wiring, especially in the high-voltage circuits. Signal wires are kept away from other wires in the interest of keeping capacitances to a minimum. The intensity and focus potentiometers, R_{27} and R_{31} , are provided with insulated shafts and are mounted on bakelite to minimize chances of breakdown.

The Power Supply

A small broadcast-type power transformer, T_4 , supplies 340 volts for the amplifier and sweep circuits through the usual rectifier-and-filter system. For the c.r.t. voltage supply, half of the high-voltage secondary of T_4 feeds an audio transformer, T_3 , whose secondary is connected back in series with the secondary of T_4 to give a resultant voltage approximately three times the voltage of T_4 . A 6L6G, with grid, screen and plate tied together, is used as a half-wave rectifier which delivers a negative potential (with respect to chassis ground) of 750 volts after the filter.

The audio transformer, T_3 , used as a high-voltage booster transformer, is an old Thordarson unit having a ratio of 2 to 1. This one was found in the junk box, but any good well-insulated transformer should perform. The transformer is mounted on a piece of laminated bakelite in order to keep the whole unit away from chassis ground. In testing this part of the circuit, if it is noticed that the output from the h.v. rectifier is low, reverse the connections to one winding of the audio transformer to obtain proper phasing. It may be necessary to adjust R_{23} in order to get the correct loaded voltage output, as different audio transformers vary quite a bit in ratios and

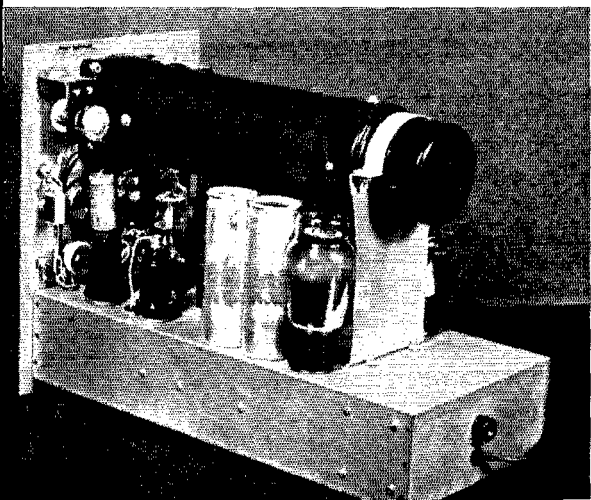
other characteristics. In any case, the value of this resistance must not be considerably under 10,000 ohms; otherwise things may get hot.

The filter consists of two paper condensers, C_{19} and C_{20} , connected in series, with resistors of equal value, R_{24} and R_{25} , across each to equalize the voltage drop. Electrolytic condensers are unsuitable in this application because of their leakage current, which to be sure may be only a few milliamperes, but which taxes the power and audio transformers. A single condenser of 2 μ fd. may be used here in place of the two shown if its voltage rating is 1000 or more.

The c.r.t. heater is run from the 2.5-volt winding of the power transformer. Since this winding is at some 730 volts above chassis, some care must be taken to insulate the leads coming out of the transformer, but it has operated very satisfactorily. No other tubes are operated by this winding because of filament-cathode insulation considerations for other tubes. A separate filament transformer, T_1 , is used to supply 6.3 volts to the amplifier and sweep tubes, while another smaller 6.3-volt transformer, T_2 , supplies the 6L6G high-voltage rectifier heater. If a transformer with two 6.3-volt windings is available in the required current ratings, it would be satisfactory and doubtless result in a more compact arrangement.

In preliminary testing, a load should be provided since the regulation is poor with a simple circuit like this, and the voltage may rise excessively without a load. The check may be made with R_{23} set at a rather high value, say 50,000 ohms, and when the load (the c.r.t. resistor network and the neon-lamp voltage regulator) is connected, the voltage across the filter can be adjusted to 750. The voltmeter used for measuring this voltage and others should have a resistance of 20,000 ohms per volt or better. DANGER—HIGH VOLTAGE!

A VR-105 tube is used for supplying a constant voltage to the screens of the amplifier tubes and to other circuits. The neon voltage regulator, consisting of three $\frac{1}{4}$ -watt neon lamps connected in series, supplies the various cathode-follower and biasing voltages. These regulators are indispensable since the feature of d.c. coupling is de-



Interior view of the 3-inch oscilloscope. The horizontal-amplifier 6J5 and 6J7, C_{19} and C_{20} , and the 6L6G used as a high-voltage rectifier are lined up along the edge of the chassis in the foreground. The 884, 6SN7, and VR105 are in line under the c.r.t. The vertical-amplifier 6J5 and 6J7, C_{24} and C_{25} , and the 5V4G are along the other edge of the chassis.

QST for

pendent upon maintenance of constant voltages. The neon lamps must be of the bayonet-base type or the resistors may be removed from other types.

The amplifier plates are directly connected to the deflecting plates of the c.r.t. The accelerating anode and the other pair of deflecting plates, being tied together within the tube, are connected to a voltage divider on the amplifier power supply so that a positive potential of 170 volts is supplied. This voltage added to that of the c.r.t. supply gives a total of over 900 volts for accelerating and focusing the electron beam. This permits economy and the use of readily-available parts and also makes possible direct coupling, which will be discussed in connection with the amplifier. The intensity and focus of the spot on the screen are satisfactory.

The Amplifiers

The input tube in each amplifier (both amplifiers are identical) is a 6J5 connected as a cathode follower so that it may be used in a positioning circuit. The positioning controls, R_{13} and R_{35} , are used for setting the trace or pattern anywhere on the screen. This is a great convenience in examining parts of a greatly-expanded pattern in detail. The control used for this purpose is placed in the cathode circuit of the cathode follower with its movable arm connected to the 6J7 grid and this is the point where it receives its bias and signal voltages. There is only slight signal attenuation across the potentiometer because of the low voltage drop across it compared with the comparatively high negative voltage supplied by the neon voltage regulator through the network.

The plate voltage on the 6J7 tube is determined entirely by the value of the voltage applied to its grid, other factors being constant. The 170 volts positive potential to the anode and deflecting plates of the c.r.t., which is supplied by the voltage divider, R_{38} - R_{39} , is at the center of the 6J7's plate-voltage swing. When the 6J7's plate voltage is 170 volts, the deflecting plates involved are equally charged and the electron beam falls at the center of the screen. Of course, when the plate voltage varies as a function of the signal applied to the input, the electron beam is swept over the screen.

High-frequency compensation is achieved by proper selection of the value for the 6J7 cathode by-pass condensers, C_{14} and C_{22} . R_{16} and R_{33} are primarily for the purpose of providing negative feed-back at the lower frequencies, down to zero (d.c.). Having attenuated the gain of the stage somewhat at these frequencies, the condensers are added to boost the gain at the higher frequencies to compensate for losses in the plate circuits of the amplifiers. This results in a substantially flat frequency response from d.c. to 100,000 sinusoidal cycles per second. Compensation by the use of inductances in the amplifier plate circuit was con-

sidered and experimented upon, but the decision was in favor of the frequency-selective feed-back network. Further extension for the frequency response was considered neither necessary nor practical in this case. For instance, the input attenuators, R_{29} and R_{37} , are one-megohm potentiometers which have appreciable internal capacitance. This capacitance, though seemingly small, varies over the range of the potentiometer and results in unpredictable distortion starting beyond approximately 100,000 cycles per second. The oscilloscope was designed primarily for audio-frequency work and thus is very free from distortion for such purposes.

The value of C_{14} and C_{22} is somewhat critical and its adjustment is best accomplished by injecting a square-wave signal into the input and noting the resultant pattern on the screen, the sweep being adjusted so as to show it properly. At several thousand cycles per second, the by-pass condenser in each case is adjusted so that the square wave appears square, with minimized droop or peak at the leading and trailing edges. It is surprising how critical this adjustment can be. It serves as a good example of general square-wave testing theory. Assuming that the layout is followed rather closely, the capacitance values given under Fig. 1 should be entirely satisfactory for all practical purposes. It is desirable to check the condensers as taken from stock, because individual capacitances may vary widely from the marked value.

The VR-105 tube is used for regulating the screen-grid voltage to both 6J7 amplifiers, primarily to retain the d.c. coupling. As mentioned before, there are no condensers, coupling or by-pass, to hamper the frequency response anywhere from zero frequency (d.c.) to 100 kc. or more. The condenser C_{37} across the VR tube, however, is primarily to by-pass the high-frequency signals and prevent a type of cross-modulation caused by the effect of one amplifier upon the other. This is a consequence of the inability of the gas tube to respond quickly to transitory changes in load current.

The Sweep Circuit

The sweep circuit comprises three tube circuits which include the 884 gas tube and the two sections of the 6SN7GT. One section of the latter is for use as a clamping diode and the other as cathode follower. The 884 cathode is grounded through a low-value current-limiting resistor, R_5 . From this point is made available a spike pulse having an extremely steep wave-front. A panel connection through S_5 is provided for this purpose. The pulse may be used for synchronizing other gear used with the oscilloscope. Also, it makes a convenient constant-signal source for testing and aligning receivers. The waveform is so steep that it is possible to pick up harmonics at frequencies as high as 15 megacycles radiated

from a piece of wire a foot long at the panel connection, when placed near the antenna terminal of a sensitive receiver.

The bias for the 884 grid is obtained from the neon voltage-regulator circuit through a voltage-divider network and the value is set at approximately 7 volts. This is sufficient to cause the 884 to conduct when the condenser in its plate circuit charges up to 60 volts or so. Various-sized condensers on a switch, S_2 , provide the coarse (step) frequency control while the fine (continuous) control is attained by means of a high variable resistance, R_{10} , in the lead supplying voltage to the sweep circuit.

The clamping diode is used for slave-sweep applications. For this purpose, a voltage divider, R_7 and R_8 , sets the diode cathode bias to something like 50 volts. Then the voltage existing at the plate of the 884 (and at the diode plate, also) is "clamped" or limited to a maximum close to that value. Since the 884 is unable to break down by itself because of insufficient plate voltage, a signal must be applied to its grid in order to cause it to conduct and discharge the condenser. Immediately after the discharging, the arc in the 884 goes out and the condenser charges up again, all the time delivering a sweep voltage to the c.r.t. deflecting plate via other circuits. Once again the 884 plate voltage hits the limit and stays there until the next pulse hits its grid. The chief use of this slave sweep (single sweep, high-speed sweep, fast sweep) is in the observation of irregular transients and other such high-speed phenomena that recur at a low rate. For example, it is possible to have a sweep lasting 1/20,000 second and recurring 60 times per second portrayed on the screen. For free-running sweep, a switch on the panel raises the diode bias to 105 volts, so that the oscillator operates by itself.

The output from the sweep oscillator is fed into a cathode follower to provide isolation from the input to the horizontal amplifier. This maintains d.c. coupling, and permits sweep rates as low as 2 c.p.s. The resistor network, R_{12} and R_{13} , between the cathode of the cathode follower and the input to the amplifier, is for the purpose of setting the sweep signal so that the center of its voltage swing is at approximately chassis ground. This is so that, with all controls in normal position, the center of the resulting trace may be about in the center of the screen. A trimmer condenser, C_{13} , is provided for the purpose of high-frequency compensation — to preserve the faithfulness of the sawtooth voltage delivered to the input across the rather high resistances on the network. Its approximate adjustment is accomplished by noting the length of the sweep baseline on the screen at low repetition frequencies, then making the length the same at the highest rate by adjusting the trimmer. Best adjustment is obtained, however, by observing the

sawtooth waveform on another oscilloscope.

A blanking pulse is delivered to the c.r.t. grid from the output of the cathode follower through a 50- μ fd. condenser, C_{16} . This serves to blank out the return trace and so keeps down confusion in the interpretation of patterns. There is also a front-panel connection and switch, S_5 , to conveniently deliver the sawtooth signal to external circuits.

The Synchronizing Circuit

As mentioned in the introduction, there are three ways in which the 884 grid may be controlled. External synchronization may be applied to a panel terminal, internal synchronization may be obtained from the vertical-amplifier output, or the 60-cycle synchronization may be obtained internally from the power line as follows: An NE2 neon lamp, a high-value resistor, R_1 , and a resistance-capacitance differentiating network, C_1 and R_2 , form the pulse (or trigger) generator, and the 350-volt half of the power transformer supplies a.c. to this circuit. As the a.c. swings sixty times per second (fifty times per second in areas of 50-cycle lines) the neon lamp fires and goes out alternately. Since there is a potential difference of some twenty volts between the starting and the running voltage of small neon lamps, this abrupt drop is passed on to the 884 grid via the condenser-potentiometer differentiator circuit, with the synchronizing switch in the power-line position. With this pulse-type trigger signal it is easy to "lock" the sweep at any frequency that is a submultiple or harmonic of the line frequency — even at a sweep frequency of several thousand c.p.s. Sine-wave synchronizing usually results in severe distortion of the sawtooth signal when working with harmonics of the line frequency, or under certain other conditions.

The Input Systems

The vertical-amplifier circuit is provided with a 20:1- and 1:1-ratio attenuator switch, S_4 , for convenience in reducing high signal voltages to a value easily handled by the input potentiometer. This too is effective on d.c. as well as a.c.; the extra terminals with the blocking condensers, C_{15} and C_{23} , provide a means of obtaining a.c. coupling whenever it is desired to eliminate the d.c. component.

The horizontal-amplifier circuit, following standard practice, has a switch, S_3 , for selecting either horizontal input or voltage from the sweep oscillator. An obvious use for the horizontal input is for connections to external signals, such as oscillators, etc., for Lissajou-pattern work, phase-shift determinations and many other similar applications.

A switch, S_6 , on the panel is provided for switching to the panel connection the spike pulse from the 884 or the sawtooth signal from the cathode-follower output.

Adjustments

The adjustment of the oscilloscope should entail no unusual difficulties. Set both horizontal and vertical positioning controls at their mid-points, the gain controls low, and turn on the power switch. The VR tube and the neon voltage regulator should ignite after a warm-up of a few seconds. Then turn up both intensity and focus controls until a spot appears on the screen.

If no spot appears on the screen, check the plate voltages on the 6J7 amplifiers with a vacuum-tube or other high-resistance voltmeter (20,000-ohms-per-volt or so) to see if they are quite far from the 170-volt center-point which is also the potential of the accelerating anode and other pair of c.r.t. deflection plates. Try each positioning control and see that the controlled 6J7 plate potential is swung through the center value of 170 volts or thereabouts. If this cannot be done, there is something wrong, and the circuit as well as the values of the resistors involved should be rechecked.

A check upon the operation of the c.r.t. may be made by shorting all deflection plates simultaneously to the accelerating anode. After turning on the power, a spot should appear on the screen; if not, check the c.r.t. circuit and see also that -750 volts is being applied. In this connection, it cannot be too strongly emphasized that high voltages are involved and that extreme care should be taken in handling the internal circuits. There are potentials exceeding 1100 volts between some points.

At a convenient time during the construction, the voltage at the c.r.t. heater terminals should be measured with a good a.c. voltmeter (with all high voltages off, of course) and it should be close to 2.5 volts. If necessary, use a series resistance of suitable value to bring it to 2.5 volts, in the interests of getting maximum tube life.

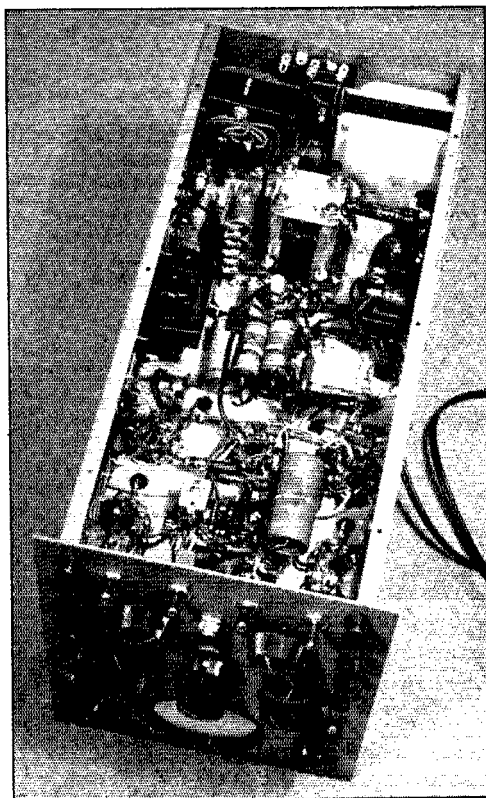
Needless to say, the intensity of the spot on the screen should be kept down and never permitted to become so bright that there is danger of possibly burning the screen.

For the final touch, a wood cabinet with Masonite panels is used. The panels were sandpapered and rubbed with stain, then with Johnson's wax, so the appearance is finished.

Applications

The instrument may be used in the usual ways for the observation of various phenomena such as distortion in amplifiers, key-clicks and hum on radio-telegraph signals, and others. Such uses are covered in various articles and books, and a little study of oscilloscope techniques as presented in these publications is strongly urged if only in the interests of impressing upon the prospective user the limitless possibilities of that wonderful device called the cathode-ray tube.

The d.c. amplifiers have proved extremely useful in investigations involving d.c. components of



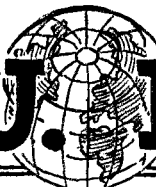
Bottom view showing placement of transformers at the rear.

signals, which may be as important or even more so than the commonly-encountered a.c. signals. For example, with suitable input circuits, the oscilloscope may be connected directly to the plate of an audio amplifier. Then the values of both the a.c. and d.c. components are portrayed upon the screen in relation to each other, and adjustments may be readily checked by observation of the pattern on the screen. The operating point of the amplifier under check may thus be adjusted precisely for optimum performance. The deflection sensitivity of either amplifier, with the gain controls set for maximum sensitivity, is such that the potential of a flashlight cell ($1\frac{1}{2}$ volts) deflects the pattern along the axis approximately one inch on the screen. This oscilloscope is in effect an a.c.-d.c. vacuum-tube voltmeter with a two-dimensional graphical indication in the form of patterns on the phosphorescent screen.

Specific applications involving pulses and slave sweep will be apparent to the thoughtful user. As is well known, the applications of pulse technique are numerous and have resulted in two miracles of electronic science; namely, radar and loran. The instrument herein described was de-

(Continued on page 189)

I.A.R.U. News



DECEMBER CALENDAR

The December issue of the I.A.R.U. Calendar reports the endorsement of an agreement with the United Nations in pledge of mutual support and coöperation, the terms of which were previously transmitted to each member-society and fully chronicled in *QST* for June, 1947.

It is further reported that Union membership has been granted to the *Chinese Amateur Radio League*, the *Radio Club de Chile* and the *Radio Club Paraguayo* as member-societies for China, Chile and Paraguay, respectively. The Headquarters was pleased to express, on behalf of the other members of the Union, sentiments of congratulations and hearty good wishes.

Because of failure to report any postwar activity, the Calendar advises, the *Experimental Radio Society of Egypt* has been suspended. The *Islenakir Radio Amatorar*, Icelandic society with headquarters at Reykjavik, has been proposed for Union membership.

The Calendar reports progress of Union affairs, including a recapitulation of the U.N.-I.A.R.U. agreement, Union activities at the Atlantic City conference, number of WAC certificates issued and various publicity projects undertaken.

CHILE

The *Radio Club de Chile*, newly-admitted member-society, has inaugurated the publication of an informative bulletin for its members. The initial issue is interestingly divided into departments relating to various phases of amateur radio and a section for items of general interest, the latter voicing a plea for 'phone amateurs to avoid using 14,000-14,100 and 28,000-28,100 kc. Also reported are the results of the traffic-handling contest of 1947.

BAND PLANNING

Recognizing that the division of amateur frequencies between telegraphy and telephony, because of the nature of radio, is of international concern, the *Radio Society of Great Britain* pro-

poses an endeavor to consolidate views of the various European I.A.R.U. societies into a concrete regional band-division plan as an integral part of future international band planning. R.S.G.B. expressed the hope that this initial move may lead to uniformity in the matter of sub-allocations for 'phone and c.w. in the European region.

CZECHOSLOVAKIA

The calls of 16 OK amateurs have been immortalized as "forever silent keys." These men died in German concentration camps in which they were confined because of their activities in resisting German occupation. As a permanent tribute to the heroism of the original licensees, the OK calls 1CB, 1GU, 1JV, 1PZ, 1RO, 1RX, 1VK, 1YB, 2AC, 2AH, 2BA, 2HL, 2KE, 2LS and 2PP will never again be issued by the Czechoslovakian licensing authority.

ARGENTINA

Effective January 1, 1948, a new system of amateur licensing was set up in Argentina by the General Administration of Mail and Communications.

Amateur licensees are now divided into three classes: The first class is comprised of amateurs who held licenses during and before 1941 and who are now at least 35 years of age. Also eligible for this class are those who successfully pass an entrance examination consisting of a code test of ten w.p.m. in plain Spanish language and questions relating to amateur regulations and general technical matters including propagation and operation and adjustment of an amateur station, both 'phone and c.w. Amateurs in this class are privileged to use all frequency bands allocated to the amateur service.

Those who were licensed prior to January 1, 1948, but who were not otherwise eligible for first-class licenses comprise the second class of amateurs. The entrance examination for second-class amateurs is essentially the same as that for first class except that the code test is omitted.

(Continued on page 126)

Jewell Knott, TG9JK, and Ralph Cozad, ex-TG9RC, both of whom are well known in the DX fraternity, look things over at the entrance to the airport at Guatemala City.



QST for



Hints and Kinks

For the Experimenter



ELIMINATING BACK-LASH IN BC-348 RECEIVERS

BACK-LASH in the tuning mechanisms of the BC-348 series receivers can be eliminated by slight adjustment of the screws that mount the tuning condenser. The holes in the bracket on the condenser are sufficiently large to allow the condenser to be moved far enough to take up the back-lash. It is only necessary to loosen the screws on the dial end of the condenser mounting bracket and the subpanel casting. Twist the screwdriver blade until the slack in the gears is taken up, and then retighten the mounting screws.

— Kenneth A. Jenkins, W6OYM

SHIELDING KINK

IN some instances, such as in a high-gain audio amplifier, it is desirable to shield an individual component to reduce hum. A very effective shield can be made from the metal case of a discarded fluorescent-light "starter" by removing the glass tube and condenser found inside and mounting the component inside on the terminal lugs. The result is shown in Fig. 1.

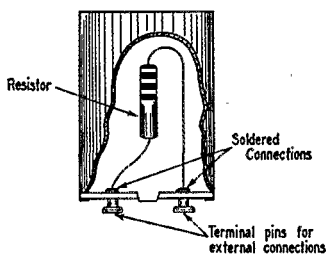


Fig. 1—An effective method of shielding an individual component. The case of a burned-out fluorescent-light "starter" is used as shown.

The assembly can then be grounded to the amplifier chassis by means of a cable clamp, or by drilling a hole in the top of the can and mounting with a 6-32 screw. The outside connections can be made with shielded wire to insure complete isolation.

— G. W. Jerguson, W4IJI

AVOIDING FROZEN FISTS

WITH wintertime upon us we begin to hear a great deal of stiff-arm and frozen-fist c.w. Few shacks are adequately heated, and though the operator may be comfortably dressed, his fingers may still become too numb and sluggish for deft

work on a key. A mitten is hardly practical.

The solution is an ordinary gooseneck desk lamp, bent close down directly above the hand. A 40- or 60-watt bulb at a distance of six to eight inches soon spreads a pleasant warmth from wrist to fingertips. The lamp will give a good light for log and note pad besides keeping your fist from "freezing."

— A. F. Scotten, W6ZMZ

ANOTHER 2-METER BCI CURE

A VERY stubborn and acute case of 2-meter BCI was eliminated entirely by a simple yet effective method. Ninety per cent of the interfering signal was found to be entering the broadcast receiver (one of the midget variety) via the a.c. power line. The remaining ten per cent was found on the twenty-foot wire that was being used as an antenna.

Three r.f. chokes, each made of 45 turns of No. 17 enameled wire, $\frac{3}{8}$ inch in diameter, were used. One was inserted in each side of the a.c. line, one at the power switch and one in series with the plate of the rectifier tube. These chokes were mounted under the chassis in the clear on stand-off insulators. The third choke was mounted directly on the antenna input terminal, and connected in series with the antenna.

Any form of insulation used to cover the chokes, such as friction tape or spaghetti tubing, will reduce their effectiveness.

— Clarence G. Jeffers, W1LZR

THE 836 AS A HIGH-LEVEL SPEECH CLIPPER

IN the article "More on Speech Clipping" in the March, 1947, issue of *QST*, the writer showed an 866 used as a high-level speech clipper and stated that "... careful checks indicate that the performance is as good (with the 866) as with a high-vacuum rectifier." The 866 was used principally because it was inexpensive, and could be used with a standard filament transformer.

Further investigation has shown that the high-vacuum type is more desirable, because under certain unfavorable conditions, such as location of the clipper tube in a stray r.f. field or in a region of high ambient temperature, there is a considerable slowing-up of the deionization time in the gaseous rectifier which impairs its performance. The splatter suppression is still noticeable, but is not nearly as effective as when

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25 Years Ago

this month

FEBRUARY 1923 *QST* recapitulated in staccato fashion the numerous history-making events of late 1922:

Three hundred and sixteen different United States and Canadian amateurs heard in Europe, the signals being reported from Britain, France, Holland, and Switzerland.

British and French amateur signals heard in the United States for the first time in history.

An American amateur station puts 14 messages across the Atlantic to England without a repeat.

West Coast amateur signals heard in Chinese and Japanese waters.

Amateur radio had at last decisively attained international stature! . . . and on "200 meters." It was the Editor's pleasant duty, this issue, to chronicle in detail these many accomplishments.

The ARRL Third Transatlantics — arranged by Traffic Manager Schnell in cooperation with an RSGB committee headed by Mr. Philip R. Coursey and a French Transatlantic Test Committee led by Dr. Pierre C6rret — saw all U. S. districts represented among the 300-odd calls heard in England and on the Continent during the transmitting period. Outstanding telegraphing stations getting across were 1BET, 1XM, 1ZE, 2AWF, 2AWL, 2LO, 3HG, 3XM, 3ZW, 8AQO (most consistent) and 8ATU, while three radiophones, 2EL, 2XAP and 2ZK also made the grade. Spark? — not a station reported! Particularly impressive is the solid reception by Mr. Burne, British 2KW, of 14 messages transmitted to him blindly by Irving Vermilya, 1ZE. The listening period of the Tests did not pay us such fancy dividends, however, heavy QRM from noncooperating stations on this side raising havoc with our simple regenerative detector-audio receivers. Final analysis shows 20 Americans reporting a total of three Europeans — RSGB's 5SW, British 2FZ, and Leon Deloy's French 8AB.

The vast expanses of the Pacific are no longer an impregnable barrier, either, this issue gleefully reports. Hurling toward Asia and new international horizons, the transmissions of West Coast 6ARB, 6CC and 7SC were logged aboard a ship off the coast of Japan, while another maritime source reports reception off the coast of China of 6CC, 6KA, 6NX and 6ZZ. Real champs, 6KA and 6ZZ — their signals were also heard in Europe during the Transatlantics!

If any amateur had time for technical reading in these exciting days, he could find enlightenment this issue from Leon W. Bishop's (LXP) prize-winning paper, "C.W. Reception with the Super-regenerator," from W. B. Schulte's "Hours of

(Continued on page 136)

Annual ARRL DX Contest

C.W.: Feb. 13th-15th, Mar. 12th-14th;
'Phone: Feb. 20th-22nd,
Mar. 19th-21st

Amateurs everywhere are invited to take part in the 14th Annual ARRL DX Competition. There will be two week-end periods devoted to c.w. participation and two to 'phone. Engraved medallion awards will be given to the highest-scoring c.w. and 'phone stations for each country and each continental U.S.A. and Canadian ARRL section entered in the contest. Operators outside the U. S. and Canada will attempt to work as many W, K and VE stations as possible. Exchange of serial numbers will be required. Complete rules and details on scoring appear on page 50 of January *QST*.

The contest periods will be divided for c.w. and 'phone as follows: first c.w. period will begin on Feb. 13th at 7:01 P.M. EST (0001 GCT Feb. 14th) and end on Feb. 15th at 6:59 P.M. EST (2359 GCT Feb. 15th). The second c.w. period will be scheduled during the same hours from Mar. 12th to 14th. The first 'phone period will begin at 7:01 P.M. EST on Feb. 20th (0001 GCT Feb. 21st) and end at 6:59 P.M. EST Feb. 22nd (2359 GCT Feb. 22nd). The second 'phone period will be scheduled during the same hours from March 19th to 21st.

Though not necessary for entry in the contest, ARRL will supply convenient report forms upon request. You may make up your own forms following the sample shown in last month's complete contest announcement.

If you are located in mainland U.S. or Canada, here is your chance to enjoy the thrill of long-distance contacts with the rest of the world and to compete for the attractive medallion awards. There will also be the opportunity to work new countries for the DXCC and other awards. If you are located outside the U.S. and Canada, you likewise have the opportunity to compete for an award and to pick up states for WAS or Canadian provinces for a WAVE award. It should be lots of fun for all participants. Be on hand for a DX contest that is expected to be the biggest and best yet!



The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* WIHDQ

For 50-Mc. men, at least, the closing weeks of 1947 were a period of frustration. After providing almost daily openings, many of them good for several hours of international DX work on 50 Mc., the m.u.f. dropped in December just low enough so that, day after day, it looked as if the band might open, but all too often it just wouldn't quite make it.

There were a few F_2 openings. The series of trans-Atlantic contacts broke off on December 1st, and no signals were heard across the Atlantic in either direction again until Dec. 18th, when G5BY worked W8MVG and heard W8CMS. On the 14th, W7BQX, Sequim, Washington, worked W4IUJ, West Palm Beach, and W4EID, Jacksonville, Fla., and W6BWG, San Gabriel, Calif., worked W2BYM. A few minutes after this QSO, at 11:20 A.M., W6BWG heard W7ACS/KH6 coming in off the back of his beam. Swinging the array around, he established contact, his second with the Islands — this with 5 watts input. Gene was having quite a time of it that day, his Mainland contacts including W6s GGM, QFT, BWG, AMD, ANN, NAW, OB, UXN, and W7ERA and W7FFE, the first Pacific DX worked from Oregon. W7ACS/KH6 also heard W5ELL, Albuquerque, New Mexico; and he was heard by WØBDQ, Lincoln, Neb., during the contact with W7ERA. On Dec. 21st, W7BQX had contacts with W4EID, W3OR, and W2AMJ.

Daily checks with G6DH, G5BY and others showed the m.u.f. along the North Atlantic path to be running close to 50 Mc. frequently during the month. G5BY heard signals as high as 49 Mc. almost every day, and your conductor heard numerous signals from the European direction as high as 49.8 Mc., but no amateur signals whatever, though G5BY was making test transmissions at peak times. A report from F8YZ, Nancy, France, received via F8ZF and G6DH, says that a number of W signals were heard on 50 Mc. on

the 24th and 25th, but further details are lacking as we write.

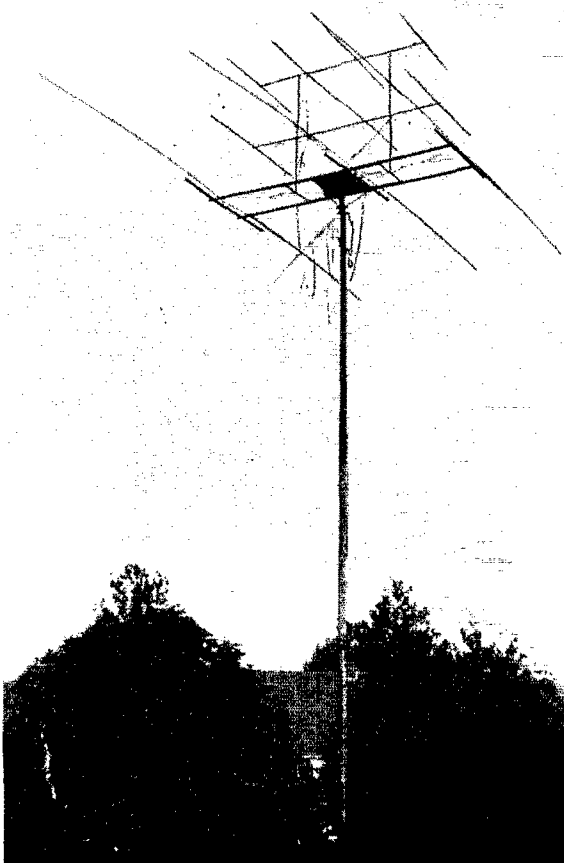
As in past years, December produced a goodly number of sporadic-E openings. This sort of thing, which may be expected each winter during a period of about three weeks either side of the shortest day in the year, started on Nov. 30th. Shortly before noon, while most of the gang in the East were still working Europeans, W9s and Øs appeared, and the East Coast had the novel experience of being able to choose between two types of DX for the next thirty minutes. The band was open for E, skip in various parts of the country on Dec. 4th and 7th. The evening of the 11th provided a nice north-south opening, with Florida and Alabama W4s renewing acquaintances with friends in W1 and 2. There was an opening between W9 and W4 and 5 on the 15th, and there were additional east-west affairs on the 20th and 24th. The afternoon of the 27th was the occasion of a two-hour session of north-

* V.H.F. Editor, QST.



This array is used by PAØUN, Eindhoven, Holland, to work DX on four bands. The two top sections are similar 4-element arrays, their lengths adjusted for 58 and 50 Mc. The large job is a 6-element 10-meter array, which is convertible to a 3-element 20-meter system by means of remotely-controlled relays.

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south work in the East and Middle West, and the same paths were active again during the evening of the 29th.

All this seems to indicate more than a normal amount of sporadic-*E* skip for December, continuing the trend of almost daily activity observed during the summer period. Further evidence of abnormal conditions is reported by W4EID, Jacksonville, Fla., who worked W7QLZ, Phoenix, Ariz., at 9:39 P.M. EST on the 20th. This is the first instance of "double-hop" *E*_s ever reported in the winter months. W5AJG, Dallas, Texas, at almost midway along the path, was S9-plus in Jacksonville at the time.

Interest in 50-Mc. work was helped along considerably in Australia and New Zealand during December by frequent sporadic-*E* contacts between the two countries. This is their summer season, December being comparable to our June in propagation characteristics, and the VKs and ZLs have been having quite a time for themselves. The big doings have been the subject of a major portion of their 10-meter QSOs with Ws, and a little nightly listening on the low end of 10 has made it obvious to us that the boys "down under" are taking to 50 Mc. in ever-greater numbers.

Prospects for *F*₂ DX in the coming months are the subject of considerable difference of opinion. G6DH is confident that January, February and March will see a revival of international 50-Mc. work. The prediction charts indicate that the m.u.f. will reach 50 Mc. on paths such as W4 to South America and Europe to South Africa, but the North Atlantic path doesn't look too promising. DX should be workable along east-west paths near Latitude 20, both north and south of the equator, and the KH6-J9 path may be open again. Good news from MD5KW: VU2CQ, Bombay, India, is now on 50.028 Mc. regularly. Asia — at last! Then, too, it should be remembered that the m.u.f. across the North Atlantic went very close to 50 Mc. on peak days right through last winter. It will bear careful watching again this year.

Summary — V.H.F. Marathon of 1947

With some regret we ring down the curtain on the V.H.F. Marathon, final results of which appear herewith. This contest, originated in 1940, has had a wide following, and it has provided us with much useful information on band occupancy and activity. But a glance at the final summary printed herewith will show why it is being discontinued — use of our v.h.f. bands has reached a point where it is virtually impossible to continue such an activity. Just get out your *QST* file and compare the 1947 scores with those of any previous year!

As in 1946, the highest score was run up on 144 Mc. Jim Kmosko, W2NLY, South Plainfield, N. J., shattered all previous records, working

803 different 2-meter stations, for a total score of 7358 points! In addition to these feats, which won for him the medallion award for the highest 144-Mc. score, Jim tied with W3HWN for the medallion award for most states worked on 144 Mc., won the certificate award for the highest score in his ARRL section (Northern New Jersey), and was three times winner of the monthly certificate awarded to the high scorer in each reporting period! Nearness to the New York area, with its almost limitless reservoir of 2-meter activity, was a factor in this record, to be sure, but there were other important considerations. They included a fine rig (a 100-watt job multiplying from a 2-Mc. crystal oscillator, which could be reactance-modulated for narrow-band f.m.), a high-gain array — the famous "Antenna That Multiplies by 50" described recently by W2NLY in *QST*, a sensitive home-built converter, and (this is what *really* does it) consistent daily activity on the band.

A similar brace of awards was won by Doc Farrar, W1CLS, Waltham, Mass., high man in the 50-Mc. section. Using a pair of 4-125-As running 250 to 400 watts input, feeding a 4-element 0.2-wave spaced array which had a second similar one stacked a half-wave below it during the summer months, and a home-built converter having two tuned r.f. stages, W1CLS worked 378 different stations on 50 Mc. for a total of 7320 points. His total of 44 different states for the year was equalled by no other Marathon entrant. His point score was more than twice that of his nearest competitor in the Eastern Mass. Section. W1CLS also set another mark in the 1947 Marathon — his score for the 10th period, 2664 points, was the highest one-month total ever recorded in the history of the Marathon. Doc was the 50-Mc. winner by no very wide margin, however, impressive 50-Mc. scores being turned in by W6OVK, W2AMJ, W2BYM and W9ZHL. Leader, through most of the year, was W9ZHL, Terre Haute, Ind., who was in there pitching every day. It is interesting to note that he made 358 contacts on 50 Mc., most of them by sporadic-*E* skip. There were very few stations being heard anywhere in the Middle West that were not worked by W9ZHL, and only the lack of more *F*₂ DX (which swelled the totals of 50-Mc. stations on both coasts) prevented him from coming out on top.

There was an appreciable amount of 235-Mc. activity in the 1947 Marathon, Alex Knights, W2DZA, Teaneck, N. J., leading in this department with 14 different stations worked for a total of 160 points. W2NLY found time in between his 2-meter contacts to work 10 stations for second place in the 235-Mc. column.

Some other noteworthy points in connection with the 1947 Marathon included the work of W7ACS/KH6, Pearl Harbor, who worked 40 different 50-Mc. stations, two of which (J9AAK

and VK5KL) were record distances at the time. He is the only 50-Mc. man in the Islands to have worked the Mainland on 50 Mc. to date. W6-BWG, San Gabriel, Calif., with 150 stations in 13 states and Hawaii worked on 50 Mc., would not merit special mention were it not known that all these contacts were made with a maximum of 5 watts input, and without the use of other bands for "promoting" contacts!

W8WJC and W8UKS ran up fine scores on 144 Mc. Using high power, tremendous antenna arrays, and highly-sensitive receivers, these fellows shared with W4FJ and W3EKK/1 the distinction of having rendered obsolete the time-honored Marathon scoring system. They have the mixed satisfaction of making a mere 20 points for several 144-Mc. QSOs beyond the 500-mile mark, when those between 250 and 500 miles were good for 50 points each! These "over 500" contacts on 144 Mc. serve to show how times have changed — when the Marathon scoring system was devised nobody had any idea that such distances would be covered on any v.h.f. band but the lowest, so the point scoring was adjusted with the peculiarities of that band in mind.

2-Meter News

Once again, correspondence relating to 144 Mc. is conspicuous by its absence in the file from which this department is compiled. This does not mean that the band is deserted, by any means, but rather that DX records are not being made and therefor most of the gang feel that there is nothing to report. Preparation of a department such as this is a feast-or-famine proposition. When things are hot we invariably come up to copy time with more dope than we can possibly use, and in the winter period we have little or nothing. The space available might well be used for all manner of interesting items — but you fellows provide them. No letters — no department, so come on 2-meter gang, let's have the news!

There is some prospect that the chain of activity down the Atlantic Seaboard may be extended, come another inversion season. In the past the DX worked from W1 and W2 has stopped (with good signals that far) with the region around Norfolk and Richmond. W4LNG, Atlanta, Ga., lists W4s LMF, KHD, KIP, LSX, KEV, FBH, IKJ and LNG as the crystal-controlled stations in the Atlanta area, all of whom have horizontal arrays of from 4 to 16 elements. W4KPK is on in Bremen, W4KGD in Dahlonga, and W4MFW in Rome, all with horizontal beams and converted 522 rigs. Almost all of these are using converters, rather than the 522 receivers. There is reported to be activity in Greenville, S. C., Augusta, Ga., and Birmingham, Ala., but the Atlanta gang have worked none of these points. They would like to arrange skeds with stations in Tennessee, Alabama and South Carolina —



Standings as of December 30th

W1CLS	44	W5VY	40	W9DWU	46
W3CIR/1	42	W5ML	38	W9PK	43
W1LLL	40	W5AJG	38	W9ZHL	43
W1HDQ	39	W5JLY	38	W9JMS	36
W1CGY	38	W5FSC	34	W9QKM	33
W1HMS	36			W9ALU	32
W1JLK	35	W6UXN	46	W9ULA	30
W1LNS	33	W6VVK	38	W9AB	23
W1CLEH	32	W6ANN	38		
W1CJL	30	W6BPT	34	W0USI	45
W1AF	27	W6FPV	31	W0QIN	43
W1NF	25	W6WNN	24	W0ZJB	43
W1EIO	24	W6EUL	22	W0DZM	42
		W6HZ	13	W0TQK	42
W2BYM	39	W6BWG	12	W0SV	42
W2AMJ	38			W0BJV	42
W2IDZ	37	W7BQX	43	W0HXY	41
W2QVH	37	W7ERA	43	W0INI	41
W2RLV	35	W7HEA	40	W0YUQ	39
		W7FDJ	36	W0JHS	38
W3OR	35	W7FFE	35	W0PKD	36
W1KMZ/3	33	W7KAD	35		
W3MKL	33	W7JPA	34	VE3ANY	27
W3RUE	31	W7QAP	30	VE1QZ	24
		W7ACD	27	VE1QY	24
W4GJO	46	W7JPN	19	G5BY	24
W4QN	40			VE2KH	17
W4GIY	40	W8RFW	25	VE2GT	14
W4EID	38	W8TDJ	22	XE1KE	12
W4WMI	33	W8QQS	20		
W4FBH	31				
W4HVV	29				
W4FJ	26				
W4FNR	25				
W4EMM	25				
W4JML	20				

Note: Only stations reporting their standings regularly are listed in this box. To get in send in a list of states worked, one call for each state, with the date the contact was made. Then report at least once every two months.

any takers? W4GJO, Orlando, Fla., has his p.p. 35TCs running as triplers with fair efficiency, and has a converter ahead of his S-36. Contacts have been made with W4EID at Jacksonville, 120 miles to the north, and Grid will be in there next spring when the DX starts up along the coast. Judging by his 50-Mc. record, he should be the man to turn the trick, if anyone can. W4GJO has heard stations in the high f.m. band from points as far north as Savannah, Ga., when tropospheric conditions were favorable, especially during the fall period, but to date Jacksonville is the farthest north as far as 144 Mc. is concerned.

Though many of the gang around Columbus, Ohio, have 522s, no great number has yet shown up on 144 Mc., according to W8WRN. He lists W8s UZ, CCS, AER, IJV and WRN as

(Continued on page 188)



Correspondence From Members -

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

S. S. S. C.

38-06 Sixty-First St., Woodside, N. Y.

Editor, *QST*:

I would like to point out that in your very excellent article in *QST* for January you state on p. 13 that amateur single-sideband 'phone originated in 1947.

To keep the records straight I suggest you read W6DEF's article in three installments published in the Sept., 1933, Dec., 1933, and Jan., 1934, issues of *R9* magazine.

I still have here, capable of operation (with a few hours work), the half-kilowatt single-sideband suppressed-carrier transmitter that I built in 1934 to his design. In that year, on the 20-meter band, I communicated regularly with at least half a dozen other stations also using single-sideband. Communication was very good using this method and I was able to suppress the carrier in excess of 50 db., but the idea languished for lack of general interest. It is possible that congestion of the amateur spectrum will reawaken interest in the system.

I believe W6DEI deserves full recognition for pioneering this particular field. Won't you see that he gets it?

— J. Evans Williams, W2BFD

DX PROCEDURES

3631 Oakland Avenue, Minneapolis, Minnesota

Editor, *QST*:

I'm thinking seriously of heading for the microwave bands and staying there. There isn't much use in trying to work any DX on 20 c.w. what with all the test-happy dough-heads on that band. As I write this letter I'm listening to the rat-race centering about EL3A on approximately 14,085 kc. As soon as he signs with one station it seems as though everybody and his brother calls him. When one of the gang waiting in line finally does contact him the majority of the rest patiently and politely wait until the QSO is completed before calling the DX station again. You'll notice I said the majority wait before calling. There are a few who seem to think, "If I can't work him, nobody else will either." They take their revenge by testing, tuning, or just horsing around on the frequency until the choice bit of DX is open for another QSO again.

Does anyone have any suggestions as to what to do with these jokers? I have some ideas, but they're not legal.

— M. H. 1sp, W0WEP

POWER

Grover's Mill Road, Princeton Jct., New Jersey

Editor, *QST*:

Maybe you can tell me why FCC does not repeal the input law — or make it stick. *QST* shows W — with a nice little rig with 460TH jugs in the final. Now no doubt these are only used to heat the shack. We would not wish to insinuate that he (and a lot of other guys) would break the law. However, if a guy is interested in a 1-kw. sig he does not ordinarily use 450THs. A pair of these will put out 3 kw. with no trouble at all.

This may sound like sour grapes, but if 5 kw. is the new limit, we should be informed so even the Mr. Milquetoasts who still follow the rules could act accordingly.

— G. W. Leck, W2POC

'PHONE FREQUENCIES

409 South Spadra, Fullerton, California

Editor, *QST*:

... I propose that 14,300 to 14,400 kc. be thrown open to 'phone immediately until the Atlantic City regs become effective. The other alternative would be to move the 'phone band to the high end. Re 3.5-Mc. c.w.: out here on the West Coast the c.w. activity does not warrant 350 kc.; my suggestion would be to throw more of the band open to 'phone.

— James C. Shaw, W6JQX

Kendrick, Idaho

Editor, *QST*:

Here is hoping for one day c.w. and one day 'phone, something on the order of the [Griffin's] presentation in December *QST*.

— Bruce Ebert, W7KDV

Yamachishe, Quebec, Canada

Editor, *QST*:

... It seems to me that, sooner or later, at one of the international conferences some of the many nations who are already doing their best to swipe the high end of 40 for b.c. will succeed, on the grounds that the W/VE hams don't use it anyway, so why should we be dogs in the manger? My suggestion is to open the band from 7250 to 7300 kc. for 'phone hams holding Class A tickets. There must be plenty of hams who would enjoy working 40-meter 'phone — I know I would — and whereas I go along 100% with the idea of c.w.-only on 40, what is the point if the frequencies aren't being used? ...

— Ken Wilmut, VE2WR

Eric, Pennsylvania

Editor, *QST*:

... Believe that fullest use of present low-frequency assignments can best be attained by leaving 'phone-c.w. subdivisions as they are at present. ...

— Raymond Rosenberg, W3NCJ

Santa Ana, California

Editor, *QST*:

... This club is on record in favor of widening the 7.5-meter 'phone band, 3800 to 4000 kc., and for the 20-meter 'phone band to be extended up to the high end, 14,200 to 14,400 kc., at least for as long as we still have that much. ...

— A. R. Van Compernelle, Secy.
Orange County Amateur Radio Club

Athens, Georgia

Editor, *QST*:

... I believe that c.w. should be retained for emergency use, but I can see no justification for it otherwise after having noted for so long the utter unfairness of the present subdivisions. I am prompted to greet c.w. noises when they issue from my loudspeaker with the same enthusiasm with which I note parasites issuing from my final tank.

Oh, for the Utopia where c.w. signals are a federal offense except for emergency purposes. Please don't let any prejudice prevent your giving the 'phone side of the question.

— Raymond A. Cook, W4JOH

[Editor's Note: Okay, Gang, it's all yours to decide. Be sure to read the Planning Committee's report in this issue, and then detach and mail the postcard with your expression of opinion.]



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
J. A. MOSKEY, WIJMY, Asst. Comm. Mgr.
ALBERT HAYES, WIIIN, Natl. Emerg. Coordinator

GEORGE HART, WINJM, Communications Asst.
A. F. HILL, JR., WIQMI, Communications Asst.
LILLIAN M. SALTER, Communications Asst.

DX Competition. A good many of us will be on in February and March to get a few more countries to our credit, whether we go in for the section competition in a large or small way.

It is perfectly natural that friends swap information about the calls and frequencies of some of the DX in QSOs, at the club, store, etc., both week-ends and in intermissions to the operating program. Where the aim for a medallion is just incidental, few contestants care one way or another about this. We would be the last amateur to criticize another for a brotherly fraternal act. Casual dissemination and pick-up of information is not subject to monitoring. He who keeps his ears open may profit from radio intelligence.

Sportsmanship is something that we must have in a keen competition like this ARRL DX fray, as well as high standards of fraternalism at all times. It is *not* sporting to push and shove (QRM intentionally) nor to give either undue helps or hindrances to amateurs seriously working for the top scores in the different sections in the DX Competition. Just as there are cheers and boos from the sidelines in an athletic event, we have our own intense amateur opinion, directed in club groups and by regions toward those who participate actively in our competitive activity. The average ham has a keen and well-developed sporting instinct. Competitors would do well not to run against the considered judgment of our whole amateur fraternity as to what is fair and aboveboard.

For the record, it must be said that it is illegitimate, unsporting and unfair for any contestant to arrange for or accept any kind of unreported assistance in his operational activity at a station working in our contest. Under no circumstances will one have one or more helpers spotting or logging stations for him at one's shack or elsewhere unless such person reports as an assisting operator. Such an "intelligence" department might be desired, but whether just a little or a lot of assistance is rendered, we are obliged to say it is unethical. ARRL has advised FCC of the dates of the Competition and will have Official Observers in our own organization on the job to assist in monitoring those things that go on over the air, so appropriate action as required can be taken.

Local amateur opinion and club visiting and

observing pick up the torch of enforcing sportsmanship in the field where national efforts cannot enter. Any award or contest is worth only what contestants make it themselves! These remarks are just to remind bystanders, as well as participants, that it is not regarded as sporting to assist or give assistance (unreported) in this year's DX Competition operating.

On Use of the Directional CQ. The "informative" CQ is discussed on page 3 of *Operating an Amateur Radio Station*. W7ETK relays a suggestion from G4CP that more W stations identify the name of their state with their calls to assist foreign amateurs interested in WAS.

Even at other times than the period of our DX Competition, any domestic use of CQ DX in the lower-frequency amateur bands is of the most doubtful merit. But directional CQs used by amateurs in other continents and countries can assure greatest benefits for all. The ratio of ham population here to overseas is such that a single general call from a good many countries outside the North American continent under best conditions *can* result in securing replies from amateurs in almost every one of our 48 states! For example, a "CQ Idaho" with answers *only* to W7s replying from Idaho reduces QRM from the greater part of the U.S.A. with which communication is not desired or needed. Such a call disappoints fewer stations not answered.

DX Amateurs: Some American operators with a high degree of interest in casual contacts may persist in calling you, even though you make your CQ directive as to state or city. It is suggested that these men *not* be encouraged by answering their calls at such times. By your strict adherence to an operating policy that is consistent with your own directive indications, you have good control over this calling and interference situation. Note last month's remarks, this column, suggesting "DX control by DX stations."

Do not reward the casual callers whose transmissions may be covering the stations you really want. Also don't forget to tell W-VI operators from what part of the band you intend to start tuning your receiver. Use the HM, MH, LM or ML designations given in this column last month.

U. S. A.-Canadian Amateurs: The directional CQ in the States similarly can be enforced advantageously. If you call CQ OHIO, there is no

excuse for a chap in Iowa answering, *unless he has a schedule with Ohio*. If he has, he should add the informative designation QSP OHIO to his reply if he expects your attention.

On Accuracy and Responsibility. Traffic handlers report a considerable proportion of "service messages" at this season, asking for better addresses on traffic held for delivery in some cases. W6CMN reports having received many messages with misspellings in the names of commonly-known cities. This suggests that greater care should be observed in transmission to read and send with care. Receiving stations should ask for repeats on any or all sections of messages containing misspelled words or sections of doubtful accuracy in any respect. Strive for accuracy!

W9GMV and W9AUH recently had their attention attracted to a signal transmitting ZAZ ZAZ RUSS RUSS. The signal was from a W2 using his bug improperly. . . . Here is a source of operating errors easily corrected technically (proper bug adjustment using a milliammeter) or by honest practice with a key. Investigation proved that the operator in question was trying to send MIAMI RUSH!

The Amateur's Code places his station always ready for service of country or community and conveys the idea of assistance and cooperation for *each other* as well. In addition to readiness to spend testing time with each other to clear technical trouble, this means that *all hams should*, as limitations of time and opportunity permit, accept traffic coming their way for prompt responsible relay or delivery as a case may require.

Wanted! Volunteer Stations To Send 28-Mc. Code Practice. Operators who can undertake a good grade of code-practice transmissions to assist amateurs in their areas in attaining code proficiency are asked to advise ARRL headquarters what schedules they can keep. Amateur radio clubs having stations are urged to undertake a local "practice program," with special attention to transmissions on 28 Mc. In writing ARRL kindly advise the frequency, days of transmission, starting time and duration of such transmissions, and the speed ranges covered. Also, state when the schedule you submit is expected to become effective. This information will be used in *QST* and mimeographed for the many readers who request information on such schedules.

Harmonic Precautions Necessary. Official Observer W9TAL suggests a squib in *QST* cautioning all who use 75-meter 'phone to run checks on their second harmonics. W5HXI passes along a suggestion given informally to him as SCM by local FCC personnel that "all nets, 'phone or c.w., appoint a member station to monitor, using an additional receiver where possible, on the second or other harmonics of the net frequency. This monitor should report to net member-sta-

tions all harmonics that should be looked into." Then Faraday shields and other means can be applied by the individual. To reduce or eliminate all spurious emissions in accordance with good engineering practice avoids possible FCC trouble.

Harmonic checking need not and should not be limited to one band. A listening check of our signals made periodically starting *right now*, with any necessary corrective action, is a good move for every radio amateur.

Best DX . . . in ARRL's 14th DX Competition. — F. E. H.

28-MC. CODE PRACTICE

The schedules of stations transmitting code practice on 28 Mc. were listed in January *QST* (page 74). Listed below are the schedules of additional stations now sending code practice.

W1EMF, Hartford County Amateur Radio Association, Carl G. Wheeler, 30 Woodlawn Circle, East Hartford, Conn., 29,000 kc., Monday, Wednesday and Friday, 7:00 to 8:00 P.M. EST.

W3KVL, Clarence J. Lauer, 345 S. Millvale Ave., Pittsburgh, Pa., 29,463 kc., Monday through Friday, 10:00 to 10:45 P.M. EST.

W7FST, FARM Net, C. W. DeRemer, RFD 2, Box 358, Clearfield, Utah, 29,000 kc., Monday through Friday, 2:05 to 3:00 P.M. MST.

BRIEF

The Young Ladies Radio League is holding a membership drive which will end on March 1st. All YLRL members are being asked to cooperate in adding new members both in the U.S.A. and in foreign countries. It is felt that there are many YLs abroad who would like to join but do not know of the organization. There will be a substantial prize for the member who scores the most points in the drive. It is suggested that non-members, interested in joining YLRL, attempt to contact active members.

A.R.R.L. ACTIVITIES CALENDAR

Feb. 13th-16th: DX Competition (c.w.)
Feb. 19th: CP Qualifying Run
Feb. 20th-23rd: DX Competition ('phone)
Mar. 12th-15th: DX Competition (c.w.)
Mar. 17th: CP Qualifying Run
Mar. 19th-22nd: DX Competition ('phone)
Apr. 13th: CP Qualifying Run
Apr. 24th-25th: CD QSO Party
May 14th: CP Qualifying Run
May 22nd: V.H.F. Contest
June 12th-13th: ARRL Field Day
June 21st: CP Qualifying Run

— . . . —

Jan. 1st-Dec. 31st: Most-States V.H.F. Contest

First Saturday night each month: ARRL Officials Nite (Get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

TRAFFIC TOPICS

A "slow-speed" trunk line, to operate at a top speed of 15 w.p.m., is being organized by Dale Brook, W8UKV, 4213 Western, Detroit, Michigan. All interested amateurs are invited to contact W8UKV giving bands worked, ARRL appointments, crystal control or VFO, and operating times. This is an excellent way to learn traffic handling and become more proficient in c.w. operating.

— . . . —

The Virginia Net has come up with a good idea on Section Net Certificates. They have established, through mutual agreement of members, that a station must report into the net fifteen times to be eligible for the net certificate.

— . . . —

TLAP has been using a good system for several years to clear large amounts of traffic. They are using frequencies 5 kc. each side of the net channel, thus giving opportunity to clear six stations at a time. If this system can be utilized by other traffic-handling groups, without QRM to nets on adjacent channels, it would help to expedite the clearing of large amounts of traffic in the shortest possible time.

— . . . —

The Nebraska Net is now in operation on 3745 kc. at 7:00 P.M. CST, Monday through Friday, and has good outlets for all traffic.

— . . . —

The Western Pa. ORS Net is meeting Monday through Friday on 3750 kc. at 6:30 P.M. EST. Any amateurs interested in traffic work in W. Pa. are requested to contact W3TOJ, RM, or W3KWL, SCM.

— . . . —

Traffic for the Ronne Antarctic Expedition may be routed via any ARRL trunk line or through W1AW.



W0TQD, Fairbury, Nebraska

Meet Lyle Quinn, one of the country's leading message handlers. Lyle is a long-haul traffic specialist. His station serves as the central relay between the East Coast and West Coast on Atlantic-Pacific Trunk Line. The transmitter at W0TQD runs 600 watts to a pair of 3005s; receiver is an HQ-129X. Responsible to some degree for his success in linking the coasts on TLAP is Lyle's skywire—a 130-foot Zepp supported by two 90-foot steel towers! W0TQD is ORS, has a 35-w.p.m. Code Proficiency Certificate, is an A-1 Operator Club member, and received a Public Service Certificate for his work in the April, 1947, Texas-Oklahoma Tornado emergency.

The Eastern Florida Traffic Net is now working on 3675 kc. at 7:30 P.M. EST, Monday through Friday. This net also ties in directly to the Florida emergency set-up when needed, offering its traffic outlets to clear emergency traffic.

— . . . —

A college network is being formed on 3900 kc., and meets on Fridays at 5:00 P.M. EST. The College Net cordially invites any amateur at educational institutions to participate. The station need not be a club station. Prep schools are likewise invited to check into the net.

— . . . —

W4KHM, of AACS at Langley Field, Va., advises that traffic for overseas GIs is now being handled with direct skeds. Traffic for overseas GIs may be routed through this station.

— . . . —

The importance of good sending may be simply and forcefully illustrated by considering the letter "C." As an abbreviation, "C" means "Yes, or Affirmative." "N," on the other hand, means "No, or Negative." Transmitted improperly, C can become NN. It would prove most confusing to copy "No No" when the sender really meant "Yes!"

— . . . —

We would appreciate receiving pictures of operators and stations that are ARRL appointment holders, for use in future CD bulletins or QST. Large photos are most suitable, preferably 5x7 or larger.

— . . . —

A revised Directory of Active Nets is now available and may be had by addressing a postal or radiogram request to Headquarters.

BRASS POUNDERS LEAGUE

(November Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W7BED	3	4	850	2	859
W0TQD	2	48	723	45	818
W6REB	5	16	708	8	737
W2TYU	16	14	644	2	676
W7WJ	85	27	452	108	672
W8NOH	38	290	199	99	626
W0TQD *	2	10	499	9	520

The following make the BPL with over 100 "deliveries plus extra delivery credits":

W1INF 229 W0QXO 131 W1AW 105
W8SAY 207 W1IIN 112 W8SCW 101

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

* October Traffic.

SIMULATED-EMERGENCY TEST RESULTS

Several hundred third-party messages, addressed to both ARRL Hq. and the National Red Cross, were originated and delivered during the October 1947 Simulated-Emergency Test. The organized traffic nets found that the test provided a fine early-season exercise to dispel whatever vestiges of summer inactivity might have otherwise remained in their procedures or equipment. One operator said, "This is bigger than the Sweepstakes." Others said that they felt that a test of this nature was the best thing that could have been done to show all amateurs the shortcomings of their present emergency organization.

The following are the scores or "ratings" of the various AEC groups who participated in the Test, and who reported their activities to ARRL headquarters. Scores marked with an asterisk (*) indicate groups claiming a score of over 100 points, obtained by the participation of non-AEC personnel.

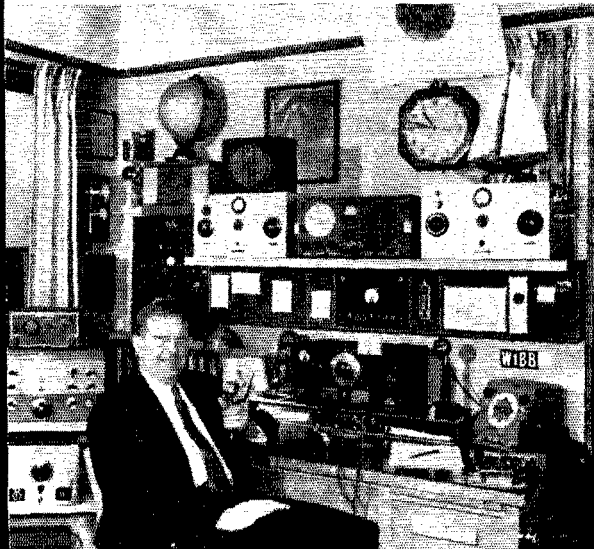
Kirkland Lake, Ont.	100*
Cincinnati	100*
Cleveland, O.	100*
Morgantown, W. Va.	100*
Richland, Mich.	100*
Washington, D. C.	100*
Racine, Wisc.	100*
Springfield, Mo.	100*
East Los Angeles, Cal.	100*
Falmouth, Mass.	100
Madison, Wisc.	100
Dedham, Mass.	100
Topeka, Kans.	100
Osage County, Okla.	100
Richmond, Cal.	100
Elko, Nev.	100
Columbus, O.	100
Gardner, Mass.	100
Brooklyn, N. Y.	95
Colorado Springs, Col.	94
Nassau Co., L. I.	93
Commanche Co., Okla.	90
Valdosta, Ga.	87
San Francisco, Cal.	85
Tarkio, Mo.	85
Willow Springs, Mo.	83
Nevada (state)	82
Worcester Co., Mass.	81
Pittsfield, Mass.	78
Versailles, Ohio	78
Wausau, Wisc.	75

Springfield, Mass.	71
Fitchburg, Mass.	74
Mecklenburg Co., N. C.	70
Manchester, Conn.	70
Queens, L. I.	60
Muskegon Co., Mich.	60
Lancaster and Lebanon Co., Penna.	60
Flint, Mich.	60
Suffolk County, L. I.	59
Winthrop, Mass.	58
New Haven, Conn.	56
Kansas (zone 16)	49
Pontiac, Mich.	47
Torrington, Conn.	45
Tulsa, Okla.	45
Santa Monica, Cal.	44
Watertown, Mass.	40
Dayton, O.	35
Hampton-Elizabeth City Co., Va.	35
Mercer Co., Penna.	32
Newton, Mass.	32
Fall River, Mass.	30
Marion County, W. Va.	26

Where does *your* community stack up in the ratings shown above? Do you have an EC? If you have an EC, is he inactive and should he be replaced by a more active individual? Has your SEC fallen down on the job? Is *yours* one of the major communities which are subject to disaster, industrial or natural, which has not demonstrated that it has a *good* emergency organization.

It is up to you individual amateurs to get together, recommend an emergency coordinator to your SCM, and to see to it that he acts in the best interest of both your community and the section at large.

ECs — go out and get all amateurs in your community enrolled in the AEC, no matter what their operating habits. SECs — if your section has a 'phone emergency net, get to work and see that a good c.w. net is organized; if your section has a good c.w. emergency net, hop on the problem and organize a good 'phone net. Both are needed. This is a situation which *all* amateurs must face. Let's not sit back and let the other fellow do it. Get to work! Write your SCM and ask him "how come" if yours is one of the "unlisted communities." The SCM is *your* representative; make him do his job for you — and help him to do it. — A.H.



S. S. Perry, EC for Winthrop, Mass., is pretty well fixed in the receiving department, as can be seen from the photo left. The part that doesn't show in the picture, however, is the battery of transmitters, one for each band, which sign W1BB, and the array of antennas including rotary beams for 14, 21, 27, 28, 50 and 144 Mc. Operations can be either 'phone or c.w. on any frequency, and besides an emergency power supply which can handle any one of the six 500-watt transmitters, there are several strictly portable units available for use in the field.

QST for

KANSAS ICE EMERGENCY

Kansas amateurs were alerted on December 3rd when RM W0OZN, on routine duty as c.w. operator at police radio KGPZ in Wichita, received a message over the interzone police system from the operators of the Oklahoma Patrol Headquarters station saying,

AMATEUR STATION AT GREAT BEND KANSAS ADVISES NO COMMUNICATIONS OPEN THERE POWER IS ALL OFF REQUEST HELP FROM KANSAS HIGHWAY PATROL STOP HIGHWAYS ARE BLOCKED WITH TREES ADVISE HELP IS NEEDED AND ABOUT THAT TIME THE AMATEUR STATION WENT OFF THE AIR STOP WAS WORKING ON BATTERY POWER STOP CALL LETTERS OF AMATEUR STATION WILLIAM ZERO LINCOLN OCEAN UNION.

Subsequent communications indicated the message had been relayed on 28 Mc. by W6TIK. The Highway Patrol was notified as requested, and sent cars equipped with radio into the area.

At Wichita, SCM W0AWP was notified, and steps were inaugurated to alert the Kansas 'Phone and Kansas C.W. Networks. Establishment of reliable, direct 24-hour communication with stricken areas was subsequently made, although first contacts were via East and West Coast relays on 28 Mc.

At Topeka, headquarters city of the Highway Patrol, EC W0ICV started alerting his net. The frequency 3920-kc. was not vacant for long! W0ICV was assisted by W0FMR and W0NCV, the latter acting as liaison between the 3920- and 3610-kc. nets.

At Manhattan the SEC, W0PAH, planned and organized an efficient system of operation which resulted in good coordination of the various bands and modes of operation. PAH was assisted by EC W0YUQ, who had also contacted the stricken area via West Coast 28-Mc. relays. At SEC headquarters, plans were made to coordinate all bands. W0AAO began a 7-Mc. schedule with W0ZAX at Great Bend, having been tipped off by W0TLG/KAIABP. TLG had heard ZAX appeal for help in obtaining data for utilities. When skip interfered with the efficiency of this circuit, W0SGG in Colorado acted as relay. This system was connected with PAH by way of a 3-watt 2S-Mc. 'phone. W0JCO shared time on 3920 'phone with PAH and YUQ.

At Beloit, all telephone and telegraph communication to the outside was inoperative, but electrical power was available from the locally-operated plant. EC W0AEY operated in the 3920-kc. 'phone net.

At Smith Center, W0DCC operated in the c.w. portion of the band to handle traffic regarding repairs to utilities.

W0PBX operated on emergency power at Miltonvale until power was restored.

At Great Bend, W0AHM, who signed into the 3610-kc. c.w. net for the first time on Wednesday evening as a routine ham activity, was

handling emergency traffic on Thursday. ZAX, as previously recounted, handled much 7-Mc. traffic via Manhattan. And of course, LOU was active on 28 Mc. At Hutchinson, W0BQJ, active in both the 'phone and c.w. nets, acted as relay to W0AHM in Great Bend.

W0HJM did excellent work in the 'phone net. Operating at Hays, he furnished communication to several surrounding communities. In order to go on the air, it was necessary to erect a temporary antenna. Another such experience was undergone by W0MFC, Wichita, who operated on 3920 with a 28-Mc. antenna until he could get to a store to buy wire for a 75-meter doublet.

Much important traffic was routed through W0FRK, Garnett, a telephone company official. As might be expected, many messages were relative to emergency repair of lines.

Other stations known to have participated in emergency communications are: W0s BXZ, CQC, CVN, DQW, FLZ, GOV, HYF, KPJ, KSY, NJS, PGL, TUH, UQD, UNQ. Also W2LQD, W3HM, W6TIK, W6VLE and many others.

Characteristic of the ham spirit was the alerting of the Oklahoma 'Phone and C.W. Nets to render possible assistance. W5HGC stood by until it was apparent the Oklahoma Net would not be needed. The help and offers of help of operators in Nebraska, Colorado, Iowa and Missouri, as well as other points from coast to coast, will not be quickly forgotten.

If there is a moral to this story, this is it: The SEC, W0PAH, says he will gladly receive applications for EC where such posts are vacant. Also applications for membership in the AEC!

— Alvin B. Unruh, W0AWO, SCM

MOBILE RADIO CLUB ANSWERS THE EMERGENCY CALL

The Mobile (Alabama) Amateur Radio Club provided the sole contact between Dauphin Island, the scene of the Alabama Deep Sea Fishing Rodeo, and the mainland on August 11th to 13th. Operating as W4INU/4, the club-sponsored station handled hundreds of personal messages and a number of emergency messages occasioned by an accident at Dauphin Island and by a severe storm which occurred during the rodeo. The operators at W4INU/4 were W4INU and W4GHZ, who kept the circuit open between Dauphin Island and Mobile on 3.85-Mc. 'phone until QRM became too bad at which time a change was made to 3.5-Mc. c.w. W4GXL, W4IBZ and W4UL held down the Mobile end of the circuit for entire period.

The experience gained by the club in this operation has provided a basis for the planned improvement of their emergency operations in the future, and it is expected that 2S-, 50-, and 144-Mc. units will be tried with automatic repeater stations and directional antennas in order to expedite matters.

HIGH 1947 "SS" SCORES

To say that the 14th ARRL Sweepstakes was "colossal" or "stupendous" would be putting it mildly indeed! It was an SS without equal. Scores were the highest ever. At least five operators claim contacts with all of the League's 71 sections, two making the grade on 'phone. About three times as many contestants made scores in the six-digit category as made such totals in the previous SS. No figures on participation are yet available, but it is fairly certain that the number will surpass all previous counts. In short, records were smashed to the proverbial smithereens!

Highest claimed score in the c.w. section — 157,080 points — was reported by W4KFC. Vic chalked up 925 contacts with 68 sections, setting a new SS QSO record. So close to W4KFC that it is not certain who the top man will be after final results are compiled is W6HZT with 902 contacts, 70 sections and a score of 157,063. W2IOP ran a good third with 156,200 points and 883 contacts. To Larry goes the honor of being the highest-scoring participant with all sections worked to his credit. Two other c.w. SSers, W6MUR and W3GAU, claimed contacts with all sections.

Among the mike boys, W6MLY submitted the highest claimed 'phone score — 65,540 points, 383 contacts and all but two sections worked. Taking advantage of the power multiplier, he nosed out W6AM, who scored a record-breaking 'phone SS contact total of 477 with 67 sections for 63,717 points. W6OGZ was a healthy third place. High in sections worked on 'phone were W8HUD and W8BKP; each claim all 71.

The following listings show score, stations worked, and sections worked. It must be emphasized that all figures listed represent *claimed* totals and are subject to further checking. Final results will appear in a later issue of *QST*.

C. W.

W4KFC	157080-925-68	W9CYU	110745-643-69
W6HZT	157063-902-70	W2PWP	109025-623-70
W2IOP	156200-883-71	W8BQJ	108469-668-65
W3BES	147700-844-70	W7BE	108192-522-69
W9FOI	138990-804-69	W2AYJ	108150-818-70
W6LDJ	137568-802-69	W8YCR	107803-811-67
W5LGG	130463-749-70	W2CZO	107640-626-69
W8WZ	130288-747-70	W5LW	106925-611-70
W9TWC/8	129893-753-69	W8VES	106778-619-69
W9ERU	125960-753-67	W9GRV	106420-626-68
W9VSO	123752-625-66	W1BIH	105570-615-69
W6AOA	122648-711-69	W2QCM	105543-650-65
W1RY	121958-708-69	W1VDY	105435-644-66
W9IU	120750-700-69	W2SAI	104425-603-68
W2OXX	120146-697-69	W3DPA	104210-620-68
W2SSC	118680-710-69	W9WFS	104018-606-69
W7FZA	117256-674-69	W8DYX	103673-601-69
W5KC	116725-668-70	W8DNW	103515-620-67
W3BXE	116535-636-68	W6DUY	103500-601-69
W8ROX	116025-720-65	W3KT	103360-608-68
W2BXA	115575-674-69	W3JAG	103050-676-61
W9FJB	114520-819-70	W3JTC	103025-634-64
W3GHM	113565-678-67	W9NII	102680-605-68
W3FQZ	111840-699-64	W2HEH	101600-637-64
W9RQM	111795-826-69	W8RCN	101238-623-65
W2PGT	111555-661-67	W1LWA	100800-627-64
W8UWM	111178-667-68	W4KFT	100750-620-65

W8LLN	99084-716-69	W5MMT	87938-533-67
W8DAE	98640-411-64	W8PNY	87938-528-67
W9WEN	98313-607-65	W3ISE	87653-567-62
W7ONG	98000-703-70	W6RDP	87450-534-66
W3AIZ	97653-583-67	W6NNV	87010-623-70
W8PQQ	97376-570-69	VE7ZM	85818-505-69
W2IMU	97262-634-62	W2EQD	85560-620-69
W7KEV	96985-571-68	W9BGC	85470-518-66
W9LVR	96475-573-68	W3FLH	85280-533-64
W3DRD	96220-566-68	W9GFF	85174-509-67
VE3KE	96220-568-68	W6TT	85000-625-68
W2FXN	95503-609-63	W2ADV	84600-564-60
W7QAP	95475-576-67	W9CRX	84160-531-64
W1JYH	95366-630-63	W8MBY	83520-464--
W6MVQ	95200-680-70	W1EOB	83490-484-69
W6EPZ	94500-675-70	W9IML	83231-548-67
W4BRB	94360-676-70	W9AMP	82938-601-69
W2CWE	93537-537-70	W3ARK	82688-525-63
W3CPS	92546-679-69	W6RM	82248-596-69
W6MUR	92229-650-71	W3MSK	82240-514-63
W3CPV	92209-553-67	W9BVG	82176-645-64
W3GYV	91665-586-63	W2PZE/2	82045-541-61
W9TO	91040-569-64	W7GUI	81834-645-69
W2FBA	89435-435-71	W8GRS	81735-563-58
W8FRE	89080-526-68	W9UIT	81656-504-65
W3GJY	88935-639-66	W3FUF	81520-511-64
W2EXB	88775-531-67	W2GFG	80640-512-63
W3GVS	88751-615-69	W8JU	80270-532-68
W6NIK	88751-519-69	W2ANG	80090-616-65

'PHONE

W6MLY	65540-383-69	W8PXP	30132-243-62
W6AM	63717-477-67	VE6FK	29504-235-64
W6OGZ	62846-471-67	W4FIS	29440-234-64
W6QEU	60375-353-69	W3KQU	29421-235-63
W7UTV	59400-455-66	W1WL	28968-213-68
W9NDA	57820-414-70	W5LRE	28490-204-70
W2NSD	57052-421-68	W8KJB	28202-239-59
W9RBI	54950-314-70	W2BDB	27960-235-48
W4YNQ	54805-404-68	W3OWK	27840-232-60
W8HUD	52966-375-71	VE3AIB	27675-185-60
VE3ACB	47973-311-62	W3AER	27192-206-66
W9TAK	45816-332-69	W5IGS	26933-171-63
W6CHV	44370-261-68	W5EHR	26845-207-52
W9RNM	43112-317-68	W6AZT	26505-180-57
W9KYM	40732-300-68	W1JNX	26460-223-60
W2RVC	38464-301-64	VE3AQB	26460-210-63
W4JYB	38464-303-64	W1BFT	25925-170-61
W8OMG	38080-299-64	W2NSD	25584-246-52
W1ATE	37672-283-68	W2PUN	25410-154-66
W6IKG	36918-303-63	W4HHU	24522-201-61
W1BIB	36696-278-66	W6YQQ	24304-221-56
W3KWL	36656-316-58	KP4CK	23548-205-58
W2EGG	35979-271-67	W8OBM	23546-193-61
W8GZD	35100-234-60	W7GUX	22894-177-55
W7KRM	34880-218-64	W8TAP	22568-203-56
W3FDJ	33337-815-53	W8NOH	21932-162-55
W9QLX	32886-263-63	W7AWA	21808-192-62
W3DHM	32572-241-68	W2LHQ	21560-181-56
W8TRX	32488-263-62	W6DZE	21376-167-64
W4AQR	32160-240-67	W6EOU	21231-171-63
W3FUV	31850-245-65	W9UUN	21122-179-59
W8SDD	31626-251-63	W1PKV	20750-166-50
W2JKH	31491-207-61	VE3BDY	20663-147-57
W8BKP	31240-221-71	W6UZX	20608-187-56
W5FH	30954-235-66	VE4RP	20518-142-58
W8RQK	30656-241-64		

BRIEFS

We daresay W3KDP must have felt just a little frustrated one day last November. He *tried* to work HS1SS during one of the busy SS week-ends!

— . . . —

W4KFC uses a clip-type clothespin as an extra weight for his bug. In addition to the convenience of easy attachment to the key for slow sending, Vic finds the clothespin handy for use on his nose when dealing with rotten signals!

DX CENTURY CLUB AWARDS

DXCC certificates based on postwar contacts with 100-or-more countries have been made to the amateurs listed below. The countries-worked totals indicated have been certified by examination of written evidence under the award rules as published in March 1947 QST.

HONOR ROLL

W1FH.....176	W8RDZ.....146
W8HGW.....163	W1TW.....146
W4BFD.....155	W9ANT.....143
W3BES.....151	W1AS.....142
W2BXA.....150	W1CH.....141

NEW MEMBERS

W9NDA.....122	W8FJL.....102
G2PL.....120	W7FZA.....102
GW3ZV.....115	W4OM.....102
W3IYE.....115	W4JXM.....102
PA#JQ.....107	W1JYH.....101
W2MEL.....105	W2QKE.....101
VE3QD.....103	W1BUX.....100

ENDORSEMENTS

W2GWE.....140	W1ME.....120
W6SAI.....125	W8FNA.....115
ZS2X.....124	W7AMX.....114
W4CYU.....120	W8KC.....113
W3KT.....120	W6SN.....110

RADIOTELEPHONE

W1FH.....132	G2PL.....104
W4CYU.....113	W2BXA.....103
W1HKK.....111	W1JCK.....100
W2ZW.....104	W9NDA.....100

EXPEDITIONS

Many amateurs will remember the prewar round-the-world cruises of the schooner *Yankee*, WCFT. The vessel usually carried an amateur aboard who acted as radio operator and made contacts both with commercial and amateur stations. A new *Yankee* is currently making a circuit of the globe. She is a 92-foot brigantine, an ex-German North Sea pilot ship taken as a war prize by the British and later sold to Captain Irving Johnson, the old *Yankee's* skipper. Operating under the call WEXO, the vessel started her voyage from Gloucester, Mass., in early November, with Alan Eurich, W7HPZ, well-known as a previous *Yankee* operator, signed on as "sparks." Alan traveled as far as Panama where he debarked and returned to the States. On the succeeding leg of her voyage the brigantine was to pick up an operator in Hawaii.

The following have worked the *Yankee* and kept schedules for traffic-handling purposes: W3EFZ, W3EIV and W3KPC. Frequencies known to be in use by WEXO are 11,020, 12,430 and 16,560 kc., with replies from amateurs requested in either the 7- or 14-Mc. bands.

Under the leadership of Commander Attilio Gatti, the Gatti-Hallicrafters Expedition departed from New York City in late November. Objects of the venture will be exploration of Africa's Mountains of the Moon and short-wave radio research in the depths of equatorial jungles.

The expedition has been assigned the call VQ5GHE and carries two operators, William D.

Snyder, W0LHS, and Robert E. Leo, W6PBV. It is anticipated that the first radio communication with the U. S. will be established between VQ5GHE and W9GGC. A daily schedule of operation will be maintained between 11:00 A.M. and 2:00 P.M. CST. Crystal frequencies of 14,326 and 14,350 kc. will be used for 14-Mc. c.w. operations and 28,250 kc. for 'phone contacts. Various other frequencies on 3.5, 7, 14 and 28 Mc. will be employed with VFO transmitter control.

The VQ5GHE transmitters are two BC-610s. Several receivers, including an SX-42, SX-43 and S-38, are in use. The transmitting antenna is a prefabricated rhombic for 7, 14 and 28 Mc.

MEET THE SCMs

Kentucky's brand-new SCM, William C. Alcock, W4CDA, adopted amateur radio as a hobby in early 1930 and lost no time in obtaining his license, which was issued to him in mid-1930 with the call W9CDA.

Upon his graduation from Centre College, Danville, with an A.B. in physics, Alcock went to work for the Advocate-Messenger Co., with which he now is employed as managing editor.

Several years before the war and until June, 1941, when he entered the Army as 2nd lieutenant in QMC as public relations officer, he was a member of the Army Amateur Radio System. During his four-years-and-seven-months of active duty he was engaged in newspaper work.

SCM Alcock holds membership in the A-1 Operator Club and the RCC, and in 1940 earned his Code Proficiency Certificate for copying on a typewriter at 35 w.p.m. Prior to the war he was a Kentucky Section Net member, and held appointment as ORS, RM and EC. He received a Public Service Certificate for amateur radio emergency work during the 1937 Ohio River Valley flood. He is editor of *Blue Grass Ether Clippings*.

An upstairs room in the house, furnished den-style, is completely devoted to W4CDA's equipment. The transmitter is a 6L6 oscillator with eight crystal selections and three fixed-tuned units, driving a TZ40 amplifier on 3.5-, 7- and 14-Mc. c.w.; input is approximately 100 watts. Receivers are an RME-45 and a Sky Buddy. Limited space permits only a 7-Mc. Zepp.

Despite Alcock's numerous radio activities, he still finds time to indulge in such forms of recreation as art work (oils, water colors, pastels, etc.) and sports including golf, fishing, hunting, and especially flying, for which he holds a private pilot's license.



CODE-PROFICIENCY PROGRAM

Have you received an ARRL Code Proficiency Certificate yet? Once each month special transmissions are made to enable you to qualify for the award. The next such qualifying run will be made on February 19th at 10:00 P.M. EST. Identical texts will be sent simultaneously by automatic transmitters from Headquarters station W1AW, and W0CO, of Wayzata, Minnesota. W1AW transmissions will be on 3555, 7210, 14,150, 28,060, 52,000 and 146,000 kc. W0CO will transmit on 3534 and 7053 kc. Either station may be copied. Send your copies of the run to ARRL for grading, indicating whether you copied W1AW or W0CO. If you qualify, you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers indicating progress above the first certified speed.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 10:00 P.M. EST. Take advantage of these transmissions to increase your code proficiency. References to texts used on several of the practice transmissions are given below. These make it possible to check your copy. To get sending practice hook up your own key and buzzer and attempt to send in step with the W1AW automatic transmissions.

Date	Subject of Practice Text from December QST:
Feb. 4th:	<i>The Q5-er</i> , p. 19
Feb. 6th:	<i>Let's Start Right on 1 1/4</i> , p. 22
Feb. 10th:	<i>Building a Code-Practice Receiver</i> , p. 28
Feb. 12th:	<i>A 40-Pound 14-Mc. Four-Element Beam</i> , p. 35
Feb. 16th:	<i>Winds, Waves, and Snakes</i> , p. 40
Feb. 18th:	<i>Keying the Tetrode Amplifier</i> , p. 46
Feb. 19th:	Qualifying run, 10:00 P.M. EST
Feb. 24th:	<i>A Universal Transmission Bridge</i> , p. 54
Feb. 27th:	<i>Paradise Regained</i> , p. 56

BRIEF

Because of a typographical error, W5IKP, one of the operators at W5KTE, New Orleans, during the Florida-Gulf Coast hurricane emergency in September, was listed in the account in December QST as W5IXP. Our apologies, OM; we have not overlooked a good job well done.

ELECTION RESULTS

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

Alabama	Dr. Arthur W. Woods, W4GJW	Oct. 15, 1947
Quebec	Gordon Lynn, VE2GL	Oct. 15, 1947

In the Western New York Section of the Atlantic Division, Mr. Harding A. Clark, W2PGT, and Mr. Edward G. Graf, W2SJV, were nominated. Mr. Clark received 253 votes and Mr. Graf received 232 votes. Mr. Clark's term of office began November 21, 1947.

In the Eastern Pennsylvania Section of the Atlantic Division, Mr. Jerry Mathis, W3BES, Mr. William W. Steckial, W3QEW, and Mr. Peter Jar Jisian, W3IQH, were nominated. Mr. Mathis received 372 votes, Mr. Steckial received 99 votes, and Mr. Jisian received 71 votes. Mr. Mathis' term of office began November 24, 1947.

ELECTION NOTICE

(To all ARRL Members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested:

Communications Manager, ARRL (Place and date)
 38 La Salle Road, West Hartford, Conn.
 We, the undersigned full members of the.....
ARRL Section of the.....
 Division, hereby nominate.....
 as candidate for Section Communications Manager for this
 Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
San Francisco	Feb. 2, 1948	Samuel C. Van Liew	Feb. 15, 1948
Connecticut	Feb. 2, 1948	Edmund R. Fraser	Feb. 15, 1948
West Virginia	Feb. 2, 1948	Donald B. Morris	Feb. 15, 1948
Maritime*	Feb. 16, 1948	Arthur M. Crowell	.....
Manitoba*	Feb. 16, 1948	A. W. Morley	Resigned
Washington	Feb. 16, 1948	Laurence M. Sebring	Resigned
Philippines	March 15, 1948	George L. Rickard	Oct. 15, 1938
Tennessee	March 15, 1948	James W. Watkins	Resigned
Sacramento Valley	March 15, 1948	John R. Kinney	April 1, 1948
Arizona	March 15, 1948	Gladden C. Elliott	April 1, 1948
Vermont	April 1, 1948	Gerald Benedict	April 15, 1948
Indiana	April 1, 1948	Ted K. Clifton	April 15, 1948
Louisiana	April 1, 1948	W. J. Wilkinson, jr.	April 15, 1948
Missouri	April 1, 1948	Letha A. Dangerfield	April 17, 1948
Colorado	April 1, 1948	Glen Bond	April 17, 1948

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

BRIEF

One of W8PVB's very first contacts was with VE3ALH, Woodstock, Ontario, on 3.5-Mc. c.w. a dozen years ago. Last November a CQ on "80" from W8PVB brought an answer from VE3ALH, now held by Vincent Zaffini of Soo, Ontario. This time it was the new VE3ALH's first QSO!



• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — Three Eastern Pennsylvania radio clubs, the Philadelphia High Frequency Radio Club, the Drexel Electronics Society, and the Harrisburg Radio Amateur Club, are newly affiliated with the ARRL. Will the secretaries of these organizations kindly advise the SCM of club activities? After competing in the CD Party and the SS, HCT has decided to build a VFO to replace his crystals. KTQ has opened a new radio store in Hazleton. WTS is ex-1PJJ and is on the Eastern Pennsylvania Net. KLZ, of Throop, and NIU, of Scranton, are on 144 Mc. with crystal-control. OP has worked 148 countries at this writing. CAU worked a G on 7 Mc. with 24 watts. DZ is on 3.5 Mc. with a 47-foot Marconi and has applied for a place on the Eastern Pennsylvania Net. GMK, RM, wants new members in the Eastern Pennsylvania Net, especially near Allentown, York, Harrisburg, and West Chester. NNV wonders why the ARRL doesn't run some activities for night workers. The Philadelphia members of the Eastern Pennsylvania Net are desirous of setting up a traffic station at the political conventions in that city. NIF manages a radio store in Pottsville. ALX is hot on the trail of a DXCC Award, having worked 121 stations and receiving cards from 94 to date. All this work was done with a 3.5-Mc. Zepp and 750 watts. BYF likes 50 Mc. for a steady diet. He has worked the 7th district with his four-element beam. 144 Mc. is quite popular in Allentown with about eight stations on nightly looking for out-of-town QSOs. GEX measures frequency with a vengeance, coming within five cycles on 3.5 Mc. and six cycles on 7 Mc. Very fine work indeed. IW and SGR are on 420 Mc. with a pair of BC845s. The receivers are superhets using 955s in the mixer and oscillator with long lines. They are running about 20 watts of power. New officers of the Chester Radio Club are: KEI, pres.; KBS, vice-pres.; NPN, secy.; MQC, treas.; EVW, EOJ, and KMS, board of directors. The operators of the W3 QSL Bureau have been giving 12-hour service. Keep an envelope on file. Traffic: W3VMF 160, QEW 92, ELI 89, HCT 36, BES 22, OML 20, AQN 9, NNV 6, CAU 5, EVW 5, GMK 5, BXR 2, DZ 2.

MARYLAND-DELAWARE-D.C. — SCM, Eppa W. Darne, W3BWT — The Washington Radio Club had as guests at its first November meeting Thor Heyerdahl and Knut Haugland, leader and radio operator of the Kon-Tiki Expedition. Both are honorary members of the club and gave an interesting talk, "Radio on Kon-Tiki." At the second November meeting members brought in and demonstrated interesting homemade gear including frequency instruments and VFOs. At the club's Dec. 6th meeting, Mr. A. L. Budlong, of ARRL, a former member of the Washington Radio Club, gave an interesting talk on the Atlantic City Frequency Allocation Conference. The Baltimore Amateur Radio Communications Society's first December meeting was held in the studio of WFBR in conjunction with the broadcast of a ham radio program from that station. The Capitol Key and Mike Club has secured a large capacity gas-engine generator for portable and emergency work. Its members have joined the Washington Area Emergency

Corps. The entire section is grieved at the passing of C. A. Briggs, CAB, in late November. He had recently celebrated his 25th year as an active amateur. He will be sorely missed by all who knew him as one who was symbolic of all that is good and fine in amateur radio. IYE is rebuilding, has p.p. 813s, and works 3.5 and 14 Mc. IL gets out nicely on 7 and 14 Mc. NDL/3 is newly-appointed ORS. EYB gets out well on 3.5, 7, and 14 Mc. Bill also has 'phone on 3.9 and 14 Mc. EWH has a new Collins 75A receiver. EQK is temporarily off pending completion of a new home. MHW is on 3.5- and 7-Mc. c.w., also 144-Mc. 'phone. PV worked Richmond, Va., and York, Pa., on 144-Mc. 'phone. MTQ is rebuilding. CDQ, LSX, MSU, and AKB had a personal QSO with ZS6GH who visited Washington, its YL stations, and KBE. CDQ's new QTH is 4627-47th St., N.W., Washington, D. C. QL did some rebuilding but stayed on the air consistently. IEF is having neutralizing troubles. ISF is busy with school but is on frequently. AHQ is on 144 Mc. as well as 3.9-Mc. 'phone. KCA has an emergency-equipped communications truck. EFZ schedules the *Yankee*, WEXO, has made WAC, and is newly-appointed ORS. KKH and BEI have been on the sick list. KOU is RCC member. KWU is on 144 Mc. KCA schedules Richmond, Va., on 144 Mc. KOU and LFF use m.c.w. on 144 Mc. JPX and FLG are trying out 235 Mc. EIM, KUX, and PV play chess on 144 Mc. JMA/NFC consistently contact their folks and friends in England on 28 Mc. HV schedules his brother, EL3A. DVQ, on 14-Mc. c.w. with indoor folded dipole, gets out nicely. EIL and HDV are rebuilding their three-element rotary. GVE is on 14-Mc. 'phone with 180 watts. GVG is working on mobile rig. HRT is rebuilding power panel controls. IIU has his rig at his radio shop. JZW is on 28-Mc. 'phone with 500 watts. LGA is busy at school. MBL and MPT are on 28-Mc. 'phone. NAS is rebuilding around a pair of 813s. NIN is using 300 watts. EXQ is active despite school work. ECP again leads the section in traffic totals. Traffic: W3ECP 167, NDL/3 110, MJQ 81, AKB 75, QL 55, HUM 43, EFZ 36, BWT 32, ISF 27, KBX 22, MTQ 19, IYE 12, PV 12, MHW 11, AKR 7, MCD 6.

SOUTHERN NEW JERSEY — SCM, G. W. (Bill) Tunnell, W2OXX — The Atlantic Radio Club has been reorganized and meets temporarily at Risley's Laundry in Pleasantville. PXZ, PG, CGP, and CYI are acting officers. The Hamilton Township Radio Association and the Sussex County Amateur Radio Association now are affiliated with the ARRL. RPH has new VFO and the largest postwar traffic total. ZI has 50 toward DXCC. SUG has 3.5-Mc. rig trouble. 3NF/2 is uncle to 1NJM's new baby. BEI is busy with OO activities, with special emphasis on 14-Mc. 'phone. SAK reports a successful exhibition of "ham equipment" by the Hunterdon County Club. The club is starting classes in radio theory. QUI is mildly active but studying hard. GCU reports that he soon will be on 144 Mc. RLY, SVV, UNT have sprouted, or are about to sprout, 144-Mc. beams. PAU wants to stir up a controversy on horizontal versus vertical polarization at v.h.f. UKS from Ocean City has a kw. on 28-Mc. 'phone. VUM is a new ham. PFQ reports activity on 420 Mc. Those of you operating mobile may avert trouble by offering to register with your local authorities until such time as we are able to get clarification of a State Law relative to the operation of mobile receivers. Our sympathy to SN (our QSL Manager) on the death of his XYL. Drop me a line if you are interested in a v.h.f. 'phone net for traffic, for fun, and for EMERGENCY. Traffic: W2RPH 207, ZI 55, RG 35, ORS 33, SUG 23, W3NF/2 18, BEI 13, OXX 10.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — KWA is the new Alternate Director of the Atlantic Division. The ATA of Pittsburgh comes through with an elegant club publication. Write to WNN if you have anything to report. From this paper we learn that emergency nets in ATA are now active. Ye Ole Polecat Net

is revamped for EC work, YDJ is NCS. Included in the Slaughter House Net are NUG, USM, OB, KKA, IWH, KSP, KSR, AER, KWA, OKS, and WNN. The Upper Ohio Valley Emergency Net meets on 3965-ke. 'phone with PY as NCS. This net handles authentic traffic and river reports of the U. S. Weather Bureau. Applications for EC can be had by contacting UST, who is EC. The Mercer County Radio Association members are active on 144 Mc. The local 144-Mc. band sounds like woodpeckers on a metal roof. Stations heard are NDD, NCD, KQA, SSFG, QMW, CJF, KWL, GEG, LBZ, and VNL. KWA worked ON4HC and HB9S on 3.5-Mc. c.w. KOB has new p.p. 812 final doing nicely on 28 Mc. AER is competing with 3.85-Mc. 'phone kw. using Surplus BC-654. GJY piled up nice SS score with 539 contacts in 66 sections, UVD is rebuilding, LGM is 28-Mc. mobile. In Meadville, KEW reports NHF building 28-Mc. 'phone. GB is possessor of VR4 QSL. In Pittsburgh AAX has WAS on mobile. BGT worked three Gs, FAØ, and VK on 50 Mc. using kw. and folded dipole. UL is teaching a radio class at Carnegie Boys' Club. The Pittsburgh Radio Club Council installed new officers: UST, chairman; OMY, vice-chairman; KUY, secy.; OC, treas. BSO was a guest on "We the People" program. For his act he carried on a QSO with the OM on 28 Mc. Thanks to CKO, NUG, and YDJ for fine traffic-handling in W.Pa. ORS Net. NCJ and TOJ take turns as Acting NCS for W. Pa. ORS Net with the following stations reporting: KWL, KQD, LOD, LQQ, L1Q, LWN, NCJ, 4TWI, TOJ, YA, CKO, GEG, YDJ, 2QYZ, 2PGT, 4IA, 2ITX, and ØARH. Average net stations reporting, 7.8; average messages handled per session, 6.6. The last SS showed a great improvement in Western Pennsylvania contestants. Traffic: (Oct.) W3KWA 35. (Nov.) W3KWL 158, TOJ 121, YDJ 71, NCJ 30, AER 22, LWN 5, KWA 4.

CENTRAL DIVISION

ILLINOIS — SCM, Wesley E. Marriner, W9AND — HON is back on the air after moving. UPW get a surplus RAL-6 receiver which was used on the U.S.S. *Edgar G. Chase*, destroyer escort. BRX is experimenting with splatter filter on transmitter. EVJ is operating on Trunk Line "L." NDA says, "Looks like more stations were in the Sweepstakes than ever before — 413 contacts, 70 sections. Missed South Carolina." LNI is installing a furnace and using radio shack for storehouse. When last fitting is removed from the shack he will be back on the air. KMN lost his antenna mast several days before the Sweepstakes so not much luck with makeshift replacement. BON has a 100-watt rig on 50 Mc. and would like to see more activity there. SYZ operates on Trunk Line "J." DBO, with 23 watts input, worked KLTMY on 7 Mc. receiving V9X report. APK has good results on 28-Mc. 'phone and nice collection of 14-Mc. DX. NDA hopes to be on 50 Mc. soon. SKL acquired a pair of ARC-5 rigs and an SCR-522 combination. There are eight 522s in Bloomington but only one on the air so far. WFS had 603 SS contacts in 69 sections, having missed VE4 and KA sections. Competition was rougher than ever. IML is active on 14-Mc. c.w. mostly, and also on 7 Mc. for contests and DX. TZQ's XYL was in the hospital. He has a 348 and a 522 working now. The frequency meter at TAL was accidentally damaged in a fall to the floor. He is trying 144 Mc. with a 522. A new boy arrived at LQP's house on Nov. 9th. The XYL says another ham but grandma says another radioman for the Navy. LQP says, "No fooling, I am moving rig from attic to coal bin." HI, AND visited HLF and UQT at Pekin and Springfield. IVU has a new u.h.f. four-element 28-Mc. beam. Traffic: W9JTX 318, EVJ 198, SYZ 115, LQP 36, FKI 29, SXL 23, YTV 15, NDA 10, WFS 5, HQH 2.

INDIANA — SCM, Ted K. Clifton, W9SWH — AQO, of Ft. Wayne, has a BC-696A on 3.5-Mc. c.w. and 40 watts input. New officers of the Michiana Amateur Radio Club are SIQ, pres.; YWE, vice-pres.; LVS, secy.; DMH, treas. KTX is new OPS from North Liberty. IHO, of Terre Haute, has a weekly column in the local paper. Winners of the Tri-State Amateur Radio Society contest were: DGA, first; VMS, second; GFS, third; RDJ, fourth; and WNM, fifth. Ex-UHB now is BSD, of Ft. Wayne. His 14-year-old nephew is CBX, at Elkhart. EOY gave a fine talk and demonstration on wire recorders at the Ft. Wayne Radio Club Dec. 5th meeting. UDD, the Ft. Wayne EC, held a mock emergency on Nov. 30th. The set-up was in the New Haven City Hall using all battery power. The Indiana 'Phone Net, with other interested stations, were standing by on the frequency with a total of 25 stations. The Ft. Wayne Red Cross Director was

present and sent a message to the State Red Cross Director at Indianapolis and received an answer within twenty minutes. A demonstration of the 28-Mc. mobile stations was made with a control station alongside the 3905-ke. 'phone rig. EHT, of Terre Haute, has offered his QIN crystal to any of the boys around Terre Haute for QIN use. ZHL worked two Gs and one HB on 50 Mc. UB is NCS of a 28-Mc. net consisting of YUR, TRN, WBA, DXH, DDC, and 5BRR. They can accept traffic for Hawaii and Guam. IPEK, ex-SCM of Indiana, visited in Indianapolis. Roy now is Assistant Secretary of the ARRL. BOQ is a new call at Indianapolis. 3FOS, an old traffic man, was in the State recently. The Indianapolis Radio Club loaded a bus with 25 members and XYLs and attended a dinner meeting of the Amateur Radio Transmitting Society of Louisville. LKZ has a new jr. operator. ET has a new three-element close-spaced beam on a 55-foot pole and rotates the pole. KOJ put up an 8JK. RCB, as NCS, and FSG and HUV, as ANCS, have been doing a good job on the QIN. Traffic: W9RCB 198, TT 67, HUV 59, BKT 58, FSG 54, BCJ 34, DGA 29, NH 19, FCS 17, RE 13, UKT 13, SWH 10, EGQ 8, PMT 6, SNQ 6, CLF 5, DHJ 5, UGH 5, KTX 5, RJU 4, AQO 2.

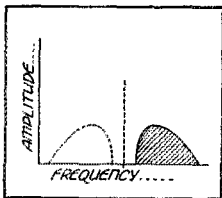
WISCONSIN — SCM, Reno W. Goetsch, W9RQM — CBE is ORS. IQW received first ZL card after 15 years on the air. BCY has 28-Mc. beam. KNL has new NC-57 receiver. RH renewed OBS appointment. We regret to report GKE as a Silent Key. The Mancorad Club elected as new officers: JAW, chief op.; RKT, 2nd op.; YUA, keeper of the log; BZU, operation manager. TVA is building torpedo twin with 807s. GAJ is putting up new beam. LBC has receiver on 144 Mc. AOF works 14-Mc. 'phone. OVE has new VFO. TQV is working on mobile rig. BZU is working on gas generator power supply. NVJ is working DX with new three-element rotary and "V" beam. DDG is on 144 Mc. with 15 watts and eight-element beam. LXC works 28-Mc. 'phone with three-element rotary. The newly-organized Eau Claire Amateur Radio Club elected the following officers: MUM, pres.; ZRZ, vice-pres.; ZGL, secy.; VSG, treas.; ZGW, act. mgr. HHK works 3.5-Mc. c.w. and 28-Mc. 'phone. His father, AFQ at Hazel Green, keeps daily schedule on 28 Mc. FIG works DX with 22 watts and three-element rotary. ZRX works 28 Mc. with 829B and rotary beam. JAZ has 70 watts on 7 and 14-Mc. c.w. RUF is organizing Milwaukee Emergency Corps. Racine Emergency Net has crystal for spot frequency of 147,988 Mc. SZL is working traffic net with 813 final. DKH completed 28-Mc. WAS. RSR is planning 500-watt rig. RQM worked 827 stations in SS on c.w. RBI has high 'phone score in SS with 314 contacts in 70 sections. AFT works HBU, at Elgin, on 144 Mc. regularly. BOQ has 48-element beam on 144 Mc. At LaCrosse, AKY, LKL, EWY, OGT, WYA, and AGO are looking for outside contacts on 144 Mc. The LaCrosse XYL Club was organized on Oct. 27. DC has 1000-ft. antenna for 4 Mc. CIH had an accuracy of within .0003 per cent in Frequency Measuring Test. Traffic: W9SIZ 171, DKH 134, LFK 64, SZL 22, ESJ 14, RQM 14, IQW 12, MUM 12, CBE 10, CIH 9.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossoletti, WØGZD — KZL is on 3.5 Mc. net from Pembina. EGC, Fargo, and RGT, VAZ, and GZD, in Forx, are attempting to schedule on 28 Mc. for first G. F.-Fargo contact on 28 Mc. Grand Forks 28-Mc. net includes OCL, VAZ, RGT, DAO, GZD, and WFO in Park River, N. D., and HZM in Warren, Minn. SSW worked ZKAM, Cook Island, with 40 watts on 3.5-Mc. c.w. ZRT is using new Panadaptor. LHB replaced Vibrapak with new PE-103. Cendak Club of Bismarck meets bi-monthly in American Legion Hall. BCH loans 16mm. projector to club. New officers: JPW, pres.; ONM, vice-pres.; CTS, treas.; SSW, secy.; RBS; act. mgr.; Iver Nelson, tech. advisor. WWL is building big rig. OEL puts Mayville in net. DM and TUF finished work on ARC-5s for 3.5 and 7 Mc. GNS, ZKU, and SWC are on 3.5-Mc. c.w. EOZ is most distant 3.85-Mc. 'phone net station. YRD finds time to use p.p. 807s and NC-173. Traffic: WØSSW 78, GZD 12.

SOUTH DAKOTA — SCM, P. H. Schultz, WØQVY — WUU visited at Canton with MVY, who expects to be on in the very near future using a new Meissner Signal Shifter. While on vacation GCP turned net over to UVL. HDO has 813 on 3.85 Mc. n.f.m. ZS1DJ is on every night from 10 to 11:30 p.m. CST looking around 14,350 kc. for a South

(Continued on page 76)



THE WRITER recently had the pleasure of sitting in at WØTQK's shack during a solid two-hour duplex 'phone QSO with W6YX — both stations using single-sideband suppressed carrier transmissions on 14 Mc. It was a stimulating experience.

Every 'phone operator on the lower-frequency bands has experienced that helpless feeling that comes when, after a five-minute transmission has been "turned over" for a reply, he is greeted by complete silence or — just as tantalizing — "Sorry, OM, QRM got you down that time." It's the most discouraging — and inevitable — feature of 'phone in crowded bands so long as the current "your turn — my turn" technique is practiced. Think how much of the pleasure of c.w. operating would be sacrificed if there were no break-in!

One sample of real duplex radiophone operation will inspire any 'phone operator to go to great lengths to have it at his own station. With s.s.s.c., the operator is immediately aware of interference or a change in band conditions — because he's listening while he talks. He knows instantly whether he ought to change frequency or save his breath. No reams of notes to jog the memory for the next round; when there's a query, there's an immediate reply.

Of course, duplex 'phone work, even on the same frequency, is not unique. We recall vividly some experiments carried on a decade ago with W2DC, W3NK and W3FVF using voice-operated relays to control the carrier so the other station could be heard during the natural pauses in conversation. It was not too satisfactory because the carrier was always being "keyed." That disadvantage is overcome with s.s.s.c. — there isn't any carrier. Besides, s.s.s.c. has more to offer than just duplex operation — reduction in spectrum occupancy, better overall efficiency, and greater effective modulated power output, among others. As for the writer — well, we left WØTQK with the burning ambition to get on the air with s.s.s.c. at W1SZ. It won't be long!

CLARK C. RODIMON

Although revised operating techniques may be necessary if the advantages of s.s.s.c. are to be enjoyed completely, single-sideband signals can be received on a communications-type receiver without too much difficulty. The missing carrier is replaced at the receiver by turning on an external tunable oscillator, or the b.f.o. itself, and setting it to the proper frequency. For best results, this calls for highly-stable receivers because the "reinserted" carrier frequency must be kept as accurately as possible on the frequency of the original carrier. High stability has always been a feature of National receivers, and whether you own the HRO, the NC-240-D, the NC-173, or the new NC-183, you will find your receiver ready to do a real job for you on s.s.s.c. as well as on regular a.m.-with-carrier. Receivers like the NC-173 and NC-183 also permit the use of a.v.c. with the c.w. oscillator turned on — a definite advantage in single-sideband reception without an external oscillator.

JACK IVERS

This opens a new vista of problems to be solved and results to be attained in the popular high-frequency bands. It is a challenge no amateur will refuse. National Company, as always, plans to help.

W. A. READY



YOU WOULDN'T BUY A PIG IN A POKE



DON'T BUY CAPACITORS YOU DON'T KNOW

You won't go wrong with Mallory transmitting capacitors. They insure complete protection for your rig; no time off the air, no danger of damage to associated components. Mallory quality and reliability are traditional for heavy duty in every branch of electronics; amateur, commercial, broadcast, industrial and television.



TYPE MH Moulded Bakelite, Mica Dielectric. 18 values from .0001 mfd. to .02 mfd. in working voltages from 600 to 2,500 volts DC. Capacity tolerance $\pm 20\%$.



TYPE MX Porcelain Cased, Mica Dielectric. 7 values from .001 to .1 mfd. in working voltages from 2,000 to 12,500 DC test.



TYPE TZ Round Can Type, oil impregnated, Paper Dielectric. 10 types, in working voltages from 600 to 2,000.



TYPE TX Rectangular Can Type, oil impregnated, Paper Dielectric. Broadcasting station quality, but priced so that the amateur can afford them. 38 types, capacitors 1/10 to 10 mfd. in working voltages from 600 to 6,000.

You can rely on Mallory Precision manufacturing to furnish you with dependable resistors, ham band switches, push button switches, controls—rheostats—potentiometers—pads, dry disc rectifiers, vibrators, and vibrator power supplies, practically every component you need to keep your rig in A-1 condition. Available at your Mallory Distributor. For further information, write direct.

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Dakota contact. BZH is going to school at St. Johns. OLB is helping PAV build a pair of 812s on 28-Mc. 'phone. Traffic: W6GCF 9, WUU 2.

MINNESOTA — SCM, Walter G. Hasskamp, W6CWB — YBM has built a band-switching converter. BBL gave up net activities for 144-Mc. work. I believe that on Dec. 7th the best Minnesota distance on 144 Mc. was accomplished. GKO, Duluth, was heard by BBN, at Grand Marais. GKO used an eight-element stacked array while BBN was using a twelve-element beam for receiving. CCF keeps schedules with AQU, who is at 4TIS. IXR has new NC-173 and is putting a pair of 813s in his final. 0QCR now is KH6OA at Honolulu. With a kw. to the final, GFR is putting up a self-supporting 80-ft. tower on which will be mounted a 28- and 14-Mc. beam. PJP has moved to Peoria, Ill. DSF is knocking off European DX on 14 Mc. EBC, ex-9SHL of Viroqua, Wis., has an HT-9 and HQ-129X set up in the rear of printing office at Remer, Minn. He is on 28 and 7 Mc. The Winona Club had a nice hamfest Nov. 18th. AGO won first prize. PPZ was in charge of the meeting with TPN and UWG in control of refreshments. JDO worked a W6 using only 11 watts on 3.85-Mc. 'phone. EBV is new ham at Bird Island on 3.5 and 7 Mc. NRV finally got back on 7 Mc. BGY is building p.p. 807s with 815 modulator. FAH made 107 contacts in October CD Party. The Mesabi Range Wireless Club is now an affiliate of ARRL. RPT has a BC-654A for emergency in Fairmont area. QVU has HY-75 on 144 Mc. DOQ is back on 3.85-Mc. 'phone with HD203A final. EJP is new ham in Duluth with SCR Command transmitter BC-459 and BC-348 doing fine on 7 Mc. We note with regret the passing on Dec. 1st of KQA. All Minnesota amateurs are urged to join the Emergency Corps. Contact JLE, our SEC. Because of QRM and so many other nets operating on 3900 kc. the MSN 'Phone Net now is on 3892 kc. GKO, Duluth, gave a safety talk at a recent club meeting. Later at home, while changing coils in the rig, Carl got some r.f. burns when his elbow accidentally knocked on the safety switch. Traffic: W6CWB 70, VJF 62, YBM 49, ITQ 44, HEO 42, OMC 36, RPT 31, FAH 29, HKF 29, HQW 24, JIE 21, ORJ 18, CLU 17, JDO 14, TPN 12, EPJ 10, MKI 8, BGY 6, CGK 4, RJF 3, KYE 1.

DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — JAX is on 3.85 Mc. since changing QTH. Welcome back, Nelson. NTV is new call in the State. Howdy, Jim. JAP has buck fever and has no time for r.f. LRE is spending most of his time on 28 Mc. EA is building a new modulator. HPL will be on 3.85 Mc. if he can get modulator assembled. The Little Rock Club is holding meetings after a summer shutdown. The Arkansas c.w. net has been named the Ozark Net and the frequency changed to 3695 kc. See you there, boys. Fridays at 7:00 p.m. JIC has dream rig finished and now is planning a super (?) antenna. HML has new mobile rig on 28 Mc. GWT is in the throes of rebuilding e.c.o. and is on 14-Mc. 'phone. Say, boys, I had to make this up out of my head and it's mostly wood and dry. So what say? Traffic: W5LRE 6, JIC 3.

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — KTE is SEC and Acting RM. CEW is PAM. HHT is NCS for the Pelican Net, the emergency set-up formed by members of the Louisiana section of the Delta 75. If all concerned will advise via the PAM, certificates will be issued. KTE has a new beam going and is keeping his fingers crossed. BSR, the newly-elected Delta Division Director, has a brand-new VFO and bug which he is learning to use. KRX, KTG, and KUM have been active on the Rebel Net. JGO has a new job. Congrats, AL. KUZ and MFS visited the SCM during the month. GHF continues his 3.85-Mc. 'phone activity. HHV has shown signs of life. KHC did some travelling this month so not too much activity. MJT has been on the air and will be going strong soon. I hope. CGC is building a new and more powerful rig. MBV says. FYS got a new car and hasn't been heard on 14 or 7 Mc. since. DC has been on 28 Mc. ABA says he will be too busy with income tax returns for much ham radio during the next few months. LQV is in the midst of forming a radio club at Centenary College in Shreveport. LQO is trying to get going again. JOK is on 3.5 Mc. at Barksdale Field. BAF (amateur club call for Barksdale) is powered by BC-610. MO is again using e.c.o. EB is active in Monroe. BLQ has Class A ticket. GHF is on emergency net. Let's all try and send something for including in this column next month. Traffic: W5KTE 112, GHF 23, VT 8, BSR 5.

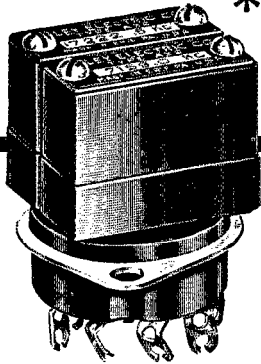
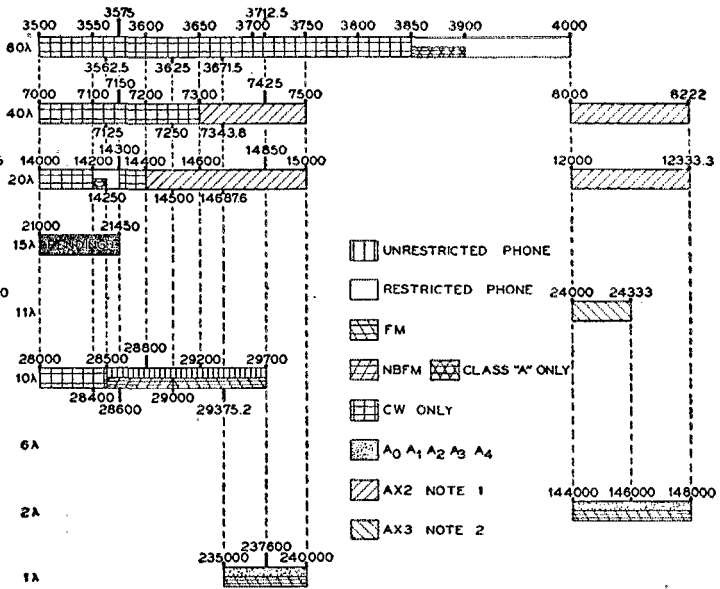
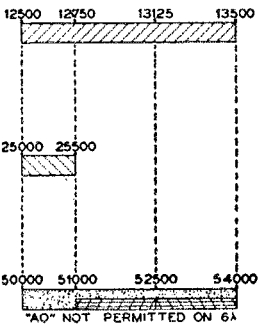
(Continued on page 78)

"Why plug in a promise?"

AMATEUR FREQUENCY CHART

NOTE 1: AX2 CRYSTALS ARE AVAILABLE IN THIS RANGE FOR MULTIPLYING INTO HIGHER FREQUENCY AMATEUR BANDS.

NOTE 2: AX3 CRYSTALS, USED IN CONJUNCTION WITH THE BLILEY CCO MODEL 2A, ARE AVAILABLE IN THIS RANGE FOR MULTIPLYING INTO HIGHER FREQUENCY AMATEUR BANDS



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Crystal quality goes much deeper than the frequency on the nameplate. Here at Bliley we practice and preach quality control all the way from the raw quartz.

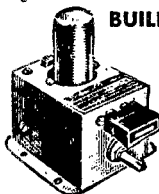
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*** 2 BLILEY TYPE AX2 CRYSTALS WILL FIT ANY OCTAL SOCKET**

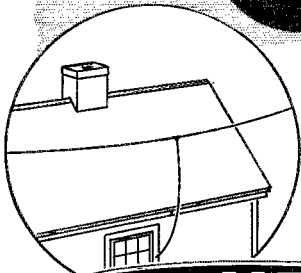
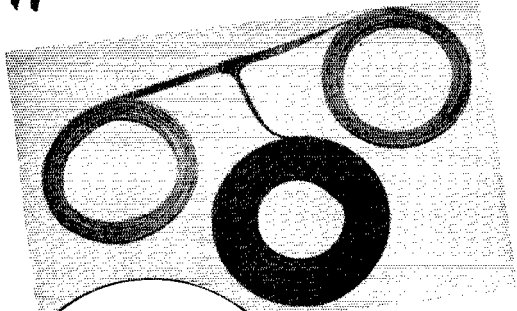
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78

MISSISSIPPI — SCM, Harold Day, W5IGW — SEC: JHS. PAM: LN. RM: WZ. NNZ is running 900 watts on 3.85-Mc. 'phone. LN has a swell gas-engine a.c. generator for emergency operation. KUT has increased power to 150 watts, to a pair of 812s. LB Y is working 3.85-Mc. 'phone. NTV is QSOing regularly on 28-Mc. 'phone. The Gulf Coast gang are in there regularly on the weekly drills of the Mississippi section of the Tri-State Emergency Net. LN, at Vicksburg, is State NCS. LAK has climbed up to 54 countries on his DX. Messages going to any place in U.S.A., Canada, or U.S. personnel overseas, may be routed through WZ, DEJ, DNS, EGE, IGW, LAK, or KUT. Deepest appreciation is extended to the SECs of Arkansas and Louisiana, KTE and EA, for their fine and sincere cooperation. Drop a line to our SEC, Norman B. Fechan, JHS, Box 491, Gulfport, if interested in EC appointment. Traffic: W5WZ 158, DEJ 88, IGW 60, LAK 52, LN 8.

TENNESSEE — SCM, James W. Watkins, W4FLS — AFR finally got that new rig completed, an 813 final and a twelve-element beam. DLK is redesigning the old rig. AWB is helping MKB with new kw. job. FLY is quite active on 14 and 7 Mc. ILZ converted BC-348 for stand-by receiver and monitor. KFK rebuilt his rig. JSM has a new three-element beam on 28 Mc. GYE calls 200 miles DX on 14 Mc. GQQ has new antenna and is converting Army surplus for n.f.m. HWC has two new doublets giving him 360° coverage. KH is another n.f.m. convert. JIM lost everything in a fire. EAL's 810 was trying to do all the work in a p.p. final. EBQ is happy now that the Tennessee 75 'Phone Net is active again. FWH is experimenting with 50 and 144 Mc. HOT has a new half-gallon plus on. IQY is new ORS in Chattanooga. FCF is new OO in Memphis. FDF is EC in Oak Ridge. LHQ has new 810 final and is doing swell with DX — he has 97 countries worked, postwar. MND is a new ham in Cleveland on 7 Mc. with 807. IUC has rebuilt new FT-102. HQO lost his antenna. QT has his new kw. almost finished. PL enjoyed the fishing in Florida. 1PY, 2VNR, 5SR, and QYDZ were among those transferred from Corpus Christi, Tex., to NATTC at Memphis. 5SR expects to get his 28-Mc. rig on soon while 1PY is thinking of 14-Mc. 'phone and c.w. QYDZ has forty watts on 3.5-, 7-, and 14-Mc. c.w. that he will have on the air soon. We regret to have to report the death of ERJ during the month. Traffic: W4TWI 267, FCF 57, KH 17, LHQ 13, HOJ 9.

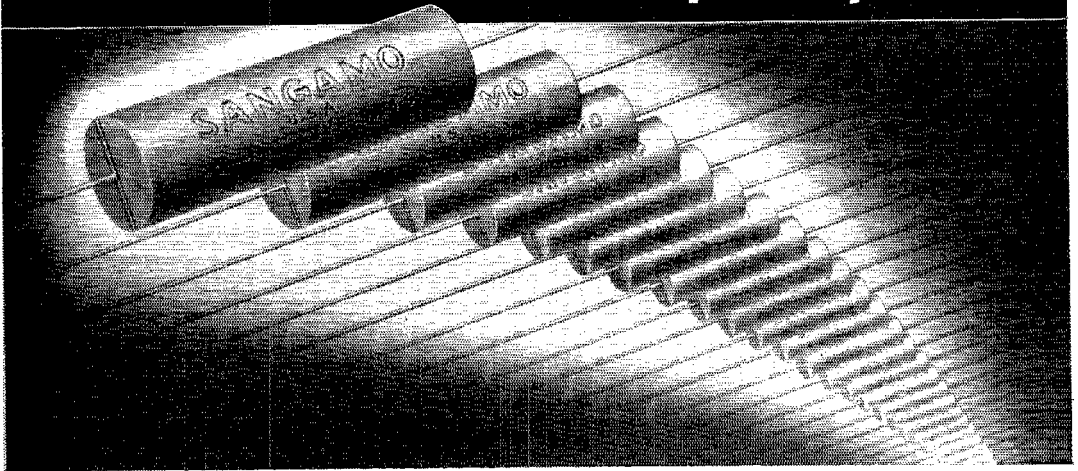
GREAT LAKES DIVISION

KENTUCKY — SCM, W. C. Alcock, W4CDA — Traffic for Kentucky is increasing rapidly and better coverage is badly needed on KYN and KYP Nets. We need Ashland, Henderson, Middlesboro, Owensboro, Paducah, Lexington, and other key points. We need a good 'phone station to organize evening KYPhone Net. FKM and PWB joined KYN Net. ELL designed beam for 14 and 28 Mc. MFG and MFH are on 28 Mc. 'phone. MRF got WAC and has worked 45 states on 28-Mc. 'phone. JEB works 28-Mc. 'phone when not studying at U.L. YAL replaced 810s with VT127s. BAZ wants to buy April '32 and November '33 QSTs. CMP has new modulator (810s) and 100-ke. frequency standard. GPT is converting BC-221 to VFO. The following were logged on KYPhone Net: TXX (net control), CMP (alt.), EDV, GPT, IXN, JHU, JTT, KWO, NDY, TFK, and UWR. Logged on KYN (c.w.) Net: BAZ, CDA (net control), FBJ, FKM, FQQ (net control), FR, KWO, MPA (net control), PWB, OEE, LNN (Chattanooga), 9IFM (Illinois, formerly of Ky.), 8UPB (Cincinnati). The Lexington Radio Club meets the first Wednesday in every month, the Louisville Club the second Saturday in every month. Contact hams in those towns and attend a meeting. JTZ has kilowatt u.f.m. 'phone on 14 Mc. YNF is busy with WHIR broadcasts. KME operates radio lab at Bowman Field. SCM invites Kentucky operators to send in news (postcards O.K.) for this column near the end of each month. ARRL members are invited to apply for ORS, EC, OPS, and OES certificates.

MICHIGAN — SCM, Joseph R. Beljan, jr., W8SCW — SEC: SAY. RMs: NOH, PVB, and UKV. GSJ is new ORS appointee and schedules QMW along with the QMN. VPE is appointed to T.L. "A." PVB and SAY report into TO and TLAP. YNG reports lots of activity on the MEN and BR Nets with good state coverage. LR, QPO, TQP, and YNG are going 28-Mc. mobile. VCN is building a kw. QQN is planning a half-kw. for 3.85 Mc. ZEX received his Class A and plans n.f.m. operation. YBR has a pair of 810s with 800

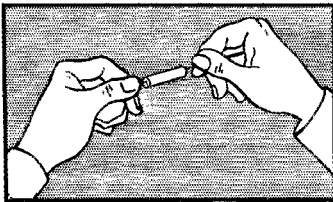
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Plastic Molded Tubular Paper Capacitors



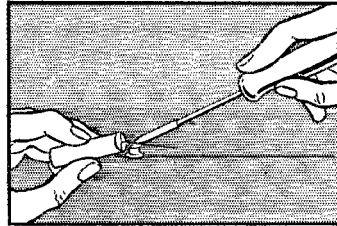
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Just as the *first* molded mica capacitor was designed by Sangamo in 1923, so the *first* plastic molded tubular paper capacitor was introduced by Sangamo in 1946. Today, after more than a year of constant improvement and development, based on reports of field service experience from coast to coast, the Sangamo Type 30 Capacitor will fully meet all new RMA Specifications.



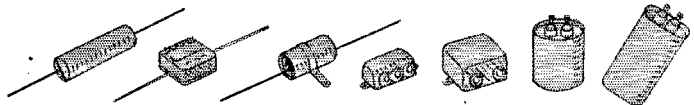
The same advantages that Sangamo pioneered in molded micas are now available in these new paper tubulars molded in a thermo-setting plastic: capacity values are permanently sealed in; no wax ends to melt out at high temperatures; and their mechanical stability has been improved so that it does away with the necessity for delicate handling.

These advantages mean better characteristics, longer life and more dependable performance.



Sangamo Type 30 Plastic Molded Tubular Paper Capacitors can be used wherever ordinary paper capacitors are used. Heat from a soldering iron will not cause wax to run . . . nothing can burn! This means greater ease of installation — less danger of damaging your rig — and better work in less time. Discriminating amateurs will readily appreciate the many improvements embodied in the new Sangamo Type 30 Capacitor. It is *definitely superior*.

Old-time hams recognize Sangamo Quality. Get acquainted with the Sangamo line today. Your jobber can supply you.



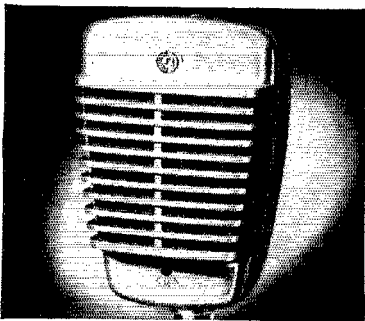
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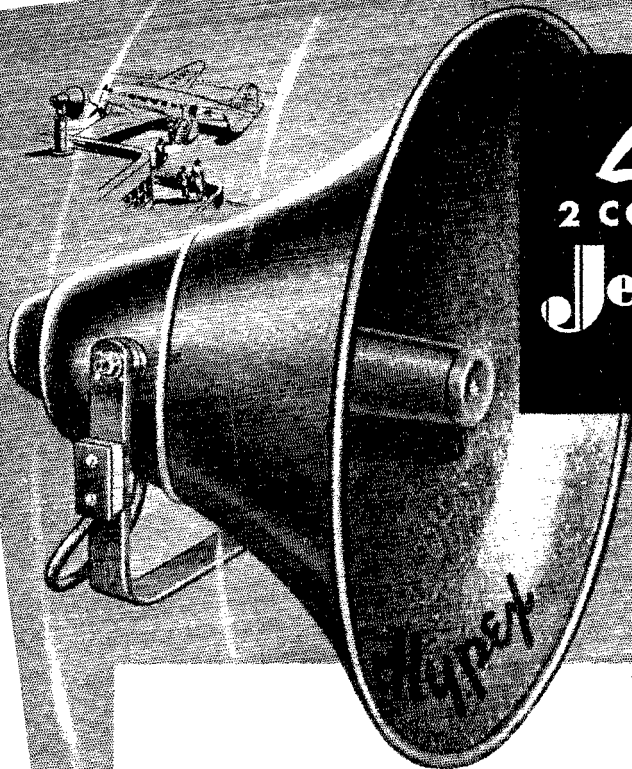
watts. AYV just completed 807 final with 80 watts. GSJ is converting his BC-211 to e.c.o. KBI is rebuilding. AXP plans on a command transmitter for 3.5 Mc. ZWL is building a five-element beam. NQ just completed new three-element beam. RMH sounds FB with his electronic key. SKQ is back in circulation with p.p. 812a at 250 watts. FM broke his motor on his beam rotator. YDJ is attending Ferris Institute and building an 800-watt rig in his spare time. HM has kw. on 3.85 Mc. ZHB built and then donated code oscillator to the local Boy Scouts. SWF will send code practice on 28 Mc. Congrats to ARJ and EGI, both are proud of the new YL additions in their families. Ex-TYE now is 9CBE from Wisconsin. ABH is now at Hart. ZCH is the new editor of the GR bulletin, QRM, NDC and DM are DXing on 14 Mc. RKE moved to new QTH. NZU plans a month's vacation in California. NOH makes BPL with a nice total. SCW makes BPL on deliveries. Traffic: W8NOH 626, SAY 243, SCW 196, UKV 111, PVB 79, TRFN 65, GSJ 57, ZHB 36, AQA 33, YNG 26, VPE 22, FX 21, DNAM 19, DPE 18, RJC 17, CPY 16, TQP 16, ATB 15, IV 15, SH 14, ARJ 12, TBP 11, QBO 10, QQN 10, YAO 10, DYH 9, DED 5, EGI 4, UGR 4, DVC 3, KZO 3, RYP 3, BCX 2.

OHIO—SCM, William D. Montgomery, W8PNQ—Appointments made during November include: DXB as OPS, PR and YGH as OBS, and IVC, TAQ, and WXA as ORS. The Ohio Council of Amateur Radio Clubs had its first meeting in Columbus on Dec. 6, 1947. Representatives from eighteen clubs and nets in Ohio were in attendance. Our Great Lakes Director, DPE, was present. Also the Ohio Section Emergency Coördinator, UPB, and the Section Communications Manager, PNQ, attended. About twenty proposals and recommendations were considered, and the delegates were polled for their opinions. It was decided to make the council a permanent organization. The Columbus Amateur Radio Assn. held its annual Christmas dinner-dance in the evening, which was a great success. And while we are on the subject, the Columbus Club's new officers are: QQ, pres.; ZCQ, vice-pres.; WAB, secy.; WRL, treas.; IVS, IVC, and YBF, directors. In Cleveland, the North East Amateur Radio Club recently elected the following officers: VDH, pres.; OZA, vice-pres.; TNB, secy.; NGW, treas. The club is a member of the Cleveland Council of Clubs, and recently completed a free school for would-be amateurs which ran for nine weeks. The Buckeye Net (3730 kc. 7:30 p.m. Mon. through Fri.) is going great guns, and has a roster of about thirty-five hot-flated members. From the *Central Ohio Radio Club News*, we learn that WZ is using a ground-plane vertical on 7 Mc., that QCQ is back in town and on 28 Mc., and that the club is trying to obtain a portable gasoline-engine generator for emergency power. The Scioto Valley Radio Club recently organized and elected as officers: CUO, pres.; PUN, vice-pres.; YKV, secy.-treas.; CUO, PUN, YKV, ZQB, and 40EE/8, directors. Also, the gang at Bellaire has completed its club organization and meets at the seaplane base on Wheeling Island, according to PUN. We hear that CBI is still taking trips to the hospital for a few days every now and then because of heart trouble. Come on, Dan, let's get that cured permanently. PBX reports that TYL has a new jr. operator (7 lbs.). EBJ had a narrow squeak when his final power transformer blew up during the Sweepstakes. PNY moved to a location on Woodley Road in Toledo where there is plenty of room for antennas. WXA is spending time trying to rejuvenate his 813. WAB tells us that MQG now has a 43-foot tower under his 28-Mc. beam. He also tells us the number of hams in Columbus—280. We hear that DAE is having good DX these days, with one week end including C9a, VU2a, UH8a, etc. TMA has recently increased his power 125 times. (From 4 to 500 watts). AQ had a bad month, with a burnt-out power transformer and a 3.5-Mc. antenna down. NDN recently worked KL7DY on 50 Mc. In closing, I wish to remind everyone to mail his monthly report before the 3rd of each month, if possible—especially if you have traffic to report. We cannot get it in QST if it is not in on time. Traffic: W8RN 140, CBI 114, EBJ 105, PIH 81, UZJ 66, IVC 53, TAQ 51, TKS 47, UPB 43, PUN 33, WE 27, WXA 22, ZAU 18, YPS 10, WAB 9, DAE 8, APC 5, TMA 5, BUM 4, AQ 4, TTH 4, EFW 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Ernest E. George, W2EZZL—Reporting this month was at an all-time high. FB, fellows. Traffic activity also reached a new high.

(Continued on page 38)



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MODERN requirements for general purpose sound equipment have outmoded older designs. Replacing Models UH-20 and UH-24, these new JENSEN Hypex Projectors answer the demand for something new, better, more reliable, and at lower cost. Power handling capacity 25 watts maximum speech and music signal input. Voice coil impedance 16 ohms.

MODEL VH-20 (ST-684). For speech and music reproduction where principal requirement is for speech. Frequency range 140 to 6000 cps. Developed acoustic path length 52 inches. Coverage angle 80°. Mouth diameter 20³/₄ inches; length 20¹/₄ inches. List price \$63.00.

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ITX reports 23 NYS net member stations active regularly and 26 outside stations reporting in. Net Control Stations are Monday ITX, Tuesday NAI, Wednesday PGT, Thursday EQD, and Friday RUF. Stations in middle Hudson Valley around Peekskill, Poughkeepsie, Hudson, Kingston, and Newburg are needed. Those interested should call in on the NYS. Net operation was extended to include Saturday starting January 1, 1948. Trunk Line "I," running from Eastern New York to Southern California now is in operation and connects with NYS. ITX is a member and EQD is alternate. LXX reports the MHARC has a new transmitter on 7 Mc. TDT is filling in term of secretary of MHARC for BJX. LDS is busy constructing. BSH is operating 100 per cent c.w. with a BC-348Q and has a new rig under construction. GYV is really knocking them over on 50 Mc. and has made contacts with W6s, W7s, VE7s, G2s, and G6s. Best crack heard on 50 Mc. in Schenectady, made by RYT, was, "Don't bother me with those local calls. I'm trying to work DX. GYV is raising them all and I can't get any of them. Go away." USH, VZU, and UYQ, all new hams around Beacon, are running a private DX contest among themselves. New appointments this month: WPO as ORS, EQD as EC. Traffic: W2LRW 262, ITX 225, WPO 75, NAI 19, BSH 5.

NEW YORK CITY & LONG ISLAND — 8CM, Charles Ham, jr., W2KDC — BGO, the EC, reports the following EC activities: OQI, Suffolk EC, is working on co-ordination of all 144-Mc. nets which are scattered throughout his county. During the October dry spell LUD, DOG, US, ADW, and FCH were alerted by the Red Cross and Forestry Service. In Brooklyn, OHE held a meeting at his shack and ten Brooklyn AEC boys were present. Frequency allocations were discussed and KDC has promised to attempt a solution of the intercounty frequency problem. Crystals will be provided for the Brooklyn gang, courtesy of TPV. The Brooklyn AEC joins with all other amateurs of our community in its sorrow over the loss of BVE, who so recently participated with us in the simulated emergency. When OKK rotates his beam the line voltage drops to a high 60. WLS, at Farmingdale, has an FB location for 144 Mc. HWR, with his 813s, can be heard from 28 to 3.5 Mc. LYH is pushing a 522 on 144 Mc. plus his usual 3.5 Mc. c.w. work. This brings Riverhead to the top with LUD, US, UDP, UFY, BFA, DOG, VSV, and FCH in the net and LRI, from Brooklyn, a steady visitor-operator. VZR is using 60 watts on 28 Mc. to an 807 and three-element beam. PDU is awaiting his Class A to hit 3.85-Mc. 'phone. KNA does a great job as NCS on 144 Mc. Groups One and Two of the 3.5-Mc. c.w. emergency net are well attended. Recently UZX and TUK have become alternate NCS for their group. 3600 kc. is the frequency to watch for NYC-LI EC activity. New additions are VOS and SMQ. GYG was one of a group of thirty old-timers who met recently to form the "Quarter-Century Wireless Amateurs." FX was elected president. RTZ and PL attended a small hamfest at Union City, N. J., and also assisted at the A.R.R.L. Hobby Show at Madison Square Garden. KV4AF/2, Staten Island, promises big traffic activity upon his return from the West Coast. KCA moved to Washington, D. C., and had to resign as secretary of the Corona Community Radio Club. NRS is secretary protem. The new club frequency is 28.8 Mc. at 2200. LQP, in Manhattan, finally got rid of the d.c. "mains" and had Edison put in a.e. KJY also has voltage trouble on his overloaded attic line. KD is on 7 Mc. nightly. JJJ is on 14 Mc. MRM gave up 28-Mc. mobile. Erasmus Hall High School Radio Club, ANU, is headed up by President VVZ. SKV, SIJ, VHS, AIQ, and OAG all did very well in the recent FMT but ALH broke all records with 8 parts per million. VRC, via WHB, suggests that an association of high school hams be formed for the purpose of promulgating the art and creating a better feeling for the high school hams with the idea of acquiring space and equipment. Those interested contact Dave Wiesen, 203 West 90 St., New York 24. WBT worked 24 states and became a rag-chewer in four months. Bob is trustee of the Lafayette High School Radio Club. MZB moved to 28 Mc. with a three-element beam. JBQ uses a wandering 60-foot antenna on both 3.5 and 144 Mc. LGK met 1LKF at the hobby show. VOS is starting in on 3.5-Mc. c.w. with 25 watts. TUK is doing a wonderful job with ARC-5, working 401 contacts in 30 hours during the SS. URX will join the L.I. City net. PZE made a big score in the SS. EC reports TLAP can handle traffic for any state and also the Pacific Islands. TYU had 550 contacts in the

(Continued on page 88)

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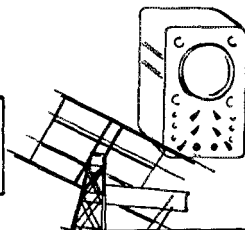
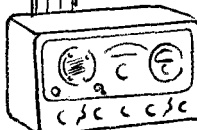
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NC-57	1	89.50	8.95	7.12
NC-173	1	189.50	18.95	15.07
NC-183	2	269.00	26.90	21.39
NC-240D	1	241.44	24.14	19.20
HRO-7	2	311.36	31.14	24.75
HALLICRAFTERS				
S-38	1	47.50	4.75	7.55*
S-40A	1	89.50	8.95	7.12
SX-42	4	275.00	27.50	21.86
SX-43	3	189.00	18.90	15.03
S-47	4	200.00	20.00	15.90
HT-9	5	350.00	35.00	27.83
HT-17	5	69.50	6.95	5.53
HT-18	6	110.00	11.00	8.75
HAMMARLUND				
HQ-129X	1	189.15	18.92	15.04
R.M.E.				
RME-84	1	98.70	9.87	7.85
RME-43	1	198.70	19.87	15.80
RME-152A	7	86.60	8.66	6.89 or 13.77*
RME-DB-22A	7	66.00	6.60	5.25
MEISSNER				
Signal Shifter	8	66.00	6.60	5.25
Coils: any band — \$4.00 per set				
Power supply — \$13.00				
SONAR				
VFX-680	9	87.45	8.75	6.95
Coils: any band — \$1.50 per set				
MB-611	10	72.45	7.25	5.76
HARVEY-WELLS				
TBS-50		99.50	9.95	7.91
50-watt xmtr with tubes and coils for 8 bands; less power supply				
WEBSTER				
Wire Recorder		149.50	14.95	11.89
SYLVANIA				
7" 'Scope		124.50	12.45	9.90
R.C.A.				
Voltohmyst 195A		79.50	7.95	6.32
Voltohmyst WV75A		125.00	12.50	9.94
Chanalyst 162C		162.50	16.25	12.92
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It's easy now to fit up your ham shack with new, modern gear. Just choose what you want . . . whether it's a receiver, transmitter, amplifier, wire recorder, or test instrument . . . and send us only 10% of its price. Start using your new equipment right away . . . while you take a full year to pay for it.



EQUIPMENT CODE

- 1 Tubes, speaker, built-in power supply
- 2 Tubes, speaker, and separate power supply
- 3 Tubes, built-in power supply, and R-44 bass-reflex speaker
- 4 Tubes and built-in power supply, less speaker
- 5 Tubes and power supply—less coils and crystals
- 6 Tubes and power supply—less crystal
- 7 Tubes and power supply
- 8 Tubes—less coils and power supply
- 9 Tubes and one set coils
- 10 Tubes — less crystal and power supply

* 6 monthly payments

We carry a full line of test equipment by RCA, Simpson, Supreme, Triplett, Precision, Dumont, Hickok . . . All available on our easy 10%-down deferred-payment plan.

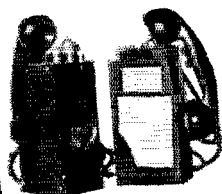
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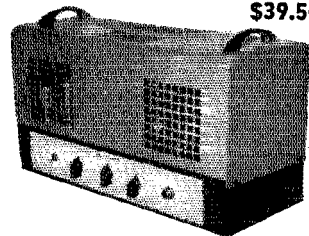
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EE-8 FIELD TELEPHONES \$19.95 per pair



Just what you've needed for fixed or portable telephone uses. You can talk from room-to-room or over many miles with these dependable sets. Uses flashlight cells for talking current; built-in hand generators ring bells. Used, but in excellent condition.

BRAND NEW! BRENTWOOD 25-WATT AMPLIFIER only \$39.50



Here's amazing value in a 25-watt amplifier admirably suited to speech and driver requirements of any amateur modulator. Output is from a pair of 6L6's terminated into 4-500 ohms. Has separate phono and mike volume controls; also bass-treble control. Fused input at 115 volts 60 cycles. Steel case, finished in black and gray crackle, is 17 1/4" x 8" x 10 1/2". Complete with tubes. Order now for prompt shipment.

BRAND NEW: BC-442 ANTENNA RELAY UNIT -\$1.50



Complete, compact unit includes 0-10 ampere r.f. meter, antenna-switching relay with 28-volt winding, and 5000-volt, 50 mmfd. blocking capacitor; all in metal case with porcelain insulators. Don't miss this buy.

BRAND NEW: CW3 RADIO RECEIVER only \$10.95



Highly selective crystal-controlled superhet for fixed-frequency operation in 1900-16,500kc band. Has variable BFO, r.f. sensitivity control, audio peak limiter, built-in power supply for 115 volts a-c; rack mounting. Furnished with full set of 7 tubes; less plug-in coils; detailed instruction manual included.



**SUPER SPECIAL
BRAND NEW!
Eimac 304 TH
JAN inspected
\$3.95 ea.
6 for \$23.20**

TUBE SUPER SPECIALS



All Brand New JAN-inspected
Eimac 304-TH \$3.95 each
Six for \$23.20
Westinghouse 807 90c each
4 for \$3.10 100 for \$75.00
826 3 for \$2.65
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6 for \$7.00

RADIO PHONE HANDSETS TS-11 TS-13



Carbon mike, push-to-talk switch, rubber cord, plugs.
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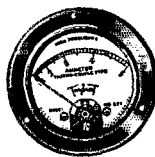
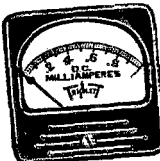
**C-D
DYNALOX
XMTO
CAPACITOR**
TQ-30020
3000 vdc
2 mfd
\$3.46 each

AND CHECK THESE TUBE VALUES

Type	Net	Type	Net
2C34	\$0.45	886	1.00
2C40	.90	874	1.95
3C24	.75	VR105	.75
2D21	.60	VR150	.75
3B24	.75	931A	1.87
3BP1	8.00	954	.75
5RP4	2.25	955	.75
6AK5	.60	957	.75
211	.37	958	.75
6C21	13.50	959	.75
3E29	3.00	1619	.15
2X2A	.60	1625	.52
801	.75	1624	.00
808	9.00	1626	.25
809	1.50	1629	.15
811	1.95	1651	.75
818	9.00	8005	3.15
815	2.25	9001	.52
(VT287)		9002	.60
826		9003	.52
(VT222)	2.25	8004	.36
832		9006	.67
(VT118)	2.25		

Minimum tube order \$2.00

Meter Specials



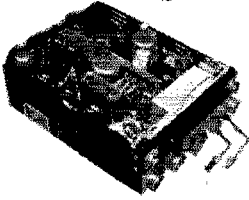
You'll find these popular instruments mighty handy . . . and at these low prices they represent real values.

A-C VOLTMETERS
0-1 volt, Western Electric, round, 3" \$3.95
rectifier-type 3.49
0-8 volts, Weston 476, square, 3"
R-F AMMETER
0-1 ampere, G.E. and Westinghouse thermocouple-type, round, 3" 4.95
D-C VOLTMETER
0-3 volts, Gruen, round, 2" 2.19
DC MILLIAMMETER
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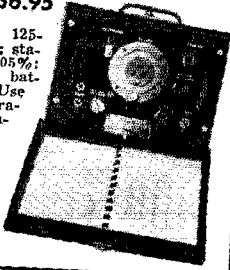
BRAND NEW G.E. BC-645A — ONLY \$9.95

Get going on 420 with this "hot" xmtr-rcvr for phone and i.c.w. Originally priced over \$2000, they cost you less than the price of the 15 tubes you get with the outfit. Full conversion instructions furnished.



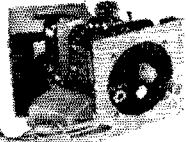
BC-221 FREQUENCY STANDARD \$36.95

Fundamental ranges 125-250 and 2000-4000 kc; stability better than 0.005%; works on 110 vac. batteries, or vibrapack. Use it for a signal generator or to make a wonderful V.F.O. Complete with tubes, original crystal and calibration charts. Used but excellent working condition



BRAND NEW! RADIO RECEIVER BC-1206-A

\$4.95 with tubes



Handy, all-round rcvr in metal case; tunes 200-400 KC; five tubes give pre-selector, converter, oscillator, 175 KC I.F., 2nd det., and A.F. Takes 900 mils at 28 vdc. Filtered and shielded battery lead.

Genuine "MAC" Key



Model 200 59c

"BUG" KEY Brand New J-36



\$6.95

You'll be pleasantly surprised at this value... its counterpart has been sold by a well-known speed, key manufacturer at more than double our bargain price. Made for the Signal Corps by Lionel Corp.; supplied complete with cord, wedge plug, and switch.

CO-AX CABLE SETS

Fifty-foot RG-8/U co-ax cable with PL-259 connectors \$1.95

One hundred-foot RG-8/U cable comprising two 50-foot cables \$3.90

RG-11/U in stock 5c per ft.

SHURE SW-109 HAND MIKE



Brand new single-button carbon mike with press-to-talk switch, cord and plug. A rare chance to get a fine hand mike under a dollar.

only 98¢

DYNAMOTOR SPECIALS — ALL BRAND NEW



BD-77 — 14 v. d-c input, 1000 v. 350 mil d-c output \$ 7.95
PE-55 — 12/24 v. d-c input, 500 v. 400 mil d-c output \$ 9.00

All outputs well filtered.

BRAND NEW BC-348 COMMUNICATIONS RECEIVER

\$69.50



Guaranteed absolutely new and unused — in original, unopened, wood shipping cases. Complete with built-in dynamotor, crystal filter, full set of tubes, and detailed AAF technical manual. Shipping weight 61 lbs. Kit for conversion to 115-volt a-c operation, with full instructions \$6.50

USED BC-348's Limited quantity \$49.50 each

In excellent working condition after moderate use, these receivers are complete with tubes and dynamotor, less instruction manual. Order now!

BRAND NEW Limited Quantity SCR-522 VHF XMTR-RCVR \$29.50

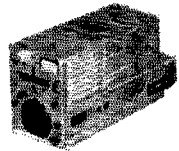


The ideal set for 100-156 mc work. Ten-tube superhet with 3 microvolt sensitivity; 7-tube, 15-watt xmtr. These are brand new, unused sets with full set of tubes. Quantity is limited so it's "first come, first served".

Spare, 832's for the SCR-522 Order spares now.....only \$2.25 each.

MOBILE RCVRS \$5.95

XMTRS \$9.95



RCVRS Great for stand-by on 40-80 meters; phone or CW; ample bandwidth; complete with 6 tubes.

BC-454-B 8-6 MC \$5.95
BC-455-B 6-9.1 MC each

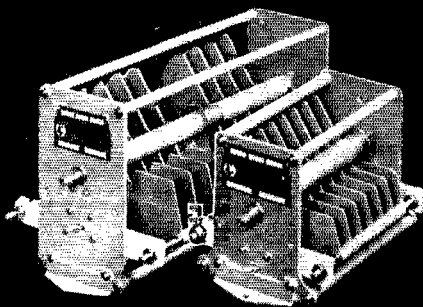
XMTRS Furnished with 4 tubes including 1629 magic eye, 1626, and 2-1625's; also calibrating crystal.

BC-459-A 7-9.1 MC 9.95
Shipping Wt. — rcvr or xmtr — 15 lbs. ea.

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(Continued from page 88)

SS. LPJ has 9 states on 144 Mc., all with 15 watts or less. OUT schedules Canadians. The stork tripped over KDC's antenna, a cute YL whose initials will be C.W. Traffic: W2TYU 676, RTZ 157, TUK 127, KV4AF/2 108, QYZ 68, OBU 51, JBQ 50, EC 46, BO 28, LPJ 27, LGK 17, VGQ 7, PF 6, VOS 5, PZE 3, URX 3, VVZ 2, OUT 1, MZB 1.

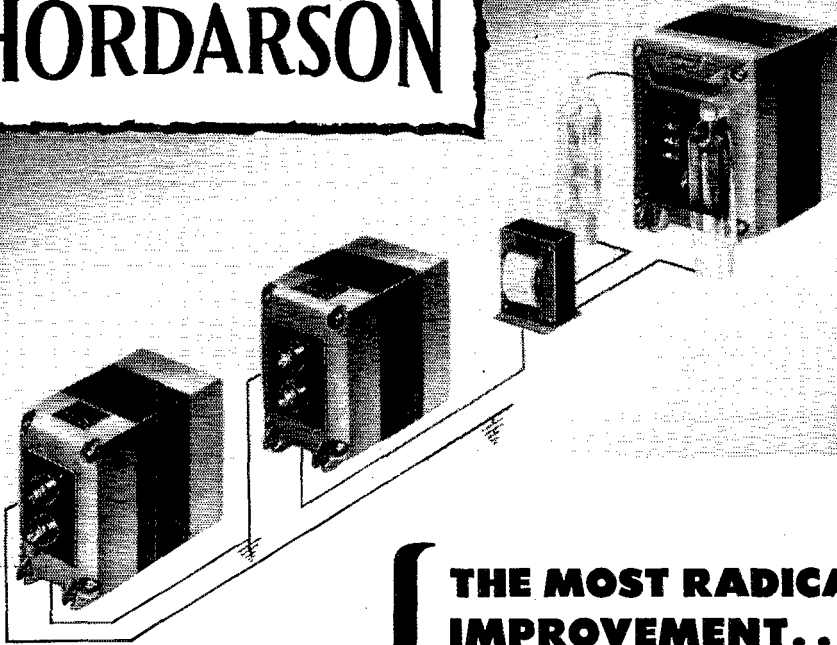
NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN — Asst. SCM, T. J. Lydon, ANW. SEC: GMN. NNJ Net (c.w.) 3630 kc. 7 p.m. daily except Sunday. NJ 75 'Phone Net 3900 kc. 9 a.m. Sunday. NNJ Net and ORS and OO appointees held a meeting at Elizabeth YMCA and arrangements were made for the handling of traffic to and from other nets. OOs described their work on frequency measurements. Those present were NCY, BF, MRG, GFW, and ANW. Next meeting is scheduled for Feb. 4th. The N.J. 'phone-OPS meeting promised more activity and improvement on procedure on emergency traffic handling. Next meeting will be held Mar. 3rd at Elizabeth YMCA at 8:30 p.m. KMK is secretary. ANW is secretary for NNJ Net. BAI has been appointed Middlesex County EC. DZA is EC for Bergen County, CQB, EC for Red Bank, is starting an emergency net. SFT is on 28 Mc. with new beam on tower. EGM is raising new tower for multi-beam operation. WEY is on 144 Mc. with 522. UWN uses same type rig. VMJ is running 200 watts with ART-13 on 7 and 14 Mc. LFR is EC for Montvale and surrounding territory. UZN is DXing with 40 watts to 807 on 14 and 28 Mc. with long-wire antenna. OUS and EUI have been working over the pond on 50 Mc. BF is using a BC-610 1-kw. 'phone or c.w., 14-Mc. beam, and has worked 84 countries postwar. GVZ has 79 countries. BF is converting a 522 for mobile 6-volt operation. CH has 30-foot tower with five-element 144-Mc. beam. KM has new 46-foot steel tower. HZY has 139 countries. ND/L/3, NNJ's personal representative in Md.D.D.C. traffic net, recently visited LFR. Hal has WAS but is pleading for the QSLs. NIY, on 3.5 Mc., worked some Gs and PAs. BLS has 124 countries, and has new two-element beam on 14 Mc. OEC maintains schedules for GIs all over the world, and is a member of NNJ Net. BWI has four-element beam on 28 Mc. and is working all kinds of DX on c.w. with 50 watts into an 807. Receiver is HQ-129X. A new net, the Loyal Order of Tish-Tishers, known as the Tish-Tish Net, operates on 29 to 29.4 Mc. almost every night, usually after midnight until after 2 a.m. BYC is royal president, MPS, is secretary, all other members are vice-presidents. The XYLs have found an auxiliary. Vice-President TZY recently gave a Welcome Home Party for his jr. operator (out of the Navy) and the local Tish-Tishers barged in. On behalf of the club Vice-President VFM presented the jr. operator with a complete transmitter (a miniature working model of a real spark transmitter). Those present were BYC, TZY, NQK, BD, SNJ, DOR, LEG, VFM, and IIN, and XYLs. PIX is president. At a joint meeting of SIARA and UCARA AMJ, assisted by HEL, demonstrated and spoke on Frank's converter. OSQ and GJC have finished conversion of their 522s. NPJ is working 50-Mc. band. VJN is DXing on 7 Mc. EKS is back on the air on 28-Mc. c.w. Traffic: W2CGG 223, ANW 174, LFR 127, OEC 117, CQB 101, NCY 73, CJX 44, CWK 40, QEM 38, DRV 33, PPH 29, ANZ 25, IIN 18, LX 16, NKD 15, OXL 15, MTV 14, GVZ 11, KMK 8, NIY 8, APL 6, BRC 6, HZY 5, UWN 4, UZN 3, BLS 3, VLW 2, VXV 1.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W0PP — DIB holds regular schedules with J2AAY. ARW is building new rig using p.p. 813s. ROW tries 3.85 Mc. now and then. SEG is going to town with his 813 final running 200 watts. WQQ swears he's going to quit modulating his buffer and pour on some coal. CVU has negative peak clipper. BPG still is waiting for that "G" on 3.85 Mc. IGP is modulating an 807 with p.p. 46s on 28-Mc. mobile. NKZ bought a new home with an extra lot for antennas. CPR now has an XYL and a new home. 4LNK, ex-MEI, visited SQQ. SEG won an SX-25 in a raffle. PEO is working on new rig for 28 Mc. IGP is with CAA working out of Omaha. TWX is sidelining with NTI building a dandy e.c.o. and exciter for the market. DIB is waiting for the card that will give him WAS. UOP visited 6WRQ and the surplus stores around Los Angeles. The Mitchellville gang gave him a job picking up surplus. DIB, CK, BAL, MBR, PP, and AED all got

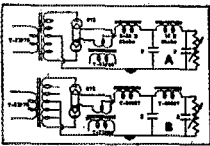
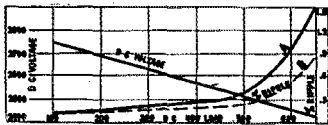
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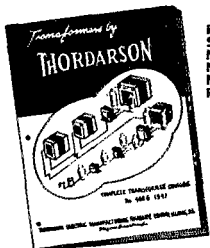


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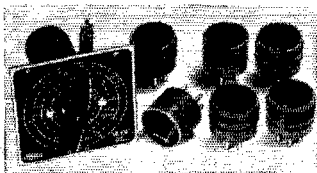
IN A CLASS BY THEMSELVES

MODEL 701 TRANSMITTER

Goes into more amateur stations to produce more CW and phone DX than anything else, it seems. A 6AQ5 Tritet drives an 807 to 75 watts CW, 30 watts phone, input; 80 through 6 meters. Modulator is built-in. Less coils (3 per band at \$5.00 ea.), power supply, 4 tubes and crystal, it's the outstanding transmitter "buy" at \$36.95.



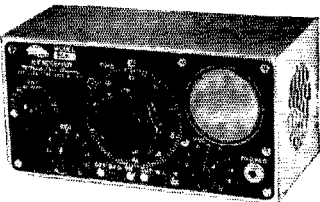
MODEL 903 ABSORPTION WAVEMETER.



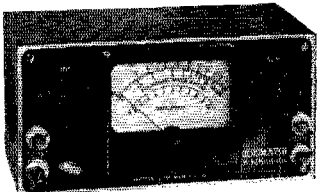
Is close to the most useful instrument in any shack. Thousands in use attest its prime necessity. Price is but \$3.30 net, plus \$6.65 ea. for plug-in coils covering 1600 kc. up to 500 mc.

MODEL 802 SUPER-HETERODYNE RECEIVER

An amateur-band-only receiver using i. f. regeneration to give variable phone up to single-signal CW selectivity. Following A. R. R. L. HANDBOOK teachings, it provides more than usual 8-tube results, over 7 feet of band spread on 80, 40, 20, 16, 11 — 10, and 6 meter bands, all for only \$38.95 less tubes, power supply and coils at \$1.00 per pair.



MODEL 908 MICROMATCH



Standing wave ratio and r.f. wavemeter will let you put more power into your antenna — from your present transmitter — for only \$29.90.

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459As for that future rig. GFQ got on 3.85 Mc. for a swell week end of contacts. IFI, UL, FRH, and RFE were pallbearers for ex-9ADQ, who passed away on Nov. 26th. IFI got a big kick out of operating his BC-654. KSS has rebuilt his rig and now drives it with a converted 696. AEH still is going after the 144-Mc. DX. WPT still abuses PP. Thanks for your cooperation during the past year, fellows. Help me to make 1948 a banner year for the Iowa section. Traffic: W6HMM 89, PP 77, FP 31, PKB 30, TIU 30, SEF 19, GKS 15, AYC 11, QVA 11, AEH 7, WMU 5, DIB 3.

KANSAS — SCM, Alvin B. Unruh, W9AWP — Top news this month is the Kansas ice storm. The following Kansas hams were known to have taken part in this emergency: AEY, AAO, AHM, AWP, BQJ, BXZ, CQC, CVN, DQW, FMR, FLZ, GOV, HJM, HYF, ICV, JCO, KPJ, KSY, LFB, LOU, MFC, NCV, NJS, OZN, PGL, PBX, SGG, TLY, TUH, UQD, UNQ, YUQ, ZAX. We are happy to announce the appointment of a new PAM, ICV, and the formation of the Kansas 'Phone Net on 3920 kc. The work done in this net will not soon be surpassed in excellence. Good work also was done in the 3610-kc. c.w. net, thanks to RMs NJS, KSY, and OZN. Others helped on 7-Mc. c.w. and 28-Mc. 'phone, using East and West Coast stations for relay points. SEC PAH still has openings for Coordinators, and will welcome AEC applications. AEY has been appointed EC for Zone 21. NCV and AEY are ORS. EML is new ham at Wamego. At Salina, PKD, MUG, and INM are working 420 Mc. Ex-VQG, of Topeka, now is 3MRN at Ft. Mead, Md. Ex-9EEL, of Wichita, now is 6ZFB, at Burbank, Calif. NCV is working in QKS and QMW nets, and Trunk Line "L." PZP has several schedules and a good traffic total. Ex-9SPN, of Kansas City, Kans., is 5LYQ. LB is ex-#BXG. BPL qualified for Class II Official Observer. Congratulations to Kansas University Radio Club, whose application for affiliation with ARRL has been approved. KEI is working n.f.m. with 60 watts. Traffic: W9NCV 57, NJS 42, PZP 42, AWP 40, ICV 36, AEY 29, PAH 27, HJM 21, OZN 18, BNU 9, CXF 9, FER 8, YUQ 4, BPL 3, WKA 2, LIX 1, PBX 1.

MISSOURI — SCM, Mrs. Letha A. Dangerfield, W9OUD — Quite a lot of nice reports this month, for which we are all duly grateful. SKA has a schedule with PZP and 5GV8 which ties in with Rebel Nets. GCL has chosen a location in the new QTH with two trees for antenna. AEJ has a very discouraging 15 watts on 7 Mc. VMI is organizing 3.85-Mc. emergency net. ZAO is working on the overall emergency set-up with plans for c.w. net on MON frequency, 3755 kc. BCD has a new OBS appointment. YHZ received degree of Master of Science in Physics and has finished transmitter for 420 to 450 with 12 watts input. ARH has just built 832 push-pull doubler for n.f.m. on 28 Mc. CRM had 225 QSOs for the month and says it was a great month for rag chews on 7 Mc. It's a wonderful hobby for the shut-ins. DEA, the new Midwest Division Director, managed 16 hours in the SS with 115 QSOs in 50 sections. KIK is NCS for MON on Thursday and has volunteered to open the net at 6:30 for any early-comers. GBJ finally got that DXCC Certificate. YSM joined TL.L. and is rounding up AEC for St. Louis. ZVS is chief janitor, radio operator, and clerk on U. S. Army boat out of St. Louis. OUD has a new monitoring oscillator keyed by transmitter carrier and hopes her fist is a bit more readable. QXO was high traffic man again as usual. MON now is rotating net control among the regular members and the boys seem to enjoy it and are learning a lot about procedure. They are doing remarkably fine jobs. The net still needs many outlets and much traffic and invites new operators to join. Traffic: W9QXO 157, SKA 28, YSM 24, OUD 22, ARH 20, KIK 20, CRM 12, VMO 12.

NEBRASKA — SCM, William T. Gemmer, W9RQK — FAM has both poles back up after losing them in a terrific windstorm. FMW worked CIO, 200 miles distant, without an antenna on either of the transmitters and running only about 15 watts input. FMW was using his "emergency rig," a modified BC-457A. LWV is looking for sky hooks so he can get on 3.5-Mc. c.w. ZQZ is on 28-Mc. 'phone. NME is on 3.85-, 14-, and 28-Mc. 'phone. DLX is on 3.5-Mc. c.w. VDC has worked XE-1, 2, VK3-5, KH6, KS4, ZLI, and has 44 states with 60 watts into an 807 on 7-Mc. c.w. DMY has added VR tubes to his VFO. TQD worked FA8BG, and ON4AU and heard ZLs, ZK1AM, FASTH, and several other Europeans on 3.5 Mc. BDO, CMO, COU, EKP, IDZ, and IDO were out-of-town visitors at the last meeting of the NPARC. TQD as Net Control has the Ne-

(Continued on page 80)

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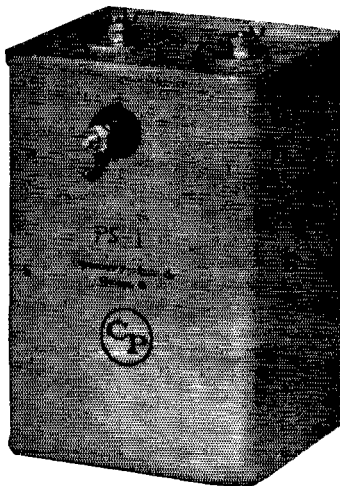
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SPECIFICATIONS:

Volts Input: 118 VAC, 60 cycles.
Volts Output: 2400 VDC, maximum.
Current Output: .005 Amps. DC, maximum.
Max. Watts Input: 10 watts.
Type of Filter: RC Filter: 50,000 ohms, 2x.1 mfd.
Terminals: 8-32 screw and nut.
Insulators: 118 VAC—2 bakelite washers; 2400 VDC—2 porcelain standoffs; container neutral.
Container: Terne plate steel—gray lacquer finish.
Size: 3 $\frac{3}{4}$ " x 3 $\frac{3}{16}$ " x 5 $\frac{1}{2}$ ".
Weight: 2.5 lbs.



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Note: The PS-2 is similar in appearance to the PS-1 except that all four terminals are on the recessed top of the container.

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Volts Input: 118 VAC, 60 cycles.
Volts Output: 2400 VDC (capacitor load)
Current Output: .006 Amps., half-wave DC.
Max. Watts Input: 15 watts.
Type of Filter: Not filtered.
Terminals: 8-32 screw and nuts
Insulation: 118 VAC—2 bakelite washers; 2400 VDC—1 porcelain standoff; 2400 VDC—lug spotwelded to case.
Container: Terne plate steel—gray lacquer finish.
Size: 3 $\frac{3}{4}$ " x 3 $\frac{3}{16}$ " x 5 $\frac{1}{2}$ ".
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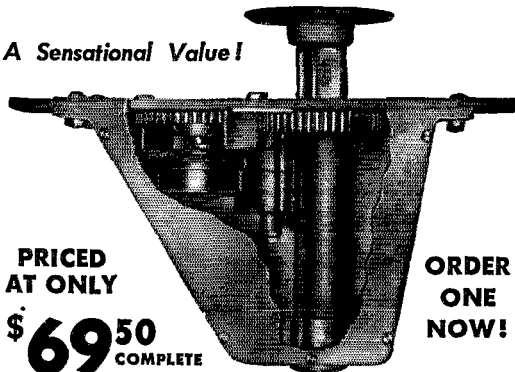
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braska C.W. Net open for business with CMO, FAM, FQB, HYR, OHU, and SAI in attendance on Mon., Wed., Fri. at 7 P.M. CST on 3745 kc. Anyone interested, contact TQD at that time. MLB started an FB 'phone net on 3983 kc. It can be heard daily except Sunday at 12:30 p.m. with RWV as NCS and EXJ as ANCS. AMY, BPY, BIW, COU, DHO, DTS, EUT, EWO, EXP, FBK, FOW, LEF, GDB, HYR, MJY, MLB, NME, NOH, NVE, NZ, OZC, PDH, TQD, VMP, YMU, and ZNI are all reporting members. RWV has 4 half-waves in phase on 14 Mc. and a three-element beam on 28 Mc. ZOQ is on 28-Mc. 'phone with 60 watts into an 807. Traffic: (Oct.) WPTQD 520. (Nov.) WPTQD 818, NZ 40, HYR 24, EUT 7, DHO 5, RWV 5, EXP 3, EXJ 2, FBK 2, MJY 2, OZC 2.

NEW ENGLAND DIVISION

CONNECTICUT — Acting SCM, Walter L. Glover, W1VB — Am pinch-hitting for KQY, who is under the doctor's care. Hope I can serve the gang as well as he did. LKF and DAV operated plenty of hours during the Maine emergency. ADW intends to rebuild. PCZ, in Stamford, hopes to be more active. BIH hit 69 sections in the SS and has DXCC with 103 confirmed. QBD applied for AEC membership. MVH, LVX, GC, and KQY rebuilt TU5B units for VFOs. NRR has gone back to sea. FMV operated GB during the SS. JQK is on again with new antenna. PBQ is active on 3.5 Mc. NWC and IGT are on 28-Mc. 'phone. AMN is running code and theory classes with a membership of fifteen. OCH has new rig. FT is on 425 Mc. BYW and KQY ran a successful test on 10,000 Mc. AMQ was transferred to Lowell temporarily by G. E. We regret to report the sudden death of MTC, of Milford. ODR is communications officer for CAP. KBZ, KPN, MWQ, OGQ, and BRL participated in the Red Cross test in Stratford. APW now is in Red Cross Net. Old-timer Homer Nichols is boning up to get his license back. PBB, JRV, JW, FT, and IYO are experimenting on 420 Mc. DWP is working 3.5-Mc. c.w., 3.85-Mc. 'phone, 14-Mc. c.w. and 'phone. TD got his p.p. 813 final working. INF now is running 450 watts to a pair of 813s. HYF has new job as operator at b.c., station WLIZ, in Bridgeport. The Manchester Club has a new transmitter. CARA, of Danbury, is negotiating for new quarters with plenty of room. NTL traffic line on 3670 kc. is getting organized with AW as NCS. The Nutmeg Net is going strong with EFW, LKF, DAV, ORP, and VB as control stations, Monday to Friday respectively. The New England Net needs active Vermont and New Hampshire stations. VW is planning to organize an emergency 'phone net. Anyone interested get in touch with him. OPG, confined to bed temporarily, works 28-Mc. 'phone from there. Received OO reports from IIN and KUK. VB can be found evenings around 3640 kc. Always glad to chew the rag. Traffic: (Oct.) WILKF 69, AFB 9. (Nov.) WIINF 363, AW 206, NJM 203, IIN 194, EFW 157, VB 150, DAV 129, ORP 83, BDI 78, FTX 56, LKF 44, JQD 42, DXT 11.

MAINE — SCM, F. Norman Davis, W1GKJ — SEC: LNL PAM: FBJ. RM: NXX. New ECS: CRP and DFC. Renewed ORS: CRP. Renewed OPS: FBJ and MFK. QUA is new ham in Portland. QQY and QUI are new in South Portland. NWJ, QIQ, and QMK operate QHA at the University of Maine Annex in Brunswick. AMR has been working 28-Mc. 'phone and adding to his DX conquests. LKP reports hearing European 'phone stations coming through fine on 3.5 Mc. AFT has increased power on his ten-watt rig; he replaced the type 80 rectifier with an 831 NXX is running 90 watts to parallel 807s and he has a new BC-348P. The Portland Amateur Wireless Association is having good attendance at its weekly meetings. Code classes are held for the beginners and theory classes are ably conducted by MBR. KVI is the club call and a rig is under construction using a 75TH in the final. QQY has started his amateur career on the 144-Mc. band. The Seagull 'Phone Net, on 3960 kc., changes net control weekly which keeps all the members interested and up to form on net operation. Anyone handling traffic, whether in a net or not, is urged to report it on the first of the month, even though it is only one message. It is not necessary to hold an appointment or belong to the League to receive credit in QST for traffic. However, applications for ORS and OPS are desired from those in c.w. and 'phone nets respectively. Traffic: WINXX 122, OHY 50, FBJ 41, LKP 15, VV 13, GKJ 11, QHA 11, AFT 8, EFR 4, CRP 1.

EASTERN MASSACHUSETTS — SCM, Frank L. (Continued on page 98)

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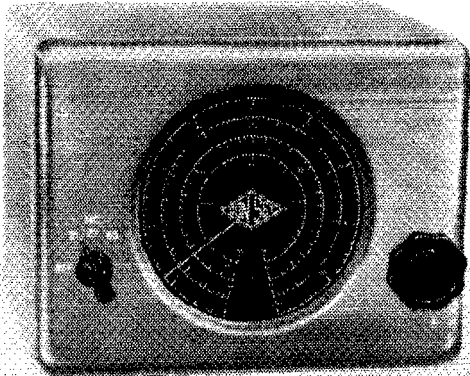
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Baker, jr., W1ALP — New ECs: JSM for Waltham, OUP for Roxbury, ZE for Mattapoisett, JOB for Braintree, KTU for Cohasset, UE for Wellfleet, BWH for Attleboro. New ORS: DWO, PYM, QHC. New OOs: DWO, LQQ. New OBS: ZE, PZG. The following renewed appointments: EC: HUP, KTG, HZU, NSP, OAI, WS, LAZ, OPS: AAR, KTE, AR, PZG. ORS: AAR, CCF, JDP, LML. OBS: ALP, AAR, LMB, MEG, BHD. OES: OAI, WS, CTW. The Brockton Amateur Radio Club and South Eastern Mass. Amateur Radio Assn. of New Bedford have affiliated with the ARRL. CLS is vice-pres. and LMG, is secy. of the Eastern Mass. Amateur Radio Assn. 2SIK/1 and JAS are on 3.85-Mc. 'phone. QON is new call of OLP's XYL. Anyone know where MBG has moved to? UE is new call of ex-LEW. GGV, NRZ, and DKS, with the help of Jack Miller, general manager of Eastern Aviation, who supplied a plane in an aerial forest fire patrol over the Gloucester area, passed information to the fire chief via two-way radio. BL reports a radio club started at Sylvania Electric Co. in Boston. ORT has three-element beam on 14 Mc. KYL is secy.-treas. of the Field Station Radio Club in Boston, PUN. 9NGE is president, LZS, is trustee. KR D is on 14 Mc. NEX is on 7 Mc. OKB, EAB, PSF, and NBV have new beams for 28 Mc. BHD has new Vibroplex. NYH handled forest fire traffic at QFT in Winthrop. The Plymouth Radio Club has been formed with GLU, pres.; LJH, secy. OJM, PHA, and VDY did well in the September FMT. OAI is on 14-Mc. c.w. ZE is putting up a 10 wave length wire for 14 Mc. aimed at G6BY. IIP and MHN are on 3.5 Mc. The T9 Radio Club had a Christmas Party at MQR's QTH. AKY was auctioneer for the South Shore Radio Club and NXM gave a demonstration of equipment on 420 Mc. DNL is working DX on 14 Mc. ONZ has new Collins receiver. OBN is on 7 Mc. and worked in the SS for the Parkway Radio Club. LQQ says the Yankee Radio Club now has 75 members. OJT has 38 countries and worked VU2AF on 28-Mc. 'phone. PZG is on 50 Mc., and worked G6BY the first day. AAL is on c.w. most of the time. MDV worked 39 sections and 234 contacts in SS. AQE had a QSO with GD3UB and UA3BD on 7 Mc. and made 68,661 points in the SS. DWO has been helping AXG with a new rig. BWJ worked 60VK on 50 Mc. HJ worked some nice DX during SS. HIL now has WAS and has worked 20 states on 50 Mc. The Waltham Radio Club and Framingham Radio Club had a bowling match. JXU has a 522 to fix up. AAR has 450 watts on the air. The El-Ray Radio Club elected the following officers: PEG, pres.; ILS, vice-pres.; PAW, secy.; JCE, treas.; JSM, act. mgr.; AQE, chief eng. The club is putting up a three-element beam for 28 Mc. and a four-element beam on 50 Mc. LYL is a new ORS. The Pocahontas Radio Club meets the 1st and 3rd Tues. at the Lynnfield Town Hall. PZ is pres.; HBR is secy. Traffic: (Oct.) W1AQE 58, AAR 6. (Nov.) W1LML 121, BDU 95, JCK 88, EPE 60, AAL 56, AQE 51, BL 37, LM 32, PYM 29, BB 28, EMG 28, DWO 24, TY 20, KKK 16, MDV 12, PZG 11, AAR 4, JDP 4, MGP 4, AYG 2, HIL 2, MRQ 2, HJ 1.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — RM: BVR, SEC: UD. The Western Mass. Nets, both c.w. and 'phone, are in full swing. The 'phone net meets each Sunday at 9 a.m. on 3865 kc. and as a reminder the c.w. net meets Mon., Wed., and Fri. at 7 p.m. on 3760 kc. All Western Mass. amateurs are welcome to participate in either of the nets. BVR will be using VFO soon. JAH renewed ORS and OPS appointments. BDV has applied for ORS and OPS appointments. JE has working hours which interfere with regular schedules. However, he is finding some traffic on 7 Mc. QQO is new ham in Worcester. AQM has a new 60-foot tower and 14-Mc. beam. IBZ is building beam rotator. GZ, who is blind, passed the examinations with flying colors. QPF is a new ham in Whalom. EAX is now Class A. MIM is letting housework interfere with radio. MND made a fine showing in FMT. He has applied for OO appointment. Others who took part in the FMT were MUN, DDK, and BKG. MUN had an error of only 4.89 p.p.m. There is a new club in Westfield. BVR and PIR are members. NQB is the experimental station. There will be some new hams in Westfield soon. LDE is rebuilding. IJT has a new transmitter and receiver. MAX is IJT's dad. FQX has new rotary. MBT and MQK have been tuning antennas to help squirt the signals. LNE is EC for Springfield. The Pittsfield Radio Club elected new officers: EZT, pres.; JGY, vice-pres.; HAZ, treas.; SR/1, secy.; and COL, act. mgr. KZS is on with 500 watts. EZT has 200 watts on 3.5, 7, and 14 Mc. COI took part in the SS.

(Continued on page 94)

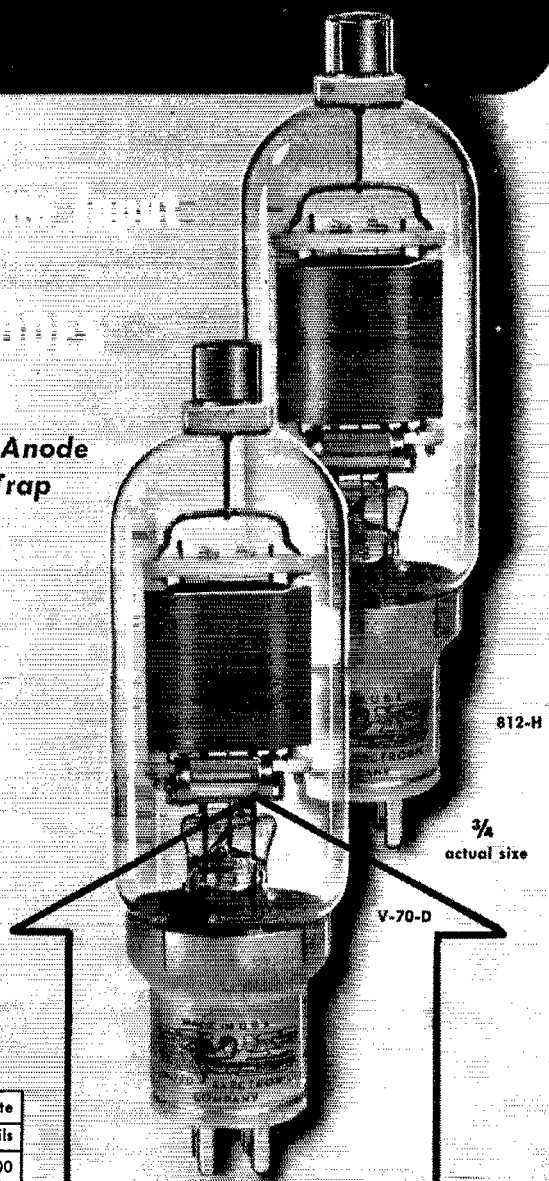
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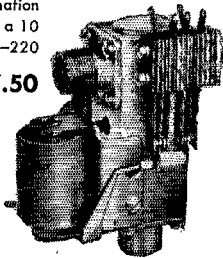
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HFO and LUA renewed ORS appointments. BIV renewed OPS appointment. FAU, MIV, and ICW are working on the new f.m. stations on Mt. Tom. Traffic: W1BVR 66, NY 47, AZW 41, BDV 17, MIV 11, JE 10, JGY 1, LUA 1.

NEW HAMPSHIRE—Acting SCM, Henry Izart, W1AUY—OPL is working out very well with only 15 watts. The New Hampshire 'Phone Net meets each Sunday at 9:30 A.M. for drill and rag-chewing. Come on, gang, and join in. (3980 kc). BT is new ORS. AXL, GDE, and LYA have all sent in their EC certificates for endorsement. Gang, how about yours? We hear that the Nashua Radio Club is building a new club house. FB, MXO has YLitis. He expects to be cured in May. Hi, Trunk Line "C" seems to be the smoothest c.w. net and a lot of the local gang are high in their praise of the manner in which this net operates. Traffic: W1OPL 6.

NORTHWESTERN DIVISION

ALASKA—SCM, August G. Hiebert, K7CBF—CF keeps busy "in the air" by checking aircraft equipment he services under flight conditions. During the latest trips he visited W7QB/KL7 at Barter Island and FT at Fort Yukon. New calls reporting 28-Mc. activity on Adak are NA (ex-W7JMV) and NB (ex-W4KKA). Also at Adak, LO has a converted Wilcox 98-A on 28-Mc. 'phone, while W7ELJ/KL7 is active on 7- and 14- Mc. c.w. MH (ex-W8PNQ), at Shemya, has been relaying traffic from the States to Japan and back, using a BC-610 into a "V" beam and scheduling W5MN on 7 Mc. EC is on 3545 kc. trying to stir up a little Alaskan c.w. activity there. AN has been acting out his traditional yearly role of Santa Claus to the Stateside jr. operators who listen to the OM's rig on 28 Mc. RD has completed installation of a new "V" antenna to improve traffic from Moses Point. Traffic: KL7LL 34, MH 33, CF 19, CM 3, BD 2.

IDAHO—SCM, Alan K. Ross, W7IWU—American Falls: The FARM Net, with DMZ as NCS, includes JL, Nampa; GFW, Jerome; ACD, Shelley; and BDL, Pocatello. Mountain Home: IY was active in the SS working 29 sections. Twin Falls: EC for the area is KEK, who also is building a new 50-Mc. rig. His 29-Mc. DX is GMSAR, Scotland. New OBS is JMX, who is the proud owner of a VHF-152A presented by the XXL for Christmas. LNC now has n.f.m. on 27 and 29 Mc. KRK is wondering where to put antennas on new house. BAW has new frequency meter. The Twin Falls report was sent in by the club's publicity officer, ex-1IRA, who is after a new call. Your SCM and DOH were guests of the club in November and wish to express thanks for a nice time. We really enjoyed meeting the gang. Participants in the ARRL FMT were EMT, JL, and IWU. Let's make the New Year an active one. Traffic: W7EMT 12, JMH 12, DMZ 11, IWU 4.

MONTANA—SCM, Albert Beck, W7EQM—SEC: EMF, BWH is in Oklahoma because of ill health. William Whipple, 1953 Warren Ave., Butte, is new SEC. CPY is trying to get the old 4-Mc. Before Breakfast Club together again. Break in on 3990 kc., gang. DYL and KGF are completing modulator for LCM's rig. LCM has VFO unit now. KJS visited Billings for Thanksgiving. DYI is about to unveil a band-switching p.p. 812 final. CT is conducting code practice class. New officers of Electric City Radio Club are: LHU, pres.; JHT, vice-pres.; BUJ, secy.-treas. DSS is on 144 Mc. with an SCR-522. GBI is on 50 and 144 Mc. GIT now is in Great Falls. JHR is moving to Dillon. JGG rebuilt final into p.p. 813s. HQT finished his shack. BOZ has gone to DX. BUJ gets an SCR-522 for 144 Mc. Missoula announces a 144-Mc. net. CAL has an 829B final on 28 Mc. HBM is working on a novel break-in system for c.w. JRM received his plate transformers and should be on 28 Mc. soon. 9RMS/7 works for KXLO. PTO will be working in the bands soon with his revised Signal Shifter. Six portable-mobile rigs on 144 Mc. at the same time were logged in Butte. New Officers of SMARA: KJS, pres.; HZS, vice-pres.; CT, secy.; JBC, treas.; LIT, sgt. at arms. Traffic: W7CT 11.

OREGON—SCM, Raleigh A. Munkres, W7HAZ—New appointments: HLF, EC of Medford; JRU, EC of Klamath Falls. Astoria: KQN, HCY, and HLJ have mobile jobs in operation. EBD received one of the five-dollar-bill QSLs from W0MCF/CI. The gang has been working Portland, Beaverton, St. Helens, Tillamook, and Olympia on 28-Mc. short skip. COZ is adding up the postwar DX. Milwaukie: KJE has just completed five months of coast-

(Continued on page 96)

VETERAN HAM LAUDS D-104

Irving Vermilya, W-1-ZE, of Mattapoisett, Mass., recently publicized in LOOK as America's first licensed radio amateur operator, prefers and uses an Astatic D-104 Crystal Microphone. We reproduce herewith a letter of December 4, last, addressed to The Astatic Corporation.




Having had years of experience with all manner and makes of microphones while in the broadcasting industry, both as owner and chief engineer of Station WNBH, I speak in earnest when I say to you and all my friends on the air, that I believe your D104 microphone is the best all around mike for Ham use. It has always been my choice at W-1-ZE, despite the fact that I could have chosen a more expensive type.

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Sincerely yours,

Irving Vermilya



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wise shipping. During short times in port he managed to build 14-Mc. 8JK, take Class A and 2nd-class radiotelegraph exams plus ARRL qualifying run for 30 w.p.m. LaGrande and Elgin: LQO, a new ham is chief engineer at KLBM. LNN was transferred by UP to Portland. JOD keeps schedules with sisters in Cleveland, Honolulu, and Saipan. KVG has 3000 feet of wire which is to go into a rhombic as soon as the snow melts. HBO is operating for CAA and CAP. IGI, at Elgin, had a voltage surge that took all the power transformers and final tubes in his rig. Medford: HLF is doing a fine job as EC. He already has seven members, is holding drills, and is lined up with the Red Cross. AEC members include KEN, Grants Pass; KXU, Medford; and KTG, Ashland. Baker: Club meetings have been resumed for the winter, the main objective being the formation of a 144-Mc. local net. Plans are to use SCR-522s on crystal-controlled spot frequency. New ham LWQ is operator at KBKR. FTQ, of Ontario, stopped at the HAZ/JFM shack for a short personal QSO. Traffic: W7WJ 672, PPF 196, LT 29, JMZ 10, FNZ 4, HAZ 1.

WASHINGTON — Acting SCM, Clifford Cavanaugh, W7ACF — JJK is ready to blast the ether with a new rig. EEJ and IVJ have finished new 3.5-Mc. rigs for Puyallup Valley Net. KHL is struggling with his beam indicator. He says "it should work." EEN, EC for Spokane County, sent his certificate to be endorsed. He states that his unit is ready for anything as they have plenty of emergency gear. The Skagit Amateur Radio Club reports election of new officers: FXD, pres.; JBH, vice-pres.; LFA, secy-treas.; and KGV, squelcher. FXD is busy on 144-Mc. KGV is busy with code practice on 3635 kc. daily at 7 p.m. (Now we know why there is no outlet for Anacortes traffic from WSNET.) LFA has 600 watts on all bands. JBH has flea power and an ART-13 and gets same DX on either. HI. FIX and JFS did very well in Frequency Measuring Test. DGN is busy building airplanes but not too busy to send in a good report. FWD wonders what happens to his traffic for California after it leaves Washington. LIA has daily schedule with KG6AY on 28-Mc. EGR moved so he could have more antenna room. He is on 3.5-Mc. 'phone with 45 watts. AAH and DRT are trying out 'phone. FFR is moving to Ellensburg to work for CAA. KFY and KFX are pounding brass on 7 and 3.5 Mc. BVM is rewiring. LJV is on 3.5 Mc. with flea power. LGG is building a 6L6-807 rig with no help from the males. FB. CZY, with receiver only, listens to all his old pals on WSNET and sends in usual report. LIL wonders what has happened to all the traffic for Tacoma. EKT is pressed for time to handle his ORS job. CAM is new Yakima County EC. ETO is new ORS. CWN had his ORS renewed. JWD and ETO are new stations on WSNET. APS is still looking for traffic schedules. LNF and IML are having fun QRMing each other. BTV schedules J9ABX and KG6BT Tues. and Wed. LEC is busy on WSNET. Being a Seattle traffic outlet has JYQ swamped. JC worked ZLIBY three successive nights on 3.5 Mc. with a 15-watt VFO. ETK is working lots of DX. FRU has secured several new men for Trunk Line "A," of which he is manager, besides being Washington outlet for same. JYQ is FRU's alternate. Net duties for FWD are being handled by his XYL, FWR, while Tate rests up from losing a finger. Reports lots better this month. Thanks a lot, fellows. Traffic: W7FRU 149, ACF 42, LEC 27, JYQ 26, FWD 22, BTV 8, DRT 8, LIL 8, JC 2, DGN 1.

PACIFIC DIVISION

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. RM: PST. PAM: KHU. ECs: OPP, KEV, QYK, TJY, JLV. BED has been very busy with traffic. BVZ visited PRE and BED at Tonopah and 6RFX in Bishop, Calif. KVF and TFF are active on 14-Mc. c.w. TKV is doing some nice DX from Lake Mead. The Southern Nevada Amateur Radio Club is running code and theory classes for more than 24 prospective amateurs. PZY has 200 watts on 14 Mc. cathode modulated. LCK reports a few more states in his quest for WAS. KHU has improved his signal by working over the speech equipment. BIC has his 250 watts all ironed out and is active on 3.85 Mc. JLV has rebuilt all his equipment and is now all-band. EEF and CX worked a number of 50-Mc. stations in the W1 district Nov. 23rd. KWA is knocking out the DX. GC and BYR have installed Panadaptors. Traffic: W7BED 859, TJY 52, CX 19.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, (Continued on page 98)

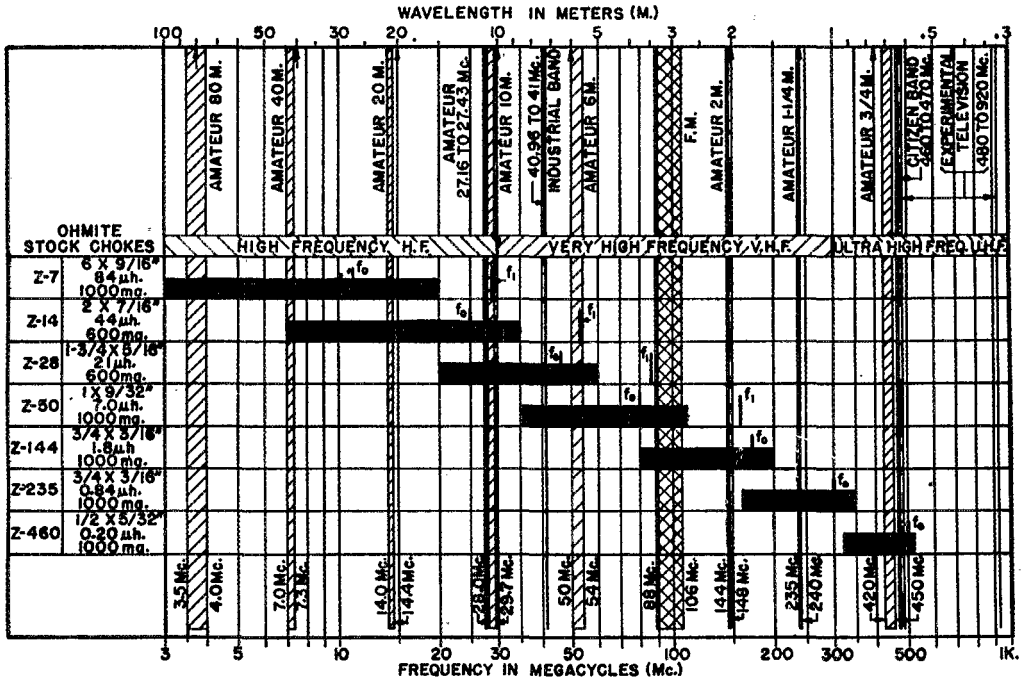
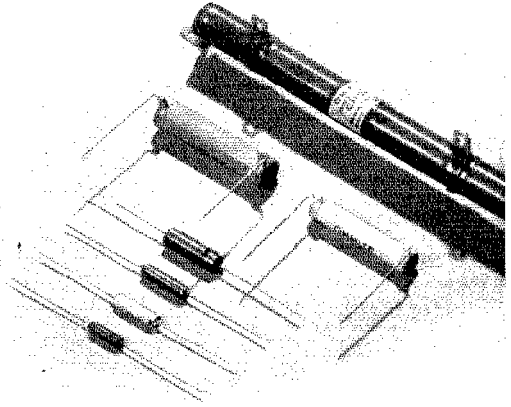
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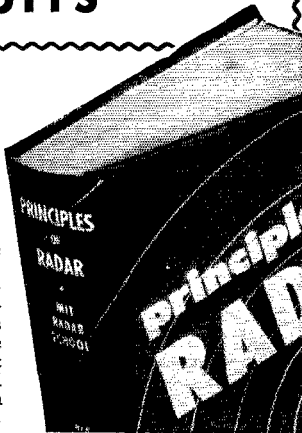
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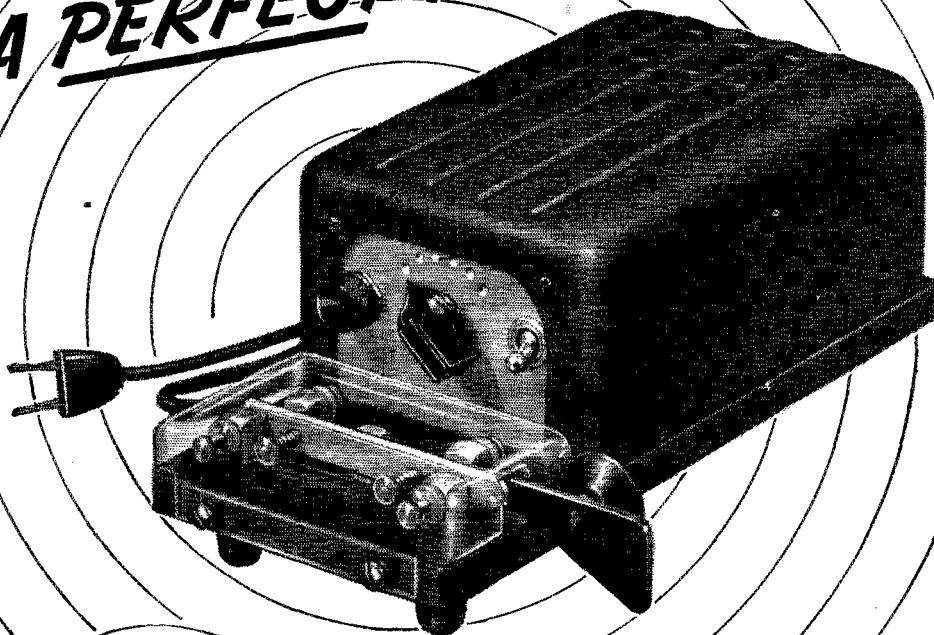
W6BPT — Asst. SCM, Geoffrey Almy, 6TBK. RM: CIS. PAM: QLP. EC: CFK. The San Mateo Junior College Radio Club holds meetings each Friday evening. The club station, YU, is to be reactivated with Dr. Jacob Weins as trustee. RFF has new jr operator at his QTH. PVV is busy with DX contacts, having worked several stations in Rome, Italy. IUZ installed mobile rig in his car. Sandy also has new e.c.o. at home QTH and works on 3.5 Mc. at present. AVJ is a new ham on 28 Mc. WNI found time to roll up a score of 78,472 in the SS. CIS has added CRGAI to countries list, making 125 postwar. The Palo Alto Radio Club has reorganized with the following temporary officers: AJV, pres.; JSB, vice-pres.; SKX, secy.-treas. WUI is building and installing new 14- and 28-Mc. beam for ZZ. VE2GT was a visitor at ZZ's shack. BUM is active on 28 Mc. handling traffic with the Pacific Islands. PH works good DX with his kw. and new rotary beam on 14 Mc. VHE has increased power to 400 watts and now works Pacific DX on 28 Mc. WGO is working 7- and 28-Mc. 'phone after moving to San Jose from Livermore. TAN, at last report, has been having his rounds with BCL. NYS is heard on 28-Mc. 'phone after a long absence. THV is using n.f.m. Traffic: W6WNI 55, WJM 51, NNX 15, DZE 13, ZZ 10, TBK 8, RFF 4, BUM 4.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, AHW, EHS, NNS, IT, IDY, QDE, and WGN. Asst. EC u.h.f.: OJU. RM: ZM. CAN believes that the 50-Mc. band is being overlooked for net work as it has great possibilities, particularly in short hauls and in locations like the East Bay section. The following are members of the Mare Island Amateur Radio Club: YTL, AAB, AFC, AIC, AIM, 4AMR/6, ANF, CAM, CHA, CQZ, EUL, FNP, GYA, ICU, KIW, KOJ, MAB, MPJ, QZF, RRG, RVU, TFO, VOJ, VPB, VPI, VZP, WBE, WGM, WGN, WOF, XU, YPD, ZHU, ZMS, ZOD, 9FD, and 0ZKP/6. MFZ thinks married life is FB. SQ has a brand-new jr. operator. RRM has high power on mobile 1.m. CRF is spending 5 to 7 nights per week on network. MLZ is on both 'phone and c.w. with SCR-399 and a BC-610. EJA is resting up after SS. MVQ, RM, and TT finished in that order with the highest SS scores in the East Bay section. YDI now has a Class A license and has new gas-driven 120-volt a.c. generator for stand-by service. LMZ added several new DX countries. SAN has a pair of 4-250As in final on all bands. Bud is operator on S.S. F.S. Bryant. AKB, ELW, UXH, and RSS did a bang-up job on Navy Day at Alameda Naval Air station originating 350 messages. Mac had his own rig on the air using a pair of 805s in the final. GRH is on both 'phone and c.w. OBJ is doing a bang-up job keeping the gang interested in emergency work. The Northern DX Club members are getting set for the coming DX Contest with many of the members getting practice in the SS. PB is all set for all bands with several new finals. ELW is making plenty of noise on 14-Mc. 'phone. MEK awaits his DXCC Certificate, becoming the third Northern California amateur to qualify. NZ has a new windmill tower up for his beam. IDY and MHB should be on the air with rebuilt rigs when this is read. DUB has new shack in house. TT has 149 postwar countries. IKQ and UPV are thinking about going on c.w. for a change. FXX is trying for WAS on 3.85-Mc. 'phone. Would like to have your traffic report each month even if only one message. Please drop me a card or phone Glencourt 1-2792. BIL is chasing DX these days. EE is active on 28-Mc. 'phone. AED is working out FB on his ART-13. SSN is feeling much better. NTU is big chief of Mission Trail Net. Traffic: (Sept.) W6GRH 10. (Oct.) W6GRH 43. (Nov.) W6AKB 350, YDI 35, CRF 21, ZM 18, TI 9, RMM 6, EJA 2.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457. The following stations are about to hit the ether soon with new or rebuilt rigs: SLX, AEY, ZZK, LE, DHE, and FYY. CWR and NAO are working for the telephone company using Morse Code. AUB, at station KHUM, has good 28-Mc. rig but lacks time to operate it. YUH is working out well with twin lead antenna tacked to the ceiling. QHW is on 14 and 28 Mc. with HT-610-E30. The Humboldt Amateur Radio Club holds meetings the second and fourth Friday of each month. At present the membership is thirty-nine with seventeen calls and three hanging fire. A social meeting was held the 12th of December. The club secretary is AEY. VPC operates in the Pioneer Net about ninety per cent of his operating time on 3725 and 7040 kc. MHF operates

(Continued on page 100)

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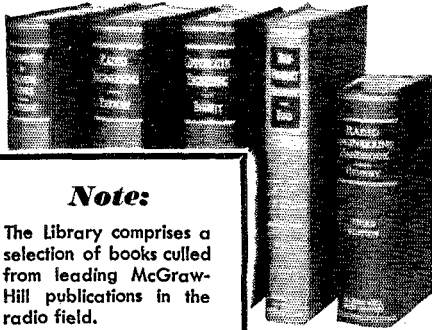
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mostly on 14- and 28-Mc. c.w. All schedules are canceled for a short period until the new QTH is settled. WGD is having a terrific time with diathermy QRN. JWF is operating in Mission Trail Net on 3854 kc. WILL is operating on 7080 kc. and schedules VE7AAX. Vic is building up modulator for 813 to get on 28-Mc. 'phone. BYB after c.w. operation on Navy Day, forsakes 144-Mc. 'phone for 7-Mc. c.w. He states he has fewer BCL complaints. Another good code man back on 7 Mc. HJP, operating ØDSF, the ROTC ham station at the University of Minnesota, is knocking off Europeans by the dozen these days. RBQ and NL are re-vamping their Emergency Corps gear. RBQ is doing well with his new 14-Mc. rotary beam. He now has 127 countries worked. We are glad to report that Mrs. Ladley is recovering from her recent illness. RBQ had a visit from Mr. K. T. Chu, president of the CARL, who is returning to China from the Telecommunications Conference, where he was a representative and advisor for the Chinese Government. Mr. Chu is making an earnest request to the amateurs of the Bay Region for any donations of radio parts or assembled equipment to help rehabilitate the Chinese amateurs. All parts and equipment will be distributed under the direction of the CARL and donations may be sent to RBQ, Bill Ladley, 200 Naylor Street, San Francisco, Calif. Kenney Hughes, the new Alternate Director, paid a visit to Bill and Mr. Chu. At the November meeting the San Francisco Radio Club had as speaker Mr. Merle W. Walthers. He spoke on the very interesting subject of "Post Position Modulation," a very difficult subject well-handled by a thorough understanding. The San Francisco Naval Shipyard Radio Club at its November meeting had a very interesting talk and demonstration of some fine portable mobile gear for Emergency Corps work. The club as a unit intends to back up the Emergency Corps program. Thanks for the reports. Traffic: W6NL 478, YPC 103, MHF 23, RBQ 12, JWF 11, WHL 8.

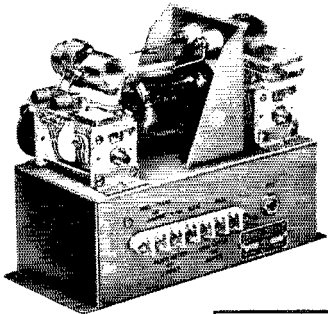
SACRAMENTO VALLEY — SCM, John R. Kinney, W6MGC — Asst. SCM, R. G. Martin, 6ZF, SEC: KME, RM: REB, OES: PIV, OO: ZF, OJW, and ZQD. OBS: OJW and AF. The GERC held its last meeting at the QTH of DR. Present were, KYO, TSR, SRW, QEE, LYQ, WYX, VZK, QYZ, TKE, PJV, GUV, and ZNU. Newest call in Chico is AMI. A Christmas Party meeting was held at TKE. RHC tells us that several of the gang have SCR-522s and multi-beam antennas. RHC has a sixteen-element beam with 90 watts and TID has a 32-element beam on 144 Mc. GUV was in Sacramento for Teachers Institute meeting and purchased a new 8X-43 for his shack. VDR, Pioneer Net station, has moved from Colfax to Oakland. VDR will be headquarters station for Mission Trail Net and also will be on Pioneer Net there. REB reports that his SS score will total 17,500 and that his traffic total for this month is his best yet. OJW renewed his OO, AF his OBS, and REB his RM and ORS appointments. PIV is busy rebuilding SCR-522s for the local gang. WTL is working on his new exciter and visited WSI's FB shack while in Sacramento. FW is going to the "Buzzards Convention" in San Luis Obispo. YTN is going after WAS on 7 Mc. SEC KME reports that CZB has been appointed EC and is Net Control Station of Sacramento Valley 144-Mc. net and is checking in with Net Controls LYQ, TID, 7KLM/6, EXH, OVK, and BXS. AF reports nothing much exciting ever happens in Oroville, but that SHW is moving his 1-kw. 28-Mc. rig here from Van Nuys. Traffic: W6REB 737, PIV 67, FRP 7, OJW 2.

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — Asheville and Wilmington both report the formation of new clubs. Thanks for the reports, fellows. Asheville has a club station, MOE, operating on 3.85- and 28-Mc. 'phone, also 7-Mc. c.w. How about getting on 3605 kc. for a little traffic up that way, gang? GMM sent the dope on the Cape Fear Radio Club. Plans are under consideration for a complete set-up including pictures, lectures, code, etc. The Cleveland Radio Club is off to a flying start over Shelby way. The organization has a meeting place, plans affiliation with the League, and certainly has a bunch of enthusiastic fellows running theory and code classes on a regular schedule. The Key and Mike Club over in Winston are planning the next hamfest. The Charlotte Amateur Radio Club requested and obtained BX as a club call. As many know, BX was the call of the late Gordon Smith,

(Continued on page 108)

HARVEY FOR EQUIPMENT



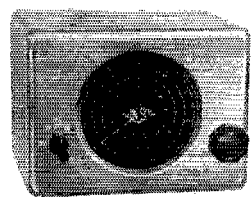
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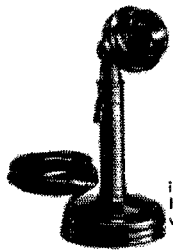
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active member of the club for a number of years. Trustee is HGC. WMI reports lots of 50-Mc. DX, including KL7, G5, and K7. HVV is in on this 50-Mc. work, also. Thanks for the report, Bill. MOC is going strong on 14 Mc. with 60 watts working lots of DX. The attention of everyone is called to the North Carolina Net on 3605 kc. operating nightly except Saturday and Sunday. CFL is doing a swell job, and lots of outlets are needed in the State. Traffic will be taken for almost any point. You fellows interested in traffic, how about getting your feet wet? Traffic: W4CFL 241, IMH 69, CYB 17.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — Congrats to RCN, West Virginia's SS winner with a score over 100,000, followed by KWI, PQQ, and UYR. EYV has a stand-by emergency rig on 3.85-Mc. 'phone and is a member of the Potomac Valley Weather Net. DNN has returned to Parkersburg and is forming a VHF Net along with a code class for his Boy Scout Troop. VKF gave the 3770 Net members a thrill when he checked in to the net as VKF/KS4. OJI is rebuilding a BC-223AX for emergency work. FMU now has new rig on 3.5 and 28 Mc. with 400 watts. CSF has schedule with 4MPA for Kentucky traffic. 3GEG, 8UTO, RUH, CSF, and PQQ attended MARA Club meeting in Fairmont. PZT is recovering from serious illness. ZFB and AQX are operating portable from W.V.U. on 3.5 Mc. QG has low-powered rig on 3.5 Mc. and is giving many stations their first Preston County contact. GBF and BOK operated portable from Webster County for a week and kept in touch with home through JM. 6VAQ and 6IC, formerly of Fairmont, check into the W. Va. 3770 Net. YBQ worked a J9 for his first Asiatic contact. JKN has formed a CAP communication unit at West Va. Wesleyan College. Traffic: W8GBF 100, JM 74, CSF 41, FMU 32, PQQ 16, DFC 11, OJI 5, UTO 5, AQX 4, VCA 1.

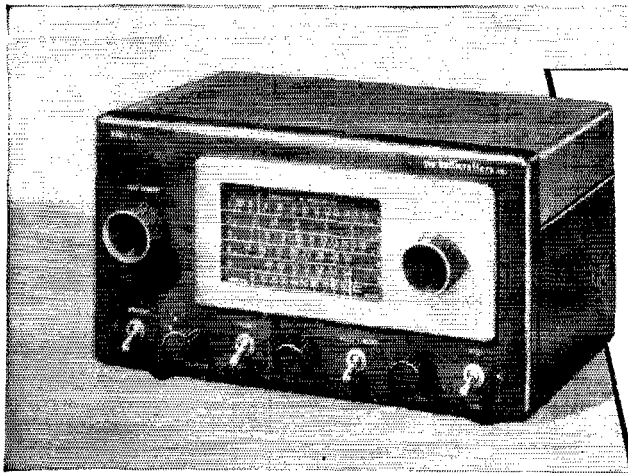
ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, W6QYT — At last we get a report from the Greeley country. RWH says they have a small emergency transmitter and receiver powered with a vibrator and 6-volt battery. We would like to see you fellows get some amateur activity going. LZV is moving traffic on 7 Mc. out of Colorado Springs. SGG has a new VFO working and won a Telex Monoset. He says it is quite a nice gadget and he is learning to use it. DRB, in Canon City, is on 3.85-Mc. 'phone as well as the other bands, both 'phone and c.w. Clay tells me they have a new c.w. net started on 3540 kc. Monday through Friday. It is called Colorado Utility Net. OWP and APZ, in Brush, are still conducting a radio class in the High School there for those interested in obtaining an amateur license. NUU, in Yuma, has a new c.e.o. which works 3.85- and 28-Mc. 'phone. 5DDM/ø is running 200 watts to a BC-696A on 3.85 Mc. WAP, of Loveland, is pounding brass at sea. Traffic: W6DRB 28, LZV 21, OWP 6.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — UOM received his ORS appointment. DLR is low power on 3.85-Mc. 'phone and hears European DX on 3.5-Mc. c.w. UTM and KIY are moving a lot of traffic on 3.5-Mc. c.w. Swing-shift work prevents GBB from operating during traffic hours. JHH is back on the air after an FB rebuilding job. UTM is building a new monitor. FST is settled in his new QTH and has his antennas up. JVU is doing a swell job of conducting personal QSOs between homesick boys in Japan and their families over here. He is using 120 watts and a four-element beam on 14-Mc. 'phone. JGS, at Sinclair, received his ORS appointment. The XYL at FOM has returned from the hospital after a serious operation. 6VXL, at Palo Alto, is looking for a contact in or around Price, Utah. OKF has just exterminated the last parasite in his 812 final. FST is putting out a fine monthly bulletin for the FARM Net. The new NCS of the FARM Net is DMZ. Traffic: W7UTM 178, KIY 126, DLR 16.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW — The Anniston Club is coordinated with the local Red Cross. BCU, GBP, LEO, and LCI are building for 144 Mc. MEP, HA, and LED are on 28 and 14 Mc. LEH is rebuilding beam destroyed in storm. The Montgomery Club meets at Power Co. Brookley Field secretary, Coggin, reports
(Continued on page 104)



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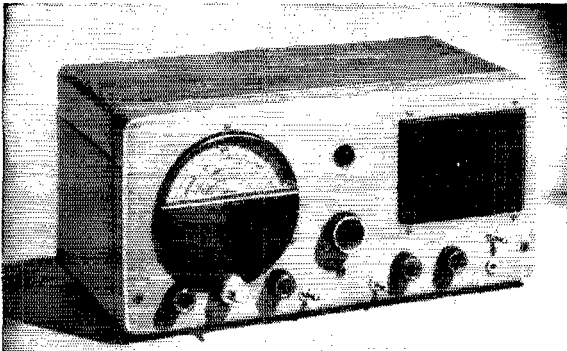
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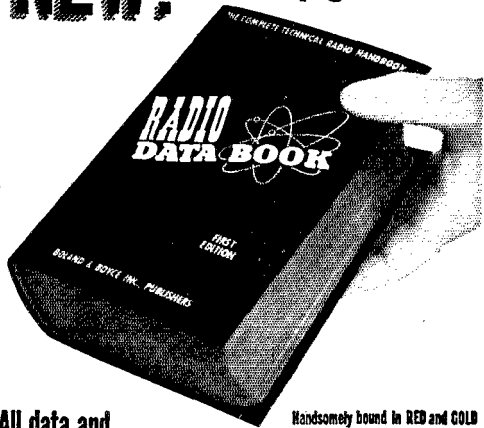
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EASTERN FLORIDA—SCM, John W. Hollister, W4FWZ—Brooksville: MNT, 13 years old, works XE2L and all over with RC-19. Clearwater: AYP, JIR, and AYY are on 28-Mc. 'phone. RQ and AYY are on 144 Mc. COR is rebuilding with relays everywhere. Ft. Lauderdale: ZC is active on 3675 Net. Jax: New officials of JARS are FRP, pres.; IVX, vice-pres.; CPO, secy.; JKI, treas.; EHU, act. mgr. PK, one of the oldest hams in Jax, has passed on. Lakeland: DFF, is president of new club which will promote AEC activities. DRH reports Lakeland hams are getting back on in a big way. Lake City: NN and AGB are reliable 'phone netters. IQV is active in traffic work in Florida Net, Rebel Net, and NTL. Miami: 431 hams now are listed for a gain of 111 in a year. BXL entered SS on 28-Mc. 'phone with 12 watts. BT is on 28-Mc. n.f.m. BT wants North Dakota for WAS. BXL, LFL, LXZ, and KLL had FB roundtable with 4AYE/MM on SS *Newmarket*. One more card and it's the DXCC for FPK. Dade Radio Club DX Contest winners were FPK, LVV, and BT. JIP has 6-kw. emergency power unit. Fourteen-year-old MKP is rebuilding to get in 3675 Net. Orlando: GIP moved here from Jax. New Port Richey: KJ is active. Winter Haven: The Citrus Belt Radio Club was formed with EQN, pres.; DFF, vice-pres.; CCC, secy.-treas. Zephyrhills: KYH is active in nets. Who's where: AAR, 3675; AYW 3675; BT, 14,140; BYF, 7170; BXL, 28,600, 29,120-29,200; IKI, 7170; LXX, 3610; MNT, 7100; ZC, 3675. Budlong's visits and talks at Jax, Miami, Tampa, and West Palm Beach were enthusiastically received. Want to help out on nets? Write to the SCM about 3675, 3910, and 7180. Traffic: (Oct.) W4ZC 184. (Nov.) W4BT 68, IQV 90, ZC 45, BYF 32, AAR 29, LXX 24, FWZ 21, LCZ 16, IKI 8, AYW 2, MNT 2.

WESTERN FLORIDA—SCM, Luther M. Holt, W4DAO—RM: AXP. HIZ schedules Mobile on 144 Mc. TL, HIZ, MS, FDL, and AXP were active in SS. EZV works 28-Mc. 'phone. CNK and EQR schedule each other on 50 Mc. FDL is active on 7 Mc. MEN built FB e.c.o. EQZ built a new beam. The Pensacola Amateur Club invites all hams in the section to attend its regular meetings the second Friday of each month. EGN works 14-Mc. DX in the wee small hours. DZX had a leg injury and was off for several weeks. FHQ wants new antenna. BKQ goes skeet shooting these days. MFY plans 7-Mc. work. JBH works 14 Mc. LCY is assisting JNP as club secretary. Newest Pensacola calls include MUN, MUQ, and MUX. CDE is the new ORS. IRO chases DX. ACB built n.f.m. unit and increased power. DLO keeps 7 Mc. warm at Cherry Lake, and DTW is heard on at Shamrock. Navy Point hams include NDB, MOB, BCC, ECT, and FJR. Traffic: W4AXP 35.

GEORGIA—SCM, Thomas M. Moss, W4HYW—We regret that our section has been without a report recently, but very little news was received during the summer. JZV writes that DJA is on 28 Mc. with p.p. 807s. GSC has moved to Valdosta. KGI has new three-element beam on 28 Mc. GZF has OBS transmissions on 3.85 and 14 Mc. at 2030 Thursdays. It's a jr. operator at AJ. DXI is on with surplus transmitter with p.p. 813s in final. LNG has been doing fine on v.h.f., and would like more schedules. GGD, on 'phone, and HYW, on c.w., have been hooking nearby states on the 28-Mc. ground wave at night. HWS has changed OBS broadcast to 2230 each week day. We welcome the Georgia Hams Amateur Radio Club at Robbins Field and the Albany Amateur Radio Club at Albany as affiliated clubs. Best of luck, fellows, and hope to have reports from the clubs and their individual members. LMF is new OES. GHU is EC for Dougherty County. GGD, EYK, and others are looking for net affiliations. Let's hear from those interested. The Atlanta Radio Club finally got a new location. HDC has applied for a station license for the club. We are sure more stations cooperated in the hurricane emergencies

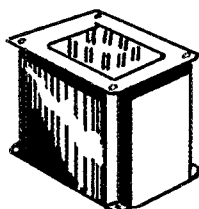
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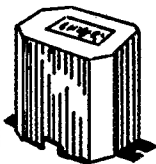
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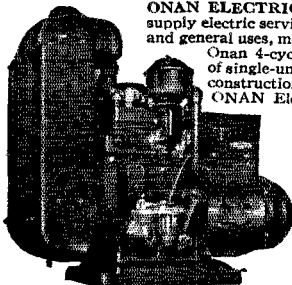
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than have been given credit. HDC covered the Atlanta gang in Q37, but we would like to have had the dope from the other Georgia stations. Traffic: W4JDR 243, DXI 138, HYW 66, FKE 32, GZF 13, BQU 11, GGD 4, JZV 3, LNG 1.

WEST INDIES — Acting SCM, Everett Mayer, KP4-KD — The Southern P.R. Amateur Radio Club held a very successful hamfest in Ponce on Nov. 30th. FJ won an NC-240D. NY4CM reports via KP4BR that he received his DXCC Certificate. AM worked GD6IA and KZ5NB on 28-Mc. 'phone. He has new three-element wide-spaced beam and new Shure "Versatex" mike. BE worked GD6IA on 28 Mc. DH has a Collins 32-RA. FC is working a few on 28 Mc. EU is building 6V6-807 exciter for 500-watt job. W9TKS/KP4 keeps a schedule with W1TW. W6DOK/KP4 now is KP4FX and W8ZKJ is KP4FZ. KD added UA1-KEC, GD3, CR9, and HE1 for a new total of 124 postwar. DV has about completed his super station. AK is having power transformer trouble. DU bought FK's rig and is going good on 28 Mc. DU, FK, FP, and CD made expedition to top of El Yunque with gas-engine power and operated 24 hours on 28 Mc. with almost continuous operation. Traffic: NY4CM 15.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Ben Onstenk, W6QWZ — The following information was mailed direct to Headquarters, and this report was tabulated by Al Hill, 1QMI (ex-6JQB and Asst. SCM). MMW, at Van Nuys, reports the Housing Project is imposing power limitations. AEE reports 144-Mc. opening to Bakersfield and Lancaster. FYW says the Paso Robles Radio Club put on a 15-minute program over KPRL on Nov. 26th. Hams participating were LKF, HFY, ZND, MYI, FYW, and GLT announcing. KEI reports good progress in the AEC program with liaison between the 50-Mc. net and the Golden State Net. SMI still is rebuilding the rig and hopes to be on soon. The whole gang seemed to really enjoy this year's Sweepstakes. Get the reports to the SCM before the first of each month. QE reports that the Tri-County Amateur Radio Association of Pomona and vicinity organized the Tri-County Net on Dec. 18th to operate on 3810-kc. c.w. 7:00 p.m. PST each Wednesday, strictly to benefit the near-amateur who needs relatively slow-speed code practice. Instead of using printed code, however, the schedule takes the form of normal QSOs between members concerning club interests and activities, but with speed purposely held to 12-15w. p.m. Some of the stations in at the start were ARV, LGO, QE, WXG, and ZGY. Traffic: (Oct. and Nov.) W6IOX 511, 126, CMN 223, AEE 40, FYW 20, KEI 5, BUK 5, 3.

ARIZONA — SCM, Gladden C. Elliott, WMLL — UPX has a new TWT kw. on the air. JZG has his console model transmitter on the air with a pair of 814s in the final. LRG has a Meck on 28 Mc. NHW is working all bands, c.w. and 'phone. UAF has his kw. on the air with 304TLs in the final. ROD has an 80-ft. tower. Highest reported SS scores are: c.w. — QAP, 95,000; 'phone — AWA, 21,000. Stations heard participating were: LLO, LHD, LAD, LHH, LPK, LHX, PUM, MAE, NHW, LHI, LIH, MLL, RU, MDD, and JMQ. New officers of the Radio Club of Arizona are: TJG, pres.; RJJ, secy.; Geo. Eaton, treas. 6WJL/7, at Flagstaff, and 6QNZ/7, at Kingman, are new additions to the 3.85-Mc. gang. JMQ has 14 ZLs on 3.85-Mc. 'phone. PEY reports 83 countries with his 60 watts. IOJ is on 28-Mc. mobile. KOY keeps a 28-Mc. schedule with 7RNT maritime mobile in the Azores. The beginners c.w. net meets at 7 p.m. on 3552 kc., with MAE as net control. OZM has a full kw. on the air. NZS is doing well with 25 watts on 14-Mc. 'phone. The 3.85-Mc. 'phone gang on 3865 kc. can be contacted nightly. QAP is on 3.5 and 7-Mc. c.w. at the Border Patrol Station in Tucson. LHH and AWA were winners in the Tucson SS Contest.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCM and SEC, Gordon Brown, 6APG. New ORS, OPS, and OBS is YDK. YYW, QG, FMJ, and WNN took part in the September Frequency Measuring Test. JRM and WNN are modifying SCR-522s for all comers and have formed the 522 Club on 144 Mc. with CAV, MXK, IV, FSH, LFU, NBJ, HRI, YYM, WSP, BOS, and CDQ. LRU schedules G8UX each Saturday. PG schedules 6YOT/C6 three times weekly. BAM schedules "A1" at W1AW each Sunday. CFN/NF is operating on 3.85-Mc. 'phone and 3.5-Mc. c.w. APG called a well-attended meeting of all amateurs interested in the Emergency Corps. The following

(Continued on page 108)

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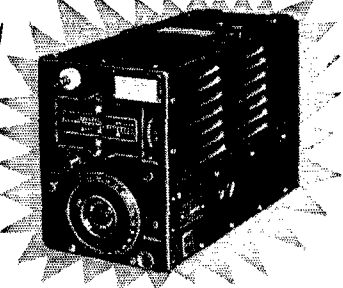
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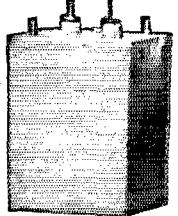
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assignments were accepted: 80 c.w.—LYF, 3.85-Mc. 'phone—FMJ, 7- and 14-Mc. c.w.—WXW, 14-Mc. 'phone—CHV, 28-Mc. 'phone—WUW, YCP, and DUP. VTS and VTV will head up 28, 27, 50, and 144 Mc. from La Jolla, while WNN does same from El Cajon. FFV will take charge of 144 Mc. from San Diego. The 7-Mc. net held an FB meeting on the air. The Palomar Club was heard operating the club station, NWG, at Veterans of Foreign Wars show at Mission Beach. VJQ reports a new net called the "Wind Bag Net" which covers from border to border and coast to coast and meets on 29.3 Mc. each Sunday morning. OOT is running 600 watts on 28-Mc. f.m. OBD now has 103 countries. KW is on 28-Mc. 'phone while VCD and GC have new beams for same band. QG received a card from an OAA, who heard him on 50 Mc. BWO completed all-band exciter using LM frequency meter. VIH has new Taylor 900-A. CGR is revamping a BC-457A. BAG, IZ, NGN, VKA, and ZWL are active on 144 Mc., while ECV, FCI, MKW, and TDE are active on 7 Mc. All amateurs interested in affiliating with the Coast Guard Emergency Communications Network, please drop the SCM a line. Traffic: W6YDK 49, PG 20, CFN/NF 13, OBD 9, BGF 7, CNQ 6, LRU 4, WNN 4, YYW 3, FFV 2, BAM 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, N. C. Settle, W5DAS/MNL—LJV has a new HQ-129X and is getting ready to fire up a pair of 809s on 7 Mc. DB has a new beam for 28 Mc. KGE has moved to California. IJO is getting a new converter for 28 Mc. near completion. ITN is back on 28 Mc. with a new beam. The Tyler Radio Club meets Thursday nights at 1930. JQY avoids BCL QRM with n.f.m. AME and IGE are new-comers to Waco. BYX reports CAA operators have organized an emergency net working on 7260 kc. which meets on Sunday mornings. KAU has a kw. working on all bands to 30 Mc. and low power rig on 144 Mc. DZ is active on 144 Mc. LRX and KRV are working 28 Mc. UF is on 7 Mc. DYN is taking a fling on 50 Mc. Imagine CDU on 'phone! ILZ is moving rig to new quarters. ARK is active in c.w. and 'phone nets when time permits. ISD keeps Big Spring on the c.w. map. MJN was transferred to Houston. JLU is on 7 Mc. and BIN works 14- and 28-Mc. 'phone. KVI is again active. ATU has *BC-610 working all bands. LSN wants more traffic. EVI has a new beam on 28 Mc. LPM works 3.85-Mc. 'phone AKM has nice signal on 3.85-Mc. 'phone. NFT works lots of DX. FMZ rarely misses net schedules. GYW reports he is very busy with CAA work. NFZ has n.f.m. JCN works 28-Mc. mobile. CC is building a new rig. AAK has new Temco transmitter. ALA works lots of DX on 28-Mc. 'phone. Traffic: W5LSN 232, CDU 73, MXV 40, ISD 29, GZU 28, BBH 16, ASA 12, ARK 10, GYW 7.

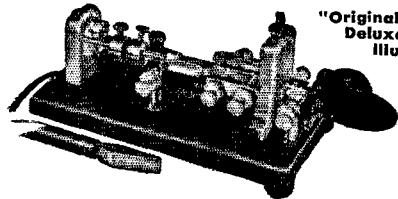
OKLAHOMA—SCM, Bert Weidner, W5HXI—Asst. SCM, George Bird, 5HGC. ECH: AHT, AAJ, ADB, AQE HXG, and FRB have all reported back into OLZ Net. The monthly OLZ Bulletin has lots of news, thanks to AST. LHP/5, at Stillwater, is using Signal Shifter on OLZ. NMM and HKH have received ORS appointments. NMM is a southpaw. GVS is improving break-in methods. HGC operates on Navy net with call N8CBE, 1BUD was guest at TARC and gave much information on the Atlantic City Conference. Let's have more v.h.f. activity. 144 Mc. is being heard up to 90 miles. HXK reports good signal strength on Oklahoma City stations during their regular evening round table. HGC has come on the air with n.f.m. working all bands. HXJ now is portable-mobile on 30 Mc. and 144 Mc. HXI has mobile rig on 30 Mc. EIO and GVS will be glad to give any frequency check. JHO and HXQ are hot on cathode follower amplifiers. All things happen on 3.5 Mc. EAK was on c.w. with a good fist. Plenty of operators who thought they had heard everything were aroused. Cards reporting station activities were very few again this month. EHC, who dropped a line, remarked that he contacted 0FXQ, his brother, for the first time since 1940. ATJ reports many stations ready for emergency in Western Oklahoma. Traffic: W5GVS 75, IGO 55, AHT 52, FMF 47, HGC 39, NMM 35, JKS 27, AQE 16, ATJ 14, EHC 12, PA 12, FRB 11, ADC 9, IOW 6.

SOUTHERN TEXAS—SCM, Ted Chastain, W5HIF—SEC: HQR, PAM: EYV. Congrats to LUJ on acquiring an XYL. NPW of Hallettsville has p.p. 813s in new final. Houston stations with portable equipment are: BGG, HSX,

(Continued on page 110)

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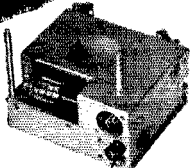
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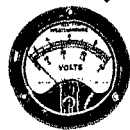
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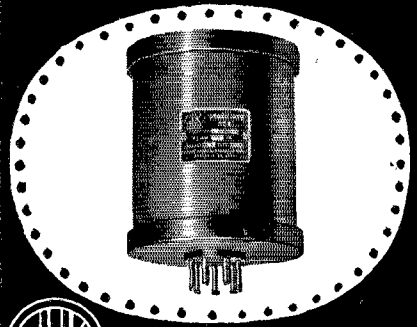
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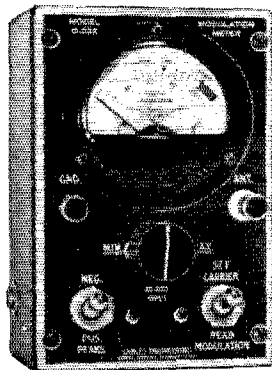
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FQI, CAB, and IC. GLS installed an SCR-522 for emergency mobile. HAJ reports considerable 450-Mc. activity in Brownsville. EWZ has new Collins 30K-1. N1Y has new antennas for 3.5 Mc. JLY and LVD are new OES in San Antonio. FNA has DXCC. LGG is new OO. AHK, BKV, IPE, IVJ, and MFV are all active in Wharton. NLS, in Laredo, is on 7 Mc. with an SPC-400X and 807 final. DAA is ORS and EC in Kingsville and is looking for 50- and 144-Mc. contacts; NQI and MTI also are active. LSO is building an oscillograph. BGG is OBS. KPX is OBS, OPS, and EC in Weslaco. FNY has a pair of 810s on 3.85 Mc. and is OPS. JLY has established 50-Mc. DX history by working G5BY, PA9UN, and HB8VD. I would again like to request all c.w. stations interested in emergency work to contact Dave Harrell, NCS, on 3840 kc., Mondays at 6 p.m. Let's have more activity reports; other fellows are interested, you know, in what is going on.

NEW MEXICO—SCM, Lawrence R. Walsh, W5SMA — An ARRL organization meeting was held at the home of HJF in Portales on Nov. 16th. Plans were made for a section monthly news letter to be edited by HJF. The 3.5-Mc. emergency net was discussed and plans were made for a 7-Mc. net. Frequencies are 3705 and 7268 kc. The following attended the meeting: HJF, MYD, KCW, CXP, FJW, DER, MXF, SNW, ISN, GHG, KXX, 9BPX/5, ZM, Mr. Robert, and SMA. At the Los Alamos Radio Club meeting of Dec. 3rd code classes for prospective hams were approved and funds voted for the first issue of the New Mexico monthly news letter. MXF has 1st-class telephone ticket. HJF received a medallion for the '46 Sweepstakes. KAD obtained his Class A ticket. HJF was appointed OBS, ZM, SEC for New Mexico, met with several Albuquerque hams on Nov. 29th at the home of FAG and made plans for a 144-Mc. Emergency Corps net. The Los Alamos Radio Club held a local emergency net drill on 3885 kc. on Nov. 9th. Stations participating were MA, NCS, MYQ, 9BPX/5, 1PUB/5, AFU, and NAS. All stations except SMA were portable and had walkie-talkie mobile transmitters under their control. Traffic: W5HJF 44, ZM 21, MXF 1, 9BPX/51.

**CANADA
MARITIME DIVISION**

MARITIME—SCM, A. M. Crowell, VE1DQ—The Halifax Ladies Dit and Dah Club was formed in '46 for the purpose of fostering friendship and interest in amateur radio among the YLs and XYLs of the Halifax area. It has a present membership of 30. Regular monthly meetings are held and code practice is varied with business and entertainment. Social affairs with the HARC are regular events and among those who already have their tickets are OW, YW, IV, YL, and WJ. ES likes rag-chews on 3.5 Mc. and schedules PZ on 7 Mc. QZ has worked G, PA8, HB, F, VE7, and W6, all on 50 Mc. TR's new rig uses p.p. 805s. QW has a rig using 813s in p.p. We hear that CR and OD have been doing a bit of work on 50 Mc. A few notes from N.B. via the *LCARC Bulletin*: FL and AYL report FB success on 50 Mc. and good contacts with the West Coast with 7-9 reports. UG is a new ham using the old 6L6-807 combination. IE is doing good DX on 3.5 Mc. EN is back from VES Land. Give a look for UL, at Bathurst, on 3517 kc. He is a blind operator who is an ardent ham and is running about 150 watts to an 804. Give him a call.

ONTARIO DIVISION

ONTARIO—SCM, David S. Hutchinson, VE3DU — BGI is on 28-Mc. 'phone. PH and ALU are on 28-, 14-, and 3.8-Mc. 'phone. BJE has new beam. BIU has 40 watts on 7 Mc. WI is running legal input limit on 14 Mc. TZ is on 14-Mc. 'phone. BBQ has seven transmitters in one cabinet. From BAV comes the following: RH is planning two-element beam and AME a four-element beam. AVJ is on 28-Mc. 'phone with folded dipole of 1 1/4" tubing. AVN schedules 8MB in the Arctic. BAV has new SCR-522 with 12 volts d.c. supply. BAX is on 144 Mc. with SCR-522 and six-element beam. BBG has new BC-645 for 420 Mc. BMI is running 140 watts to single 807. BOP is on 50 Mc. KM is in Ontario 'Phone Net and Hamilton Emergency Net and is our new SEC. WK schedules BAJ and W3NSV on 7 Mc. VD schedules BRO of Port Arthur daily. GT schedules VE7RU, HC, and 6DK on 7290 kc. ADC is a member of Ontario 'Phone Nets "A" and "B." ATR, BCS, WX, SF,

(Continued on page 118)



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WK, DH, BMG, XO, GI, OI, TM, DU, GT, and BME keep things humming on Beaver Net. The following qualified for Code Proficiency Certificates on the October 17th run: DD 35, BCS 25, BCH, AN 20, AKO, APK, and BMI 15 w.p.m. DU took time out from SS to work ZL3AB. 'Phone Net news: AZH has new HQ-129X. CI plays checkers on 3.8-Mc. 'phone. NX has new rig 810s final and new super de luxe shack. OR has new e.o.o. and beam. HK has regular traffic schedule on 3.88-Mc. 'phone. GB is ready to go with de luxe new rig. HI has new beam tower but no beam. BKQ has beam on top of stepladder in yard. AJQ and ANB can be heard on 3.8-Mc. 'phone every night. Consistent 3.8-Mc. 'phone signals are APH, CP, NX, and VU. Loudest signal for lowest power on 3.8 Mc. is AWL. Thirteen parcels have been sent to British hams and donations are still coming in. QB originated the idea. Donations may be sent to VE3DD, 26 Dixon Ave., Toronto. Beaver C.W. Net members have adopted calls of G hams and will send parcels. Let's all get behind this movement. Traffic: (Oct.) VE3BBQ 25. (Nov.) VE3ATR 100, WX 98, XO 62, TM 70, DU 47, SF 46, BCS 44, DH 23, OI 22, VD 17, ADC 16, GT 12, WK 12, GI 11, BMG 10, KM 6.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — WR worked a GD with only 10 watts on 3.5-Mc. c.w. KT, with 45 watts on 7 Mc., worked his first G. EF is heard on 14 Mc. JZ has a pair of TZ40s on 7- and 3.5-Mc. c.w. PV and AAE are new in St. Maurice Valley. TI is active on 28 Mc. KY is on 14-Mc. c.w. VI has new rig with 813 final on 28 Mc. ZG has a pair of 807s on 28 Mc. with remote-controlled beam. VE and VH are heard occasionally on 28 Mc. QA has a pair of 810s on 3.8- and 14-Mc. 'phone. DD has new low-powered rig on 28- and 14-Mc. 'phone. OD has returned to Trois Rivieres. QI is rebuilding. ZZ reports following E.C. appointments: BW, DV, IG, EQ, AQ, LX, and RA. EC had 235 QSOs during November. LO is having trouble getting rig on 14 Mc. but reports good success on 7 Mc. JI is located in Rover Scout Den at Drummondville. TM continues on 14-Mc. 'phone. The Quebec City gang entertained the Montreal E.C. gang at an oyster party. MJ is new on 14 Mc. with a pair of 807s. RK has gone to Wales to live. PT suffers from BCI and maintains quiet hours. MO is heard occasionally on 14 and 3.5 Mc. TQ maintains schedules with the Maritimes. QV is rebuilding. EX has SCR-522 on 144 Mc. LP is having fair results on 50 Mc. using coax aerial. RY is on 28-Mc. 'phone. AR, LR, WP, and WS are new on 28 Mc. LV has new NC-173 receiver. BE has made more than 200 VK contacts. WF has 813 Class B linear on 28 Mc. IB is active on 14, 7, and 3.5 Mc. Traffic: VE2GL 68, EC 32, ZZ 32, VT 13, KT 1, WR 1.

VANALTA DIVISION

ALBERTA — SCM, W. W. Butchart, VE6LQ — AL is talking 805s. QS applied for ORS appointment. HQ is building plumber's delight. LQ visited the Calgary gang while on business trip to Cowtown. HM imported beam motor before new regulations came in effect. MJ races winter to put up his 28-Mc. beam. GY gets FB results on 28 Mc. with beam. CARA's C2 frequency meter was sold at a profit to the club. The Calgary Club will ask D.O.T. for emergency portable-mobile privileges. 1948 CARA executives are: AO, pres.; PY, vice-pres.; XX, treas.; QS, secy.; GR, publicity; BU, activities. FK has new 14-Mc. rotary which is the envy of all the boys. WG is Alberta representative on Trunk Line "I." The Alberta Net will go into operation immediately. AO's log looks like DX directory! (Yeah! That story about the Calgary gang burying their antennas is true! — See last month's report.) JG is active on 3.8-Mc. 'phone. SZ handled prearranged schedule for Truman-Evans flight crew on arrival in Edmonton. HM made excellent frequency check on Official Check. AE got thumb caught in washing machine gears! CW is new Edmonton call. Traffic: VE6LQ 10, WG 2.

BRITISH COLUMBIA — SCM, W. W. Storey, VE7WS — AJP is building a new layout and has also taken down the beam for a few improvements. MH still is getting more DX cards than the rest of the fellows. OJ says he has built his last rig. But we hear that it already is in pieces and another one is on the way. AME is on 14-Mc. c.w. and is building an o.f.o. to fight QRM on 7 Mc. KK has a little more power, 807 final now. UU is working boys down under on 28-Mc.

(Continued on page 114)

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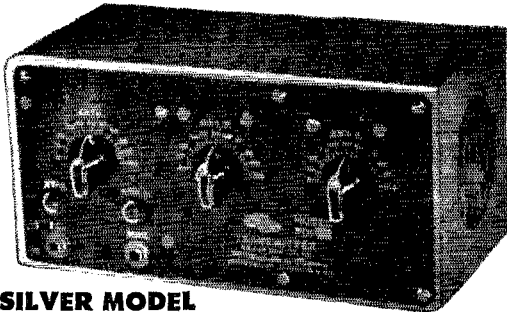
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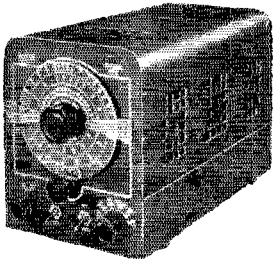
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A new Silver product that develops amazing power for its size — 10" x 5" x 5 1/4". Frequency range all amateur bands from 3.5 to 54 mcs. with interchangeable sets of three plug-in coils. Uses 3-6AQ5's and 1-807 in final. Tritet crystal oscillator works straight, doubled or quadrupled as needed. No meters — panel lamps indicate crystal and output currents. Built-in phone modulator. Operates from 6.3 volts a.c. or d.c. and 300-750 volts plate supply. Ideal for fixed or portable service or as driver for a high-powered rig.

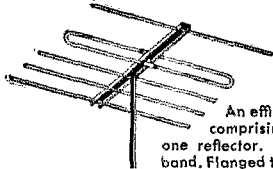
Price less tubes, coils and accessories.....\$36.95
Plug-in coils (3 per band required), each..... .50



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 807 1.35 ea. 2.65 pr. 15E 1.95 ea. 3.50 pr.
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'phone with the new rig and is building a converter. KW, on 3.5-Mc. 'phone, has completed an o.f.o. and is on 7-Mc. c.w. BE is working on modulator and is going on 'phone. LF is working 7-Mc. c.w. using 814 final and now is o.f.o. from T. U. unit. XT is on 7-Mc. c.w. using p.p. 814s hooked to a beam. ABP soon will have cathode follower off on 7-Mc. c.w. ADY has a new pole up. He is going to put up a permanent beam and recently had some of the boys hauling rock, etc., for a solid base. AZ works 28-Mc. 'phone. AGP is building a new transmitter and is using 28-Mc. set at the present time. Pat Larkin is awaiting his new call and has transmitter ready for the big day. IP, an old Winnipegger, will be on the air shortly with his rig. ID is working regularly on 7 and 3.5 Mc. He has a BC-348J, and his transmitter is BC-696A. CE's 807 has accounted for 32 countries. AEB worked VU2TM on 28-Mc. 'phone. IM has put in an appearance on 28-Mc. 'phone. EB is heard on 14-Mc. 'phone occasionally, but he still likes 28 Mc. Traffic: VE4AEU 72, IU 5.

YUKON — SCM, W. R. Williamson, VE8AK — AJ is rebuilding, a suitcase size rig this time. AN finds customs duties keeps him busy in Yukon with little time for hamming. BC is working out on 28 and 3.5 Mc. CD is on 3.5 Mc. from his trapping cabin at MacMillan River. AT, AM, CD, BC, and AO find the Yukon Family Hour at 8 P.M. on 3.8 Mc. a good way to spread the latest news. AK is on a building spree as duties permit from his new QTH at Radio Range Station, Teslin, Y.T. BV is very active on 28 Mc. from Whitehorse. AI is heard on 14 Mc. from new QTH at Watson Lake. AL is packing for move to Whitehorse. AO is happy with new home complete with running water and three-element beam. Your SCM hopes to be on more often in 1948 to collect activity reports.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Orchids to the WARC. 3.85 Mc. has become popular in Winnipeg with EA, DG, JO, and KX all showing up. AU, in Brandon, handled traffic from the "Round the World" Fliers. AA, at Balmora, uses 3.5 Mc. HS, at Miami, finally got hydro power and is very active with a VFO to an 807. TJ worked 35 countries in 10 days. NI is using micromatch to find his standing waves. FJ is a new call and will be heard soon. The SS ran a number of the boys ragged and among those still catching up on their sleep are RP, YO, JO, PK, FW, GW, and AM. WF got a 250T and when last seen was carefully polishing it with a handkerchief. All schedules on TL "I" are clicking 100 per cent and 24-hour service is given coast to coast. Traffic is on the upgrade but it isn't being reported. We have facilities for clearing anywhere on the North American Continent. Use them. Nightly schedules are maintained on TL "I," the MSN, and AP Net. Traffic: VE4AM 78, JO 3.



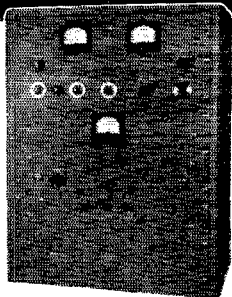
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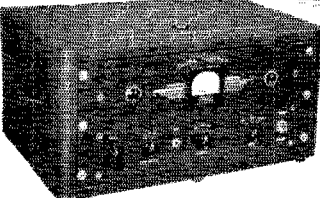
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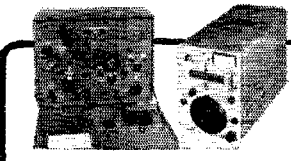
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Amateurs the world over are praising the performance of this high quality, low cost rig. It's a 40 watt input kit including all parts, power supply, chassis panel and streamlined cabinet. Write for export prices. Cat. No. 70-300 less tubes.....\$69.95
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1 set of coils, meters, tubes, extra.....\$17.49



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From our own labs. Uses 6L6 regenerative Osc. into an 807 driver or final. Similar to unit described in A.R.R.L. Handbook. Output 35 to 40 watts. Comes mounted on standard relay rack panel 3 1/2" x 19"
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West Hartford, Conn.

QSL Manager

(Continued from page 17)

Jamboree of 1937 in Washington, D. C.

Hank now has four transmitters and little time to use them, he says. Being a member of the Helmetta Police Department consumes some of his time and the work incident to the functioning of the QSL Bureau takes quite a bit of the rest.

In the more than a decade and a half since he assumed the task of distributing cards in the W2 area, Hank has handled more than a quarter million cards. From a modest 5000 cards handled the first year, the annual total swelled to 27,860 in 1935, grew to 35,716 in 1937 and reached a prewar peak in 1938, during which 38,530 treasured QSLs were mailed out to waiting hams.

Because of the increase in the size of the district and also the general increase in DX activity, an all-time record high of 70,115 cards arrived at the Bureau for distribution to waiting amateurs during the year just concluded. Envelopes on file, overflowing a 12-drawer filing cabinet pending construction of additional filing space, would make a stack 36 ft. high. Unclaimed cards, if pulled from their separate file, would make another stack 24 feet high. Moral: Do you have an envelope on file with your QSL Manager?

W2 amateurs may find it interesting to know that they are helping Uncle Sam's Post Office Department to stay in the red by spending about \$700.00 annually for stamps to pay the freight on those coveted DX cards.

When a QSL manager goes to that particular corner of Heaven reserved for him, Hank is sure that all cards would be of a uniform size. All would display the call of the station for whom the card is intended prominently in the upper left-hand corner, just to make sorting a little easier. Every active amateur would of course have one or two envelopes always on file and it goes without saying that the envelopes would be that magic stationer's size No. 10 and certainly would have his call lettered prominently in the upper left-hand corner and show a legible, correct address.

Finally, in spite of the huge volume of cards that would have to be taken care of in QSL-heaven, the manager would have countless hours to pursue the elusive DX on his own account.

QSL Strays

Newly-licensed W7LQQ's first QSO on the air was with W4LQQ! During the course of this unrehearsed QSO, it further developed that both were members of AACs.

A new "split-anode" electrometer tube, which measures reliably currents as low as a millionth of a billionth of an ampere (10⁻¹⁶ ampere to you slide-rule artists), has been made available by G.E. The new tube is expected to prove of value in nuclear, medical and industrial research.

A handy "World Time Teller" time-conversion slide rule is available from the Gruen Watch Co., Cincinnati, Ohio, with their compliments.—W5SP

HARRISON HAS IT!

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The newest and the best —
Greater value than the rest —
Plus service with a zest!

If you can't visit either of my well-stocked stores, phone or mail in your orders for really superior SERVICE. All standard lines at lowest prices.

73, *Bil Harrison*, W2AVA

DODGE QRM!

Single Sideband Suppressed Carrier

We'll have all the specially designed components for SSSC in stock as they are brought out by the leading manufacturers. Depend on Harrison for the very newest things!

- High Q sideband Filter \$35.00
- Crystals: 350 Kc — \$5.95, 6 Mc. 2.75
- PP plates to VC, open mount. 2.25
- Single plate to CT line 10.80
- Plate to PP Grids (HA-104) 12.00
- 465 Kc double slug tuned I.F.'s 2.40
- 3/4" x 1" powdered iron slug39
- B&W 3/4" Miniductors44
- Sylvania 1N34 diodes — \$1.60, V-306 Varistor

Send me your order for everything you need!

NFM Give NFM a real chance by using an NFM adapter in your receiver!

- NATIONAL: For HRO-7, NC-183, NC-173... \$16.95
- SA: 4842 Discriminator Transformer 4.50
- RME: NBF4 for RME-45 19.50

SONAR NFM EXCITERS:

- NE-10 \$39.45
- VFX-680 \$87.45
- MB-611 Transmitter \$72.45

COAXIAL CABLE

72 ohm. Not surplus!
Newest improved production having RG-59/U characteristics. For TV, FM, and medium power transmitter lead-in.
100 feet **\$7.90**

- 1,000 foot spool \$59.50

HI FI with your speaker plus the new

University TWEETER

Extends range to 15 Kc. Connects across VC output. Twin unit gives 100° horizontal and 50° vertical dispersion.
\$23.52 in walnut cabinet.

- Single tweeter \$11.76

"MON-KEY"

Ditch that Lake Erie swing! Be one of the few to have a tape-perfect fist by using this first ELECTRONIC KEY priced for the Amateur. Makes uniform dots, dashes, and spaces — automatically! One control sets speed 10 to 35 WPM, maintaining correct ratios. Side-swipe lever. Built-in speaker permits monitoring of transmission and code practice. Internal keying relay. MONitor-KEYer, complete with **\$29.95** tubes, for 110 volts AC.

IN NEW YORK — ONLY HARRISON HAS IT!
Come in and try it out — you'll be fascinated!

INQUIRIES and ORDERS are solicited from Amateur, Dealers, BC Stations, Laboratories, Industrials, Schools, Public Utilities, Governmental Agencies, Importers, Engineers, SWL's, etc. in

ALL PARTS OF THE WORLD!

Complete TRANSMITTERS

Highest Quality and Proven Performance

— Moderately Priced

Ready to go on the air! All factory built and tested units with components of newest production. Complete with tubes, coils for one band, and operating instructions. Housed in modern deluxe rack cabinets. Less only crystal, microphone, key and antenna.

75 WATT. The famous Millen 90800 streamlined crystal controlled transmitter employing a 6L6 oscillator-multiplier and an 807 amplifier. Hundreds now in use, giving outstanding performance! Meter indicates both stages. Dependable, well-filtered power supply. Cabinet 14" high. Model **\$145** C75.....

(Coils, per additional band — \$2.50)

For VFO control, plug in the Millen "Variarm" (\$42.50 complete) or any other good EXC. For phone operation plug in a Sonar NE-10 Narrow Band FM unit (\$39.45 complete), or use any good AM or NFM unit.

For both VFO and NFM PHONE order the Model FV75 Transmitter. Incorporates a Sonar VFX680 exciter. Cabinet 19 1/2" high. **\$235**

500 WATT. This excellent high power Transmitter is built around the Millen 90800 as an exciter together with the well-designed 90881 push-pull 500 watt amplifier. Uses the stable, sturdy 812-H triodes in high efficiency layout. Separate power supplies for the oscillator-buffer and the final for good regulation. Power relay with provision for remote control. Three meters for easy tuning. Safety interlock switches on top and rear doors of the 28" high cabinet. Model C500. **\$345**

For VFO or NFM PHONE plug in the units recommended above, or order the Model FV500 Transmitter which incorporates the Sonar VFX680. 36 3/4" high. **\$435**

HALLICRAFTERS

World Famous HT-9 XMITTER

Proven, dependable performance at a reasonable price. **\$350**

SUBRACO MT-15. Unbelievably compact CC mobile Xmitter rated at 20 watts output on 10-11 meters. Provision for push-talk mike. Metered. 5 1/4" x 4 1/2" x 8" deep for glove compartment mounting with all controls accessible. With tubes and separate **\$129.50** 6 V dynamotor pack.

SUBRACO 75T. Rated output 75 Watts AM conservatively rated, well engineered and solidly constructed transmitter embodying modern, desirable features. Deluxe 14" rack cabinet. Complete with tubes, coils for 10, 11, 20, 40 and 80, and crystal. **\$296.50**

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Pre-Tuned—Pre-Spaced—PreMatched

High-Power Beams Use
Wide Maximized Spacing

NO TUNING TO DO!

Beam clamps, 3 inch Dural tubing rotating masts, and bearings, available. Make up your own combination 10 Over 20, 6 Over 10, etc. Literature shows low-cost no-loss two inch open line flex. connection, all your RF power guaranteed out front.

Amateur net prices, 10-meter beams: 3 el. beam, length 12 ft., weight, 8½ lbs., \$35. 4 el. beam, length 20 ft., weight 13½ lbs., \$50. 5 el. beam, length 29 ft., weight 25 lbs., \$65. 3 el. 20-meter beam, 23 ft. long, 39 lbs., \$100. For shipping prepaid anywhere in U.S.A. or Canada add \$10 deposit on strong wood box. Refund on return of box, less outgoing shipping charges.

50 to 100 ft., television ant. masts.

Beams for 50, 144, 235, 425, and parabolas, including 32 el. on 2 meters, 32 el. on 425 MC. Send for literature. Power gains over a folded dipole. 3 el. 9.9; 4 el. 11.5; 5 el. 15.

MAIL ADDRESS GUION ROAD, RYE, N. Y.

ALL LETTERS ANSWERED PERSONALLY

U. H. F. RESONATOR CO.

W. F. Hoisington, W2BAV

FACTORY AT PORTCHESTER, N. Y.

'Phone Assignments

(Continued from page 38)

setting of a standard would be an incentive to amateurs to correct each other in our traditional self-monitoring action. We believe that such a regulation should apply only as high as 27 Mc., since congestion is not so intense above that figure; and a precedent for such a frequency division is already set by our requirements for pure d.c. and certain stability below 144 Mc. We believe that no 'phone stations should occupy over 6 kc. and that the practical implication of that is that an endeavor should be made to cut off speech frequencies in the vicinity of 2500 cycles. We therefore unanimously recommend to you that you seek from FCC a new amateur regulation which, in effect, would specify that any frequency components removed more than 3 kc. from the carrier frequency must be reduced at least 30 db. below the carrier amplitude."

Field Day

(Continued from page 45)

		QSOs Power Score	
W5GU/5	Oklahoma City Amateur Radio Club ¹⁴⁷	206	AB— 3,649
VE7ES	Totem Amateur Radio Club ¹⁴⁹	65	A— 1,035

Seven Transmitters Operated Simultaneously

W6AOA/6	The Metropolitan Radio Club ¹⁵⁰	891	AB— 13,778
W9IT/9	Northwest Amateur Radio Club ¹⁵¹	927	A— 13,286
W3QV/3	York Road Radio Club ¹⁵²	721	A— 9,783
W9KYC/9	St. Paul Radio Club ¹⁵³	604	A— 8,613
W6EUL/6	North Bay Amateur Radio Association ¹⁵⁴	335	A— 7,790
W2QW/2	Raritan Valley Radio Club ¹⁵⁵	...	A— 7,020
W6CG/6	Royal Order of Suda Club ¹⁵⁶	257	A— 5,711
VE3BNG	Hamilton Amateur Radio Club ¹⁵⁷	370	A— 5,211
W6EPS/6	San Francisco Naval Shipyard Amateur Radio Club ¹⁵⁸	257	A— 4,982
W2US/2	Suffolk County Radio Club, Suffolk Amateur Radio Club ¹⁵⁹	350	AB— 4,407
W9RJY/9	Fort Wayne Radio Club	270	A— 4,050

Eight Transmitters Operated Simultaneously

W6RNQ/6	Inglwood Amateur Radio Club ¹⁶⁰	737	AB— 13,031
W6SD/6	San Fernando Valley Radio Club ¹⁶¹	638	A— 12,018

MEL, MEN, MNY, W3KNH/5. ¹⁴⁸ Eight. ¹⁴⁹ Thirteen. ¹⁵⁰ W6AOA, MBA, VBQ, NY, WPF, MYK, UB, JJP, YGB, VVH, UVR, YPG, SJ, OFZ, YXH, WYL, YGK, WAT, WKO, WUB, VSU, MNC, MOE, WJD, VVY. ¹⁵¹ Thirty-five. ¹⁵² W3AJF, ALB, BC, BWQ, CXU, ED, EHZ, EM, EPC, ERF, ETM, FSC, GKW, GNF, GRY, HIO, HLK, HVB, HZS, IGR, JKK, JOO, JPP, KBB, KDF, KHR, *KIW, KKN, KMH, KMI, KQO, KRF, KRO, LDV, LVF, LYD, LZG, MHH, MQU, NDZ, PN, QD, QV, BYB.

¹⁵³ W0JRI, MPW, YCR, BBL, VUZ, TOZ, ZWW, JLE, NCS, ORA, OYC, SBO, LAE. ¹⁵⁴ W6BPC, CHA, CQZ, EUL, MPJ, RRG, RVU, TFO, VEE, VEF, WGM, WNJ, WUR, WVK, WXU, YGU, YUJ. ¹⁵⁵ Fourteen. ¹⁵⁶ W6OQB, CG, OGM, SYG, UP, ICS, VCO, VDJ, TTY, SOQ, UON. ¹⁵⁷ Thirty. ¹⁵⁸ Twelve. ¹⁵⁹ W2ADW, AJF, AJE, BFA, BRU, CKU, CZD, DOG, EBT, FCH, FSK, HQB, HWR, JFP, KNA, KOA, LCU, LUD, LVN, LWE, LXX, LYH, MZB, NMP, NXZ, OHL, PDU, PNB, TPZ, UDP, VSV, WH, US. ¹⁶⁰ W6WRJ, OH, ACS, QIR, UXN, KRJ, OWW, KPC, QVS, TCY, MUB, KGC, RNQ, QLL, TPB, VJU, NHF, AKQ, NXW, MYS, EKM, KYV, VST, YMM, WTJ, VBS, EKM, WHX, UBO, VEG, WGK, QWZ, UXB, DUC, REB, MHW, QXB, SJP, ZJH, PNH, MSO, YWN, RNN, ZCM, Whitaker, Hepburn, Johnson, Holtrichter, Engel, Cogan. ¹⁶¹ Forty-four. ¹⁶² Eighteen. ¹⁶³ Ten. ¹⁶⁴ Seventeen.

(Continued on page 180)

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IN the recent purchase of radio transmitting crystals ever made by one wholesaler in the history of the Radio Parts Industry, Sun Radio acquired title to over a half million dollars (\$500,000.00) of Army Surplus, precision built, exactly tooled crystals in moisture proof holders which are shock mounted . . . thousands, . . . or should we say miles, of gleaming brand new crystals in moisture proof holders manufactured by the world's finest crystal manufacturers (RCA, Billey, Western Electric, Valley, etc.). We can claim that we can supply every frequency, because they are offered "first come, first served," but we can supply the early birds with the below listed frequencies at the lowest prices you have ever seen.

CRYSTALS WITH A MILLION USES

Fractions Omitted											
kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc
412	420	429	437	445	457	469	479	490	497	506	516
413	422	430	438	446	458	470	481	491	498	507	518
414	423	431	440	447	459	472	483	493	501	508	519
415	424	433	441	448	462	473	484	493	502	509	522
416	425	434	442	451	463	474	485	494	503	511	523
418	426	435	443	453	466	475	487	495	504	512	
419	427	436	444		465	477	488	496	505	515	

49¢
each

I.F. Frequency Standards			Crystal Frequency Standards 98.356kc			For Crystal Controlled Signal Generators 525kc		
kc	kc	kc	kc	kc	kc	kc	kc	kc
450	454.166	461.111	Easily altered for 100 kc Standard Mounted in low loss 3 prong holder.			526.388	531.944	536.111
451.388	455.556	464.815				527.777	533.333	537.500
452.777	459.259	465.277				529.166	534.722	538.888
						530.555		

99¢ each

\$3.89 each

99¢ each

ASSORTED MISCELLANEOUS CRYSTALS

Fractions Omitted					FOR HAM AND GENERAL USE Fractions Omitted				
370kc	376kc	381kc	384kc	387kc	390kc	395kc	402kc	405kc	408kc
372	377	383	386	388	391	396	403	406	409
374	379				392	397	404	407	411
375	380				393	398			
					394	401			

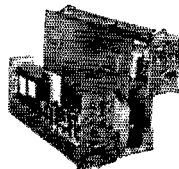
39¢ each

79¢ each

priced at a fraction of the cost of their holders alone.

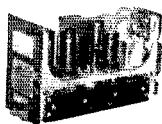
• Payments must accompany order. Enclose 20c for postage and handling. Minimum order—\$2.00 plus postage.
• Crystals are shipped packed in cloth bags inasmuch as they are shock mounted. All shipments guaranteed.

"Hot Radio Values" AT SUN RADIO



WAVEMETER BC-1073A

These units are only slightly used and are guaranteed in good condition. They contain a high quality resonant cavity wavemeter, oscillator, heterodyne amplifier, electric tuning eye, complete with nineteen tubes (8-6SA7, 2-6V6GT, 2-6H6, 1-5Y3GT, 1-9002, 1-9006, 10V5, 1-6SF5) 110-volt A.C. power supply. 27" x 20" x 6 1/2" — Net weight 95 lbs. These units tune from 150 to 210 megacycles. Original cost \$550.00, your cost **\$24.95**



SPERRY AMPLIFIER

Manufactured by Sperry Gyroscope Co. These amplifiers contain 2 beam power output tubes (1632) similar to 25L6, 2 twin triodes (1638 & 1634) similar to 6SC7, 2 mica condensers, dozens of color coded half watt resistors, 3 bathub condensers, 2 dual bathub condensers, 1 tubular condenser with 4 sections, 3 hermetically sealed transformers, 2 water shielded rotary switches with resistor assembly, 1 volume control, 4 octal sockets, measurements 9 1/2" x 5 1/2" x 3 1/2". Brand new. Easily converted to excellent audio amplifier. . . . **\$3.95**



5-GANG TUNING CONDENSER

Brand new . . . 5 gang, 365 mmfd. per section . . . a truly precision built condenser with ceramic insulation. A \$13.50 value in the greatest offering ever made in tuning condensers for **\$2.95** only

AC VOLTMETER

Brand new Westinghouse 3" square panel meter 0-150v ideal for checking primary voltage. **\$3.49**



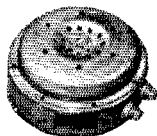
TS13 HANDSET



Combining a 200 ohm carbon mike and 2500 ohm earphone with butterfly switch for listen and talk. Has 6' flexible rubber cord with 1-P155 and PL68 plugs attached. **\$2.95** Brand New

NAVY SPEAKERS

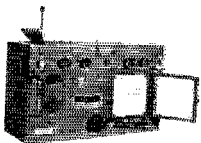
Stromberg Carlson and RCA waterproof speakers. Brand New 25 Watt **\$14.95** PM driver unit



WALKIE TALKIES

SET \$129.90

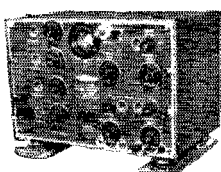
SCR195 Walkie Talkies, brand new, weight 27 1/4 pounds including knapsack. Range up to 25 miles in open country. Frequency 52.8 to 65.8 MC. Transmitter and receiver with regular hand set. Complete ready to operate with spare parts. Each. **\$69.95**



1222 Signal Generator

Brand new; Frequency from 8 MC to 230 MC in 2 bands. Calibration graph furnished. Crystal controlled check points. 110V AC power supply. Output attenuator. Dial calibration 10 points per division. A true laboratory instrument. A \$350 **\$54.95** value for only

100 WATT BENDIX TRANSMITTER TA12



CHECK THESE VALUES: Three 807 Tubes, four 12SK7, one 2 inch 5 amp. RF meter, four Separate Master oscillators. (These can be easily changed to cover 20-40-80 meters and by using crystal for the 10-meter band you will have a complete coverage transmitter).

Four separate output tanks. One 4 position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. The housing is cast aluminum; shields and case are sheet aluminum. Dimensions 11 x 12 x 15 inches, weight 35 1/2 lbs. Complete, simple instructions for conversion furnished. Complete with tubes. **\$49.95**



110 VOLT AC SUPERHETRODYNE RECEIVER:

This crystal fixed frequency receiver comes with full conversion instruction for variable tuning of all ham bands and broadcast. 110V. A.C. power supply built-in. Uses the following tubes: 6K7 RF Amplifier; 6K8 Mixer and Oscillator; 6K7 I. F. Amplifier; 6F7 Detector and A.V.C.; 6C8 Output and Noise Suppressor; 80 Rectifier. Dimensions — 3 1/2 x 19 x 11 1/2 inches. Comes complete, brand new, with one set of coils and two sets of tubes. **\$16.95**

• TERMS: All items F.O.B., Washington, D. C. All orders \$30.00 or less cash with order. Above \$30.00 25 per cent with order, balance C.O.D. Foreign orders cash with all orders, plus exchange rate.

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600-10—the Drake No. 600-10 is ideal for those all important connections when rewiring your rig. Get back on the air fast. Make good dependable connections with this 100 watt 3/8" tip.



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Elinor Ears — well designed, easy to assemble — priced low.

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Tempered Alum. Tubing — 1/2" to 1", also angles.

300 Trussion Line — regular and heavy.

War Surplus — many good items.

We stock and recommend the above lines.

Prompt Service

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Rockford, Illinois

		QSO.	Power	Score
W6VB/6	Mike and Key Club of Santa Monica, California ¹⁵²	552	A-	11,340
W2ZD/2	The Somerset Hills Radio Club ¹⁵³	816	AB-	10,674
VE3RH	Toronto Amateur Radio Club ¹⁵⁴	487	A-	6,955
W5BPL/5	Delta Radio Club ¹⁵⁵	355	A-	5,472

Nine Transmitters Operated Simultaneously

W6VX/6	Society of Amateur Radio Operators ¹⁷²	697	A-	14,378
W8JM/8	Mountaineer Amateur Radio Association ¹⁵⁶	619	A-	9,891

Ten Transmitters Operated Simultaneously

W2GSA/2	Jersey Shore Amateur Radio Association ¹⁵⁷	1,707	A-	15,804
W3FRY/2	Frankford Radio Club ¹⁵⁸	1,002	A-	13,923
W2OMY/2	Tri-County Radio Association ¹⁵⁹	1,006	A-	13,149
W2WK/2	The Monmouth County Amateur Radio Association ¹⁷⁰	748	A-	10,422

Eleven Transmitters Operated Simultaneously

W6NWX/6	Palomar Radio Club ¹⁷¹	727	A-	13,298
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A.R.R.L. EMERGENCY CORPS GROUPS

One Transmitter	QSO.	Power*	Score	
W3AXT/3	Amateur Emergency Corps, Lancaster County, Pa. ⁴	188	A-	3,375
W8VVL/8	Queen City Emergency Net	180	A-	1,578

Four Transmitters Operated Simultaneously

W9DXU/9	The Pole Cats Emergency Corps of the Hamfesters Radio Club ⁹⁴	438	A-	6,750
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NONCLUB GROUPS AND INDIVIDUALS

One Transmitter	QSO.	Power*	Score	
W6EYH/6	W6EYH-VUC-OMQ	252	A-	6,170
W1BDI/1	W1JTD-AOK-BDI-ODY-JMY-APB	179	A-	4,215
W1HFO/1	W1HFO-ORP	206	A-	3,726
W6BAM/6	W6BFB-BAM	125	A-	3,308
W2FBA/2	W2JQB-FBA	162	A-	2,970
W2TZP/2	W2ADV-TZP-UXY-PJM	177	A-	2,961
W8LCN/8	W8BTV-LGN	164	A-	2,727
W9DEP/9	W9CMT-AWB-BQJ-ICC-DEP	155	A-	2,655
W2UBU/2	W2UBT-CHU-SKJ-UBU	136	A-	2,493
W7HAZ/7	W7AOL-HBO-KVG-HAZ	78	A-	2,336
W7RT/7	W7RT	110	B-	2,061
W0RSI/0	W0LUR-MYC-IFB-RSI-NFM-Howard Carol	114	A-	1,872
W1NXX/1	W1DFC-NKM-GKJ-NXX	90	A-	1,800
W6ECV/6	W6BBR-ECV	56	A-	1,692
W0HLDU/0	W0HLDU	64	A-	1,634
VE1QM	VE1OK-SW-PB-SO-QG-QR-QM	85	A-	1,431
W4GTS/4	W4ELO-PIN-GTS	71	A-	1,278
W5KSW/5	W5KSW	41	B-	1,269
W9TT/9	W9KLM-TT	61	A-	1,215
W1BB/1	W1BB	60	A-	1,071
W1ORN/0	W1ORN	30	A-	1,044
W7JU/7	W7JU	29	A-	1,015
W5BAJ/5	W5HRN-BAJ	39	A-	986
W6NRM/6	W6NRM	26	A-	972
W7IWU/7	W7IWU	24	A-	864
W5DAM/5	W5CJJ-DAM-Ed Preston	76	B-	837
W9YUR/9	Four ops	68	B-	810
VE3PA	VE3BQP-PA	50	A-	783
W7QAP/7	W7QAP	24	A-	743
W1HY/1	Four ops	114	A-	708
W5NY/5	Three ops	157	C-	707
W5IEO/5	W5EHR-IEO	17	A-	702
W5QA/5	W5MKS-LWZ-GUD-FQG-QA	38	A-	702
W3HMM/3	W3HMH-HMM	26	A-	657
W2JZ/2	W2RTW-JZ	24	A-	603
W3AFA/3	W3GKR-AFA	49	A-	576

(Continued on page 122)

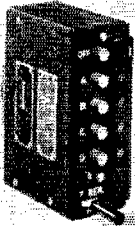
¹⁵⁵ Twenty-one. ¹⁵⁶ W8GBF, OXO, KWI, VAB, SGV, JM, WSL, RCN, QG, NTV, ZOW, FMU, EBG, KWL, YGL, SPJ, TDJ, ESQ, BOK. ¹⁵⁷ Thirty. ¹⁵⁸ Thirty. ¹⁵⁹ Twenty-five. ¹⁷⁰ Thirty-five. ¹⁷¹ Thirty-five. ¹⁷² Twenty-two.

LEEDS

The Home of RADIO

IN OUR
25th YEAR

QUALITY—PRICE
DEPENDABILITY



ATTENTION ! ! !

ALL SCR-522 OWNERS:

Remote Control Boxes for SCR 522's, Brand New in Original Packing; Consists of 5 push button switches, 5 Western Electric Pilot Assemblies, with Pilot Bulbs and Dimmer, and lever Switch all finished in Black Crackle. Order yours To-Day for only.....\$1.25 ea.

Antenna Plug 46-PS-1 for 522A
15c ea.

BEST BUY OF THE MONTH

100 Watt Wire Wound, Ferrule Type Resistors, in the following sizes: 25,000, 30,000, 40,000, 50,000 and 100,000 Ohms. For only, each.....**25c**
.003 Mfd. 2000 V. Sangamo Postage Stamp Micacs, 5c each, 100 for.....**\$4.75**
X-Tal Mike and Desk Stand with Cable. Made by Shure. This is good value at.....**\$5.50**
1 Mfd. 750 V.D.C. Sprague Oil Filled Condensers.....**15c**
0.5 Mfd. 1500 V.D.C. Gudeman Oil Filled Condensers. **25c**

OIL FILLED CONDENSERS

3x.2 Mfd., 4000 VDC. Tobe..... **98c**
2x.1 Mfd., 7500 VDC. G.E......**\$2.00**
.02 Mfd., 8000 VDC. Aero..... **98c**
16 Mfd., 400 VDC. W.E. Co...... **98c**
10 Mfd., 600 VDC. G.E. or C.D...... **98c**
1 Mfd., 5000 VDC. Solar.....**\$2.95**
2 Mfd., 600 VDC. C.D...... **49c**
2 Mfd., 1000 VDC. Aero..... **79c**

Wire Wound Potentiometer
100,000 ohm, precision made.
G.R. type, 25 watt, 6" diameter.
Brand new.....**\$1.95**



ANOTHER LEEDS SPECIAL

We have just received some 6.3 Volt Filament Transformers at 6 Amps. They'll Go Fast at—each.....**\$1.50**

VARIABLE AND MICA CONDENSERS

0.4 Mfd Aerovox Mica Condensers, 600 VDC eff. in low loss moulded Bakelite Case. A Real Buy at, each.....**95c**
APC-25 Trimmers, Screw Driver Adjusted. 12 plates, 25 Mmfd. Silver Plated Variables, **15c** ea., 10 for.....**\$1.25**
25 Mmfd. Balanced Stator variables, Polished Plates, Isolantite Insulation. Swell for V.H.F. **29c** ea., 10 for.....**\$2.50**
15 Assorted Silver Micacs: All for.....**95c**
.01 Mfd 600 VDC Postage Stamp Micacs, **5c** ea., 100 for.....**\$4.75**

Ouncer Transformers, Mike to Grid, 25:1 Ratio, Low to High Impedance. **35c** ea. 10 for.....**\$2.95**
Heinemann Magnetic Circuit Breakers; In 3 and 5 Amp. Sizes.....**95c**
832 Tubes. Brand New.....**\$2.15**
Crystal Diodes IN23A. **35c** ea. 3 for.....**\$1.00**
De Jur Wire Wound Potentiometer. 12 Watts, 20,000 Ohms.....**49c**

METER SPECIALS

New in original cartons.

0-1 MA. D.C. Gruen 2" Round Metal Case.
0-30 MA. D.C. Westinghouse 2" Round Bakelite Case. Each.....**\$1.95**

I.T. AND T. SELINIUM RECTIFIERS

Full Wave Bridge Rectifiers; 54 volts AC Input, 39 Volts DC Output at 1.2 Amps. Signal Corps Spec. 4DQ238. Special at.....**\$1.50**

Full Wave Bridge Rectifier; 144 volts AC Input, 96 volts DC Output at 1.1 Amp. Signal Corps Spec. 9DQ612B. Special at.....**\$2.50**
These Rectifiers are all Brand New

5-INCH CATHODE RAY TUBES, Type 5BP1. Green Screen, Brand New in Original Cartons. All Scope Owners Will Want a Few at this Ridiculously New Low Price of, each.....**\$1.45**

Radio Transmitter & Receiver APS 13

With Schematic **\$11.95**



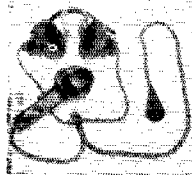
ITEMS YOU MAY BE LOOKING FOR

Arc-5. Banana Plugs Silver Plated. Per Doz.....**10c**
24 Volt G.E. Relay 200 Amp. Silver Plated Contacts. Each.....**39c**
110 Volt Candelabra Base, 1 Inch Bull's Eye Pilot Assemblies. Clear or Amber. Each.....**39c**
39" Telescoping Antennae. Each.....**25c**
6 Volt Bayonet Base Pilot Assemblies with Dimmer. Red or White. Each.....**19c**

ARMY RADIO PHONES

They're Weather, Water, and Shock Proof, Made to Army Specs. A Complete Dynamic Hand Mike, 2 Earphones, Headband, Cord Set. A Wonderful Buy, for only **\$1.95** each.....

These Units are all Brand New



STEEL CHASSIS

10 x 17 x 3.....**\$1.38** **11 x 17 x 3**.....**\$1.86**
5 x 10 x 3..... **87c** **13 x 17 x 3**.....**\$2.22**
7 x 13 x 2..... **96c** **7 x 7 x 2**..... **63c**
10 x 14 x 3.....**\$1.35** **4 x 17 x 3**..... **99c**

STEEL CANS AND BOXES

4 x 4 x 2..... **68c** **12 x 7 x 6**.....**\$1.68**
4 x 5 x 3..... **78c** **15 x 9 x 7**.....**\$2.35**
6 x 6 x 6..... **99c** **11 x 12 x 8**.....**\$2.25**

1/2 INCH STEEL PANELS

3 1/2 x 19..... **66c** **10 1/2 x 19**.....**\$1.22**
5 1/4 x 19..... **87c** **12 1/4 x 19**.....**\$1.46**
8 3/4 x 19.....**\$1.10** **14 x 19**.....**\$1.62**

1/2 INCH ALUMINUM PANELS

3 1/2 x 19.....**\$1.38** **8 3/4 x 19**.....**\$2.25**
5 1/2 x 19.....**\$1.74** **10 1/4 x 19**.....**\$2.87**

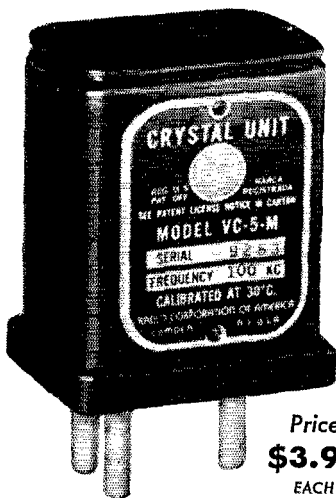
If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00.
We ship to any part of the globe

LEEDS RADIO CO.

75 Vesey Street
Cortlandt 7-2612

Dept. Q52
New York City 7

High Precision 100 KC. CRYSTALS



Price
\$3.95
EACH

(No C.O.D.'s. Please include 25c for postage and handling.)

Reprint of article from March 1947 CQ "Make Your Receiver a Frequency Standard," furnished with each crystal.

Brand New Surplus at about 1/10 Gov't. cost. An Ideal Frequency Standard for Amateurs, Servicemen, Laboratories, etc.

Exceptional Frequency Stability ± 15 cycles from -50° to $+80^\circ$ c. (.0015) 10G Vibration Test. Calibrated at 30° c. Brand New, Mounted in Sealed Cases as Shown.

ELECTRONICRAFT, INC.

5 Waverly Place • Tuckahoe, N. Y.



Founded in 1909

RADIO TELEPHONY RADIO TELEGRAPHY

Courses ranging in length from 7 to 12 months. Dormitory accommodations on campus. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details.

PORT ARTHUR COLLEGE PORT ARTHUR
TEXAS

Approved for G.I. training

		QSOs	Power	Score
W4IIB/4	W4IP8-KVM-LIB-IIB.....	20	A-	567
W6QHQ/8	Two oprs.....	26	A-	567
W3FPQ/3	W3FPQ.....	35	A-	531
W3FY/3	W3NL-TVX-FY.....	98	B-	408
VE7ALJ	VE7ALJ.....	26	A-	405
W8DYH/8	W8DYH.....	8	A-	351
W2LDS/2	W2HES-LDS.....	17	A-	279
W7HPH/7	W7HPH.....	8	A-	203
W9TZL/9	.....	17	A-	153
W1EMG/1	W1EMG.....	7	A-	117
W5GCM/5	W5GCM.....	8	B-	96
W3NCJ/3	W3NCJ.....	7	A-	63
W1NRZ	W1NCT-NRZ.....	7	...	21
W2QKX/2	W2QKX.....	4	A-	21
W2AA/2	W2AA.....	1	A-	9

Two Transmitters Operated Simultaneously

W3PUC/3	W4KFC-QY-W8FUE-W3ATC-PUC.....	455	A-	7,206
WILLX/1	W1GGH-RCQ-JHG-ALP-HJ-PDO-SH-LCP-LLX.....	356	A-	5,337
W4HHU/4	W4DIU-FVM-HHU-JWK-INM-KBO.....	209	A-	3,726
W8AII/8	W8QHG-PQ-QAII.....	203	A-	3,466
W5CUU/5	W5D NV-DEJ-DNW-DNB-CUU-W4EDG.....	253	A-	3,009
W8JTI/8	W8JSC-SLE-TOL-JTI.....	155	A-	2,322
W8TYE/8	W8CCE-KZV-PSL-TYE.....	86	AB-	1,599
W8JNJ/8	W8LEV-FBC-SPT-INJ.....	82	A-	1,314
W9ESI/9	W9CAS-MTM-ESJ.....	74	AB-	1,314
W8JJY/8	W8LOY-KYI-JJY.....	193	A-	1,137
W4KMG/4	W3FVD-GKP-LTR-W4KMG.....	72	A-	951
W9ZJT/9	Louis Adlin.....	91	AC-	862
W2UZN/2	W2TWO-UZN.....	54	A-	834
W8OG/8	W8WXG-ZCY-ENS-OKB-JID-ZCE-HAR-JRG-QWC-OG..	52	A-	747
KH6EL	KH6EL.....	23	A-	365
W4FLW/4	W4FLW-Charles H. Greene....	20	C-	276

Three Transmitters Operated Simultaneously

W3AM/4	W1UE-W3AM-BMX-DF-IUZ-KDP-W4AW-UQ.....	403	A-	6,498
W3USA/3	W3MTQ-NHB-KZR-NHU-NHR-JTC-W9NWX/4-W4LRI-LUV-KXN-LBM....	384	A-	6,282
W9ERU/9	W9HOA-MAP-NTV-EZQ-ESD-BNO-AGV-CZB-ERU.....	343	AB-	5,424
W8GW/8	W8UJ-FFK-AYS-BSS-NV-EBJ-WV-QV-AVH-GW.....	266	A-	4,626
W9FAP/9	.....	224	AB-	2,830
W6MIO/6	W6QZQ-LEF-PZV-TWJ-ZSM-MIO.....	90	A-	2,093
W1VW/1	W1KDK-MBK-OA-VW.....	73	A-	1,287
W1NY/1	Seven oprs.....	80	A-	900
W3PR/3	.....	48	A-	693
W4TM/4	W4CTU-GWS-AQV-HXC-JMW-CYO-ASC-GEH-TM...	76	AB-	342

Four Transmitters Operated Simultaneously

W6NIK/6	W6ZFS-JQX-NYA-KBD-NIK..	190	A-	4,820
W3EIS/3	W3AKB-BWT-CJT-EIS-MAR-MCG-MFJ-MHW-MSK-W4JAZ-KKZ-W9VDF.....	291	AB-	4,686
W1KUX/1	Eighteen oprs.....	122	A-	2,242
W9ES/9	.....	139	A-	1,440
W8TLQ/8	W8ZTA-ZEP-UNA-TLQ.....	143	AB-	703

Five Transmitters Operated Simultaneously

W6JWD/6	Twenty oprs.....	543	AB-	6,381
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Six Transmitters Operated Simultaneously

W6ERT/6	Eleven oprs.....	277	A-	6,791
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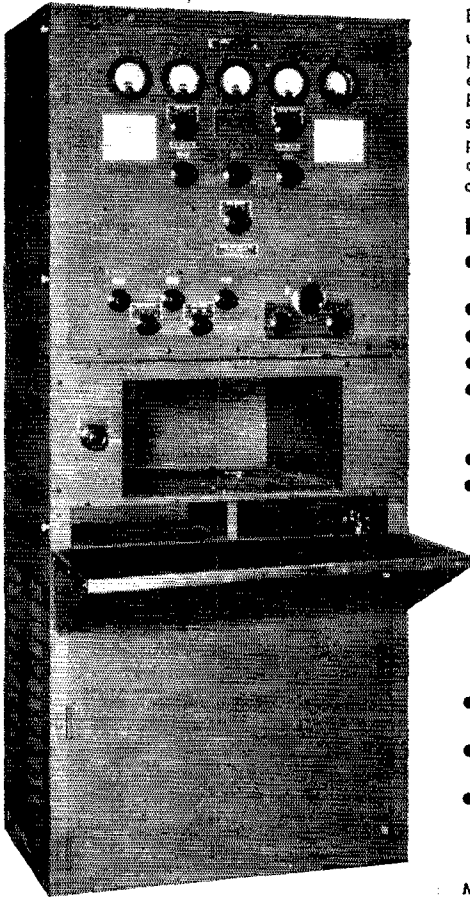
V.H.F.-ONLY PARTICIPANTS

One Transmitter		QSOs	Power*	Score
W1PCJ/1	W1PCJ	34	A-	1,206
W2AUE/2	UHF Institute of Maspeth	96	A-	1,089
W6VCG/6	W6Y8R-VCG	30	A-	837
W6UXC/6	W6UXC	26	A-	315

(Continued on page 124)

This Famous **167 BY-C.W. TRANSMITTER** *is Yours for Only* **\$187⁵⁰**

fob. New York



Overall size 69" high, 29" wide, 19" deep.
Beautiful dark-grey wrinkled finish.

**Be one of the lucky Hams to get a
167BY Transmitter — Order yours
today! No C.O.D.'s**

Built by one of the foremost transmitter manufacturers for use on Liberty ships. Brand new surplus in original export-packed, moisture-proof cases. Complete and ready to go except for power supply. Terminal strip provided for latter in bottom compartment of cabinet. Hook in your present power supply or build one from available, inexpensive surplus, and proceed to pound brass! Also ideal for narrow-band FM with addition of simple phase or reactance modulator. This is the opportunity of a Ham's lifetime!

Here are some of the Features of the 167BY . . .

- 200 Watts C.W. output from 2 to 16 mcs; 150 Watts from 16 to 24 mcs. (Conservative commercial ratings.)
- Any frequency between 2 and 24 mcs.
- Choice of 10 Xtal positions or V.F.O.
- High Stability V.F.O. with precision reset dial.
- Tube Lineup: 76 V.F.O., 6L6 buffer amp., 6L6 doubler, 6L6 doubler, 6L6 doubler-tripler, parallel 813s final amp.
- All important circuits metered.
- Pi antenna network matches impedance various antenna lengths.
 - Built-in shock-mounted keying relay and key.
 - Built-in filament transformer for all tubes.
 - Space provided for receiver (18" wide, 19" deep, 10" high).
 - Entire lower compartment of cabinet available for power supply, modulator, etc. Space 29" wide, 19" deep, 24" high.
- Demountable, chromium-edged, linoleum-covered operating shelf.
- Hinged R.F. deck. Swings down exposing all parts for easy service.
- Side doors and bottom-front of cabinet hinged providing access to interior.

FRONT PANEL CONTROLS

Multiplier Plate Meter, Amplifier Grid Meter, Amplifier Plate Meter, Filament Voltage Meter, Antenna Current Meter (All 3" bakelite model 301 Westons), Amplifier Range Selector, Antenna Coupling Switch, Antenna Coupling Control No. 1, Amplifier Tuning Control, Antenna Coupling Control No. 2, Plate Current Selector Switch, 2 Frequency Logging Charts, Multiplier Tuning Control No. 1, Multiplier Tuning Control No. 2, Multiplier Tuning Control No. 3, Multiplier Selector Switch, Frequency Check Switch, V.F.O. Tuning Dial, Oscillator Range Switch, Crystal Selector Switch (10 positions), Filament Transformer Variable Primary Control.

HERE IS WHAT YOU GET FOR YOUR MONEY:

- 1—167BY Transmitter as described.
- 2—Sets of tubes including: 2-76s, 8-6L6s, and 4-813s!
- 10—Mounted Crystals!
- 1—Transmit-Receive Switch.
- 1—Demountable operating shelf.

- 3—Boxes spare parts, wire, cable, fuses, insulators, copper tubing, lugs, misc. hardware, etc.
- 1—Set of V.F.O. calibration curves.
- 1—Complete instruction book.

Above comes packed in 3 wooden cases weighing as follows: Case No. 1—610 lbs., Case No. 2—45 lbs., Case No. 3—175 lbs.

TELEPHONE

Electroncraft

TUCKAHOE 3-0044

5 WAVERLY PLACE

INC.

TUCKAHOE 7, NEW YORK

CAST ALUMINUM CALL LETTER PLATES

W8ENH \$2.70

Postpaid

Made of sturdy, light weight, cast aluminum with letters and borders raised and satin-finished against a baked crackle-enamel background. Black is standard—red, gray or blue 50c extra. Size 2 3/4" x 8 1/4" with large 1 1/2" letters

For **YOUR CAR - Type A-18**

Cast with brackets for auto mounting and two 6-32 x 3/8" threaded studs for panel mounting.

For **PANEL MOUNTING - Type A-19**

Same as above, but without auto brackets. Equipped with studs for panel mounting.

LAPEL BUTTONS

Type A-26 - These attractive metal lapel buttons furnished with screw type backing for lapel. The raised lettering is sharp, clear and highly polished against a black enamel background. Other colors for 50¢ additional per order.



Actual Size
\$1.10
Postpaid

TERMS --- Orders under \$3.00. cash with order; orders over \$3.00 require 20% deposit --- balance. C. O. D.

SREPCO

STANDARD RADIO & ELECTRONIC PRODUCTS CO.
135 E. SECOND ST. DAYTON 2, OHIO.

• LEARN CODE •

SPEED UP YOUR RECEIVING

with

G-C Automatic Sender Type S

\$20.00 Postpaid



Housed in Aluminum Case, Black Instrument Finished. Small—Compact—Silent induction type motor. 110 Volts—60 Cycle A.C. Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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For over 28 years the educational radio center of New England. Prepares for all U. S. Government Radio Operators' Licenses. Also gives Radio Technician Training. Approved courses for Veteran Training under G.I. Bill.

Send for Catalog

Licensed by Commonwealth of Mass.

Department of Education

W3AWS/8 W3AWS
W7BYR/7 W7BYR
W2LZG W2LZG

QSOs Power Score
5 A- 288
9 A- 59
5 A- 15

HOME-STATION SCORES

W6BIP/6.....	300	W3HQJ.....	22	W5AWT.....	8
W6MHF.....	221	W1BHM.....	21	W9MSJ.....	8
W9JMG.....	147	W3MOE.....	21	W0DEB.....	8
W2TUK.....	129	W1BWN.....	20	W1OJP.....	7
W1MDU.....	128	W3MCI.....	19	W2KEL.....	7
W6WNI.....	113	W7DIS.....	18	W3IW.....	7
W7BE.....	111	W6ON.....	17	W9QHI.....	7
W2IFA.....	106	V61GU.....	16	W1NRZ.....	6
W1AW.....	104	W2LZG.....	15	W2VW.....	6
W8DAE.....	101	W3UVD.....	15	W8FRY.....	6
W6UWL.....	86	W5KWY.....	15	W6KDX.....	5
W3GJY.....	82	W6IV.....	15	W6WCQ.....	5
W4QMW.....	78	W2AA.....	14	W8TCP.....	5
W6WOO.....	67	W6EJA.....	14	W2JSE.....	4
W0SIL.....	58	W6BWG.....	13	W2PCQ.....	4
W2PLH.....	57	W1NBS.....	12	W4EID.....	4
W9LFK.....	55	W6YCN.....	12	W8VGW.....	4
W2NIY.....	46	W7IY/7.....	12	W3NCJ.....	3
W2QJY.....	45	W8EJZ.....	12	W4LTV.....	3
W2KVL.....	43	W9STL.....	12	W5JFR.....	3
W2WGL.....	39	W1BTU.....	11	VE3BPW.....	3
W9KBU.....	36	W1MD.....	11	W2FE.....	2
W3GUB.....	35	W2FAA.....	10	W4AXP.....	2
W6SLF.....	32	W2UWK.....	10	W0BRF/5.....	2
W4BAQ.....	30	W5KC.....	10	VE2XR.....	2
W7GNJ.....	29	W8VXO.....	10	W7AEB.....	2
W3DZ.....	28	W3NRE.....	9	W2NPE.....	1
W2WC.....	27	W6NAZ.....	9	W2OUY.....	1
W7EWE.....	27	W8PUN.....	9	W0URH.....	1
W2PY.....	24	VE7CS.....	9		

How's DX?

(Continued from page 50)

munications operator and would like to work more Ws on 7 Mc. He formerly was LU1EJ and is putting together a new rig, 'phone-c.w. at 80 watts. . . . KP4KD deduces some 108 countries worked without an Asian counted (124 with 16 Asians) and this should settle that old question. . . . Those SSA listings in the QTH department aren't commercials. They are stations operated in the amateur bands by the Swedish army for training purposes. . . . W2OM quotes 11IY as saying that ET3AB returned from Ethiopia and can be reached for QSL purposes at the listed location. . . . Remember that ARI and AR8 are different countries — don't send your AR8AB cards to Syria. Jean says that the postal authorities don't appreciate it. . . . W2AEY QSOed J3AAD at 1650 EST on December 16, 1947. Checking back through the log revealed that he had worked J3AAD previously at 1650 EST December 16, 1946! It's a small world, it is. . . . W2VKQ wants to set the boys at ease on HZ1AB. It is an Army station and is still being used in spite of a former operator, W4JMQ, returning to the U. S.

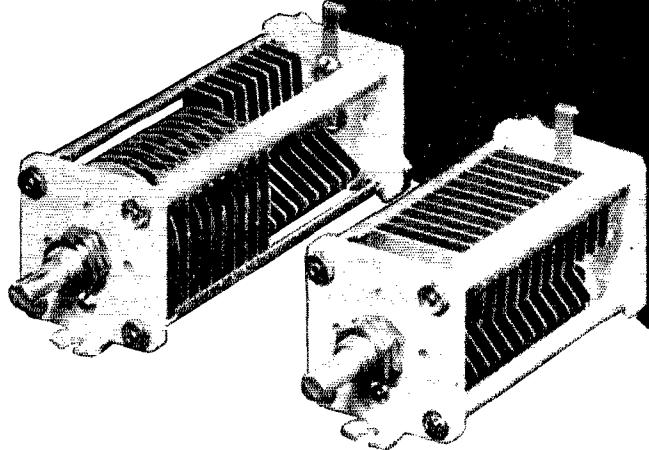
SWITCH TO SAFETY!



*Light
in Weight!*

**Type H
JOHNSON
CONDENSERS**

Combining minimum weight with small size, JOHNSON Type H Condensers are designed especially for aircraft transmitters. Simple and rugged in construction, JOHNSON Type H Condensers easily withstand heavy vibration. STEATITE end plates prevent any possibility of "short circuit loops" and permit panel mounting with both rotor and stator insulated from ground. Capacities and spacings are provided for low and medium power stages. Aluminum plates are .020" thick. End plates are 1½" square.



Excellent for police equipment, airline ground equipment, amateur equipment, test equipment, VHF and others.

They're small in size — great in performance!

For further details write for Latest JOHNSON Catalog



JOHNSON *a famous name in Radio*

E. F. JOHNSON CO., WASECA, MINNESOTA

**REVOLUTIONARY NEW INSTRUMENT
FOR COMPLETE RECEIVER TESTING!**

Signalette

MULTI-FREQUENCY GENERATOR

\$9.95

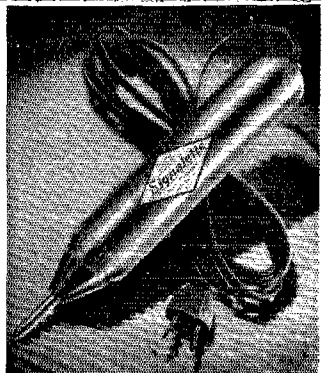
at distributor or
F. O. B. Cincinnati

Generates R.F., I.F. and AUDIO Frequencies, 2500 cycles to over 20 megacycles, using new electronic multivibrator radar principle. Completely self-contained — fits coat pocket or tool chest. Just plug into A.C. or D.C. LINE AND CHECK RECEIVER SENSITIVITY, AUDIO GAIN, R.F. and I.F. alignment, auto radio aerial peaking or shielding, breaks in wires, stage by stage signal tracing tube testing by direct comparison, etc. etc. Sturdy construction, handsome appearance! See at your distributor, or write for details. Shipping Wt. 13 ozs.

Recognized Jobbers — wire, write for details of territories open!

CLIPPAID INSTRUMENT LABORATORY, INC.

DEPT. T, 1125 BANK ST., CINCINNATI 14, OHIO



LOOK

UTC TRANSFORMERS

For Immediate Delivery

S-57 • 2.5 VCT 10 A.....	\$4.50
S-59 • 5 to 5.25 VCT 13 A.....	4.50
S-61 • 7.5/6.3 VCT 8 A.....	4.50
S-63 • 14/12/11 VCT 10 A.....	10.00
SC-3 • 24/16/12/8/4 V. 4 A.....	4.00
S-21 • Univ. Modulation 110 watts.....	15.50
VM-3 • Univ. Modulation 125 watts.....	18.00
PA-53AX • Univ. Driver: PP 2A3, 6L6, etc. to PP 805, 810, 811, T55, etc.....	6.36
CM-16 • Cathode Modulation 35 watts..	4.25
S-33 • Filter Choke, 20 H. 300 Ma.....	7.00
PA-104 • Filter Choke, 12 H. 300 Ma....	12.60
PA-301 • 475/425/250 VDC, 500 Ma...	15.00
PA-302 • 760/610 VDC, 325 Ma.....	18.00
PA-305 • 2000/1500 VDC 350 Ma. C.D.	40.80
VT-10 • Speech Band-Pass Filter.....	9.00

Steinberg's

633 WALNUT STREET • CINCINNATI 2, OHIO

ANOTHER *New* BROWNING DEVICE

AMATEUR FREQUENCY METER - MODEL MJ-9

Now most widely used ham frequency meter. Accuracy .05% on all frequencies: Direct frequency reading on 7 ham bands.

Frequency meters, WWV standard frequency calibrator, Oscilloscope, Power supply and square wave modulator Capacitance Relay, FM-AM Tuners, FM Tuner.

KNOW THE ENTIRE BROWNING LINE • ENGINEERED FOR ENGINEERS

WRITE TO DEPT. D FOR CATALOG



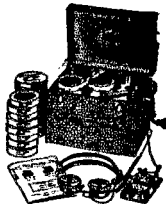
BROWNING LABORATORIES, INC.
WINCHESTER, MASS.

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INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS

A 'Scope

(Continued from page 57)

signed with a view toward the utmost in versatility within a reasonable outlay for parts. The extra features add but little to the total cost compared with that of an ordinary oscilloscope, and they are certain to do much to the usefulness of the instrument.

For one getting acquainted with the oscilloscope for the first time, it is suggested that he gain familiarity by playing around for a while with the various controls on the instrument. Feed the signal from the 6.3-volt binding post into the vertical input.

It is most interesting and instructive to observe the loran signals with the oscilloscope connected to a receiver tuned to about 1850 kc. The sweep rate should be set near 30 c.p.s.; the crystal filter and b.f.o. in the receiver should be off, and the gain adjusted to show the pulses to best advantage. Ionospheric reflections and fading are very plainly seen on the different sets of signals that drift along the sweep baseline, in the form of multiple signals and variations in height of the individual pulse.

I.A.R.U. News

(Continued from page 58)

Class three is composed of amateurs who pass successfully an examination on regulations and fundamentals of amateur radio. It is also open to those who are presented by a recognized radio club, sponsored by a first- or second-class amateur or those who have completed secondary school or who have completed at least the first year of official schools of electricity or electronics.

By successfully passing the appropriate endorsement examination, LU hams may be promoted to a higher license class.

Third-class amateurs may use only frequencies in the 80- and 5-meter bands and are limited to 40 watts power input to the final amplifier. Distinctive calls for this class are characterized by the letter "P" after the three letters immediately following the numeral in the call.

EMPIRE DX CERTIFICATES

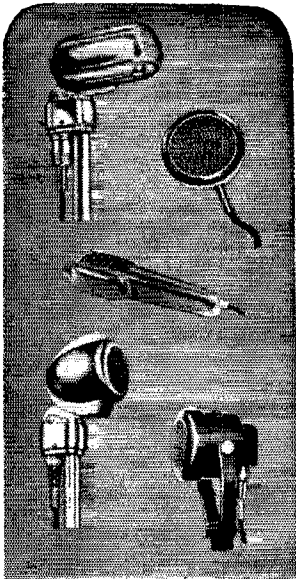
The *Radio Society of Great Britain* reports that, contrary to the notice in I.A.R.U. News in December 1947 *QST*, Empire DX Certificates are available only to paid-up members of R.S.G.B.

AUSTRALIA

A few changes in the rules and regulations governing VK amateurs have been promulgated by the Postmaster-General Department. Henceforth, VK hams are to be known officially as "amateur station licensees," the expression "experimental" having been dropped.

It is no longer necessary for a new amateur licensee to serve a probationary period before

(Continued on page 128)

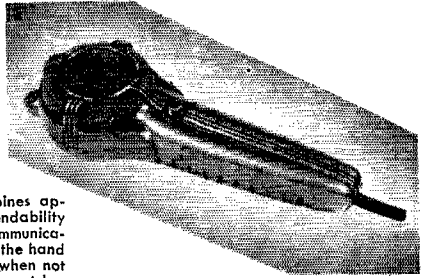


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Model 15

Crystal or Dynamic



This high quality hand mike combines appearance, convenience, and dependability with ideal response for amateur communications. It is perfectly balanced to fit the hand naturally and hangs from a hook when not in use. Professional gunmetal finish matches your equipment. Furnished with 20 ft. attached, shielded cable. "Push-to-talk" thumb switch as illustrated optional at extra cost.

15X CRYSTAL—Level: 52db below 1 volt/dyne/sq. cm. Response: ± 5 db from 40-8000 c.p.s.

15D DYNAMIC—Level: 54db below 1 volt/dyne/sq. cm. at high impedance Response: ± 5 db from 40-7000 c.p.s.

Ask your dealer or write for literature

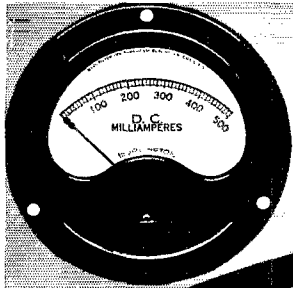
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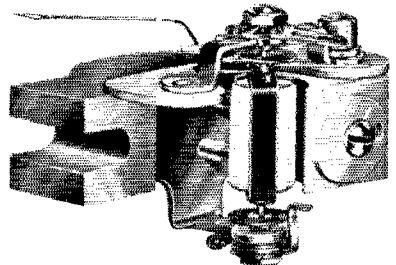


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MAGNETS OF ALNICO are standard for all DC instruments because it is the most stable magnetic material available, having greatest resistance to effects of stray magnetic fields, vibration, shock and heat. All ranges AC and DC available in 2½", 3½", 4½", rectangular or round case styles and are fully guaranteed for one year against defects in workmanship or material. Refer inquiries to Dept. J28.



INSTRUMENT COMPANY

BURLINGTON, IOWA



2 NEW POWER SUPPLY KITS

by "Buck" Stretcher



up to
3000 Volts!

They contain everything you need, all parts being brand new and nationally famous, including RCA, Kenyon, Millen, etc.

#4 2000 V DC @ 600 ma \$103.50

Use this one supply for double duty (600 ma CCS)

#5 2000 V DC @ 500 ma or
3000 V DC @ 400 ma \$119.50

And "Buck's" Other Power Supply Kits:

#1 500 or 750 V DC @ 300 ma \$39.50

#2 1000 or 1250 V DC @ 300 ma \$49.50

#3 1500, 1750, or 2000 V DC @ 300 ma \$59.50

Power Supply kit for the BG-221 \$ 5.95

Complete wiring diagrams with all kits
ORDER NOW!

Prices subject to possible change

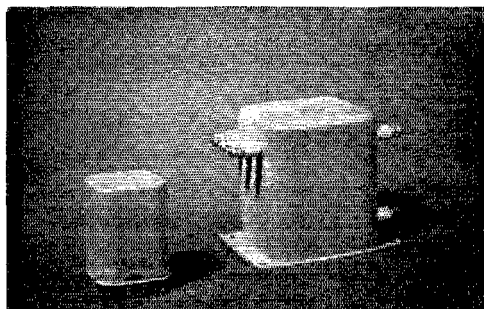
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MODULATION & DRIVER TRANSFORMERS



These transformers are suitable for use with type 811, 809, TZ40, TZ20, etc. to modulate either triode or beam tube RF amplifiers. Two secondaries are provided. Impedance ratio primary to secondary number one, 2 to 1. Primary to secondary number two, 16 to 1. Will modulate up to 300 watts input. Modulation transformer, driver transformer, circuit diagrams and other information all for \$6.90 Please include 50 cents for postage and handling.

Send full amount to speed delivery and save C.O.D. charges. Shipped only in the U. S., its possessions and Canada.

ELECTRONIC NAVIGATION, INC.

Box 735, Church Street Station
New York 8, New York

being accorded full privileges; the permissible power input has been raised to 100 watts for all hands. Nor are newcomers required to employ only c.w. but may use 'phone immediately if they wish.

Hints & Kinks

(Continued from page 69)

a high-vacuum rectifier is used. Also, the transients that sometimes result under conditions of retarded deionization may, during moderately-heavy clipping, cause the voice quality to sound much more "unnatural" than would otherwise be the case.

An ideal high-level clipper tube for medium or high power is the 836. This high-vacuum rectifier is not subject to the difficulties encountered with the 866 mercury-vapor type, and is available at even lower cost in the surplus market.

One 836 will handle 250 ma. input to the Class C amplifier stage; two in parallel can be used for currents up to 500 ma. Unlike the 866, no special precautions need be taken when using 836s in parallel. The voltage drop through an 836 is approximately 20 volts per 100 ma., or about 10 volts per 100 ma. for a pair.

— W. W. Smith, W6BCX

50 Mc.

(Continued from page 65)

the most active, and says that he will be glad to arrange skeds with interested operators in other localities.

The polarization controversy had forced many Middle Western stations to use both vertical and horizontal arrays, but this has had an unexpected benefit — it helps in duplex operation, according to W9AFT, Milwaukee. He has been making duplex tests with W9TAZ and W9LPF with good results, employing cross-polarization. He reports that the consistent winter DX is furnished by W9BHT, Union, and W9BBU, Elgin, Ill., hardly DX by summer standards, but nice going when conditions are at their lowest ebb.

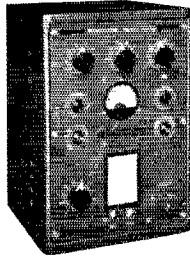
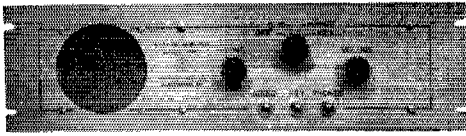
There has been no mention of Ft. Wayne activity in this section, says W9UC, and he provides the material needed to bring this about. He and W9UCH and W9UDD all have crystal rigs and horizontal arrays on 144 Mc., and there is some activity almost nightly. There could be a lot more doing during the winter months, however, and they invite others in the Ft. Wayne area to join them, instead of waiting for another DX season before exhuming their 522s. Surplus is no good on the shelf!

There may be QRM on 144 Mc. in some of the big cities, but W6IPI, Olmitz, Kansas, says it has a long way to go to reach that stage out his way. So far he has had one crossband contact and one two-way, and he is looking for some more converts.

Things have been pretty quiet up around Halifax, N. S. since the end of the DX season.

(Continued on page 130)

TURN TO *Harvey*-WELLS FOR VALUE



Harvey-WELLS
TBS - 50
TRANSMITTER

Harvey-WELLS
STATION MONITOR

- ★ SIZE 19" x 5 1/4" x 5 1/2"
- ★ PROVIDES AUDIO NOTE FOR MONITORING ANY CW TRANSMITTER
- ★ NO TUNING OR BAND SWITCHING REQUIRED
- ★ PROVIDES PHONE MONITOR WITH 2 STAGE SPEECH AMPLIFIER
- ★ 4" PM SPEAKER AND PHONE JACK
- ★ BUILT-IN POWER SUPPLY

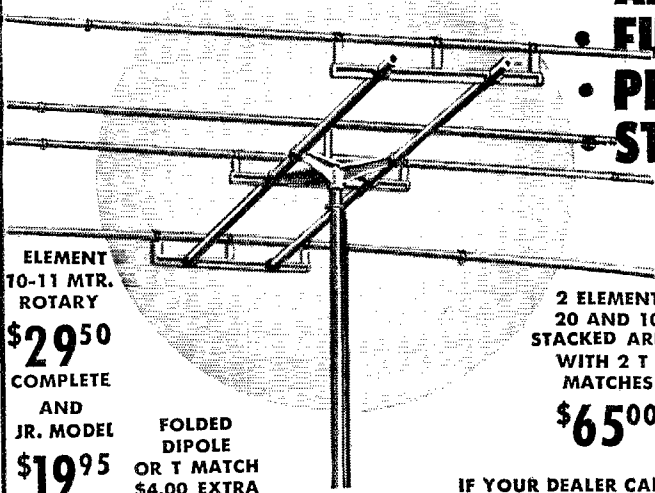
PRICE - incl. tubes \$34.75

- ★ 50 WATTS
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OR T MATCH
\$4.00 EXTRA

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20 AND 10
STACKED ARRAY
WITH 2 T
MATCHES
\$65.00

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With a HY-LITE ROTARY BEAM you will hear and work 'em.
Built of rigid aluminum castings and tubing the HY-LITE ROTARY BEAM is light weight and will stand strains many times greater than encountered in actual use.

Compare these specifications; The crossarm and center supporting frame is of heavy, high grade aluminum castings, with 1 inch aluminum tube connectors. The elements are 3/8 inch and 1/2 inch telescopic aluminum tubes for the 6, 10-11 meters and 7/8 inch and 1 inch telescopic aluminum tubes for 20 meters. The spacing between the elements is .10 for the director and .15 for the reflector and adjustments are easily made with Allen set screws with the wrench supplied. Complete instructions are supplied with each HY-LITE ROTARY BEAM. Heavy rubber clamps on Steatite insulators rigidly support the elements. HY-LITE BEAMS are supplied with a 6 foot mast.

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Stacked arrays can be had or easily added to your first HY-LITE BEAM. 20, 10-11, 6 meter beams are now available. HY-LITE ROTARY BEAMS are made right and priced right . . .

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Cardwell condensers at bargain prices — All new original boxes: —

- XR-500-P.D. — List \$14.00 — Our price **\$3.45**
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- MR-365-B-S — List 7.00 — Our price **2.50**
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C.D., Sprague and Sangamo — Porcelain Cased
—(12,500 volt— .00005—.0001—.00025—.0005—.001
—.0015—.002) (7000 volt—.01) (3500 volt—.02)
(8000 volt—.00025) (10,000 volt—.0015) Special
\$1.50.

ADIRONDACK RADIO SUPPLY

32 Guy Park Ave., P. O. Box 88 Phone 73
AMSTERDAM, NEW YORK
Ward J. Hinkle W2FEU, Owner

VE1QZ has been hearing nothing at all for some time, and hearing it 12 db. better on his 16-element array is not much help. Cheer up, Oscar, there'll come another day!

(Continued on page 138)

V.H.F. MARATHON

(Final Results)

States Worked
in 1947

Call	50 Mc.	144 Mc.	225 Mc.	Score	50 Mc.	144 Mc.
W1AF	206	22		3188	27	1
W1BCT		248	5	1141		8
W1CGY	191			4035	38	
W1CLS*2,3				7820	44	
W1HDDQ1	320	149		7510	39	9
W1HMS	168	10		3607	35	1
W1KLR*		162		967		5
W1LL*2	297			5631	40	
W1PEN		130		1177		8
W2AMJ	348			6188	37	
W2BYM*	358			5934	39	
W2CBB		288		1338		8
W2DZA*	247		14	1275		7
W2NLY*2,3		803	10	7358		10
W2QVH	258	296		3909	37	6
W2RLV*	134			2829	35	
W2RSO		242		2278		8
W3GKP*	49	149		2251	12	8
W3HWN*2		237		2605		10
W3MFW		208		1404		6
W3RUE*	104	116		2695	31	5
W4FJ*	72	66		2317	26	9
W4FNR*	67	6		865	25	1
W4HVV*	182	4		3661	29	2
W4WML/4*	261	5		4074	33	2
W5FSC*	137	30		2623	34	1
W6BPT	124			4430	34	
W6BWG	150			1168	13	
W6HZ*	128	393	1	2477	13	1
W6OVK*	182	192	4	7038	38	1
W7ACS/ KH6*	40			1654	4	
W7QAP	139			2482	26	
W8RFW*	85			1093	26	
W8TDJ*	63	1		928	22	1
W8UKS		165		4258		8
W8WJC*		164		5082		8
W9AB	72	13		977	23	3
W9ALU*	108	14		1314	32	2
W9JMS	254	10		3149	36	3
W9ZHL*	358	8		5792	43	3
W9QIN*	238	5		3460	43	1

Incomplete reports were received from: W1EH, W1FRK, W1LMU, W1MPO, W1PLQ, W1PYM, W3CIR/1, W2COT, W2PWP, W2RPO, W2ZD, W3AWS, W3CGV, W3EKK, W3IUN, W3MNA, W1KMZ/3, W4AVT, W4JAZ, W4LNG*, W5ESZ, W5JLY, W5LIU, W5ZZF*, W6PBV, W8WNN*, W8QQS, W9AGV, W9CZD, W9MBL, W9PK, W9DND, W9DYG, W9VIK, VEADG.

* Certificate award — highest in his ARRL section.

1 Not eligible for award.

2 Medallion award — most states worked in his band.

3 Medallion award — national leader in his band.

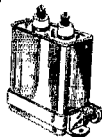
Monthly certificate awards: W2ZD, W9PK, W3HWN, W2NLY, W9ZHL (2 months in succession), W8WJC, W2NLY (second and third times), W1CLS, W2AMJ.



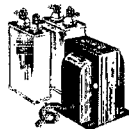
BARGAIN SPECIAL

2 Mfd. 2500 Volt OIL FILLED CONDENSER

Well known brand. Ceramic pillar terminals, in hermetically sealed metal case, size overall $1\frac{3}{4} \times 3\frac{3}{4} \times 5\frac{1}{2}$ " high. Comes with handy removable mtg. bracket and solder lug terminals. No. 21T3990, Special, Each..... **\$2.95**



1000 V.—200 Ma. POWER SUPPLY FILTER KIT



Consist of Two 4 mfd. 1000 volt DC oil filled condensers size $2\frac{1}{2} \times 1\frac{1}{8} \times 5\frac{1}{2}$ " high overall and One Thordarson 10 Hy.-200 Ma. filter choke fully enclosed metal case size $3\frac{3}{8}$ " sq. x $4\frac{5}{8}$ " H. No. 21T3983, Special, Per Kit..... **\$3.65**

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V.H.F. Men's Net on Lower Frequencies?

From Rod Newkirk, of the W1AW staff and conductor of the DX Department, comes the suggestion that the v.h.f. gang the country over could make good use of some spot frequencies in our lower-frequency bands. Quite a bit of v.h.f. talk can be heard on almost any of our bands, but most of it is more or less at random at present. A v.h.f. net frequency in both 80 and 40, to be used for communication relating to v.h.f. activities, could serve many useful purposes. It is always of interest to know what fellows in other sections of the country are doing, and, if the avid v.h.f. discussions which occur at ham-fests are any indication, there would always be plenty of material for rag-chews. A check channel on a lower band would be invaluable in arranging for v.h.f. tests, and the spot frequencies would be useful for alerting other sections of the country when unusual propagation conditions develop.

There are several instances of this use of lower frequencies already in operation, but the possibilities are far from being fully exploited. In Western Pennsylvania a number of the 2-meter gang use 3610 kc., gathering on that spot at 9 P.M. EST. The "Doghouse Net" on 3860 is used for swapping v.h.f. news in Ohio and surrounding territory. The 11-meter band has long been used as a meeting place for the 50-Mc. gang, though its propagation vagaries make it of limited usefulness except during week-ends, when most of the interested participants have their only daylight operating time. If you have a v.h.f. spot frequency now in use, let us have the dope on the time and frequency and we'll be glad to publicize it here. And we're open to suggestions as to permanent v.h.f. net frequencies in any of our bands.

We Move to 220 Mc.

There has been one consideration which held up amateur occupancy of our 235-Mc. band. This band was released as a temporary authorization, pending the removal of a British navigational aid from 220-225 Mc., officially recognized as the amateur band in the American Region, China and South Africa. Temporary use of 235 Mc. was in prospect until 1952, with a possible renewal after that time.¹ Recent investigations have determined that no use of the 220-Mc. band is contemplated in this hemisphere, so the FCC order releasing 220-225 Mc. for amateur use is in the processing stage as we write.

This is good news in several respects. First of all, it gives us the green light to go ahead on this interesting frequency with full-scale effort. And 220 Mc. has some advantages over 235: being a little further below the maximum-frequency capabilities of most of our v.h.f. transmitting tubes, it will be just that much easier to get efficient performance. It is a much nicer frequency to

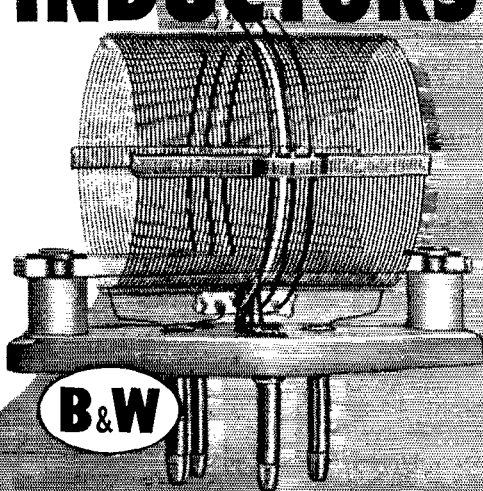
(Continued on page 134)

¹"Atlantic City Report," *QST*, October, 1947, page 20.

Get TOP Performance per Watt with these Low-Loss B&W JUNIOR INDUCTORS

B&W JUNIORS are highly efficient in operation because they are made by the same exclusive process for which B&W coils are famous. They're molded into position with a minimum of insulation, thereby reducing coil losses to minimum and insuring maximum performance. Mechanically, they're as rugged as they come—don't let the small amount of insulation fool you! And since they're both efficient and compact, they often fill the bill where space limitations are important considerations.

B&W JUNIORS may be used in oscillator, buffer or final amplifier stages with input powers up to 75 watts and plate voltages up to 850. Three different assemblies are available—end link, center link, and variable center link. For complete details, write Dept. Q28 for B&W Bulletin.



BARKER & WILLIAMSON, INC. 237 Fairfield Ave., Upper Darby, Pa.



Elements for Your Beam Arrays

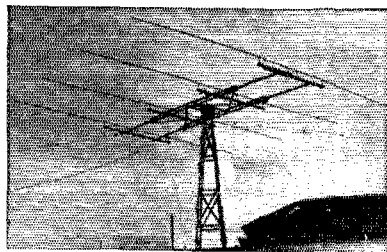
DESIGNED to meet the demand for light-weight but dependable elements for use in horizontal arrays and similar applications, Premax Elements are unusually light in weight and their special construction insures exceptional strength and rigidity which is so essential in horizontal arrays. Premax Elements are fully adjustable and possess the electrical conductivity that you have been seeking.

Corulite Elements — A tubular element with reeded design which gives extra rigidity. Available in 1, 2, 3 and 4-section designs, giving lengths from 5 to 17 feet.

Corulite Element Kits — Contain elements and mountings, together with working drawing for wood frame and support. Available for 3-Element 10 Meter, 4-Element 10 Meter, 3-Element 20 Meter, 4-Element 20 Meter.

Rotary Beam Kit — Includes frame and three pairs of Elements with necessary insulators and hardware including T-match accessories but without transmission line. Adjustable for 6, 10, and 11-Meter Bands

Ask your Radio Jobber for the new Premax
Catalog of Antennas and Mountings



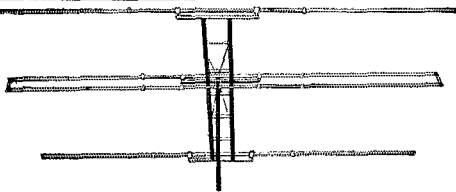
FM-TV Extended "V" Type Antenna — Gives coverage from 44 to 216 mc. Dipole elements are seamless aluminum with cast aluminum fittings. Comes complete with mounting bracket.

FM Universal Dipole Antenna — Another complete dipole Antenna designed for FM reception. Available with or without reflector. The most compact FM Antenna on the market.

Premax Products

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ELINCOR ALL ALUMINUM BEAMS



Model 400-EA

Model 400-EA. 3-ELEMENT FOLDED DI-POLE 10 METER BEAM KIT. Feed with RGR/U coaxial cable. Amateur net price..... **\$31.20**

Model 400-RA. 3-ELEMENT 10 METER BEAM KIT. Feed with 300 ohm twinax line. Amateur net price..... **\$27.00**

Model 400-BA. 2-ELEMENT 10 METER BEAM KIT. Feed with RGR/U coaxial cable. Amateur net price..... **\$20.40**

All of the above antennas are furnished complete with all aluminum supporting ladder, 2 1/2" steatite standoff insulators, hardware and instructions. The elements are 3/8" aluminum tubing telescoping to 1/2" and are adjustable over a range of several feet.

Model 200-EA. 5-ELEMENT 2 METER BEAM KIT. Folded di-pole driven element. All aluminum construction. Feed with low impedance coaxial cable. Amateur net price..... **\$8.40**

We also manufacture a complete line of FM, Television, Broadcast and shortwave antennas. Send for literature.

Sold through Dealers
Only



Prices slightly higher
on West Coast

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DEPT. TN

Valparaiso, Ind.

THE RADIO AMATEUR'S LICENSE MANUAL

Before you can operate an amateur transmitter, you must have a government license and an officially assigned call. These cost nothing — but you must be able to pass the examination. The examinations are based on the multiple-choice type of questions. The "License Manual" has been written to make it as easy as possible for the individual to acquire the necessary knowledge to pass the examination with flying colors. Whether you are going up for your Class C, B or your Class A ticket, "The License Manual" will provide the most direct path to getting that ticket. If you are one of the thousands who always want a "License Manual" around the shack for ready reference for amateur regulations, it will please you to know that the regulations are very thoroughly indexed.

25 cents • **POSTPAID ANYWHERE**
(No Stamps, Please)

AMERICAN RADIO RELAY LEAGUE
WEST HARTFORD, CONNECTICUT

handle in conjunction with 144 Mc. in crystal-controlled rigs, the same crystal being usable for both bands by the simple expedient of doubling or tripling in one stage along the line. For instance, using 8150 kc. $\times 3 \times 3 \times 2$, we have 146,700. Tripling in the last stage instead of doubling would bring us out at 220,050. The high end of the new band is in even-harmonic relationship with the DX bands, allowing us to use 7-, 14- or 28-Mc. crystals, with appropriate doublers. A half-wave antenna for the middle of the band is 25 inches long, permitting higher-gain arrays in locations where small antenna systems must be used, yet results should be about equal to those achieved on 144 Mc. When unusual conditions prevail, signals may even be stronger at the higher frequency. Let's get started, now, so that next spring and summer may see extensive activity and some new records!

420-Mc. Interest Growing

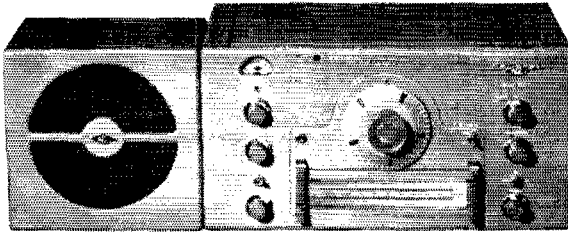
From all sides comes evidence of interest in 420-Mc. operation. The numerous surplus items now available have a lot to do with it, the APT-2 and APT-5, both jammers covering wide frequency ranges, being among the latest and most intriguing releases. The APT-5, using a high-powered lighthouse tube (3C22) and covering 300 to 1500 Mc., is one of the most attractive pieces of surplus yet to become available. The APN-1, somewhat similar to the APS-13 but easier to convert (some of the gang say) is another good prospect for 420-Mc. use. The ASB-7 is another surplus item, this one finding favor for 420-Mc. reception. And if you want to build your own gear, don't overlook the 703-A "door-knob" tubes.

We should not rely entirely on surplus gear for the 420-Mc. band, however, as half the fun lies in building the stuff and getting it to work correctly. Transmitters and antennas, particularly, are fun to work with, even if you don't contemplate extensive actual communication on the band. Scores of fellows have written in to say that they've built variations of the 6J6 rig described in November *QST*, and all agree that "Four-Twenty Is Fun!" Critical comment regarding the November article comes from W3-BNH, who points out that accurate measurement of antenna performance is not possible unless greater distances are employed between the antennas being tested and the indicating device than those given in our example. He also points out the precaution that such checks should be made out-of-doors, or in a space sufficiently large so that reflections from surrounding objects cannot affect the results, if accurate measurements are to be made. It is also true, however, that the average ham who likes to play with antennas (and who doesn't?) will have plenty of fun with a 420-Mc. model set-up, regardless of the conditions under which he makes his tests.

From Medford, Mass., W1KNI writes that

(Continued on page 136)

Great Tidings for Hams from TYDINGS . . .



THE NEW NATIONAL HRO-7

This tested and proved new National receiver combines all the superior points of the famed HRO, plus many new refinements. Here is the ideal set for the man who wants superlative all-around performance.

WRITE FOR FREE BOOKLET TODAY

NATIONAL TERMINAL ASSEMBLIES



FWG

This terminal assembly uses a polystyrene insulator, recommended for high frequency use. The binding posts take banana plugs at the top, and grip wires through a hole at the center—simultaneously, if desired.



FWH

The insulators of this terminal assembly are molded mica filled bakelite, have serrated bosses that allow the thinnest panel to be gripped firmly, and yet have ample shoulders. Binding posts same as FWG.

TYDINGS COMPANY

632 GRANT ST.

PITTSBURGH 19, PA.

HEADQUARTERS
for

hallicrafters

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AMATEUR EQUIPMENT
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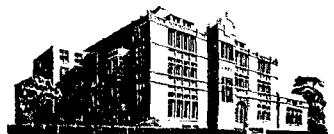
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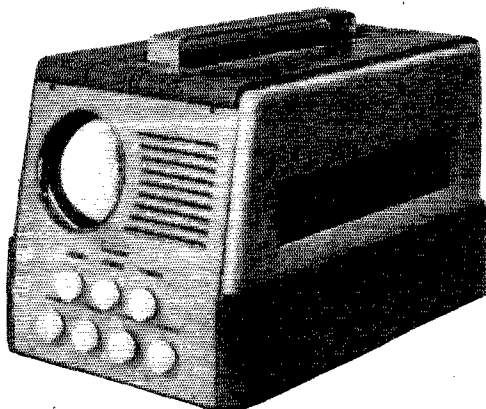
Write today for free informative booklet, "RADIO ENGINEERING AS A CAREER."

CAPITOL RADIO ENGINEERING INSTITUTE

DEPT. QS-2, 16th STREET & PARK ROAD N. W. • WASHINGTON 10, D. C.



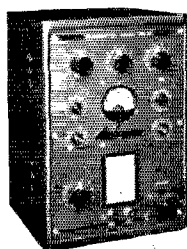
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The most versatile small transmitter on the market — only 8" x 13" x 9" — 50 WATTS — Phone or CW — 8 BANDS with band switch (NO plug-in coils) — Crystal controlled on all bands — For fixed or mobile operation — Supplied complete with tubes. It's today's BEST BUY!

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Aeorology Division
DEWEY AND ALMY CHEMICAL CO.
Cambridge 40, Mass.

*T.M. REG. U. S. PAT. OFF.

he has a pair of 15-Es on 420 Mc., running 30 watts input. He says that quite a number of stations are on in the Boston area, and more are coming. W9AB, Mishawaka, Ind., reports that most of the fellows out his way are building their own gear, with 6J6s, 15-Es and 316-As being most used. W7QAP, Tucson, Ariz., writes that W5AOK/7 has one of the little 6J6 rigs going, putting r.f. all over the kitchen (some DX!) and lighting neon bulbs on such miscellaneous items as the oven door. W7OWX and W7QAP have been bitten by the bug, and will have their 6J6s going in a few days. Bud has a BC-788AM receiver working, and is planning something in the low-drain category for work in the mountains in his Jeep. In a recent trip to Cleveland, your conductor came across several 420-Mc. rigs in a number of ham shacks in that area. Apparently all that is necessary to get something started there is agreement on an operating schedule, so that those who have gear will be able to get together; a condition which is prevalent in many quarters. An item in the Stratford, Conn., newspaper reports that W1-PBB, W1JRV, W1JW, W1FT and W1IYO are on 420. Amateurs in several countries have written in to say that they have built the 6J6 rigs, even though no 420-Mc. band is assigned in their areas, and more correspondence was received relating to this band in the past month than any v.h.f. or u.h.f. assignment higher than 50 Mc. Yes, it appears that we shall soon be going places on 420!

25 Years Ago

(Continued from page 60)

Service of 'B' Batteries," from Phillip N. Em-mich's "R.F. Amplifier with Regenerative Detector," and from Technical Editor Kruse's symposium, "Synchronous Rectifiers for Plate Supply."

With amateur and commercial technical development and expansion rapidly outdistancing legislative controls, Congress is now giving consideration to the White Bill, which would give the Department of Commerce greater regulatory powers. At the invitation of Secretary Hoover, ARRL President Maxim has been sitting in on the meetings, presenting the recommendations of Vice-President Stewart and the League's counsel, who have been jointly studying the bill at the Board's direction.

Descriptions of a trio of prominent amateur stations are published this month. They are Central Division Manager R. H. G. Mathews' 9ZN, Chicago, H. A. Cole's 4EH, Atlanta, and Don C. Wallace's 9DR-9ZT, Minneapolis. Introductions to W. W. Lindsay, jr., 6ZF, and J. A. Gjelhaug, 9ZC, are completed through the "Who's Who" section.

Random gleanings: 3XM, station of the Princeton University Radio Club, tops the 1000 mark in messages handled, setting a new record. . . . Assistant Editor Boyd Phelps highly recommends the newly-announced WD-11 receiving tube.

KS4AE

DX MEN!

SP1LP

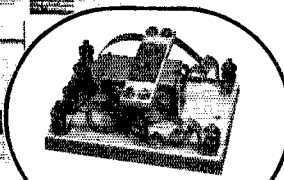
LU7EF

SV1RX

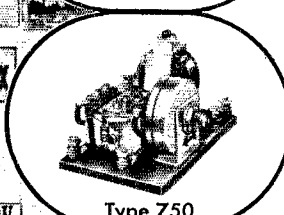
Get Ready for the Contest

- Switch 300 ohm line with Type 2300's mounted end to end — line spacing is constant (see illustration). Net price \$4.35 each.
- Now's the time to provide over-load protection. Don't let expensive failures force you to QRP at a time when you need all the sock you can get. Type 700 costs only \$6.09 net. Type 750 has electrical re-set (see illustration). Net \$7.92.
- Switch 600 ohm line from xmt'r to rcvr with a Type 400 heavy duty ceramic ins. antenna relay (for powers up to 1 KW). Net price only \$5.94. See illustration. Also available in latching type for push button change from one antenna to another... \$7.80 Net each.
- High scorers pile up points fast with clean fast keying. Type 101K keys 1 KW in the primary — never sticks — follows as fast as your bug will go. Net price only \$3.30 each.
- Do you use a receiver input relay? Protect rcvr from RF pick-up by grounding input when transmitting... makes excellent monitor of well shielded rcvrs. K1504 DPDT, \$2.10 Net each.

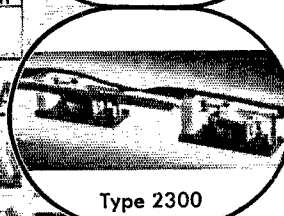
See your jobber today... be fully equipped for maximum flexibility and protection... be ready for the most competitive contest yet to be held. There is an Advance relay for every ham need. Valuable complete catalog available at your jobber's or sent free.



Type 400



Type 750



Type 2300



ADVANCE ELECTRIC & RELAY CO.
 Department Q248
 1260 W. Second Street, Los Angeles 26, Calif.

VS3AE
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HAM EQUIPMENT



MILLEN Model 90810

High Frequency Transmitter

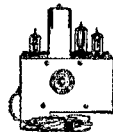
Crystal control transmitter provides 75 Watt output on the 10-11, 6 and 2 meter amateur bands. Higher output may be obtained by forced cooling. Quick band shifting by means of the new 48000 series high-frequency plug-in coils. Consists of a Bilecy CCO-2A crystal oscillator unit, using a 6AG7 crystal oscillator, a 2E26 tripler and an 829B power amplifier stage. **\$6475**

RME RATIO DETECTOR

NBF-4

\$1950

Narrow Band FM and AM
 Either one with a flip of
 the switch



This unit is designed to be plugged into the 7A6 2nd detector socket of the RME45, but can be used with any speaker. Chassis contains one 6BA6, two 6AL5 tubes.

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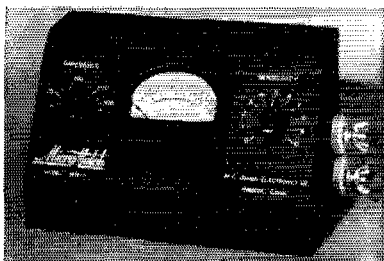
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MM1 (shown) for open wire lines.....\$29.50
MM2 for coaxial lines.....\$37.45

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The Armed Forces recognize the tremendous contribution of radio amateurs in war and peace. Those of you who have served actively, in the Army, Navy or Air Force or who intend to in an emergency or are otherwise interested, should retain contact with military communications, which will continue to pioneer in radio and electronics. Join an association, supported by both industry and the military, whose only purpose is to ensure, through preparedness, that America will remain strong. Fill in this form and mail with \$4.00 or write for full details to:

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(Formerly Army Signal Association)

President, David Sarnoff

804 17th St., N. W. Washington 6, D. C.

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A.R.R.L QSL BUREAU

FOR the convenience of American and Canadian amateurs, the League maintains a QSL-card distributing system which operates through volunteer district QSL managers in each call area. To secure such foreign cards as may be received for you, send your district manager a stationer's-size No. 10 stamped self-addressed envelope. If you have reason to expect a considerable number of cards, put on an extra stamp so that it has a total of six cents postage. Your own name and address go in the customary place on the face, and your station call should be printed prominently in the upper left-hand corner. If you have held other calls in previous years, submit an envelope for each such call to the proper manager—there are many thousands of uncalled-for cards in the files. All incoming cards are routed by Hq. to the home district of the call shown in the address. Therefore, cards for portable operation in other districts should be obtained from the home-district manager.

- W1, K1—Charles Mellen, W1FH, 320 Cornell St., Boston, Mass.
W2, K2—Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3—Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.
W4, K4—Edward J. Collins, W4MS, 1003 E. Blount St., Pensacola, Fla.
W5, K5—L. W. May, Jr., W5AJG, 9428 Hobart St., Dallas 18, Texas.
W6, K6—Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.
W7, K7—Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.
W8, K8—Fred W. Allen, W8GER, 1959 Riverside Drive, Dayton 5, Ohio.
W9, K9—John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.
W0, K0—Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
VE1—L. J. Fader, VE1FQ, 125 Henry St., Halifax, N.S.
VE2—Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3—W. Bert Knowles, VE3QB, Lanark, Ont.
VE4—Len Cuff, VE4LC, 286 Rutland St., St. James, Manitoba.
VE5—Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6—W. R. Savage, VE6EO, 329 15th St. North, Lethbridge, Alta.
VE7—H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B.C.
VE8—Yukon A. R. C., P. O. Box 268, Whitehorse, Y.T.
KP4—E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P.R.
KZ5—C.Z.A.R.A., Box 407, Balboa, Canal Zone.
KH6—Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T.H.
KL7—J. W. McKinley, KL7CK, Box 1533, Juneau, Alaska.

Strays

Members of the Ontario (Canada) 'Phone Net are coöperating in conducting a Food for British Amateurs Fund, a plan which makes possible the delivery of 10-lb. parcels of essential foodstuffs—no ham gear—to active amateurs in England and Scotland. The committee in charge of arrangements consists of VE3QB, QSL manager for Ontario, VE3DD, and VE3CP. Contributions of cash or mailable foods are invited. Further information on the workings of the plan may be obtained from any of the committeemen.

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 arrangement, 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 30¢ 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 7¢ per word will apply to advertising in which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2), (4) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 75 words in any one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to touch for their integrity or for the grade or character of the products or services 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.

QSLs in colors. Stamp for samples. Glenn Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

DEKA-XTAL. New compact 10-crystal unit for standard 5-prong socket. Looks and operates like a dial-knob. Just plug it in and turn to any of 10 frequencies, your selection. Ask your dealer or write us. Also other low TC ham crystals in FT cases to fit octal sockets. 80 and 40 + 1 kc. \$2.65; 20 + 4 kc., \$3.50. Scientific Radio Products Co., 738½ W. Broadway, Council Bluffs, Iowa.

COMMERCIAL radio operators examination, question-and-answers. One dollar per element. G. C. Waller, W5ATN, 6540 E. Washington Blvd., Tulsa 15, Okla.

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QSLs in plastic — record cards, Ham Xmas cards. Stamp for samples. Reber Print, R.D. 1, Sewell, N. J.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. \$1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

QSLs, Samples, Albertson, W4HUD, P.O. Box 322, High Point, N. C.

TRANSMITTER kits, 40 watts, \$69.50. Exciter kit, \$17.95. 275 watt Globe King. All makes and models new and reconditioned receivers. Trade ins accepted; low payment plan; terms financed by Leo, W6GFQ. Write for specials. World Radio Labs., Council Bluffs, Iowa.

TREMENDOUS stock of new guaranteed Government radio parts. Handle and Walkie Talkies for portable operation — Ground plane antennas \$12.50 — Transmitting tubes and condensers — Coaxial Cable and connectors — panoramic adaptors. See our display ads Radio News, CQ, Amateur Callbook, Electronics, Proceedings of I. R. E., Communications, American Aviation, Popular Mechanics, and Electrical World. Write for new illustrated Ham Catalog H200C. Wells Sales, Bob Whan, Pres. (W9BBQ), 320 N. La Salle St., Chicago 10, Illinois.

METERS repaired. Springfield Testing Laboratory, 815 North 12th St., Springfield, Ill.

BEAM control cable, new material: 2 #16; 6 #20 rubber insulated, coded, tinned conductors. Weatherproof rubber jacket. Heavy overall braided shield. ¼" diameter. Value 30¢ ft. Real buy 11¢ foot. F.o.b. Chicago. Associated Industries, 6639 Aberdeen Street, Chicago 21, Ill.

NEW or used: all popular brands in stock. Hallicrafters, National, Hammarlund, RME, Gon-set, Millen, Meissner, others. Send deposit for new gear or write for list of used or surplus. Van Sickle Radio Supply, Indianapolis 6, Ind.

QSLs, colored and plain. Samples free. Austin Ross, W1PBB, 50 Shore Road, Stratford, Conn.

QSLs, Kromkote cards at fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

SELL: S-22-R Hallicrafters, 110 Kc. to 18 Mc. Excellent condition. Best offer. H. Madden, 166 Buena Vista Road, Bridgeport, Conn.

RME-69. Perfect condition. Best offer. C. R. Ruthstrom, 100 Kingsland Road, Clifton, N. J.

BOUND 1922 volume QST and 160 copies 1932-1946. All for first \$25 offer. W90TL, Woodruff, Wis.

MUST sell Mark II xmtr-rcvr combined includes mikes, phones, antennae, spare parts; Hallicrafters SX-11 A-1 shape; two unused 814s. All for \$150.00 or your offer separate items. W1LIV, Lincoln St., Jamestown, R. I.

SELL or swap SP-400-X receiver. Best offer over \$200. Lt. Jg. Woodrow Huddleston, W5LSC/1, Sqdn VX-4, NAS, Quonset Point, R. I.

SALE: BC-903-A receiver (Army version NC-100A) converted for AC, xtal filter added, 0.54-30 Mc. \$60 F.o.b. Ralph Hanna, 3843 Wallwerth, Toledo, Ohio.

HRO 5 RA-1 newly realigned, FB condx, coils, speaker, pwr supply, \$225. W6OTR.

FOR Sale: Reconditioned surplus communications rcvr. Superhet with R.F. 2 IFs. Xtal, filter and two output impedances, \$45. Write for dope. All inquiries ansd. W5GEO, Box 548, State College, New Mexico.

FOR Sale: W7EST selling out. BC-610-E, A-1 condition, complete with speech amplif., ic, antenna tuner, tuning units and tank coils for 10, 20, 40, 80 and all new tubes, \$550.00; Precision model 920P, \$65.00; EV-10P with RF-10 Probe new, \$86.00; E-200, \$45.00; RCP Model 1662, \$30. C. N. Caughie, 206 Jefferson, Vallejo, Calif.

ERECO Beam Rotator, 110 VAC, heavy duty, variable speed, selsyn indicator, weatherproofed. Complete indicator and rotor ready to plug in, \$69.95. Satisfied users all over the country. Buy from your dealer or direct. Free literature. Dick Rose, Eresco, 2912 Hewitt, Everett, Washington.

HALLICRAFTERS S-36 AM-FM rcvr 27-146 Mc. for sale. \$175 postpaid. W9HJW, A. Stefuca, 311 E. 9th St., Mishawaka, Ind.

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QSLs? SWLS? Super-gloss stock! No cheap trash! Samples 10¢. QSL printer Sakkers, W8DED, Holland, Mich. America's finest QSLs. (DB-22A? VHF-152A? HF-10-20?)

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SACRIFICE 300 watt all band CW transmitter complete plus VX101 DeLuxe per page 113 December, 1947 QST \$200. Roof, 3656 Rawnsdale, Shaker Heights, Ohio.

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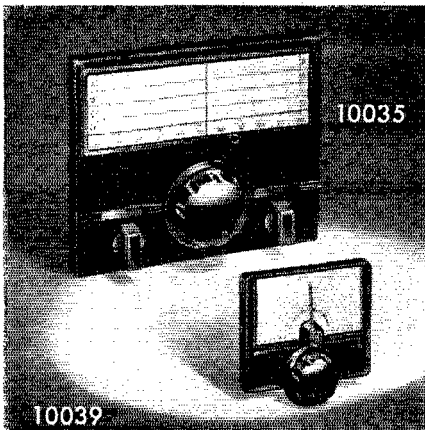
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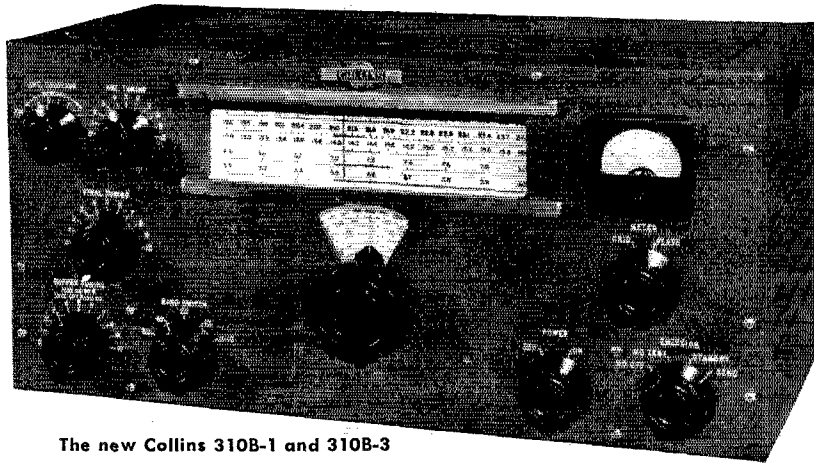
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However, the pilot model's excellent behavior, and an input of 40 watts on all amateur bands under 32 megacycles, led to the question as to how it would perform as a low power CW transmitter. The result was so gratifying that it was decided to offer the 310B in two forms. The first, the 310B-1, has a link circuit output to work into a final of higher power. The second, the 310B-3, has a series-parallel tunable antenna network of the universal type, which will match any antenna having an integral number of $\frac{1}{4}$ waves in length. Except for their output circuits, the 310B-1 and the 310B-3 are identical.

The 310B-1 is a highly satisfying exciter unit, with all the flexibility, accuracy and stability assured by the 70E-8 PTO. With additional multiplication it makes a reliable frequency control

for amateur bands in the VHF and UHF regions. The 310B-3 will find many uses around any shack. It is an excellent standby transmitter, is a natural for spot frequency network, and is the answer for emergency work due to its low power source requirement. And for the beginner in ham radio, it is the ideal combination of top performance and low initial investment. Later, when more power is called for, none of this investment is sacrificed. It is only necessary to add a final amplifier of higher power. Write for the Collins exciter bulletin describing these and other units.

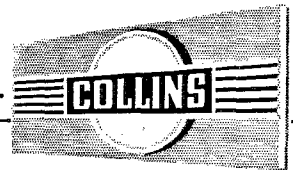
Net prices to amateurs, complete with tubes and instruction book, F.O.B. Cedar Rapids, Iowa:

310B-1 Exciter \$190.00

310B-3 Transmitter and Exciter 215.00

Terms, if desired, 20% cash with order; balance, plus 5% carrying charge, in twelve equal monthly installments.

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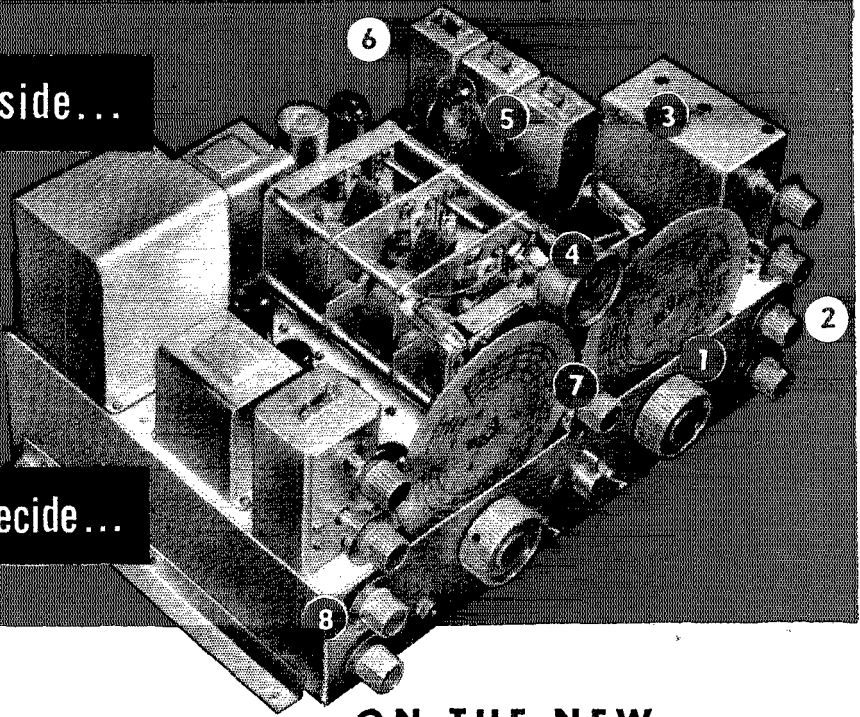
COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, New York 18, New York

458 South Spring Street, Los Angeles 13, California

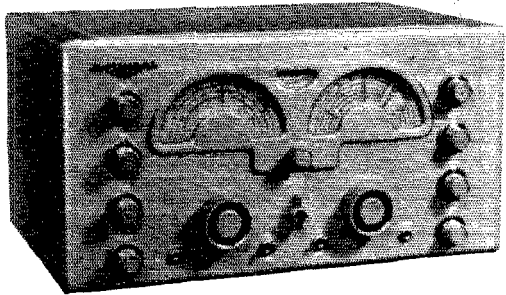
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NATIONAL NC-173



- RANGE: 540 kcs to 31 mcs plus 48-56 mcs
- TUBE COMPLEMENT: 13 (including rectifier and voltage regulator)

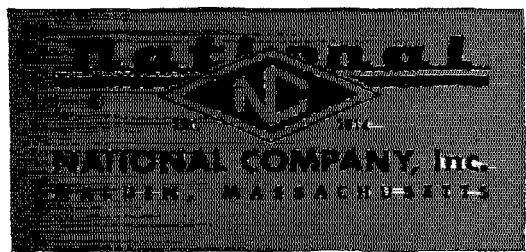
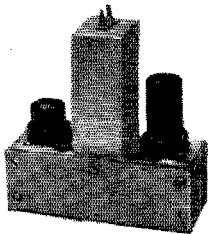
Not just another "assembly job," the new NC-173 is constructed with rugged, dependable National-built components. That's why it outperforms, outlasts other receivers in the field under all operating conditions! Try it at your dealer's today.

\$189.50 (with PM speaker)

- 1 Calibrated electrical bandspread for 6 10-11, 20, 40 and 80 meter amateur bands!
- 2 Automatic noise limiter effective on both phone and CW, with adjustable threshold!
- 3 Highly flexible crystal filter provides 6 steps of selectivity!
- 4 S-meter for both phone and CW!
- 5 New temperature compensation and voltage regulation assure exceptional stability!
- 6 Accessory socket for NFM-73 adaptor!
- 7 Trimmer control permits panel adjustment of RF stage!
- 8 Tone control. Phono input jack also provided.

NFM-73 adaptor makes the NC-173 a real NFM receiver! Instant selection of AM or NFM from front panel.

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For technical data and typical operating conditions, write RCA, Commercial Engineering, Section BM-54, Harrison, New Jersey.

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TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.

Shall 'Phone Assignments Be Increased?

THE Board of Directors of ARRL wants to know what licensed amateurs of the United States think about certain proposals pending before the Board for increasing some of the 'phone assignments. The purpose of this article is to explain the matter and to seek your opinion.

In 1946 the League, through its Board, made certain requests of FCC for expansion of some of the 'phone suballocations. Quite a few amateurs expressing objections to FCC, the Commission decided to hold a formal hearing on the subject. It then becoming apparent that decisions could not be put into effect until the eve of the Atlantic City allocation conference, the Board decided to cancel its requests for the time being and to wait until Atlantic City had adjourned and the exact dimensions of the amateur bands for the next several years were visible. To permit a decision as soon thereafter as possible, the Board arranged that a study of the subject should be made in advance of its 1948 meeting by its Planning Committee, consisting of five directors under the chairmanship of Hugh L. Caveness, W4DW, of the Roanoke Division. This committee was charged with formulating recommendations to the Board as soon as it could after Atlantic City, these proposals then to be published in *QST* and an advisory, informative poll of amateur opinion solicited thereon for the general information of the Board. That course would permit the directors to come to decisions in the matter at their meeting in May of this year.

The Planning Committee has completed its work and laid its recommendations before the Board. Now the Board has directed that they be published in *QST* so that you will see exactly what is contemplated and be given an opportunity to express your opinion of it. The presen-

tation of this matter hereunder is a direct quotation, in full, of all of that portion of the Planning Committee's report dealing with 'phone assignments. It states not only the proposals but the reasons therefor. It is to be emphasized that this explanation was not written by the Headquarters staff of the League but by the Committee itself; and that the form of the questionnaire on the detachable card was written by the Committee and approved for publication by the Board. There is therefore no question of editorial bias one way or the other.

Expressions of opinion, for the information of the Board, are now solicited from all licensed amateurs, whether members of ARRL or not, but from the United States & Possessions only. (Determination of Canadian sentiment on Canadian regulations is made separately by Canadian General Manager Reid.) Please detach the card, fill it out completely, affix postage, and mail to ARRL as soon as possible — to arrive by March 31st at the latest. The Board gives you this opportunity to express your opinion on one of the vital questions of the day and urges you to avail yourself of it.

We now quote the Planning Committee's presentation of its proposals which now pend before the Board:

"Your Planning Committee has made a very careful study of the matter of 'phone assignments in every amateur band from 3.5 to 29.7 Mc. Although the 28-Mc. band was not really at issue, since it had been dealt with at the Board meeting last May, we included it in our examination in the interests of overall perspective. Similarly, although the 21-Mc. band will not be available until the latter part of 1949 and is therefore not yet a pending matter, we included it in our study

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American Radio Relay League,
West Hartford,
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U. S. A.

General Amateur Poll No. 3

I indicate below my opinion on the proposed assignments of frequencies for 'phone operation now under study by the ARRL Board of Directors:

- 1) Shall the U. S. assignment 3850-4000 kc. be changed to 3800-4000 kc.? YES NO
- 2) Shall the 7-Mc. band remain exclusively c.w. telegraphy? YES NO
- 3) Shall the U. S. assignment 14,200-14,300 kc. be changed to 14,200-14,400 kc. until the effective date of the Atlantic City allocations, thereafter to be 14,200-14,350 kc.? YES NO

Your name

Call

City and state

Are you a member of ARRL? _____
ARRL Division in which you live (See list on page 6): _____

To be counted, this card must be returned by March 31, 1948.

in our endeavor to round out a balanced assignment of 'phone frequencies for the visible future. There are detailed hereunder our recommendations for each of these bands and an outline of the reasons therefor.

"3.5-Mc. band: The problem in this band is simpler than the others because of the shorter range. It is the Committee's opinion that room may be made in this band, under present-day operating conditions, for a small increase in the 'phone assignment without noticeable injury to c.w. telegraphy. We consequently recommend that the Board endeavor to bring about a 50-kc. increase in the 'phone assignment of United States amateurs, so that the allocation would be 3800 to 4000 kc. in this country. In keeping with Canada's past practices, we contemplate that that country would probably assign an additional 50 kc. to 'phone, or 3750-4000 kc.

"7-Mc. band: Your Committee began its study of the 7-Mc. band in the general feeling that it was desirable to make some 'phone provision in this band but was forced to the conclusion, after a detailed study, that it would be very unwise to do so. This band can be said to be our most generally useful band and it therefore experiences the greatest per-kilocycle use of any of our bands. Interference conditions under the existing occupancy are already very difficult. Although commonly available for 'phone operation in countries other than the United States and Canada, the amount of such 'phone operation — bad though its interference is — is actually relatively small. Your Committee is of the opinion that this comes about primarily from the fact that 'phone operation has not been permitted here in U. S. and Canada. If it were, we believe there would be a relatively vast influx of 'phone stations from other countries desiring to communicate with U. S. and Canadian 'phone stations, and that the opening of 'phone frequencies in our countries

would invite such a measure of 'phone occupancy as would practically destroy the usefulness of the band for any c.w. purposes. It is to be noted that the band carries a heavy percentage of beginner telegraphy, itself a precious thing in our future. The Committee wishes to emphasize to the Board that when a portion of a band is open to United States and Canadian 'phone operation, the remainder is not actually left available for c.w. operation in our countries. Foreign 'phone stations must be expected to operate outside of our 'phone assignments, generally on the low-frequency side thereof, and effectively occupying, so far as c.w. purposes are concerned, a considerable portion of the remainder of the band. Such a condition cannot be justified for the 7-Mc. band, since it would leave no provision for the heavy c.w. load now carried there. The question of 'phone is further complicated by the regional variations in allocation which this band will have after the effective date of the Atlantic City regulations. Although in the American region we shall continue to have 7000-7300 kc., the only portion that will be worldwide exclusive is 7000-7100. (Most foreign 'phone would have to be below 7100.) The foreign amateur allocation will frequently stop at 7100, will in some cases go to 7150, but only exceptionally will exceed that figure. It has been suggested by government allocation officials that our future interests require that on this side of the ocean we should use the frequencies 7150-7300 only for communication within and between the countries where those frequencies are open to amateurs, and that trans-ocean communications should be confined to the frequencies that are on a world basis. While the Committee is undecided about the validity of this suggestion, it observes that if it were adopted and 'phone were wanted, it would require two 'phone assignments and two c.w. assignments in the band, one set interregional and one intra-