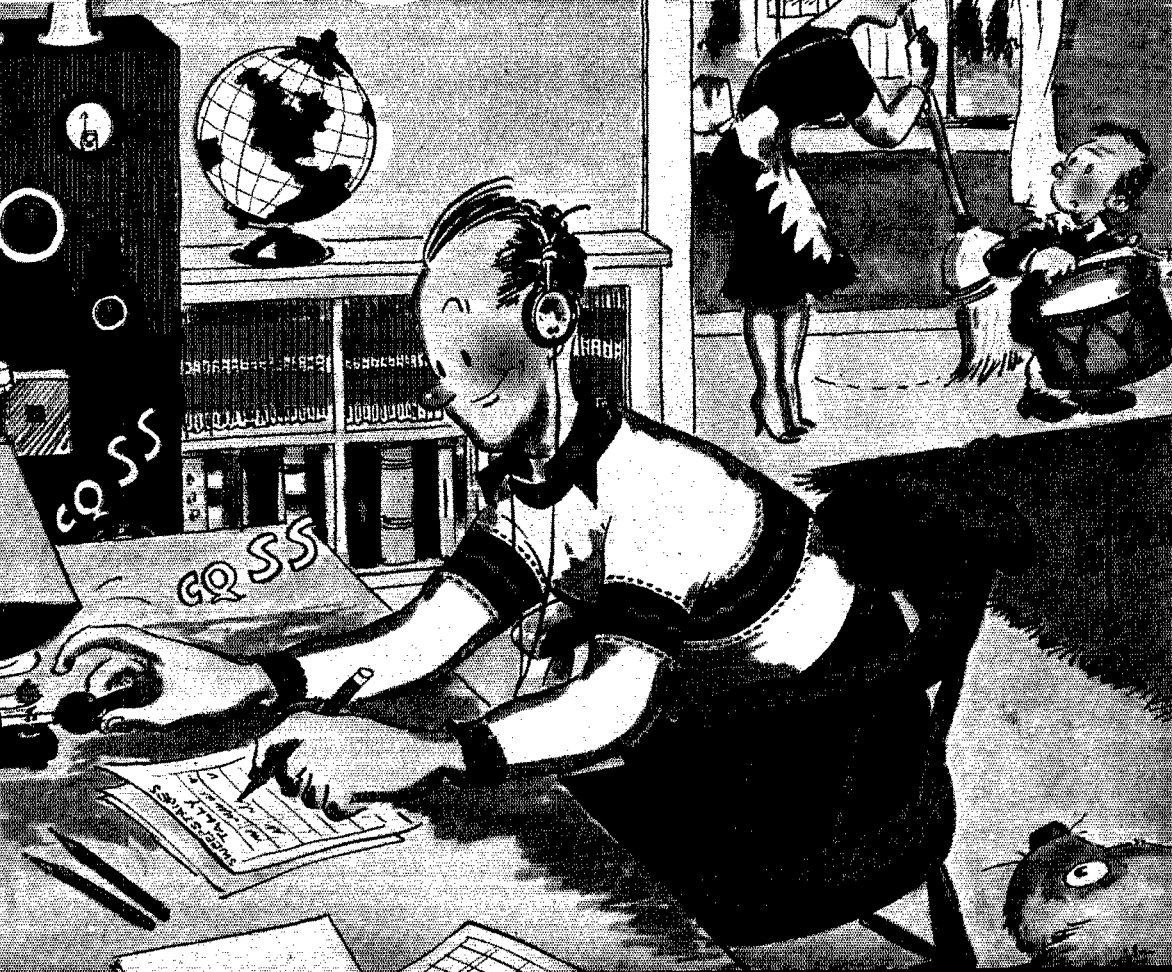


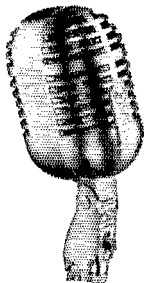
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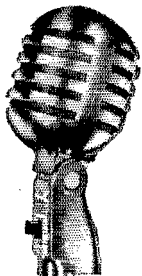
amateur radio



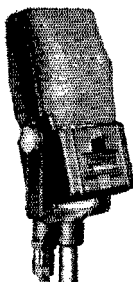
A. R. R. L. SWEEPSTAKES — NOV. 16-18, 23-28, 1946



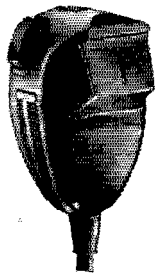
"Cardioid" Cardioid Dynamic
Models 731 and 726



"Cardax" Cardioid Crystal
Model 950



Bi-Directional Velocity
Models V-3, V-2, V-1

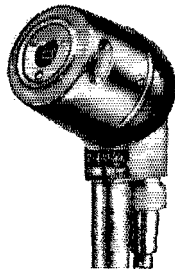


Differential Carbon
Hand-Held Model 205-S

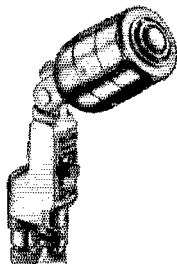


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TODAY'S MOST COMPLETE LINE OF
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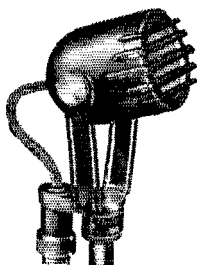
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Model 630

WITH important E-V developments such as the *Mechanophase** Principle, the *Differential†* Principle, the *Aconstalloy* Diaphragm... ELECTRO-VOICE brings you the widest selection of quality microphones, for both general and specific applications. In the complete E-V line of uni-directional, bi-directional, and non-directional types, you can easily find exactly the right microphone to give you the sound pick-up and reproduction you want. A few models are shown here. ELECTRO-VOICE engineers are glad to help you on any special problems. Send now for new E-V Catalog No. 101.

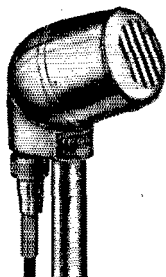
*Patents Pending †Patent No. 2,350,010
Crystal Microphones licensed under Brush patents.



Hand-Held Dynamic Model 600-D
Differential Dynamic Model 602



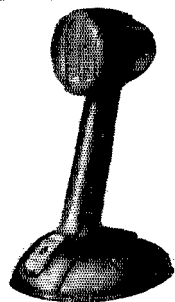
Versatile Dynamic
Model 640



General-Purpose Dynamic
Model 605



Differential Handset
Model 260 Carbon, Model 660 Dynamic



Comet Crystal Model 902

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ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN

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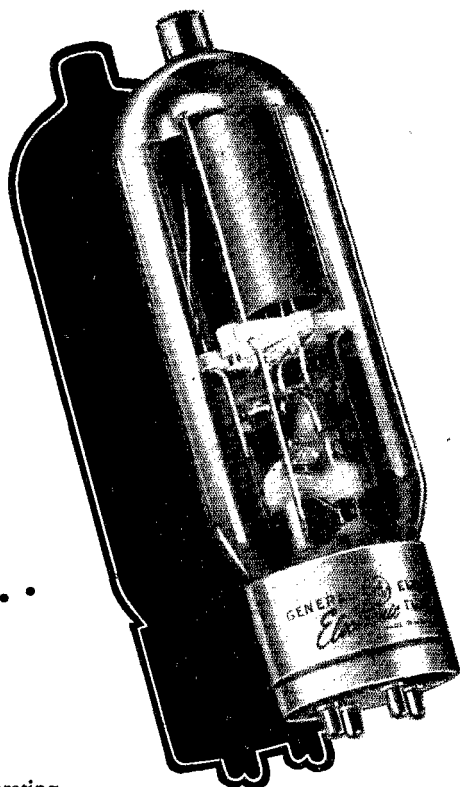
13 E. 40th St., New York 16, N.Y., U.S.A. Cables: Arlab



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Your Class B modulator needs . . .



TYPE GL-805 is tailor-made for Class B modulator use—therefore the most popular ham tube for this service. First off, you get high power output at relatively low plate voltages and with a low drive (see ratings).

Second, grid-bias requirements are small—zero for many Class B conditions. If the plate voltage applied is 1,250 v, the GL-805 needs no grid bias, while output easily will modulate a 600- or 700-watt carrier.

Ideal as a Class B modulator, the tube also makes a first-rate

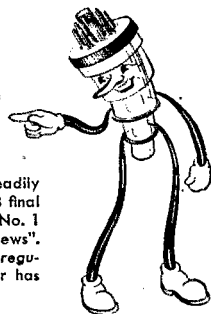
Class C r-f amplifier, operating up to 10 meters at full ratings, and well beyond the limits of the 6-meter band at reduced ratings.

General Electric builds the GL-805 to quality standards that assure value-plus service. There is no better ham “buy”—no tube, either, whose day-in, day-out fine performance contributes more to your rig’s smooth operation!

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Rating (CCS)	Class B A-F service (two tubes)	Class C R-F service, telephony	Class C R-F service, telephony
Filament voltage	10 v	10 v	10 v
Filament current	3.25 amp	3.25 amp	3.25 amp
Max plate voltage	1,500 v	1,250 v	1,500 v
Max plate current	210 ma (per tube)	175 ma	210 ma
Max plate input	315 w (per tube)	220 w	315 w
Max plate dissipation	125 w (per tube)	85 w	125 w
Driving power (approx), typical operation	7 w	16 w	8.5 w
Plate power output, typical operation	370 w	140 w	215 w

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GENERAL ELECTRIC

161-E20-8880



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Be one of the first to own this brand new job. You'll be proud of its excellent performance and attractive appearance. Let us send you an illustrated bulletin with complete details.

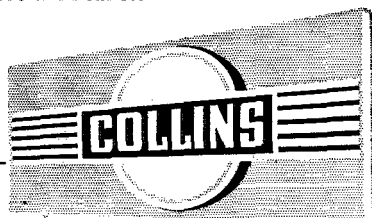
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NOVEMBER 1946

VOLUME XXX

NUMBER 11



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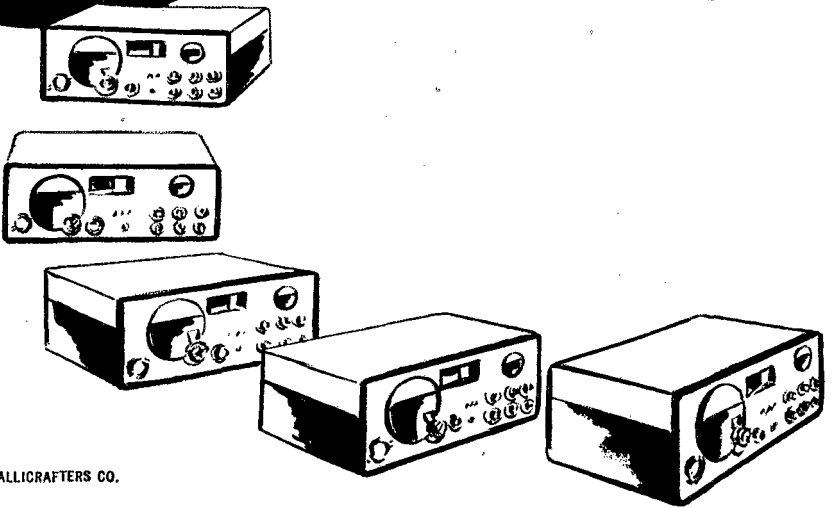
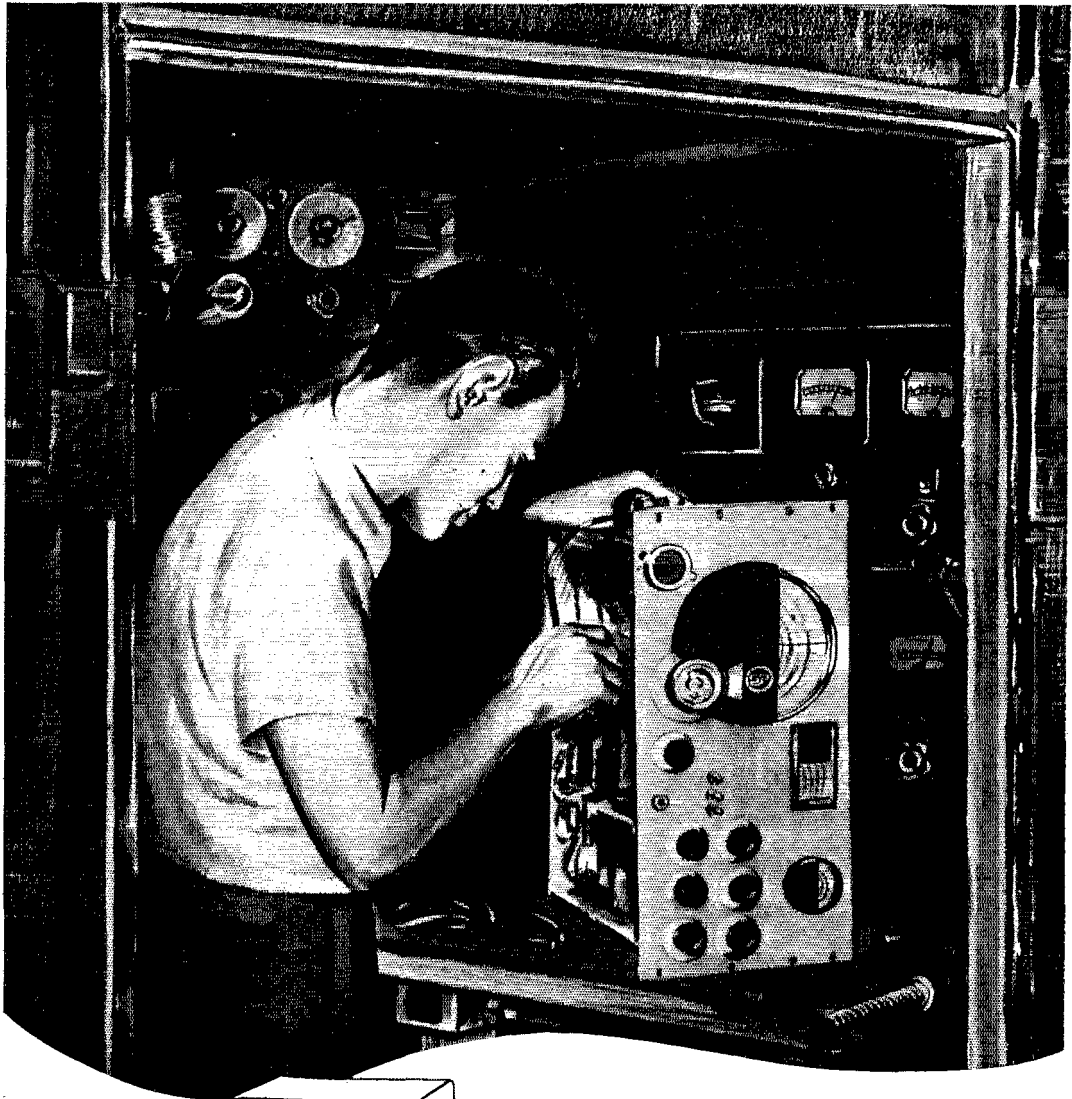
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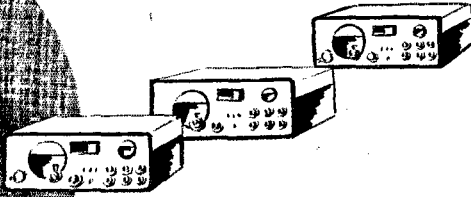


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“Signal to noise ratio unbelievable . . .”, “. . . its frequency coverage from 540 kc to 110 Mc is amazing . . .”, “. . . its beautiful appearance is revolutionary in ham radio, I like its functional and practical design . . .”, “. . . on all bands I’ve heard stations I never heard before . . .”, “I found the crystal action superb for cutting through QRM . . .”, “. . . the calibrated 6 meter band opens up new DX possibilities with coming sun spot activities . . .”, “I like the features of both AM and FM on 10 meters . . .”, “Your new easy-on-the-eye green dial color is certainly appreciated after several hours on the air . . .”

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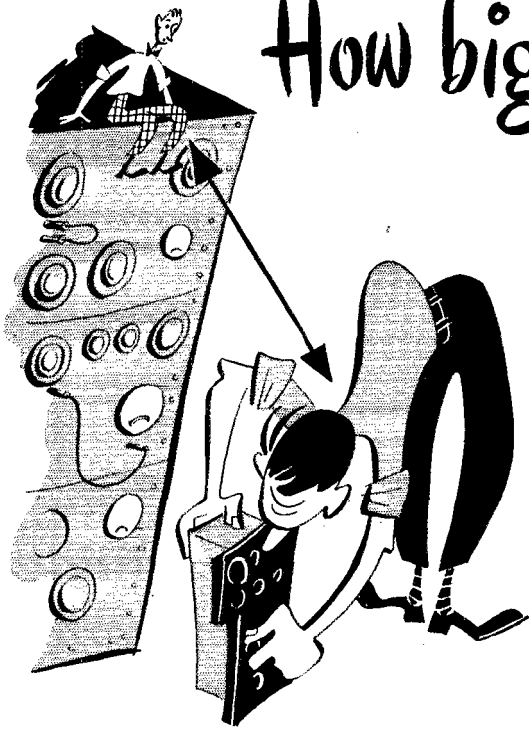
Section Communications Managers of the ARRL Communications Department

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.

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How big is your rig?

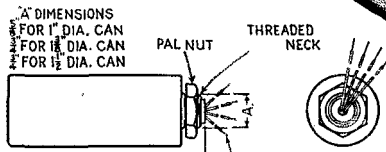
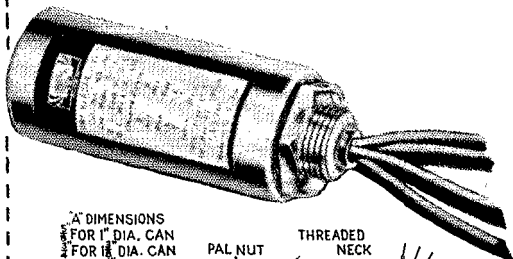


Your rig can be "as big as a house" or "as small as an ice cube". But *depend* on it, you can always be certain to find the exact C-D capacitor you need to fit into your circuit. Any size, any type—C-D's are all packed to the hilt with long-lasting oomph and extra value in every feature. Even a pin-money budget can work wonders. Save time hunting for questionable capacitors. Ask for C-D and you'll *know* that you're right on the beam.

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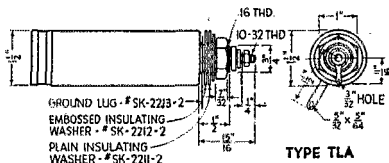
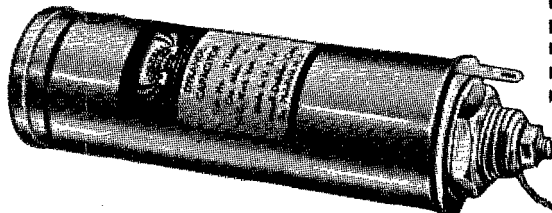
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TYPE TLA DYKANOL CAPACITORS—Ideal for high voltage filter applications. Convenient mounting and terminal arrangement makes this unit a good-looking and effective component for any rig. Available in all popular capacities at ratings of 600, 1000 and 1500 volts.



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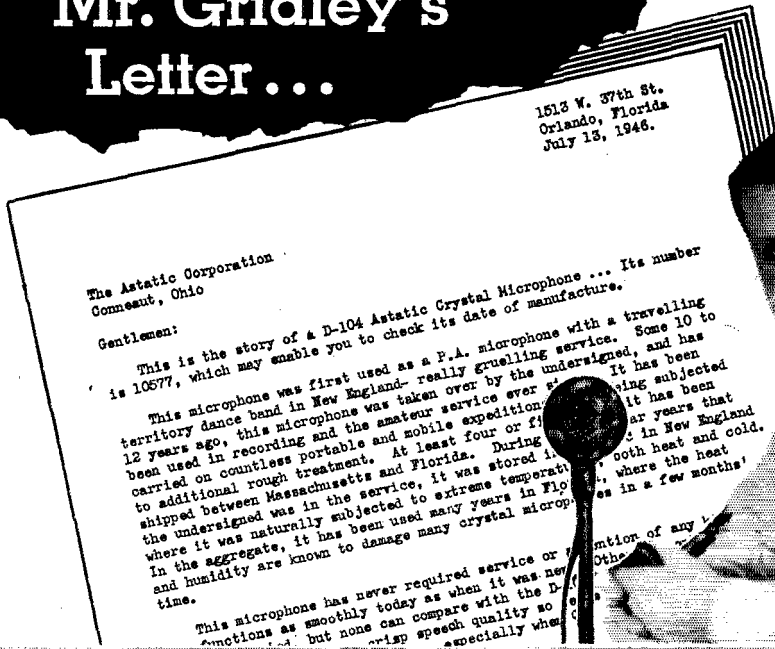
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Mr. Gridley's Letter . . .



1513 W. 37th St.
Orlando, Florida
July 13, 1946.

The Astatic Corporation
Conneaut, Ohio

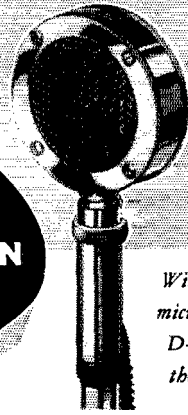
Gentlemen:

This is the story of a D-104 Astatic Crystal Microphone . . . Its number is 10577, which may enable you to check its date of manufacture.

This microphone was first used as a P.A. microphone with a travelling territory dance band in New England—really gruelling service. Some 10 to 12 years ago, this microphone was taken over by the undersigned, and has been used in recording and the amateur service ever since. It has been carried on countless portable and mobile expeditions. It has been subjected to additional rough treatment. At least four or five years that it has been shipped between Massachusetts and Florida. During that time it has been where it was naturally subjected to extreme temperatures in New England, both heat and cold. In the aggregate, it has been used many years in Florida, where the heat and humidity are known to damage many crystal microphones in a few months' time.

This microphone has never required service or attention of any kind. Other functions as smoothly today as when it was new. It is as good as new, but none can compare with the D-104. It has a crisp speech quality so especially when used in a P.A. system.

CONFIRMING Astatic's claims for the dependability of its products is the word of Ansel E. Gridley (WINWE/4, ex-W4GJO) of Orlando, Fla., in an unsolicited but greatly appreciated letter of commendation concerning Astatic's original Model D-104 Crystal Microphone. Mr. Gridley writes, in part: "This microphone was first used as a P. A. microphone with a traveling dance band, but was taken over by the undersigned some ten to twelve years ago and has been used in recording and amateur service ever since. It has been carried on portable and mobile expeditions . . . never required service or attention. Functions as smoothly today as when it was new. I have received more dollar for dollar value from the D-104 Microphone than from any electronic component ever purchased." Thank you, Mr. Gridley.



With many newer microphones, Model D-104 is still in the Astatic line.

New

ALSiMAG
TRADE MARK

property chart

SENT FREE ON REQUEST

The many AISiMag insulators in the average rig must meet several different insulation requirements. For that reason, AISiMag insulators are made of many different technical ceramic compositions. All these compositions are sold under the trade name AISiMag. Each one has definite electrical and mechanical properties which have been carefully determined. The new Property Chart gives the properties of the more frequently used

AISiMag compositions. A copy will be sent you free on request.

● All AISiMag technical ceramics are custom made. Sales are made only to manufacturers or to supply houses. No sales can be made direct to hams. However, the Research Division of American Lava Corporation welcomes suggestions or criticisms and is always on the alert for suggestions for improvements in AISiMag products.

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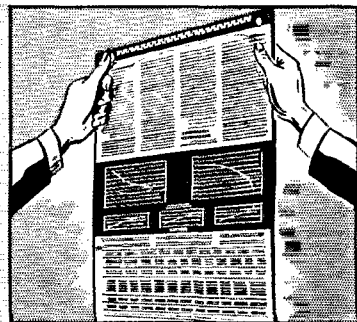
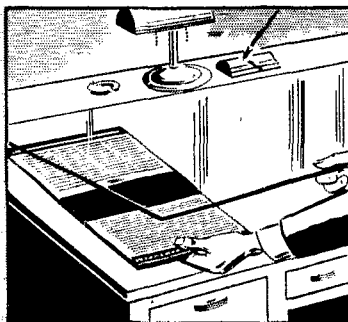
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. 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.

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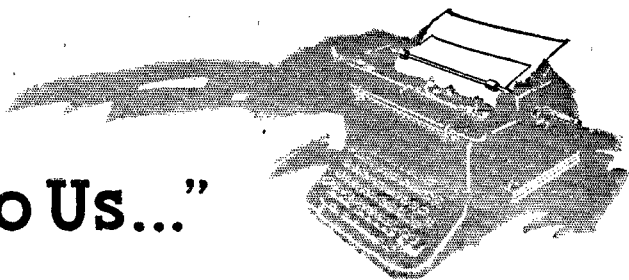
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"It Seems to Us..."



ON REPORTING

Many years before the war the League launched the RST system of signal reporting. It is now the world-wide standard method of exchanging data on the quality of the signals and the goodness of the contact. In this system a report of three digits is given in telegraph work, of two in telephone work. For either c.w. or 'phone, the first digit is the readability (R) on a scale of 1 to 5, with precisely the same meanings as the QRK1-to-QRK5 scale of the International Radio Regulations; and the second digit is the signal strength (S) with the same 1-to-9 strength scale that we have used so many years. This is all there is for voice work but for c.w. there is a third digit to indicate the tone (T) on a 1-to-9 scale. Thus a c.w. report of "RST488" (or just "488") means readable with practically no difficulty, strong signals, good d.c. note with just a trace of ripple. And so on for the whole range of possibilities.

This scheme has been publicized in amateur literature everywhere. In c.w. work it is well-nigh universal and it seems to be applied with reasonable uniformity and "honesty." But in 'phone operation there are so many confusing variations, misunderstandings and abuses that we think the subject deserves some examination. Mind if we number a few points to keep them separated?:

1) If you feel that you like to use c.w. abbreviations in 'phone work, the report of signal strength should be given as an S number, not an R number. In the amateur world, R is for readability — for these many years back. Your receiver has an S-meter, not an R-meter. An extremely strong signal is S9, not R9. Too many of you old-timers have elephant memories that go back to the old Eccles R scale of years ago. The newcomers hear you and follow you, so that we have a whole crop of R strength reports that cause distressing conflict with the thesis of R-for-readability. *Please say S.*

2) But we'd like to say that, for our money, it is not pleasant to hear purely-c.w. abbreviations used in 'phone operation. With the most flexible means of communication in the world

at our disposal, the human voice, we believe in "saying it with words." Let us illustrate with an example. To our mind it is much more logical to say, "Readability 4, strength 9" than it is to pronounce the abbreviations "QRK4, S9" (and an awful lot better than saying "Q4 and R9"!). Or, if you care to go all out for saying it with words, why not just tell your correspondent station that his signals are extremely strong and readable with practically no difficulty?

3) The report of readability, to mean anything, must be carefully arrived at by an actual comparison of the goodness of reception with the scale on which the other fellow relies for information. And flattery must be left out of it, both because the man at the other end seeks data of technical value to him and because he will gauge his transmitting to what you say of your reception. The scale seems to deserve repeating and new emphasis:

- 1 — Unreadable
- 2 — Barely readable, occasional words distinguishable
- 3 — Readable with considerable difficulty
- 4 — Readable with practically no difficulty
- 5 — Perfectly readable

You can see that you ought either to know the scale by heart or have a copy constantly before you. You must actually consider the received signal and grade it. The other morning an Australian 'phone station in the course of one sentence raised us to a magnificent glow and then threw the reversing switch. What he said, in effect, was, "You have a grand signal, Q5 and R9, but I can't understand a word you say because of bad interference." Well, maybe we were S9. But we were certainly not Readability 5. We were Readability 1 — which is to say, unreadable. It was obvious that this lad didn't understand the readability scale at all. It is perfectly possible to have a 1-9 signal in interference, just as the converse 5-2 signal may exist under favorable conditions. We don't think he just reached for a number he thought we'd like. We think he somehow thought the "Q" part of his report also had something to do with strength. He wouldn't have said perfectly-readable-but-I-can't-read-anything if he had stopped to think what his abbreviations meant.

He couldn't have said it if he'd "said it with words." Let's remember what those scales mean!

We plead for a little more knowledge of the scales, a little more care and understanding in their application, a little more uniformity in their rendering.

BAD SIGNALS

That war hurt us. If we were to judge solely by the quality of the W signals on the air today, we'd say that we have been set back technically at least fifteen years. We're trying to figure it out, and we suppose it comes about because we're so hungry to operate that we go on with an insufficient signal rather than take the time first to get out all the termites. Maybe shortages have something to do with it. And probably the current emphasis on VFOs and break-in has considerable of the responsibility.

At any rate, the average quality of our signals is certainly not very good. We were listening rather critically to 80-meter c.w. signals the other evening and it struck us that if T9X is our standard, a good half of them won't stand even casual examination; and we estimated that not more than one in ten had crystal stability and purity. On 14-Mc. c.w., one really has to hunt to find a signal one would say was of true crystal characteristics. Most telegraph signals do some yoooping under keying or display some of the impurities that come from dynamic instability; and there are some frightful keyclicks to be heard. Many 'phone signals have overmodulation splatter or take too much spectrum space through wobblelation. Harmonics are rampant.

Definitely our signals aren't of as good average quality as before the war. Almost every one of us has a lot of "inside work" to do to make up for the haste with which we got going. Now is the season for that, OM. It's something each amateur must do for himself. We urge you to monitor your signal and study its deficiencies. Solicit critical reports (and give them). Find out where the trouble lies and remedy it. Do the necessary redesigning and rebuilding. Have pride in the quality of your signal — to the other fellow, that signal is *you*. Don't be content with anything less than practical perfection.

If each of us will adopt this critical attitude toward our own emissions, in two months we can remake the American ham ether. Do your part?

TEN-METER OBSERVATIONS

Under the above heading we had items in our May and June issues outlining an amateur observing program on propagation conditions in the 10-meter band, on behalf of the Bureau of Standards. We invited participation, ex-

plained the simple requirements, and said that the Bureau was preparing log forms and data sheets for those who responded.

To date, just eighteen amateurs have volunteered out of all our thousands, and two of those were foreigners. We are letting the Bureau down rather badly, fellows. It deserves much better of us. We ought to feel ashamed. You are all aware of the marvelous strides that were made during the war in prediction work. That activity centered at the Bureau and it continues, because man's knowledge is still incomplete. We amateurs ourselves benefit from this program and should be willing to help in it. It is one of the few opportunities we ever get to participate in scientific work. We are not asked to make complicated and dreary observations but chiefly just to report what results we experience in our attempts at 10-meter contacts, particularly on schedules — and our failures as well as our successes. We can still have the full enjoyment of operating.

If we may moralize a moment: The security of amateur radio rests upon its value to the nation. We have a good record but we must keep it fresh. We should embrace opportunities to do useful work in repayment for our privileges. In the present case, where volume of observations is needed, the quantity and variety of amateur reports would permit us to be particularly helpful, and at small effort to ourselves individually.

If you operate on 10 or 11, drop a card or note to the Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C., saying that you want to take part in the NBS-ARRL 28-Mc. Band Observing Project. Page 35 of May *QST* and page 17 of June give the story.

Edwin

Strays

W5GUZ is back on the air after 3½ years as a Jap POW and 8 months in Army hospitals. He reports that W9VTH, USN, and KA1AT, USA, died in Jap prison camps. W7AYV, USN, and W5GUZ took over the Jap radio station, JAW, near Tsuruga, Japan, during the interim of August 29–September 9, 1945, before the Yanks landed at Yokohama. They did this unarmed and in the company of ex-W6HJJ, USN, one Marine, and a Navy radio operator. San Francisco was worked and relief food obtained by plane. They then ran a sked with the POW camp in Osaka, Yokohama and 1st Army Hq.

Keeping Your Harmonics at Home

A Discussion of the Factors in Harmonic Generation and Radiation

BY GEORGE GRAMMER,* W1DF

FOR a time after the opening of the 80-meter band it began to look as though the ham that didn't have a harmonic report from the FCC was just waiting his turn like the ten little Indians in the nursery jingle. Certainly there was a lot of activity on 40! But some good will come of it if the situation focuses attention on the unnecessary radiations that plague our own operation as well as that of other services.

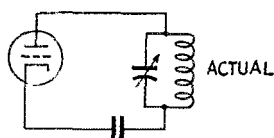
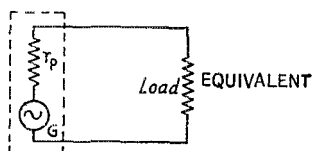


Fig. 1 — The tube amplifier and its generator equivalent.



For years we have had a collection of nostrums for harmonic radiation, some of which seem to have acquired acceptance chiefly by repetition. For example: "Push-pull amplifiers have no even harmonics." Lots of hams believe it, although that particular theory was exploded by Uncle Jimmy way back in the early 30s — and despite the fact that users of push-pull amplifiers stand high in the list of ticket collectors. There are others, too, likewise based on a sound-enough idea, but with no data to prove whether or not they are effective. Among these are such things as reducing excitation to make the amplifier output "purer" and the use of high-*C* tank circuits for the same purpose. The whole subject seems to be enveloped in a vagueness that doesn't offer much help to the chap who's in trouble and wants to know how to get out.

A couple of things at least are clear: (1) Any power amplifier operated at reasonable efficiency — that is, beyond Class A conditions — will generate harmonics of appreciable amplitude. (2) On high frequencies an extremely small amount of radiated energy can put down a good readable signal hundreds and sometimes thousands of miles away. (3) Radiation can take place directly from transmitter tank circuits and

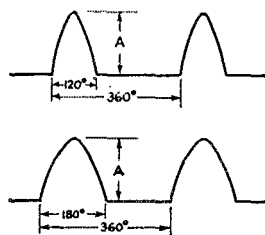
wiring. (4) Or it can take place from the antenna. So the question of eliminating harmonic radiation is really three questions: How can the amount of harmonic generated by the transmitter be reduced? How can radiation from the transmitter itself be prevented? How can harmonics be kept from getting into the antenna system?

Excitation vs. Harmonics

We have a means of getting at the answer to the first question by considering power-tube operation from the "equivalent generator" standpoint. The tube is replaced by a generator, *G*, having the same internal resistance, r_p , as the tube (see Fig. 1) and working into a load having the same characteristics as the plate tank circuit. (For the moment this load is assumed to be a resistance, because its characteristics do not actually matter in what follows immediately.) The advantage of the equivalent-generator method is that the circuit operation can be analyzed purely on an a.c. basis, using ordinary a.c. circuit theory.

When a power tube is adjusted for optimum operation, the plate current flows in pulses that are approximately the shape of a section of a sine wave. The "operating angle," or proportion of the r.f. cycle during which plate current flows, usually is between 120 degrees and 180 degrees; that is, between one-third and one-half cycle.

Fig. 2 — Shape of plate-current pulses in normal power-amplifier operation with 120-degree excitation (above) and 180-degree excitation (below).



The smaller the angle the higher the efficiency, provided other operating conditions are adjusted to match. The plate-current waveshapes for the 120-degree and 180-degree cases are shown in Fig. 2. Although these drawings represent the way in which the d.c. plate current varies, with the base line in each case representing zero current, on the equivalent-generator basis we consider them as representing complete a.c. waves, ignoring the fact that there is d.c. present. In other words, the equivalent generator is putting a distorted a.c. wave into the load.

* Technical Editor, *QST*.

The relative second-harmonic content of the two waveshapes shown will give us some idea of the improvement to be expected by reducing excitation, since the 120-degree case represents high-efficiency Class C operation and the 180-degree case Class B. In terms of the peak-to-peak amplitude, A , of the wave, the two cases compare as follows:¹

	120 degrees	180 degrees
Amplitude of fundamental component	0.40	0.50
Amplitude of second-harmonic component	0.28	0.21
Ratio of second harmonic to fundamental	0.70	0.42

For a tube driven to the same peak plate current in either case, the second-harmonic content will be reduced by a factor of 0.21/0.28, or 0.75, by using an operating angle of 180 degrees instead of 120 degrees. This does not represent much improvement, although it should be observed that since the fundamental component is larger with 180-degree excitation, a somewhat better picture is obtained on the basis of the individual harmonic/fundamental ratios.

Comparison on the basis of the same peak plate current probably is not entirely legitimate, because with 180-degree excitation the *average* plate current (the value read by the plate milliammeter) increases 46 per cent over the 120-degree case. The probability is, therefore, that the tube or tubes would be overloaded. If the comparison is made on the basis of the same *average* plate current, the second harmonic with 180-degree excitation will have only 53 per cent of the amplitude of the same harmonic with 120-degree excitation. However, the fundamental component also is smaller — slightly under 70 per cent of the 120-degree figure. Perhaps the fairest basis of comparison — although it may not represent what can be done with a given tube or tubes in view of plate-dissipation limitations — is the same fundamental component in both cases; on this basis, the second harmonic with 180-degree excitation will have 62 per cent of the value it has with an operating angle of 120 degrees.

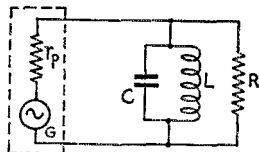
Whatever the means of comparison, the reduction in second harmonic appears to be only of the order of 4 to 6 db., or about one point in the S scale. The normal fading in sky-wave transmission would make it hard to tell that any improvement had been made. Reducing excitation does not appear to be the solution to the harmonic

problem — not unless the reduction is so drastic that Class A operation is approached. Few hams would be willing to sacrifice tube capacity to that extent. Besides which, Class C operation is a necessity if the amplifier is to be plate-modulated.

Tank Q and L/C Ratio

If the tube worked into a resistance load such as the equivalent circuit shown in Fig. 1, the picture would be pretty discouraging because the second-harmonic component of the plate current is only 3 db. below the fundamental component. However, the actual load is a tuned circuit that is resistive only at resonance. It can be represented as in Fig. 3, where the resistance R is understood to be the "coupled-in" resistance; in other words, the parallel-resistance equivalent of the power-absorbing capabilities of the actual load (which may be the antenna system) at resonance. As is usual in such cases, it is assumed

Fig. 3 — A loaded tank circuit can be considered to be equivalent to a high-Q resonant circuit in parallel with a load resistance, R , that absorbs the power output of the generator.



that the parallel impedance of the tank circuit alone is so high that practically all of the power delivered by the generator is absorbed in R — that is, the losses in the coil and condenser by themselves are negligible. Since R is, for the moment, assumed to absorb power only at the fundamental frequency, it does not exist at the harmonic frequencies. For the harmonics we have only the reactances of the coil L and condenser C in parallel.

Now since the amplitude of the second-harmonic component in the alternating plate current ("line" current) is fixed by the operating conditions that determine the shape of the plate-current pulse, it is clear that no variations in tank-circuit Q or L/C ratio can affect the second-harmonic amplitude so long as the same plate-current waveshape is maintained. Then since the harmonic component must flow through the tank circuit and will have the same amplitude regardless of Q , it is obvious that there will be no "suppression" of harmonics by high- Q or high- C tank circuits.

At the fundamental frequency the reactances of the tank coil and condenser are equal. At the second harmonic the condenser reactance is halved and the coil reactance is doubled. Because of this, the second-harmonic current in the condenser will be four times as large as the second-harmonic current in the coil. However, the two currents are 180 degrees out of phase, which causes the condenser current to have a value

¹ Formulas for calculating these values are given in *Reference Data for Radio Engineers*, published by Federal Telephone & Radio Corp., 67 Broad St., N.Y.C.

equal to $\frac{1}{2}$ the second-harmonic line current and the coil current to be $\frac{1}{2}$ the line current. With 120-degree excitation, where the second-harmonic component of line current is 0.7 times the fundamental component, the second-harmonic current in the coil is consequently equal to $\frac{1}{2} \times 0.7$, or approximately $\frac{1}{4}$ of the fundamental component of line current. This ratio will hold regardless of L/C ratio, since the ratio of the coil and condenser reactances always must be constant.

The benefits of high- Q tank circuits lie not in suppression of harmonics but in the fact that they build up the *fundamental* component of line current. If the operating Q is 10, for example, the fundamental current in either the coil or condenser will be 10 times the fundamental component of line current. This means that the *ratio* of fundamental to second-harmonic current in the tank coil will be 40, since the second-harmonic current is equal to $\frac{1}{4}$ the fundamental current in the line. The ratio increases in direct proportion to the Q . In circuits using inductive coupling to the load the current in the coil is the important thing because this current provides the means for magnetic coupling.

Fig. 4 is a general type of circuit having inductive coupling to a load resistance, R , which is assumed to have the same resistance at all frequencies. With the available power output and load resistance fixed at definite values, the desired power will be obtained at a definite value of voltage across R . Now the voltage induced in L_2 is proportional to the primary current, the frequency, and the coupling between L_1 and L_2 ; consequently, the higher the primary current the looser the coupling may be to obtain the necessary voltage across R . Hence high Q , by raising the fundamental component of primary current, permits looser coupling between the two coils for the same power delivered to the load. But since the value of second-harmonic current is not

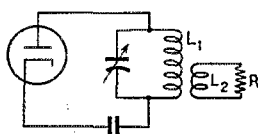


Fig. 4—A simple type of output circuit. In practice, R usually is replaced by a nonresonant transmission line that simulates a pure resistance at the fundamental frequency.

affected by the tank-circuit Q , the second-harmonic voltage induced in L_2 is reduced by the looser coupling. Looser coupling is, in fact, the whole secret, and high Q is beneficial simply because it makes loose coupling practicable.

Even so, it does not pay to go to extremes. Doubling the Q and readjusting the coupling would reduce the second-harmonic voltage induced in the secondary circuit by a factor of 2, which is about an "S" point. But doubling the C/L ratio cannot be done many times without running into unworkable values of inductance and capacitance, which in practice would defeat

the purpose because the tank current would become so high that tank losses no longer would be negligible — meaning that the actual Q would not increase with the C/L ratio. The optimum appears to be a Q between 10 and 20.

Fig. 4 probably represents the worst possible case. With a 40-to-1 ratio of fundamental to second-harmonic current in the tank coil, the harmonic in the load would be 26 db. below the fundamental, while raising the Q to 20 would drop the harmonic down to 32 db. However, there are few, if any, practical applications where the load resistance would be the same at all frequencies. The circuit of Fig. 4 is equivalent to a tank circuit coupled to a flat line at the *fundamental* frequency, but at the second harmonic the load may be anything from a short-circuit to an open-circuit, depending upon the electrical length of the line and the characteristics of the antenna in which it is terminated. Where the line is matched to the antenna the termination is more likely than not to represent a short-circuit for the second harmonic, with the result that the radiated harmonic power is negligible compared to the fundamental.

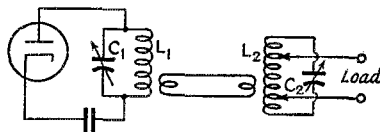


Fig. 5—The link-coupled antenna tuner provides additional selectivity to help in the discrimination against harmonics.

However, it is an easy matter to improve the situation to the point where there is a large factor of safety by using *two* tank circuits, as in the common form of link-coupled antenna tuner shown in Fig. 5. Because of the resonant rise in voltage in the tuned secondary circuit, L_2C_2 , the voltage developed across the load will be greater than the voltage applied to the load in Fig. 4 by a factor equal to the Q of the secondary circuit. Thus if the secondary circuit Q is 10, the voltage will be ten times as great as with a nonresonant coupling coil. This means that, for the same voltage across the load, the coupling between L_1L_2 need be only one-tenth as great for the same power transfer as between L_1L_2 in Fig. 4. (The link between the two circuits, incidentally, is simply a convenient means for providing mutual inductance between the coils.) Consequently, the second-harmonic voltage induced in L_2 will be reduced by a factor of 5, as compared with the conditions existing in Fig. 4. This alone would give an additional improvement in the fundamental/harmonic ratio of 14 db., but the actual situation is more favorable because again the load is not likely to have the right value for maximum power transfer at both the fundamental and harmonic. On the whole, it is reasonable to

expect that the fundamental/harmonic ratio through a system such as is shown in Fig. 5 should be of the order of 50 db. in practice. Even at the maximum power authorized for amateur stations the second-harmonic power in the antenna should be but a small fraction of a watt.

Nevertheless, the fact is that stations using just these coupling systems, particularly the type in Fig. 4, do get tickets for harmonic radiation. Part of the reason is that those who get cited have harmonics falling outside an amateur band where they stand out like the well-known sore thumb even though the harmonic power radiated undoubtedly is quite small. But in many cases the ratio between harmonic and fundamental is not anything like the ratios arrived at by the reasoning above. If the harmonic is not getting into the antenna through magnetic coupling there is only one thing left — capacity coupling.

Coupling Through Stray Capacity

As an example, consider the arrangement shown in Fig. 6-A. Here a half-wave antenna is centered by a transmission line which — although no attempt has been made to show it pictorially — is assumed to be matched to the impedance at the center of the antenna. The line gets power from the transmitter tank through the usual small coupling coil such as a variable link. The possibility that any appreciable second-harmonic power could get into the antenna through magnetic coupling and ordinary transmission-line operation is rather remote, as we have seen. But there is capacitance between the tank and coupling coils, as indicated in Fig. 6-B, and r.f. current can flow through this capacitance from the tank to the line. There is no particular reason why this current should know that it is supposed to behave itself on a transmission line; in fact, there is every reason why it should not. With

magnetic coupling the voltages at the ends of the coil are opposite in phase with respect to the two sides of the line, hence the currents flow in opposite directions in the two wires. But the voltage across the stray capacitance is in practically the same phase all across the secondary coil, with the result that current flows in the same direction in both sides of the line. The line, in other words, is simply two conductors in parallel for the harmonic, and the currents arrive at the center of the antenna in phase. Since each side of the antenna is a half wavelength long at the second harmonic, the whole system simply acts as a full-wave antenna fed at the center by a single-wire transmission line; the only difference is the purely mechanical one that the line and antenna sections are separate wires. Of course, the "line" radiates, too, since the usual cancellation does not exist. If the line happens to be near a multiple of a half-wavelength long at the harmonic, conditions are almost ideal for absorbing and radiating a great deal of the harmonic power in the tank, because under such conditions a very small coupling capacitance will suffice for maximum power transfer.

Similar conditions can exist in almost every type of antenna-feeder system just so long as there is stray capacitance between coupling coils. Installing a separate antenna tuner such as is suggested in Fig. 5 will improve things to the extent that it cuts down the stray capacitance because there are two coupling points instead of one. In itself this is quite advantageous, particularly with the loose coupling that reasonably high-Q circuits make possible, because loose coupling between coils reduces the stray capacitance. Also, since in transmitters high Q is achieved by reducing the L/C ratio, the harmonic voltage developed across the tank coil also is reduced, the amplitude of the harmonic current being independent of the L/C ratio. But there is nevertheless still a possibility that a great deal more harmonic will get through than should.

The real answer, obviously, is to eliminate the stray capacitance. A time-honored device is the Faraday shield — and there is nothing better. But such shields are not only rather difficult to make but cumbersome to install and use, particularly with plug-in coils. There is a simple dodge that works almost as well as the shield, doing the job by reducing the effect of the capacitance, although not eliminating the capacitance itself.

Of the total harmonic voltage coupled from the tank, the greater proportion appears between the coupling coil and ground (that is, the cathode return on the amplifier), and only a small part appears across the stray capacitance when power is being transferred. But if the coupling coil is brought to ground potential there will be no harmonic voltage between the coil and ground and all of it will appear across the stray capacitance. In effect, this short-circuits the harmonic

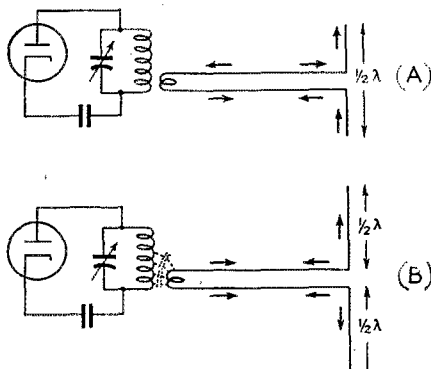


Fig. 6 — Current flow on the antenna and transmission line at the fundamental frequency (A) with magnetic coupling to the line, and current flow (B) through stray capacitance between the tank and coupling coils. In the latter case there is no essential difference between the line and a single conductor, since the two wires act in parallel.

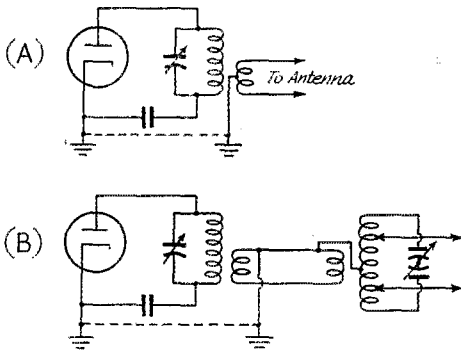


Fig. 7 — Grounding the coupling coil to reduce the effect of stray capacitance by short-circuiting the harmonic voltage in the link and antenna circuits.

at the point where it is coupled to the antenna system. It is impossible, of course, to connect every part of the coupling coil to ground, but the equivalent effect can very nearly be realized by making a single connection to any part of the coil. To maintain the symmetry of the system at the fundamental frequency, probably the most desirable point to ground is the center of the coil, as in Fig. 7-A. Combined with coupling to the "cold" point on the tank, this should pretty effectively eliminate coupling through stray capacitance. The ground connection should be to the transmitter chassis and should be short; if the lead has appreciable reactance at the harmonic frequency it will not be a short-circuit at all.

It would be hard to overemphasize the importance of coupling through stray capacitance as a factor in harmonic radiation. We recently had occasion to look into two cases of excessive harmonics, and in both instances eliminating the effects of stray capacitance reduced the harmonic to the point where it was not appreciably stronger with the antenna on than it was with the antenna system completely disconnected. The remaining radiation, in other words, was practically entirely from the final tank circuit itself, a condition that can be cured only by proper shielding. The two transmitters concerned were widely different, one being a low-power outfit with a single-ended final tank circuit and the other a moderately high-power push-pull amplifier. In the latter case the second-harmonic signal was of good "local" strength at a distance of about two miles; grounding the antenna coupling coil reduced it to the point where it was not more than 50 per cent readable, with no difference in strength whether the antenna was on or off.

When a link-coupled antenna tuner is used between the final tank and the feeders, it is advisable also to ground the center of the coil in the antenna tuner, assuming that a balanced feeder system is used, as indicated in Fig. 7-B. A short lead is called for here also. Note that the link coil at the amplifier

tank also is grounded; this is the really important ground. As suggested in the diagram, the side of the link farthest from the cold end of the tank should be connected to ground because that is the "hottest" end of the link (especially when the link is wound over the tank) and therefore the place where the stray capacitance voltage needs to be short-circuited.

Incidentally, it should be rather obvious that the way really to ask for harmonic trouble is to use direct coupling between the tank and feeders. Low-pass filters such as the pi-section coupler don't have a chance to work when the harmonic currents flow through both sides in the same direction. And direct coupling is practically synonymous with maximum coupling for harmonics as compared to the coupling through stray capacitance.

Push-Pull

The old saw that "even harmonics cancel out in push-pull amplifiers" is one of those dangerous half-truths that generate a false sense of security. It is true in a push-pull audio amplifier. In a push-pull Class-C r.f. amplifier the cancellation may or may not be effective.

Let's take the case of two tubes in push-pull from the equivalent-generator standpoint. For a 120-degree plate-current pulse the amplitudes and phases of the fundamental and second-harmonic components are approximately as shown in Fig. 8. This picture is for one tube only. Since the grids of the two tubes are excited 180 degrees out of phase there is a difference of one-half cycle (at the fundamental frequency) in the operating conditions of the two tubes. In other words, if one tube is operating at Point A in Fig. 8, then the other tube is simultaneously operating at Point B. The fundamental compo-

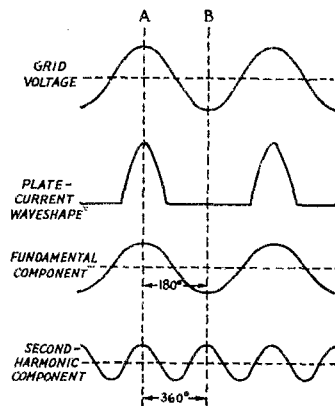


Fig. 8 — In a push-pull amplifier the grids of the two tubes are excited 180 degrees out of phase, so that when one tube is at Point A in the cycle the other is simultaneously working at Point B. The fundamental components of plate current are out of phase but the second-harmonic components are in phase.

nents in the output are 180 degrees out of phase, which means that the two tubes are supplying current to the tank circuit in series. However, the phase difference in the second-harmonic component is 360 degrees, which means that the second-harmonic currents are *in phase* at the ends of the tank circuit. These instantaneous conditions are perhaps made a little clearer by Fig. 9, which shows the instantaneous polarities at the grid and plate corresponding to A and B in Fig. 8. The resulting current flow is shown by the solid arrows for the fundamental component and

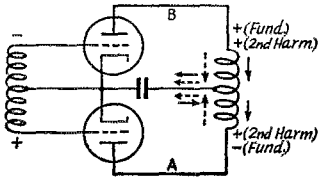


Fig. 9 — Instantaneous polarity of fundamental and harmonic voltages at the ends of a push-pull tank coil and directions of current flow at the same instant. Dotted arrows show direction of second-harmonic component, solid arrows direction of fundamental component.

by dotted arrows for the second-harmonic component. Since the latter currents are flowing in opposite directions through the two halves of the tank coil their magnetic fields *tend* to cancel out. However, true cancellation does not occur unless there is 100-per-cent coupling between the two halves of the coil. No r.f. coil has anything like that coupling, with the result that although the fields may practically cancel near the center of the coil there is little if any cancellation near the ends. Nevertheless, with a symmetrical circuit and a coupling coil inserted at the center so that it has equal coupling to the two halves of the coil, very little second-harmonic voltage will be induced in the output circuit by magnetic means.

However, Fig. 9 is not a practicable amplifier circuit for radio frequencies. Probably the most common type of tank circuit is that shown in Fig. 10-A, using a split-stator condenser with the rotor grounded. The other type, less commonly used nowadays, has the center of the coil grounded and the condenser rotor floating. From the harmonic standpoint there is considerable difference between the two. In Fig. 10-A the harmonic currents cannot flow from each tube through the halves of the coupling coil to ground because there is an r.f. choke in the return lead. Consequently, practically the entire second-harmonic component is carried to ground through the two condenser sections. However, the harmonic *voltages* developed across the condenser-section reactances appear at the ends of the tank

coil, and since no current flows in the coil the same voltages (they are identical in amplitude and phase) *appear at every part of the coil, including the center-tap*. Insofar as second-harmonic coupling through stray capacitance is concerned, it makes no difference whether the coupling coil is at the center of the tank coil or not. The center of the coil is just as hot as the ends at the second harmonic. But since there is no second-harmonic current in the coil there is no possibility of *magnetic* coupling to the output circuit. With a good Faraday screen between the two coils this circuit will have practically zero even-harmonic output.

In Fig. 10-B, the second-harmonic current components flow through the two halves of the coil just as in Fig. 9. In this case the *voltage* at the center of the coil is zero, so coupling through stray capacitance to the coupling coil at this point is minimized — but it should never be assumed that it is negligible. A coupling coil concentric with and close to the tank coil can have enough capacitance to the tank to transfer considerable harmonic energy to the antenna. Grounding the coupling coil or the installation of a screen is just as advisable as in the case of Fig. 10-A. In this circuit magnetic coupling of the even harmonics is eliminated to the extent that the coil and circuit as a whole are balanced. With reasonable care it should be quite small.

With care taken to eliminate stray capacitance, the circuit at A has a slight edge on B. Without such care, A is far more likely to put out a strong

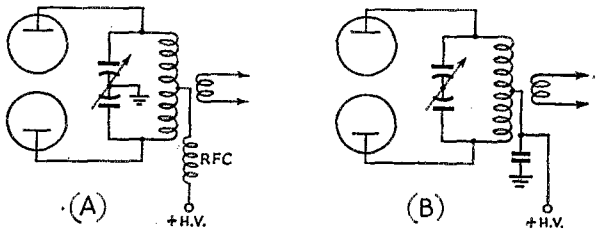


Fig. 10 — Two methods of grounding the center point of a push-pull tank. The differences in respect to harmonic operation are discussed in the text.

second harmonic than B, but both can be troublesome.

Other Circuits

The push-pull discussion should make it plain that because a circuit behaves one way at the fundamental frequency, there is no guarantee that it will do the same at harmonics. In a single-ended amplifier with plate neutralization using a grounded split-stator condenser, for instance, there is a voltage node at the center of the tank coil at the fundamental frequency. But a little study of the circuit will show that there is no node at that point for the second harmonic; there is a node, but it appears near the end of the tank

coil farthest from the tube. On the other hand, if the center of the coil rather than the rotor of the condenser is grounded, there is a node at the coil center—but the second-harmonic voltage across each half of the coil is almost four times as large as the voltage across the whole coil in the grounded-condenser circuit. However, in this case the harmonic currents in the two halves flow in opposite directions through the coil, just as in the push-pull case, so magnetic coupling is decreased. There is no such thing as complete cancellation because the two currents in the two halves of the coil are not exactly in phase, in addition to the fact that the coupling between the coil sections is rather loose.

Other Harmonics

Although not negligible, harmonics higher than the second are less likely to be bad offenders. The amplitude of the third harmonic with 120-degree excitation, for example, is only 20 per cent of the fundamental-component amplitude, and as we continue up the harmonic scale the amplitudes decrease rapidly. Also, the tank reactances decrease in proportion, so the harmonic voltages appearing across the tank coil drop off with considerably greater rapidity than the harmonic components themselves. Both things are favorable to reduction of harmonic transfer either magnetically or through stray capacitance.

However, it would be dangerous to neglect them. To offset the assets of smaller current and lower voltage, there is a greater likelihood of unsuspected resonances in the antenna-feeder system that may result in efficient radiation of the small amount of power available. This is one reason why the ground leads to coupling coils and links should be as short as possible. In addition, push-pull amplifiers may get into difficulties with some antenna systems because the third and other odd harmonics flow through the tank circuit in the same way as the fundamental component. This is favorable to magnetic coupling—and unfortunately most antenna systems in which the impedances are matched at the fundamental frequency also are fairly closely matched at odd-harmonic frequencies. The additional selectivity provided by a tuned antenna coupler of reasonably high Q is the best solution.

To sum up:

1) Don't take it for granted that you have no appreciable harmonic radiation; the chances are that you have. Radiation from a tank coil alone can bring in a ticket when propagation conditions are right.

2) Don't worry about excessive grid drive. A Class C amplifier can't be operated without strong harmonics, and within the Class C range there isn't much that can be done to reduce them.

3) Use a tank Q of 10 or more, but don't carry

the reduction of L/C ratio to the point where the loaded tank starts to run hot.

4) Use an antenna tuner having at least the same Q as the final tank and tune the whole system "on the nose"—in other words, with the loosest coupling that transfers the power to the antenna.

5) Use a Faraday screen between the final tank and the coupling coil, if possible. If it's out of the question for constructional reasons, ground the coupling coil to the final chassis by a short lead, and ground the center of the antenna-tuner coil to the same side of the link. See Fig. 7.

6) After you've done these things (they should be done in any case) get a nearby ham friend to listen for your harmonics, up to the limit of his receiver's frequency range. In the case of each one heard, check by removing the feeders from the vicinity of the transmitter to see if the radiation is from the transmitter itself. If the transmitter is radiating a strong harmonic some shielding is in order.

7) Before you decide that all this is too much trouble, remember that it's *your* record in the FCC files that gets the black mark when the pink QSL starts on its way.

Silent Keys

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

W20C, ex-W2CMO, John G. Campbell, Brooklyn, N. Y.

W2PMR, Bernard J. Yaskell, jr., Belleville, N. J.

W4COY, Toland A. Gunter, McBee, S. C.
W51QU, Gordon Anderson, New Braunfels, Texas

W5KFI, City R. Coleman, SM1c, USNR, West Point, Miss.

W8BWB, Albert Farrenkopf, Detroit, Mich.

W8CUE, Edgar W. Donovan, Watervliet, Mich.

W8QMR, Zeh Bouck, Livingstonville, N. Y.

W9AML, Herbert Hildebrandt, Bloomington, Ill.

W9FOT, Wells C. Chapin, University City, Mo.

W9GJT, Lyle P. Mason, Bloomington, Ill.
W9VTH, D. A. Selvig, USN, Willmar, Minn.

KA1AT, Joseph M. Molitor, USA, Clark Field, P. I.

A Three-Band Utility Transmitter

A General-Purpose Rig for Home or Emergency

BY J. H. DuBois, * W3BXE

How many times would an auxiliary transmitter have been useful as an emergency rig, Field Day transmitter, or at the home station as an exciter to try out that new final and still deliver enough power to stay on the air while rebuilding? In the event of failure of the regular transmitter, it would always be available to keep a schedule, finish out a contest or help another amateur over that period of accumulating parts for the "new rig." The transmitter to be described was designed for these purposes and is simple, dependable, and self-contained with the exception of an antenna coupler, since it was considered desirable to terminate the amplifier with a link winding as a universal means of coupling to another unit. An additional terminal, connected to the output tank-condenser stator, may be brought out if capacity-coupling to a single-ended amplifier is contemplated.

The Circuit

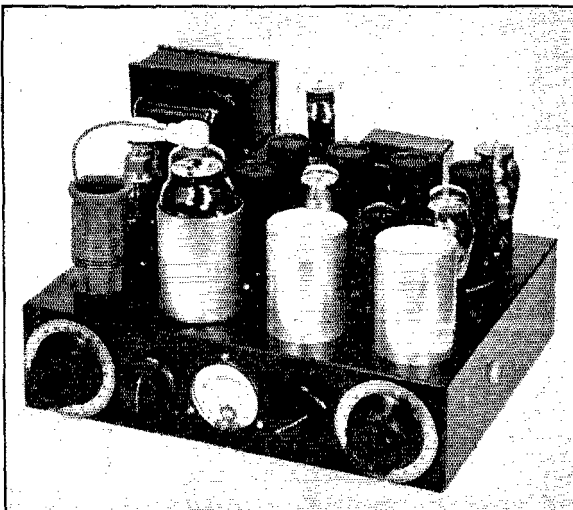
The circuit, shown in Fig. 1, uses a 6F6 or 6V6 VFO driving an 807 operating as a straight amplifier or doubler. Plug-in coils are used throughout, the oscillator grid and plate coils being housed in removable 2-inch diameter shield cans. A reliable make of tuning condenser with a long bearing, or preferably a double bearing, should be used at C_2 , and reasonably low-loss insulation throughout the entire transmitter is

* 4105 E. Elbridge St., Philadelphia 35, Pa.

• Here is a neat little transmitter that will do yeoman duty as the regular station rig, emergency or Field Day transmitter, or experimental exciter unit. Its excellent design and construction make it worthy of duplication by beginner and old-timer alike.

desirable from an efficiency and reliability standpoint. The oscillator grid coils are arranged so that a series condenser, C_1 , is used for 7- and 14-Mc. bandspread. On 3.5 Mc. the condenser is shorted and the oscillator covers the entire c.w. portion of the band. If it is desired to cover the complete 'phone band of 3850 to 4000 kc., the value of C_3 should be reduced slightly together with an increase in the number of turns in L_1 . A 6V6 was substituted for the original 6F6, with an increase of output and no noticeable loss in stability. Probably this is possible because the oscillator plate is always tuned to the second harmonic of the grid circuit and results in a minimum of reaction through the tube. Conventional cathode keying is used.

A switch, S_1 , is provided for cutting the cathode circuit of the 807 while retuning, and the meter is connected in series with it, placing both at ground potential. The grid and plate circuits of the 807 are sufficiently isolated so that no



◆
A three-band utility transmitter, using a 6V6 VFO driving an 807 amplifier. The VFO grid and plate coils are inside the shield cans on the right. A jack for the key leads is on the right-hand side of the chassis.
◆

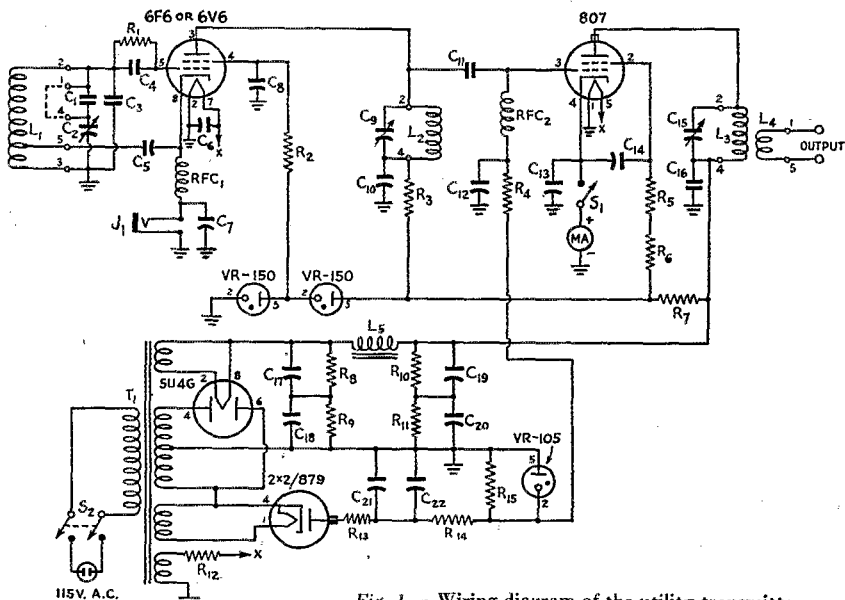


Fig. 1 — Wiring diagram of the utility transmitter.

- C₁ — 100- μ fd. zero-temp.-coef. mica.
 C₂, C₁₅ — 150- μ fd. variable.
 C₃ — 500- μ fd. zero-temp.-coef. mica.
 C₄, C₁₁ — 270- μ fd. 600-v. mica.
 C₅, C₆, C₇, C₈, C₁₀, C₁₂, C₁₃, C₁₄ — 0.01- μ fd. 600-v. paper.
 C₉ — 50- μ fd. variable.
 C₁₆ — 0.005- μ fd. 1000-v. mica.
 C₁₇, C₁₈, C₁₉, C₂₀, C₂₁, C₂₂ — 40- μ fd. 450-v.
 R₁, R₈, R₉, R₁₀, R₁₁, R₁₅ — 0.1 megohm, 1 watt.
 R₂, R₃, R₄, R₅ — 100 ohms, 1 watt.
 R₆ — 2750 ohms, 10 watts.
 R₇ — 10,000 ohms, 50 watts.
 R₁₂ — 1 ohm, 10 watts.
 R₁₃ — 25,000 ohms, 10 watts.
 R₁₄ — 1000 ohms, 1 watt.
 L₁ — A — 1.75 Mc., 25 turns No. 22 enam., tapped at 8 turns. Winding length 1½-inches (jumper from Pins 1 to 4)
 B — 3.5 Mc., 40 turns No. 22 enam., tapped at 4 turns. Winding length ¾ inch (no jumper).

- L₂ — A — 3.5 Mc., 40 turns No. 22 enam., closewound. Winding length approx. 1¼ inches.
 B — 7 Mc., 17 turns No. 22 enam., closewound. Winding length approx. 7/16 inch.
 L₃ — A — 3.5 Mc., 35 turns No. 18 bus. winding length 2¾ inches.
 B — 7 Mc., 16 turns No. 18 bus. winding length 17/16 inches.
 C — 14 Mc., 9½ turns No. 18 bus. winding length 15/16 inch.
 L₄ — A — 6 turns No. 22 enam., interwound at low end.
 B — 4 turns No. 22 enam., interwound at low end.
 C — 3 turns No. 22 enam., interwound at low end.
 All coils wound on 1½-inch diam. forms.
 L₅ — 5-henry 150-ma. choke.
 J₁ — Open-circuit jack.
 MA — 0-150 d.c. milliammeter.
 RFC₁, RFC₂ — 2.5-mh. r.f. choke.
 S₁ — S.p.s.t. switch.
 S₂ — D.p.s.t. switch.
 T₁ — 600-0-600 v., 200 ma.; 5 v.; 2.5 v.; 6.3 v.

parasitics were noticed on any band. This is evidenced by a smooth rise and fall of cathode current when tuning through resonance, either loaded or unloaded. Precautions were taken to keep the inductance of the screen lead at a minimum by wiring the screen by-pass condenser, C₁₄, directly across the 807 socket. The method of applying screen current was experimented with and the one shown in the diagram was finally adopted. If a regulated voltage of 300 is placed on the 807 screen, the screen draws excessive current under no-load conditions and, in addition, the VR-150s are required to work over a greater range. If a dropping resistor is used from the high-voltage tap, to self-regulate the screen voltage, the by-pass condenser must be of a higher voltage rating and furthermore places the full 700 volts on the screen when there is no excitation. The method shown limits the screen voltage to 300 with no excitation and keeps it

between 230 and 250 volts respectively, under unloaded and loaded conditions, depending on the frequency of operation. The resistors, R₂, R₃, R₄, and R₅ are 100 ohms each and are only for ease in checking currents without opening the wiring, by shunting a milliammeter across them. In order to conserve space, a single transformer is used for supplying all voltages. The two rows of filter capacitors require less space than two 20- μ fd. 900-volt condensers. The high-voltage transformer also supplies the oscillator, and plenty of filter should be used. Since 700 volts is just above the rating of most electrolytics, two are used in series in each case. Of course, a separate low-voltage supply may be used if space is available. The bias voltage is obtained from a 2X2/879 and is held constant by a VR-105. If a separate low-voltage supply is used, then a 6X5 may be substituted, but in our case the ratings of a 6X5 would have been exceeded. The

2X2/879 will deliver 7.5 ma., enough to ignite the voltage regulator and supply the normal leakage current of the filter capacitors. Condenser input was originally tried on the bias rectifier but the surge proved a little too much for the 2X2/879, so the filter was changed to resistor input by wiring C_{21} in parallel with C_{22} . The 40 μ fd. in C_{22} alone, is more than enough for this section of the power supply, and the drop through the rectifier and resistor brings the voltage far below the 450-volt rating of the condenser. A 5U4G is used as the high-voltage rectifier and has proven satisfactory, although a 5R4GY may be substituted if preferred. Care must be taken to connect the filter capacitors with their polarities as shown, which places high voltage on four of the housings. Card-board tubes, commercially available for this purpose, were cemented to the capacitors to prevent accidental shock to the operator. Insulated plate caps on the 807 and 2X2/879 are also used, leaving the amplifier plate coil the only exposed component with high voltage on it.

Construction

The unit is built on a 10 \times 12 \times 3-inch chassis, with the r.f. section along the front edge. A little thought given to the placement and orientation of sockets will help considerably in maintaining short leads and eliminating unwanted couplings between circuits. Reading from right to left across the front apron are the oscillator grid tuning condenser, oscillator plate tuning condenser, 807 cathode meter, 807 cathode switch

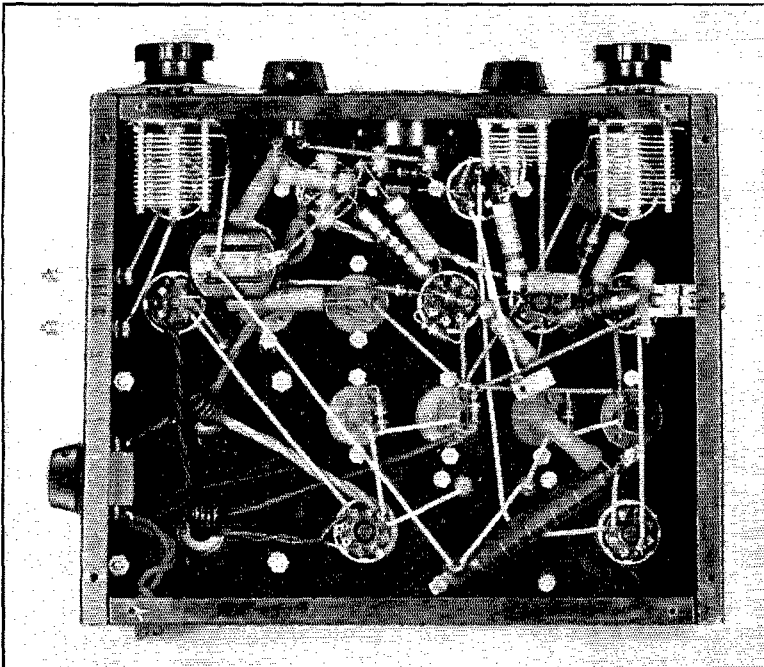
and 807 plate tuning condenser. The key jack is on the right-hand apron and the output link terminals on the left. The a.c. cord emerges from the rear apron below the transformer, with the line switch near the rear of the left-hand apron.

Along the rear edge are the power transformer, 5U4G, choke, oscillator plate VR-150 and input and output filter condensers. The central line of components comprises the 2X2/879, bias filter, bias regulator, oscillator tube and oscillator-screen VR-150. All filter condensers are mounted on insulating wafers.

There is nothing critical about the construction of the coils, and the coil data is given in Fig. 1. It will be noticed that the socket connections for L_3L_4 will accommodate manufactured-type miniature coils (B & W Jr.). The plate lead for the 807 plate coil is connected to the top of the winding and is disconnected from the tube each time bands are changed. A convenient method is to solder a long piece of bus to Pin 2 of the coil form and run it up along the inside of the form. When the winding is finished, anchor it to the bus and leave enough to form a loop, to which the plate lead may be soldered.

To complete the unit a base plate is screwed to the bottom, removing any "weave" in the chassis and also serving as a shield. No change in oscillator frequency was noticed by this addition, and the base plate also serves as a place to mount sponge rubber feet if desired. Even though there was no drift over two operating periods, one of

(Continued on page 184)



Heavy wiring used throughout the transmitter adds to the stability of the signal. The r.f. output is taken off at the two feed-through insulators at the left, and the a.c. line switch can be seen just below the output terminals.

Let's Not Overmodulate — It Isn't Necessary!

Speech Clipping and Filtering for More Effective Communication

BY JOHN W. SMITH,* WØUCM, AND N. H. HALE,* WØJIH

• Crank up the gain and blast that DX loose — and still be looked upon kindly by the fellows on the next channel because they *don't* have to swallow your overmodulation splatter! That's what a clipper-filter in the audio system can do for you. Here's more practical information on a principle introduced in *QST* last winter.

HIGH average modulation is most desirable in radiotelephone communication, in order to be heard above static and QRM at the receiving end. Yet in a carrier modulated 100 per cent on voice peaks, the average modulation is roughly 30 per cent. A common method of improving the situation is to crank up the audio. The result is, of course, lots of audio. Also overmodulation, a broad signal, splatter, loss of reputation, and violation of the FCC rules and regulations for amateurs. On the other hand, it's downright irritating to get a report that "you've got a strong carrier but the modulation's down," when you're using an oscilloscope and it says you have 100-per-cent modulation.

Many amateurs have used volume compressors to good advantage in obtaining higher modulation without splatter. Low-pass and band-pass filters have also been employed to limit the bandwidth to the range required for most effective communication. However, low-pass or band-pass filters do not eliminate any of the bad results of overmodulation; they only limit the frequency response of the audio system to the desired frequency range. They cannot prevent a broad signal or splatter when it is created in the final r.f. power amplifier because of overmodulation.

During the recent war the advantages of speech clipping were reaffirmed as a means of preventing overmodulation, with the added benefit of a high average audio level. Various authors have discussed it in more or less detail.¹ This discussion will present the matter in a practical manner, and will include circuits and data helpful to the person who would like to incorporate speech clipping in his audio amplifier.

The clipper is an instantaneous device. It is inoperative until the audio voltage reaches a predetermined level, then chops off everything above that level. As soon as the signal voltage drops below this limit the clipper ceases to operate. Such a device introduces a considerable amount of distortion, but the distortion is introduced at a point where the objectionable high-frequency harmonics can be controlled and not allowed to appear in the sidebands.

With average modulation of 30 per cent, the sideband power is down about 10.5 db. from the 100-per-cent level. If we should attenuate the voice peaks 10.5 db. and increase the over-all amplifier gain by the same amount, the lower-level voice components would be better utilized and the average modulation would approach 100 per cent.

In tests conducted for the purpose of determining the effects of harmonic distortion upon the intelligibility of speech, it has been established

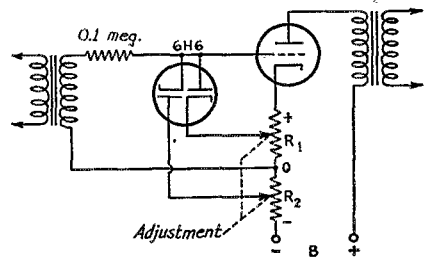


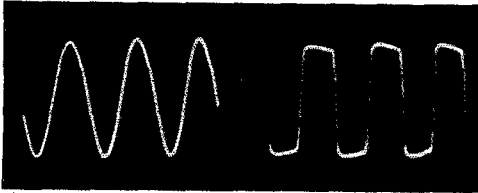
Fig. 1 — A simple shunt-diode type peak limiter for low-level Class A amplifiers.

that the vowel sounds contain the major portion of speech power, yet contribute very little to intelligibility. Consonant sounds (t, k, c, p, v, b, etc.) carry little power but are the principal means of conveying intelligence. Therefore it should be possible to change or distort the wave-shape of the vowel sounds (the voice peaks) without adversely affecting intelligibility.

Extensive tests to determine the degree to which voice peaks can be distorted without adversely affecting intelligibility show that 6 db. of peak clipping is barely noticeable, 12 db. is not objectionable, and 24 db. of clipping can be tolerated. By the use of this system, and with an over-all increase in amplifier gain, (1) the effective power in the consonant sounds (low level

* Collins Radio Co., Cedar Rapids, Iowa.

¹ For example, W. W. Smith, "Premodulation Speech Clipping and Filtering," *QST*, February, 1946.



(A) (B)

Fig. 2 — A — amplifier output without clipping; B — output with 10.4 db. of clipping. Note that there is no change in the maximum amplitude of the wave, showing that the clipping circuit holds the modulation percentage at a given level.

components) is increased, (2) the mean audio power is increased, (3) the average modulation level is increased, (4) intelligibility is aided in QRN and QRM, and (5) the carrier is utilized to the maximum.

Circuit Considerations

There are several methods of accomplishing peak clipping. An audio filter should be used in conjunction with a clipper to suppress high harmonics created by the clipping action and thus maintain a narrow bandwidth. The filter introduces problems of its own, but if clipping is done at a low level the filter components will be small and relatively inexpensive.

Fig. 1 shows the schematic of a simple peak clipper for use in a low-level Class A audio amplifier. R_1 and R_2 are each equal in value to the normal cathode bias resistance for the particular tube. Potentiometers are used to vary the diode bias according to the signal amplitude at which clipping is desired. The 0.1-megohm resistor provides a high circuit impedance which is desirable with the shunt-type clipper shown in Fig. 1.

It can be argued that shunt clippers will not positively prevent overmodulation because the diode impedance does not drop to zero during conduction. However, in a circuit having an impedance of the order of 0.1 megohm, the somewhat-less-than-1000 ohms shown by the 6H6 is for all practical purposes a short-circuit. Fig. 2-A is a photograph of the output oscilloscope pattern of a normal modulator, and Fig. 2-B shows the

output of the same modulator employing 10.4 db. of peak clipping using a shunt-type circuit. Fig. 2-B shows clearly that there would be no overmodulation if the amplifier gain following the clipper were set for 100-per-cent modulation.

Any audio-level indicating device or average-level compression will necessarily precede the clipper, since the peak level is constant following the clipper.

In designing Class B modulator stages, it must be kept in mind that the waveshape shown in Fig. 2-B represents considerably more power for the same peak value than that of the sine wave of Fig. 2-A. The ratio of r.m.s.-to-peak of Fig. 2-B is 0.9, which is considerably better than the 0.707 of the sine wave.

A Practical Clipper-Filter Circuit

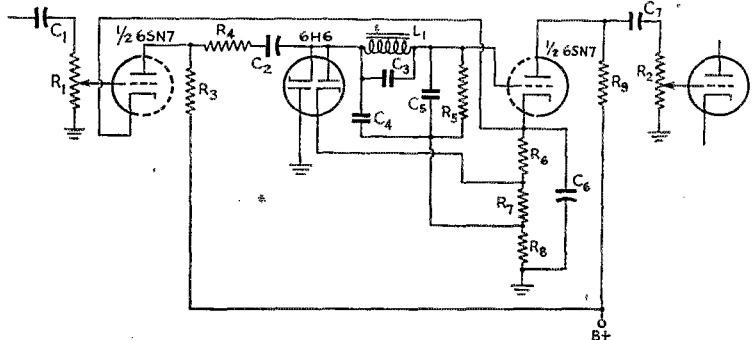
The Collins 30K transmitter for amateurs employs peak clipping successfully, using the circuit of Fig. 3. The low-pass filter following the 6H6 clipper prevents high audio harmonics from modulating the carrier and causing unnecessarily wide signals. Thus a high audio level is achieved without overmodulation, and the signal is narrow.

The bias for the clipper is obtained from the 6SN7 cathode resistors. Clipping begins at an audio level of about three volts. The amount of clipping is determined by the voltage available at R_1 . Some method of checking modulation is necessary in order to adjust the gain following the 6H6. R_2 is set for 100-per-cent modulation with R_1 advanced about half way. R_2 should preferably have a screwdriver adjustment so that it will not be disturbed after it is set. R_1 will then regulate the amount of clipping.

The filter cut-off frequency is 4000 c.p.s. Fig. 4 shows the amplifier response with the filter in action. The choke used must maintain its inductance over the audio-frequency range. Some chokes lose their performance at higher audio frequencies, due to capacity between turns, etc. A good textbook on filters will enable the designer to use other circuits for his particular application. The filter used in the 30K has a characteristic impedance of 0.1 megohm, which is a good practical value.

Fig. 3 — A practical clipper-filter circuit using a dual triode and a 6H6. C_1, C_2, C_7 — 0.01- μ fd. paper.

- C_3 — 180- μ fd. mica.
- C_4, C_5 — 200- μ fd. mica.
- C_6 — 20- μ fd. 25-volt electrolytic.
- R_1, R_2 — 0.5-megohm volume control.
- R_3, R_4, R_5, R_9 — 0.1 megohm, $\frac{1}{2}$ watt.
- R_6 — 330 ohms, $\frac{1}{2}$ watt.
- R_7, R_8 — 620 ohms, $\frac{1}{2}$ watt.
- L_1 — 3.75 henrys.



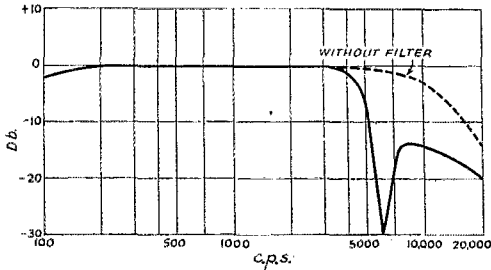
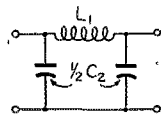
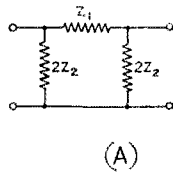


Fig. 4 — Frequency-response curve of the modulation system employing the clipper-filter circuit of Fig. 3.

The cut-off frequency should be 3500 to 4000 c.p.s. Higher frequencies make for broad signals and contribute nothing to communication. If you want your rig to have broadcast quality, by all means design it to have wide frequency response — up to 20,000 c.p.s. maybe. Check it in your laboratory and be proud of it. But don't put it on the air. Use a filter. A signal that is 40 kc. wide covers up seven or eight other stations that someone wants to hear.

Filter Considerations

Two common types of "pi" filters,^{2,3} are shown in Fig. 5, together with their attenuation characteristics. Fig. 5-A shows the prototype and Fig. 5-B the composite or *m*-derived filter. The *m*-derived filter with a value of 0.6 for "*m*" will have a constant impedance over the voice-frequency range, and several sections can be used in tandem without mismatch. The different sections can be assigned various frequencies of high or "infinite" attenuation, and a really formidable filter will result. Terminating half-sections are utilized in a complete filter design, but for amateur use a simple filter will usually suffice. The total attenuation of the filter in decibels is, of course, the sum of the attenuations in all sections. The equation for attenuation assumes that there is no dissipation in the filter. The fact that there is a small amount of power dissipated in the filter need not bother you.



$$L_1 = L_K$$

$$C_2 = C_K$$

$$L_1 = m L_K$$

$$C_1 = \frac{1-m^2}{4m} C_K$$

$$C_2 = m C_K$$

R = Load resistance
 f_2 = cut-off frequency
 f_{∞} = frequency of very high attenuation

$$L_K = \frac{R}{\pi f_2}$$

$$C_K = \frac{1}{\pi f_2 R}$$

$$m = \sqrt{1 - \left(\frac{f_2}{f_{\infty}}\right)^2}$$



Attenuation at any frequency in decibels = 8.686α

$$\cosh \alpha = \left| 1 + \frac{Z_1}{2Z_2} \right|$$

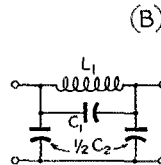


Fig. 5 — Low-pass filter design. A — π -section; B — *m*-derived section.

Other Considerations

Since the effective microphone sensitivity is extremely high in a clipper amplifier, a noisy operating location should be avoided. Close-talking microphones and noise-cancelling microphones are helpful if the noise cannot be avoided. An alternative is to reduce the gain preceding the clipper and talk loudly.

² W. L. Everitt, *Radio Communication*.

³ F. E. Terman, *Radio Engineers' Handbook*.

The thought will occur that receivers can use clippers. Transmitters can utilize clipping to put more power in the sidebands and thus compete with atmospheric static or QRM. However, a receiver would be impartial; peak clipping there would benefit all signals, with special advantage for none. Experiments have confirmed this reasoning.

When a clipper is used in a transmitter, care should be taken to avoid phase shift, which occurs especially in transformers. Phase shift can tilt the clipped wave and cause overmodulation. By using an oscilloscope, phase shift can be detected. A variable-frequency audio oscillator is necessary if thorough checking is to be accomplished.

Attenuation of the low frequencies (below 150 or 200 c.p.s.) is desirable in communication equipment. A simple *RC* filter will be satisfactory. A rising frequency response will result, and low frequencies will not be bothersome.

Conclusions

A peak clipper followed by a filter will have the following advantages:

- 1) Raise the audio level
- 2) Prevent overmodulation
- 3) Maintain a narrow signal
- 4) Conform with FCC requirements

Thus by using this system, amateurs can have high average modulation and still conform to FCC rules and regulations. The signal will be narrow. All these things are desirable, but many hams have disregarded the ethics of good hamming in their determination to be heard.

The clipper must be followed by a filter if the signal is to be kept clean and narrow. (A filter should be used anyhow if maximum use of the crowded amateur bands is to be achieved.)

Because the consonant sounds are effectively amplified more than vowels, intelligibility is improved when reception is hampered by static or when frequencies are congested. The advantages of clipping rise in proportion to the interference.

This system has been proved. It is within the reach of everyone. The circuit presented can be followed with excellent results.

Acknowledgment

The clipper circuit of the Collins 30K transmitter was originally developed by P. G. Wulfsberg for use in airborne transmitters. W. B. Bruene designed the 30K and supplied test results.

Strays

The Somerset Hills Radio Club will hold a hamfest November 14, 1946, at the Valley Inn, Springfield Avenue, Stirling, N. J. Registration, \$2.50. Dancing, prizes, buffet supper and entertainment are on the program.

WWV Schedules

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

- 2.5 Mc.—7 A.M. to 9 A.M. EST (0000 to 1400 GCT).
- 5.0 Mc.—Continuously, day and night.
- 10.0 Mc.—Continuously, day and night.
- 15.0 Mc.—Continuously, day and night.

The 10- and 15-Mc. radio frequencies are modulated simultaneously at accurate audio frequencies of 440 and 4000 cycles. Five Mc. carries both frequencies during the daytime but only 440 cycles from 7:00 P.M. to 7:00 A.M., EST, while 2.5 Mc. carries only the 440-cycle modulation. A 0.005-second pulse may be heard as a faint tick every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted precisely on the hour and each five minutes thereafter, resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric disturbance warnings applicable to the North Atlantic path are given at 20 and 50 minutes past each hour. If a disturbance is in progress or is anticipated within 24 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcement of the station's services and of the station's call (WWV) is given by voice at the hour and half hour.

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

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

Narrow-Band F.M. with Crystal Control

A Reactance-Modulator Crystal-Oscillator Unit

BY GEORGE W. SHUART,* W2AMN

NARROW-BAND f.m., we believe, is destined to become an important factor in ham radio, as it already has in commercial radio services. True, you always get some "bitter with the better," but in narrow-band f.m. there is every sign that there is going to be plenty of better and not too much bitter. It eliminates the high-power — and therefore expensive — audio equipment needed for amplitude modulation, and will reduce certain types of interference to broadcast reception — and no one will deny that the latter has been a sore spot in ham radio for a long time.

Narrow-band f.m. is just like any other type of f.m. except in the extent of the swing. How wide and how narrow are two burning questions. Also, what about noise? All these questions are going to be answered by the type of receiver we are going to use. Simply stated, all f.m. can be converted into a.m. by riding up and down the side of the selectivity curve of the receiver. Fortunately, n.f.m. (let's call it that, it's much easier), can be made to swing back and forth across either side of the selectivity curve of a communications receiver, and since most of these curves have a linear portion some 2 or 3 kc. wide there is ample bandwidth for good reception.

To see how this works refer to Fig. 1, which represents a typical selectivity curve. Axis A represents the center of the curve, and starting

at about 6 db. down the curve becomes straight out to about 4 kc. This means that our point of tuning for narrow-band f.m. should come at axis B. As the frequency shifts back and forth, the amplitude will vary and thus we have converted to a.m.

Considering Fig. 1, when the receiver is tuned to a signal on the high-frequency side it is true

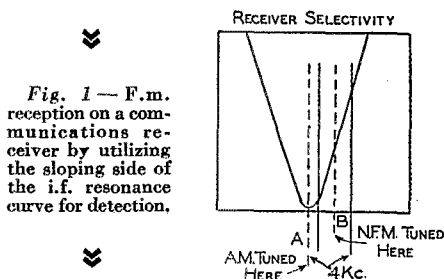
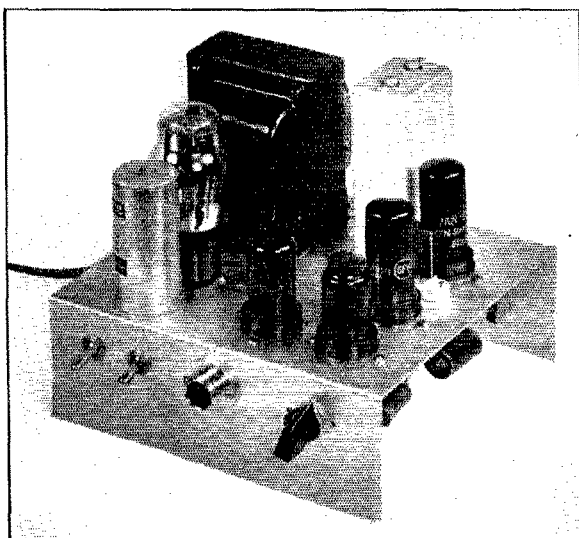


Fig. 1 — F.m. reception on a communications receiver by utilizing the sloping side of the i.f. resonance curve for detection.

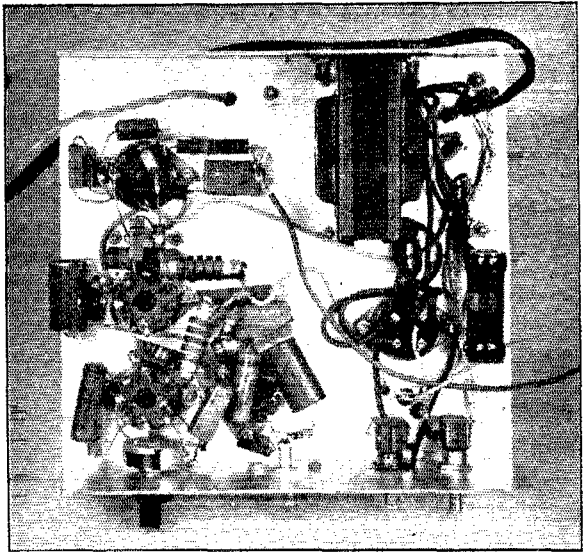
that it will also simultaneously respond to a signal on the low-frequency side. It will also respond to the same signal with the receiver tuned to either side of the resonance curve; in other words, each signal can be tuned in at two spots. The interference is doubled, therefore, even though the n.f.m. transmitter takes no more channel space than an a.m. transmitter. The situation is comparable to that in c.w. reception

* Hammarlund Mfg. Co., N. Y.

The experimental model of the crystal-controlled narrow-band f.m. unit. Controls along the front edge are the a.c. and B+ switches, microphone connector, and gain control. The power-supply section is at the left. The 6SJ7 speech-input tube is on the chassis above the microphone socket. Along the right-hand edge, from the front, are the 6CS, 6F6 modulator, and 6F6 oscillator. The oscillator tuned circuit is in the shield can at the rear.



This view of the bottom shows that wiring presents no special problems. The encased unit at the top is the filter choke. The oscillator-modulator is built on an aluminum chassis formed by bending an $8 \times 13\frac{1}{2}$ -inch sheet in the form of a U with 3-inch sides. A 0-100 milliammeter is connected to the flexible leads running out of the picture to the right. The twisted pair at the top is the r.f. output link.



can be moved to the unused side of the resonance curve, and thus reduce a lot of interference and noise.

Crystal-Controlled Oscillator-Modulator

In the circuit diagram of Fig. 2, the crystal frequency is varied at an audio-frequency rate by a reactance modulator; in effect, the modulator operates like a variable inductance connected across the crystal and thus varies its operating frequency at an audio-frequency rate. The extent of the frequency variation—that is, the frequency deviation—is relatively small, but is

to point A, which is just on the high-frequency side of the minimum plate-current point and on the long sloping part of the curve. With the adjustment farther along the curve on the steep side a wider swing can be obtained but operation is not as stable and on some audio peaks the crystal may be knocked out of oscillation. In any event, with the circuit values and the system shown in Fig. 2, the swing will be in excess of that required by the average receiver.

It is desirable to build the oscillator and reactance modulator in one unit having its own power supply, as in the case of the experimental unit shown in the photographs. The n.f.m. r.f. output can be link-coupled to practically any transmitter having a 3.5-Mc. crystal oscillator. Coupling through a link wound around the present crystal-oscillator plate tank coil is suggested. The speech amplifier in the unit pictured has plenty of gain for a crystal microphone, with a 6SJ7 input stage followed by a 6C5 which in turn drives the 6F6 reactance modulator.

Aside from the normal precautions in wiring r.f. and audio circuits, no special ones need be observed in building a unit similar to this. Long leads between the reactance modulator and the crystal are not likely to be a cause of instability.

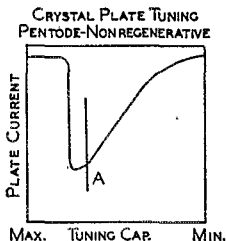


Fig. 3—Plate current vs. plate tank-condenser capacitance in a crystal oscillator. The best operating point for frequency modulation is at A, on the low-capacitance side of the minimum plate-current point.

ample for narrow-band f.m. at 28 Mc. With a 3.5-Mc. AT-cut crystal the frequency can be varied over a range of approximately 400 cycles, or a total swing at 28 Mc. of 3200 cycles.

The circuit values are rather critical and it is advised that they be strictly adhered to unless you want to do a lot of experimenting. The critical adjustment factor is really the setting of the plate tank condenser in the oscillator circuit. The curve in Fig. 3 shows that the plate current at first drops slowly as resonance is approached from the high-frequency side and then increases very rapidly just before the crystal ceases to oscillate. Best results are obtained with the tank adjusted

Strays

WØRQS, who writes the ads for PR Precision Crystals, sez bizzness-is booming, thanks to QST ads. And no small wonder! To date W2AJ0, W4BYY, W4HZK/4, W9BLE, and Pete Poppas of Rochester, Minn., have written us about the PR ad in July QST. It reads, "Z-5 . . . ten-meter crystal . . . will drive 807 to fuel output." (Italics ours.) Sure is a hot item for the shack these cool days!

ARRL's 13th Sweepstakes

Nov. 16th-18th, 23rd-25th—Awards to Section¹ Leaders—C.W. and 'Phone Certificate in Each Club—Gavel to Winning Club—Use Any Ham Band (s) and 'Phone or C.W.

BY F. E. HANDY, * WIBDI

CONTEST PERIODS

Time	Starts	Ends
	Nov. 16th & 23rd	Nov. 18th & 25th
EST	6:00 P.M.	3:01 A.M.
CST	5:00 P.M.	2:01 A.M.
MST	4:00 P.M.	1:01 A.M.
PST	3:00 P.M.	12:01 A.M.

THE AIM of this contest is to work as many stations as possible. The points from such work will be multiplied by the number of different ARRL Sections worked, with at least a complete one-way exchange, during the contest. All essential contest information is sent in the form of a standard preamble, with city-and-state shortened to the giving of only the name of the ARRL Section. Exchanges are for the record sent to Hq.

The "SS" builds operating keenness. The order of work follows the order of message parts. New station records are invariably made in each "SS." It's operating fun and a builder of operator confidence and ability. "SS" telegraphing operators contact and compete with other telegraphing operators. 'Phone hams compete with other 'phone hams. Paper work is completed as the contest progresses, with nothing to do at the end but to total and summarize points and send them in. *Mimeographed contest forms will be sent gratis to anyone who requests them by radiogram or card.* Use of our sheets is not required nor is advance entry necessary. The purpose of the suggested form is to help participants keep uniform logs. Follow the form arrangement shown with this announcement, or ask us for our prepared form.

The contest provides for 40 hours total operating in the two contest periods. You can

* Communications Manager, ARRL.

¹ Including Puerto Rico, Hawaii, Alaska, P. I.

² See list of Sections in the ARRL field organization, page 6, QST.

³ There is no point in working the same station more than once in the contest periods if two points have been earned by an exchange. If but one point is made the first time, you can add a point by working this station again for exchange in the opposite direction. Underline all such exchange entries in your "list," identify them by showing parenthetically the call of the correspondent station. Leave right or left report columns blank so that other pairs of exchanges completed in one contact are side by side.

operate "solid" for one 33-hr. week end (with 7 hours to go) if you wish. Cross-examination of logs makes it possible to check operating time. Every licensed amateur in any field-organization Section² is urged and invited to take part. The general c.w. call is CQ SS CQ SS CQ SS de W... W... W..., though sometimes a single snappy CQ SS has been known to net a row of successful exchanges. Use any authorized amateur frequency bands.

Medallion Awards

The League is providing new, distinctive medallions for this year's "SS" winners, the two in each Section to go to the c.w. and radiotelephone winners. Additional certificates will recognize competitive effort in clubs, where three or more club members submit properly-identified logs connecting their work with a particular club. At least three stations must compete and report, to rate either a club-'phone or a club-c.w. "SS" certificate. The sum of all club-member scores (phone and c.w.) for which logs are submitted will count toward a club gavel award to the nation's leading club in the "SS." Through Section awards, operators compete under equal DX conditions and oppor-



This specially-designed medallion (front and back views, actual size) is offered in each of the 71 Sections to the c.w. and 'phone winners in the 13th ARRL Sweepstakes. One of the most beautiful awards we have ever announced, it will provide dignified and lasting proof of accomplishment in one of the most popular of operating contests.

HOW TO SCORE

All contacts count:

One point for each QSO when "receipt" is completed for an exchange one way.

Two points for each QSO when the required information is exchanged both ways.

For final score: Multiply totaled points by the number of different ARRL Sections² worked, that is, the number in which at least one bona fide "SS" point or exchange has been made.

Multiply this by 1.25 if you used 100-watts-or-less transmitter input at all times.

EXPLAINING CONTEST EXCHANGES

Send Like Standard Msg. Preamble	NR	Call	CK	Place	Time	Date
In the "SS" Exchanges	Contest Info. number sent consecutively, 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (RST report ⁴ of station worked)	Your ARRL Section ²	Send time of transmitting this NR	Send Date of QSO
Purpose	The QSO NR tells how you are doing; aids Hq. checking	Identifi- cation	All stations exchange com- plete reports	The ARRL Section is vital contest data	Time and date in both logs must fall within the contest periods to prove each point claimed	

tunity. Operating enjoyment is assured. Ask any amateur who has been in an "SS."

Exchanges-by-Radio to Prove QSOs

Before points or Sections can be claimed at least a one-way six-part exchange must be completed and acknowledged between two stations as "proof of QSO."³ (It is not essential that each station worked be taking part in the contest to make your points count. Any operator who needs information can be referred to this announcement. Ask the operator to take your preamble and come through with like information in preamble form.)

⁴ Send CK and numerals or just the three-number RST report. In 'phone exchanges only two numerals need be used. In 'phone reports say READABILITY . . . , STRENGTH. . . This avoids confusing abbreviations. Instead of just the state (which is the same as the Section in many cases), identify your ARRL Section as, for example, Eastern Mass., R. I., W. N. Y., Neb., E. Bay, N. Y. C.-L. I.

More Rules

- 1) Information in contest exchanges must be sent in the order indicated, that of the ARRL message preamble. Incomplete exchanges or wrong order of sending justifies disqualification.
- 2) Entries should be (a) in the low-power class, or (b) high-power class. Any work on high power places all of one's score in the high-power class. Logs must show the power used for each QSO or for groups of QSOs.
- 3) Reports must show operating time for each period spent on the air in the "SS," and the total of such operating time.
- 4) Logs must be marked for "'phone" or "c.w." entry, grouping all work by either method together as one score.
- 5) All work must fall in the contest periods.
- 6) Award-committee decisions shall be accepted as final.
- 7) Reports from all stations must be postmarked no later than December 9, 1946, to be considered for awards.

(Concluded on page 188)

STATION W.... — SUMMARY OF EXCHANGES, THIRTEENTH A.R.R.L. ALL-SECTION SWEEPSTAKES

Freq. Band (Mc.)	Time On or Off Air	SENT (1 point)				Time	Date (Mon.)	RECEIVED (1 point)				Time	Date (Mon.)	Number of Each Different New Section as Worked	Points
		NR	Stn.	CK-RST	Section			NR	Stn.	CK-RST	Section				
3.5	On 6:10 P.M.	1	WIAW	579	Conn.	6:15 P.M.	16	3	W1JTD	589	Conn.	6:18 P.M.	16	1	2
		2	"	439	Conn.	6:25 P.M.	16	7	W1HYF	479	Conn.	6:30 P.M.	16	..	2
		3	"	589	Conn.	6:40 P.M.	16	2	W3LJM	339	Md.-Del.- D. C.	6:45 P.M.	16	2	2
7	" "	4	"	499	Conn.	10:18 P.M.	17	3	W2SJV	569	W. N. Y.	10:24 P.M.	17	3	2
		5	"	579	Conn.	1:25 A.M.	17	7	W9SXL	589	Ill.	12:15 A.M.	17	4	2
		6	"	549	Conn.	2:50 A.M.	18	15	W9NCS	479	S. Minn.	1:55 A.M.	18	5	2
14	On 1:00 P.M.	7	"	589	Conn.	3:00 P.M.	24	14	W5DWW	339	La.	1:05 P.M.	24	6	1
		8	"	579	Conn.	4:06 P.M.	24	11	W5NW	459	So. Texas	2:20 P.M.	24	7	2
		9	WIAW	349	Conn.	4:30 P.M.	24	16	WIGB	589	Conn.	3:55 P.M.	24	..	2
" "	Off 5:20 P.M. 4 hours, 20 min.	10	"	479	Conn.	5:10 P.M.	24	9	W6TI	439	East Bay	1:31 P.M.	24	8	2
									W9AND	579	Ill.	4:15 P.M.	24	..	2

Total Operating Time: 13 h., 10 m.

3.5, 7 and 14 Mc. used.

8 Sec., 21 Pts.
85 Watts Input Power

Number and names of operators having a share in above work
 Claimed score: 21 points × 8 Sections = 168 × 1.25 (85 watts input) = 210.

I hereby state that in this contest I have not operated my transmitter outside any of the frequency bands specified on my station license, and also that the score and points set forth in the above summary are correct and true.

Signature.....

Address.....

Tube line-up.....

Number different stations worked.....

Foreign Notes

ARGENTINA

In the first such instance on record, Arnold Proner, W2OMU, has been granted authority by the Argentine government to operate with the portable designator /LU while his ship, the SS *Winthrop Victory*, is in the port of Buenos Aires. Needless to say, the *Radio Club Argentino* arranged the matter. Proner must, of course, comply with all local regulations governing amateur stations.

Several Latin American countries have, from time to time in the past, granted licenses for special temporary permission to resident aliens. A great deal of what we hear on the air these days involving a portable designator plus a foreign prefix is "unofficial," of course. But now Argentina has taken this step, Colombia has proposed to IARU that reciprocal licensing arrangements should exist between countries, Cuba already licenses amateurs visiting from nations who grant reciprocal privileges, Canada and the United States may soon effect such an arrangement — and some day an amateur license may be valid throughout most or all of the world.

WAC CERTIFICATES

The International Amateur Radio Union is again issuing the coveted Worked All Continents award to licensed amateurs who submit confirmations of two-way communication with an amateur station in each of the six continental areas of the world.

The required areas are North America, South America, Africa, Europe (including European Russia), Asia (including Asiatic Russia), and Oceania (Australia, New Zealand, the Philippine Islands, the Netherlands East Indies, and most of the Pacific islands). Many questions arise because of the operation of amateur stations by occupation forces, particularly in the Pacific

islands. It may be said that only the main Japanese chain of home islands lies in the continent of Asia; all outlying islands are counted as Oceania. The Headquarters would be glad to answer inquiries about specific islands.

Under the rules of the Union governing the issuance of WAC certificates, the applicant must be a member of the national amateur society of the country in which he normally resides. No fee is required from such applicants. Persons residing in a country not represented in IARU must pay a fee of 50 cents to the Headquarters before a certificate can be granted.

Applications should be sent to the headquarters of the national amateur society; if there is none, they may be sent to Union headquarters, care of ARRL. Two types of certificates are available: the regular award, and a special one for telephony. In addition, there is a 28-Mc. endorsement available if an applicant submits cards showing that all contacts took place on that band.

FAR EAST

As a result of discussions between the R.S.G.B. and its members in India, it is planned to form a Radio Society of India, operating through branch managers, one in each of the larger cities. J. McIntosh, VU2LJ, Assam, is organizing the society in the north, and J. S. Nicholson, VU2JP, Travancore, in the south.

Licenses are again being granted in Malaya, with general provisions for 30 watts and as much as 100 watts available on special permission. The 160-meter band is available, shared, plus the 10- and 5-meter bands. C.w. or 'phone may be used.

British army personnel in Japan expect to obtain licenses soon, with J4 calls. The J9 calls apparently will be for U.S. service men.

(Concluded on page 132)



In a corner of the club rooms of the Radio Club Argentino several officers and members of the society gathered to welcome W2OMU. L. to r., LU7AZ, LU9AN (society secretary), W2OMU, LU6BK, LU7BK (society president), and LU9AX. In the background are various trophies and cups awarded for amateur operating skills, and the original receiver used by CB8 for the first Argentine-New Zealand contact (2AC) in May, 1924.

The VT-127-A in Amateur Transmitters

Practical Operating Data for 144 Mc. and Lower Frequencies

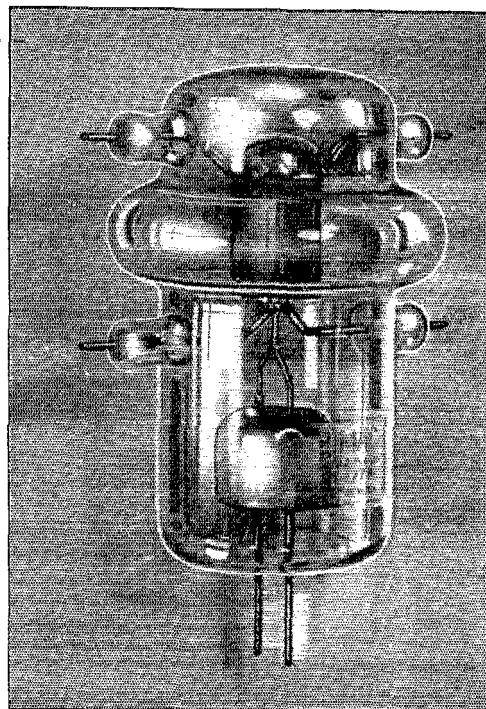
BY GOMER L. DAVIES,* EX-W8AFW

DURING the war, large quantities of tubes known as VT-127-As were required for use in connection with early radar equipment. The rapid development of better and better radars has made these early equipments obsolete and they, along with the tubes in them, have been turned over to the War Assets Administration by the Army for disposal as surplus. At the request of the WAA, we have made a study to determine just how these tubes could be used by amateurs, and some interesting results have been obtained.

In common with all other radar transmitting tubes, the VT-127-A was especially designed for pulse operation. It was therefore endowed by its designer with a very husky filament and with terminal insulation to permit operation at very high plate voltages. The tube, accordingly, should be capable of taking a terrific beating electrically, as compared with many other tubes.

Because pulse operation permits, in a properly-designed tube, the application of extremely high voltages to the plate, electron transit time is quite appreciably reduced and the tube can be operated at much higher frequencies under these conditions than under continuous-duty conditions. Consequently, most radar tubes cannot be operated under continuous-duty conditions except at frequencies much lower than their normal radar applications.

The original application of the VT-127-A called for operation at approximately 205 Mc. It is possible to use the tube as a Class C amplifier in continuous duty at this frequency, but neutralization becomes quite ticklish and the plate tank circuit almost disappears into the tube, so that reasonable efficiencies are rather difficult to obtain. In the 144-148-Mc. band, however, quite decent efficiencies are obtainable, and a pair of these tubes in a Class C amplifier is perfectly capable of putting 100 watts into an antenna system without the use of ex-



The VT-127-A, a triode designed for pulse operation in early radar equipment. The filament (leads out the bottom) takes 10.4 amperes at 5 volts.

cessive plate voltages, necessitating expensive power-supply equipment. This amount of power at about 146 Mc., together with a reasonably-directive antenna system, will establish fairly-high field intensities over rather long distances, particularly if the transmitter can be located at some altitude.

The appearance of the tube is shown in the photograph, and outline dimensions are given in Fig. 1. The plate leads are at the top of the bulb, the grid leads below them, and the filament terminals extend through the bottom in the form of two stiff wire leads approximately $\frac{1}{16}$ inch in diameter. Special mounting blocks or other contact arrangements must be used for these filament leads, but this should not present an insuperable problem to most amateurs. Fig. 2 shows a drawing of the filament support and connection blocks which were used in the radar transmitter designed for use of the VT-127-A. If this

• Large quantities of the VT-127-A were made during the war for now-obsolete radar equipment, and the tube is plentiful as surplus. Little, if any, information has been available on its performance in c.w. transmitters as contrasted to the pulsed oscillators for which it was designed. Here's some authentic dope on what the tube can do and how to use it.

* P.O. Box 71, College Park, Md.

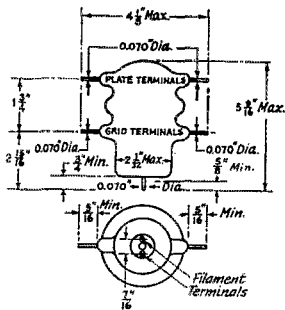


Fig. 1—Outline drawing and dimensions of the VT-127-A.

TABLE I

VT-127-A Two Tubes in Push-Pull as a Power Amplifier Typical Operating Conditions—144 Mc.		
D.C. Plate Voltage	1000	2000
D.C. Plate Current	330 ma.	200 ma.
D.C. Grid Current	48 ma.	10.6 ma.
D.C. Grid Bias	5000-ohm resistor	Fixed Bias
Grid Driving Power	— 240 volts	— 300 volts
Power Output	14 watts	15 watts
Over-all Efficiency	36 watts	109 watts
	26%	27%

particular mounting block is beyond the scope of your shop facilities, you will undoubtedly think of a half dozen other methods of connecting to the filament leads and supporting the tube. The only thing that need be remembered in this connection is that the filament current is fairly heavy and the contact design should be adequate to carry this current.

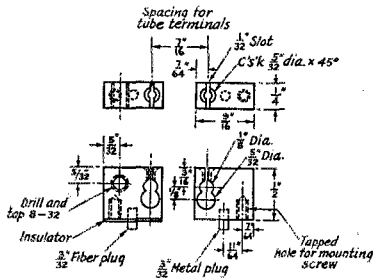


Fig. 2—Filament support and connection blocks. The two differ in that one is intended to be grounded to the metal chassis and the other insulated from it. Both blocks may be made like the one at the left if the center-tap of the filament transformer is to be grounded. The 8-32 tapped hole is for a binding screw for filament-supply leads.

Operating at 144 Mc.

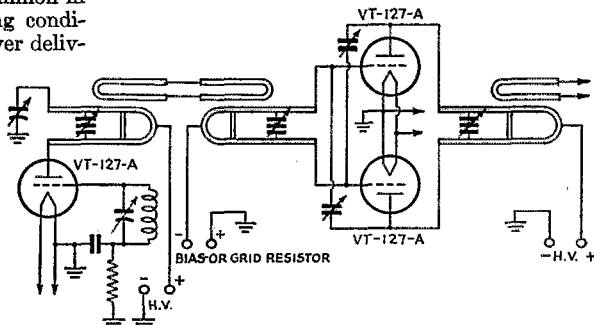
Table I shows a typical set of operating conditions for continuous-duty operation in the 144-148-Mc. band. These latter data were obtained with a push-pull neutralized amplifier of conventional design. The power output given does not represent tube output, as is common in such tabulations of calculated operating conditions, but actually represents useful power deliv-

ered to a load and thus takes into account losses in the tank circuit and some transmission-line losses. In order successfully to use the tube as an amplifier it was necessary also to determine suitable driving means, and it was found that one VT-127-A will operate very nicely as a doubler to drive two of them in a final amplifier. If high-level modulation is desired, the tube may also be used as a Class B audio-frequency amplifier, two of them operating in this fashion being able to modulate two VT-127-A Class C amplifiers. Grid modulation is also reasonably satisfactory.

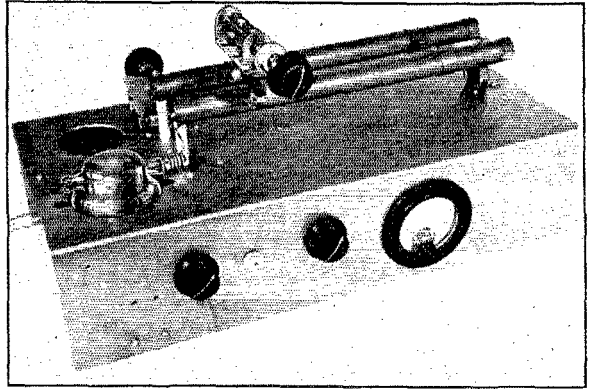
Fig. 3 is the circuit diagram of the doubler and amplifier, while various views of the experimental units are given in the photographs. The stages preceding the doubler are not shown because techniques for obtaining the 8 to 15 watts necessary to drive the doubler are well known to amateurs. Presumably, of course, a crystal oscillator and suitable doubler stages would be used. A tube such as the 807 would provide adequate excitation for the VT-127-A doubler.

It is vitally important that the neutralizing-condenser leads be made as nearly zero in length as possible. Consequently, the adjustable elements of these capacitors are mounted directly on the high-potential ends of the plate-tank conductors, as shown in the top view of the amplifier unit. The neutralizing condensers are coaxial capacitors, dimensional details being given in Fig. 4. In order to hold the inner conductor concentric with the outer shell and to increase the flash-over voltage, the polystyrene sleeve indi-

Fig. 3—Circuit diagram of the 144-Mc. transmitter using a VT-127-A doubler and a pair of the same tubes as the final amplifier. Circuit values are discussed in the text.



One VT-127-A as a doubler provides sufficient drive for the pair in push-pull. The small variable condenser connected to one side of the plate tank is used to balance the tube capacitance and thereby maintain symmetry in the tank circuit.



cated was used. This eliminates the necessity for rigid and accurately-aligned supports for the inner movable elements of the condensers. The plate-tank conductors are $\frac{3}{4}$ -inch copper tubing 16 inches long. The tuning condenser is a miniature dual-section unit having a maximum ca-

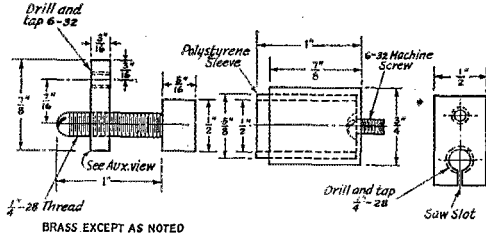


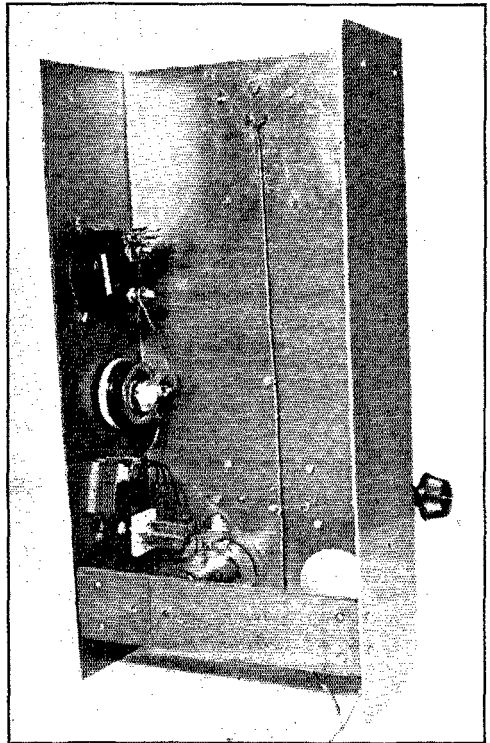
Fig. 4 — Construction of the neutralizing condensers used in the amplifier.

capacity of $15 \mu\text{fd.}$ per section. It is mounted $2\frac{1}{2}$ inches from the high-potential end of the plate tank circuit. No choke or by-pass condenser is used in the high-voltage plate-supply lead, because careful attention to symmetry is far more effective at these frequencies than any chokes or by-passes ever built. The high voltage lead naturally must be disposed physically so that it does not pick up energy from the r.f. circuits. This may be done in several ways: (1) by keeping it in the center plane of the amplifier unit; (2) by keeping it close to the chassis; or (3) by running it inside a copper tube or shielding braid which is carefully grounded.

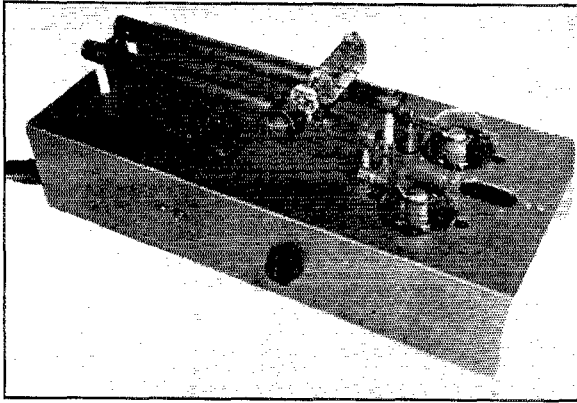
The bottom view of the amplifier unit shows the grid tank circuit and grid connections of the neutralizing condensers. It will be noted that these connections are made from wide copper strips to reduce the inductance as much as possible. The tuning condenser is the same type as the one used for plate tuning, and is mounted $2\frac{1}{4}$ inches from the high-potential end of the tank circuit. For the experimental work which is being carried on the tank circuit was made longer than actually necessary, and its length is adjusted by the short-circuit shown to resonate it

properly. The actual length used is $5\frac{1}{2}$ inches, and it is unnecessary to make the circuit longer than this. Conductors used in the grid tank circuit are $\frac{3}{8}$ -inch copper tubing, spaced $1\frac{1}{2}$ inches. If the conductor size or spacing is changed, it will be necessary to change the length of the tank.

For satisfactory operation, the filaments must be as near r.f. ground potential as possible. It was found that this could be achieved to a sufficient degree by grounding one of the filament support blocks of each tube to a wide metal sheet



The doubler grid circuit, operating on 72-74 Mc., uses a conventional coil-condenser tuned tank.



An experimental amplifier using VT-127-As in push-pull. Short leads in the neutralizing circuit are an essential for proper operation.

passing under the chassis. This sheet extends across the upper end of the chassis in the bottom view.

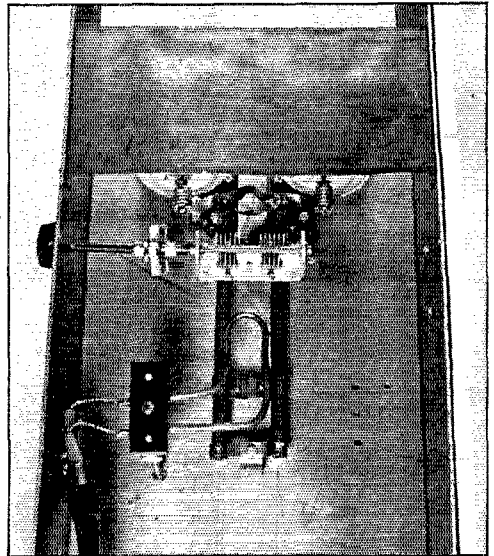
The extra grid and plate connections on the tube are very tempting as neutralizing-condenser connections, because they would provide a very handy mechanical separation of tank circuits and neutralizing condensers. Such an arrangement does not behave properly, however, and any attempt to put the neutralizing condensers on the side of the tube opposite to the side on which the tank circuits are located makes it impossible to tune the grid circuit, and also reduces very materially the excitation voltages which can be developed on the grids.

In the adjustment of the amplifier, the excitation is first applied without any plate voltage on the amplifier and the grid circuit tuned for maximum grid current. Initial neutralizing adjustments are made by swinging the plate tuning condenser through resonance and adjusting the neutralizing condensers until the effect on the grid current is minimum. It will probably be impossible to eliminate entirely the variation of grid current as the plate tuning is swung through resonance. Final adjustment of neutralizing condensers is made by applying a relatively low voltage to the plates and making final "touch-up" adjustments so that plate-current minimum and grid-current maximum occur at exactly the same setting of the plate tuning condenser. Neutralizing adjustments must be carefully made, because incorrect adjustments may result in severe oscillation at settings of the grid or plate tuning condensers quite different from the resonance setting. This condition may also occur when the neutralizing condenser leads are not returned to the grid and plate circuits at points as close to the tube terminals as is practically possible. It is for this reason that the neutralizing-condenser connections are made directly to the grid terminals of the tube. Even a half inch of lead common to the neutralizing-condenser circuit and the grid tank circuit may be very detrimental to proper neutralization. If the circuit is properly laid out and

adjustments are carefully made, neutralization will be as effective as at lower frequencies.

Doubling Frequency

The doubler is quite conventional, using a coil and condenser for input tuning, as shown in the bottom view of that unit, and a transmission line tank for the output tuning as shown in the top view. The grid coil is composed of three turns of No. 14 wire, $1\frac{1}{4}$ inches in diameter, with a spacing of $\frac{3}{8}$ inch between turns. The tuning condenser has a maximum capacity of $8\ \mu\text{fd}$. The plate tank circuit is $7\frac{1}{2}$ inches long and is made up of copper tubing $\frac{3}{4}$ inch in diameter, spaced $2\frac{1}{4}$ inches apart. The tuning condenser is the same as is used in the amplifier unit and has a maximum capacitance of $15\ \mu\text{fd}$. per section.



Bottom view of the amplifier chassis. Note the arrangement of the tank and neutralizing leads to the grid. The leads are made from copper ribbon to reduce inductance.

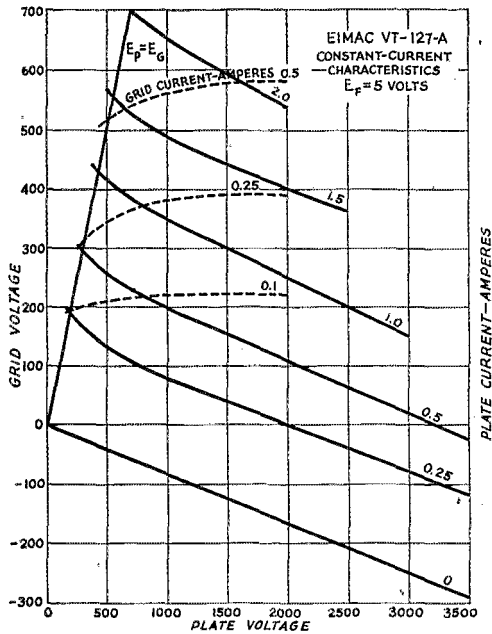


Fig. 5 — Constant-current curves of the VT-127-A at plate voltages usable in continuous-duty service.

In order to balance the doubler plate line to the r.f. potential, a variable condenser having a maximum capacitance of 50 $\mu\text{mfd.}$ is connected at the high-potential end of the line opposite the tube.

The power required to drive the doubler is approximately 8 watts. Excitation power for the final varies, of course, with operating conditions, and ranges from 15 to 25 watts. Power gain in the final amplifier is approximately 10 insofar as the tubes themselves are concerned, although it may be as low as 4 or 5 from driver output to useful load because of circuit losses added to the tube losses. Actual tube efficiencies in the final amplifier are in the vicinity of 60 per cent, as indicated by measurements made with a crude optical pyrometer to determine the plate dissipation, calibration of the pyrometer being made by applying plate power to the tubes in a nonoscillating condition. This method is not too accurate,

TABLE II

VT-127-A Audio-Amplifier Operating Conditions — Two VT-127-As in Push-Pull, Class B	
Load Impedance	3000 ohms
Equivalent Plate-to-Plate Impedance	12,000 ohms
D.C. Plate Voltage	1500
D.C. Plate Current	242 ma.
D.C. Grid Bias	— 125 volts
D.C. Grid Current	44 ma.
Power Output	200 watts
Grid Driving Power	7.3 watts

TABLE III

VT-127-A Class-C Amplifier (Single Tube) Medium-Frequency Operation		
D.C. Plate Voltage	1000	2000
D.C. Plate Current	220 ma.	210 ma.
D.C. Grid Current	75 ma.	67 ma.
Grid-Bias Resistor	2700 ohms	5100 ohms
Grid-Bias Voltage	— 200	— 340
Driving Power	28 watts	25 watts
Plate Dissipation	110 watts	105 watts
Power Output	110 watts	315 watts
Plate Efficiency	50%	75%

however, because the distribution of heat on the plate is different when the tubes are operating under r.f. conditions than when they are operating under static conditions. It is rather difficult, therefore, to compare plate temperatures under the two operating conditions.

Audio- and Low-Frequency Operation

Fig. 5 shows the grid and plate constant-current characteristics for use in calculating tube performance. These characteristics were used to calculate the audio-amplifier operating conditions listed in Table II. Two VT-127-As operating under such conditions will furnish power for plate-modulating the final amplifier

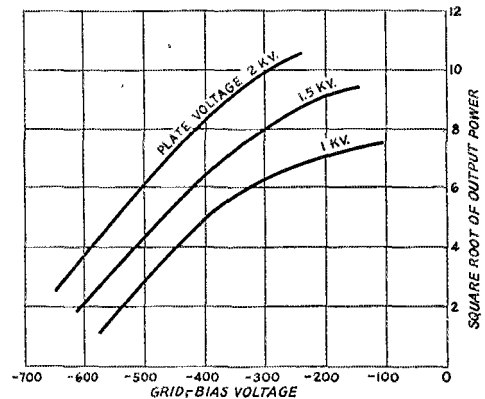


Fig. 6 — Grid-bias modulation characteristic of the 144-Mc. amplifier under typical operating conditions. The square root of the output power is proportional to either r.f. tank voltage or current, thus perfectly linear operation would be indicated by a straight-line characteristic.

previously described. The amplifier may also be grid-modulated, Fig. 6 showing the square root of the power output against grid voltage. This shows that reasonably good grid modulation can be obtained with a carrier output of 25 watts. Modulating power required is approximately 3 watts under these conditions.

Of course, the VT-127-A may be used in a similar manner in any lower-frequency amateur

(Concluded on page 138)



Happenings of the Month

INTERNATIONAL CONFERENCES — BUDLONG TO MOSCOW

Giving expression to the wishes of 30-odd nations, the United States has issued invitations to a plenipotentiary world telecommunications conference to be held in the United States next year, to revise both the Madrid convention and the Cairo regulations. The most probable site is Chicago. The tentative opening date is April 15th. The conference is expected to last many months, perhaps eight or nine.

Meanwhile a preliminary conference of the five great powers — China, France, Great Britain, U.S.S.R. and U.S.A. — convened in Moscow on September 28th. The United States sent a delegation of 14 persons plus a secretariat of 7, accompanied by 5 “industry representatives” who are spokesmen for various civilian enterprises in this country. Included in the latter is our own senior assistant secretary, Arthur L. Budlong, W1JFN, representing ARRL. The conference is expected to last about a month. Its purpose is to seek a preliminary understanding and exchange of views between the major nations, prefatory to the world conference, since many changes are contemplated in the international organization of telecommunications. There will also be an exchange of views on allocation matters, and much about the outlook for the coming world conference may be visible from this preliminary one — which was the main reason why ARRL thought it wise to have representation, even though the Moscow meeting does not possess the power to make final decisions. In a later issue we'll give you a report of the outcome.

ELECTION RESULTS

Apparently there is going to be spirited voting for director and alternate in most of our divisions where elections are being held this year. In only a few cases did the Executive Committee find a single candidate to declare elected without balloting by the membership.

The only such case concerning a director was in the New England Division where the incumbent, Percy C. Noble, W1BVR, was the only eligible candidate. He has been declared reelected for the 1947-48 term. W1AVJ was also nominated but was found ineligible for want of the required continuous membership.

The Central Division has its new alternate director for the next term in the person of Harold H. Jansen, W9DJG of Alton, the only lawfully-nominated candidate. A former assistant director

under Director Dosland, OM Jansen has had an active ham career and has held various offices in the Egyptian Radio Club. He is a division furniture-department manager for Sears-Roebuck.

The Northwestern and Roanoke Divisions returned their incumbent alternates, respectively R. Rex Roberts, W7CPY, and J. Frank Key, W3ZA. Mr. Roberts was the only candidate in his division. In the Roanoke, W8DFC was also named but was ineligible because of insufficient length of membership.

In the Southwestern, W6ANN and W6RBH were nominated but the former was ineligible for want of continuous membership in the League and the latter OM, Arthur Schifferman of Glendale, was declared elected.

A report of the balloting for the other offices will appear in our January issue.

HUDSON DIRECTORSHIP

Director Robert A. Kirkman, W2DSY, of the Hudson Division, after six years in office has found that the press of personal affairs makes necessary his withdrawal from active participation in League affairs. He has turned over his powers and authorities to his alternate, George Rulffs, jr., W2CJY, who will be acting director for the remainder of the year. This exchange of positions will be further reflected in the fact that in this autumn's elections Mr. Rulffs will be a candidate for director, Mr. Kirkman for alternate.

MICROWAVE CHANGE

In this column in the September issue we told of a change expected in our 5250-Mc. allocation which would narrow that band and shift its location slightly, and compensate us by creating an additional band in the 3000-Mc. region. FCC has now taken care of the matter with its Order 130-I, which recapitulates all presently-authorized amateur frequencies except our 5250-5650 Mc. assignment, making instead assignments to amateurs at 3300-3500 Mc. and 5650-5850 Mc. As with the other microwave bands, A0, A1, A2, A3, A4, A5, f.m. or pulse emission may be used. The order was effective September 10th.

RENEWALS & MODIFICATIONS

The FCC amateur licensing unit is now up to date in its handling of amateur applications and is eager to have all amateurs eligible for renewal or desiring to submit applications for modification because of change of address or call area make filings *immediately*, while the extra staff is available to handle the load.

Amateurs whose licenses show date of issuance between December 7th and 31st in the years 1938 to 1943, inclusive, or any day in the months of January and February from 1939 to 1944, inclusive, are now eligible to apply for renewals. Note that renewals applied for now (and up to December 31, 1946) do not require proof of use; this portion of the application form may be disregarded. Amateurs located at addresses other than those specified in their licenses, or in locations where the station call is due to be changed because of changes in the call areas, should also apply for modification, regardless of date of expiration.

If you fit any of the above classes, send now to the proper district office of the Commission for Form 610, fill it out, *attach your old licenses*, and get it into the Commission at Washington, D. C. Prompt action now will avoid delay later.

ELECTION NOTICE

To All Members of the American Radio Relay League Residing in the Dominion of Canada:

You are hereby notified that, in accordance with a resolution of the ARRL Board of Directors, a special election is about to be held in the Dominion of Canada to elect both a member of the ARRL Board of Directors (in the office of Canadian General Manager) and an alternate thereto, for the unexpired remainder of the 1946-1947 term and for the following 1948-1949 term of two years. Your attention is invited to §1 of Article IV of the constitution, providing for the government of ARRL by a board of directors; §2 of Article IV, and By-Law 12, defining their eligibility; By-Laws 13 to 24, outlining the process for the nomination and election of directors and their alternates; and By-Laws 28 to 30, dealing particularly with Canada. Copy of the Constitution & By-Laws will be mailed any member upon request.

Voting will take place between January 1st and February 20, 1947, on ballots that will be mailed from the Headquarters office in the first week of January. The ballots will list, in one column, the names of all eligible candidates nominated for Canadian General Manager and, in another column, all those similarly named for the office of alternate thereto. Each member will indicate his choice for each office.

Nomination is by petition. Nominating petitions are hereby solicited. Ten or more Canadian members of the League may join in nominating any eligible Canadian member as a candidate for Canadian General Manager or as a candidate for alternate thereto. No person may simultaneously

be a candidate for both offices. Inasmuch as all the powers of the director are transferred to the alternate in the event of the director's death or inability to perform his duties, it is of as great importance to name a candidate for alternate as it is for director. The following form is suggested: *Executive Committee,*

*The American Radio Relay League
West Hartford 7, Conn.*

We, the undersigned Canadian members of the ARRL, hereby nominate....., of....., as a candidate for Canadian General Manager; and we also nominate....., of....., as a candidate for Alternate Canadian General Manager; for the remainder of the 1946-1947 term and for the full 1948-1949 term.

(Signatures and addresses)

The signers must be League members in good standing. The nominee must have been both a member of the League and a licensed radio amateur operator for a continuous term of at least four years immediately preceding receipt by the Secretary of his petition of nomination, except that a lapse of not to exceed ninety days in

the renewal of the operator's license and a lapse of not to exceed thirty days in the renewal of membership in the League, at any expiration of either during the four-year period, will not disqualify the candidate; *provided*, that if a candidate's membership has been interrupted by reason of service in the armed forces of Canada or the United States, he shall not be deemed to be disqualified so far as concerns continuity of membership if he has, since May 7, 1943, renewed his ARRL membership within ninety days of discharge from the military service. He must be without commercial radio connections: he may not be commercially engaged in the manufacture, selling or renting of radio apparatus normally capable of being used in radio communication or experimentation, nor commercially engaged in the publication of radio literature intended, in whole or part, for consumption by licensed radio amateurs. Further details concerning eligibility are given in By-Law 12. His complete name and address should be stated. The same requirements obtain for alternate as for director. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EST of the 20th day of December, 1946. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition

NOTICE TO READERS

• The Publishers regret that rising production costs have made it necessary, effective with this issue, to increase the newsstand price of *QST* to 35 cents a copy.

There is no change in League membership dues.

for the office of alternate. To be valid, a petition must have the signature of at least ten members in good standing; that is to say, ten or more members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are frequently found not to be members in good standing. It is not necessary that a petition name candidates both for director and for alternate but members are urged to interest themselves equally in the two offices.

Classification of Canadian members into Full Members and Associates is still in process, occurring at time of renewal throughout the coming year. Members possessing certificates of Full Membership, and members not yet classified and holding valid old-style membership certificates, may nominate candidates, or may stand as candidates if otherwise eligible. But members holding certificates of Associate Membership are not eligible to either function.

The present Canadian General Manager is Alexander Reid, VE2BE; the Alternate Canadian General Manager is Leonard W. Mitchell, VE3AZ.

This election constitutes an important part of the machinery of self-government of ARRL, providing the constitutional opportunity for Canadian members to put the management of their affairs in the hands of representatives of their own choosing. Canadian members are urged to take the initiative and file nominating petitions immediately.

For the Board of Directors:

K. B. WARNER,
Secretary

October 1, 1946

NOTICE TO MEMBERS DISCHARGED FROM THE MILITARY SERVICES

The requirement of continuous membership in the League for eligibility to ARRL offices has been waived for members serving in the uniform of the United States or Canada. See particulars on page 27 of *QST* for July last. Those desirous of

DX QSLs

• "Claim your old QSL cards now or never," says page 31 of July *QST*, because all prewar cards not applied for by next January 1st will be disposed of at that time, by order of the ARRL Board of Directors.

If you did any hamming prewar, some of these DX cards may be for you! Look up the July article and submit the required self-addressed stamped envelope to your *QSL* Manager now.

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.

taking advantage of this arrangement are required to claim the right when renewing membership, stating the beginning and ending dates of their military service.



SAY, Marthy, would this be November *QST* or is it your copy of *McNiche's Fashion & Sewing Guide*?" Cosh-oh-golly, what's our *QST* coming to — with this 1921 fashion-plate cover picturing the glamorous middling sister of the Gibson Girl and Flapper, complete with scalar, purple frock coat, checkered stockings and swanking stick? It's captioned "A Wireless Message"!

However, a quick glance at the inside pages puts us on familiar ground. In "QRV for the Transatlantics?" we read that our second effort to span the Atlantic seems destined to succeed, if the coöperation and enthusiasm of the gang are any criterion. Preliminary tests are under way, with 78 stations taking part. Messrs. Burnham & Co., English manufacturers of the "Burndept III Ultra" receiver, have announced that one of their models will be awarded to the first-ranking ARRL member in the test. Paul Godley sails on the 15th, and for the reception of his reports as broadcast nightly from MUU, Carnarvon, A. L. Groves, long-wave reception authority, passes along some choice pointers.

ARRL's Advisory Technical Committee, working with Messrs. Godley, Dellinger, Mathews, Kruse, Hazeltine, Ballantine, Ballard and Clausing, has gone into the problems of spark-transmitter interference to lighting, bell-ringing and telephone circuits. These serious troubles are caused either by feed-back into the power lines, or because of direct radiation from our antennas. Many remedies are suggested in "The Protection of Near-by Wiring Against Troubles Caused by Spark Transmitters." One brave committeeman goes so far as to recommend use of c.w. when all other approaches have failed.

McMurdo Silver gives us fresh ideas on making

our variometer-tuned receivers operative as low as 150 meters, in his article "Increasing the Tuning Range of Regenerators." Ellery W. "A-P" Stone writes of "Short Wave H. F. Amplification," and describes the sure-fire receiver circuit he mentioned at the Chicago convention. The first r.f. tube is made to do double duty in one version, also acting as an audio amplifier. C. F. Butcher, 5AL, tells how to loop-modulate c.w. transmitters; H. H. Beverage, 2BML, shows the way to lower antenna resistance through "Improving the C. W. Ground System"; and W. C. White's paper on "Some Operating Notes on the Larger Sizes of Transmitting Tubes," presented at a recent meeting of the Radio Club of America, is reprinted for the edification of the high-power c.w. group. New apparatus descriptions include the Tuska Tuner and the Vocaloud 'speaker. J. V. Pursell, of 3ZF and 1CAR, rounds out the technical section with his "Theory of Freak Transmission," which sets us right on present-day propagation thinking.

The static season has passed and c.w. is helping traffic totals soar to new heights. Decker, 2UA, White Plains, leads with 491 messages. Vermilya has his old Grebe "sink" back, and reports 204. Division reports are growing — Alaska reports 6 ARRL members now as against 1 six months ago. Traffic Manager F. H. Schnell also is conducting *QST*'s "With the Affiliated Clubs" department, and this month's section shows lots of activity around the country. Outstanding emergency work is reported during the recent New Mexico flood, with credit to 5FY, 5FZ and 5ZJ.

Letters to the editor this month favor simplified receiver tuners and graded amateur licenses, suggest new means for r.f. amplification, and protest transformer (high-powered) hams.

Strays tell us the White Plains, N. Y., gang are using call plates on their cars that match the license plates. . . . Speculation is rife as to the brand of tonic or hair restorer used by J. O. of 2ZL, to produce the luxurious sward he is wearing in the photograph on the cover of the Radio Corp.'s catalog. . . . A suggestion is made by 3VR that when vacuum tubes are mounted horizontally from a panel, the ends be dipped in lamp coloring to reduce glare. . . . Wouldn't it be wonderful if we could all hear as much on one tube as ITS does!

Advertising Manager Adams will have a difficult time explaining why the Rose Radio Supply half-page ad was published upside down — or was it done deliberately to arrest our attention? The General Radio Co. promises 20 miles per watt on c.w. to those using their components.

**SWITCH
TO SAFETY!**



Strays

W6HG worked W1ADM for the second time in May, 1946, *twenty years* after their first QSO, which took place in June, 1926!

— — — —

Gas-driven, or just motorboating? W3CJM ran across this one in *The Sunday Star*, Washington, D. C.: "Amplifying system, dual 50-watt put-put . . ."

— — — —

Would the 10,000-volt 100-ma. final stage at W3IIN/3 be called a "killerwatt" rig?

— — — —

Ex-DX Hound

Oh, the night was dark and hazy when the ham went DX-crazy,

As he heard the signal "DX3IB."

Indistinctly he could hear him, for the QRM was near him,

And the signal was so poor in RST.

Disillusionment was bitter when he turned to his transmitter —

Not a meter moved when he depressed the key.

He madly flipped the switches, turned dials with frantic twitches —

Oh, there never was a sadder ham than he.

Out upon the working table spread he tubes and coils and cable,

Mixed with solder, blood and sweat and toil and tears. When the rig had been dissected, double-checked and reconnected,

Then at last an r.f. signal met his ears.

Still possessed with DX fever, back he turned to his receiver, Weak with fear that he had lost the station now;

As his hopes were surely falling, once again he heard him calling:

"3IB didowdidowdit dowdidow."

In his heart was wistful wishing as his ECO went swishing, And he parked upon the DX frequency.

He was filled with tense emotion, hoping he could span the ocean,

As his trembling fingers pressed upon the key.

In a state of wild elation then he listened as the station,

Through the QRM, said plainly, "QSL" —

But it left him quite suspended, for to *whom* that was intended

Was the all-important thing he couldn't tell.

Called he now the station madly, eagerly at first — then sadly,

But he heard that DX signal nevermore.

Ever hopeful — faith undaunted — for the QSL he wanted, Every day he met the postman at the door.

But his mood was not elation when at last the confirmation Of the effort he'd expended reached his hand.

'Twas a formal accusation of illegal operation

On a frequency not quite within the band.

Sadder now — his fever broken by the FCC's blue token — Still he operates with everlasting hope.

But, although his calls are many and his QSOs are plenty, They are always strictly local in their scope.

— Joanna and John Brawley,
W0JWJ and W9GYZ

Postwar DX, Where Is Thy Ring?

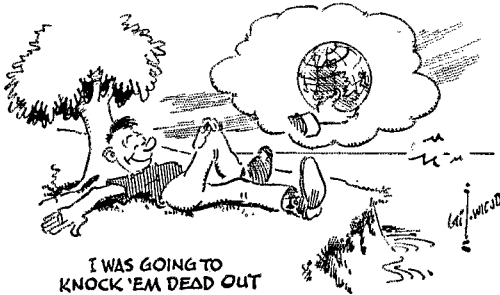
A Californian Fantasy

BY NED JACOBY,* EX-W8KPB

SINCE MY release from the Army Air Forces after nearly six years of duty I have read a great deal about the readjustment problems of the veteran but I have yet to read about those of the radio amateur and, particularly, of the DX man. Having weathered the war with nothing worse than several harrowing experiences caused by contact with unknown amounts of Chinese plum brandy and orange champagne, I really have nothing to kick about, mind you; it's just that events of the past few days have shaken me a little and I'd like to pass them on so that other postwar "innocents" may profit from my ordeal.

After living like a mole for seven years and spending an inhuman amount of time running up 124 countries and 39 zones from Cleveland, Ohio, 1940 found me taking my physical examination for the Air Corps Cadets with no serious defects other than a deep groove across my skull, caused by "featherweight" headsets, and a pair of ears slightly cauliflowered and prone to vibrate like tuning forks every time an auto went down the street. "Merely an acute case of ignition-noise anticipation," said Army authorities, and with that I was snatched into a life in which, except for forcibly mooching the key now and then from our air-crew radio operator, DX and the familiar trampled ground of 20 meters vanished for many years.

Then, suddenly, I awoke to find myself established in Southern California, a copy of *QST*



opened in front of me to "How's DX?" and a decided itching sensation in the almost vanished callous on my old key finger. The thought of how I was going to knock those Asians dead from the West Coast was almost too much for me, and I sneered serenely to myself as I visualized the havoc I was about to wreak on the Los Angeles

* Box 351, Laguna Beach, Calif.

DX crew. Naturally I had heard those fantastic rumors about Kalifornia Kilowatts but really, I told myself, one has to discount a lot of things one hears. Besides, I had once known a ham in Cleveland who had a kilowatt and his signal strength scared DX so badly they never had the nerve to come back to him. I'll murder 'em out here, I thought, visualizing my prewar 100-TH exciting my prewar Hertz until the very ether shook.

At any rate, preparation for my debut into West Coast DX circles found me walking down a boulevard in West Los Angeles, accompanied by De Jones, an old friend of mine who had already received his new W6 call. Mind you, since 1940 I had been as cut off from developments in radio as VR6AY — maybe more! Jones, whose face was prematurely lined and whose hands shook noticeably (the war, I thought naively) was leading me to my first postwar radio shop where, after looking over available equipment I was going to lay my plan of action for the rebirth of W8KPB on the Golden Coast of the Pacific. An old hand at haunting the bins of dusty resistors and SW-3s that passed for radio shops at home before the war, I had a pathetically-unfounded feeling of confidence as Jones and I passed several hopped-up Model As parked along the curb and entered the polished doors from which I was shortly to emerge a broken man.

Like the low end of 40 on the first night of the DX contest, what happened from that point on is not too clear to me yet. My friend, Jones, was snatched from my side and I was sucked into the vortex of a mob scene resembling something out of Cecil B. DeMille's best efforts in "Sign of the Cross." On all sides of me were thin, tanned, intense individuals mumbling what seemed to be football signals to a man in a white smock on the other side of a counter. With the exception of that man the oldest actor in the scene was at least twelve years old. As I watched uncomprehendingly, a youth approximately four feet high leaped to the counter, deposited a roll of bills the diameter of a beer barrel and staggered out of the door carrying a huge box on his back labeled cryptically, 750T. At first I imagined that he had just purchased a crated jeep, but a second glance revealed Eimac's trade-mark and I gathered that I was standing at a sales counter for radio tubes.

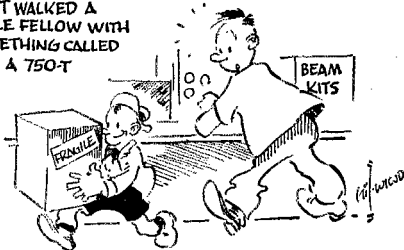
And I realized this none too soon, for suddenly the white smock was in front of me. A taut hush

fell upon the crowd and all eyes turned coldly toward my quaking form. They could recognize a tourist when they saw one.

"Yeah?" said the white smock, "What ya want?"

"Well," I said timidly, "I had a 210 buffer before the war and . . ."

OUT WALKED A
LITTLE FELLOW WITH
SOMETHING CALLED
A 750-T



With that a hoarse chorus of disparaging jeers went up from the mob and I felt myself lifted by many hands and hurled bodily through the air.

Upon landing and cutting my engines I found myself in another room. Except for a soft crackling noise all was silence. Before me at a long table sat at least ten people, clad mainly in sandals, hand-stitched sport shirts and pastel-colored slacks, hunched intently over a number of giant metal cabinets bristling with meters and chromium knobs. Silently I crept up behind one of the friendlier-looking of these individuals and stole a closer look at the strange instrument he was manipulating. At first I had an uncomfortable sensation that I was witnessing a combat dive in a U-boat, but when signals recognizable as c.w. began to come from a 'speaker, I realized that I was in familiar territory at last. This was a receiver demonstration room!

"Where's the volume control on that thing, Mac?" I asked. "Gee, I had an old FB7-A that could really drag them in and it only had one knob . . ."

"Quiet!" he snapped and, sure enough, through the Los Angeles QRN came a weak and tantalizing "CQ DX." By maneuvering several gear handles labeled in Arabic my tutor suddenly brought the signal up to a pitch that made my insulas rattle like a Vibroplex. The signal signed VS4JH.

"Boy! And S9!" I said.

"S4 on the meter," said my tutor with a distinct air of toleration and superiority.

Then a strange thing happened. As VS4JH continued his CQ, weird swooping sounds reminding me somewhat of a low-level Kamikaze attack began to come from the 'speaker. By some coincidence these peculiar signals all stopped directly on VS4JH until finally it was hard to tell whether we were listening to Borneo or Kirsten Flagstad singing "The Ride of the Valkyrie."

Before I could inquire about this queer phenomenon the floor began to tremble and a low

whirring sound, like a helicopter in flight, filled the room.

"What's that, an earthquake?" I whispered nervously to my new-found comrade. He favored me with a look of pity and amazement.

"Rotaries," he said starkly.

"I was a member in Cleveland myself," I began confidentially, "but I never knew that out here they . . ."

"Look out the window, stupid," he rasped and turned back to his wrestling with the receiver controls.

As I obediently gazed out of the window my first sensation was one of pure scenic pleasure. The view was unobstructed toward the distant Hollywood and Beverly Hills areas. Then I began to notice a horrifying thing. Like a vista of Dutch windmills, extending as far as the eye dared to reach, were myriad weird devices perched on top of telephone poles and, as they all ceased revolving and came to rest pointing in the general direction of Borneo, the ghastly realization burst upon me.

"Good Lord, man," I said excitedly, "We've got to get some word to VS4JH before he finishes that CQ. If he doesn't take his headset off when he signs over he'll be electrocuted by remote control!"

But at this moment I was approached by another figure in a white smock who had evidently been waiting until he could catch me in a vulnerable position.

"I see you're looking over one of our new post-war models," he said craftily. "What do you think of that supersonic stream-flow cabinet? This one only has thirty-six tubes and twenty-three knobs, you know, but by merely browbeating your family into taking a five-months' indoctrination course at the receiver factory they can eventually learn to use this model for ordinary broadcast reception, not to mention f.m. Its handsome Shocking Pink and Dirty Brown crackle finish will grace any living room, and you'll find it'll make the OW welcome your hobby at last."

As he paused for breath I tried to argue that the only place I could escape from the OW was a back-room shack and that the prospect of sweating over AC4YN in the parlor while listening to her relatives was a pleasure that I would pay good money *not* to experience. Nevertheless I found that the salesman had stuffed a catalogue into my shirt and moved on unperturbed to another prospect.

Fortunately, my friend Jones, seeing that I was about to collapse, rushed up and practically carried me out to the street.

"That's enough for today," Jones said. "You've got to take this readjustment business pretty slowly at first. Now just relax and tell me what you thought about it while I'm helping you back to the car."

"Well," I stammered, "I really didn't get a chance to do much looking around at anything but the receiver situation and it sort of has me worried. With one of those gadgets, provided he doesn't catch his hand in the control gears, any guy can hear *everything* there is to hear. That's sure going to make DX competition rough, I guess."

". . . and I saw some little fellow walking out with something called a 750-T," I added thoughtfully.

"Yeah, sure," said Jones, "a 750-T makes a good buffer."

"Well, anyway," I said, trying to conclude on a note of optimism, "I guess that even with those hot receivers the boys still have to build their transmitters and maybe lack of parts will keep quite a few people off of 20 meters for a month or two until I can work a VE or maybe K6."

As if in answer to that remark fate dealt me its cruelest blow of the day. The catalogue, tucked forgotten in my shirt, fell open upon the pavement and, as I stooped to pick it up, my eyes bulged out as if I was staring at a cobra coiled to strike.

On the page below me sat a well-groomed and earphoned youth of about fourteen, reclining comfortably in a chromium-tube chair before a modernistic plastic table. The surrounding room was done tastefully by a Park Avenue decorator and, nestling modestly behind some fifty-buck drapes, were several QSLs (DX, of course) pinned neatly onto wallpaper which had cunning pictures of ships and airplanes printed on it. When, like the docile reader of advertisements that I am, I had this preliminary atmosphere imprinted firmly on my mind, I allowed myself to look at what was on the table.

There, reposing on its glittering black surface, stood two little boxes side by side. They were each the size and shape of a portable b.c.l. set suitable for taking to the beach on Sundays. Beside one box a key peered out timidly at me and, as I grasped the implications of this entire photograph, I let my numbed eyes wander to the legend below. In what follows immediately hereafter I cannot quote but can only attempt to convey the impression I received as I scanned the printed lines.

For approximately one hundred dollars I could have this entire real-life radio station complete with receiver, transmitter and a genuine radio-operator's table that has an actual 'phone jack built right into the front edge. Also I would receive a key, antenna wire and insulators, plus many more useful and necessary features.

Anybody who can handle a pair of pliers, I was assured, can have this little station operating within two hours after its arrival. Then, as a dutiful afterthought, I was told that I would have to get something called a "radio license"

before I could get on the air legally.

Whether a set of cards to qualify the lucky purchaser for the DX Century Club is included in the "additional items" I cannot recollect but I think that the cards plus a live, genuine operator to save the client the bother of actual QSOs would be an excellent idea.

At the time, however, I was in no mood for such constructive criticism. As a matter of fact, upon finishing my perusal of the page I experienced an acute sensation of vertigo and fell twitching to the pavement. Whistling VFO noises mingled in my head with a noise like the thumping of a 4400-volt transformer, and I seemed to see a Daliesque scene in which my wife was band-switching my new receiver from a CQ by FR8VX to the frequency of "Information Please" while, in the background, my four-year-old son was busy assembling his 1-kw. "Beginner's Model" radio station that we had purchased for his birthday at Sears, Roebuck & Co. Then a Sterba curtain fell before my eyes and all went black.

It is now two weeks since that fateful day at the radio shop and, thanks to my Blue Cross policy, I am recovering rapidly at the local hospital. I have had time to do a bit of thinking, lying here, and many old DX friends have dropped in to correct my warped impression of the existing DX situation. I think that it is quite clear now and I feel completely readjusted. The peaceful war days are finally behind me and I am ready to take my place at the top end of 20, let the chips fall where they may.

First, however, I am going to take my Master's degree in electronics at Cal Tech and then, with that basic preparation, proceed to follow one of two plans that are currently in vogue in California. The first is one that I like because of its relative reliability. It entails the organizing of an expedition of Commando-trained amateurs and traveling directly to the country you wish to work for, let us say, your Number 146. Upon arrival at the shack of the DX victim a 1-kw. portable rig is coupled direct to his receiving antenna and, if lack of QRM permits a QSO, you are in an ideal position to get an immediate QSL confirmation.

This plan, though assuring you of reasonably consistent results, strikes me as being a bit unsporting and extravagant. Therefore, I have decided on Plan Two, inasmuch as I can be satisfied with but one or two DX QSOs a day. I have taken a first option on a section of land in the High Sierras (the peak of Mt. Whitney by an odd coincidence) where I'm told that an ultra-conservative kilowatt using push-pull 2000-Ts feeding into a little stacked-rhombic rotatable array ought to get results late at night during the week-days. That's all I want anyway. I'm not the greedy sort.

A High-Gain Two-Meter Rotary Beam

Six-Element Broadside Parasitic Array with Coax Feed

BY JAMES A. K MOSKO,* W2NLY

• Here's a compact lightweight 144-Mc. directive array that has given excellent results at W2NLY. Designed for work with 50-ohm coaxial line, it includes folded dipoles and appropriate linear matching transformers.

A VERY POOR two-meter location brought about the development of this beam antenna. Extensive tests have shown a forward gain of approximately 12 db., or a power gain of 16, with a front-to-back ratio of 36 db.

In contemplating a design for this antenna a number of factors had to be taken into consideration. First and most important was good forward gain, to provide a greater sock than the average two-meter rotary. Also, in order to minimize QRM from other stations, and to limit radiation in undesired directions, a good front-to-back ratio was considered desirable. The third consideration was physical size. It could not be too bulky and it should not offer too much wind resistance, because it would have to be located above a ten-meter rotary which was already forty-five feet above the ground on a self-supporting wood-frame tower.

* 119 Lakeview Ave., South Plainfield, N.J.

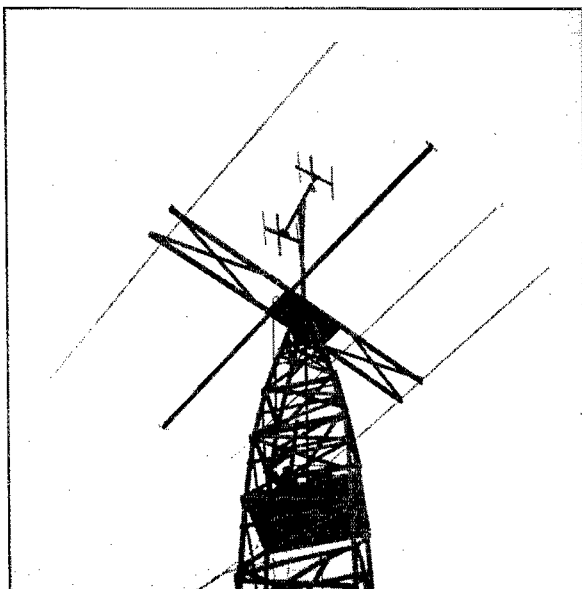
In attempting to achieve the first objective of high forward gain, it was realized that a low angle of radiation and good horizontal directivity would be important contributing factors. Therefore the author finally decided to base the design on that of two three-element parasitic beams fed in phase, as it was evident that a close-spaced vertically-polarized beam would provide a low angle of radiation; and feeding two such antennas, spaced $\frac{1}{2}$ wavelength apart, in phase, would sharpen up the horizontal directivity and provide a greater forward gain.

Tests run on a single three-element beam proved it to have a front-to-back ratio of approximately 26 db. It was later found that by stacking two such antennas an increase of better than 10 db. (or a total of 36 db.) in front-to-back ratio was obtained, thus realizing the second consideration.

An antenna of this design was found to be small enough in physical size to offer very little inconvenience in mounting.

It was decided to make one-half of the array first: that is, a three-element parasitic beam by itself. Because we intended to stack two such antennas, the terminating impedance of one would have to be twice that of the line impedance at the point of feed — or 104 ohms, in order to use 52-ohm coaxial cable for the transmission

◆
Perched atop the 28-Mc. rotary, the 6-element 144-Mc. beam looks like a pygmy, but the wallop it packs is not midget-sized.
◆



line. To arrive at an impedance close to this value, it was decided that a four-wire folded dipole would be used with one director spaced 0.10 wavelength and one reflector spaced 0.15 wavelength. The parasitic elements were made so that they could be adjusted plus or minus 10 per cent of their calculated physical length.

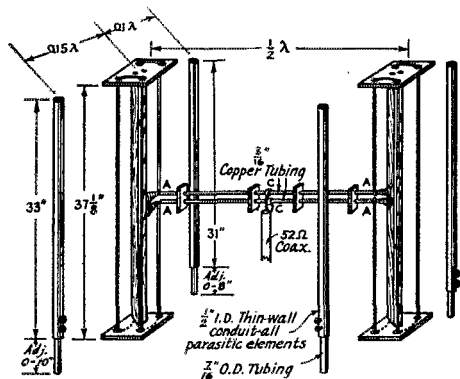


Fig. 1 — Electrical construction details of the six-element array.

Theoretically, the four-wire folded dipole in free space has an input impedance of approximately 1200 ohms. With the parasitic elements added the input impedance should drop to approximately 300 ohms. Tests on this antenna, fed with 300-ohm line, showed a low standing-wave ratio on the line with a forward gain of approximately 5 1/2 db. and a front-to-back ratio of 26 db.

Matching Line to Antenna

Another array identical to the one just described was built. Now we had two parasitic beams which we were going to space one-half wavelength apart and feed in phase at the center. The impedance of each unit was assumed to be 300 ohms at the dipoles (see Fig. 1, points A-A) and the line impedance one-quarter wavelength away was 52 ohms (points C-C). It was therefore necessary to design a transformer to match the folded dipoles (300 ohms each) to the 52-ohm line impedance.

The formula is the well-known one for a "Q" matching section, or

$$Z_0 = \sqrt{Z_1 Z_2}$$

where Z_1 = line characteristic impedance

Z_2 = antenna input impedance

Z_0 = transformer characteristic impedance

It must be remembered that the transformer input impedance at the point of feed must be twice that of the line (or 104 ohms) so that when both transformers are connected together at points C-C they will present an impedance to the line of one-half their individual input impedances.

Using the formula above, a figure of 175 ohms was obtained for the characteristic impedance of the transformer. Since we were feeding in the center, or one-quarter wavelength away from each dipole, it was possible to combine both transformers into a single 175-ohm line a half wavelength long. We had our choice of using 3/16-inch o.d. copper tubing with 1/16-inch center-to-center spacing, or 3/8-inch tubing with 1/8-inch spacing center to center. Since we had 3/16-inch tubing on hand it was decided to use it and make four spacers (see Fig. 2) to keep the line conductors uniformly separated.

Tuning Up

The method used for tuning the antenna was as follows: With the beam mounted on a pole several wavelengths above ground a field-strength meter was set up approximately fifty feet away at about the same height as the antenna. The two directors were set approximately 5 per cent shorter and the two reflectors 5 per cent longer than the driven elements at the start. The transmitter final amplifier was tuned to resonance and the power input was measured to be 25 watts. The first field-strength check was made. Then both directors were adjusted for maximum indication on the field-strength meter, the transmitter retuned to resonance and the coupling readjusted so that the input was still 25 watts. This procedure was repeated several times until there was no further increase on the field-strength meter. Next, the reflectors were adjusted for maximum gain, the input power and final-amplifier resonance being checked after each change in tuning of the elements.

The directors were then rechecked, and it was found that with a very slight adjustment some additional increase on the field-strength meter was observed. Fine adjustment of both directors and reflectors was made until no further increase resulted.

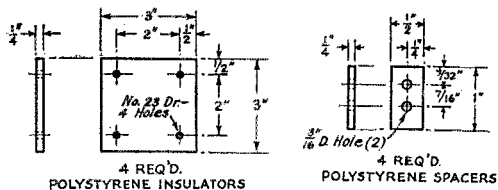


Fig. 2 — Insulators for the folded dipoles and spacers for the linear matching transformer.

Tests were then made by substituting a single dipole for the beam and measuring the field strength with the same power input. The results proved the beam to be superior by better

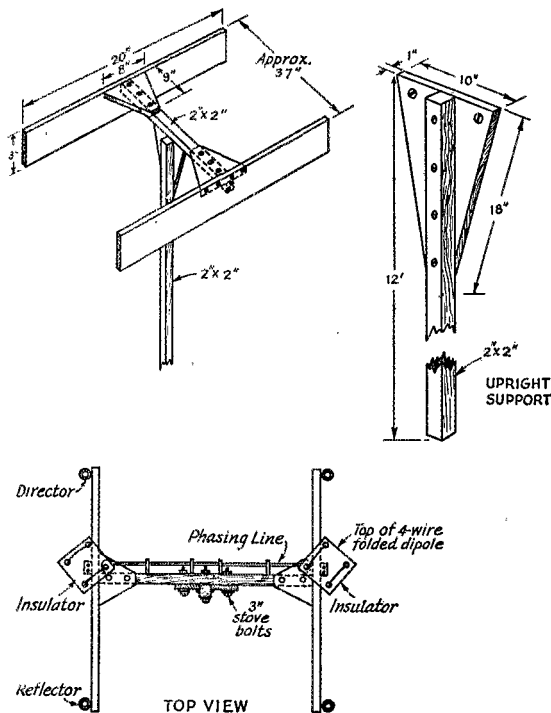


Fig. 3 — Frame construction and method of assembly with the antenna.

grees between the maximum- and half-power points on each side, or a total beam width of 20 degrees.

That the original objectives have been satisfactorily fulfilled is evidenced by the fact that in the six weeks the beam has been in operation over 143 contacts have been made with 92 different stations, 60 per cent of them over 25 miles distant. On the one occasion during this period when the writer happened to be operating during an inversion-bending opening, W3HWN — over 140 miles away — was worked with a 30-micro-volt signal report.

About the Author

• James A. Kmosko, W2NLY, has been partaking of his share of DX and v.h.f. experimentation ever since being licensed in 1939. An associate member of the IRE, Jim holds Class A amateur and radiotelephone first-class operator tickets. He was associated with the Western Electric Co. for five years as a radio technician, supervisor and field technician on broadcast, u.h.f., v.h.f., radar and pulse equipment. Currently, he is engaged as a laboratory supervisor in the development of radar for the USN.

than 12 db.¹ or approximately 16 times the power.

The beam was now put back on the test pole, and with the same input the front-to-back ratio was checked and found to be 30 db. With the antenna turned away from the field-strength meter the reflectors were readjusted for minimum indication on the meter. The final-amplifier tuning and input power were checked but found to be unchanged. Then the antenna was beamed again at the meter and the reading checked; it was found to have increased very slightly. The front-to-back ratio was now 36 db. Resonance was once again checked and then the coax line was disconnected at the transmitter; the final-amplifier tuning was rechecked and resonance was found to be at the same spot on the dial as when the feed line was connected, indicating a resistive load to the transmitter.

A final measurement was made on the beam before mounting it on top of the tower. The sharpness was checked and found to be 10 de-

¹ This gain seems somewhat high, in that two in-phase broadside elements have a theoretical gain of about 4 db. which, with the 5½-db. gain of one three-element group, would lead to an estimate of 9 to 10 db. for the complete antenna. However, W2NLY's measurement technique appears sound, and his field-strength meter was checked against two v.h.f. signal generators of known reliability. — Editor.

Strays

"As a Filipino guerrilla leader, financier, and internal spy, I was caught and tortured almost to death by the Japs in 1943. I escaped from prison in 1944, after more than a year of horrible living and suffering, to my unit in the mountains. I managed, through my intelligence officers, to obtain from my home in Manila my 1941 edition of *The Radio Amateur's Handbook*, which I used to good advantage in building and repairing our receiver and transmitter. A U.S. Army hand-operated generator, brought over secretly from Australia by submarine, was used for power. These made it possible for our unit to contact Mindoro, Leyte, and other Guerrilla units on Luzon.

"We were able to print a daily War Bulletin based on information received from KGEI, San Francisco, and General MacArthur's "Voice of Freedom." Copies were distributed throughout Manila and to our 13 regiments scattered over the province of Cavite. This was all done under trying conditions and under the very nose of the Japs. . . . Thanks to *The Radio Amateur's Handbook* and more power to ARRL."

— Mamerto M. Buenafe, Lieut. Col.,
Philippine Guerrillas



Correspondence From Members -

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

METEOR HOWLS

83 College Avenue, Poughkeepsie, N.Y.

Editor, *QST*:

I ran into a rather curious phenomenon a while back upon which I would prefer to express no positive opinion until some corroborating evidence has been obtained. Let me put it this way:

On the night of the Perseid meteors, I tried listening for the Doppler-effect howls in the manner set forth by W6QYT in *QST*. Picking the short-wave broadcast carriers in the New York area which were well inside skip distance from me (75 miles or so) and some of which were, conveniently, unmodulated at the time, I was regaled for a while with sundry yoops, chirps and grunts, with the S-meter of the trusty SX-25 performing in the expected manner — flying up sharply and sagging back in a generally logarithmic way. When this palled on me, I flipped on the little 144-Mc. superregen to see if anything was cooking. No locals were on, so I cranked her up and started fishing for DX (anything out of town). I was quite astounded to note that distinct bursts of 144-Mc. 'phone came in from time to time, tapering off in intensity in a generally logarithmic manner. I made a guess that maybe meteors were responsible and set up the SX-25 alongside the v.h.f. job to see if there was any notable correspondence between the two effects. And there was!

I found that, at almost every 144-Mc. dial setting, bursts of 144-Mc. signals were invariably accompanied by a major burst on the SX-25 (up to S9 or more). Now I have been at this game long enough to know that one can hear all sorts of "signals" in the superregen hiss after tuning around a dead band long enough, so I tried to get away from the possibility as follows: I turned off the SX-25 speaker and sat so I couldn't see the S-meter. Then, every time I heard a 144-Mc. burst, I would spin about and sure enough, the S-meter was just starting to sag after a healthy rise! Next, I tried the effect of antenna polarization by reaching out the window to turn my little folded dipole. I found that with vertical polarization, the 144-Mc. bursts were strongest when the meteor howl had a high average pitch and a great change of pitch, and with horizontal polarization, the "grunt" type of meteor howl gave the strongest 144-Mc. effect. Please note that when I speak of the pitch of the note, I refer to the sound in the SX-25; no Doppler howls were heard on 144 Mc.

And there you are. If this observation can be relied upon, it means that 144-Mc. signals can be refracted by the stronger meteor trails. But before I would accept this conclusion, I would like to see some corroborating evidence. I hope that you have some.

— *Gurdon R. Abell, jr., W2IXK*

ONE-SIXTY, ET CETERA

28 Vivian Street, Ahmeek, Michigan

Editor, *QST*:

Judging from the correspondence page of September *QST* it appears that old "one-sixty debil" is back with us again. Your editorial in the same issue clears that up to my entire satisfaction. As for Blaney's letter — I operated for over 4 years on 80 c.w. with inputs of 1 to 6 watts and worked coast to coast plus 4 to 5 hours of local rag-chewing each day. I had a beautiful time. Now I'm interested in 'phone. Holding a

Class C ticket, I've gone to 10 — and it's a good band for my money. About 160 meters? I didn't need it before the war. I don't now.

The Hq. staff have been telling us time and again, giving us the straight dope. Since December I've listened to some real calamity howling on the air — "The staff is lying." . . . "Mark my words and remember old W9 — told you: 'We'll never get 80 again' . . ." (Later it was 40 and 20 and now it's 160.)

Through it all I've seen ARRL tend to its knitting and get us all or parts of most of the bands in question, just as prophesied by the ARRL! I've seen the Armed Forces listening with respect to our case as presented by Hq. I have seen the day come when a petition by the Board to FCC is tantamount to a new and favorable allocation, regulation, or what have you.

Obviously, in a case like that we can't go drunk with power and ask for the moon. We need a sane level-headed Board and staff, and I maintain that we already have them. The ham deserves a lot. I believe the Board and Hq. are doing a beautiful job of getting it for him.

— *Henry L. Luoma, W8YFT, ex-W9SQB*

AN ORCHID FOR W3LO

3434 University, Baltimore, Md.

Editor, *QST*:

I have just read with interest the article captioned "Georges" on page 39 of the September issue of your very swell magazine. I noted your mention of Charles Ellert, W3LO. . . . Charlie, as you know, was Inspector of the 3rd District, at Fort McHenry here, for many years. Many a ham passed through his offices, on his way to a ticket. Yet Charlie was never known to "throw his weight around." On Saturday afternoons you could always find him at one of the local ham radio shops chewing the fat with the boys, always ready and willing to give freely of his vast store of technical knowledge. When the war came along, Charlie was called to Washington to do an important and confidential job. I happen to know that he did it with his usual flair for doing things well.

Charlie is one of those grand guys who has been one of ham radio's most loyal friends at court. What do you say we give him a hand?

— *Marx S. Kaufman, W3IUC*

"THE ENDLESS QUESTION"

10,052 Sheldon Drive, St. Louis, Mo.

Editor, *QST*:

"Razberries" to W9DUD for his belief that amateurs should be limited in power to 100 watts input to the final. . . . He states that without ham operators, communications and radar during the war would have never succeeded. It is my understanding that power considerably in excess of 100 watts was used in numerous instances during the war for communications and radar. Who would be the better qualified to handle such equipment — the amateur having had experience with transmitters using inputs up to one kw. to the final, or the ham who had never fiddled with anything stronger than 100 watts?

Mr. Chapin also says the average ham cannot afford over 100 watts. This is a bit of understatement as the majority

of amateurs cannot really afford half that power for their transmitters not to mention factory-built receivers, antennas and associated equipment. Following this line of reasoning we should all be limited to 20 watts input for our transmitters and two tubes in a blooper circuit for receivers. . . .
— Earl R. Linder, W9DZG

804 Danforth St., Syracuse, N.Y.

Editor, *QST*:

Rather than tuck W9DUD's letter in September *QST* away in a back corner with the whimsical comment "the endless question," the ARRL had better come out of its lethargy and realize that the question of limiting amateur power input cannot and must not be dealt with in such an apathetic fashion.

Let's not fool ourselves into believing the amateur frequencies are a magnanimous grant, set aside for a pleasant, absorbing hobby. The sole reason for our existence today is the military value of a reservoir of trained operators and technicians — the recent unpleasantness proved that without doubt. Comes the next phase, or unpleasantness No. 3. We will again have to justify our existence and contribute gainfully — and that we cannot do if the influx of fresh blood into the ranks of amateur radio is stifled by the need for expensive high-power equipment. Ham radio must continue to attract beginners who can get on the air and work out with a 6L6-xtal and a two-tube blooper. The present trend toward belittling any power under one hundred watts is already driving many a would-be ham back to his stamps and glue pot. The majority of amateurs running high power are doing so as a means of self-defense and would be only too happy to see the present one-kilowatt limit reduced to one hundred watts.

I propose the ARRL take immediate steps to weigh amateur opinion on this question.

— Jack Najork, W2HNH

[EDITOR'S NOTE: The League's Board of Directors, which establishes ARRL policy in such matters, has in the past indicated satisfaction with the present 1000-watt limit. ARRL Hq. has no voice in the matter. Amateurs interested in effecting any change should communicate with their division directors.]

CHANNEL UTILIZATION

2839 Seminary Ave., Oakland, Calif.

Editor, *QST*:

In view of the tremendous increase in amateur activity since the end of the war, our bands will become increasingly crowded and every effort should be made to make the best use of our frequencies. I realize that your poll conducted before the war was favorable to allowing 'phone operation on the 40-meter band, but I believe that things have changed to such an extent that if another poll were taken it would be found that an overwhelming majority would be in favor of having no 'phone operation in the 40-meter band. (And probably the same would be true of 20 meters.) I do not write this as an opponent of 'phone operation; quite to the contrary — of all my QSOs at least three-quarters of them have been made on 'phone. My main concern is the conservation of what few frequencies we have.

The present state of the 'phone bands on the West Coast (and I assume elsewhere) is nothing but confusion. Only the strongest of signals are readable through the conglomeration of heterodynes from band edge to band edge. C.w. operation would allow many times the number of completed QSOs that would be possible with 'phone. On the lower-frequency bands, 'phone operation seems a sheer waste of valuable frequencies. On the higher frequencies (10 meters and higher) where there are much wider bands of frequencies available 'phone operation is definitely desirable. I am very anxious to see *QST* take a firm stand for the conservation of the Amateur frequencies. I think that the editorials on efficient calling and operating technique that have appeared in *QST* can be extremely beneficial to the amateur fraternity if consci-

entiously applied. However, I think we should go a bit farther.

— F. A. Streib, W8QPM

Route 4, Covington, Ky.

Editor, *QST*:

"We was robbed."

This seems to be the consensus among the men operating 14-Mc. c.w. In theory this band is equally divided for 'phone and c.w. operations. Actually the division is one-half almost exclusively Class A American 'phones. The rest of the world which includes American Classes A, B and C, c.w., Canadian, Cuban, Central American 'phone, etc., share the other half.

My wish is that the members of our Board would spend some time on 14-Mc. c.w. and get the effect of the present allocation first-hand. I am sure this would have lasting results. I know our directors have no intention of slowly strangling and finally eliminating c.w. operation on 14 c.w. Further, I know they cannot control the operation of foreign 'phone stations in our c.w. band. All we can ask of them is a more fair division.

Of the several methods there are two which seem to be preferred. (1) The KBW allocation (as detailed in September *QST*). (2) Allocate the band along the prewar line. For example: 14,000 to 14,175 c.w.; 14,175 to 14,350 'phone; 14,350 to 14,400 open. By common consent the 14,350-14,400 section would be used by foreign 'phones. . . .

— Bert Brown, W9FS

QSL CARDS

10 S. New Jersey Ave., Atlantic City, N.J.

Editor, *QST*:

I have sent reports to stations, mostly in the U.S., and out of three hundred reports sent I have received 49 QSL cards. Is this fair? Give us a break, too. We also like QSL cards.

— Stanley Schwartz, SWL

2075 Nelson St., Vancouver, B.C.

Editor, *QST*:

It might be a good idea to pass along this suggestion to the gang, while on the subject of sending envelopes to QSL managers. Drop into the local postoffice and register your call letters. So many cards are received without the full address it helps the authorities to ensure delivery.

— H. G. Wightman, VE7HC

OPERATING PRACTICES

Washington, Michigan

Editor, *QST*:

Regarding correspondence from members of the fraternity on operating, some of the boys are a little drastic in their cures of the many operating faults. Perhaps it appears at first that such stern measures should be taken; but to me, after a good many years of operating an amateur station, the education of the new member in operating procedure takes time and a great deal of experience on his own part.

When we were young squirts, the tendency was to work as many stations as possible and gather as many cards as we could. Isn't it possible that those just starting want to put a bunch of QSOs under their belt like we did? We also run into the fella that has a new xmtr or new antenna and is anxious to get reports from several different points to gauge its efficiency. Then there is the one who is striving for WAS and trying to work as many states as possible. There are many reasons for the short and hurried QSO. . . .

Usual QSO procedures will wear off in time as it has among the old-timers. I still like to hunt states, countries and DX but the quick QSO has attained a sort of emptiness,

as though nothing was gained. I now value the rag-chew above other QSOs and hunt for the fella that has something in common with me to chew the old sock about.

There will always be the young squirt, the old-timer, et al. That makes ham radio. Let's let come "what comes naturally."

— W. W. Simpson, W8KPL

3631 Oakland Ave., Minneapolis 7, Minn.

Editor, QST:

... I strongly disagree with J. H. Paist, W9RBA, that the new, inexperienced op should be restricted to frequencies above 30 Mc. If those of poor operating ability are unable to contact more proficient operators they're not going to get much worthwhile experience. It's standard procedure to transmit at the same speed as the station being worked. The experienced op who refuses to answer a call at a slower speed than his original CQ or won't come down to the other fella is breaking one of the rules of good operating and is therefore, in my opinion, inclined to be a lid because he knows better and refuses to do so. Then there is the guy who transmits much faster than his own ability to receive. Of course he's just asking for it and should be taken aside and told a few things. . . .

— Marvin H. Asp, W0WEP

STARTING RIGHT

18 Garden St., Potsdam, N.Y.

Editor, QST:

I just want to say a few words in appreciation for the reception this LSPH has had. It makes me feel very proud to be one of the gang which has given me encouragement, praised my efforts and which has heeded my call to QRS. They even say they are proud to be my first contact on any of the bands.

Yes, it's swell to be received as a brother!

— Carl A. Emerson, W8RWH

1101 West 40th St., Baltimore 11, Md.

Editor, QST:

I am only a tyro in amateur radio and I want to express my thanks to W. H. Fraser for his article "For Beginners Only." It certainly hit the spot with me and I am sure with many others. Let's have some more of the same. Many thanks.

— Nelson L. Ellis

THAT WORD AGAIN

Drygulch, Texas

Editor, QST:

When the fences hereabouts need patchin' we aim to fix up all the holes. And now that us fellers know we done wrong — goin' around them bands, askin' and tellin' our "handles," we aim to quit it, pronto. And, jest so's it'll be a real big event, we aim to stop on the same day when them hired hands on the QST ranch stop usin' technical baby talk. Youall know what we mean? That dadburned stuff like "snivvy," "sniggle-sniggle snoopers" and the like which don't make no better sense to a grown man than "handle" does to KBW.

— Brazos Bill

Kipperin-on-the-Charles, Mass.

Editor, QST:

The controversy in QST over the use of "handle" should not be taken lightly, since the knowledge of the other operator's nickname is such an important part of amateur radio. It should be obvious to even the most casual operator that the other man's handle, or "sine" as it was called in the days before trigonometry and plastics, is one of the most useful bits of information to be garnered from a QSO,

ranking, perhaps, with the vital facts about QSL. However most operators stop giving out dope after this point, a deplorable condition that cannot be decried too vociferously if amateur radio is to survive. It is with the knowledge that something must be done, and done quickly, that the Rapp Plan is promulgated at this time. The Rapp Plan can save ham radio for the hams!

Briefly, the Plan consists of a code group or "HAHWEHS" reports sent immediately after the signal report (RST) and the location (QTH). A sample HAHWEHS report would be "LARS 55 6-1 180 BWN BLK 76-42-6060." This brief bit indicates to the receiving operator that the man at the other end is called "Lars" by his friends, that he is 55 years old, stands 6 feet 1 inch tall, weighs 180 pounds, has brown eyes and black hair, and that his social security number is 76-42-6060. The HAHWEHS system derives its name, of course, from the first letters of each of these gems of information (Handle-Age-Height-Weight-Eyes-Hair-Social Security) and makes it easy to remember the sequence. I urge its immediate adoption, or amateur radio is doomed!

— Larson E. Rapp, W10U

830 Airport Rd., Muskegon, Mich.

Editor, QST:

"Handle" is only slightly distasteful. Consider the term "hams" as applied to amateur radio operators by newspaper writers, the general public, and even by radio amateurs themselves. To me it is much worse than "handle." It gripes me when someone asks me if I am a ham. I usually answer them in words such as "I am an amateur radio operator."

As a suggestion for a single word name for the sake of brevity, I have utilized a system popular with the late FDR — that is, a word made up of the first letters of the full name. Applied to us, the plural word would be AROS (pronounced "arrows") for Amateur Radio Operators.

If that name doesn't suit you, might I suggest SWAYBACK, the full meaning of which is, "Short-Wave Amateur Yarnspinners' Brotherhood and Celebrated Kegtilters." Or if people ask if you are a SWELL, tell them, "That's right — I am a Short-Wave Emitter Legally Licensed." Maybe you will be a DRIP (Department of Radio's Immortal Perfectors). Or rather than be called a "ham" I would stick out my chest with pride on being called a LOUSE, which may mean I belong to the League Of Ultra-Short-wave Experimenters.

— Edward Eggebrecht, W8OAH

INTERNATIONAL REGULATIONS, 'PHONE-C.W.

P.O. Box 1081, San Juan 5, P.R.

Editor, QST:

Possibly it is too early to be giving much serious consideration to plans for an international radio conference [Ed. Note: We started in 1944!], but there is a problem that will take considerable thought beforehand if anything approaching a satisfactory agreement is to be reached. I refer to the indiscriminate radiophone operation by foreign stations in the American amateur c.w. allocations.

Although the use of c.w. is legal in the U.S. 'phone bands, the great majority of code stations do not take advantage of that fact, but stay in the exclusive c.w. portions. On the other hand, foreign 'phone stations operate almost exclusively in the American c.w. portion and indiscriminately from one end to the other. At the moment it is next to impossible to have a code contact that is not interfered with by foreign 'phone stations. . . .

— E. W. Mayer, KPAKD

[Editor's Note: In a considerable number of countries in the world, particularly Latin America, there is very small use of c.w. and almost all activity is 'phone, so that such countries are commonly unwilling to regard any of the DX portions of bands as exclusively c.w. Further, outside of Canada and the United States, the major countries of the world are opposed to making any division of bands as between 'phone and c.w. Interested readers are referred to

(Continued on page 118)

How's DX?

How:

Last month we sounded off at some length on certain operating practices and, since *QST* hasn't been out long enough for the squawks about "Hey, don't fill up our column with that stuff — we wanna read about DX!" to show up, we'll take a chance on one more small outburst. This time it's a minor point, but someone might have a good idea about it, so we're putting it up to the gang.

It strikes this self-styled brass-pounder that our operating is pretty indefinite when it comes to the use of "AR," "K" and "SK." For example, the book says we should put "K" after our call letters when sending "CQ" and of course after our call when we are in contact with a station. As a result, when you tune in on a station and hear, for example, just "ZD7A K," you can't tell if he is working someone or just finishing a CQ. Yes, we know, you'd call him anyway, but that's what we're trying to get away from! Likewise, in the business of finishing a QSO, both stations end up with "SK" after their calls — which isn't the book way to use SK, incidentally — and if the DX station signs off that way first, the poor signing-off W gets snowed under, if he wasn't already during his regular transmissions, by some of the omnipresent DX hogs. What we need is a sign-off signal meaning "I'm through with you and I intend to listen for someone else — don't bother to come back," in a polite way, of course.

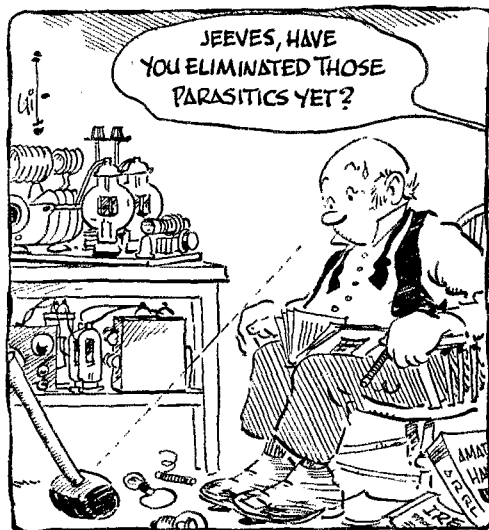
We contend, therefore, that our standard operating procedure needs a little revising in the light of present plenty-QSOs-per-hour technique, such as shows up in contests and during the busy hours. [Are there any unbusy hours? — *Jeeves*.] Personally, we think the old business of using "AR" after a CQ or any call where you weren't yet QSO was a good system, and "K" could be reserved for "Go ahead" during actual contacts, but what to do about the end of a chat to eliminate any possible confusion — and, incidentally, to postpone the "climbing-on" process for as long as possible — has, to coin a phrase, got us stumped. Is it worth thinking about?

What:

The members of the 3-F club (Faithful Followers of Forty) are finding their allegiance rewarded these days. For instance, W1JJL snagged for himself PAØXE (7145), HAF (7120), D2DDX (7140), F3AS (7100), KH6AO (7195), HB1CE (7135), HB9GA (7145) and TI4MAR (7145), while W3KNM, ex-W2BZB, grabbed HC1PC

(7280), VP5AD (7150) and VE8MU (7175) — — — — WØNCS added XE1QS (7110), EI9N (7150), CM6AH (7145) and W6TZB/KH6 (7195), and heard ZK1AA (7135), while W4BRB snuck in HR1AT (7055), G3AGC (7090) on the Isle of Man, HC2CV (7140 T6), and W5JWN/KL7 (7170), and heard J2AAF (7170), ZK1AB (7250) and VP2AP (7140 T9c) — — — — W2BO worked J2AAF (7160) and KA1ABR (7170), which is mouty fine DX — — — — W2BRC uses an attic antenna "to keep the r.f. concentrated" from his 35 watts, but managed ZL2GO (7185), VO4F (7230), VO1S (7240) and G2BTO (7240), a high-power merchant who runs 7 watts to a 6L6 ECO — — — — WØQVA worked ZL2GO and heard J2AUW (7185).

In the 3-T department (Timely Tips on Ten), we have several worthwhile contributions. Take W9KOK as a forinstance, who is up to 56 on ten, with such gems as ZB2A (28,080), J9AAE (28,400), VQ2PL (28,115), VQ2FR (28,260), VQ4ERR (28,320), VQ4ASC (28,240), OQ5BL (28,500), ZE1JB (28,240), CN8BA (28,130), I1KY (28,370), VP1AP (28,130), HR1MB (28,400) and ZP8CN (28,225) — — — — Then there's W2KIK with I1SB (28,380), CE1AH

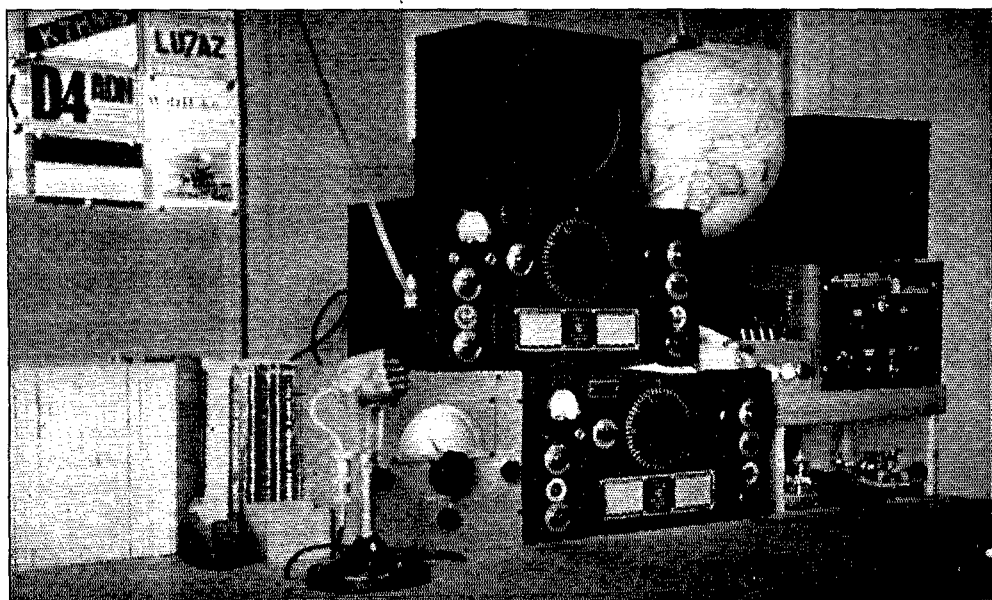


(28,240), VQ3TOM (28,140), VP3LF (28,300), OA4AK (28,470) and ZC6FP (28,080), worked and XZ2AB (28,280), and VS9AP (28,330) heard — — — — W1EH heard VU2PK (28,400) with a good 'phone signal at 1300 GCT, and W1KKS has spotted FM8AC (28,050), HH2BL

(28,000), D2AG (28,025), KP4AK (28,225) and KZ5AB (28,075) on c.w. W5LDH, way down yonder in New Orleans, has been busy with HK3DD (28,100), VP4TK (28,040), TI2AV (28,300), LU8EE (28,040), VP9F (28,290), PY2QK (28,420) and TG9FG (28,160), all via the chain route W6HG says to look for W4FGW/J2 (28,600) and W9EUG/J2 (28,700) around 0200 GCT.

Now that all of the very clever headings have been used up, we will dive into the talk of twenty, AC4YN. As we piece the story together, with the kind help of W6KIP, W6SAI, W6VFR and VE7ZM, that notable group and W6GRL, W6LEE, W6ITA and W6NRQ were in on the grab during August. W6GRL kept a regular sked with Reg Fox, and the cards will come through him. The Tibetan station was running 20 watts at the time, although there is a BC-610 over there waiting for a gas-driven generator. If anyone has a spare, we suggest he shoot it along, so that everyone can get a crack at a 600-watt AC4! W6SAI and W6VFR used single-section W8JK antennas to turn the trick. We had the time wrong last month — it was around 1500 to 1630 GCT VE7ZM is bound and determined to put VE7 on the map, in a DX way, and has a new QTH with 5 acres of ground, which should be enough room for his rhombics. He is up to 88, postwar, with ZE1JI (14,125), VS7ES (14,070), VP8AD (14,080), OX1A (14,190 f), XU4B (14,120 to 160), CP5EA (14,185 f), VP4TR (14,060), CN8HM (14,070), PK5LK (14,095) and FO8AC (14,080) W6SAI has some other good ones: UA1AF (14,090), YR5C (14,070), XZ2KM (14,075), VQ2GW (14,080), PK6HA (14,060),

VP7N (14,025), VK4OS (14,030) on Papua and PK1RI (14,095) on c.w., and JC3AR (14,050) on Quelpart Island between Korea and Japan, EL4A (14,340), CR9AN (14,060), VS2BF (14,190), GM2DI (14,305), PA9JQ (14,345), VR2JI (14,280) and PK1AM (14,060) on 'phone. Bill heard VS7CW (28,400) on Maldiva and EA9AL (14,160) W5ASG has some more, in the form of UA9CB (14,090), EL3A (14,080), CR7AD (28,020), VP8B (14,050), OH3RD (14,090), EA1B (14,050), J9LG (14,290), UA9DP (14,080), and W6TMY/Saipan (14,165) on code and LX1SI (14,340), VP2MY (14,330), W7GXR/KG6 (14,290), PK6AW (14,350), PZ1A (14,310), FG3FP (14,375) and ZP2AC (14,340) on voice. Bill is up to 82 postwar, 129 all-time W2HHF, working under difficulties with only a simple doublet and 250 feet of feeders, shows that he has what it takes by latching on to VP2AT (14,100), FA8RA (14,090), XACP (14,100) in Sardinia, LZ1XX (14,060), LX1AX (14,150 T6), VQ4CRB (14,010), OE1XBC (14,125), ZP8CN (14,040), FT4AC (14,170 T8), SV1AZ (14,050), OY3G (14,085), EQ4DC (14,110 T8), GC8MF (14,070), ET3Y (14,135), ZC4NX (14,085), EK1AZ (14,135), W2LEV/C1 (14,155), I7AA (14,145) in Eritrea, OH0AA (14,040), and J9AAH (14,120), with VS9AN (14,150), FK8OSL (14,155), MX1DF (14,160), YI2BA (14,085), TA1DB (14,080), ZC1AR (14,080), VR5BY (14,015), XABU (14,075 T7) in Rhodes, YN1MH (14,075 T7) and VS1QB (14,085) W1JYH snuck in the back door and told Jeeves that he had worked LA3GA (14,065), OX1AA (14,090), PZ1FM (14,140), YV1AD (14,070) and IIR (14,045) and had been hearing ZD8A (14,060)



CN8MZ (14,110) and **FM8AC** (14,090) W4BRB would like to get the QTH of CT3AB from anyone who has it. In return, he'll be glad to tell you how he worked **SV1EC** (14,075), **YR5X** (14,085), **W6VKV/I6** (14,110), **KL7AD** (14,125), **VP3JM** (14,070), **OQ5BY** (14,135), **VK7DH** (14,135), **EL5B** (14,125), and **VS1BX** (14,085), a fair trade The 807 final at **VE7CE** accounted for **W6VDG/KW6** (14,175) and **ZK1AB** (14,010), and **W1GKM** got **OQ5JF** (14,190) **W2RDK**, ex-**W8JSU**, has been improving his luck lately, and some of the better ones were **CX4CZ** (14,075), **UA9KH** (14,470) — yeah, that's right — **HB1AW** (14,090) during Swiss Field Day, **ON4PZ** (14,090), and **OK1FF** (14,085) **W4JXM**, ex-**W8AWX**, skeds **KAI1AW** (14,150, 14,196.f), but manages some other stuff occasionally, like **VK9AZ** (14,070), **VQ8AE** (14,095), **VU2AA** (14,040), **CR9AG** (14,075), **C3YW** (14,095), **PK6TC** (14,065) and **XU8KR** (14,070).

In the 'phone Dept., as a starter, **W1GKK** has **CN8AD** (14,200), **F7AA** (14,320), **G6IA** (14,305) on the Isle of Man, **HC2CS** (14,320), **J2AAB** (14,250), **OX1WB** (14,330), **TG9RC** (14,310), **VP5RS** (14,200), **VO6H** (14,200), **YV5AG** (14,300) and **PA0IDW** (14,320) **W6RIR** knocked off **W5IBE/J5** (14,270), **J9AAB** (14,305), **W8SIR/VP9** (14,315), **KA1SC** (14,315) and **J9ACE** (14,280), while **W2MPA** got his usual jackpot with **C1SU** (14,180), **CN8MA** (14,320), **J9LG** (14,310), **KA1CB** (14,150), **J2JSB** (14,280), **KG6AA** (14,220), **ON4OU** (14,330), **PK3RS** (14,110), **PZ1UD** (14,305), **W8CJR/XU** (14,180), **YN1RA** (14,390), **PZ1G** (14,350), **W8CHT/J7** (14,220) and **XU1YY** (14,270) worked, and **VU8GA** (14,330), **VS2BF** (14,140), **ET1Y** (14,310), **PK5AR/CR10** (14,345) in Timor and **W6ONT/KW6** (14,250) heard At **W6ITH** a check of the log reveals such luminaries as **W9CAC/TF** (14,200), **HC2OD** (14,040), **F8AH** (14,180), **GM8NW** (14,180), **OZ3J** (14,045), **PA0MZ** (14,125), **ZS2CI** (14,200), **PY9AT** (14,190), and **XABZ** (14,160). On ten he found **HP1A** (29,200), **OQ5BH** (28,390), **GM8MN** (28,150) and **HK4CO** (28,000).

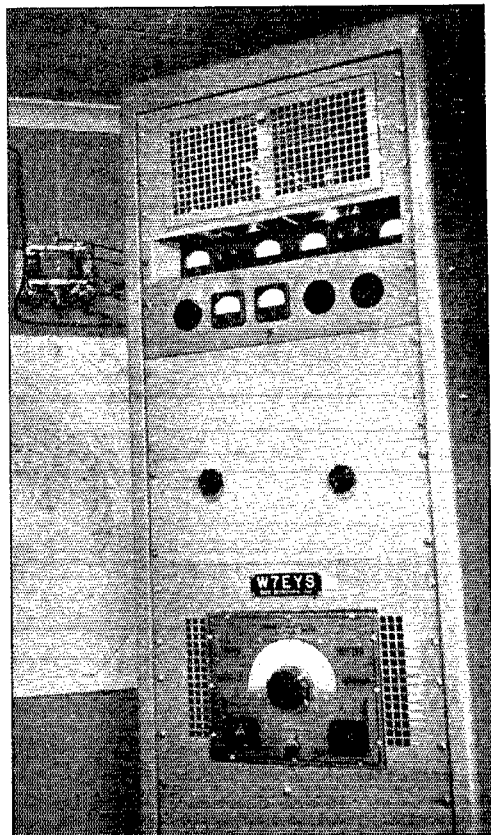
W7EYS in Bellingham, Wash., has been doing right well by DX. The present station uses an **HRO** and **DB-20** preselector, with **W7HJZ**'s **HRO** borrowed for monitoring the *Dreamboat* flight. The box to the right of the receiver is for filament and power controls and relay switching of the antennas, and to the right of this is the crystal standard. One bug keys the VFO and the other is used for primary keying of the final, depending on what kind of work is being done.

The transmitter is located behind the operating position, but the meters are watched in a mirror on top of the globe. The rig uses a Meissner Signal Shifter into an 807 buffer/doubler, which drives a pair of 4-250As. Grid modulation is used on 'phone.

Bob has several antennas. On 10, eight half-waves are stacked 2 over 2 over 2 over 2. There are two 4-element collinear antennas for Europe-ZL and S.A.-Asia on 14 Mc. and a 14 Mc. 3-element rotary for general coverage. The shack is only 7 by 11, which makes **W7EYS** a "compact kilowatt."

Where:

Everyone has a right to be wrong, but sometimes Jeeves thinks we abuse the privilege. Like last month, when we said **KS4AA** wasn't licensed by the FCC. That was a prize bull, for fair, because he is licensed and his name is James Patterson and we hope he isn't sore at us because we would like to work him, too, someday. Yep, we'd rather be right than play the piano **W6AM** says **B1ZD** (14,085) was in the Indian Ocean, bound for Bombay, when he worked him. Did we ever tell you the story of the Bombay Tennis Club? We're trying to get the story on those Russian prefixes, but so far all we know is what **G6WY** had in his column, that **UA** is Russian, **UB** is Ukraine, and **UC** is White Russian. Ham got that from **UA5KAE** The printer dropped the tail of the "Q" in **EQ4DC** last month, in case you didn't know that his cards go to **W9RRT** **W8PQQ** will be glad to QSP cards for **TR1P**, who is now an instructor at West Virginia U. Send your cards to A. H. Hix, 47 College Park, W. Va. Univ., Morgantown, W. Va. All contacts will be acknowledged. **PQQ** will also QSP cards for **CP1AP** and **OQ5BJ**, and he says cards for **VO4F** should





◆
 The second semiannual ham-fest on Okinawa was held September 1st, with nine of the twelve active hams present. From left to right, in the front row: J9AND, W3GZT/J9, J9ABF, J9AAE and W4FNT/J9. In the back row, likewise: WINDA/J9, J9AAG, J9ACE and W5KDA/J9-J9AAK. Three-letter J9 calls are obtained by request, otherwise the fellows use their W calls with the /J9 suffix.
 ◆

go to C. E. Wardle, 376 Redfern, Apt. 1, Westmount, P. Q., Canada ····· W6KIP says VQ8AD is prewar VQ8AS of Chagos, and can now be reached at Paul Caboche, Rose Hill, Maritius ····· The gang is really coming through with the addresses — here are a few. From VE7ZM: VR2AB, P. O. Box 338, Suva, Fiji; FO8AC, Austral Islands, QSL via R.E.F. only. From W2HHF: CN8MZ, Robert Cornebois, Rue de Quelcy 38, Rabat, French Morocco; C3YW, c/o CNAC, Foochow, China; VK4OS, Charles A. Rowles, Port Moresby, Papua. VS1BX, Royal Naval Air Station, Sembawang, Singapore; OA4AQ, Herman Guttman, Pan-American Grace Airways, Lima, Peru. From G8UA: EA9AI (14,170), Dr. Mora, Melilla, Spanish Morocco; VU2OK (14,100), c/o R.S.-G.B.; YR5R (14,180), c/o Miss Munro-Ashman, "Venturefair," Padworth, near Reading, England. From W2KIK: VQ3TOM, Box 457, Dar Es Salaam, Tanganyika; ZC6FP, R.A.F. Station, Aqir, Palestine; XAAA (28,270), Signal Section, AFHQ, Caserta, Italy. From W4BRB: VP3JM, Andy Jasmin, 294 Thomas St., Georgetown, British Guiana; VP5AR, Samuel Jackson, c/o Sunset Lodge, Montego Bay, Jamaica; EL5B, Jess Bell, APO 605, c/o Postmaster, Miami, Fla.; OQ5BY, Box 491, Leopoldville, Belgian Congo. From W1KKS: HR1AT, Oscar Alvarado, Radio Nacional, Tegucigalpa, Honduras. From W4GXB: HH3L, Roger Lanoix, Box A 153, c/o RCA Communications, Port au Prince, Haiti. From W6ITH: J9LG. L. Gale, Box G, Navy 824, Fleet Post Office, San Francisco, Calif; HR1MB, Marion Brashier, c/o American Embassy, Tegucigalpa, Honduras; OX1WB, Eric Summers, Walrus Bay, APO 358, New York, N. Y. ····· A letter from ET3Y requests his cards to G. Granath, Box 1191, Addis Ababa, Ethiopia. He says he is running 100 watts at a location 7790 feet above sea level, and that ET3Z may be on soon ····· W5EWF is now W2OUB/C7 on 20 c.w., and can be reached thus: Lt. John H.

Schulte, APO 912, c/o Postmaster, San Francisco, Calif. He is in Tsinan ····· W1BUX passes along another: I1KN, Fortunato Grossi, Via Toselli 152, Florence, Italy. They aren't licensed over there yet, so it might be wise to leave the call off the envelope ····· W9ERU, whose rig uses the HK354s from old OX2QY, says that QSLs for G5KW/Rhodes (14,090) should go via R.S.G.B. ····· We don't even get a chance to scoff at LH2A, because a nice letter explains to us that it is a legitimate call, issued to the Physical Institute of the Norwegian Technical University at Trondheim. They are making a series of antenna experiments, and LA90 is in charge, with H. Torgersen the second op. ····· VS4JH is back in England and can be reached by addressing your card to Mr. J. A. Hunt, 2 Parkhill Rd., Chingford, London E. 4, England. He will catch up on his QSLs as fast as he can, but points out that VS3/4/5JH were all the same station, at Labuan Island, and the different prefixes were the result of confusion by the licensing authorities. He worked several hundred Ws "through the W6 QRM"!

Who:

W8LYQ grabbed G6IA on the Isle of Man for his 100th postwar ····· You should be hearing a signal from China one of these days. W6GRL, who had been working AC4YN and AC3SS before he left, is now in Nanking setting up a transmitter for the "Voice of China," the Chinese Ministry of Information station. Hughes Aircraft built the transmitter, and Doc and Dave Evans both had a finger in it. It is a powerful brute, but if Doc finds time for any hamming it will be with an HT-4 and a rhombic. Dunno the call, but it might be XU6GRL. W6HBD will hold down the fort at W6GRL in Doc's absence ····· According to W0NVF/KG6 (14,105), W7GXR/KG6 has 88 countries from Guam. NVF got 34 in six continents during his first 15 days on the air ····· K6CGK took advantage

of the good conditions and worked 52 British stations in three weeks, in addition to many other Europeans. He says working Europeans on the bug is something he will never get tired of, even if he had the chance! W5CXS, the five-element beam man, worked nine Gs, an EI and an ON4 in one day on 10, in case you were wondering if his beam works. This with 125 watts OA4AG, with 75 watts, and VK2SGJ with 50 watts, had a 3½-hour contact without missing a word! Solid stuff, of course, but they didn't mention what part of the band they were using It looks like the only ARRL Directors who go in for DX are from the Atlantic Division [Hey, careful, boss, or you'll be out of a job — Jeeves]. First we had W3QV working from China as XU1YV, and now the present director, W2ZI, ex-W3ZI, sends in a long list of the stuff he has been knocking off and admits he is as hard hit by the bug as the next fellow. Good stuff, says we, as we list his W6JIM/C1, W6VDG/KW6, W8AJ/KH6, W1DTS/CT2, D4ANR and VE-8AY, with a lot more stuff heard W6-UWQ, ex-W9CSB, thinks it's nice living in W6-land but tough to be located within 800 feet of W6SA who is after DX these many years and no stranger to the technique. However, Bud managed to sneak in VS1BD (14,125) and VQ2GW when Ed wasn't looking W6WLY got his call in August and 11 days later sent in a DX report that makes us wonder if that is his first call. On ten he worked G6WN, G6RB, VK6RF, G5RF, G6NG, G2LB, OZ7SN, G3CK, G2DH, ZLIAX, VK2YC, PAØVT, and VP8LK! The only consolation we find in his letter is that he missed CR7AD for his WAC 8 days after getting his call! Louis runs 225 watts to a T55 and has a lazy-H and a 7-Mc. Zepp. He may make us take back those earlier remarks about newcomers having to learn the business EL4A, Cliff Evans, APO 605, c/o Postmaster, Miami, Fla., is running 450 watts on 'phone to a 2-wavelength wire 40 feet high at one end and 6 feet high at the other. Cliff says he really appreciates the spirit of cooperation shown by the Ws in helping him get so many messages and two-way conversations through to relatives of the fellows there in "darkest Africa." W9DSO tells us about the original ET3Y, Jim Cheeks, who is no longer there but is planning to return next spring. Bill Erholm, W2JWW, has been made director of the Ethiopian radio system and is in charge of issuing licenses. He has interested the Duke of Harrar, one of Haile Selassie's sons, in ham radio and is trying to get him going, so it appears that amateur radio is going well in Ethiopia W1KKS thinks NY4CM might be W8LZK/NY4, but after our bum guess on KS4AA we are very quiet W8KPL has his own theories about antennas, and has 134 feet of haywire strung over the house into the attic room and folded back onto itself, so with 40 watts and an

FB-7 receiver all he gets is 14 countries during his first two weeks on 20! That good old "one-a-day" brand W3EKK/J uses 400 watts, a 22-foot whip antenna and a Super-Pro receiver. His monitor is an SX-23A. Anybody got some antenna wire? W1BPX is up to 109 post-war and W1DLC to 98 VU2WP is QRT and going home to Scotland, where he will be sporting a GM call shortly We quote W9VES verbatim: "About two weeks ago I erected a screwy wire about 100 feet long and spent my time getting S6 from the East Coast. Natch, I was preparing to disassemble it, when on September 6 I worked CR9AN, CR9AG and VS1BX. My frequency was 14,110, I was running 100 watts, and the whole band was calling them. Counted 23 stations buzzing VS1BX when I finished with him. Haven't retuned the rig since!" Fine, fine, but what was the *exact* length of the wire? CR9AG has 71 countries so far Here's one for the DX: W7ONG is plenty active in Nevada on 7, 14 and 23 Mc. His latest are W3GZT/J9, HA5X and VP8LK Prewar we gave you poems and recipes — now we give you plays. This one is transcribed from life by W5ACL and should be read aloud, to catch the full dramatic impact.

Some Queer Things Happened, or Am I Getting DX-Happy?

The scene is the 14-Mc. band, the time early evening. The action is continuous.

ACT I

EL3A QSO W2. Unidentified VFO slides in beside 3A, holds key down, "Here, Jack, right here," holds key down.

ACT II

EL3A QSO W5. W5 proposes to switch to 'phone but gives wrong frequency. EL3A can't find W5 on 'phone, says return to c.w. EL3A can't find W5 on c.w. While searching hears W9 . . . who says he is QRX. EL3A finds W5. Is told of wrong 'phone frequency. Tells W5 W9 is waiting and that city lights will be turned off in about 10 minutes so "73 es SK."

EL3A QSO W9. Immediately after mentioning about lights out EL3A goes off air in middle of sentence. W9 says apparently lights went off so "73 es CUL."

ACT III (On EL3A's frequency.)

1st unidentified signal — "The lights went out."

2nd u.s. — "What lights?"

1st u.s. — "The city lights."

2nd — "What city lights?"

1st — "His city lights."

2nd — "Who turned them out?"

1st — "Moses, I guess."

Then silence except for the moans of the band-edge QRM.

FINIS

(Author's note: See what I mean?)

Personally, we're convinced, eh, Jeeves?

— W1DX

SWITCH TO SAFETY!



An Unusual Rectifier Circuit

Multiple Voltages Using Two Transformers and a Common Rectifier

BY COMMANDER E. E. COMSTOCK, * USCG, WINVH

THE rectifier circuit to be described was originated at WINVH and used successfully for nearly two years prior to the war. Other amateurs who have seen and used it have been so enthusiastic that it is presented here for general circulation.

The most interesting of the new circuit's many advantages and possibilities is that it offers the amateur a chance to obtain a selection of more-desirable voltages with the power-supply equipment already at hand. No longer need he be stuck with, for example, 1750 volts, when a full 2000 volts is desired. In such a case it is only necessary to add a relatively inexpensive transformer to make up the voltage deficit. The same circuit also provides for easy selection of several reduced voltages by steps, for use while tuning the transmitter and communicating over short distances.

The complete circuit is a combination of the conventional full-wave center-tap rectifier circuit and another one which at first appears unorthodox. It is shown later in Fig. 3, being first developed by stages for easier understanding.

In order to establish symbols and to facilitate explanation, the part of the circuit which is the conventional rectifier circuit is reproduced here in Fig. 1. A technical description of its operation can be found in *The Radio Amateur's Handbook* as well as numerous other radio texts.

The part of the circuit which appears to be unorthodox is shown in Fig. 2. Don't worry, it works! In fact, it is frequently used in synchronous-vibrator power supplies, although in-

* District Coast Guard Officer, 12th Naval District, San Francisco, Calif.

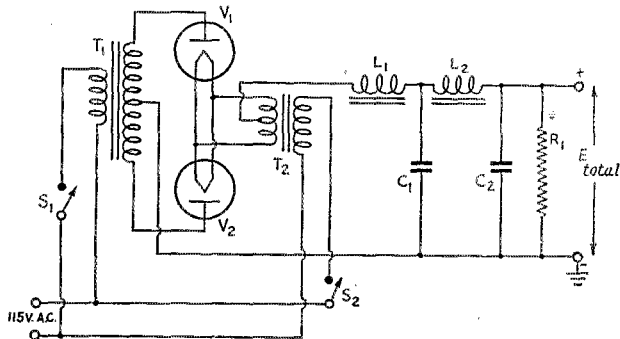


Fig. 1 — The conventional center-tap rectifier circuit, with two-choke-input filter and bleeder.

• Need a bit more voltage than your present power transformer will give? Here's how to get it — along with the possibility of obtaining four different voltages from the same power-supply set-up.

frequently employed with tube rectifiers. The symbols are the same as in Fig. 1 except that the high-voltage transformer is marked T_4 . T_2 and T_3 must be separate filament windings because the entire secondary voltage of T_4 is between them.

It can be seen upon examination that this circuit is simply an inversion of the more-conventional one of Fig. 1. It can be used alone and possesses a number of advantages over the standard one, such as:

- It reduces hazards because the plate caps on such rectifier tubes as 866s and 872s can be at or near ground potential. The number of exposed high-tension leads is minimized.
- Ripple voltage in the output has always been found to be less. If T_2 and T_3 are not center-tapped, experimentally connect the secondary of T_4 to either side of these individual windings for least ripple voltage. However, the difference in ripple is not important in ordinary use.
- There is less trouble from r.f. getting into the power supply. This is because the high-potential leads of transformer T_4 are bypassed to ground for r.f. by the secondary-to-primary capacitance of the windings of T_2 and T_3 . Also, the plates of V_1 and V_2 are at or near ground potential.
- It permits cheaper grounded-anode cooling methods for heavy-duty rectifiers.

A brief technical analysis of the circuit is made easy simply by following the paths of the electrons through the various elements. Referring to Fig. 2, note the positive and negative signs shown at the terminals of the secondary of T_4 . These are given for a particular instant (or half cycle) when the upper half of T_4 is operating so as to impress a negative potential upon the cathode of V_1 . You must

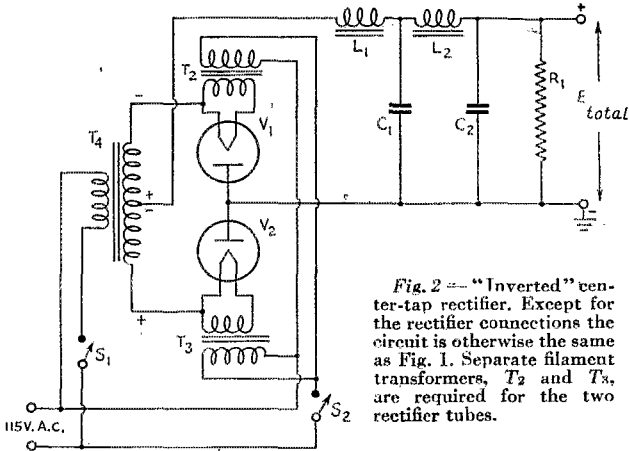


Fig. 2 — "Inverted" center-tap rectifier. Except for the rectifier connections the circuit is otherwise the same as Fig. 1. Separate filament transformers, T_2 and T_3 , are required for the two rectifier tubes.

then agree that the center-tap of this winding is positive at this same instant. Since electrons can flow through V_1 only in one direction — that is, from filament to the plate — the supply of electrons from the negative potential readily flows across the tube to the plate, which is positive because it is connected to the positive end of the half-winding (center-tap) via the load resistor, R_1 . It should also be observed that the lower half of the secondary of T_4 cannot function at this time because the plate of V_2 is negative with respect to its cathode through the load.

The final circuit is developed by combining Figs. 1 and 2 as shown in Fig. 3. For all practical purposes we have merely added another transformer, T_4 , to the old rectifier (not counting extra filament windings). Because the lower-voltage transformer usually has poorer insulation, it is advantageous to place it in the T_1 position where it can be kept close to ground potential.

The following statements hold true:

a) The total output voltage is the sum of the voltages separately obtainable from T_1 and T_4 if

these transformers are connected in phase to the power line. This can be experimentally determined by transposing the primary leads to the power line to obtain the greater output voltage.

b) The total output voltage is the difference between the voltages separately obtainable from T_1 and T_4 if the transformers are connected out of phase to the power line.

c) When the system is operating as in (b) there is no undue loss of efficiency because only the resultant voltage and not each of the canceling voltages is rectified.

d) The polarity of the d.c. voltage delivered to the load R_1 will always be the same regardless of the transformer switch connections. In other

words the positive output lead will never shift position.

e) The total output voltage is only the voltage obtainable from T_1 alone if the primary of T_4 is opened.

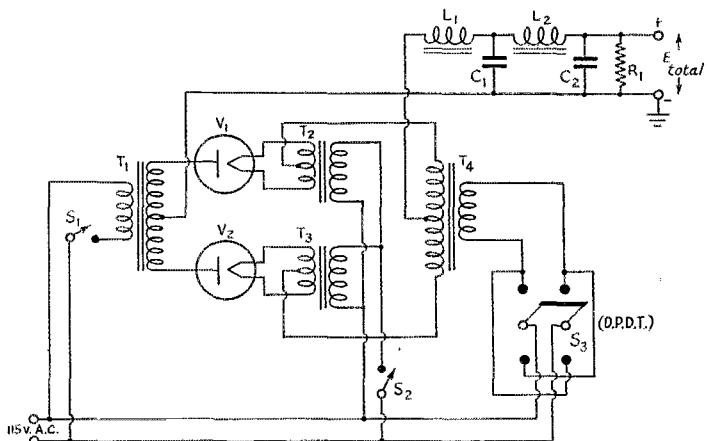
f) The total output voltage is only the voltage obtainable from T_4 alone if the primary of T_1 is opened.

g) The secondary of the "dead" transformer in (e) and (f) acts as an additional smoothing choke and as part of the filter circuit.

The switches shown in Fig. 3 provide the four different output voltages mentioned in (a), (b), (d), an (e) above. It goes without saying that all components must be designed for the power and insulation requirements of the circuit involved.

Never trust this power supply any more than any of the others, since the possible potential across some of its components is equal to *plus or minus death!*

Fig. 3 — The new circuit combines Figs. 2 and 3 to make four different output voltages available, depending upon whether each transformer is used alone or whether the two are used together aiding or opposing. The d.p.d.t. switch, S_3 , reverses the line connections to the primary of one transformer to reverse its secondary phase with respect to the other. Filter constants are the same as for conventional power supplies of the same voltage and current ratings.





The World Above 50 Mc.

CONDUCTED BY E. P. TILTON, * WIHQD

A FEW operators who worked on 6 during the summer months switched back to 28 Mc. as soon as that band showed signs of coming to life in early fall. To them there seemed to be no point in attempting to carry on on 50 Mc., for they "knew" (from past experience on a different band, at a different point in the sunspot cycle!) that the DX season is all over by the first week in August. Those who stayed with the v.h.f. bands were well repaid, for September turned out to be one of the most interesting months yet experienced. A prolonged session of aurora, which wiped out communication on the low-frequency bands, brought in new states for many, and frequent temperature inversions resulted in numerous fine contacts. Occasional bursts of sporadic-E skip came in unexpectedly, and enabled at least two more workers to complete the conquest of all call areas on 50 Mc.

One of these was WILLL, of Hartford, Conn., known the country over as the fellow who never misses a v.h.f. DX opportunity. Since he worked W6NAW and W5JGV/7 in July, Brownie has been scouring the band for a W5, the only call area needed to complete his Grand Slam. No one was more surprised than he when W5FRD, Fort Worth, Texas, broke through at 12:40 A.M. on Sept. 29th, calling CQ. The long vigil paid off, and WILLL has the well-deserved honor of being the first W1 ever to work all U. S. call areas on a v.h.f. band.

This contact came as the climax of an evening which was packed with everything that can happen on 6. A pronounced temperature inversion had been in evidence for several evenings, permitting contacts the length of the Atlantic Seaboard from Maine to Washington, D. C., and this undoubtedly helped to stretch W5FRD's coverage out to nearly 1500 miles, unusually long for a single-hop opening. A fine flurry of aurora DX earlier in the evening made possible a number of contacts between stations in W1, 2, 3 and 8. This was the chance that W8SLU, Auburn Heights, Mich., had been looking for, and he got W1PFJ, Waltham, Mass., for his first W1 and WACA. This is believed to be the first 50-Mc. WACA from W8, though some may have gone unreported.

The night of September 28th and the morning

* V.H.F. Editor, QST.

RECORDS

Two-way Work

- 50 Mc.: W6OVK-W2BYM
2500 Miles — June 14, 1946
- 144 Mc.: W3HWN-W1MNF
390 Miles — September 29, 1946
- 420 Mc.: W6PSQ/6-W6FZA/6
140 Miles — August 25, 1946
- 2300 Mc.: W1JSM/1-W1ILS/1
1.6 Miles — June 23, 1946
- 5250 Mc.: W2LCF/2-W7FOF/2
31 Miles — December 2, 1945
- 10,000 Mc.: W4HPJ/3-W6IFE/3
7.65 Miles — July 11, 1946
- 21,000 Mc.: W1NVL/2-W9SAD/2
800 feet — May 18, 1946

of the 29th were the occasion of record-breaking DX on 144 Mc. also. Your conductor arrived home from a fishing trip (who picks the dates for those things!) at midnight, just in time to hear Brownie work that W5, and then we turned to 144 Mc. and found it full of wild tales of the evening's DX. At this writing we do not have full confirmation, but we understand that W2PCQ/1, operating from Mt. Greylock, in the northwest corner of Massachusetts, worked W3LN, Lancaster, Pa., W4CDG/3, Towson, Md., and W9STX/3, of Washington, D. C., this last one exceeding the current record by a goodly margin. W1MNF, East Orleans, Mass., on the elbow of Cape Cod, was heard gloating over the W3s he worked, but, with deadline staring us in the face, we do not have details as to just who was worked. Any W3 is plenty good DX from W1MNF, however!

The tendency to work 6 by the calendar is bad at any time, for a large measure of the satisfaction to be derived from v.h.f. activity lies in daily work within a radius of 300 miles or so, but it is particularly unfortunate at this point in a sunspot cycle, when our first real opportunity for international DX is just appearing over the horizon.

We went through a sunspot peak in the middle 30s, but the state of the v.h.f. art was such that the possibility of DX communication went almost unrecognized. Now we have a new band six

megacycles lower in frequency, well inside the predicted ceiling for F_2 reflections; we have equipment which permits us to work with extremely low signal levels, making it possible to copy signals which were far below the threshold of our 1935 receivers; we have stabilized transmitters and high-gain antennas; and, perhaps most important of all, we have a world-wide awakening to the possibility of international v.h.f. work. Surely these factors should be enough to keep interest in 50-Mc. work alive throughout the year in this country!

And what are the possibilities? The always-conservative information supplied by the Bureau of Standards forecasts maximum usable frequencies as high as 62 Mc. during the month of November in some parts of the world. Unfortunately, the highest m.u.f. is in prospect for paths where there is little, if any, v.h.f. activity, such as the hop between the Hawaiian Islands and New Zealand. Points approximately 2500 miles apart on either side of Latitude 20 degrees south, in the Western Hemisphere, will have an m.u.f. well above 50 Mc. The California-Florida hop is within the realm of possibility, although the predicted m.u.f. for November is about 44 Mc. At other points in this country the m.u.f. will be up around 37 Mc. There will undoubtedly be some further rise in these figures before the slump which comes in the spring. It should be borne in mind that these figures are well on the conservative side, as was demonstrated last winter, when the predictions showed that 28 Mc. would not be open for Europe except for a very short period. Ten-meter men need not be reminded that their band was loaded with Gs, D4s, and other European stations a considerable number of days either side of the predicted period.

In addition to the chances for international DX, the fall season also affords opportunities for work by means of aurora reflection. Late August and September provided the best examples of this little-understood phenomenon yet experienced on 6. As has been pointed out in these pages before, the character of aurora reflection changes markedly with the sunspot cycle, and we are now passing through our first experience with aurora effect in a sunspot maximum. As stable signals and superhet reception are necessary for

communication by this medium, it went unrecognized until about 1938, when advanced techniques first began to be used to any considerable degree in v.h.f. work.

In 1940 and '41, when the aurora effect was known well enough to most v.h.f. men so that they were able to recognize and make full use of it, we were in a sunspot minimum. In those years, the visible aurora appeared in the form of a vertical curtain in the northern sky, and 56-Mc. signals were bounced off it in fine style. In the sunspot maximum now approaching, the aurora is spread more generally over the whole sky, and aiming north with the directional array is not always productive of a signal increase. V.h.f. men who worked aurora DX in prewar days remember the broad buzz-saw signals which rendered anything but keyed carrier unintelligible. This effect is present during current aurora sessions, but to a lesser degree, and occasionally voice modulation is readable. C.w. still remains the preferred medium, however, and any operator who has the urge to make full use of the 50-Mc. band should make provision for changing to c.w. easily. The aurora effect often slips in and out rapidly, leaving no time for rebuilding the rig in order to get it on c.w.

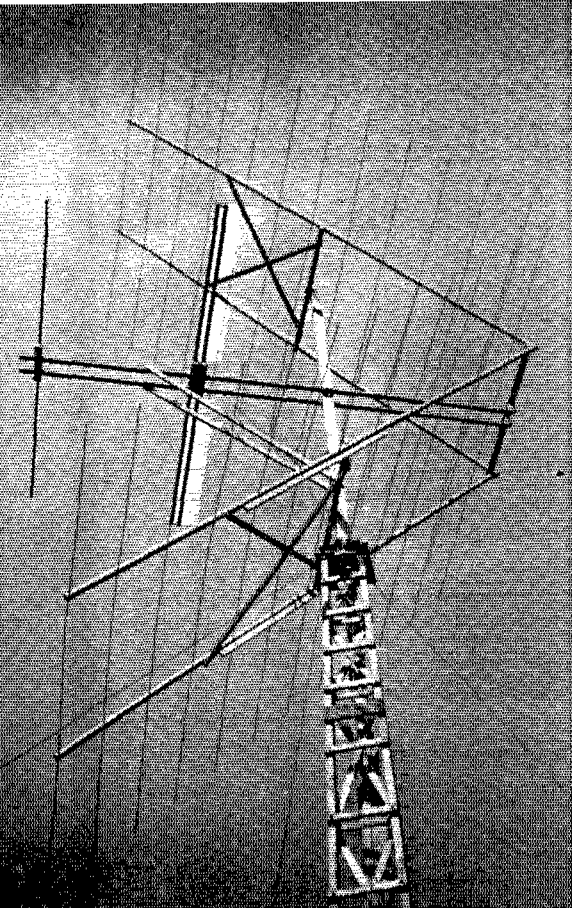
The magnetic storm which wiped out almost all low-frequency communication during the third week of September was a boon to 50-Mc. men, affording a fine opportunity for work over the intermediate distances between the 200-mile range normally covered by extended-local work and the 500-mile minimum which is characteristic of the summer's sporadic-E skip. One night's work netted contacts with New Jersey, Pennsylvania, Maryland, Delaware, Ohio, Michigan, Illinois and South Dakota for several WIs. A great many more could have been worked if stations had been active in the right places. October and November should produce even better sessions. Let's not sell 6 short, just because the calendar says that summer is over!

International Notes

That international interest in v.h.f. work is at an all-time high is evidenced by reports received, within the past month, from Canada, England, Belgium, France, Italy, Czechoslovakia, Chile, and New Zealand. Attending the Maritime District Convention at Halifax, Nova Scotia, in early September, we found considerable interest in 50 Mc. To be sure, most of the gear in use was reminiscent of our early efforts on 56 Mc., but the interest is there, and several of the VE1s are working on equipment which will permit full utilization of the band. One such is VE1QZ, who has a crystal-controlled rig with an 829 in the final, a hot acorn converter, and is now building a 3-element rotary beam. He is determined to make the first VE1-W contact on 50 Mc., so watch 50.1 and 50.6 for VE1QZ.

Who's Where on 6

WBNS Squantum, Mass.	50.2 Mc.
W1CAU Lynn, Mass.	51.33
W1DBM South Norwalk, Conn.	50.7
W1LH Bloomfield, Conn.	52.3
W1OUN Portland, Maine	50.36
W1RX Reading, Mass.	51.5
W2HMS/1 Fairhaven, Mass.	50.28
W2MDW Scarsdale, N. Y.	50.9
W4ZZ Greenville, Tenn.	50.18
W8SFG Hubbard, Ohio	50.99
W9ZWF Wilmette, Ill.	50.025
W1KTF/9 Prospect Heights, Ill.	50.18
VE1QZ Halifax, N. S.	50.1, 50.6



This square-corner reflector array is used on 50 Mc. by W9QCY, Fort Wayne, Indiana. It rotates 360 degrees, and may be tilted up or down about 5 degrees.

Activity in the vicinity of Winnipeg has reached the point where the QRM from modulated oscillators and superregenerative receivers is limiting the results that anyone can obtain, according to VE4DG. Here, and at other points in Canada where there is appreciable activity on 50 Mc., there is agitation for stabilization regulations similar to those in effect in the United States. Actually there is little justification for such archaic technique, for similar gear will produce just as good results on 144 Mc., and with smaller antenna sizes. Only hindrance to the more advanced workers results from the use of oscillator-and-rushbox technique on 50 Mc.

Such a change might well be achieved on a voluntary basis, however, as evidenced by the high state of the art in Great Britain, where there is still no legal barrier to the use of modulated-oscillator rigs. The Gs are confined to 1.5 Mc., however, and such a narrow band practically precludes the possibility of using anything but sharp-signal technique. Australia, on the other hand, has the 50-Mc. band, and our reports from "Down Under" indicate that crystal-controlled rigs and superhet receivers are almost standard

equipment there, despite the lack of any legal requirements as to the nature of the transmitted signal.

Aurora effect was noted by G5BY on August 22nd, the occasion of one of the best sessions ever experienced for work with stations on the Continent. Starting at 1700 GCT I1FA was worked, followed at 1800 by F8RSN, in Southern France. These two signals came in from the normal southeast direction, but at 2200 the band filled up with Swiss and Italian signals, these peaking with the beam aimed northeast, and exhibiting the rapid flutter and low intelligibility which are characteristic of aurora-reflected signals. Between 2000 and 2130 the following were worked in rapid succession: HB9CD (the first HB-G QSO on 5 meters, apparently), HB9J, I1IRA, HB9BZ, I1TH, I1KS, and I1MH. Two other Italian stations were heard, and a Swedish station and Czech stations were reported heard by other Gs.

From the v.h.f. department of the *Short Wave Magazine* (British) we learn that at least 13 OKs are active on 5, including 1AA, 1AK, 1AW, 1JM, 1KA, 1LI, 1LX, 1MP, 1WY, 1ZV, 2MA, 2MV, 2OA. OK1AW and OK2MA have worked a distance of 195 miles, and OK1AA-OK1AW over 175 miles. When working portable the letter X is added to the call of the station so operating. The *Short Wave Magazine* also contains a report from PA0AD, who says that there is considerable 5-meter activity in the vicinity of The Hague. A total of 130 Gs are listed as active on 5, indicating that a considerably higher percentage of their amateurs are engaging in work on that band than we Ws can boast on 50 Mc.

G5BY never fails to monitor the 50-Mc. band during 58-Mc. openings, having a separate receiver and a 4-element beam for that purpose. He actually listens on 50 during "long calls" by various Europeans on 58, but to date he has heard nothing but commercial harmonics, mostly of European origin. A few American-type calls have been heard, with transmissions in English. On Sept. 1st, at 1503, "QTC de KOE," followed by messages in plain English, was heard on 50.5 Mc.

August 22nd was a big day for the Italian stations. Using a crystal-controlled transmitter of 20 watts output, I1KS, Florence, Italy, worked G2XC, G5BC, G5BY, G5LL, G5MA and G5TX. I1MH, using a 30-watt ECO-controlled rig, contacted G2XC, G2DMZ, G4OS, G5BY, G5LK, G5MA, G6LK and G6MR. I1WW, operating portable 12 miles south of Florence with a simple 807 Hartley oscillator and m.c.w., worked G5TX. Many other Gs were heard by I1KS and I1MH, most of them with extremely strong signals. Short skip was present on 28 Mc. at this time, with signals coming in until well after midnight, Italian time. It's a good thing that the Europeans don't know that the DX season ends in July!

W3HWN DOES IT AGAIN!

144-Mc. Record Boosted to 390 Miles!

Late reports on the 144-Mc. DX work of Sept. 28th and 29th show that the record for 2 meters now exceeds the greatest distance ever worked on 2½. Apparently the high spot of the evening was a contact between W3HWN, Mechanicsburg, Penna., and W1MNF, East Orleans, Mass., a distance of 390 miles. W1JFF, Newport, R. I., also worked W3HWN, 320 miles, W3LN, Lancaster, Pa., 290 miles, and W3QS, Feasterville, Pa., 200 miles.

From Czechoslovakia comes information that the OKs are now licensed for operation in the following v.h.f. bands: 56-60 Mc., 112-118 Mc., 224-230 Mc., and 408-420 Mc., as well as all the lower-frequency bands. OK1MC, in a 14-Mc. QSO with W1AW, reports frequent DX reception on 56 Mc., with good signals from F and G stations. OK1AA and OK2MV have been heard in England, and considerable international work on 5 is anticipated.

Upward of 25 QSOs with English stations have been made since May 1st by F3JB, Bandon; France, and OK1FF has also been contacted. Transmissions are directed toward the United States, and F3JB would like to arrange tests with interested amateurs in this country.

While working W1DX on 14 Mc., ON4IF mentioned that he was using an 815 rig also employed in 5-meter work. His operation had been confined to local work, but DX contacts were anticipated, as other European countries have been heard in Belgium.

Among the best spots for v.h.f. DX, if activity can be stimulated there, are the various Latin-American countries. The fine signals from many South American stations on 28 Mc., during the summer months, when the band appeared dead for other localities, are some indication of the high m.u.f. which may be expected in that part of the world. From Santiago, Chile, CE3FV (W6QPN in this country) writes that he expects to be on during October, if not before. There is the little matter of the license, which authorizes only "10, 20, 40 y 80 metros," but Ken believes that this can be taken care of.

Until recently only Canada, Australia, and the United States have been operating on 50 Mc., all other countries holding to the 56-60 Mc. assignment, or using the narrow slice from 58.5 to 60 Mc. Now we can add New Zealand to the 50-Mc. column, the ZLs having switched from the 5-meter assignment in late summer.

Around the Country on 6

If anyone in W1, W2, or W3 has not worked all New England states, it's no fault of W8CIR/1. Ed has taken his mobile job and 3-element collapsible array to Mt. Agamenticus in Maine,

Hogback Mountain in Vermont, Mt. Monadnock in New Hampshire, and Woonsocket Hill in Rhode Island to provide contacts with those hard-to-get states on 50 Mc. for many who otherwise never would have been able to work anyone there. Resident activity is low in each of these states, and nonexistent in Vermont. Maine contacts may be provided soon by W1OUN and W1DEO, both of Portland, who have been working each other locally for some time.

Every so often someone "discovers" 6! Such was the case recently with W2MDW, Scarsdale, N. Y. With low power, and 500-watt competition from W2PTL in the same building, 10 proved a waste of time. Revamping the rig to an 807 doubling in the final, W2MDW has been enjoying himself on 6, as there is no high-powered competition, and even the lowest-powered rig will provide nice contacts over a considerable local range. Yet only a handful of stations operate on 6 in many large cities which would provide room for scores of stations of this sort.

How about more f.m. on 6? Tests have shown that narrow-band f.m. is receivable on communications receivers of the conventional sort; thus it is no more wasteful of space than an amplitude-modulated signal. Of course, to realize the full advantages of f.m. it should be received on equipment designed for this service; but, in the absence of such receivers, narrow-band f.m. still has many advantages, not the least of which is the freedom from broadcast interference resulting from its use. The principal factor now working against the greater use of f.m. on 50 Mc. is the allocation by which it is confined to the high end of the band, where activity is at present nonexistent. W3CPG/2, and others, suggest that narrow-band f.m. be allowed all through the band, with wide-band f.m. continuing in the present assignment. How about some discussion?

One of the best ways to promote activity in the off-season is by the organization of relay routes. Attempting to get messages off keeps stations on the air, and such networks are mighty handy to have around in case of natural disaster, when the day-and-night reliability and freedom from QRM which are characteristic of 50 Mc. make it an ideal band for emergency traffic. One of our objectives in prewar days was a transcontinental network of 56-Mc. stations. This aim might well be revived on 50 Mc. A start along this line has been made by the Eager Beaver V.H.F. Net, whose members are working to maintain regular activity on 50 Mc. in Kansas, Missouri, and adjacent states. A message to your conductor in West Hartford, originated by WØJQC, Fort Riley, Kansas, came all the way on 50 Mc., the route being something like this: WØJQC, WØYUQ, Manhattan, Kans., WØZJB, Gashland, Mo., WØNFM, Solon, Iowa, W9PK, Downers Grove, Ill., W8CVQ, Kalamazoo, Mich., W8SLU, Auburn Heights, Mich., W2BYM, Lakehurst,

V.H.F. MARATHON

Call	Contacts Through August			Score	States Worked	
	50 Mc.	144 Mc.	235 Mc.		50 Mc.	144 Mc.
W1AEP	47			395	14	
W1BCT*		150	1	636		4
W1CGY	37			302	15	
W1DXL		46		216		5
W1EH1		33		156		4
W1FJN		44		366	14	
W1HDQ1	94	117		1702	24	7
W1KLR		53		308		2
W1LLL	88			931	23	
W1LMU		127		480		3
W1MBS*		122		395		2
W1PFFJ	112			945	23	
W2AMJ	35			699	23	
W2AUF*		130		366		3
W2BQK	60			522	17	
W2BYM	107			892	23	
W2COT	14	31		128	3	2
W2DZA		175	5	757		7
W2JWO*		174		1088		9
W2LXO		224		980		5
W2PWP	69	15		603	17	2
W2QVH		201		823		4
W2RPO	6	44		348	3	2
W3BKB		49		272		4
W3BTP*		55		273		1
W3CGV	28	49		449	7	5
W3GKP*		88		569		6
W3HWN*		122		1044		7
W3KIE		81		399		3
W3LN*		118		652		5
W3RUE	24	13		377	13	1
W4CDG/3*	9	120		722	6	5
W4HVV	32			574	15	
W6ANN	61			688	11	
W6BWG	28			90	2	
W6NJJ*		215		1054		1
W6OVK	9	38		364	6	1
W6QG	41			419	8	
W6RVL*	109	164		795	4	1
W6TGY*		45		132		1
W8LLM/6	33			205	3	
W7KAD	59			1245	19	
W7QAP	31			374	11	
W8NKJ	18	6		106	7	1
W8WKE		7		25		1
W9AB	13			80	5	
W9ACU	8			84	2	
W9ALU	13			140	6	
W9NCB	23			228	8	
W9PK	46			435	15	
W9UNS	16			213	11	
W0YUQ	61			798	20	
W0ZJB	96			1148	26	

* Includes portable or mobile work.

† Not eligible for a award.

‡ W2JWO winner for August with 298 points.

N. J., W1HDQ. All these hops except that between W8SLU and W2BYM were made without the aid of unusual conditions, repeating our prewar experience that the Ohio-Pennsylvania, or Upstate New York path is the stumbling block. Let's try again!

Some very nice hops are being covered in the Middle West. W0YUQ and W0ZJB are working W0s NFM and IFB in Solon, Iowa, and CHI in Grand Junction. YUQ hears bursts of signal from W9QUV, Moline, Ill., and W9ZHB, Zearing, on what may be reflections from meteors. Two or three words will come through at high signal level, and the signal will disappear entirely.

W9ZHB and W0ZJB got together via the aurora route on Sept. 18th. W9PK has worked the Solon, Iowa, boys, and has heard W0CHI, a distance of well over 300 miles. Jack reports that the Iowa stations are louder than the Michigan stations, though the latter are considerably nearer.

Out in Arizona, W7QAP and W7KAD (W5JGV/7) have finally made the grade, the first contact being made on the evening of Sept. 23rd. The distance is just about the same as that between Tucson and Phoenix, the path worked so successfully in prewar days by W6QLX and W6OVK. The terrain between Tucson and Douglas is even more rugged, and the bridging of this gap can be considered a major accomplishment.

Some 200-mile work is being done along the California coast, long the scene of nice hauls on 144 Mc., but seldom exploited on 50. W9LLM/6 has worked three Santa Barbara stations, W6TMI, W6AMD and W6FFF.

W91ZQ, Wauwatosa, Wis., takes issue with us on the use of Scotch Tape on the coils of our mobile receiver described in *QST* for September. George relates that some leakage troubles have been experienced with this type of insulation in high-humidity climates. A layer of polystyrene tape would provide much better insulation, at a slight loss of convenience.

Fall DX on 144 Mc.

The month of September was productive of the best temperature-inversion bending yet experienced on 144 Mc. On the night of the 7th, W8YIO/4, operating from Skyland on the Skyline Drive in Virginia, worked W2JWO, Patchogue, Long Island, a hop slightly longer than the W3HWN-W1KOE record. The presence of a temperature inversion, plus the high altitude of W8YIO/4 made the 2-meter band sound like 20 on a Sunday afternoon. Signals from 200-300 miles were booming in like locals, and 5 states were worked, the list including W1OUB/3 and W3LN, Lancaster, Pa., W3LCT/3, Gap Hill, Pa., W4CDG/3, Towson, Md., W3BKB, York, Pa., W2HWX, Little Silver, N. J., W2SKH, Pennington, N. J., W2BV, Minotola, N. J., W2PFFQ, Merchantsville, N. J., W3BTP, Marietta, Pa., W3GQS, Feasterville, Pa., W9TBB/4, Arlington, Va., and W9STX/3, Washington, D. C. The addition of Virginia gives W2JWO a total of 10 states worked on 144 Mc., believed to be the greatest number ever worked on any v.h.f. band above 60 Mc. W2PCQ/1 nearly equaled this total in two nights' work from Mt. Greylock on the 27th and 28th.

The story is going around that various W2s and W3s have worked a station in Georgia, but no details which can be confirmed have yet been received. With loud signals from as far south as Washington, it is believed that only lack of ac-

tivity in the right places below that point has prevented the covering of much greater distances. In any event, we'd like more dope on this Georgia story!

Some nice hauls are being covered on 144 Mc. in the vicinity of the Great Lakes. Using the crystal-controlled 815 rig he described in September *QST*, W8NBV worked W1MGL/8 and W8YNT, in Dearborn, Mich., and W8UMI, Highland, Mich., on the night of Sept. 19th. These contacts are over Lake Erie, about 175 miles.

September 14th and 15th brought S9 signals from the stations in the Detroit area at W8UKS, Cleveland, Ohio. W2RPO (ex-W8NOR) Buffalo, New York, was also heard. Helen Harris of W8UKS lists 12 new stations on 2 in the vicinity of Cleveland and Toledo. She reports that the Toledo gang are trying horizontal polarization, and more stations are coming on with crystal control. Crystal-controlled stations include W8s DVI, FSS, LBJ, ML, YGM, VVY, UMI, GJF, YGG, YDT, WJC and UKS.

In the San Francisco Bay area, quite a few stations are able to work out consistently to distances of 100 miles or more, despite mountainous terrain. When W6OVK moved down to Redwood City he was sure that he was going to be out of touch with the gang, but crystal control, superhet receivers, and high-gain antennas are turning the trick. Jim works several stations in Sacramento regularly, including W6BVK, 92 miles, and W6PIV and W6RKM at 87 miles. These stations have good strong signals at any time, with very little fading, but W6LSX at Watsonville is more variable. W6WAI, at Forestville, near Santa Rosa, is also a regular, and W6OVK (at sea level) is able to act as go-between with LSX and WAI, who are separated by about 130 miles, with the Coast Range intervening almost all the way. Higher gain in the antenna is the universal aim, and W6TCP is leading the parade with 8 half-waves in phase with directors, backed up by a wire-screen reflector. W9OAW/6 and W6QR have crystal-controlled rigs in their cars, and have very consistent coverage all through the Bay Area. W6NJJ made the first home-station contact with W6WAI, who is 50 miles north of San Francisco.

The 12 half-waves in phase, vertical, and 10 half-waves in phase, horizontal, with a reflector of chicken wire in between — the beam to end all beams at W3KIE, Lancaster, Pa. — has been paying off. From his low location, John could not even hear York, 24 miles away, with a dipole antenna. Since the erection of the big array, 21 W2s, at distances up to more than 200 miles, have been heard with good signal strength. W2s ER, JWO, OJR, and LDQ are extremely strong. John has had no luck with the horizontal side of the array as yet, and asks for some other horizontally-polarized stations with whom to make

tests.

Anyone looking for low-cost tubes for 144 and 235 Mc. should not overlook the 7193, used extensively in various v.h.f. applications during the war. It has an element structure similar to the 6J5, but with plate and grid caps on the top of the envelope. W5IHT/6 says that the 7193 works well in conventional circuits, at frequencies up to 300 Mc.

420-Mc. Records Going Up!

Just too late for inclusion in the last issue, we received word of a new 420-Mc. record. On August 25th, W6PSQ/6, operating from Park Ridge Lookout in the Grant National Park, contacted W6FZA/6 on Mt. Frazier, near Bakersfield, a distance of 140 miles. Equipment at W6PSQ/6 was a push-pull oscillator using 446-A lighthouse tubes, modulated with a 6L6, a rig supplied by W6VQB, the former record holder. The receiver was also a 446-A, operating as a superregenerative detector. The antenna was a 16-element array. W6FZA/6 used a single large lighthouse tube in a linear-oscillator circuit similar to that described by W1DBM in November, 1945, *QST*. The receiver was a 955 acorn, tuned by a 100- μ fd. condenser at the end of a 1 $\frac{1}{4}$ -inch line of No. 8 wire. The antenna was 8 half-waves in phase, backed up by a 3 \times 4-foot copper-screen reflector.

W6VQB/6 was on Mt. Diablo during the work-out, and was hearing W6PSQ/6 over the 190-mile path, but contact could not be established two-way on 420 Mc. The competition is keen, and the 140-mile record is not expected to stand very long. The behavior of the 420-Mc. band seems to be much like 144 Mc. in that strong signals are exchanged over short hauls where high hills intervene, W6VQB reporting work over (or around) a 500-foot hill in the Bay area.

Another 420-Mc. contact well beyond 100 miles is reported by W6WSQ. Operating from Mt. Wilson on September 29th, he contacted W6IBS/6 at Point Loma, a distance of 118 miles. As the report came by telegraph no details of the equipment used are available at this writing.

Reception of the signal from Hauppauge, L.I., by W1BBM at North Harwick, Mass., reported in September *QST*, has been repeated frequently throughout the summer and early fall. W1BBM feels certain that he could have worked into New York on 420 Mc. at these times, but he has never heard a signal out on the Cape, other than the 438-Mc. signal from Long Island, 170 miles distant! He is going to 1250 Mc. now, and hopes to get some cooperation on that band. Any takers?

Getting things started on 235 or 420 Mc. can best be accomplished by getting interested parties together on an operating schedule. W2BAV (ex-W1LAS/2) has been operating on 235 Mc. at 8 P.M., and on 420 Mc. at 9 P.M. each Wednesday

(Concluded on page 136)



Hints and Kinks

For the Experimenter



CONNECTOR FOR TWIN-LEAD

THE small FT-243 crystal holders that are available in the present surplus market make neat and inexpensive plugs for use with almost any small-diameter two-wire cable, such as the

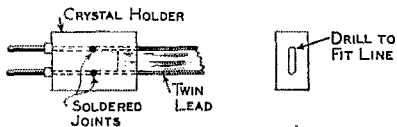


Fig. 1 — Efficient connector for small two-wire cable made from an old FT-243 crystal holder.

75-, 150- and 300-ohm Twin-Lead, as shown in Fig. 1. The holders fit the new ceramic crystal sockets, and make convenient connectors for coupling links and antenna input connections. — James A. Gundry, W8KNP, ex-KA1AA.

AUTOMATIC BREAK-IN CIRCUIT

WITH THE automatic break-in circuit shown in Fig. 2 the transmitter is turned on with the first dot or dash, and is automatically turned off a predetermined interval (usually one-third to one second) after the operator stops keying. Between "on" and "off," the rig may be keyed as usual, provided that at no time is there an interval between keying characters of more than the length of time required for the automatic "off" action to take place. Thus the need for a stand-by switch is eliminated, permitting fast, efficient operation with the key as the only operating control.

The circuit has two divisions, V_1 , which fully charges condenser C each time the key is closed, and V_2 , which has an s.p.s.t. relay (contacts normally closed) for switching the whole rig on and off in its plate circuit, and a time-delay circuit in its grid return.

Under "key up" conditions, V_1 is cut off, as its cathode circuit is open, and V_2 is conducting, holding contacts A and B of the sensitive relay open. When the key is closed for the first time, V_1 conducts, and its plate current, flowing through the potentiometer, increases the bias on V_2 beyond cut-off, causing the relay to close the circuit between A and B . The condenser C , in the meantime, has charged fully, acting as a holding bias to keep V_2 cut off. When the key is next opened, C starts to discharge through the potentiometer, but because the time constant of

the circuit is long, it cannot discharge fast enough to permit V_2 to become conductive before the next keyed character comes along to charge it up again. Thus, the circuit between A and B remains closed as long as dots and dashes are coming along at the usual keying rate. Once the key is left open long enough for C to discharge, however, the circuit opens, taking the transmitter off the air. The time delay used may be adjusted to suit the operator's individual keying speed by means of the potentiometer.

The relay may be used to close the circuits of a number of other relays, thus permitting complete station control from the key. If the delay obtained is too long or too short, try replacing the condenser C with another of the same value. Sometimes the actual capacitance may not be that

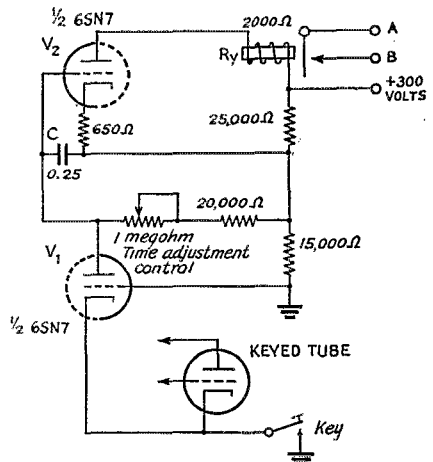


Fig. 2 — An automatic break-in circuit with adjustable time delay.

shown on the label, and in one instance I found one, with the correct label and size, that gave a delay of fourteen seconds, while most condensers tried gave a two- or three-second delay at the maximum.

I suggest that the transmitter power-supply circuit be examined to insure that the automatic break-in circuit cannot turn off the same power supply that furnishes its plate voltage! If desired, a switch may be connected across the relay contacts to disable the automatic break-in circuit when you are asked to QRS when the delay circuit has been adjusted for fast keying. — Henry L. Cox, jr., W8UPS/S

SURE-FIRE SAFETY PRECAUTION

FOR the expenditure of a couple of dollars for a relay and a switch, and a few hours labor, the safety system described below was installed at W8ICO. No longer is it necessary to worry about getting a serious and perhaps fatal shock when changing plug-in coils in the final amplifier.

A double-pole double-throw relay is used in the circuit shown in Fig. 3. The relay is one commonly used for antenna switching, with ceramic insulation and sufficient spacing between contacts to withstand the full plate-supply voltage. One set of relay contacts immediately grounds the B+ voltage when the transmitter switch is turned off, and the other set energizes a green panel light, signifying that it is safe to touch the final tank coil. This safety signal will not operate until the B+ is actually grounded, thus if the relay fails to operate, the green light will not come on, and the operator knows that danger is present. The red panel light is turned on whenever the transmitter switch is turned on.

Because relays sometimes do not throw as they should, it is possible that the path to ground from B+ may (instantaneously) be through the pilot light and the filament winding. For this reason, a filament winding separate from any

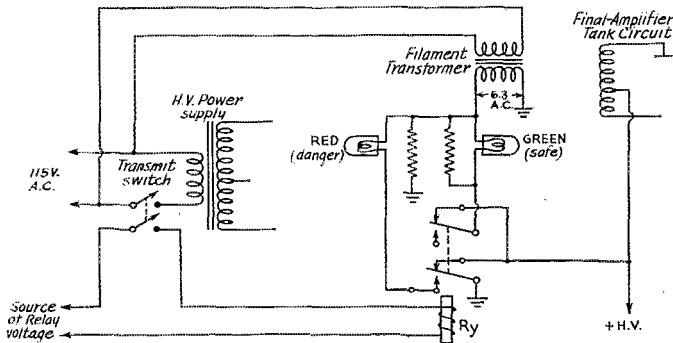


Fig. 3 — Safety circuit used to ground the plate supply when the "send" switch is turned off. The relay used is described in the text.

tube circuit is advised. Two resistors, connected as shown in the diagram, prevent surges from blowing the bulbs. Good insulation should be used on the lead from the relay to the green lamp to eliminate the possibility of a short to ground, which would cause the green signal to light. The key to the system: If the red light is on, stay away! If the green light is on, it is safe to touch the final tank coil. If neither light is on, or if both lights are on, something is haywire, and it will pay to ground the tank before touching it. A simple safety precaution such as this will save quite a few gray hairs, and might save your life!

— Charles F. Lober, W8ICO/4.

COUPLING 500-OHM 'PHONES TO THE RECEIVER

WITH tube-to-500-ohm-line transformers still scarce, many amateurs are faced with the problem of using 500-ohm 'phones with their re-

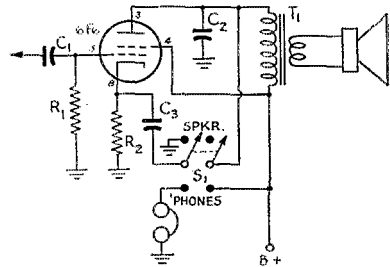


Fig. 4 — Proper operation of the output stage of the receiver when 500-ohm 'phones are used is provided by the connection of a d.p.d.t. switch, as shown. All other parts shown in the diagram are those usually found in the receiver.

- C₁ — 0.01- μ fd. 600-volt paper.
- C₂ — 0.0047- μ fd. 600-volt paper.
- C₃ — 10- μ fd. 25-volt electrolytic.
- R₁ — 0.47-megohm, $\frac{1}{2}$ watt.
- R₂ — 470 ohms, 2 watts.
- S₁ — D.p.d.t. toggle switch.
- T₁ — Tube-to-voice-coil transformer.

ceivers without burning out the output tube, its plate by-pass condenser, the output transformer, or all three, because of high peak voltages developed as a result of operating the tube with improper load on the voice-coil winding.

Operating the output tube as a cathode follower, as shown in Fig. 4, solves all of these problems with the additional advantage of producing excellent frequency response and very low distortion. By the addition of a double-pole double-throw toggle switch as shown, and a little re-wiring of the components that are already in the receiver, proper operating conditions under both 'phone and 'speaker loads can be achieved.

— Robert C. Potter, VE3TO.

Strays

"In my rounds of the MDs I ran across one whose specialty was radiology, and his name, believe it or not, was Sender!" — W3QP.

Eleven-meter DX man, of course.

—

Cliff Arkett, popular comedian on the daytime network radio program "Glamour Manor," in real life is G. W. Richert, W6SGP.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.

E. L. BATTEY, WIUE, Asst. Comm. Mgr.

GEORGE HART, WINJM, Communications Asst.

J. A. MOSKEY, WIJMY, Communications Asst.

LILLIAN SALTER, Communications Asst.

Sweepstakes Contest. The most outstanding news this month is announcement of the first postwar ARRL Sweepstakes. See page 30 for complete details. Once more the bands will ring with "CQ SS" and the echoes will come back in the form of QSOs galore. Former participants in these annual affairs need no introduction to the "SS." Newcomers have a treat in store. You will find contacts more plentiful and easier to make than you ever dreamed possible. It is the opportunity you have been awaiting to give your station a real test. You'll be surprised at the lift your operating ability will get from the experience. If you're working for the Worked All States award, here's your chance to snag some rare ones. There's operating unexcelled awaiting you in the 13th Sweepstakes. Don't miss it!

Harmonics. We've been including in our WIUE operating efforts a "Harmonic Notification Service." This service has been confined to harmonics from 80-meter band signals falling outside the 7-Mc. limits. It's an interesting activity and quite worth while, if the gratitude expressed by those notified is any indication. Here's how we work it. One receiver is tuned to the 7-Mc. region, a second to 3.5-4 Mc. When a signal is heard below 7150 or above 7300 kc., the VFO (isolated from antenna!) is tuned to zero beat with the off-frequency signal, and picked up on the 3.5-Mc. receiver. In most cases, the station will be heard on its fundamental, confirming that the 7-Mc. signal is a harmonic. Contact is then established on 3.5 and the sad news passed along.

Occasionally the offender cannot be heard on 3.5. This sometimes means that skip conditions are at work, but often we are picking up radiations from a 7-Mc. stage of a 14-Mc. transmitter instead of a harmonic from 3.5. Over-the-air notification then becomes difficult, usually impossible due to the differences in 7- and 14-Mc. propagation conditions. It is unnecessary to use two receivers for this notification service. It is, of course, more convenient, especially when your "correspondent" starts to make adjustments and tests to eliminate the harmonic.

While we're on the subject of harmonics, we must remind all operators that both harmonics and subharmonics are still being observed in worrisome numbers. Official Observers are on the job, sending postal notifications, but there is no guarantee your first notice will come from an OO

rather than FCC! It is urged that all amateurs make every possible check at their stations, and test with other stations, to insure that spurious signals are kept at an absolute minimum. Investigation now may save the embarrassment of an official notice of violation later.

Rotten Signals. You have no doubt read the article "Unstable Signals," by Don Mix in August QST. If not, read it now. We don't know what has happened to the old time "pride of signal." There never was a time when *all* c.w. signals were T9X and free from chirp, but we do recall the day when "rotten signals" stood out among the good like a sore thumb. Today the good stand out among the poor. "That's funny," a chap remarked recently when we gave him T7, "I have been getting T9 from everybody." We came back and told him, "It may be a case of even your best friend not telling you." Suppose that could be the answer to some of the weird signals on the air today? Let's adopt a more realistic attitude when reporting "tone." If it's T5, say so. If there is evidence of a chirp, add a "C" to the numeral in the report (T9C, etc.). Tell him if he has clicks, or if you notice a lag in his keying. You want the straight facts yourself, so give the other fellow an equal break. True enough, we should all check our signals in our own shacks, but there is a possibility some of the lads are not aware of how their radiation sounds to us. Reserve those T9X reports for those with the ultimate in quality.

Brass Pounders' League. "Hall of Fame" for the traffic-handler is the Brass Pounders' League. There is indication this month that the traditional BPL-box soon will be with us again. Message pushers are back in the swing, traffic routes, nets, and trunk lines are shaping up rapidly. W7FST, Utah-Wyoming Section, sets the pace with a BPL total for the month of August — 823, handled mostly by voice on 14, 3.85, and 28 Mc. with stations in Japan, P.I., Guam, South Africa, England, Germany, and Australia. W7MAE, W1AW, and WIBDI are recent BPLers on "deliveries." A message total of 500 or more, or 100 deliveries plus extra delivery credits will place you in line for BPL listing. In determining your monthly total count one point for each time a message is handled by radio (one if originated and sent forward by radio, one if received by radio and delivered, or two if received by radio and sent forward by radio). In addition, an *extra credit*

of one point for each delivery made by mail, telephone, in person, by messenger or external means other than use of radio is also allowed. This extra credit is not allowed for a message received for yourself or party on the immediate premises. Count only one (received by radio and delivered) in such cases. The Brass Pounders' League listing is open to all operators who qualify for this monthly "honor roll."

— E. L. B.

— . . . —

On Giving Signal Reports. A high standard of honesty and accuracy in giving signal reports is desired by all amateurs. A printed list giving the R-S-T definitions (Readability 1-5, Strength 1-9, Tone 1-9) is mailed each ARRL member with his membership card or certificate. It is suggested that such lists be posted in every operating position, and consulted during QSOs, in order to insure accurate, instead of loose usages of these definitions that mean so much to operating amateurs. Let's hear more Strength-3 and Strength-5 signal reports when the signals really are "weak signals" or "fairly good signals!"

"Strength 9" by definition means "extremely strong signals." All this talk about so many db. over S9 and past S9 is termed a lot of hooey to many of the folks who write us — at least until some absolute station standard is developed that makes a true calibration of an S-meter possible! We wonder why so many voice operators who can "say it with words" don't give their reports in modern terms instead of using telegraph QSA-lingo. If you use the readability-strength definitions at least be accurate in using them. For example, say "readability five, strength eight" (or whatever it should be). It's an idea.

On Q Code Use. Concerning the above, W2NYC says "readability . . . , strength . . ." is much more appropriate, dignified, and sounds better than any Q Code. He suggests also a worldwide campaign to inform people to use Q Code correctly, where necessary to use it. It is safest to consult an up-to-date list of Q Code to be correct and to avoid positive confusion. W2NYC says further, "Six years after the change you would think people would know the difference between QRK and QSA. And that QRA is now the name of station, so that what we want is QTH, referring to the location."

How Is Your DX Factor? A new unit for evaluation of DX might be of some general interest, W9VYW suggests. He would propose that the mileage divided by power input (watts) be defined as the DX Factor. Presumably this numerical rating for each QSO would be added up for a rating on the communication accomplished by the day, month or year. As proposed the factor wouldn't accredit the gain of rotary beams, the reliability of communications, what messages or intelligence were exchanged, or be af-

ected by the number of amateurs or activity at the distant spot. However, in the face of high-power competition and extensive interference such as are present in our bright postwar DX world, we fancy there still should be interest and profit in making some miles-per-watt comparisons.

WØZNN has devised a world-coverage radio map that is independent of political boundaries or call prefixes. The world is projected into seventy-two equal surface areas which represents good logic in showing coverage of global areas. An area as large as a small postage stamp represents about 2.7-million square miles. New ways of crediting radio results always appeal to us, so we have been particularly interested in comment from leading DX men on this map system. It would be nice (from our standpoint) not to have decisions dependent on the geographical and political boundaries that determine "countries" but which change arbitrarily from time to time! Would a new yardstick be welcome for DXCC?

Five of eighteen leading DX men have responded initially to a request for opinions. Their comment seems to be sharply and equally divided. For example, W1CH and W7VY are enthusiastic on the basis of the logic in the system. But W6GRL and W8BKP cite reasons why such an area system is not a true DX test. (The earth is $\frac{5}{8}$ water, with perhaps unfair stress on ship-opr-skeds with a favored few; credit for large areas of America or Europe may be got by one contact though there are many states or countries; at the very Poles one could get 12 areas at a whack; prefixes and countries are greater numerically so more interesting.) WØYXO takes a middle position and likes the map as "another system" but is strongly opposed to dropping our country counting for DXCC. There is more romance in thinking in terms of countries with different tongues, peoples and customs, than there is in talking latitude and longitude. We therefore think that all amateurs want to continue to think of their DX in terms of countries. From the over-all fairness standpoint, present information would indicate that there isn't any important difference in the order of listings. Of course exceptions may turn up, but look at the country-area record of these five: W6GRL 160-56, W7VY 117-52, W8BKP 79-42, WØYXO 75-36, W1CH 70-29. Of course it wouldn't be a Century Club if the DXCC Award required just 45 or 50 world-coverage map areas. What do you think?

— F. E. H.

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BRIEF

W1KKS, upon completion of his cruise as radio operator with the MacMillan Arctic Expedition, reports a July traffic total of 506 for the Schooner *Bowdoin*, KLPO.

BRIEFS

The following two items are from the Cuyahoga Radio Association's *CRA Bulletin*:

"Amateur Radio proved its usefulness in an emergency recently when W8CZA of Massillon, Ohio, while traveling near Vermilion, Ohio, came upon the scene of a serious highway accident. Having portable ham gear in his car, W8CZA hooked up with W8DJJ in Huron, Ohio, who in turn called the State Police. Police and ambulances were dispatched and those seriously hurt were cared for. One victim, pinned under his car, was saved because of early arrival of a doctor. . . ."

"Lieut. Colonel G. Stone, Civil Air Patrol, sends an acknowledgment of services rendered by the following Cleveland, Ohio, amateurs during search for two missing Army Fliers: Mobile Units, W8JNF, W8BF, W8LEX, W8COG. Stand-by stations, W8OZJ, W8DS, W8RHP, W8JVN. Another example of the value of amateur radio."

— . . . —

W2OAB, operating at Pearl Harbor, arranged a 28 Mc. 'phone schedule with W3PK/3, Norfolk, Va., through which several lads stationed at P.H. were able to talk direct with their families by radio. The W2OAB-W3PK contacts clicked for 18 days out of 24 during March, with consecutive QSOs from March 1st to 10th. The average length of contacts was forty-five minutes, with some lasting as long as an hour and fifteen minutes.

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**MAKE NOTES TO
HELP IN FORMING CON-
CISE TRANSMISSIONS**

A scratch-pad is a necessity for every operator. Especially in voice contacts, where many and diverse thoughts are exchanged rapidly, is it helpful to make notes on what the other fellow says. Don't trust everything to memory. Much unnecessary duplication and repeating is avoided, if you make notes. The habit of jotting down thoughts as they occur to you aids in forming understandable and connected transmissions. The chap you contact is talking to you, not to himself. Show him that you're listening by making your transmissions jibe with what he says. Depend on your recorded notes instead of your memory!

CODE-PROFICIENCY PROGRAM

W1AW conducts practice transmissions nightly, Monday through Friday, 10:00 p.m. EST, at speeds of 15, 20, 25, 30, and 35 w.p.m. on 3555, 7145, 14,150, 28,060, and 52,000 kc. Once each month a special transmission is made to enable you to qualify for a Code Proficiency certificate or endorsement sticker indicating progress above your first certified speed.

The next qualifying run will be on November 16th. The text transmitted on that date, received successfully by ear at the highest speed you can copy, should be sent to ARRL for checking. To avoid errors in recopying, send your original copy. *Attach a statement certifying over your signature that the copy submitted is direct copy, made from reception of W1AW by ear, without any kind of assistance, personal or mechanical.* If you qualify, you will receive your certificate, or appropriate endorsement sticker for certificate you already hold. Those who qualified in the past should submit copy only if speed is higher than indicated on certificate or endorsement sticker.

QST lists in advance the text to be used on several of the CP schedules. This makes it possible to check your own copy. It also provides a means of obtaining sending practice since it permits direct comparison of one's fist and tape sending. To get sending help hook up your own key and buzzer and attempt to send right in step with the tape transmissions. Adjust your spacing in the manner indicated as necessary for self-improvement.

Date Subject of Practice Text from September QST
Nov. 6th: *A Simple VFO Crystal Substitute*, p. 13
Nov. 8th: *A Deluxe Electronic Key*, p. 17
Nov. 12th: *How to Catchum DXCC*, p. 24
Nov. 14th: *Mobile Receiving Equipment . . .* p. 28
Nov. 16th: *Qualifying Run, 10:00 P.M. EST*
Nov. 18th: *Revamping the BC-343*, p. 42
Nov. 20th: *Technical Topics*, p. 53
Nov. 26th: *Color*, p. 56
Nov. 29th: *A Combination Test Meter*, p. 61

BRIEFS

In September QST we asked who were the oldest and youngest active hams. The oldest so far heard from is Ed Kingsland, W8NA, who has just entered his 82nd year. He has been active almost continuously for the past twenty years, on 'phone and c.w. W2AA is 76, VE2BN 72. Among the "youngsters," H. T. Brown, W4JVJ, writes that he is 14 years old and active on 3.5 and 7 Mc. It is reported that W8YHG also is 14. W1OFY advises that he is 15 years of age. Is there an active ham older than 82, or younger than 14?

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KZ5AB is on the air at Fort Clayton, C. Z. Operation has been mostly on 28,080 kc., with some contacts on 3.5 Mc. The station consists of an HT4 transmitter and SX-28 receiver.

XACA/XADK, CASERTA, ITALY

The following brief history of operations in Caserta, Italy, is reported by Signal Corps Lieutenants Harold Riedl, W9VWP/XACA, and John Burgio, W2JRP/XADK. Many 28- and 14-Mc. operators will recall contacts with XACA and XADK.

It all started when we landed in Italy in January, '46, and were told by the military authorities that amateur operation was permitted on the 28-Mc. band. We found an old GI f.m. receiver in a salvage yard. After burning the mid-night oil for a couple of nights, W9VWP finally got the thing to receive Ws while W2JRP worked on the antenna and transmitter. Not long after, we liberated our first good receiver, an HQ-120. From then on our receiver problems were over for good. On 28 Mc. we used a small home-made transmitter using 807s with between 50 and 75 watts input.

We had a grand time working the boys on 28 Mc. up to the end of April, when the band closed for transmission to the States. We then sweated out the opening of the 14-Mc. band. It was a glorious day when the authorities approved our operation on that band.



A good 14-Mc. antenna then became a problem. We had been using a W8JK four-and-eight-section beam on 28 Mc. and decided to stick with it on 14 Mc. since it would give us considerable gain and yet be broad enough to cover the states east of the Mississippi. A fifty-foot steel tower was erected in the back yard of our signal company. Broadside from the tower to the building gave us the desired great-circle path back home. Between the tower and the building we hung an eight-element W8JK with tuned feeders. Placing our 50-foot steel tower in a vertical position was quite a job. Italian laborers helped in pulling on and holding the guy-wires as we pulled the tower up through a group of trees where it had to go.

We were not lucky enough to fall heir to the Army's popular BC-610 transmitter, so we had to build our own with radio parts that we could beg, borrow, or "liberate." As a result we wound up with quite a cosmopolitan set-up composed of American, British, German and Italian components. The final amplifier used a pair of 100THs modulated by the same type tubes. Trying to operate American transformers on Italian 42-cycle current didn't help our operation any, as well as the fact that we never knew when the Italian power station was going to send us 95 volts or 160 volts, or any happy medium. The photo shows our layout as finally established. We were fortunate to have had the use of several receivers, some of which were the SX-28, HQ-120, AR-77, NC-100, and the Army BC-342.

From March 1st to April 15th, W2JRP was on detached service in Athens, Greece, as Radio Officer with the AMFOGE (Allied Mission For the Observation of Greek Elections) and operated XACR jointly with W7IGK from that location. Our only regret was that we were there while a severe magnetic storm raged and for 10 days we heard practically nothing to the west of Athens.

We wish to express our sincere thanks to the many stations that have handled traffic for us. In many cases important messages were cleared faster than ever thought possible through the best commercial channels in the States. We hope it will be possible to confirm all QSOs upon our return to the U.S.

BRIEFS

Low power is ineffective, you say? W4HYB, Pensacola, Florida, indicates the contrary in a recent letter from which we quote: "In April when 3.5 Mc. opened, I began operation once again with as much haywire as a ham can have and still operate. Since I sold most of my gear to the Government, I didn't have anything left but some spare parts. This is the story of those spare parts and a few extra dollars. The transmitter is a 6L6G oscillator, with an 80 for power supply. Receiver is a homemade two-tube regenerative, using a 1Q5 and a 1N5. The antenna is a quarter-wave Zepp. With this layout I have worked 24 states, coast to coast, plus Canada. That's what 20 watts did for me in twenty-five days on one frequency (3883) in the 3.5-Mc. band."

HB9BG, visiting in Cleveland, Ohio, held an hour-and-a-quarter QSO with his YL in Lucerne, Switzerland, over W3RDZ's 14-Mc. 'phone.

W5LDH, New Orleans, tells of an experiment in "triplex" 'phone on 11 meters by W5KXU, W5LAE and himself. Station 1 listened to Station 2, Station 2 listened to Station 3, and Station 3 to Station 1. Each participant piped one other station through. The only difficulty encountered was from feed-back. W5LDH reports that observers said it sounded worse than 14 Mc. on a Saturday night. Hi.

W8DAQ's daughter married W8WAK on August 27th. The minister was ex-W8CLN.

W8ORI, Dayton, Ohio, arranged weekly 28-Mc. schedules with K6OQE and K6RVG, to keep in touch with Honolulu where his mother had undergone an operation. Conditions sometime prevented direct contact, but in true ham tradition the messages got through. W8ORI has received messages originating in Hawaii via air mail from W9DFX/6 and via telegram from W9RUK. The most striking example of "amateur radio service" was a telephone call from W6SIN, Beverly Hills, California, with word that K6RVG was on the air and wished to contact W8ORI. Several two-way exchanges were made between K6RVG and W8ORI via W6SIN.

PRIZE-ARTICLE CONTEST

• Mr. George L. Downs, W5CS/1, is a winner in the CD Article Contest with his article on "Building Friendships on the Air."

The Communications Department conducts a continuing Article Contest in which the author of each article used is awarded a \$10 prize, consisting of \$5 in Victory Stamps and \$5 in ARRL supplies or publications (except QST). Contributions may be on any subject of interest to amateur radio operators. Articles are selected on originality and value to the fraternity.

Give this contest a try. You are not limited; make your contribution on any topic relative to ham operating or organization. Entries should be not over 500 words long. Please mark your contribution "For the CD Contest."

BUILDING FRIENDSHIPS ON THE AIR

By George L. Downs, * W5CS/1

Friendships grow out of acquaintances. Acquaintances begin with contacts. Trouble is, so much time often elapses between contacts that each person forgets the other and introductions have to be made all over again.

Contrast this with what happens when you visit a doctor you have visited before. You are flattered and pleased to find that he remembers all about you, your case history and your complaints. Yet this doctor has hundreds of patients and has seen you but once. How does he do it? Simple! While you were sitting in the waiting room, an attendant took your name, removed your card from a file and the doctor had just finished reviewing it when you walked in.

Picture a ham contact working that way. You hear a station calling you; you check your card file. Sure enough, you have worked him before, six years ago. Quick reference to his cards gives you his name (John Jones) and address. You noted he had a new jr. op at that time. Reference to your log by date of QSO shows he had a T7 signal before — now it's T9X.

So, when he signs you come right back and call him by name. You are glad to work him again, you mention the previous QSO and wonder what he has done to improve his rig (the note is better), and you guess the jr. op must be getting pretty husky by now — maybe he has had another since then.

Brother, Johnny is going to be one more pleased ham and will warm right up to the subject. You have immediately taken the QSO out of the "Tnx fer call — ur sigs RST 549x — WX clr — wat sa

* 72 Watson Road, Belmont, Mass.

OM?" class, and taken a big step toward making a friend of John. And you'll get lots of satisfaction out of your QSO.

This satisfaction can be yours for little effort. Here's how:

- 1) At any stationers get a few hundred 3 × 5 index cards, a set of blank index tabs, and a cardboard file tray to fit the cards.
- 2) Prepare one tab for each W district, another for each foreign country usually worked.
- 3) Each time you work a station, take a blank card, enter the call in the upper left hand corner, note name, address, and date of QSO. Record comments as desired.
- 4) File card behind proper tab in the file drawer.
- 5) As soon as your file is sizeable, check for the station you are working at the beginning of each QSO. Repeats will soon begin to show up. Quick reference to the log fills in any missing information about previous QSOs and you are ready to begin talking where you left off last time.
- 6) Date each new entry on a card and return it to its place after the QSO. As your file grows you will rearrange and add to the index tabs from time to time to keep card filing (and finding) easy.

There is plenty of precedent for this sort of system. Doctors, engineers, even men of genius are lost without their card-file "memories." Try this plan. It pays off in lots of satisfaction for little effort.

BRIEFS

Slogan for every amateur before communication emergencies develop: "It Can Happen Here!" Take a lesson from the words of SCM Hutchinson, VE3DU, Ontario Section, "The tornado at Windsor has awakened in the Ontario boys a sense of the need of having emergency equipment. . . . The Windsor gang had no emergency equipment on hand when the disaster struck. . . . VE3AHL lost everything he owned. . . . The old 'It Can't Happen Here' complex got a rather bad jolt once more. . . . We are building up the AEC throughout the Section." Every active amateur should join the ARRL Emergency Corps and help to prepare his community for any emergency.

— . . . —

While operating as D4ACT, in Darmstadt, Germany, W1MBR enjoyed contacts, many lasting over an hour, with his family in Maine through W1LNI and W1FBJ of Portland.

— . . . —

Communication facilities for reporting progress of the Marin Annual Dipsea Race held September 8th were furnished by the Marin Radio Amateurs, Mill Valley, Calif. Mobile phone units on 3.85 Mc. were used. W6AOF handled the first post at the top of the 400 steps, W6GPB Post 2 at the half-way mark on the course, W6OEI Post 3 at White's Dairy, and W6DNY was at the finish line. W6KNZ and W6VEJ assisted on the trail in spotting the runners. Reports went through in good shape and officials were highly pleased with the operation.

UNLICENSED STATION LOCATED

An unlicensed radio station at Richmond, Calif., was located and closed by FCC on August 27th. The illegal station was operated by Robert Lee Eldridge, who was masquerading as an amateur on 144 Mc., under the self-assigned call W6ATQ. Eldridge admitted that he had been operating without a license for five months. The station was located by bearings and field measurements taken by an FCC mobile unit. A continuing effort is being made to track down other unlicensed stations. Conviction of illegal operating carries a maximum penalty of a \$10,000 fine, or two years in prison, or both.

BRIEFS

Amateur radio reporting of the Pikes Peak (Colorado) Auto Races held on Labor Day was highly successful. W0WYX at the starting point, W0DDF midway, and W0QYT at the fourteen-mile point, all 28-Mc. mobile, reported progress of the racing cars passing their stations. The record for the eighteen-mile course was 15 minutes, 8 seconds.

Clara Dishong, W6TDL, in February started daily schedules on 28-Mc. 'phone with W6PKP/KG6 on Guam. These contacts, maintained solely for handling GI traffic, continued throughout May. In this period 146 messages were handled. When W6PKP was not on, W9YM would take over and handle traffic through the Guam 5-meter net. Other stations cooperating were W9ZEO/KB6 and W6QKB/KG6. W6TDL's last contact with Guam was on June 5th, when she received six messages from W8EL/KG6 (W6PKP's successor), making a total of 152 messages handled. All but 71 were delivered by or received at W6TDL by long distance telephone, mail, or telegraph. The 71 were both received and relayed by radio.

An example of the worthwhile traffic handled is a message originated by W6MWO, Beverly Hills, relayed via W6TDL to W6PKP/KG6, and thence to Japan. This message was from an anxious family concerned with the well being of a son who had been reported dying from typhus. In Japan, the message reached the soldier and he was permitted to telephone home from General MacArthur's headquarters with the welcome news that he was in good health. As a memento of her good work, W6TDL has an honorary membership card in the 314th Bomb Wing Chapter, Guam Radio Relay League, presented to her as the first woman member.

BRIEFS

The opening of the 3.5-Mc. band found Harold D. Simpson, W6JQV, navigating a C54 to Honolulu. Ten minutes after the official band-opening on April 1st, he did a little tuning and heard the following on c.w.: W2GWE, W3DGM, W4KL, W5EYD, IGW, W6CIP, CUL, EQS, LDD, LJT, LTO, PBV, QIL, QQB, QUE, RJL, RXN, RYV, SOU, SWQ, UP, UWQ, W7ABO, ALH, ASG, DMN, FOR, FPP, GK, GVN, HGC, RT, WE, W9ALC, BAZ, RQE and TQK. The C54 was flying at 8000 feet, 400 miles east of Honolulu.

W3QP has resumed schedules (14 Mc.) with VK6MO, the Carnegie Institute Magnetic Observatory, Watheroo, Australia. He hopes also to resume soon with OA4U, the Carnegie Observatory, Huancayo, Peru. W3QP has maintained communication with VK6MO and OA4U for some 15 years, handling Carnegie Department of Terrestrial Magnetism traffic on regular schedules almost without a break up to the start of the war.



These are the operators whose voices or fists you hear most often from W1AW. Standing outside the front entrance to the Maxim Memorial Station are, left to right, Tom York, "TY," Bill Matchett, "BM," and John Rameika, "JR." An expanded schedule for two-way work will make possible more contacts with your Headquarters station. See page 58, October QST, for details on W1AW operating hours and frequencies.

MEET THE SCMs

North Dakota's energetic SCM is Raymond V. Barnett, W9EVP. Entering this "vale of tears" in Pawnee, Missouri, on November 20, 1905, Ray has led a versatile life, working at farming, structural-steel construction, power-shovel operating, broadcast operating, and two-and-one-half years as monitoring officer with the RID of FCC. At present he is employed by the Meyer Broadcasting Company as radio operator.



After three years in high school he took a correspondence course from National Radio Institute, Washington, D. C., from which he received his diploma. The ham ticket and call W9EVP came in 1938, following a seventeen-year interest in amateur radio. Ray obtained his Class A ticket in 1940. He holds a Code Proficiency award and RCC certificate. During the war he was active in the WERS Club at Bismarck.

The rig, located in the basement in winter and the garage in summer, includes a composite rack-and-panel transmitter working all bands, 3.5 through 28 Mc. Tube line-up is 6V6-807-HY30Zs. Receiver is an S20R. A 144-Mc. mobile transmitter-receiver, run from a Vibrapack, takes care of portable and emergency operations.

As a secondary hobby, Ray goes in for catfish fishing in the "Big Muddy." A family man, he writes, "I have four children, ranging in age from ten to two years, and what with building a home and making a living, there is little time left. I would rather build, repair, and experiment with radio than eat." In spite of limited time, Ray is conducting the SCM affairs in an exemplary manner, and North Dakota's hams will find him always willing to cooperate in every way possible.

BRIEFS

The D4s in Berlin have formed a club, the American Radio Amateurs—Berlin. In abbreviated ham lingo they call themselves the "ARAB Hams" or just plain "ARAB."

BRIEFS

The Muskegon (Michigan) Area Amateur Radio Council provided communications for a meeting of the "Dawn Patrol," an aeronautical society, held at the county airport on August 25th. A mobile station installed in a jeep reported the plane numbers and pilots' names and addresses as they landed, to speed up registration of nearly 200 ships. The following amateurs participated: W8TBP, UCG, NWU, MRL, MRK, and NZU.

— . . . —

The Racine Megacycle Club operated a station during the Wisconsin State American Legion Convention, held in Racine, August 1st to 5th. Operating under the call W9PWJ, equipment was set up in a tent at the Boy Scout Service Camp, on a hill alongside Lake Michigan and opposite the hall in downtown Racine where the convention was held.

W9PWJ worked mostly on 14 and 7 Mc., with a 50-watt transmitter, HQ-129X receiver, and 3.5-Mc. half-wave antenna. Seventy-five messages of greeting were sent to Legion posts in 25 states, and a number of replies received. Amateurs participating were W9SZL (ARRL EC), W9CFP (club president), W9PPP, BVG, KZU, PFH, OXD, HHM, HFL, KZZ, APB, YPB, ORV, RFW, RIW, and W8WEP. Amateur radio received quite a boost from Legion officials, and the Racine gang were complimented highly on their efforts.

— . . . —

The North Shore Radio Club, Oshawa, Ontario, provided communication during the air show held in that city June 30th—July 1st. A high-frequency link from radio truck to tower was used to cover several of the events. A 3.5-Mc. net was set up to handle weather reports and to pass information about incoming and outgoing aircraft. With the mobile set-up, on various events, output of the receiver was fed into an audio amplifier and rebroadcast to the spectators through the local p.a. The truck (a $\frac{3}{4}$ -ton Jeep) played a useful part when a plane crashed far out on the field. A call for a doctor was made by radio, and much time was saved in getting him to the scene of the accident. Among other uses made of the mobile unit, two glider pilots were interviewed at the spot where they landed, with rebroadcast over the p.a. system. VE3CAR, Toronto, acted as control of the 3.5-Mc. net, which endeavored to cover cities which had planes at the meet.

Club participation in the event was led by Doug Hinton, VE3AZG, and George Blanchett, VE3BAD. Others taking part included VE3AFI, AGT, QO, QU, QN, BIB, ADD, AZS, ARI, AZV, AXM, SZ, AKB, ABV, AHJ, ACC, Al Brown, and Tom Crooks.

RAG CHEWERS' CLUB

Judging by the size of the roster of active RCC members, rag-chewing is still one of the most popular of amateur activities. The list which follows contains the calls of all old members who have notified us that they are active, and the calls of those initiated in the postwar period.

How to get in:

- 1) "Chew the rag" with a member of the club for at least a solid half-hour. This doesn't mean a half-hour spent in trying to get a message over through bad QRM or QRN, but a solid half-hour of conversation or message-handling.
- 2) Report the conversation by card to the Rag Chewers' Club, ARRL, West Hartford, Conn., and ask the member station you talked to do the same. Indicate time contact started and ended. When both reports are received you will be sent a membership certificate entitling you to all the privileges of a Rag Chewer.

We have on hand hundreds of nominations and applications which do not "match up." Remember that it is necessary for both the applicant and the club member worked to submit confirmations of the "chew." If you work an RCC member for the required thirty minutes, and after a reasonable time do not receive your membership certificate, you will usually find that either you failed to notify Hq. of the contact, or the member-station forgot to send the confirmation. You both must report the QSO.

Club members are urged to sign "RCC" after their calls so that those wishing to join may identify them. If you like to use your amateur station to make and maintain real friendships, if you are a disbeliever in the "hello-goodbye" brand of contacts, you will want to get into the Rag Chewers' Club.

W1BDI BDV BFT BNJ BRI CTI DCE DF DF DXV EH EMG FFP GAW GDY HBL HIL HWE HYJ ISK JCI JMY JNE KXB LLA LMB LQA LRE MAN MBU MMD MRQ MYD NAI NBT NKW NMB NRW NXE OAA OAR OCE OEC OEB OER OGF OGH OHR OMD ONJ OOS RP SX TS UE WI WV

W2ADP AEX ANN BRC OGH CW FKF GVZ HMJ HVR HXU IHW IXY JBP JIW JTA JUU KBH KIL KRF KTF KTT LBA LMD LUY LXC LYC LZG MCB MJV MMZ MRX MST NCV NIY NJL NNZ NTY NVO NVR OCH OCL ODA OHI OEN OMU ONO ORC ORD OSF OUP OUY OVW OWX OXX PAF PED PEX PGY PJQ PKU PLQ POY PPA PPC PQS PSS QDM QMV QOS RQJ SSC VEY

W3AEB AQN AVI BSB B4I DRO ECP FFN FWV FXN FY GRS GZF HJB HRT HUS HVD IEM IOS JJD JOS JPR JTG KBD KBX KCD KEW KFD KHU KIV KJU KKM KOL KQD KQR KXP LCZ MUE OP TTD TWI WIQ

W4AXP DJT DQW DZV EAB EGN EQR EYI FCF FJC FKA GUP GXI HAH HCR HQM HUW HYW IEO IKK IKO ILP ILZ IQY IRA IRL IRM IRT IUP IUR IVZ JAQ JRU JV KG PL

W5AQE CEW DTL GKI GRG GUD GXL HGG IBF IGW JFY JIC JFF KCP KQL KZM LAK

W6AW BLL BVZ DHE HLY LIZ MTO MYT NEQ NQY NRM NXY ODE ODN PGH PGW QE RTF RZ SET STA TEU TNH TTI UQY UYQ VBQ VDR VOG

W7ABO AEC AYW BGG EKT FAF FHW FIX FVK HLU IHU ILL IOL

W8AIR AKX AL AYS BFJ BSR BTY CSG CZR DCC DFC DVA EBH EU FF FUG GON GV GXK HHU HPS JM KOS KPL KVF KWL KXQ LBH LSF LY MGQ

MIH MPG NIE NJF NYS PAF PGG PMJ PUN PVW PWK QYR REZ R3F RN RWN SCW SFD SLB TKZ TRS TSF TUJ TXQ TZE TZO UEN UGR UHX UIL UPS URP UVD UWZ UZJ VJI VPE VZA WCH WGY WKD WKE WLM WVL WZK YAM YCD YGL

W9AKS ALE BFH BGC BLI BOB BOT BQP CBA CVM DAK DIB DOF DSP DXL ECV EHS EKP EQJ EXM FCN FON GBG GOM GUH GXA GZK HCV HQW HQZ IFM IHQ IJU INN IVQ JBK JKL JNC JPY JSW JTX KPO KUJ MKM MPP MZP NEP NQT NS NZI NZZ PCY PHB PW QBJ QIP QLL QUY QVA RCB RPQ SHL SIY SNQ SXS SYZ TEU UID UOP UWQ VEL VKS WAP WGB WHN WIA WNZ WZV WRP YHZ YZB YZO

W0DBC DCD FTG FWC JOJ JRJ JXB NVB PCY SWY TRK

VE1EY 1HO 1OM 1RR 2TH 3AJR 3ALU 3AQB 3BAL 3BCZ 3OI 3QO 3TM 3WB 6IJ 6OT 6US 7CE 7CS

Others: G2YY G6WY G6ZO G8QZ GM3VB K6NDF VO2JZS6AG

Last-Minute Additions: W1ARO FLG IPG IXI IYF JDD JXU MBS NBS NXJ OCD ORZ OTM OUP-PAL W2JSE KBT KIK KTX NFU NGO OCY PCV PLY PYJ QJM QSV QXG RBZ W3BXE DQZ GHD KAT KDF KET W4BVT HRB HRN IKU JEB JMW JOS MS W5JPC LDD LFG LFL W6HG RJC VMN WZV W7FNC GFV JKK W8ALC DPS DZO LUW PSE SCT UXL VKK VWX YDN YOB ZAQ W9ALD BVG EUX JUV MFK MMR OXE WSU YBV YXF Y6GUS IVJ OZA VE3ANV 3BKT 6HZ 6UT CO2JK CO2MG.

BRIEF

During a QSO between W1OIO, Providence, R.I., and W1OKX, New Haven, Conn., it was discovered that both work for the same railroad (NYNH&H), both are towermen, and both live on Pine Street!

CALENDAR OF A.R.R.L. ACTIVITIES

Nov. 16th: CP Qualifying Run.

Nov. 16th-18th and 23rd-25th: Sweepstakes Contest.

Dec. 15th: CP Qualifying Run.

Jan. 11th-12th: ARRL-Member Party.

Jan. 14th: CP Qualifying Run.

Jan. 25th-26th: CD QSO Party (for all appointees and officials).

Feb. 13th: CP Qualifying Run.

Feb. 14th-17th: DX Competition (c.w.)

Feb. 21st-24th: DX Competition (phone).

Mar. 14th-17th: DX Competition (c.w.)

Mar. 17th: CP Qualifying Run.

Mar. 21st-24th: DX Competition (phone).

May 1st-Dec. 31st: 1946 V.H.F. Marathon (complete details in May QST).

Mar. 1st-Dec. 31st: WAS Competition Above 50 Mc. (see page 80, May QST).

Started Mar. 1st: Competition for First WAS on 50-Mc. Band (see page 58, May QST).

First Saturday Night Each Month: A.R.R.L. OFFICIALS NITE (get-together for SCMs, RMs, SECs, ECs, PAMs, Directors, Alt. and Asst. Dirs., and Hq. staff).

• 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 — 3KMW is going out strong for traffic and is interested in lining up schedules for 7 or 3.5 Mc. 3QP says the 'phone stations are covering up his VK6MO schedules on 14.200 kc. 3BRZ has left 3.9 Mc. in favor of 14-Mc. 'phone. 3QEW has daily traffic schedules with 2PCZ, 3BET reports a lot of G.I. traffic on 14-Mc. 'phone. 3AIZ renewed his ORS appointment. A letter from the Reading Radio Club informs us that Richard N. Grass, Hi-Field Farm, RD 1, Souderton, Pa., is back home from the Marine Corps and would like to contact any amateur in his vicinity who will give him details on getting into ham radio. 3FT is out of the Navy and is on 3610 kc. looking for the old gang. 3EU now is on with 3EU; his first contact was 3AVK, who is ex-3AVK. 3GHD visited the VEIs and stopped by for a session with 1JPE in Hartford. 3BXE also will visit Headquarters and show them his brand of Field Day transmitter. 3DMQ joined the Army Sept. 18th. 3HMO is on the air as 3HMO/J3. 3GZT/J9 is eager to work the fellows near Collingdale. So far the closest he has come is Glenside. 3UA will make a tour of the Susquehanna watershed this month and line up the S.E.N. 3HFD holds many fine contacts with the G.I. stations in the Pacific area for the benefit of their families. 3CBT moved next door and put up a 90-foot steel tower. 3LXN says that there is not much doing on 50 Mc. but he now is working out on 14-Mc. 'phone and c.w. 3KT put up a vertical antenna and his first QSO was ZDBA. Just previous to that his new 8JK got him KA1AE on the first call. He says each antenna is good for one QSO. Maybe the new final with two VT127As will help matters. 3CTA has a new final with two 4-250As. He is tired of having the other fellow come back with "QRM QSB, etc." I trust that all the old ORS/OPS will be back in the fold before the next "Party." There is plenty of traffic being handled. How about more reports? Traffic: W3BET 48, 3QP 21, 3KMW 20, 3QEW 11, 3GHD 8, 3BES 6, 3CPV 5, 3LXN 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Hermann E. Hobbs, W3CIZ — August seems to have been a month of hamfests. CDQ praises the WRC picnic of August 24th, which was attended by 200. XU5ML, Mr. Lee from China, was present. The D.C. Radio Club's picnic brought out about 150. 9GBA handled the push-pull transmitter; IER strummed the banjo and did "swell" Western rope tricks. New calls from this area include: 9IVL (returned to Washington from Chicago), 7BUX, 3LJV, 3KQS, 3KKR, 3KRN, 3JJD, 3KGI, who was 1HJI, of Manchester, N. H., now is in D.C. using 7, 14, and 28 Mc. 3KOW, of Baltimore, was 2CHH. The 144-Mc. gang in Baltimore includes HDZ, HOP, JMA, JPX, KCA, KKH, KLA, 4CDG/3, 4HUR/3, and 9JQJ/3, as well as 3KOW. CDQ is among those having new rigs. 4GPW is building a new rig for all bands. KAU is building a new kw. 4ERG is on the air with a basement shack. IER, 4GPW, and IIR plan to reopen the Spanish round table. Anyone interested in joining? A French round table seems to be shaping up, also, according to the Washington Radio Club president. 4GPW. New code classes will start soon for the Washington club; for information call Ludlow 5223 (4GPW). Incidentally, it is reported that K6UUT's c.w. sounds like perfect machine-set code.

SOUTHERN NEW JERSEY — SCM, W. Raymond Tomlinson, W2GCU — SEC: 2BAQ; ECs: 2SAK, 3JNZ.

The Delaware Valley Radio Association honored 3BBO at the August meeting. 3DEA has moved to Hot Springs, Ark. EED has finally convinced Ole ZI that the sky-wire can be horizontal also. 2RYB, ex-3JJX, says the new rig will cover 10-80 meters with 811 p.p. final. The annual corn roast of the DVRA was held Aug. 21st. 3VE/4HOE will maintain schedules with some of the local boys upon arrival at his new assignment. 3GNU has 45 watts on 3.9 Mc. 2QUH is in love with his BC-348Q receiver. 3AWL was heard on 3.9 Mc. recently for the first time since 1930. 3ILT is quite consistent on 28 Mc. 3DNU, an old-timer in New Jersey ORS and AARS nets, comes up with W2ORS! 3CHO is working c.w. on 7 Mc. 3GLG keeps regular schedule with his brother, 1CMO, in Augusta, Maine. 3EED's 1-kw. rig will emanate from the cellar of 2ZI. 2AQW has nice pair of Lazy H antennas. 3GQS is working out on 144 Mc. 2SAK (3ABS) is shaping up the 144-Mc. net for the Forestry emergency. 2EKU is assistant EC for that territory. 2RG has been handling some traffic. AQW reports traffic from five foreign countries. OXX has been sweating out some 14-Mc. DX. 2QCM has been busy ironing some bugs out of the new 1-kw. rig using p.p. 810s on 3.5, 7, 14, and 28 Mc. The new rig at 2RG consists of a Meissner 150-B transmitter with Signal Shifter. The receiver is an NC-2-40D. 2RGV worked 8QEN/CT2 in the Azores. The Lakeland Radio Club conducted a hidden transmitter hunt on 144 Mc. Sept. 15th. 2BBI is proud possessor of Old Timers Club certificate. New calls are 2BEI, ex-3BEI, 2EQ/3EO, 2FXN/3FXN, 2PTM/3COT, 2PIN/ex-4BER, 2QCM/3HYT, 2BDL/3BDL, 2KNQ/3IIZ, 2RGV/3CWG, 2RGD/3BYR, 2RG/3AVJ, 2AZZ/3AZZ, 2GQT/3GQT, 2HUJ/3HUJ, 2SAK/3ABS, 2FCR/3FCR, 2FWP/3FWP, 2RPE/3AAE, 2QVH/3HOH, 2UM/3UK, 2FBC/3FBC, 2RLY/3GQX, 2RLQ/3GNM, 2BAQ/3BAQ, 2QKE/3AXU, 2RYB/3JJX, 2V1/3HWO, 2RSP/3HTJ, 2RNX/3ITR, 2EET/3EET, 2EZM/3BYK, 2SDU/3IOW, 2ORS/3DNU, and new calls, 2PNO and 2PFZ. 2BAQ and 2AQW want traffic schedules. Traffic: W2QCM 13, W2OXX 10, 73. Ray.

WESTERN NEW YORK — SCM, Charles I. Otero, W2UPH — The Great Lakes Early Net, covering the States bordering on the Great Lakes, is on 3663 kc. Mondays through Fridays, 7 A.M. 8UGR writes that with his affiliation with QMN Net of Michigan and connections with Trunk Line 7-14-Mc. schedules, an opportunity is at hand to handle considerable traffic. Those with e.c.o.s. and crystals within a few kc. of that frequency are invited to join. Clubs, please take note and pass report along. 2QCP, ex-8ACY, has worked 116 countries, all on 14-Mc. 'phone. The last one was PK6AW, Biak Island, Dutch New Guinea, on 14.345 Mc. He is handling traffic for Japan and Okinawa. 8OHB reports that the first postwar meeting of the Northern Chautauque Amateur Radio Club in Dunkirk was held at 2SB's shack. SB is pres., 8CDX, vice-pres.; and 8OBH, secy.-treas. RAWNY had a field day and basket picnic on Grand Island. PES, MBZ, OTY, and OTN arrived with their portable-mobile rigs working. DSB, UBR, JNW, SCT, UJR, TXN, OVT, and UXL are on 28 Mc. PQI, QLK, and SD are on 3.9 Mc. RPO gave an instructive talk and demonstration on tuning and adjusting all types of antenna and feeder systems at the last meeting of the Niagara Falls Radio Club. The Club's new call is 2QYV. RPO is experimenting on 144 Mc. and 50 Mc. UHI is active on 144 Mc. QAG has 70 watts to an 829B. QUP is a new call on 144 Mc. QZJ and QNA are also on 144 Mc. HHN has a 65-foot tower for his sixteen-element rotary on 144 Mc. IPZ now is RGO. SEF is changing his QTH at the Falls. VE3QO and VE3ATT visited WOH. SRCK is in civvies again. 8SZK is planning to run 175 watts to 807-RK28 rig on 3.5, 7 and 14 Mc. SJV paid a visit to Headquarters during his vacation tour. SCO now is 2CQ, 8LOY is 2R8K, 8AXW is 2AXW, 8CSE is 2RIZ, 8BOA is 2PHQ, active on 14-3.9-Mc. 'phone bands; 8DII got 2DII, DII and PIF are putting the finishing touches to their half-kw. rigs. 8USV and QLI are active in Corning. QLI is working 3.5- and 7-Mc. c.w. 2PRX is on with 500 watts on 28-Mc. 'phone and a three-element beam. 8WS is on 3.5, 7, and 28 Mc. 8FEJ now is 2RGG and has 1 kw. on 'phone. 2RIP is back from abroad and active

on 28 Mc. 2PTN is rebuilding. OXP is back from Far East and active on c.w. PHQ is building new shack. Your SCM may call "CQ WNY" on 14-Mc. 'phone from Havana during November 8th to 30th. Arrangements are being made with Cuban stations. 73. Charlie.

WESTERN PENNSYLVANIA — SCM, R. R. Rosenberg, W3NCJ — Section EC: AVY. ECs: AAQ, JLL, KWL, LOF, LQQ, NDE, OJL, TOJ, TUA, VYU. LOF is EC for Venango County. Ex-8BVK is active on 144 Mc. with new call, LTN. The Fort Venango Mike & Key Club of Franklin is being reactivated. Latest call changes in Franklin: AEG now LID, HUL now LOF, and ITF now LKC. LST runs 170 watts on 14-Mc. c.w. and uses BC342 receiver. AXD has been relicensed as LQQ. MJK maintains daily 5 a.m. traffic schedules with 4PL, 2CGG, 1BDU, and 1LM. KQJ is winding 3500-volt plate transformer for TXQ. LQJ and LQS are new Altoona amateurs. KWA and his XYL, JSE, now have their transmitter in condition. BWP keeps traffic schedules on 14-Mc. 'phone with 60CA/J3, D4ANS, and 9FYZ/J5. QCN and KIL are experimenting with 14-Mc. oscillators and receivers. WFR is back on the air Bob Jordan, of Erie, now is KZU, 8UG, of Detroit, announces formation of new Great Lakes Early Net, which meets at 7 a.m. Monday through Friday on 3663 kc. HAF is active on 3.9-Mc. 'phone. RB8 is using 6L6 to drive 813 on 3.5-Mc. c.w. NUH has sold T55 rig to RWJ and is building low power job with p.p. 807's final. PDP is working out well on 14-Mc. 'phone with p.p. 813s. LTN NBV, and WBM have crystal-controlled transmitters. GV, formerly GU, will have 500 watts on this band with p.p. 4-125As in final. QKI is constructing 144-Mc. c.c. transmitter with 829 final. KEW worked ZL2US on 7 Mc. with only 15 watts input. CA has new call, CB. MIE is active on 3.5-Mc. c.w. Chief RM, TOJ, submits August ORS net report; Seventeen net sessions held, twenty-nine messages handled, with following stations reporting: LQQ, KWL, HKU, KQD, CKO, VYU, LCZ, TOJ. VYU reports into net twice weekly. KWL has new final in operation, and with recent Trunk Line appointment, will have more outside traffic for the net. Additional net stations are needed, particularly in the Pittsburgh area. Amateurs interested in traffic and net operation are welcomed to report into the Western Pennsylvania ORS net, which meets Monday through Friday at 6:30 p.m. on 3750 kc. RMs TOJ and KWL are in charge. Traffic: W3MJK 28, W3TOJ 28, W3BWP 21, W3LQQ 5. 73. Ray.

CENTRAL DIVISION

ILLINOIS — SCM, David E. Blake, II, W9NUX — SUGR says, "Join Great Lakes Early Net — 3663 kc. Mondays through Fridays at 7 a.m. EST. Traffic and fine rag-chewing hamfest is promoted." 8SML/9, ex-6HBQ, changed his YL to XYL June 8th and now is preparing her for FCC exam. He is looking for his old pals on 3.5 and 7 Mc. IHT has been operating 28-Mc. 'phone at ZXR, Tower Radio Club of Wheaton College. CSRA must be having good meetings; EJX took IET who says "OK," as do many others. JVI reports that YHS, the crystal-grinder from Bethalto, now is in Enid, Okla. He lives at 113½ Broadway, and has an XYL now. EJT is on 3.5-Mc. c.w. FTZ is on 3.9-Mc. 'phone in Dwyer, Ind. After 5 years of plugging JVI's dad passed Class B test and now is PHE. FWE came home from Michigan for a visit; he's on 3.9-Mc. 'phone. IDNV, ex-8RY (1922), ex-9FO (1927-36), Box L, Hingham, Mass., would like to QSO the old gang. He's on 1713 kc. at present. JVI is contacting by mail local 50-Mc. men interested in coverage, rag-chewing and traffic on this band. EJT worked W6 on 3.5 Mc., changed 807 for 813, dropped to 7 Mc. and worked K6, then went to 14-Mc. c.w. and got VK. Now he's headed for 28-Mc. 'phone. (Mars, look out.) UPW has a new 03A, and an HQ-129 ordered. NUF has 100 watts to 829 on 3.5, 7, and 14 Mc. KMC reports nothing heard on 50 Mc. What's wrong with the North Shore gang? GXA and KMC are experimenting with TBY-6 on 27 Mc. They operate mobile in Waukegan and Wadsworth almost every Sunday afternoon. PNQ is on with 170 watts from Niles. TZL has one of those 2-8 Mc. portables with 235-Mc. channel. His XYL threw a hamfest picnic for DKO, BGM, GHB, and JUI after DKO found the bug in TZL's rig and JVI overhauled his ACR receiver. TZL is hoisting Amphenol dipoles. BGM is on 14 Mc. HDA has been heard on 14-Mc. 'phone 50 miles away at midnight working W6s. FIF got 600-watt Hallcrafters rig. JUW years for a kw. His 28-Mc. beam still is just tubing. ENQ is on 3.5 and 3.9 Mc. TZQ is rebuilding, four 35Ts in final, all-band e.c.o.,

and crystal, and is making many parts himself. FGZ lives at 10833 S. Ave. F, Chicago, and rebuilt 250TH 500 watts input c.w. and 'phone SX receiver. MFY/9, Stop 16, Long Beach, Michigan City, Ind., has been on 14 Mc. and works ZLs and VKs with good reports. He gets into Chicago on 28 Mc. with 25 watts consistently but can't raise a soul on 144 Mc. even with beams. He had schedules with BRD. VKF/9, of Minneapolis, now is at 512 Parkside Drive, Peoria, Ill. A memorial radio station will honor three members of the Central Illinois Amateur Radio Club who died during the war. The station (Kickapoo Radio Operators) is affiliated with ARRL and is to serve as headquarters for community disaster communications during any emergency. Charter members are AMP, BIK, BPU, CEO, CFV, LKU, LMJ, MRT, OBN, PRV, and SXL, ex-WLTH. Welden Springs, near Clinton, has a new club — the Cenozo Radio Club, SXL. The club has a fine layout and a swell bunch of hams who really are going to town. FXB is starting his second year as EC for the Chicago area with some fine ideas and your SCM, NUX, will give him much of his time when the new SCM takes over. Traffic: (July) W9EBX 9, NDA 5. (August) W9NDA 20, EBX 8, 73. Dave.

INDIANA — SCM, Ted K. Clifton, W9SWH — AB and UIA are OES. UKT is OO. QLW and ENB are ORS. JXA is member of AMFOGE (Allied Mission For the Observation of Greek Elections) and will return soon to IU. GWL is going with 50 Mc. converter at Griffin. UIA reports 50 Mc. open on the night of July 27th; on August 8th at 5 p.m. he heard 1NWE/4 at Orlando, Fla. On Aug. 9th he reports the band open from 8:30 a.m. until noon; he worked 1NWE/4 and 4IUI in Florida and 8CIR/1 and 1QB in Massachusetts. He heard 0YUQ in Kansas. JMS received his SX-28 back from the factory with 1853s in r.f. stages. HUV has new transmitter, receiver, and antenna; same operator, however. TIY is back — where? OFG is at Wausau, Wis. FJI worked 6RZA portable-mobile on the fishing schooner, *American Girl*, off the Theresa Maria Islands in the Pacific on 287,000-kc. 'phone, Aug. 22nd at 6 p.m. RZA was running 3 watts to ¼-wave vertical. FJI has pair of 1625s with 115 watts modulated by a pair of 1625s in Class B feeding a folded dipole rotary antenna 30 feet high. CYC will be back at the fixed location in Kokomo for the winter with 200 watts to a 28- and 14-Mc. beam. BKH needs either an operating table or key to strap to his leg; on my last visit to his shack he was operating while lying on the floor. JLT is starting at Purdue. EGQ needs 866 filament transformer before he can put the rig on 3.5 Mc. EGV is modulating the plate of his 807 besides the screen which gives him 40 watts input. JEJ received a mike from the local gang for his birthday. EHU worked PK6TC and 2 VKs on 7 Mc. WNM is on 28 Mc. FJI has more r.f. in his antenna support than the radiator itself. QLW worked PK6TC, EI9N, 6VDG/KW6, 7JFE/KG6, on 14-Mc. c.w. BVS is rebuilding final for the national 600-watt transmitter. UMS has transmitter with 829 for 50 Mc. but no receiver. MWM has a converter for 50 Mc. but no transmitter. GFS has 815 transmitter but no receiver. FBG visited in Mishawaka. ONB is on 28 and 3.5 Mc. MDX has a new HT-4 on 28-Mc. 'phone. GFO lost his receiver in a fire. Ex-1KM is after new ticket. JMS is changing his final to 812s. Traffic: W9HUV 10, DJH 6. 73. Ted.

KENTUCKY — SCM, Joseph P. Colvin, W5IEZ/4 — Ex-9ARU now is 4YR and his reaction is NUTS! 4KKG has been rebuilding and has 600 watts and a folded doublet. Special Note: 4IUP has the only RESONANT log book in Kentucky! 9MRF and LNU have been making scheduled QSOs with WUC in Indianapolis on 28-Mc. 'phone for hours on end and it's less than 100 miles airline! 9YXF is busy working with his new 28-Mc. beam. 9GOM is the latest to erect a beam. 5IEZ has audio trouble. 9BVT has been seen purchasing radio parts. 3FWW is portable 4, QTH 2414 Lexington Ave., Ashland. He is on 3673 kc. 9BAZ is IN the air more than ON the air. He has sold more aircraft than he can deliver in two years. 4JON is old ham in Middlesboro but he is operating /8 at Willow Run. 9GMN has a 9-plus signal on 7 Mc. New Calls: 4KCS, Richard Anderson; KFB, Bill Fallon; KFE, Bruce Long; KFH, Donald Yates; KFI, Raleigh Walling. IEZ has audio trouble. 9LXF is active in O'Bannon. 9HZL has deserted us for Florida. 9ALB represents Shelbyville these days. 4IKO has a new 28-Mc. beam. 9MRF is working VKs and ZLs. Has anybody heard 9JYL/KH6? He wants Kentucky contacts. Attention, please! I want the name and address of every ham in Kentucky. The way to let the other fellows

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know what you are doing is to send a postal card once a month with the information. How many of you are interested in emergency work? How many want to handle traffic, either c.w. or 'phone? Traffic: W4IEZ 11, KKG 3, 73, Joe.

MICHIGAN — SCM, Harold C. Bird, WSDPE — SMCV reports the Detroit Metropolitan Club held a swimming party and wiener roast on July 21st. 8EQF and 8UMI are operating on 144 Mc. 8LKE operated 23-Mc. 'phone at new eastside QTH. MYP is on 3.9 Mc. 8YDJ is using 6L6 oscillator 6L6 amplifier running 35 watts, and uses an 8X25 for receiver. 8JJD is running about 140 watts and uses 8-40 receiver. 8LLD is looking for crystal for QMN Net. 8FJL, president, reports the Motor City Radio Club run up a big score in the recent Field Day and has some very fine emergency equipment. 8UGR would like all adjoining states to get on the Great Lakes Early Net. 8NGO is working 3.9-Mc. 'phone. 8KQC is working 14-Mc. 'phone using VT127A tubes. 8Y CJ is using Millen exciter for his QSL rig. 8OGV has Signal Shifter pair 807's 35T's at 500 watts which is modulated with push pull 805. 8YKS is handling traffic with his Elgin, Ill. schedule. 8TRP has schedule with 2VUY at 9 p.m. week days on 3590 kc. 8YCT is working on QMN Net. 8UKV has crystal for QMN Net but now his receiver has gone haywire. 8MQT reports his rig as 6L6 e.c.o. — 6L6 — 807 — HK24B — HK54 push pull final 300 watts working 14 and 23 Mc. 8UCG says "Our club furnished radio communication for the 'Dawn Patrol' held at county airport on August 25th. Following participants: TBP, UCG, NWU, MRL, MRK, NZU and others. 8RJC has been getting used to BC342N. 8WWL is working BR Net and QMN Net and building oscillator for keying monitor. 8SFX is busy with DARA work. 8YNG is working on BR Net. 8DYH and your SCM want you fellows to inform them of meetings taking place. They also would like club secretaries to send news of activity. 8TBP is doing a swell job on QMN Net. 8YX has 3618- and 3514-ke. crystals for QSY. 8YLA reports the following call changes in U.P.: 9EVI now 8YOO, 9HSQ now 8YIU, 9CSI now 8CSI, 9VJJ now 8YLA, 8YCL, new call in Negaunee. 9VJD has new rotary beam. 8NDL has been heard on QMN Net lately working from Ann Arbor. 8NVH is working on all bands with low power. 8WO worked in Central States boat regatta with 8ROR using portable 144-Mc. rigs. The QMN will be split into two nets, one starting at 7 p.m. running at 15 w.p.m. and one from 8 p.m. to 9 p.m. using faster method of operating. Traffic: W8SAY 169, 8DAQ 144, 8SCW 78, 8ABH 70, 8YX 42, 8DPE 34, 8WET 28, 8FX 24, 8WWL 19, 8TYE 18, 8YKS 17, 9GJX 17, 8TBP 14, 8UFH 11, 8KOS 8, 8TRP 6, 8NQT 4, 8MGQ 3, 8YNG 3, 8YCT 1. 73. Hal.

OHIO — SCM, William D. Montgomery, W8PNQ — GVL is working VK2, 3, 5, 7, and ZL2 with an 813 on 7 Mc. at about 6 a.m. almost every day. HB9EG, visiting in Cleveland, held a 14-hour QSO with his YL in Lucerne, Switzerland, over RDZ's 14-Mc. 'phone. YTF is having better luck on 3.5-Mc. c.w. with 7 watts than he had with 25 watts. CTP is out of the Army and is on 7-Mc. c.w. EFW has a new formula for getting out on 28 Mc. — he travels over Ohio and Michigan quite a bit with a 28-Mc. mobile rig in his car. EBY is out of the Army and doing postgraduate work at U. of California. FPL also is out of the Army, and is on the staff of a Cleveland radio school. FFW and FPL are taking flying lessons. GD is working with f.m. b.c. plans. FZN is operator of Cleveland Transit Radio. BJK has moved and is on 14 Mc. with a BC-610. ZAU is Ohio outlet for QMM Net. KLP is back in the Engineering Dept. of WHK, Cleveland. DAE reports he worked EQ4DC in Iran for 25 minutes solid on 14,150 kc. LEY reports two new hams in Oberlin, ACS and NGZ. NGZ is teaching at Oberlin U. UGR reports the formation of a traffic net on 3663 kc., Monday through Friday at 7 a.m. This net is to be known as the Great Lakes Early Net, and covers Western New York, Western Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin, and Ontario. Anyone with the proper crystals or e.c.o. is invited to join. When there is no traffic, rag-chewing is the order of the day. UGR also says speed is not a requirement. 1NXX/8 now is 8VR. TII is new OPS at Mansfield. OUR reports that he is on 3.5-Mc. c.w. and ARP is on 7-Mc. c.w. at Delaware. ERE is at Ashley, on all 'phone bands. 9YAH/8 now is 8ZFA, and has had over 400 postwar contacts. JFC reports that he is keeping schedules with 8LQA, who is in the Marshalls, and that on one occasion LQA's family came to his house and talked with their OM for over an hour. SCT reports that 9MFK

of Morristown, Ind., stopped in for a visit en route to West Virginia. SCT also reports that he has sent several boxes of food to PA0YN, which was really appreciated. He suggests that other hams do likewise to PA friends. DGU reports trouble in organizing the hams in Middletown, and asks for ideas and help from Middletown hams. 8RN is new RM for Northern Ohio. UKS has been working Detroit, Toledo, and Pontiac from Cleveland on 144 Mc. FPL has received his private pilot's license. PTF and VMJ are new officers of DARA. Cincinnati: PPK gave an interesting talk on matching feeders at the September QCEN meeting. The QCEN held a Hidden Transmitter Hunt on Sept. 22. The Outcall Memorial Station at the Red Cross in Cincinnati, 8VVL, is nearing completion. All hams in the Cincinnati area who saw service in World War II are requested to contact PNQ so that their names may be engraved on the memorial plaque at VVL. The GCARA recently donated a bug to the Red Cross Station, VVL. The QCEN meeting night now is the FIRST Friday of each month instead of the second Friday. The GCARA meets on the second Wednesday of each month. The GCARA Stag Hamfest was held Sept. 8th at Ash Grove. Attendance was quite large, and a swell time was had by all. PPK has joined the staff of Steinberg's Radio Co. UPB recently worked KL7AB with 20 watts on 7-Mc. c.w. 9ICF has a transmitter on 50 Mc. and is trying to interest others around Cincinnati in this band. The winner of the August GCARA raffle of the HQ-129X receiver was Ray Neidhard, of Cincinnati. Traffic: W8ZAU 40, EQN 29, RN 14, EFW 5, DAE 4. 73. Bill.

WISCONSIN — Acting SCM, C. C. Richelieu, W9ARE — RQM renewed ORS and put 100TH in final and reports FZC and HEE have new rotary beams. FHU has 829-B on 144 Mc. The Wisconsin Valley Radio Association held its picnic and get-together Sept. 8th at Wausau and a great time was reported by all. GLX is working on 3.9-Mc. DX with low power. NPK is trying beams on 28 Mc. and ADV is getting the 14-Mc. bug. DRN and JPK have new sixteen-element beams on 144 Mc. PYM works real 144-Mc. DX from his elegant location north of Milwaukee. SYT is on 144 Mc. GPI has new rig on 28 Mc. and new HRO and 240-C. SQK has new BC-610. FUS is ex-4HJI and now is located at Madison. Ex-8HH now is 9HI at Troy. PZV and HRD are brothers of BXM and MUM, all active in Wisconsin. Can any section beat this? CIH is very active in OO work. NWRC held annual fall banquet and get-together Sept. 15th in Elk Mound. Your SCM was Master of Ceremonies. QHR has new tower and three-element beam on 28 Mc. working the world. QHR was host to the entire Southern Wisconsin gang at Watertown Sept. 15th with chicken dinner to top it off. The boys got a real treat in seeing that super beam. ZSGFU reports through QHR for W 28-Mc. boys to please use the higher frequencies above 29,000 kc. Signals are just as strong and QRM 95 per cent less. GPI, GIL, RUF, UG, and ARE attended the Hamfesters picnic at Chicago Sept. 1st. MRAC started fall meetings Sept. 5th and cordially invites any visiting ham to attend the weekly meeting held every Thursday evening in the Directors Room of the Public Library, Museum Building, 818 W. Wisconsin Avenue, Milwaukee. Your SCM will be on 3.9-Mc. 'phone and 3.5-Mc. c.w. regularly the first week of each month for the express purpose of collecting activity reports. Give me a call or drop me a card. Thanks. Rich.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Raymond V. Barnett, W0EVP — KZL and PJT visited their brother, SWC, at Minot, for a family hamfest. They keep schedules daily between Minot, Bismarck, and Ashley, on 3.9-Mc. 'phone and 3.5-Mc. c.w. PJT and EVP have added crystal sockets to front panels for quicker frequency change. GJJ didn't finish the 28-Mc. mobile rig in time to take on his trip to W6-land. EOJ, from South Dakota, called on Bismarck gang with some good dope on use of folded dipole antenna on 3.9 Mc. KZL is to be Route Manager for North Dakota. If you are interested in getting in on a net this fall, contact him at 811 6th Street, Bismarck, or write your SCM. We want and need every ham in North Dakota. Traffic: W0EKZL 4, W0SWC 4, W0EVP 3, W0PJT 3. 73. Ray.

SOUTH DAKOTA — SCM, P. H. Schultz, W0QVY — Be sure to make application for your zero call as soon as possible if you expect to be on the air. ZBU has been visiting the gang. LLG and LMC are at Eagle Butte. LMC received his pilot's license and is awaiting a plane. FRM has

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SOME MONTHS AGO we published a series of articles on phonograph reproduction and since then we have received a number of requests for a wiring diagram of an amplifier such as we described.

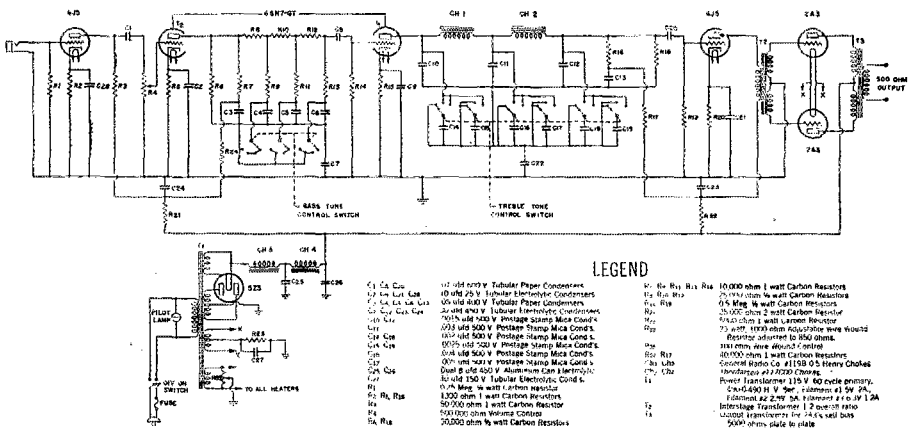
You will find the diagram below. The amplifier was designed to use standard parts available to the amateur. There should be no difficulty in building it for it is a straightforward circuit with no tricky elements. However, it does have very high gain at low frequencies and care must be used to keep hum at a low level. We will give you some pointers on this next month.

It is designed for use with a high-grade, velocity-type pickup having a flat frequency response throughout its range. The bass compensation provides, at maximum setting, about 30 db rise at 50 cycles. This is more than is needed and switch position No. 2 which provides about 20 db gives more faithful reproduction. On many records you may wish this extra bass.

The high frequency filter is designed to give good response with commercial wax pressings of the kind you buy in record stores. At the lowest step, the response is down about 16 db at 5000 cycles. On poor recordings, this relatively low cut-off suppresses high-frequency distortion in the record and holds needle-scratch at a low level. On good records you will prefer wider range. The best switch position can be determined for each record by ear.

If you have access to high-fidelity transcription records you will want a wider frequency range than the filter provides and indeed may decide to eliminate it altogether. However, with commercial wax or plastic records of the type used in the home, the filter shown below gives best results.

WILLIAM A. READY



(Continued from page 76)

set up a radio service and electric shop in Moberidge; he has acquired an XYL, IK, in Aberdeen, is busy with service. INT was on ZBU's itinerary. ZBU and SGI, in Chicago, have regular schedule. DNT, STI, ORE, and ZBU took exams at Sioux Falls recently. 5JJV/θ is with CAA at Black Hills Airport; he was 7CSE at Sheridan, Wyo., and 5JJV in Texas. WUU sends in ORS certificate for renewal. How about some more of the gang? JLS reports on meeting and classes held by the BHARC at Rapid City. KTS reports from Bear Butte Club at Sturgis, and asks for reappointment as ORS. He has a new NC-46. FKX has a new RME-45 and RWX a new receiver. 73. Phil.

SOUTHERN MINNESOTA — SCM, Vernon G. Pribyl, W9OMC — The Jackson County Amateur Radio Club held its annual picnic September 15th. FAJ finally got an FB skywire up and is all set for the winter. JOY came back from Colorado on his new motorcycle. LSX still is looking for a receiver. GBZ has his antenna poles but no wire or insulators and is looking for a high voltage transformer. NUI reports he worked a G6 on 14-Mc. c.w. with 35 watts to an 807. RJF enjoyed a vacation and visited IGZ at Kensington. He is active on 3.5-, 7-, and 14-Mc. c.w. with 400 watts. He also wants to obtain all information possible on fusing the high voltage power supply after losing his 1500-volt transformer. GRJ is on 14,236 kc. and looking for Minnesota traffic. 9DCM, ex-SCM of this section, sends an interesting report. He was discharged in February as a colonel in the Signal Corps after six years of duty and now is sales manager for Electro-Voice, Inc. Web is active on 3.9-Mc. 'phone and 80-Mc. c.w. with a 4-250A in the final running 600 watts, and wants to get in touch with the old Minnesota gang. He said he enjoyed an FB QSO with ITQ. TRT and TLU are active on 3.9-Mc. 'phone. WAO is active on 28-, 14-, and 3.9-Mc. 'phone and reports FYA and FNP are new amateurs in Rochester. OZX has a new jr. operator. UWG is back in Winona after being discharged from Truax Field, Wis., where he was a radio instructor. A good get-together was enjoyed at Rochester recently. Traffic: W9GRJ 12.

DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — LCO is on 28 Mc. and is going to town in a big way. CFQ and his XYL, IZK, recently were visitors in town. HPL is on 7 Mc. with 150 watts to a pair of 24Gs in final. HOT is in the midst of constructing a super-duper e.o.o. HYS is on 3.9-Mc. 'phone with BC-610 transmitter and is getting acquainted with the QRM. GKZ is getting the bug again. IGM is building a dilly of an e.o.o. So is ICN. KGU has Lazy H antenna on 28 Mc. JNM is building low power rig with 6L6s and 59s. BMI has a good signal with a pair of 813s. BMM and EA were visitors in Ft. Smith recently. KKM and GVK went on 7 Mc.; 28 Mc. being in a slump. AQF is burning the midnight oil building up a pair of 4-125As. EGY is laboring over a pair of 4-250s. KVN and LGH are faithful to 28 Mc. AXP is on all bands with BC-610. AVH and ERD got on recently with 814s. The Texarkana boys have organized a club with EGY as president. KNI is on 3.5-Mc. c.w. KVV is on 3.9-Mc. with kw. QI handles traffic on 14-Mc. 'phone. HEW actually has got some r.f. in the air. FWD/W1 and his XYL, HBW/W1, visited in Eldorado. JIC has three-element close-spaced beam. 73. Marshall.

LOUISIANA — SCM, W. J. Wilkinson, jr., W5DWW — IUG is building 1/4-kw. all-band rig with bandswitching for c.w. and 'phone. LER has finished 35-watt rig for 28 Mc. Ouachita Valley Club has started classes in theory. JEY has new rotary beam. IDK is elated over DX on 28 Mc. IIG is helping new hams. 9ZZZ/5 is portable in Monroe. FJW has new antenna poles and will be on 7 Mc. HEJ-HEK are having fun with mobile rig and on 7 Mc. at home. IVF is theory instructor for OVARC, Monroe. CNG is busy on 3.9 and 28-Mc. 'phone. JPJ is looking for hams to take part in Louisiana CAP program, especially those in Shreveport, Monroe, Baton Rouge, Lake Charles, and Lafayette. KTB has 1-kw. rig under construction. IHN has forty-one countries on 7 and 14 Mc. LLJ bought rig from EVR. LMN and KYK like 28-Mc. 'phone. 9JWB/5 and his XYL like duplex on 27 Mc. LAE, KXU, and LDH worked triplex on 27 Mc. YU is call of Tulane Radio Club station. KOU got his Class A ticket. KYK, KXP, KXU, LAE, JFZ, HTU, LDH, and 9JWB/5 are looking for contacts on 27 Mc. from New Orleans. CEW is back on 28 Mc. CGC has received new RME-45. LQO, LQV, and LEE are new hams. QH

recently worked five continents in 2 1/2 hours on 28 Mc. FHS is on 28 and 3.9 Mc. 'phone. 10P is searching 28 Mc. for China. AKI WACED in five hours. KMD is using new beam. ORS and OPS applications are wanted by DWV. BLQ is EC for Monroe and vicinity. MLL is going after DX. BUK is on 14-Mc. 'phone with 700 watts. ACA has been a ham twenty-two years. Traffic: W5DWW 18, LDH 5, JET 2. 73. Dub.

MISSISSIPPI — SCM, P. W. Clement, W5HAV — The following was sent in by IGW: LAK is active on 7- and 14-Mc. c.w. CQJ is putting with speech equipment on 3.9-Mc. 'phone. IGW now has Class A. HTE's rig went up in smoke, and he is rebuilding. AMR is working 14-Mc. 'phone. HFQ and BDQ deserted 3.9-Mc. 'phone for 14-Mc. 'phone. (DX Hounds.) DNS, HTL, and DEJ are active on 7- and 3.5-Mc. c.w. HTL is rebuilding to run about 250 watts. GG is active on 3.9-Mc. 'phone. JZK is active on 28-Mc. 'phone. HQC is on 28-Mc. 'phone. HKJ is on 3.9 Mc. regularly. EWD is on 3.9 Mc.

TENNESSEE — SCM, James W. Watkins, W4FLS — 3BD/4 returned from vacation in Philadelphia with new BC-610. BLG, IGR, GSS, and 5GMR, and their XYLs, recently visited the SCM. FCF and his brother, GTB, recently visited PL. KGY is new call in Chattanooga. IUG and BBT have new jr. operators. QT and IIB are active on 14-Mc. 'phone. QT says he now has plenty of grid drive for the first time and is looking for 14-Mc. DX — preferably Europe. PL is active on 3.5-Mc. c.w. DIJ is operating from his new location. The Chattanooga Amateur Club has been reactivated and has 100 cent ARRL membership. HP, ex-6UGM/4, HHU, ENL, and 5HFN/4 are active on 28 Mc. AM moved to Knoxville. This is the first report we have had in this column for some time. Because of lack of information, other sections of the State have not been covered. Please notify your SCM, W4FLS, of interesting activity in your area so that it may be included in future reports. Send in your certificates for endorsement. Traffic: W4PL 28.

HUDSON DIVISION

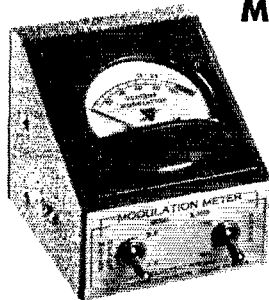
EASTERN NEW YORK — SCM, Ernest E. George, W2HZL — NJF reports AD building 40-ft. tower on his barn to hold up a Mims de luxe rotary squirter. PTL, ex-SUICH, is in Scarsdale but having trouble with BCI with his HT-4. NJF, besides being a proud father of an 8-lb. jr. operator, has put up two 30-ft. poles on his apartment from which he has suspended three half-waves on 14 Mc. fed in center with RGZZ/U. LXW is busy on 3.5 and 7 Mc. and has the parish house in White Plains covered with antennas. LSO is back from his peregrinations. 14 Mc. seems to be the mecca of hams in the lower part of the State. The Westchester Club has eliminated red tape at meetings. A door prize is given at each meeting and a hamfest is due in October or November. Schenectady hams held one of their monthly meetings the second week in September. Outboard Motor Race Day in Schenectady brought out KLM and HZL for radio control on 144 Mc. The SARA Hamfest is well under way. Two receivers for prizes so far!

NEW YORK CITY AND LONG ISLAND — SCM, Charles Ham, jr., W2KDC — Queens County's new EC is taking hold very rapidly. BSP has contacted the Red Cross for affiliation. New stations include DCJ, CIQ, OWO, EES, PNL, and PAG. Brooklyn's EC, OHE, vacationed but drills continued with at least ten stations on regularly. On August 19th many messages were originated and delivered. NQK has ground plane working FB. DZR's m.o.p.a. also works fine, as does a super built by NNX on 144 Mc. LVI and JSJ operate narrow band f.m. on 28 Mc. They report it sure helps remove B.C.I. The same is planned for 144 Mc. NXT sports homemade f.m. rig on 144 Mc. and 8FLX/2 battles feedback. KU has rotary but is shadowed by hill. DIO gave up radio on recent Atlantic Coast cruise. PFA is toying with idea of going to W6-land. ODS has FB m.o.p.a. ODI favors record-players to 144 Mc. BO is assistant EC of Brooklyn. He and OHE are seeking 28-Mc. recruits for the Emergency Corps. FF is on again after long lapse. Suffolk combined business, etc., at a recent hamfest at the home of ADW, who had the gang help erect new antenna. Fourteen were present, including GZ and HTG, from Nassau, with their families. Net attendance averages ten stations. Traffic-handling is improving, and includes a weekly message to the SCM via radio. DFP is home again after short Maritime Service hitch. OQI and LUD are going mobyling. EBT worked New Hampshire on 144 Mc. FCH is bothered by

(Continued on page 80)

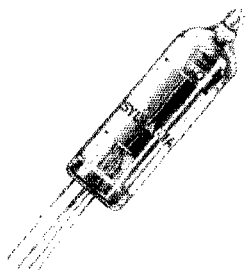
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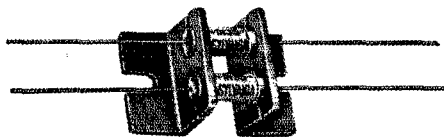


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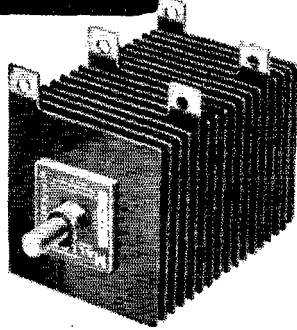
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(Continued from page 78)

whistles (not R.R.). AYJ is active on 3.5, 7, and 28 Mc. using low power pending the usual kilowatt. (What has California that we haven't?) FJG worked twenty countries on 28 Mc. and has sixteen cards already. IGO left New York City for Newburgh. KFC took fatal step recently but XYL knows the (radio) fate that awaits her. MID received his old call after holding 3KCP and 2PJD; he's on 28 Mc. JBP now has p.p. 813s on 7 and 14 Mc. PGP disregarded popular advice and operates with low power on 3.9-Mc. 'phone. Herb has worked eight states and four districts so far with 15 watts. The president of the YLRL finally got her call, W2QGG. IMJK/2 also finally did it; Joe now sports 2RQJ and is very active on 3.5, 14, and 28 Mc. with some nice DX. From Staten Island, GHK, assistant EC, reports increasing interest, partly due to good local publicity. The hills present quite a problem, however. AMO, on 144 Mc., occasionally uses GHK's TR-4. CF is raising broad-band three-element rotary on 28 Mc. ACZ is using 400 watts on 28 Mc. FCS now is in Huguenot. PZP and PRP are new hams in Grant City. QYB, ditto Tompkinsville. NCH is on 28 Mc. after long silent spell. GHK has hot 6-10 converter. All Staten Island hams interested in the Emergency Corps should contact OFD or GHK. HPB is living at Elmhurst, awaiting family from Charleston, S. C.; Nemo will be discharged by Nov. 15th. ORW worked 2NVL/1 in Massachusetts on 144 Mc. LGK gave up 2A3 oscillator and now uses 832 and has worked Orange Mts., N. J., on 144 Mc. 3ILB/2 operates from Flushing. NAZ is district chairlady of the YLRL. QVM has her 807 perking on 7 Mc. PBH has worked 100 stations on 144 Mc. and wants to contact others who have done same. BGV, released from the AAF last December, is pushing an 813 on 3.5 and 28 Mc. plus some 14-Mc. DX. EC reports TLAP operating on 3630 kc. OBU is forming N-S net on 3.5-Mc. c.w. and works 8XFQ on schedule Friday midnight. HXT has urge to rebuild, but old rig works FB. LXX, of R.C.A., transferred to Riverhead; the East End gang welcomes Marshall. OWG reports, even though on vacation. QAK is on M.S. *True Knot* with 50 watts on 28-Mc. c.w. en route to Iceland. Traffic: W2BO 36, RQJ 21, DOG 10, KDC 8, BGO 7, OBU 6, EC 5, JBP 4, HXT 3, OWG 1.

NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN — 12C reports that hams in Western Electric, Kearny, are forming a club. FKI, with 100 watts to an 829, 14T Super, is on 144, 50, and 28 Mc. DFV, with 7 watts 6C4s, worked seven states. LKN has a sixteen-element rotary beam. NUM is using crystal 815. NPJ and PFE are on 28 Mc. IBR is using a TR-4. MLF is using a superhet and 60 watts on 144 Mc. DFV reports that JLR has new 144-Mc. beam. 6RTS, PQC, RUH, EGU, NLE, and RPF are on 144-Mc. ODZ is using a BC-1068A. MDZ and MDP are working mobile. The Red Bank Radio Club meets at Perth Amboy YMCA the fourth Tuesday of each month. ADP and JN are on 14 Mc. LAO/3 is running 250 watts on 3512, 3580, and 3737 kc., and is open for traffic to D.C. BZJ is on 3.5 Mc. with 100 watts. BRC knocked off thirty-five states quick as a flash on 7 Mc. and worked eleven sections during ORS Party. GVZ has 200 watts on 3.5, 7, and 14 Mc. NML and OHN are on 14 Mc. from Goosebay, Labrador. LTP and NKD are on 14 Mc. Hank has a new rotary beam for the kw. LIQ is doing nicely with Collins 13A. PQC and RIG are buzzing c.w. on 3.5 Mc. BLC is working on multiband receiver. DOR is on 7 and 3.5 Mc. NLH is looking for 144-Mc. DX. EBK, HXW, and 3AEH/2 are on 3.5 Mc. The UCARA is operating a 144-Mc. net nightly at midnight. MRG is crystal on 144 Mc., also mobile with six-element portable beam; he is looking for stations on 144.1-2 Mc. for a net. MUP and NUM have 1068As. GOJ now is 6WIF. Ex-8WWQ is 2NZH again. The MCARA meets on Thursdays, 8 p.m., at Vail Homes Hall. QMZ, QQH, QZW, and QEM are members. HTA is on 28-Mc. 'phone. LFE is on 7 and 14 Mc., 200 watts to 814. OPB has 100 watts on 14 Mc. to 809, using an e.c.o. IGW has 150 watts to pair 807s on 3.5, 7, and 14 Mc. HLX has 300-watt 'phone on 3.9, 14, and 28 Mc. to pair of V7ODS. 8UAM/2 has 50 watts on 3.9 Mc. 10HF, FQF, and 3ABS work mobile. NXC is on 14 and 28 Mc. with 300 watts. NCX would like to contact NRM. LKN has 75 watts with a three-element fixed beam 35 feet above sea level. Capt. NCG has 125 watts on 3.9 and 14 Mc. The UCARA meets every Thursday 9 p.m. at Elizabeth YMCA. Code and theory classes at 7 p.m. CGG has traffic channel for Japan. MWJ is on 3.5, 7, 14, 28, and 144 Mc. BZJ maintains schedules with 2LAO/3. NIY has schedules with

(Continued on page 88)

6½
KC

3¾
KC

2½
KC

1
KC

½
KC

¼
KC

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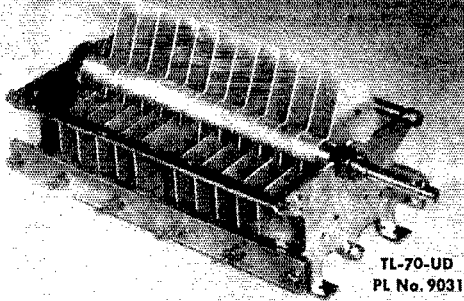
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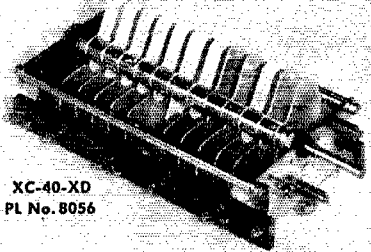
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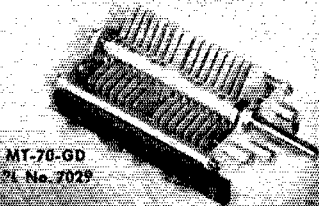




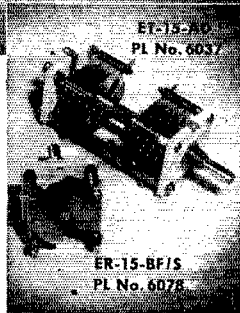
TL-70-UD
PL No. 9031



XC-40-XD
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(Continued from page 80)

1UE, LTP has schedules with EL4A on 14 Mc. nightly, BRC, with 35 watts and indoor antenna, worked G2s, ZLs, CMs, and VOs. Ex-EUG now is 6VSE and is on 14,260 kc. EWL works Gs and VEs with mobile rig on 28 Mc. HIK, on 27 Mc., has two-element beam. The Lake Land RC meets first Wednesday of month. 3CWG is president. The Dover RC meets first Tuesday of month at Dover High School. PDT is on 'phone. NWA is on 3.5 and 7 Mc. While in New Hampshire, PJJ operated portable, 25 watts with BC187 on 3.5 Mc. JIB is president of Bloomfield RC. LUJ has windmill tower 55 ft. high for his 28-Mc. beam. GPG has 900 watts on 3.5, 7, and 14 Mc., 600 watts on 28 Mc. and 35 watts on 144 Mc. Traffic: W2CGG 58, NKD 10, GVZ 6, BRC 1. 73. John.

MIDWEST DIVISION

IOWA — SCM, Leslie B. Vennard, W9PJR — YBV still is active in Iowa 75 Net and is working on EC net. He needs only Montana and Vermont for WAS. 0AHX is on 7014 kc. and worked VK and KL7 last month. He says QRM is too bad on 14 Mc. EOE is running 60 watts on 7217 kc. and is having a good time trying to get a new receiver. He wants the Class B 'phone band opened. GKS is working DX, a few ZLs and a G, with 20 watts and will be on soon with 600 watts. YOY, a new ham in Burlington, teaches school for a living. QVA is very busy on 7 Mc. with some traffic from W0USA. WNL has gone into service work but still wants parts for his large power supply. LAC toured the East Coast while on vacation. We need more ECs and activity with those we have. Traffic: W9YBV 21, EOE 4, AHX 4, QVA 4. 73. Les.

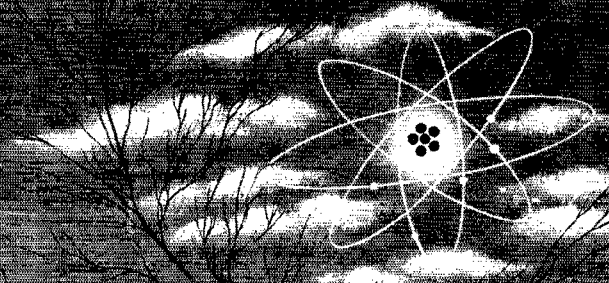
KANSAS — SCM, Alvin B. Unruh, W0AWP — PKD makes application for OES; KEI for ORS transfer from Missouri. He also is OBS. QTH is at Liberal, where he is radio engineer for Panhandle Eastern Pipeline Co. TVU is radio operator at KVGB, Great Bend, where LOU has 28-Mc. mobile rig with converter in car for receiving. At Wichita, QUU also has 28-Mc. mobile going. HCU has mobile 144-Mc. station. DJL has walkie-talkie with 957 oscillator at 90 volts. This rig made nice DX when taken for aeroplane ride. VBQ is getting pretty well settled at his Lawrence farm. He replaced the rotary 8JK with three large "V" beams. He has been keeping daily schedules with several 14-Mc. 'phones in Japan for traffic to folks in Kansas and Oklahoma. His list of juicy DX cannot be listed here since space is limited. Ex-KCS, now W4IYT in Miami. has worked eight countries with Meissner Signal Shifter, and is building 600-watt rig. PNN is new in Kansas City. CES and BXZ, both of KGPZ, are new in Wichita. BXZ is using a Millen exciter, and CES is revamping small military rig. Jack Walker is operating at W0CAC/TF in Iceland, looking for Wichita 14-Mc. 'phones. OZA is LSPH in Pittsburg. He is active on 14-28-Mc. 'phone, and 7-14-Mc. c.w. with 65 watts to pair 6L6s, and HQ-129X receiver. LQS (ex-7FHZ, 9NSD-OHZ, 5AEI-BXD) is new at Coffeyville; he has 80 watts, 3.5 to 28 Mc., c.w. and 'phone, and RME-45. The Wichita Club assisted at National Model Airplane meet, held there in late August. Don't forget to report traffic. Traffic: W0VBQ 41, KEI 5. 73.

MISSOURI — SCM, Letha A. Dangerfield, W0OUD — Nice reports this month on traffic, DX, u.h.f., and rag-chewing. FIR/FOR has an 807 on the high end of 7 Mc. and almost made WAS the first week that the band was open, although he is having trouble getting QSLs, and is planning a new rig. YHZ couldn't get his 12 watts through QRM on 3.9 Mc. to make his OPS test schedule; he has elaborate designs for new rig. ZJB is very active on v.h.f. and compares 50 Mc. favorably with 28 Mc. when short skip is in. ZVS has a 6L6 with 40 watts and higher power plans, a daily schedule to Michigan and is eager to have the Missouri net start. AXB/1 is operator for IMX at M.I.T., has schedule with ZVJ, and has worked a few VKs. VEE has been trying a little DX on 14 Mc. ARH is in hard luck — his beam blew down and he can't get rotating mechanism, but he worked LU, PK, and HH anyway. DHN is on 3.9-Mc. 'phone and suggests a Missouri Party for 3.5 and 3.9 Mc. in November or December. OUD has to disconnect burglar alarm and receiving antenna before she can get out on 7 Mc., then she can depend on reaching Texas. About that Missouri Party — suggested dates will be welcome and next report will give time decided upon if interest is shown. Missouri Traffic Net started October 1st on 3755 kc. at 7 p.m. Traffic: W0VEE 2.

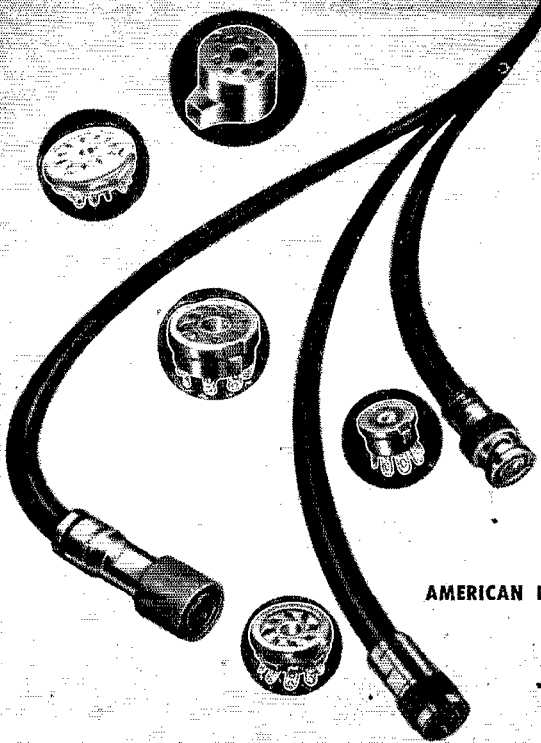
NEBRASKA — SCM, Arthur R. Gaeth, sr., W0FQB —

(Continued on page 86)

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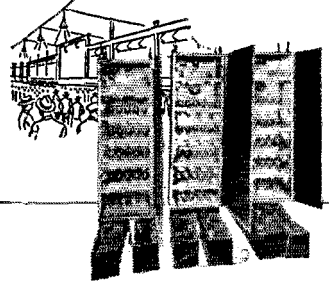


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1919. These Western Electric amplifiers powered the mightiest sound system of its day, at New York's "Victory Way" Celebration. There were 113 loudspeakers in the system.

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Equipped with unexcelled tools of research, experience, skill and manufacturing facilities, the Bell Laboratories-Western Electric team will continue to design and build amplifiers outstanding in quality, efficiency and dependable performance.

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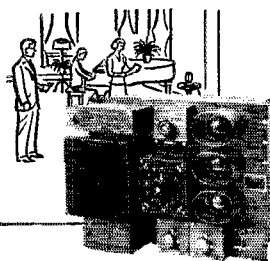
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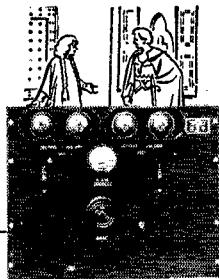
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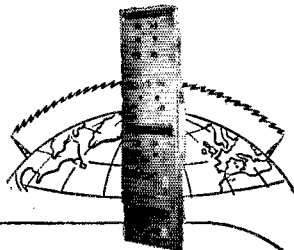
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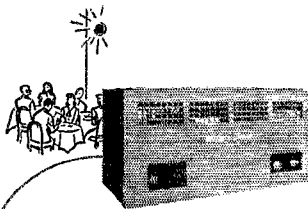
1922. The Western Electric 8A was the first commercial broadcasting amplifier. Today, 24 years later, some of these 8A's are still in use. This long life speaks volumes for the quality built into them.



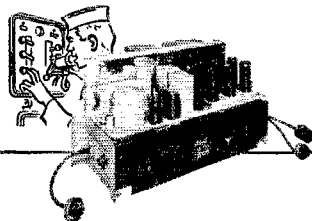
1928. This ac operated amplifier, one of the first made, reduced maintenance costs, did away with cumbersome batteries and charging equipment. Used to record some of the earliest sound motion pictures.



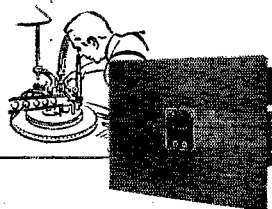
1934. Western Electric was an early leader in making compression type amplifiers to enable higher speech intensity between noise level and overload point. Used in overseas radio-telephony.



1946. The brand new 124H and J amplifiers for wired music and public address systems are small and light weight, yet deliver 20 watts. They are setting new standards of quality for music reproduction.



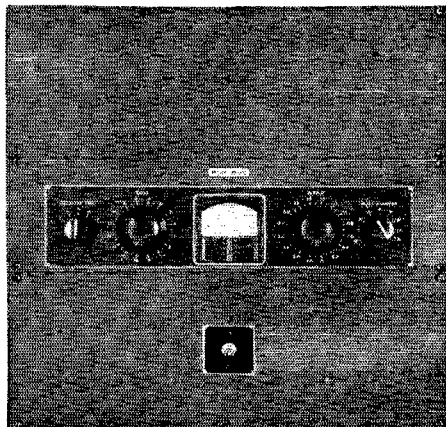
1942. This compact and powerful unit for battle announce systems is typical of Western Electric amplifiers designed during the war. It operated dependably when mounted a few feet from the largest guns.

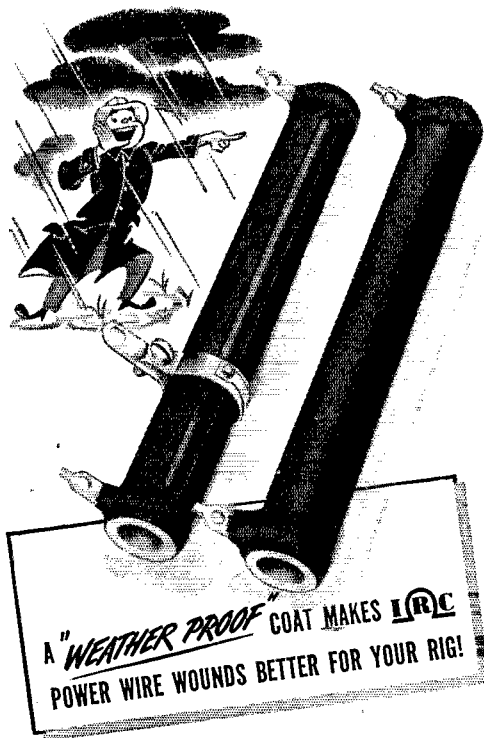


1938. Negative feedback is another of Bell Laboratories' many contributions to amplifier design—now in general use. This amplifier for disc recording was able to supply as much as 50 db of feedback.

1946. The 1126C is the latest design of Western Electric's popular level governing amplifiers. In operation it acts as a program-operated gain control to prevent overmodulation in AM or FM broadcasting. It immediately reduces gain when an instantaneous peak exceeds a predetermined level, slowly restores it when the peak is passed.

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(Continued from page 82)

MPP has 6V6 crystal 807 p.p. 800s at 195 watts input in 3.5, 7, and 28 Mc., plus 6V6-807 emergency-powered rig, and an 8-29R and RME-45 receiver. TQD received new HQ-129X. Schedules are maintained three times a week with 5HHO/J2, and also a schedule is kept with 5IGW, who gets overseas traffic from KA1AW. PLO received Class A ticket. TJZ is on 28 Mc. BQP is using a 6L6 grid-plate oscillator driving 807. Antenna is 67 ft. end-fed Zepp, receiver SX-24. DX for month: 6MMZ/KL7, KH6BR, and ZL2US. Hal and TSA, ZAR, and YPH, get together regularly on 7250 kc. TRE is using a pair of 810s on 7 Mc. FMW reports as follows: GFI and CIR are rebuilding; VMP, BOP, and BRD are active on 3.5 Mc.; FMW is on 3.5- and 7-Mc. c.w. using 100 watts. JBK reports activity on 7-Mc. c.w. using an e.c.o. and 807 with 70 watts into a full-wave Zepp and a new SX-25 and Class A ticket. DX is VK5JM, ZL1DI, ZL2GO, PK6AQ, CM7AM, several K6s and all Canadian districts. CIR and GFI are active on 3.9-Mc. 'phone. VKT received his Class A ticket and promptly QSY'd to 14 Mc. LHZ and YAU now have Class A tickets. ZSP is building 1/2-kw. rig, using a pair of 813s. ZAB sports 35 watts to final 6L6 on 28 Mc., cathode modulated, and a folded dipole. RQS put up a 7-Mc. doublet. FQB received HT-9, then had modulator power supply short-out. The Ak-Sar-Ben Radio Club recently held a very successful picnic at Linoma Beach. Traffic: W0BQP 30, TQD 19, FQB 10. 73. Art.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — JTD is back on 3.5 Mc. 3EHW/1, now ORP, is using "V" beam, four wavelengths each leg on 14 Mc. EAO now is VW; 6OTA/1 now is PUM. TD is working 14-Mc. DX with MVE. JFN is on the air with old 20-watt rig. HXL advises the Charter Oak Net ('phone) reactivated 9 A.M. Sundays 3950 kc. For further information drop a line to HXL, 119 New London Road, Mystic. LDW is on 7 Mc. with 40 watts and Sky Champion receiver. APA is on 14 Mc. running 500 watts to 8JK antenna. BDI kept schedule with KLPO (Schooner *Bowdoin*) from June 29th to July 14th. AW, JMY, and CJD took over when BDI left for Maine with portable rig. While vacationing in East Hampton your SCM was visited by CJD, 8WTS/1, 6OTA/1, and MVH. A hamfest was held at FMP's QTH with FMP, ANA, EAO/VW, MBK, EAP, and KQY attending. JAK has worked Japan twice with 8JK antenna. Club News: Stratford ARA — Lt. Col. John Mudge has resumed his theory class. AZP has been appointed Asst. EC to OGQ. Six portable-mobile units participated in Red Cross disaster tests operated by JYQ, MWQ, AZP, OGS, KPN, and KBZ. OGQ and NQV operated with the others in a later test. ODR and A. Dietz were guests at the Bridgeport Radio Amateur Club. Red Corliss has loaned his BC-375E to the club until he secures his license. ASO has obtained call ORS for the club. Candlewood ARA — 2GZT/1 reports KYF on 28-Mc. 'phone. IQE is after Maine QSO on 28 Mc. ADW is working with F.C.I. 2MSG/1, IQE, NLF, CQF, 2GZT/1, and QI operate at 10 P.M. nightly on 28,712 kc. QI is building new final using TZ40s. 2MSG/1 has new RME-45. Norwalk ARA — NXB reports Don Gerrish and Bill Premry, both on 28 Mc., now licensed as OOT and OIX. New Haven ARA — ATH reports Steve Tabor licensed as OTD. AMM, IGT, and HMZ are converting club c.c. rig from 112 to 144 Mc. KAT, with forty-four countries worked, is leading the club, with EUG and MVH close on his heels. The club is getting ready to celebrate its 30th anniversary. New appointments: ORS — JTD, LHE, and KYF. OPS — IQE, QI, and HXL. EC — KYF, Danbury. Traffic: (July) WIKKS/KLPO 506, AW 338, BDI 266, JMY 32, UE 22, CTI 6, JFN 4, APA 2. (August) W1AW 28, JMY 21, UE 10, BIH 3. 73. Ed.

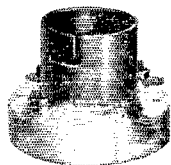
MAINE — SCM, G. C. Brown, W1AQL — FQ returned home recently with the rank of colonel. 6PNP and 5KUD are on duty with the Navy at Seawall. EZR and ACW have been issued OO tickets. OHY reports that with the help of FBJ he was able to get his ham ticket last May, and now is on 3688, 3764, 7166, and 7179 kc. BWB expects to be EC for his area soon. A card was received from 8VR, ex-1NQX, stationed at Dow Field, Bangor, who wants to be remembered to the Bangor gang. His frequency is 7163 kc. GKJ reports visits from LKP, 8AQ, 2PRW, LYK, and HZJ. LDC is back on the air after a six-year layoff and is using a 6L6 and an NC-100X, frequency 3700 kc. CTI, in Norwalk,

(Continued on page 88)

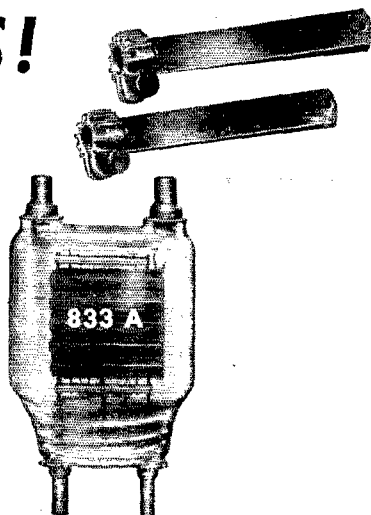
Tubes are . . . CHARACTERS!



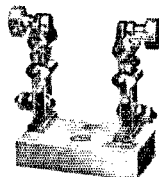
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123-209



BROADCAST



124-212



INDUSTRIAL
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122-244

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SOCKET—	BASE OR TYPICAL TUBE
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	4 Pin
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124-214	1500th
124-215	204A
120-267	9000 series
120-277B	Miniature
121-235	Acorn
121-245	
121-265	
122-101	829
122-217	Small 7 Pin
122-224	4 Pin
122-225	5 Pin
122-226	6 Pin
122-227	7 Pin Med.
122-228	Octal
122-234	RK22
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	No 412 Base
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122-248	826
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*an added
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*Pres. W. A. Kuehl is shown at his amateur radio station W9EZN. With the war over, Walt is again pursuing his favorite hobby.

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CHICAGO 13, ILL.

(Continued from page 86)

Conn., is interested in forming a New England traffic net on 3640 kc. EZR reports that OTM is a new ham in Norway; he also says that his new NC-46 has arrived. BWB reports DMX is working in Worcester, Mass. CEQ has the rank of major in the Reserve Corps. LKP reports a visit from LNI. OTM worked his sixty-fifth station a month after receiving his ticket. MDK has moved from Winn to Mattawampkeag. Your SCM recently spent a week in York County and called on LKP, BWB, GKJ, and DAY. This office is in receipt of reports from some of the gang who were former members of such nets as the Pine Tree Net, Sea Gull Net, Penobscot Bay Net, etc. Why not revive some of these nets and start the old ball rolling in Maine? 73. "GC."

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—Anyone interested in New England Traffic Net should drop a line to CTI in Connecticut or to our RM, BDU, New ECs: NXY, Watertown; IIP, Medway; NXJ, Mattapan; OAI, Somerville; HZU, Brookline. ONZ, in Ayer, now is OO and OBS. HWE renewed his ORS appointment. OAI and OLP are OES, PBC, JBY's brother-in-law, in Quincy, is on 144 Mc. PAB, PBM, OTZ, and OEX, in Greenwood, and OSR, Mattapan, are on 144 Mc. PAK, in Auburndale, is on 14 Mc. PCC, an ex-W8, is on 3.9-Mc. 'phone in Lowell. PCJ, of Needham, operates from 2OEC, the Fort Monmouth Radio Club station, on all bands. OSX, ex-4IHA, in Allston, has a new Meissner transmitter. ILP has one that he is using at ORT, Watson Lab Amateur Radio Club, in Cambridge. HVR is on 144 Mc. JDO says his sister, ex-1MTB now is 0LOA and her OM, ex-5CSU, is 0LOI. JDO is president of the Teleo Radio Club, which consists of commercials of the N. E. Telephone Co. LIO says his daughter Arlene Berry, former secretary of the Waltham Amateur Radio Club, had a son recently. JMJ is back in Vineyard Haven. MBG has a rig on 144 and 50 Mc. in his car. HOM has a rig on 144 Mc. in his car. OEK, in Hyannis, wants to get a radio club started. Anyone interested should write him at 124 Bayview St. He is on 3.5-Mc. c.w. and 144 Mc. Joe Singer, ex-1MJK, now is 2RQJ and writes from Rego Park, L. I., N. Y., that he would like to work the gang in this section. 9AXB, publicity manager of MX, says they have 350 watts on 14-Mc. c.w. and have QSOed VKs and ZLs. OTA, in Danvers, lives in the same house as JFS; he is the station agent for the B&M R.R. HWE has not been on much lately. NXG is a new ham in Malden. ADP has plans for a rig on 144 Mc. after a long layoff. NBV is going back to sea as a brasspounder. OMT is in Somerville. BHD is on 144 and 14 Mc. OKB is going to put a rig on 28 Mc. FVJ says they have most of the old WERS group lined up and will have four mobile and fixed stations in Newton. The Shoreline Amateur Radio Association, 38 Prince St., Revere, has been organized. Temporary officers are: FBZ, pres.; NK, vice-pres.; ESN, secy-treas. One official meeting a month is held. JLK is living in Woods Hole. MGP bought a house in Saugus. He is on 144 Mc. now but will be on 3.9-, 14-, and 28-Mc. 'phone by winter. LXQ has a rig ready for 28 Mc. The T9 Club held a meeting at MNK's QTH. EMG got his 25 w.p.m. certificate. ONV has been on 14 Mc. and worked twenty-one countries with VE9AN, Aden, making him WAC. He QSOed 1DTS/CT2 twice and helped to get a message through to 1KFV (ex-KF6SJJ) in Springfield. KCP is getting married. NXO has been on 144 Mc. from Hull and now is in Newton. NJV is working for General Radio. BCF, in Attleboro, is on 14 and 28 Mc. with a BC-610 and an SX-28A receiver. Ex-8AQE now is OUD and is an ORS. He formerly was ORS and RM in the Western New York section. ONZ, one of our OBS, told a ham in England about being able to work on 3.5 Mc. before he had heard about it over there. Traffic: W1BDU 25, NXY 19, EMG 7, OEK 6, ONV 5, JLR 1.

WESTERN MASSACHUSETTS—SCM, William J. Barrett, W1JAH—BVR bought set of Millen decals to dress up rig. Perce is doing swell job organizing Western Massachusetts traffic net. Stations active in net to date include BVR, EOB, JAH, LTA, KZS, MKR/2, BKG, AZW, LUA, MPJ, IHI, BIV, FOI. For now the net is meeting Mondays and Thursdays at 7 p.m. on 3760 kc. We are in the market for schedules with other section nets. EOB says he is beginning to get the range and art of working DX. Vic has wound 3.5-Mc. coils for new receiver. FOI put up new antenna during vacation. His signal is nearly twice as loud here now. ODU now has pair of 8005s running 600 watts. Bob handled one message direct to Sweden. He reports new Worcester Radio Club ready to start rolling after summer

(Continued on page 90)

Here's Why Eimac 250T's Lead the Field

TYPICAL CW OPERATION ONE TUBE, 250TH OR 250TL

	2000	2500	* 3000	† 4000	volts
Plate Voltage	2000	2500	3000	4000	volts
Plate Current	350	350	333	315	ma.
Driving Power	25	30	32	36	watts
Power Output	460	625	750	1000	watts
Power Input	710	875	1000	1250	watts

TYPICAL PHONE OPERATION ONE TUBE, 250TH OR 250TL

	2000	** 2500	3000	† 3200	volts
Plate Voltage	2000	2500	3000	3200	volts
Plate Current	200	200	240	235	ma.
Driving Power	20	25	35	35	watts
Power Output	300	375	555	585	watts
Power Input	400	500	720	750	watts

* Recommended for 1-KW input.

** Recommended for 1-KW input (two tubes).

† Typical operation at maximum rated plate voltage.

CLASS-B MODULATOR—TWO TUBES, 250THs

	1500	2000	2000	* 2500	3000	volts
Plate Voltage	1500	2000	2000	2500	3000	volts
Zero—Sig. Plate Current	200	150	150	140	100	ma.
Max.—Sig. Plate Current	750	550	700	450	560	ma.
Grid Voltage	0	—30	—30	—50	—65	volts
Driving Power	50	24	34	14	32	watts
Plate-to-Plate Load	4300	6000	6000	10,000	12,500	ohms
Power Output	650	650	900	650	1150	watts

CLASS-B MODULATOR—TWO TUBES, 250TLs

	1500	2000	2000	* 2500	3000	volts
Plate Voltage	1500	2000	2000	2500	3000	volts
Zero—Sig. Plate Current	200	150	150	140	100	ma.
Max.—Sig. Plate Current	750	550	700	450	560	ma.
Grid Voltage	—40	—80	—80	—140	—175	volts
Driving Power	50	17	32	9	30	watts
Plate-to-Plate Load	4300	6000	6000	10,000	12,500	ohms
Power Output	650	650	900	650	1150	watts

* Recommended for modulating 1-KW input—allows for 25% transformer loss.

OVER A DECADE OF PROVEN PERFORMANCE

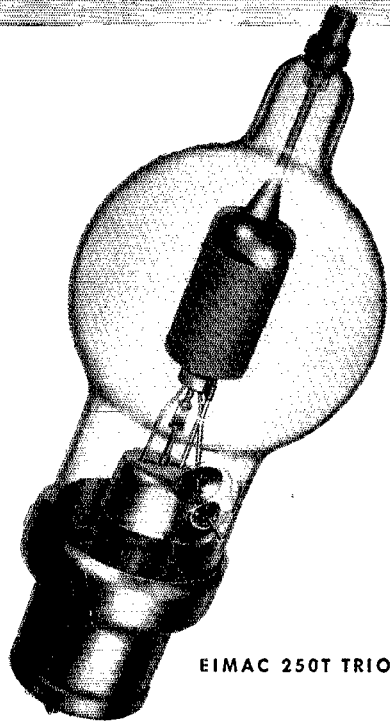
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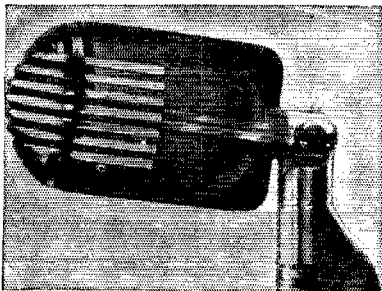


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SHURE 707A CRYSTAL MICROPHONE



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Microphones and Acoustic Devices
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Cable Address: SHUREMICRO

(Continued from page 88)

layoff. NKN inquires about section net. BIV finally got 3.9-Mc. 'phone rig going and is battling the kw. boys on 3949 kc. ODS is on with Millen exciter, running temporarily on low voltage supply. The Pittsfield Radio Club now has its own call — OSA, which acts as control for 144-Mc. emergency net drills which are held Mondays at 7 to 8 on meeting nights and 9 to 11 on alternate nights. This net is under the direction of ECLUD. The club has also ordered a McMurdo-Silver 3.9-Mc. 'phone-c.w. rig. JAH is working on new full-wave antenna to give the peanut whistle a break. Please time your reports to reach here right after the first of each month. Traffic: WIBVR 26, EOB 17, JAH 11, FOI 8, ODU 5, 73, Bill.

NEW HAMPSHIRE—SCM, John H. Stoughton, W1AXL — Reports are rolling in better. Keep up the good work. We have yet to hear from you fellows in the northern part of the State. We have a newcomer to the New Hampshire section, Edwin Hill, 4HMS/1, a staff transmitter engineer at WKNE in Keene. He is working 'phone and c.w. on all bands. Welcome to our section, Ed. OM³ is active on 3.9-Mc. 'phone in Charlestown. NQH's XYL will be on the air soon. In the meantime, Bert is keeping her new RME-45 and 150-B in good shape. JNC is now on the road traveling for BFT. IOC expects to be back on the air this fall. CME was a recent visitor at Bow and Manchester while home on a short vacation from his work in Florida. Ex-HJI, of Manchester, now is 3KGI, of Washington, D. C. He is on 3.5, 7, and 14 Mc. with 100 watts and is looking for his New Hampshire friends on the air. OST, of Tilton, has a new 150-B and is going to town, having made over ninety contacts in three weeks. APK, our SEC, has the emergency net started. He is setting the New Hampshire section up by counties. We expect to have simulated emergency communication drills in the near future. Drop a line to Basil and ask for an application blank and join the AEC. 30. Old #4.

RHODE ISLAND—SCM, Clayton C. Gordon, W1HRC — QR says he had a swell time in the ORS Party and got a total score of 1425. He visited Tropical Radio at Hingham to see JOB/WBF and to see the sights, and JOB returned the visit the following Sunday. He is the Rhode Island station in a New England net being formed by the Nutmeg Net. Which brings up the question of the forming of a Rhode Island traffic net. Get in touch with either QR or myself if interested in joining such a net, please. ODJ is a new ham in East Providence with 6L6 for a starter. OUB will be at Brown by the time this comes out. He is an old friend of mine who got his start through my humble efforts. Traffic: W1QR 3.

VERMONT — SCM, Gerald W. Benedict, W1NDL — AVP has beam on 14 Mc. NDL visited EKU and MMU. MMU is building nice shack, and has two poles over 70 feet. MMV has four-element beam on 55-foot pole. KJG and JRU visited MCQ at Stowe. MCQ is building 28-Mc. beam. MMU, MMV, and MLJ have new finals under construction. Your SCM regrets that he has not been able to visit more Vermont hams but is always glad to have you drop in. 73. Jerry.

NORTHWESTERN DIVISION

ALASKA — SCM, August Hiebert, K7CBF — New line-up at the Anchorage Amateur Radio Club is 6LKR/KL7, pres.; AJ, secy.; CZE, treas.; EYI and 7EPT/KL7, program committee. A club station is planned, with AWH donating the transmitter and 7EYC/KL7 the receiver. BV keeps ACS receivers going at Ketchikan. 3HWJ/KL7 reports traffic and DX activity on Adak. Others operating there are 3IOY/KL7, EUJ, and BP. Moses Point activity includes CC on 7-Mc. c.w., 7ISD/KL7 on 14- and 3.9-Mc. 'phone, and BD on 14-Mc. c.w. The latter is ex-8DQR, now in Alaska with the CAA. GBF is driving his HT-6 on 7 and 14 Mc. with a BC-221 frequency meter. CF finally cleaned parasites out of his new 3.5-Mc. c.w. rig. DD is on 3.5-Mc. c.w. in Whittier. FBN returned to the air with an 813 in the final on 3.5- and 7-Mc. c.w. AR, BA, and CK are active in Juneau on 14-Mc. 'phone, while AF and 9TOM/KL7 are burning up 7-Mc. c.w. Traffic: K7CF 9, 3HWJ/KL7 2, 73. Augie.

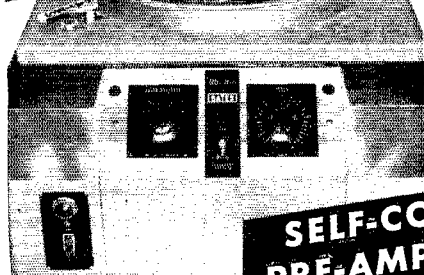
IDAHO — SCM, Alan K. Ross, W71WU — Greetings to all. This is your SCM's first report. Let's hear from you Idaho fellows for mention in this column. Let the gang back East know we are on the air and can supply that Idaho contact. Get on and try to work as many Idaho stations as

(Continued on page 94)

THE NEW **Gates** CB-10 TRANSCRIPTION ★ **TURNTABLE...**

Featuring

**INTEGRAL
GAIN CONTROL**



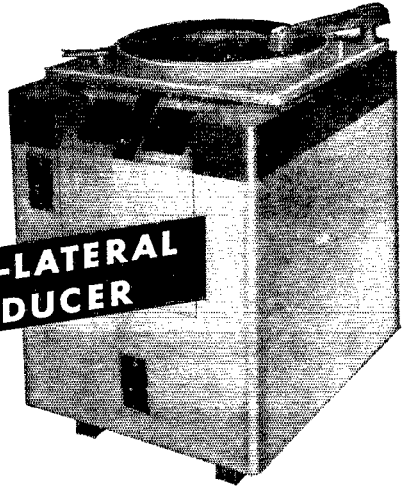
Operating controls at your finger tips on the conveniently arranged CB-10 Front Panel.

**SELF-CONTAINED
PRE-AMPLIFICATION**

**...affords a Perfected
Playback Technique**

Because it's new — in engineering, in simplicity and in ease of operation, the CB-10 excels all others in playback technique — it need not be confined to the control room.

**VERTICAL-LATERAL
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**for Modern Professional Operation
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Embodying integral gain control, self-contained, 3-stage preamplification, power supply, mixer attenuator and filter control, right on the Control Panel, the GATES CB-10 is a master Turntable — the answer to the demands of the modern broadcasting station. Affording five different frequency response curves selected by the filter switch, a high level performing Reproducer Unit, and compactness, the CB-10 will bring your station up-to-the-minute in efficiency and studio technique. The chassis also is superior throughout in construction and materials, and the whole unit adds distinction in appearance as well as in performance, to any station.

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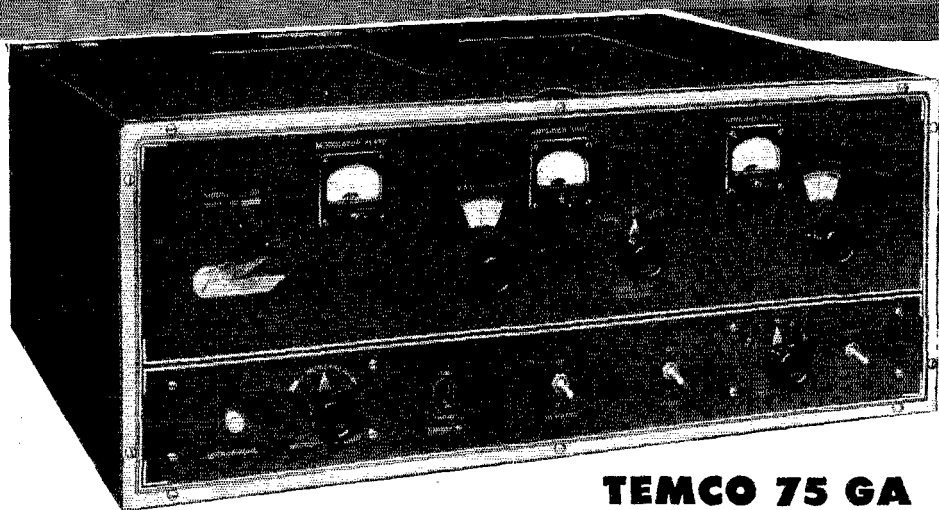
CONDENSED SPECIFICATIONS

SPEED ACCURACY—4% over extended periods of time. Within one revolution accuracy is better than .2%.
TURNTABLE DIAMETER—17 inches.
OVERALL DIMENSIONS—22 in. wide, by 26 in. deep by approximately 36 in. high. Packed for export, 25 cu. ft.
WEIGHT—Gross, approximately 215 lbs. Net 165 lbs. Packed for export, 285 lbs.
POWER REQUIREMENTS—Approximately 150 watts from 115 volts, 60 cycles source. Other voltages and frequencies available.
COLOR and FINISH — Cabinet is flat two-tone grey enamel. Turntable assembly finished in grey wrinkle enamel with green felt tapping on platter.
MOTOR SPECIFICATIONS — 1/75 HP. Continuous duty type. Very quiet and stable in operation.

WRITE FOR COMPLETE SPECIFICATIONS

EXCLUSIVE MANUFACTURERS OF RADIO TRANSMITTING EQUIPMENT... SINCE 1922

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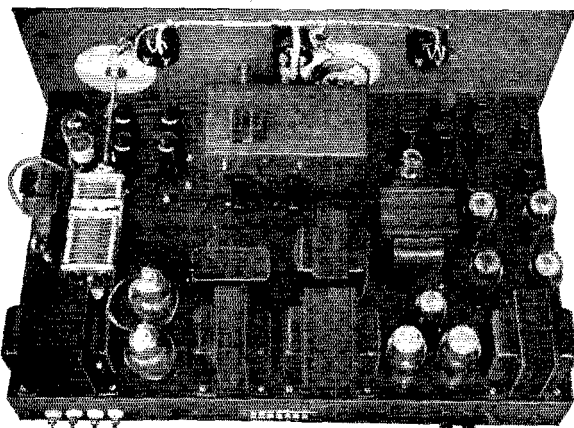
TEMCO 75 GA **Telephone & Telegraph** **75/100 Watt Output** **TRANSMITTER**

It's a rare pleasure to operate the TEMCO 75 GA for it is engineered and designed to combine into one cabinet all the conveniences and high performance qualities desired by the most discriminating amateur. When you snap on the switch and go on the air here's what you have at your fingertips — 75 Watts output on Phone — 100 Watts output on CW. Multi-frequency VFO with crystal-like stability. 5 band operation covering 3.5-7-14-21-28 megacycles. Crystal control with front of panel selection for two crystals.

Unusual Operating Simplicity

One dial operation when on crystal frequency control. All controls adjacent meters. Switch controlled built-in antenna relay for Standby-Transmit. Metering of grid and plate currents of the final amplifier and plate current of modulator.

Front panel connection for high impedance crystal or dynamic microphone. Compact construction without sacrificing accessibility for easy servicing. Selected components rated in excess of requirements to afford long trouble-free performance. Craftsmanship of the highest order which has been Temco's distinguishing mark throughout the world.



Combination Transmitter and Exciter **Permanently Protects Your Investment**

The 75 GA is also the exciter unit for the 500 watt transmitter pictured at the right. This means that your investment in a Temco 75 GA is good forever and represents a substantial savings when stepping up to 500 watts. For further details see previous ads in this publication.

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Operating Features

TEMCO 500 GA **500 Watt Output** **Telephone & Telegraph** **TRANSMITTER**

Rated Output: 500 watts on both radio telephone and telegraph.

Frequency Range: 3.5—7—14—21—28 m.c. amateur bands (other harmonically related bands within 2 to 30 m.c. can be supplied on special order).

Type of Modulation: High Level Class B.

Modulation Capabilities: 100%.

Emission: A1—A3.

Input Level: From high impedance crystal or dynamic microphone, level of approximately —60 db.

Audio Frequency Response: ± 2 db from 100 to 6000 c.p.s.

Noise Level: —50 db below 100% modulation.

Audio Distortion: Less than 5% at 90% modulation.

Custom Built Quality Throughout

Frequency Control: Variable frequency oscillator or crystal control with positions for two crystals.

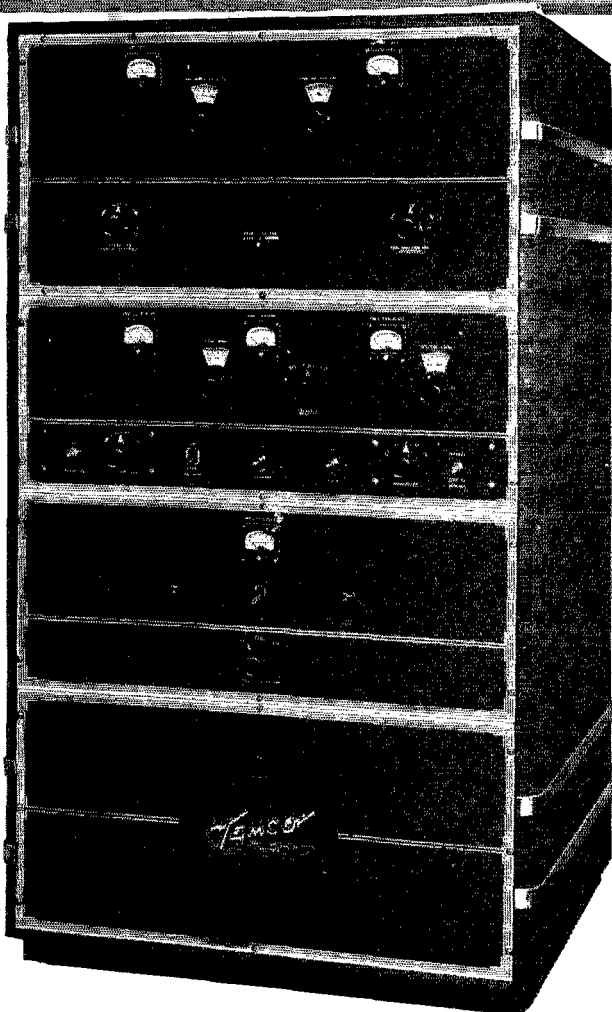
Front of Panel Control: VFO dial—IPA tuning dial—PA grid selector switch—PA grid tuning—PA plate tuning—PA variable link control—VFO or crystal selector switch—Exciter band switch—Transmit-standby switch—Phone CW switch—Line Switch—Overload relay reset button.

Metering: IPA grid—IPA plate—PA plate—PA grid—Modulator plate current—Class A driver plate current.

Tube Complement: In addition to the tubes contained in the 75 GA exciter, the tube line-up of the 500 GA is as follows:

Final amplifier and Modulator Section

Type	Function
2-100TH	Push-pull final amplifier
2-100TH	Class B Modulator
2-872A	Final amplifier and modulator power supply
1-5U4	Final amplifier and modulator bias supply



Handsome Enough for the Library

Power Consumption: Approximately 2 KW.

Power Factor: Approximately 90%.

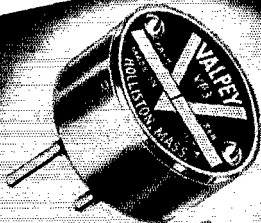
Power Source: 110-115V, 50/60 cycles AC.

Measurements: Approximately 55" high x 31" wide x 24" deep.

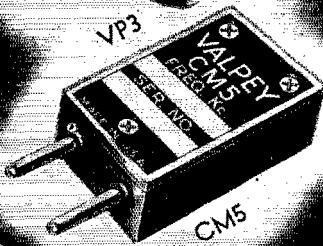
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**Everything at your fingertips
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(Continued from page 90)

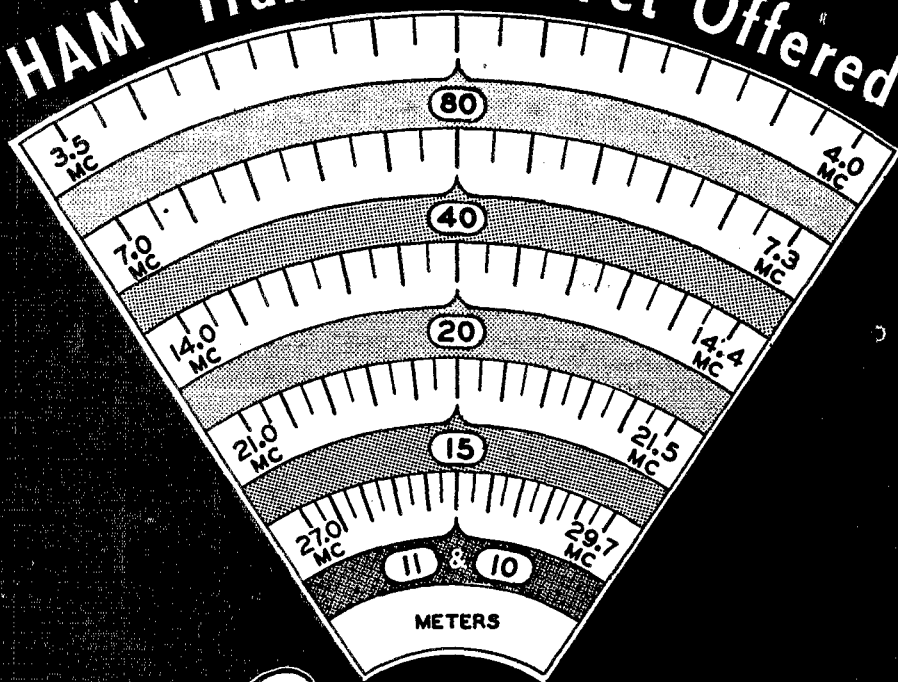
possible. Let's combine our talents and interests into making a good Idaho section. Suggestions for a weekly 3.5-4.0 Idaho Night will be welcome. All current ORS, OBS, EC, etc., please advise of your continued interest for renewal of appointment. Those interested in new appointments should write at once. JMH is looking for traffic and desires net work. DOH is 28-Mc. beam-tuning. GVN is going to school this fall. Father, mother, and daughter, are licensed as GQA, GUG, and JFZ, respectively. 5CAJ/7 bought a BC375E. CYY, using his BC654, was worked on 3.9-Mc. 'phone. IWU, on 7155 and 3743 kc, and on 3.9-Mc. 'phone, wishes to work Idaho stations. 73. Alan.

OREGON — Acting SCM, Cliff Tice, W7BEE — Pendleton is getting ready for annual celebration of the Round-Up and that cramps activities. Three of the PARC, MQ, KR, and FLS, now have the SCR transmitters and as soon as the Round-Up is over there should be plenty of QRM on all bands. A going-away party was held at MQ's house recently for EQI, the manager of the local broadcasting station. For the next year and a half Uncle Sam will be his employer. Yes, he was drafted. The only visitor at BEE's home from outside was IMM, who used to live at Durkee but now is in La Grande. He hazes a helper locomotive over the Blue Mountains from there to here on the Union Pacific. BEE will be off the air for a while for two reasons. One is that annual leave is due and a trip up the Coast from Crescent City, Calif. — all the way to Vancouver, Canada, is in prospect. This may drum up a little news. The other reason is that a very severe lightning storm played hob, burned out a transformer in the receiver, did the same to the antenna relay and a good hot water heater, and, worst of all, ruined the 220- to 110-volt transformer supplying juice to the transmitter. It also kicked out all the fuses in the house, burned the phone line in two and split one of the poles a short distance away. Now for a more pleasant subject. It is time for the Oregon gang to think about electing a regular SCM. I have tried to carry on when GNJ was unable to do so because of illness. His term expires in November, so fly at it, gang. Very 73. Cliff.

WASHINGTON — SCM, O. U. Tatro, W7FWD — DHY, A. J. Wade, 7718 — 16th N.W., Seattle, is EC and ORS. CZY is Washington OES No. 1. Colfax: ERO and DRD are working DX on 14-Mc. c.w. ERH was on 7-Mc. c.w. until h.p. plate transformer burned up. CSN keeps 3.5-Mc. c.w. schedule with ELH in Moscow. DP keeps early a.m. schedule with ELH on 3.9-Mc. 'phone and is changing from 14 to 7 Mc. for a trial. DTJ, CNS, DP, and FDD held a three-hour round table with ELH, who was in the mountains working portable-to-portable with CGJ down in Central Idaho. FDD is on 3.9 Mc. Everett: CZY has new HT-9 that is being put out without coils. IOQ reports the organization of a club with MH, pres.; BLK, vice-pres.; IOQ, secy.; and CHZ, treas. AYO reports the following CAA hams active: JJT, BWC, 1GAE/7, DQX, JIQ, HYE, IXT, and AYO. 5CGW/7 has new HQ-129. HQV, HEG, BWC, and 9WJB help keep KCJ's transmitters on the air while DQX, 1GAE/7, and 6KIO are on the receiver end. Seattle: JIJ reports DET on 14-Mc. c.w. with a kw, and contacted the Dream Boat, through 7NU. 1LIN/KL7 is on 28 Mc. looking for someone in Seattle to handle traffic. FWL is on 28 Mc. JIJ is on 14 and 28 Mc. with an 8JK beam. GWA is on 3.9, 14, and 28 Mc. JNI has offered his 3.5- and 7-Mc. rig for emergency use. APS is on 3.5 Mc. RT is on 144 Mc. with HK24Gs; he also is on 7 Mc. and worked all districts, KH6, KL7, XE2, ZL, VE8, in both Yukon and Northwest Territories. DET now has two transmitters; i.e. 200 watts on 3.9-Mc. 'phone and kw. on 14 Mc. He says there are openings for RM and ETM in Seattle Area U. S. Naval Reserve Division. JWC, XYL of IGM, has an HQ-129X. EKW is on 3.5-Mc. 'phone and c.w. Renton: AXS, on 3.5, 7, 14, 28, and 50 Mc. with 600 watts. marine mobile with 15 watts on 28 and 144 Mc. and a walkie-talkie on 144 Mc., is working BQX at 5000-ft. elevation in Olympics from boat on 28 Mc. and worked DYD, EUI, EQO, and JHQ on 144 Mc., a 144 Mc. three-way with AXS, marine mobile; JHQ, car mobile; and EQO, fixed. Tacoma: The Tacoma Radio Club, with Director BG presiding, entertained F. E. Handy, ARRL Communications Manager. EVW holds a schedule with his son, KA1SS, every morning. McChord Field: 6TPN/7 is active on 28 and 3.5 Mc. 5EII/7, 7JPT, and DSR are on from the McChord shack at Spokane. Your SCM feels that a younger man should assume the responsibilities of this office, and has appointed EHQ as Acting SCM for the

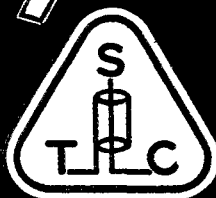
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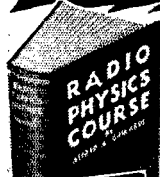
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(Continued from page 84)

balance of his term. Traffic: W7YC 5, RT 4, 6TRX/7 4, QB 2, FWR 2, JLJ 1. 7S. Tate.

PACIFIC DIVISION

HAWAII—Acting SCM, John F. Souza, jr., KH6EL— With the change from K6 to KH6 the gang has been getting acquainted all over again. The c.w. gang is riled at having to spoil the once rhetorical call with the extra "H" thrown in. K6HOT is doing a spell down at Canton for CAA. QBI is planning more power with a pair of TZ40s to "V" beam after wearing down his key to pair of 807s in vain. PLZ is giving DX a hot time on 14-Mc. c.w. with 800 watts to pair of 327As feeding three-element beam. CJK snagged fifty-five Europeans in two weeks in between turning out hams at Kauai High School, namely KH6BP, KH6BK, and KH6CO. FKN is gathering parts for rig. The Hilo Amateur Radio Club now is affiliated with ARRL and plans great doings. KH6BN, ex-PIN, is looking for lumber to complete his four-element rotary for 14 Mc. KH6AC, ex-PCM, is on 7 Mc. with single 807. KH6DK, ex-FAZ, is on 14-Mc. c.w. with 300 watts. BJJ is on 28-Mc. 'phone. 73. Johnny.

NEVADA—SCM, N. Arthur Sowle, W7CX—Asst. SCM, Carroll Short, jr., W6BVZ. RM: 7PST. EC: 7JU, 7TJY. OO: 7JU. OBS: 7JUO. OES: 7TJI. 6MRT, now 7JU, ran six-day tests with members of his AEC unit, a distance of 200 miles, all using battery power. 6G8B now is 7JUO; 6RPU is 7JXH; Kotovsky is 7JWW. 7TJY is constructing a full galled (kw.) for 14 Mc. 6UO now is 7VO. 7JNZ has an FB folded doublet on 3.5-Mc. c.w. 7JYS is on 3.5 Mc. 7PST and collaborators built an antenna similar to the Johnson Q beam entirely of 300-ohm Amphenol elements, matching sections, and feed line. 7RPQ acquired a pole pig. 6FUO is 7GC; 6OZ is 7PA. 7RXK is on 3898 kc. consistently. 7JPW is converting an ART-13. 6TUT and 6TGA, of Glendale, Calif., and 6DEE and 6AYL, of San Francisco, Calif., visited the Reno gang recently. 6BKY, Southwestern Division Director, visited your SCM recently. 7CX has knocked off some new DX on 14-Mc. c.w., SM, UA, and HB, and on 'phone, C, VS. 73. Art.

SANTA CLARA VALLEY—SCM, Roy E. Pinkham, W6BPT—Asst. SCM, Geoffrey Almy, W6TBK. PAM: QLP. The SCCARA held a dinner in honor of F. E. Handy, C. M. of ARRL. Among those present were J. L. McCargar, vice-president of ARRL; RBQ, Bill Ladley; TI, Horace Greer, both of whom are candidates as Pacific Division Director. The SCCARA is arranging a display of amateur gear for the Santa Clara County Fair. OKQ has 40-foot windcharger tower on which to mount his 14- and 28-Mc. beam. 20FK, 6 now is 6WNM. CFK returned from vacation and is hot about getting on 14 Mc. LXA is using Q matched antenna on 14 Mc. LCF has a BC-610 and hopes to work lots of DX. KG tried his luck on 14 Mc. 9FAV/6, HC, and LCF have secured telephone poles for their antennas. It should be busy time around San Jose with pole-raising parties. QLP has a DB-20 ahead of his RME-45. TBK worked 200P on 28 Mc. Vera would like to contact S.C.V. gang. BPT is working hard trying to raise DX on 14 Mc. JSF and HBB are busy working 140 Mc. 7IKU/6 has been heard working European DX. UGF now is in business for himself. He is destined to become the juke box king of the valley. OMT and his XYL, PMC, are heard on 28 Mc. signing portable KH6. Look for Bill and Marie when the band is open for KH6 contacts. They will have four-element beam on San Jose. 1WV/6 has applied for his W6 call. Miles says DX on 14 Mc. is hard to raise. Do I know it! PBV is working for CAA so has only week ends for amateur work. Traffic: W6DZE 15, PBV 8, 'BK 4. 73. Pinky.

EAST BAY—SCM, Horace R. Greer, W6TI—SEC: EE. RM: ZM. EC: QDE. EC u.h.f.: FKQ. Asst. EC u.h.f.: OJU. OO u.h.f.: ZM. OO: ITH. OBS: 'T, IDY, ZM, ITH, RMM, UZX. The first week in September found Ed Handy of ARRL paying us a visit, and his stay was greatly enjoyed by all ARRL members. It is hoped that he will be with us again in the not too distant future. UZX reports things a little slow on the air for him. ITH has new 100-ft. poles up and has 150-watt Collins transmitter which he will use in a station wagon for his extended Mexican and Central American trip in November. EJA is new Richmond Club president and says WAM, WDY, and WPG are new calls for three local boys. K6TXO/W6 is in the Army. RMM is on 28-Mc. mobile. CRF says he is eager to handle any and all traffic destined for Vallejo-Mare Island area from any-

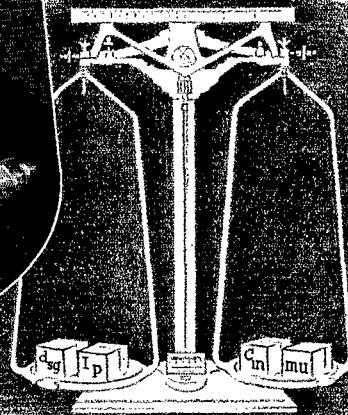
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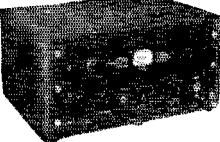
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(Continued from page 96)

where; he has n.p. 100THs with 700 watts on 14- and 3.9-Mc. 'phone. AHW, in San Leandro, has been working LSX, in Watsonville, with an HY75 with 10 watts on 144 Mc. with R9 signals both ways. WNI received his new call; he was 5JTC. LMZ is working good DX with his 807 rig. TT is getting to be a good fisherman. DUB is very active on 14-Mc. 'phone. BUY and PB are having a contest on DX. HAVE YOU JOINED THE OAKLAND RADIO CLUB YET? SSN is busy these days in his new business as design-construction-modification and repair of commercial-amateur and airborne communication equipment. Let's get those reports in each month. Traffic: W6ITH 26, EJA 13, CRF 11, TI 4, UZX 3. 73. "TI."

SAN FRANCISCO—SCM, Samuel C. Van Liew, W6CVP—'Phone Juniper 7-6457. Asst. SCM, Joseph Horvath, 6GPB. RM: RBQ. ECs: DOT, KZP. OO: NJW, WB. OBS: FVK, KNH, DJI. ORS: RFF, BIP, ATY, RBQ, CVP. OPS: OZC, NYQ. Mike Jackowski, ex-2GOJ, now is a resident of San Francisco with new call of 6WIF. Mike has an SX-18 and a new SX-28A. Ex-9WWB, Buck Buchanan, now is 6VPC, located in San Francisco, and is active on 14 Mc. VKB sent in the following: MGL is attending Healds and is operating school station at 250 watts using 3 1/2 waves in phase on 14 and 7 Mc. IUH QSOed Madame Stork and it is a kirl. LUM, Corte Madare, worked San Francisco from home QTH with R4 report from VKB at Aquatic Park, San Francisco. Ed says a beam is in order. There is a good chance for some comparative tests there. Ed is working on 144 Mc. from home QTH, 740 N. Point St., using HY615. His DX list includes EUH, Vallejo, and ATE, San Rafael. VQB's high frequency report includes the following observations for August: Extreme conditions of temperature inversion observed on 144-148 Mc. Unusual reports and many contacts between points with hills or mountains in between antennas. On 420 Mc. frequent contacts in San Francisco of a mile and a half over 500-ft. hills. Thompson has completed his parabolic antenna for 420 Mc. Tests show forty-degree beam width. Continued experiments with 420-Mc. antennas are in progress. Another record attempt was made August 25th on 420 Mc. VQB was heard on Mt. Diablo but, unfortunately, was unable to work PSQ, who was at Parkridge Lookout, 192 miles to the south in Grant National Park. However, PSQ contacted FZA, 140 miles to the south of him at Mt. Frazier. This should be a new record for 420 Mc. OZC is working South Africa on 28 Mc. with R9 report. Doug says the secret of his success is his new four-element rotary beam. All the 28 Mc. boys report many fine DX contacts east, the band staying open several hours in the morning for Europe and Africa. RBQ is installing a portable 28-Mc. 'phone rig in his car, using 110 volts a.c. gas-driven generator power supply. Remote control from car instrument panel is being used. Bill is now on 144- and 28-Mc. 'phone and 7- and 14-Mc. c.w. DJI manages to work some 14-Mc. DX between vacationing and painting the house. PSN is awaiting parts to complete his 'phone rig. He is including an automatic modulation limiter of his own design which is well worth duplicating in any 'phone rig. KNH temporarily has reduced power, and is now running 811 final. WB has volunteered his services in frequency checks to all stations requesting same. He now holds OO appointment, so any out-of-band reports will be authentic. The f.m. followers report about fifty f.m. stations around this area, all looking for contacts and schedules in other sections on or between 27.37 Mc. and 29.4 Mc. The San Francisco Radio Club elected new officers at the August meeting. They are: MZ, pres.; LV, vice-pres.; BUJ, secy-treas.; JDP, sergeant at arms. The Board of Directors consists of WN, NYQ, NGV, WB, CVP, and the above officers. The Marin Annual Dip-sea Race was held Sept. 8th, with the Marin gang furnishing portable communication on 3.9-Mc. 'phone for reporting the race in progress. MZ had the misfortune to break his wrist "working DX," he says. Thanks for reports. Traffic: (July) W6BIP 36. (August) W6RBQ 32, VPC 28, BIP 5, DJI 2. Sam.

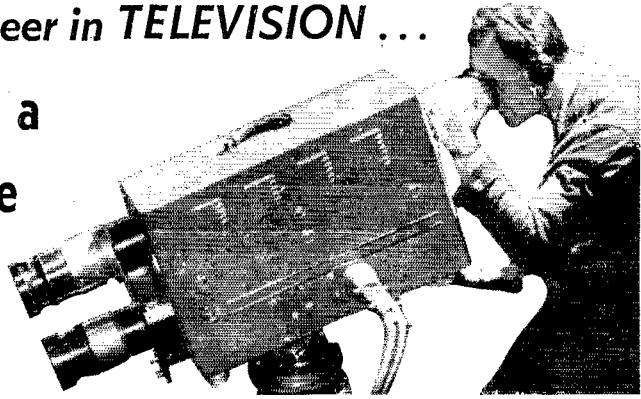
SACRAMENTO VALLEY—SCM, John R. Kinney, W6MGC—The Sacramento Amateur Radio Club, Inc., held Old Timers Night on Aug. 21st to honor OAH, AK, RBQ, ex-KU, FW, AP, EWV, BY, AEJ, APE, UM, JN, AHN, NO, ATN, CKA, DVE, and FOT. ZF will have a 250-watt portable rig on 3.5 and 7 Mc. MGC and GVM report new jr. YL operators. KME is using an HK-24. CLV, BVK, GZY, KME, QKJ, YQY, MIW, RKM, PIV, AUO,

(Continued on page 108)

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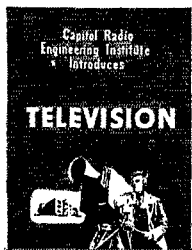
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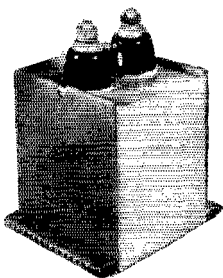
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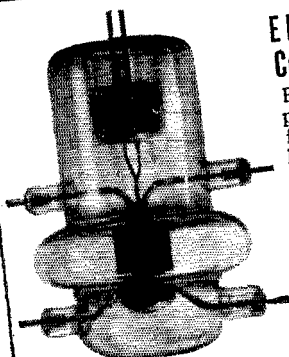


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Mfd.	Volts d-c	Net ea.
.1	2000	\$0.49
2	1000	.71
2	600	.59
4	600	.71
8	600	1.19
10	600	1.29
8	660 a-c	1.50

... and a few more BC-375-E transmitters available at only \$45.00 complete with tubes and accessories.

TUBE SPECIALS



EIMAC VT-127A

Comparable to 100 TL

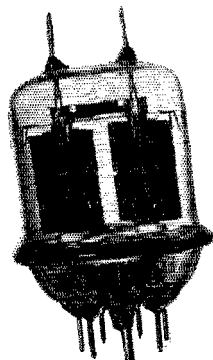
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\$3.45 each

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In original packing, these Signal Corps inspected tubes are a real bargain at

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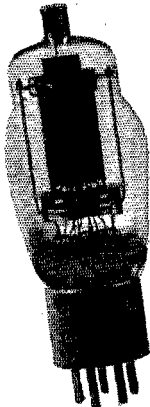


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Brand new, JAN-inspected 807's at a price you never hoped to see — only \$1.35 each.

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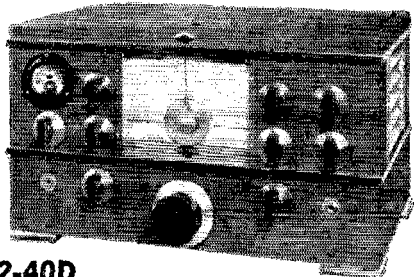
813's	\$9.95 ea.
838's	4.95 ea.
832A's	5.95 ea.
211's	4.95 ea.



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... order your NATIONAL RECEIVER NOW!

Put your favorite amateur — yourself — at the top of your list and make him an early Christmas present of a new NATIONAL receiver. These amateur favorites are in stock at the Radio Shack for delivery immediately (that's RIGHT NOW, son). Time payments, too, if you want them — see schedule below.



NC-2-40D

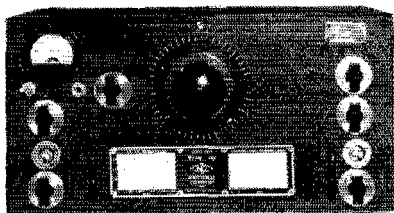
Here's another National favorite that's been kept abreast of amateur needs by incorporation of war-proved features. Covers 490 Kc to 30 Mc with calibrated electrical bandspread in 80, 40, 20, and 10 meter bands. All components treated to resist moisture and fungus for all-weather dependability in any climate. Complete with 12 tubes, built-in power supply and matching speaker.

Net price only \$240.00



NATIONAL 1-10-A

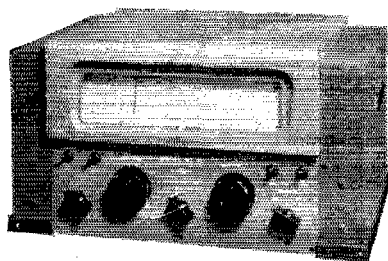
For your experimental work between one and eleven meters, you'll find this 4-tube super-regenerator the answer to your need. It's furnished with six sets of easily changed coils, kit of tubes, power supply, and speaker for only \$101.93.



HRO-5TA-1

This is the newest version of the favorite receiver for amateurs who want professional performance. The familiar value features of the HRO are complemented by new ANL circuits that give even greater efficiency. Furnished complete with 11 tubes, speaker, power supply and plug-in coil sets for the popular amateur bands.

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NC-46

This postwar design is already acclaimed for its sensitivity, stability, and day-in-and-day-out dependability. Smooth handling, convenient grouping of controls, positive band switching, full-vision, slide-rule type dial — and modern styling in keeping with the trend toward beauty in amateur gear. Furnished ready to use with tubes, power supply, and matching speaker.

Net price only \$107.40

TIME PAYMENT SCHEDULE

	Net Cash	1/3 down	6 mo. payments	9 mo. payments	12 mo. payments
HRO-5TA-1	306.71	102.71	35.01	23.68	18.02
NC-2-40D	240.00	80.00	27.50	18.58	14.13
NC-46	107.40	36.40	12.67	8.60	6.62
One-ten-A	101.93	33.93	12.18	8.26	6.38

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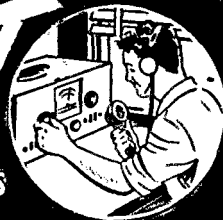
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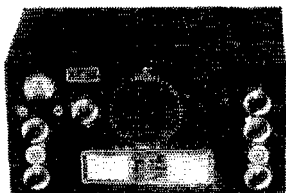
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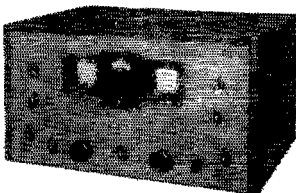


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NATIONAL HRO-5TA-1 • Net \$274.35
697 Power Unit \$20.36 • MCS Speaker \$12

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HALLICRAFTER S-40 • Net \$79.50
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Performance and beauty are combined in this outstanding Receiver value. Many circuit refinements never before available at this price. Electrical Bandspread Dial—Coverage 540 KC to 43 MC.

HAM RADIO SUPPLIERS SINCE 1919

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(Continued from page 98)

BLP, NRZ, AK, and MGC are active on 144 Mc. HIR is active on 3600 and 7210 kc. DBP is on 7 Mc. with 160 watts and an HQ-129. REB has a 1/2 kw. on 3.5-Mc. c.w. RXY has surplus BC375E transmitter on 3.5 and 7 Mc. POB is active on 28, 14 and 3.5 Mc. SXF has a pair of 807s on 7.0 and 3.5 Mc. At the SARC meeting on Sept. 18th DBP won an FB mike, donated by Sacramento Electric Supply. VKM won Cardwell v.h.f. kit donated by F. M. Kemp Co. New calls are WSI and WRD, ex-9MIQ. PIV reports schedule with REB and PQS on 3.5 Mc. OJW is on 3.5 Mc. and schedules 7CW and KL7CF. GZY, OBS, reports official bulletins are sent on 147 Mc. Mon. and on 3.795 Mc., Wed. and Fri. GVM reports DX worked: On 28-Mc. 'phone—ZK1AB, XAAP, EL4A, PK6AW, OX1AD, W9CAC/Iceland, VS4JH and YN1FF. On 14-Mc. 'phone—FA1D, CT2, OX1AA, VO6F, I11Y, VP4, CR9, and SU1KE. AP reports DX worked on 14-Mc. c.w.: ZS6CH, ZS5Q, ZS6B, ZS5LK, ZS1DW, ZS5DE, ZS2X, PAZJØ, D4ADN, XU4B—Mongolia, UA3RBC—Moscow, G2HF, G3HK, and G1BB. Traffic: (July) W6HIR 28, GVM 16, AP 8, GZY 1. (August) W6GVM 48, PIV 13, AP 8, OJW 1. 73. Jack.

ROANOKE DIVISION

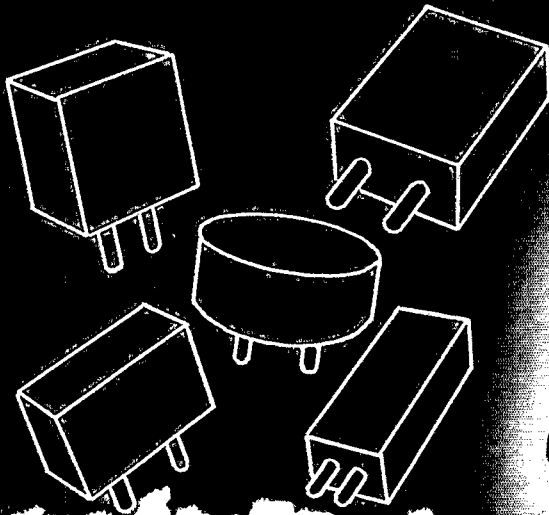
NORTH CAROLINA—SCM, W. J. Wortman, W4CYB—Thanks for the reports this month, fellows. It was good to hear from a few of the gang. MR has a McElroy e.c.o. working and is on 14 Mc. with lots of watts. Part of the gang in Greensboro spent the Labor Day week end painting up the club house. GG, BHA, BML, and AGD are given credit for most of the work. Someone went berserk with the spray gun and when the windows are cleaned off the members will be able to see out again. Plans are under way for a kw. rig before Sweepstakes time. The fellows around Burlington are planning the organization of a club, according to HER. The Western Electric Plant there has created lots of foreign hams. 2BWK, 1GJH, 1ASQ, 9SEA, 9TCP, 2OPR, 9YUX, 20FN, and 2CPU are moving into this area. CXM, COC, FLT, EYE, GHY, and HDS are on 3.9-Mc. 'phone. AEH is busy on 7 Mc. BYG and HER are on 28 Mc. FXU is interested in the formation of a traffic net for the winter. It is hoped that some of the gang are interested. The Charlotte Club has an EC who has lined up quite a few fellows to help out. HER is EC for the Burlington area. BIP is OPS. TO now is in Atlanta but comes through this area occasionally. Attention, Raleigh, Winston, Asheville, and Clinton. How about a report from the clubs there? We can't write the news if we don't get it, so send some dope along.

SOUTH CAROLINA—SCM, Ted Ferguson, W4BQE/ANG—FNS had trouble with receiver power supply. CXO QSPed traffic from Frankfurt. BPD has rhombics on 7, 14, and 28 Mc. and reports the following DX: VK, LU, CX, and VU. ILP has 150 watts on 7- and 14-Mc. c.w. EZF has taken unto himself a wife, none other than GUZ from Tennessee. GCW is knocking them off on 14 Mc. with his exciter. GCJ works 7-Mc. c.w. HAZ has 300 watts on 7 Mc. HAX works 7 Mc. DPN is dividing his time between his new jr. operator and 3.5 Mc. CEL helped BPD with his rhombics. 9ZZW 1/4 keeps Ft. Jackson on the air. HMG has a new 28-Mc. beam. HEV now is Class A. CO works 28-Mc. HOY keeps schedules on 3.5-Mc. c.w. FMZ is EC for Columbia area. BEN works 27 and 28-Mc. 'phone. JGM is waiting for his new HT-9. HJR is dividing his time between 7-Mc. rag-chew and DX. CZA has had his hands full making preparations for the Charleston 'fest. DPN is EC for Orangeburg area. Has any one seen GKD? FNC is on 3.9-Mc. 'phone. On October 16th I completed ten years as SCM. It has been a real pleasure to serve the fellow hams of this section. I wish to thank those who have served as RM, PAM, OO, OBS, and EC in the past. Traffic: W4HJR 5. 73. Ted.

VIRGINIA—SCM, Walter R. Bullington, W4JHK—The following are new calls in Roanoke: Aldhizer, 4JFV; Canaday, 4JGI; Francis, 4JDT; Norris, 4WFF; Perky, 4EPK; Nicewarner, 4ISA; Lasise, 4IRC; Wohlford, 4CA. 4EOP is new RM. Anyone interested in traffic handling should get in touch with him. New calls in Richmond are: Arnold, 4JOT; Smith, 4KCM; Anderson, 4KAO; Martin, 4CYW; Jones, 4BZE; Hull, 4BJZ; Johnson, 4ITK; Eubank, 4WT. EOP has new kw. that is burning 'em up. SCM invites applications for station appointments. AOT is publishing Ham News for the benefit of amateurs in the Roanoke Division. Anyone interested in subscribing should address: Box

(Continued on page 104)

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**10 METERS
PR Type Z-5.**

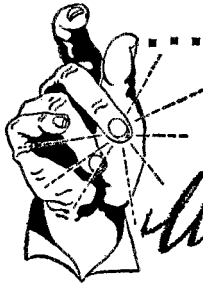
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Limited quantity! Highly sensitive, 8000 ohms impedance. Bi-polar magnets, bakelite shell and cap. A swell value!

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Immediate to 30-Day Delivery On:

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(Continued from page 102)

308. Petersburg, Va. The SCM sure would appreciate more station activity reports. Here's for more news next month! Traffic: W4EOP 36, 73. *Monk.*

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — BTV visited 3AVJ and 2RG while on vacation and upon his return accepted the RM post for Northern West Virginia. KKQ moved to Virginia, but WXW is on 3.5 Mc. for you boys who need Hardy County — and who doesn't! JWL has returned from service. MOP has new HRO-5TA1. GBF has a new beam on 14 Mc., and the first day running low power he worked ten countries. OM and CFB, two Clay County boys, are on 3.5-Mc c.w. regularly. HD visited the MARA and brought along his movies. OXO has returned to the air after a long absence. New hams: ZFB, YBO, YBI. MIS works VKs and ZLs on schedule on 14 Mc. with low power. YCK is new ORS and drives 125 miles regularly to attend the MARA meetings. SGO is stationed in Cuba and has a kilowatt on 14-Mc. 'phone. 5KVX, Houston, Tex., wants West Virginia schedule to handle traffic to Manning. 3GEG visited hams in Clarksburg and Grafton while on vacation. UGH/LIS is located at Lowell, Mass., and can be heard on 14-Mc. 'phone. QWM '9 has moved to Chicago and is operating on 3.5-Mc. c.w. GQE has a new high-power rig on 3.9-Mc. 'phone and has spare operator to insure twenty-four-hour-a-day operation. Reports to date show JM out in front in the Work All Counties Contest. 73. *Don.*

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, W0QYT — With summer over and vacations gone we can now settle down to some good old DX on the bands. There has been some very nice DX coming in on 14 and 28 Mc. 9FAN has rebuilt his rig using 811 modulated with four 6L6s. DSB is sporting a new 28-Mc. three-element beam. QYU has returned from Bikini, where he was associated with the electron staff of the Cross Roads Project. BJN has his rig working now. TRR is trying to get back on the air but WELCO has been selling his rigs as fast as he can rebuild. ARROD is building a club transmitter to be used in Field Day activities. TFP is putting up a tower and 14-Mc. beam W4AXG, at Canon City, passed his radiotelegraph 1st exam and is taking radiotelephone 1st soon. QDC has been grinding crystals for 7 and 14 Mc. ACA and his brother, LUF, are doing some 144-Mc. testing from Boulder and Flagstaff Mountain. The Western Slope Radio Club held a hamfest on Grand Mesa this summer with most all the members attending. Nathan Bale, the president, got his ticket and now is 0PXZ on 28-Mc. 'phone. GMB is harvesting his peaches but will be back on as soon as he debugs his rig. FQT is building a house. GKW is on 7 Mc. with an 807. EBW still is cashing checks at the local bank. We had several 28-Mc. mobile visitors in town this summer and the local boys are putting rigs in their gas buggies. W0FKK is in Phoenix, Arizona, and will be looking for 7- and 14-Mc. contacts. 9YBS, reported dead in July QST, Iowa report, is very much alive. 73 *Glen.*

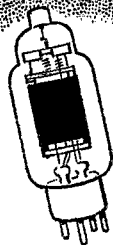
UTAH-WYOMING — SCM, Victor Drabble, W7LLH — 7UOM, 7MQL, and 7DLR now have rotary beam antennas. 6QZO has rebuilt the war-surplus transmitter into a ham rig for 28 Mc. 7NPU finished his final, which is an RK4D32 and puts out 120 watts. 9DAD blew three crystals in his rig. 7DLR and BCL have resigned as EC. 7HDS will take over for 7BCL. The Shy-Wy Radio Club held its annual picnic at Roundtop picnic grounds. 7EUZ has a new BC-348-P receiver and is finishing his converter for the 28-Mc. band; also he has an FB rig designed for 28 and 3.9 Mc. using an HFO into an 829. 8IFB/7 is getting out FB with 30 watts on 14-Mc. c.w. 9RHF is back in Cheyenne. 0ZNN, of Estes Park, Colo., and 5RG, of Dallas, Tex., were visitors in Cheyenne recently. 7LLH has finished his v.f.o. 7OKF and 7BLE had calls changed to the W7 area. 7DLR rebuilt his rig, a 6V6 Pierce oscillator, 6L6 buffer into an 829B final, to work all bands; he also built an FB field-strength meter covering the 28-, 50-, and 144-Mc. bands for his OES work. 7FST has a BC-610 transmitter with 600 watts, all frequencies, 'phone or c.w., an SX-28 receiver and an antenna array for each band. 1RK and 6UOM are making FB experiments in tuning up beam antennas. Traffic: W7FST 823, DLR 5, MQL 4. 73. *Vic.*

SOUTHEASTERN DIVISION

EASTERN FLORIDA — SCM, Robert B. Murphy, W4IP — GVC is SEC; his helpers are: BYF, Dade; FWZ, (Continued on page 106)

SPEER GRAPHITE ANODES DON'T WARP

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SPEER Graphite Anodes help tube manufacturers produce closely matched tubes that give closely matched performance — because SPEER Graphite Anodes defy warping.

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9. Enhance tube appearance
10. Provide precise anode dimensions
11. Produce uniform tube characteristics
12. Retain original dimensions in service
13. Maintain normal tube characteristics
14. Allow wide latitude of anode design

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COMPLETE WITH 15 TUBES:
Receiver: 2-955 4-7H7 2-7E6 2-7F7
Transmitter: 1-W.E. 316A 2-6F6 2-7F7

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Complete with battery case, vibrator power supply, telescopic antenna, sectional antenna and spring mount, handset, all tubes, and crystals.

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(Continued from page 104)

Duval; AYY, Lake; CQZ, Lee; DQW, Manatee; KH6IRS/4, Monroe; QN, Orange; ACZ, Palm Beach; IYO, Pinellas; HGO, Seminole; and ASR, Volusia. RM BYF has DQW, AYY, and IML with whom to start his traffic net. PAM ACZ has CQZ, ASR, and AFO with whom to start his net. OO's: IML, AYY. OBS: BYF, FJC. Please drop your SCM a card if you are interested in appointments. HXM will have about 300 watts. FWZ and IP get together for a nice rag-chew on 7.2 Mc. after a ten-year lapse. GVC says Orange County has plenty of emergency power and is ready with a well-organized unit to cooperate with the Red Cross. GJO and GIY are operating on 50 Mc. 5KIX now is JWC. BE is on the air. GJT is putting on high power. GVC is Old Timers Club member. 8LUV is jr. operator at IML. DQ is a W2 now. IYO is taking over the EC job from EYI of Pinellas County. It is believed that JVJ is the youngest operator in the section, being but 14 years old. His father is EOK and they plan some work on v.h.f. KH6IRS/4 has emergency equipment ready to go. IWM has a very effective two-element rotary on 28 Mc. JHL is on 28 Mc. RQ says JIR, COB, AXX, 1CTN/4, and 8FBW/4 are getting on 14, 28, and 144 Mc. ALP is the TARC's secretary and communications coordinator for the local Red Cross. DLH and ES have had some QSOs. DQW is working 3910 kc. in the emergency net. AFH, AYY, and AHK are forming a club. DKA is still shooting at the stars for DX. BYF, our RM, wants some of the c.w. boys to get in touch with him to form a net in preparation for National Trunk Line circuits. He needs an OBS for 7.2 Mc. Mac runs about 300 watts and sends official ARRL bulletins Monday through Thursday, and sometimes on Friday, at 8:30 P.M. EDST (0030 GCT). Traffic: W4BYF 63, IP 3, AYY 1, DQW 1. 73. Merf.

WESTERN FLORIDA — SCM, Lt. Comdr. Edward J. Collins, W4MS — JNP is our latest ham. EQR is having an FB time working VKs. AXP has rebuilt the rig and it looks FB. JJU is moving to Memphis. JBI is going great guns on 28 Mc. HJA sold the BC-610. 2OTU/4 now has four-element Yagi. 5IAO/4 has moved to W1 and wants schedules. DAO is rebuilding 28-Mc rig but really perks on 7 Mc. FHQ is having an FB time on 7 Mc. JV has three-element Yagi now. DXQ promises activity. DZX has just finished FB final tank condenser. BFD has renewed ticket. JBJ is about set to go. VR is busy with police work as is UW. 7CEV/4 is on with 5 watts. EGN continues to work DX. 1DBT/4 is increasing power. ECT and FJR hold down 7 Mc. MS gradually is getting the 14-Mc. rig together. AXF enjoys solid QSOs on 28 Mc. BKQ has been having tube troubles but promises more power. Several new hams are about to blossom forth. How about more reports? 73.

GEORGIA — SCM, Thomas M. Moss, W4HYW — The Georgia Tech. Radio Club has been reactivated and the following officers elected: IEO, pres.; FEK, vice-pres.; HKQ, secy.; IRA, treas.; FZE, activities chairman. Meetings are on the Tech. campus. Club station is AQL, with DYH as station trustee. We welcome 2HUH to the section. FNX is with CAA in KP4. DYX now is KP4BK. JRQ is with Eastern Air Lines in Atlanta. GT, BNB, and ex-5LY-5DDS have joined Southern Airways in Atlanta. The Delta Airways gang includes BNX, BBR, DHI, EAW, FPY, GPD, 3DNY, 9KMR, 9PEL, 9BMC, 9RQD, CRO, FID, FCH, and IYF are with CAA in Atlanta. GEG is Asst. EC for Bartow. The Bartow EC organization is functioning. FVI is with Pan-American Airways in Miami. Secretaries of reactivated clubs are urged to forward the dope on their club. Club stations are urged to apply for OBS appointment, and to take part in traffic activities as ORS and OPS. County ECs are urged to secure cooperation of Red Cross, public utilities, military and naval authorities, and the state, county, and municipal law enforcement and relief agencies in order that amateur radio's service to the community in an emergency can be rightfully recognized. IVE is on from Atlanta. GCD is with WGOV in Valdosta. CMA is installing f.m. system for an Atlanta transportation system. CFJ is back in Atlanta. We can use many OPS and ORS. Let's have your inquiries. Traffic: W4HYW 16. DXI 1. 73. Tom.

WEST INDIES — Acting SCM, Everett W. Mayer, KP4KD — AZ sold out to AS but worked VS, CR, ZC, OK, and XZ before going off the air. Jack is going to the States. AM, CE, and W6PQE/KP4 work three-way duplex on 27 Mc. AM had 15 G contacts plus TG and LU during August. VP6ZI works the KP4 gang and wishes to contact British W.I. on 14-Mc. phone. BP is working out FB on 14

(Continued on page 108)

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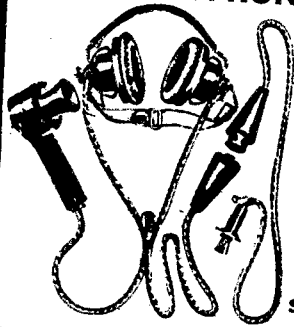
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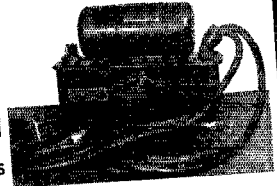
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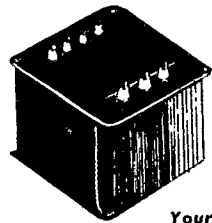
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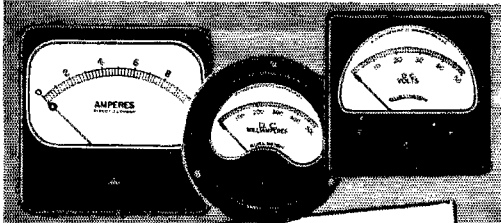
Mc. AW worked EI9J for his first big DX on 28 Mc. AY makes FB recordings of local 'phones AU tried running a kw. to his p p 813s but settled for a half-kw. AG sold out to W4DRS/KP4 and is going to the States. W4DRS/KP4 is on leave in the States. BJ still is engineering on 1/4-kw. rig. CF is back on 28 Mc. after giving 14 Mc. a whirl. He and KD worked J9LG on 14 Mc. and got QSL. AO, ex-K4DTH, is on 14-Mc. c.w. AK has new rig with 829 final on 28-Mc. c.w. Call changes: KP4CF, ex-W4BZA; KP4CE, ex-W8VRD; KP4CC, ex-K4ESH. Traffic: KP4AM 8.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Ben Onstenk, W6QWZ — The Los Angeles Section Council of Radio Clubs has grown to the Federation of Southwestern Division Amateur Radio Clubs. All clubs not already approached by this organization are requested to contact their SCM. The newly-formed Metropolitan Radio Club of Los Angeles is doing very nicely. For information as to meeting dates and places call Ben PL. 9752. During the latter part of July the Mike and Key Club operated for the Aquaplane Association during their races off Hermosa and Manhattan Beaches. The members operated three evenings for swimming, paddleboard, and dory races, all day Saturday for laying out of the course and spotting of the race publicity photographers, and all day Sunday for the main races themselves. For night races they had one station on shore for the p.a. system, and one on a boat at the seaward end of the course for reports on the races. RIU put the output of an MBE right into the p.a. system. ESR did the announcing. On Sunday for the big races they had three mobile marine stations and two on land. On boats were ESR, NSC, and AQJ. On shore CFI and PTR were at the finish line at the end of the pier and RIU was at the judges' stand for the p.a. NSC used his boat as pole boat to start the races. MBE's were used exclusively on a frequency of 51.84 Mc. ESR, RIU, VED, AQJ, CFI, NSC, PTR, and TVK participated. The Mike and Key Club assisted in the races for several years before the war using 112-Mc. equipment. The Foothill Club AEC Net is coming along very nicely under FPN. They check in each Friday night at 8 p.m. on 146 Mc. During August the Inglewood AEC, under MSO, held regular weekly drills each Monday. A general meeting of AEC operators was held at which a thorough discussion was had on AEC emergency equipment, crystal-controlled transmitters on spot frequency, and improved operating procedure and incident drills. A complete revision of net operating procedure now is in process and will be completed soon. The Inglewood net has fifteen members. IFW is tearing his hair out because of BCI with his HT4. Try using an MBE. Lee, GM is using his frequency meter to calibrate v.f.o.s for the boys in the Citrus Belt area. IOX, using a BC610, has traffic schedules with 4PL. ASW put out six ARRL bulletins in August. BPU is out of the hospital now and is doing fine. EPL is back after thirteen years absence from hamdom. MEP has five half-waves long wire on 3.9 Mc. BKY is on 3.9 and 14-Mc. 'phone. BMO is studying the License Manual again. AM made WAC on 14-Mc. c.w. and 'phone in two hours. A modulation transformer blew WIR into a c.w. man. GZZ puts out ARRL bulletins three times a week on 28, 14, and 3.9 Mc. SN uses two "V" beams on 14-Mc. PAIV is settled in his new home in Arcadia. New OO is IWU of Chino. New ORS are CMN, TZD, AAE, UXX are OES. SYP is EC for East Los Angeles. MEP is OBS for Burbank. RP is busy being an FB Scout Master. IBDI visited Los Angeles to attend the Glendale Barbecue and the first meeting of the Metropolitan Radio Club. BGEH is looking for a place to put his antenna poles for that kw. all-band rig. JQB, running 750 watis, has 20,000 acres and fifteen telephone poles to use for antennas up in Lone Pine. Thanks for all the reports, fellows. Traffic: W6QE 108, VZF 79, SN 54, OGM 40. IOX 22, WIR 10, AM 5, TZD 4, AAE 1, 73. Ben.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — OHM has code and theory classes at Tempe College. OAS sends code and theory on 27 Mc. JOK works ZLs and VKs with his 300 watis on 28 Mc. New 7-Mc. stations are: JZD, JEC, UKK, UMV/7, JGZ, JGX, 5JSF/7. RMB gets good results with a Meek transmitter and Premax beam on 28 Mc. MAE handles traffic on 3.5 and 7 Mc. and worked 4JHS (ex-FZQ) on 28-Mc. portable-mobile. New calls are 7OAS, 7TBR, 7GV (ex-6GS), 7JKS, 7JUQ, 7KAE, 7KAD, 7KAP, 7JXL, and 7JZU (ex-6FDW). TJH has a new four-

(Continued on page 110)



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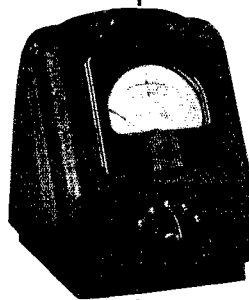
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(Continued from page 108)

element beam on 28 Mc. JKN runs a 6L6 final on 28 Mc. RNB has 500 watts on 7, 14, and 28 Mc. KMM won an S-38 as first prize in the Phoenix QSO Contest. JYJ got a Millen exciter for second place. New Phoenix Club officers are: SOG, pres.; Holcomb, treas.; JMS, act. mgr. 7JFT is on 27 and 28 Mc. QNO worked his first J on 28 Mc. New Tucson Club officers are: UPF, pres.; JQP, vice-pres.; JKK, secy-treas. QWG has a super compression unit on 3.5-, 14-, and 28-Mc. 'phone. JHB has thirty-seven countries with 90 watts. PEY has sixteen countries with 60 watts. PDA has WAC with 37 watts and heard a G work JHB. QAP and KAD, ex-5JBG, have heard each other's carriers. Traffic: W7MAE 172. 73. GC.

SAN DIEGO — SCM, Ralph H. Culbertson, W6CHV.—FB report was received from MKW on activity around Orange County. SCO is on 3.5 Mc. with QRP. IZ is on 3.9 Mc. at Balboa. AQD has portable rig on 3.9 Mc. at Balboa. UWM is new call on 3.9 Mc. PHJ is working for local radio factory. TIK is sticking to 28 Mc. and VAD is trying his luck on 14 Mc. In Santa Ana CIG, DHP, FCT, and MQF work at Post Office. DEY, FCI, ROA, TON, VEK, and 3LKB are at monitoring station. ALO and BAM are on 14 Mc. DEY is on 3.5 Mc. with low power. VEE and VKN are new calls. QG has worked plenty of DX on 50 Mc. with pair of 3C24s working W4 and W8. RPI is working at local radio plant and schedules IWE weekly on 3.9 Mc. BWO, HWJ, and MKW are on 3.9 Mc. with pair of 807 rigs and are active on GG Breakfast Club. LYP uses an HT-4 at Dana Point. DHP and CIG are active on 3.9 Mc. LHN schedules his brother-in-law in Germany on 14 Mc. 3LKB/6 is on 3.5 Mc. with Signal Shifter and SX-28. HWJ and MKW have new 144-Mc. rigs. GG Breakfast Club held FB picnic on Aug. 25th at Doheny Beach State Park with A.D. AQD, BP, BWO, CZT, DAN, ESW, HWJ, LGO, LMF, LUG, LYP, MKW, PFQ, RYE, SEL, UYK, WDO, and WKF among those attending. BAM wants OBS appointment cancelled until he can keep regular schedules. LUJ has shifted to 7 Mc. where conditions are more stable and DX hounds in minority. FMJ reports little activity because of summer vacations. PDP has returned to college. PAX also left for college at Los Angeles. ACW reports working all seven districts in Australia in about 45 minutes on 14-Mc. 'phone. A combined meeting of the San Diego Radio Club, The Helix Radio Club, and the Palomar Radio Club was held Sept. 10th at which Mr. Handy, from Headquarters, attended. GWY is working for Western Radio. Traffic: W6BAM 32, ACW 18, LUJ 4, FMJ 3. 73. Ralph.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, Jack T. Moore, W5ALA — SEC: DAS. PAM: EGCE, RM: CDU. IZU reports that the Tyler Radio Club has been reorganized with the following officers: IZU, pres.; IBM, vice-pres.; PIJ, secy-treas.; EME, program director; J. B. Sheppard, technical director. This club meets monthly on the 2nd and 4th Tuesday nights. The East Texas Amateur Radio Club met in Tyler in July with IYJ presiding and BMM, Delta Division Director, as guest speaker. LMI and 3KFX/5 are new hams in Tyler. JAD reports working some nice DX on low power. The Pampa-Borger-Phillips Radio Club continued to meet throughout the summer. BFA has a BC-610 and NC-240D and is working lots of European DX on 14-Mc. c.w. KYR is using an HT-4E and an SX-28 on 28-Mc. 'phone and 14- and 7-Mc. c.w. HCR has been having trouble with his HT-4E. JZB is active on 28-Mc. 'phone and is building a c.w. rig for 7 Mc. IJQ is running 220 watts to a new four-element beam. HVP is working lots of DX on 28-Mc. 'phone. JHA was formerly a W7. IWQ is rebuilding and will increase power. SH has so much r.f. on 28 Mc. that the link on his antenna coil caught fire. Eddie still is trying to work Cairo, Egypt, on 14-Mc. 'phone. IYJ has a WAS with his mobile pig running 40 watts to a beam antenna. Ex-GDE now is 6VIM and is working for the Southern Calif. Telephone Co. at Los Angeles. BNQ worked a VQ4 on 28-Mc. 'phone who was running 5 watts to a four-element beam. KI has a new four-element beam for 28 Mc. The Dallas Amateur Radio Club met in a joint meeting with the Dallas chapter IRE in October. 73. Jack.

SOUTHERN TEXAS — SCM, James B. Rives, W5JC — CVW has a new 400-watt rig using a pair of HK54s in the final and is pilot for American Airlines. ERS and ERX are operating on 3.5-Mc c.w. JPC is on terminal leave at

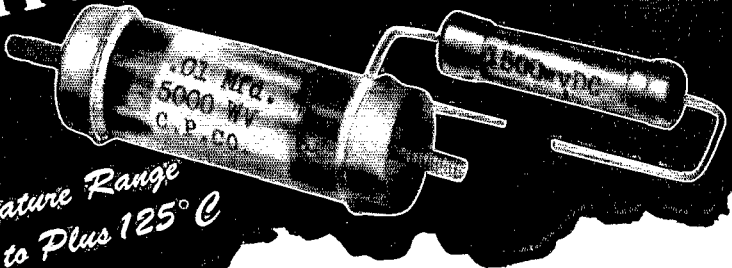
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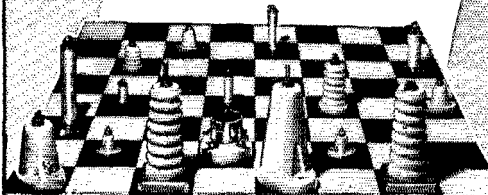
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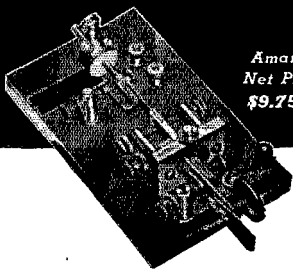


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(Continued from page 110)

Kilgore and active on all bands and makes application for ORS appointment. HIF reports the Navy radar school at Corpus Christi has brought in a lot of hams from all call areas. FH is out of the Navy and engaged in the radio supply business. AQK, HP, and 3IME/5 have been working some good DX on 28-Mc. 'phone. HIF has two new steel poles erected for a new beam. WIR is operated by Ward Island Radio School Club. FBC is active with a pair of 100THs. MN is pushing the construction of his new rig and is looking forward to lots of traffic. EWZ is on 14-Mc. c.w. and 28-Mc. 'phone in Harlingen. BKJ is busy getting the bugs out of his final amplifier and teaching the XYL the code. EIS is moving again and expects to be on the air shortly. 73. Jim.

CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — Highlight of the past month was the Maritime Division Convention. EP won the DX trophy with EA runner-up. JH won the high speed copying contest. FQ, new EC, has just returned home from overseas. If you have any self-powered gear or are interested in emergency work, contact FQ and join the AEC. EY now is RM and will welcome a word from all interested in traffic in order that we may get our net going again. ORS appointments and TLS posts await suitable stations. FQ, our QSL Manager, says, "Send your stamped and self-addressed envelope to FQ for cards now coming in." KY is putting the new RME-45 through its paces on 3.8-Mc. 'phone. CW is using the new SX-25 and new rack and panel transmitters on 3.5 and 28 Mc. CO has made WAC on 3.5 and 14 Mc., with VS7 as his last oac. BD is on 14-Mc. 'phone. He uses a pair of T40s in his final. Ex-AP, another awaiting new call, will use pair of 807s to start. Recent visitor to Summerside was W2CO, East Orange, N. J. Dja' see the new Panadaptor in action at BC — OW? An' the new transmitter — mmmmm? Think I'll have to hook up my 5B-PI for a look into the band now before going on. Traffic: VE1HJ 20. 73. Art.

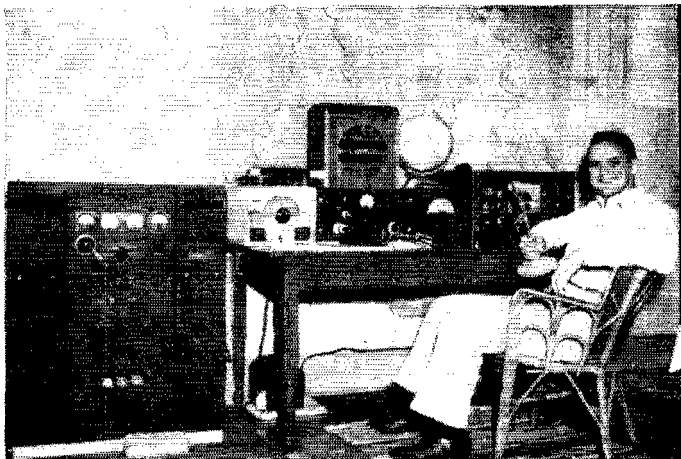
ONTARIO DIVISION

ONTARIO — SCM, David S. Hutchinson, VE3DU — TW is a mile out in Lake Ontario at Port Weller Light-house. OL is on 14-Mc. c.w. LO has moved to Queenston and is working with long wire antennas. BKL has BC-610 rig with SX-28A, Super-Pro and three-element beam, and is anticipating four-element beam for 14 Mc. BJG, new in Thorold, is on 3.5-Mc. c.w. BBE was on 28-Mc. 'phone all summer and works ZL and ZS. The AFARS net was active all summer. Plenty of 50-Mc. activity in Toronto with UT, AMY, AEM, AUS, etc., on every evening. The North Shore Radio Club of Oshawa put on a hamfest on Labor Day with about 120 present. With over a hundred prizes almost everyone got something, with QK of Toronto winning the grand prize. W3CUM came the furthest, with Ontario hams from Ottawa to Goderich in attendance. HP is operating on 3.5, 7, and 14 Mc. QU has changed QTH to Welland. According to dope reaching me rather belatedly the North Shore Radio Club was formed on Apr. 5th with JV, pres.; QO, vice-pres.; ADD, secy.; and AGT, treas. There is a new club in Peterborough with BCE, pres.; AXQ, vice-pres.; and BJH, secy.-treas. The year's program consists of code instruction classes and possibly some in theory. The Peterborough gang had a weiner roast on Aug. 27th. Any Ontario boys who can get up in the morning can move traffic to Western New York, Western Pennsylvania, Ohio, Michigan, Indiana, Illinois, and Wisconsin via Great Lakes Early Net on 3663 kc. each morning at 7 A.M. This net also connects with QMN Net of Michigan which operates on 7 and 14 Mc. BEV and HI were active on 14 Mc. in August and HI worked his usual quota of DX. ADB and GV were heard on 3.5 Mc. GB is getting Signal Squirter. C. D. appointees had better "smarten" up as not a single report was received this month. Traffic: VE3HP 44, ATR 19, VD 2. (June and July) VE3EF 14. "Dave."

QUEBEC DIVISION

QUEBEC — SCM, G. F. J. Phelan, VE2SU — Greetings from your new SCM. Postwar reorganization of the section will require lots of hard work, but we are sure you

(Continued on page 114)



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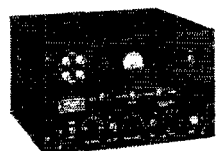
Hallcrafters S-38	\$39.50	RME DB-20 Preselector \$	68.20
Hallcrafters S-40	79.50	Hammarlund HQ-129X . . .	188.00
National NC-46	97.50	RME-45	188.00
NC-46 Speaker	98.90	National HRO	274.35
RME-84	98.70	National NC-240D	225.00
RME VHF-152 Converter	86.60	Hammarlund SPC-400X . .	342.00

Net F.O.B. Chicago. Prices subject to possible change.

This month, our hats are off to Edwin C. Shaw, W5SH, Ft. Worth, Texas . . . first, for his fine-looking rig; second, for his stimulating activity on the air. And we want to add our thanks, too, for his recent friendly note that expresses, among other pleasant things, his "complete satisfaction not only with the equipment but also with the extremely courteous treatment I have received from your good company."

No need to thank us, W5SH. That's what we're here for. We get our satisfaction out of serving you. Whether you're an amateur starting "from scratch," rebuilding, or newly licensed, you can count on ALLIED for all the help you need—for earliest delivery of the latest available gear, for guaranteed quality at the lowest prevailing prices, for preferred personal service from ALLIED'S staff of licensed hams, each of whom shares your interest in amateur radio.

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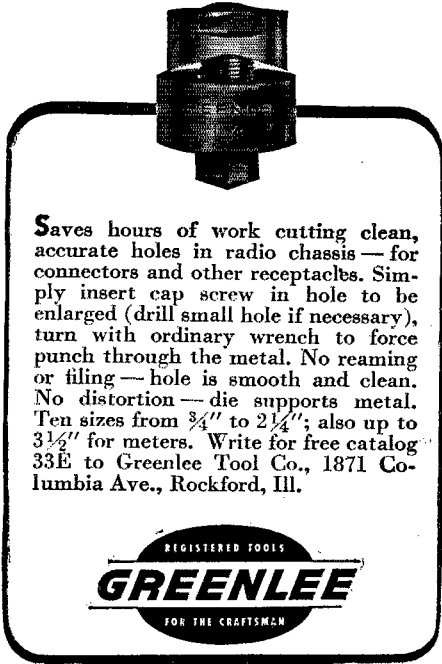
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(Continued from page 118)

will pitch in and help us out. Many thanks to LC for helping to get the column in each month. Your former SCM, CO, is deserving of many thanks for the hard work he had to do during the long war years. Congrats to II on his appointment as RM. Ossie needs all the help he can get, so send in those applications for ORS. Lots of AEC members are required, particularly from the smaller towns. OBS are needed in Quebec City, Montreal, and Hull districts. Drop us a card for information on those or PAM, EC, or OES appointments. UO is interested in traffic work. EA is firing up a new rig. XR is warming up the shack with a 6L6 and all the trimmin's. JO has nice signals on 14 Mc., as have DO, DR, and MZ. KS is going on with 808s. LZ, of Quebec City; OA, of Chicoutimi; and QA, of Cap de Madeline, put nice signals in to Montreal on 3.9-Mc. 'phone. LP's 144-Mc. receiver is working well. UG is with TCA. BO has the lower apartment in an excellent DX district. Gordie Waugh, ex-1LY of Halifax, expects his VE2 call. BB will be heard with 6L6, 807, and 812. UN, RZ, SU, and II favor the old 6L6, 807 enervator. SB will have a few hundred watts on from 813s soon. Lloyd is ex-3ASB of London. KC is back in the city. Start sending in that dope on what you are doing, boys. If you prefer, phone AT0545. See you in the SS Contest. Traffic: VE2SU 23, VE2UO 4, VE2DR 2, VE2EG 2, VE2VN 2. 73. Gordon.

VANALTA DIVISION

ALBERTA—SCM, W. W. Butchart, VE6LQ—JJ crocked both ankles when he fell off roof while adjusting new beam. AO has new half-kw. rig on 7 Mc. ZJ is stationed in Edmonton with RCCS and has station set up in P. of W. Armories. MJ has new e.c.o. under way. EL spends more hours on 3.9-Mc. 'phone than any other VE6, and gets \$9-plus reports from down near Mexican border. 8AO is very enthusiastic over new HQ-129X recently delivered to him at Lac La Barge, Y. T. EY puts FB 'phone signal into local telephone lines, thereby getting in subscribers' hair! DR has placed tentative order for a "single sideband receiver." AE hit 3.9-Mc. 'phone in August with 80 to 90 watts to pair of 807s. He wound his own modulation transformer, too. IR has 30-watt c.w. rig on 3.5 Mc, using 807 final. QE keeps 3.9-Mc. 'phone hot over the week ends when he gets home from Calgary. LW is busy lining up equipment to get on 3.5 Mc. WG probably will be alternate ORS for Calgary. HM has pair of 35Ts to replace 830Bs. WS finished new 28-Mc. beam. AZ has SX-25. FK put pair of 810s in final, running 300 watts. LQ keeps schedules with 7CD to keep in touch with XYL on holidays at Vancouver. Traffic: VE6AO 44, ZL 22, LQ 20.

PRAIRIE DIVISION

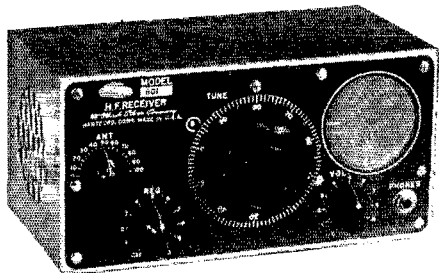
MANITOBA—SCM, A. W. Morley, VE4AM—We now have several towns working on 50 Mc. The latest to report are AP, RK, NB, YW, and portable 5AU, from Brandon. AP managed to work W6ZJB on this band. DG, our only OES, is trying to form a net and clean up the interference from transceivers. PA, in Dauphin, is on 7 Mc. and reports activity for northern points. AW spent holidays in Salt Lake City and parted with some sugar for equipment. EO is on at Flin Flon. XP hates suppressor grid modulation and will replace it with megaphone. CU, ex-AEE, is on at Roblin. New call at Portage is DX. No reports of working any net though. The Simpson family, HS, LS, and KN, are all active on 3.5 Mc. and all work within 40 kc. of each other. IF/GE had a swell holiday at the Coast. They still talk about it on 3.9-Mc. 'phone. AD spent his vacation visiting Ws and VE3s. New 50-Mc. stations in Winnipeg include QE, QC, CX, and PV. CS in Morris also hangs out on 50 Mc. Bootlegging is getting bad on 50 Mc. and it is hoped anyone knowing the whereabouts of any such station will report it to the R.I. WF has new receiver. How about some dope from a few of you who haven't been heard from for ages? 73. Art.

SASKATCHEWAN—SCM, Arthur Chesworth, VE5SY—PK uses a 6-volt wind charger for power to run an 807 e.c.o. and 807 amplifier at about 20 watts. Receiver is an SW3 operating on 7 and 14 Mc. SY got his Tri-tet working OK at last; he now is trying out 28-Mc. doublet. OM is working some DX on 14 Mc. MW has a new 50-Mc. transmitter under construction, also new 7-Mc. "V" antenna. 4ES and MW want to know if anyone is interested in

(Continued on page 116)

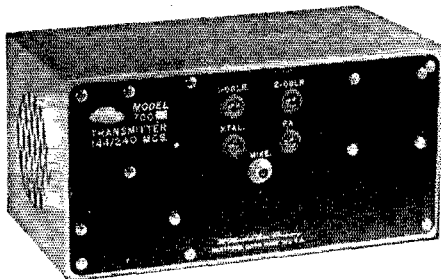


Announces -



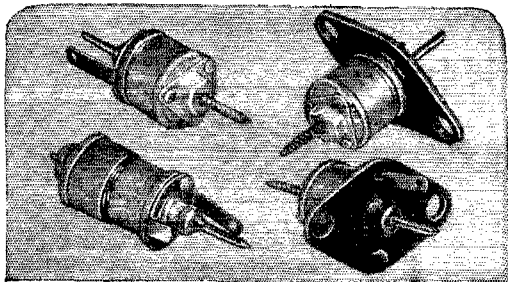
MODEL 800 RECEIVER

MODEL 800 144-148 and 235-240 mcs. U.H.F. receiver. Edward P. Tilton's Feb. 1946 QST design modified by Byron Goodman's inductive r.f. tuning, built-in PM speaker, 88" band-spread, all in new "ATOM-X" construction. Factory built or kit for easy home construction, compact.



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MODEL 700 xtal controlled transmitter. 144-148 and 235-240 mcs. 6AQ5 Tritet drives 6C4 doubler, 6C4 doubler/tripler, 832 long-line push-pull final. Built-in 14 watt 6AQ5 push-pull voice modulator. New "ATOM-X" construction, size only 5" x 10" x 5 1/4". Matches MODEL 800. Makes serious home-station or mobile rig. Factory built or kit.



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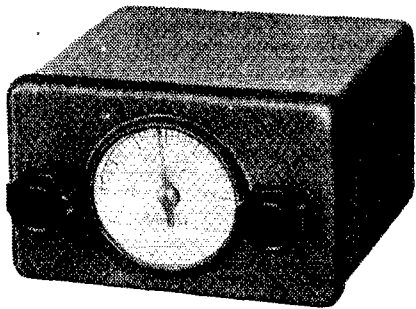
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(Continued from page 114)

starting up a network taking in Manitoba, Saskatchewan, Alberta, and the northern states. The Moose Jaw Club has started fall meetings. Attendance at the first meeting was very small. Come on, boys, let's get together again. Very little news, so this report will be short. Traffic: VE5MW 4. 73. Ches.

MARITIME DIVISION A.R.R.L. CONVENTION

Enthusiastically acclaimed the best ever held, and attended by over 300 hams and their XYLs and YLs, the first postwar Maritime Division ARRL Convention took place during August 31st, September 1st and September 2nd at the Nova Scotian Hotel in Halifax. The Halifax Amateur Radio Club under the capable leadership of Walt Wooding, VE1ET, saw to it that everyone had an excellent time, and the varied program was completed without a hitch. At the banquet, Mayor Ahern of Halifax, in extending a cordial welcome to all visitors, spoke in appreciation of the amateurs' wartime contribution, and expressed the conviction that hams would continue in the future, as in the past, to exhibit the highest ideals of citizenship.

C.G.M. Alex Reid, VE2BE, spoke interestingly on phases of ARRL relationship in Canadian amateur affairs, and received a tremendous ovation. Other speakers at the banquet were Mr. E. P. Tilton, W1HDQ, West Hartford, and the VE1's own R.I., Mr. G. F. Harris. The speakers were introduced by Art Crowell, VE1DQ, who presided most acceptably. Ron Hart, VE1MZ, with his roving "mike," provided much amusement, his effervescent wit being a considerable factor in the evening's fun. Table "contacts" were made with many districts, including VE1, VE2, W1 and VO1. The usual hamfest contests, with some added novelties, kept the crowd in a continual uproar, and the judges, Messrs. Reid, Cobb and Tilton earned the plaudits of the crowd.

On Sunday, following a talk by Mr. Halroyd, of Canadian General Electric Co. on frequency modulation, a field day with various athletic events was featured, and concluded with a delicious picnic lunch. A theater party completed the day's activities, local hams keeping "open" house until a late hour to accommodate out-of-town visitors.

The five-meter hunt on Monday morning was followed by an interesting talk on v.h.f. by Mr. Tilton, whose articles in QST are so widely read. At the conclusion, 73—and, in many cases, 88—were exchanged, before the visitors took very reluctant leave.

The Halifax Amateur Radio Club deserves great credit for a difficult job excellently performed. Visitors can never forget the wonderful hospitality. Thank you, historic Halifax, we're coming back!

— VE1FG

~~Strays~~

"New Electronic Terms" Department:

From the *Lansing State Journal*: "P.A. system, hydraulic mike, like new, \$100." — D. D. Gibbs

From the *Chicago Daily Tribune*: "The voltage in use has dropped from 2400 amperes to 800 . . ." — W9GPK

— — —

Latest FCC W9/W-cipher reshuffling has brought about these complications: W9LVE is now a W0LVE, a swell guy like W9RM turns out to be a W0RM, and the W0RLD is ex-W9RLD's. Ex-W0RSE got the W0RSE of it.

—W0BP

It's
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at

HARVEY!



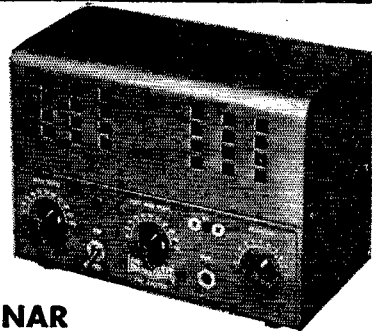
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Self-contained power supply.

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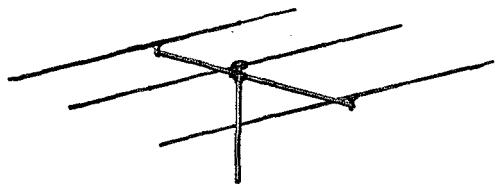
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10-Meter Beam Conversion Kit Model #29B..... \$27.50

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ASK FOR OUR BARGAIN BULLETIN

Correspondence

(Continued from page 50)

QST reports on world radio conferences, particularly the regional Inter-American meetings. It is hoped, of course, that some day it will be possible to work out a satisfactory international solution.]

CLASS D

414 Marshal St., Hampton, Va.

Editor QST:

When the Signal Corps accomplished the feat of receiving a signal reflected from the moon, it must have been apparent to the League and to anyone else with more than an ounce of imagination that it was only a matter of time before point-to-point communication to all parts of the world would be practical on the ultra highs. It was immediately apparent to commercial interests, who lost no time in starting work on installations to do just that. ARRL probably foresaw the rush to those frequencies would overwhelm the amateur unless something was done about it, and I am in complete agreement that the Class D license proposal was the only answer. How so many amateurs could be so short-sighted as to petition against such a license is beyond my comprehension. Those Class D amateurs could have and would have helped hold those frequencies available for us to step into after the techniques had been established. Where has the ham spirit of cooperation and building for the future gone?

— Fred S. Howell, W9QAF/4

QRI?

302 Starnes Park, E. Gadsden, Ala.

Editor, QST:

I want one of those musically-modulated bell-ringing notes that cut through QRM so well they cover up completely any signal beneath 'em. You know — the note like W5 — and a lotta other nice fellas use. What I like about such a D — #%\$&@ signal is that no one can smother it. Isn't there some way I can fix my rig so I'll always come out on top with a nice T5 note? And isn't it nice of FCC to let us use 'em?

— Dawson W. Bearden, W4KKK

Editor, QST:

There is nothing that has disturbed me, in my 16 years as a ham, so much as the obvious trend toward more and more power in the final, forced by the increased number of people on the air and the consequent QRM. It is a vicious circle: more QRM, so we use more power to overcome it.

Much has been written on the subject of power and many suggestions made, but right now it is beginning to look as though the 80-meter band is going to be quite useless during evening rush hours unless you have high power. I speak not only of the 'phone band, where even a kilowatt frequently is insufficient, but also of the c.w. portion of the band.

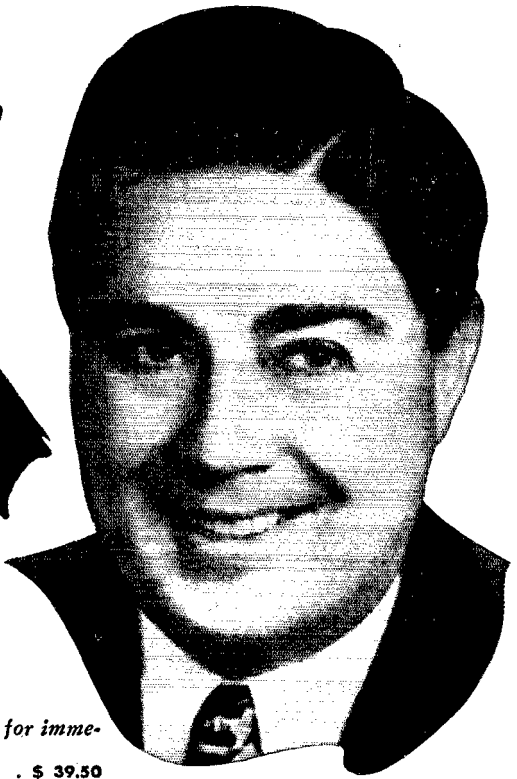
All of this power business is tied up with another very important item to most of us, and that is money. More and more of the little green notes are needed now to get the same results on 80 — and I'm not talking inflation, I'm talking power. We have arrived at a sad state of affairs when we are forced to admit that, in general, our success on 80 is a direct measure of our pocketbooks. Right now I defy anyone to deny flatly that this isn't true today. It was not true ten years ago and our hobby was never intended to be that way.

I have a feeling that the majority of hams, and would-be hams, would like to see some sort of limitation. I speak of 80, and 40 when we get it back. I think they would like to see part of the 80-meter band, say 150 kc. of the c.w. portion, restricted to those using 100-watts input or less. Some such arrangement might also be worked out for the 'phone boys. Likewise, 100 kc. of the 40-meter band might be reserved for those using 100 watts or less. This would allow the fellow with the limited pocketbook to go on the air with his inexpensive receiver, and his rig with an 807 final, and rag-chew and handle traffic with a reasonable and equal chance of success which anyone, who listens on 80, knows he hasn't got today.

— Henry B. Sprague, jr., W2NOH, ex-W1CHR

(Continued on page 120)

**Bob Henry says:
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Hallcrafters S40 complete	79.50
Hallcrafters S36A	307.50
Hammarlund HQ-129X and speaker	168.00
Hammarlund SP-400-X and speaker	342.00
National NC-2-40D (complete with speaker)	241.44
National HRO-5TA1 and HRO-5RA1	274.35
National NC-46	97.50
National 1-10A with tubes and coils	67.50
RME-45 complete	198.70
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RME DB-20 complete	68.20
Pierson KP-81 complete	318.00
Panoramic panadapter complete	99.75
Temco 75GA transmitters	495.00
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Gordon, Amphenol, Johnson rotary beams	

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The delivery situation is much improved. I can make immediate delivery of most receivers and other apparatus. Take advantage of the extra service and selection you get by dealing with me, based on my reputation as the world's largest distributor of short wave receivers. Send me your order now. Send five dollars and I will ship at once C.O.D. Or order on my 6% terms. I finance the terms myself to give you better service and save you money. Trade-ins accepted. Tell me what you have to trade, and let's make a deal.

Besides having all amateur receivers and transmitters, I also have a complete stock of all other amateur apparatus and parts, also test equipment, etc. I have real bargains in the really good war surplus such as SCR-211's, BC-610, BC-342, BC-348, BC-312, parts, etc. Write, phone, wire or visit either of my stores.

Bob Henry
W9ARA

Butler, Missouri

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Los Angeles 25, Calif.

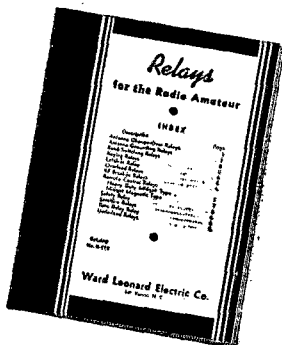
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Correspondence

(Continued from page 118)

528 Colima St., La Jolla, Calif.

Editor, QST:

Let's have a band for low-power 'phone. I enjoy DX 'phone contacts as much as the next fellow, but try to break through these California kilowatts! With the increase in number of amateur high-power stations, soon there won't be any 100 per cent QSOs. I have worked Okinawa on 10 watts when there wasn't any QRM and know it can be done; the VKs use 50 watts. It seems to me the rest of us low-power boys ought to have a chance at DX. Why not have a band limited to 50-watts input?

—Ed. Marriner, W6BLZ

AMATEUR G-2

[Editor's Note: The following is excerpted from a letter to W2CSS and published with his permission.]

Editor, QST:

"Johan calling Ludwig: How is Highroad?"

"Ludwig calling Johan: Highroad 238."

"Johan calling Ludwig: Victor! Highroad 238. How is Polarbear?"

"Ludwig calling Johan: Polarbear 20."

"Johan calling Ludwig: Victor! Polarbear 20."

I did not grasp it the first time I heard it. Neither will you, I suppose. Imagine a ham in Holland. Time: second year of World War II. Spot: his shack. Circumstances: German boots stamping thru the streets, British bombers roaring overhead in the night. Ham activity: completely at a standstill, xmtr confiscated, all other gear that could be kept out of the hands of the occupiers safely hidden from the spying eyes of the German "organizers." All that is left for the time being is a BCL-box. Officially it is not of much use. Listening to any other but Dutch and German stations is *verboten!* The Germans were such bad psychologists; they did not know that the way to have a Netherlander do something was to forbid it. So we listened to any station but the Dutch and German ones — and kept ourselves well informed about the happenings at the war fronts.

The BCL was quite content when he managed to pick up the news from London thru a lot of German-made static. But I, as a ham, was not content with that. Every now and then I explored the whole range of my receiver, looking out for anything interesting. The range of my box was up to 23 Mc., so the possibilities to find something were many. . . .

One evening, searching for something interesting on shortwave, I heard a communication somewhere between 3 and 5 Mc., part of which I recorded at the beginning of my story. (For your convenience I translated it literally into English.) I suspected at once it had something to do with the nightfighters, and after a few weeks of intensive listening I knew who they were and what they chattered about: it was the German nightfighter communication system.

As soon as I knew this, I wished to know everything about it, in order to pass my information to British Bomber Command. I supposed they would be interested to know more about this German system. So from now on I was in my shack every night the nightfighters took to the air; all lights put out including dial-lights, windows opened in order to see and hear what happened in the sky, at the same time making mental notes of what I heard in my radio. The volume control was turned down as low as readability permitted to prevent being overheard by an occasional German passing by my window.

Due to my knowledge of the German language and due to the very simple code the Germans used, I was soon able to tell what were the results of the fighters, how many went up on a night, in what mood the pilots were (afraid, drunk, lazy, etc.), why a plane was sometimes circling around for hours on end (connection with ground broken) and, most important of all, which methods might be used to disable this defense system.

Thru the underground channels I sent a report of my observations and suggestions to British Bomber Command. I was not a little surprised when I observed, several months

(Continued on page 128)

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Same, with additional NC and NO contacts to control receiver, ECO, etc. Model 6351..... **\$8.33**

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RG-8/U. 52 Ohm Impedance. FB for feeding beams, etc. Handles a KW with high efficiency. New, perfect cables.

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65-foot length with one plug. List \$22.59. HSS. **\$3.45**

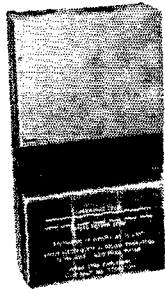
Cut to size in one piece within -0% to +20% of length ordered. Full measure!

Jan Type	Impedance	O.D.	Price per foot
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RG-11/U	75 Ohms	.405"	10¢
RG-13/U	74 Ohms	.420"	14¢
RG-39/U	73 Ohms	.312"	11¢
RG-58/U	55 Ohms	.195"	8¢

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Complete with tubes: 5-954, 1-955, 4-6SK7, 2-6SJ7, 2-6N7, 1-5T4.

Instructions and diagrams for easy conversion to a hot 10 (also 6 and 2) meter superhet receiver are included. Parts alone are worth much more than **\$19.98** our low HSS Price.....

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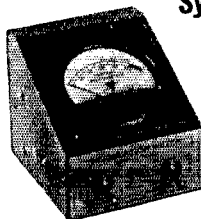
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This compact instrument enables you to accurately determine modulation percentage and monitor speech quality. Accuracy is within 5% from 300 KC to 144 MC. Use of Sylvania IN34 Germanium Crystal Diode eliminates plate and filament supply and makes for compactness and **\$29.50** Net economical design.

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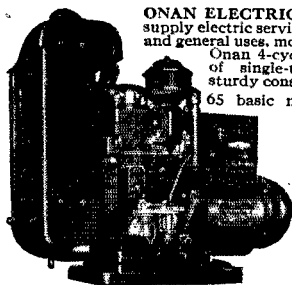
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Correspondence

(Continued from page 180)

after sending my report, that my suggested methods of jamming, false messages, etc., actually were used by the RAF and with good success — tho I did not know whether this was in consequence of my information (the RAF must have had many sources of information!). I took it as a proof that I was able to serve my country and the allies with my hobby. It was a stimulant to continue in the field. How I and so many other PA-hams did so is another story.

— G. H. Pierson, PAGE

Strays

"T'other day when winding an oscillator coil I needed some binding strips. I found an old phonograph record and used that. On looking at the title I read 'Looking for Someone.' Prophetic? Well, I remember the second line of the song went '... and not finding anyone there.' I wonder!" — VEAAGH

— — —

W5GUZ is back on the air after 3½ years as a Jap POW and 8 months in Army hospitals. He reports that W9VTH, USN, and KA1AT, USA died in Jap prison camps. W7AYV, USN, and W5GUZ took over the Jap radio station, JAW, near Tsuruga, Japan, during the interim of August 29–September 9, 1945, before the Yanks landed at Yokohama. They did this unarmed and in the company of ex-W6HJJ, USN, one Marine, and a Navy radio operator. San Francisco was worked and relief food obtained by plane. They then ran a sked with the POW camp in Osaka, Yokohama and 1st Army Hq.

— — —

W4ICC, author of "A Combination Test Meter," September *QST*, forwards this added operating note: When using the device as an output meter, with the pin jacks J_2 connected to the speaker terminals of a receiver, L_1 should be removed from its socket.

— — —

It works today — it worked then! At the turn of the century, Lord Kelvin (William Thomson, 1824–1907), inventor of the siphon recorder and the galvanometer, and scientific writer of repute, wooed and won his second XYL via the romantic language of the dits and dahs.

— — —

It is our sad duty to relate that Gordon Anderson, W51QU, was electrocuted on August 1, 1946, while operating his 'phone transmitter. Investigation has disclosed that a defective transformer, with windings shorted to the core, caused Mr. Anderson's *ungrounded* transmitter rack and microphone cable to become "hot" with respect to ground.

— — —

Note to enterprising receiver manufacturers: The Signal Corps has announced a war-developed radar device for measuring wind velocity, which should make a handy receiver gadget for accurately measuring verbose 40-db.-above-S9 'phone stations.

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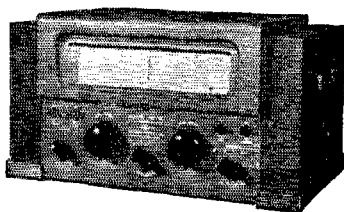
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- G.E. 0-200 Milliamperes, 3½" round case..... 3.39
- G.E. 0-4000 Volts DC, 1 mill movement, 3½" round. Complete with external precision multipliers..... 8.45
- Westinghouse 0-2000 Volts DC, 1 mill movement, 3½" round case. With external multipliers..... 7.45
- 4 Mfd.—600 Volts, oil, round can..... .75
- 4 Mfd.—1000 Volts DCW, oil, rectangular can.... .95
- 1 Mfd.—2500 Volts DCW, oil, round can..... 1.25
- 1 Mfd.—5000 Volts DCW, oil, rectangular can.... 2.50
- .001 Mfd.—2500 Volts DCW, 5000 V test, mica. 65c ea., 5 for 3.00
- .002 Mfd.—2500 Volts DCW, 5000 V test, mica. 65c ea., 5 for 3.00
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- Precision resistors, 1% tolerance, wire wound. .5 meg—75c, 3 for \$2.00 1.0 meg—95c, 3 for 2.50
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- Dunco 30 sec. Time Delay Relay, 20 amp. contacts. 4.65
- Twin-lead 300 ohm transmission line, polystyrene insulation. Per foot..... .03

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- HRO-5TA1, complete.....\$306.71
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- S-38, complete..... \$39.50
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- R-42 Speaker for above..... 25.00
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Hammarlund

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Three-Band Transmitter

(Continued from page 28)

26 hours and one of 33 hours, it is suggested that 2 rows of $\frac{1}{4}$ -inch diameter holes be added along the rear apron for ventilation, since R_7 dissipates approximately 10 watts.

Operation

Operation is as usual with a VFO and amplifier. If the coil specifications have been followed closely, only a slight adjustment of end turns on the oscillator grid coils should be necessary to obtain full band coverage.

With a 60-watt lamp connected across the link terminals as a dummy load, the following data were obtained:

Oscillator screen, 150 volts at 1 ma.
Oscillator plate, 300 volts at 11 ma.
Amplifier grid, 105 volts at 2.5 to 4.5 ma.
Amplifier screen, 240 volts at 10 to 15 ma.
Amplifier plate, 660 volts at 110 ma. doubling, or 75 ma. straight-through.

It must be remembered that the meter reads total grid, screen and plate currents, so the minimum at resonance, unloaded, will be in the neighborhood of 30 to 45 ma., depending on whether the 807 is running straight through or doubling. Loaded, the plate input runs about 70 watts when doubling and 50 watts at straight-through.

The proper ratio of plate voltage to plate current for an 807 operating as a straight amplifier at 750 volts requires a tuning capacity of better than $1\frac{1}{2}$ μ fd. per meter or resonance for a Q of 12.¹ If the plate is tapped down on the coil,² a better impedance match can be obtained using the values called for here and greater loading may be obtained on 3.5 Mc. or 7 Mc. straight amplifier operation. Of course, greater loading than shown may be used, but no increase in output will be gained, as indicated by a detuning of the plate tank circuit. The West Coast was worked on 7 Mc., operating the amplifier straight through and as a doubler, and there isn't a great difference in output one way or the other. Since the tuning is not as sharp for doubler operation, the transmitter and antenna coupler may be tuned for the center of either the present 7- or 14-Mc. bands, after which only the oscillator grid tuning need be varied for changing frequency. A neon bulb at the antenna tuning condenser shows no change with this type of operation. For straight amplifier operation it will be necessary to retune all circuits approximately every 100 kc., but the output will be greater.

Performance

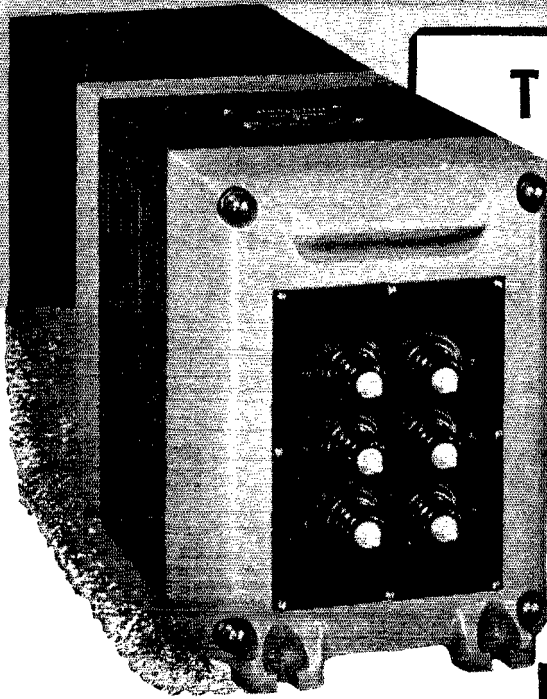
The antenna used with this transmitter was 67 feet long, center fed, and the antenna coupler was of the swinging-link type. Over a period of 6

(Continued on page 126)

¹ The Radio Amateur's Handbook (Power Amplifier Operation).

² Goodman, "A 125-Watt Four-Band Transmitter," QST, Dec., 1945.

*For Outstanding
Performance!*



THORDARSON

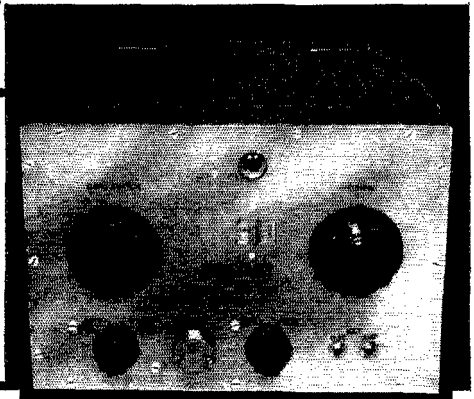
Transformers

Ham rigs "Powered by Thordarson" have been creating and breaking DX records since radio began. Designs now available to match the newest tubes. Power your new rig with Thordarson...visit your Thordarson jobber today!

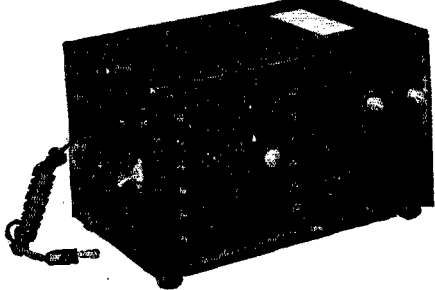
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SIGNAL SHIFTER

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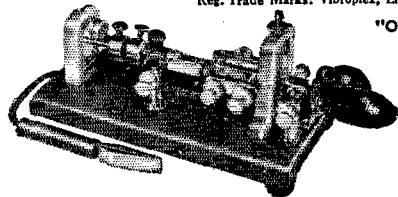
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For downright easy sending -- there's nothing to equal this "Original" Deluxe Vibroplex key. Famous the world over for its effortless action, superior signals and ease of operation. The only key equipped with PATENTED JEWEL MOVEMENT. Actually cuts sending effort in half, prevents "glass" arm and develops the highest degree of sending skill attainable. Try this labor-saving key and you will agree with thousands of other operators that it is the finest key you ever used. Polished chromium parts and base. Red switch knob, finger and thumb piece, DIE CUT contacts and main spring. 3/16th contacts. Circuit closer, cord and wedge. Also available in "Blue Racer" and "Lightning Bug" models. Order yours to-day! Money order or registered mail. FREE catalog.



The "BUG" Trade Mark identifies the Genuine Vibroplex. Accept No Substitute

THE VIBROPLEX CO., Inc.
 833 Broadway New York 3, N. Y.

(Continued from page 124)

weeks, 36 states, 6 Canadian districts and 10 countries in 5 continents were worked with average reports. This transmitter was also used in the July ORS party for 33 hours continuous operation, and for 26 hours at reduced input in the June Field Day. During Field Day Tests, the VR-150s really earned their place in the rig, compensating for line voltage fluctuations from the gasoline-driven generator. Excellent reports have been received on the air from members of the ARRL Headquarters gang, who, it might be mentioned, are about the most critical group of hams this side of Purgatory, when the question is "QRI?"

A.R.R.L. QSL BUREAU

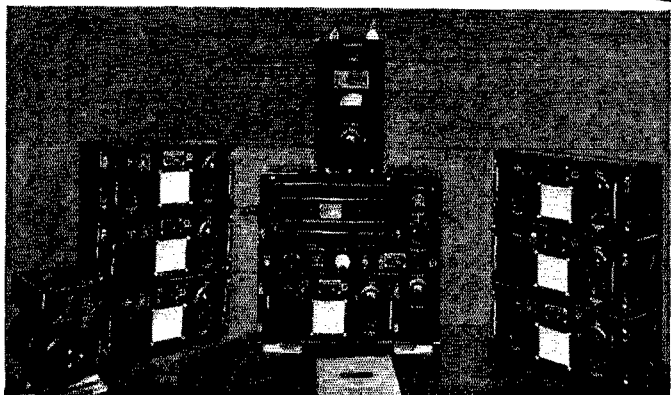
FOR THE convenience of American and Canadian amateurs, the League maintains a QSL-card distributing system which operates through volunteer "District QSL Managers" in each call area. To secure such foreign cards as may be received for you, send your district manager a standard No. 10 stamped self-addressed 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 — Jules T. Steiger, W1BGY, 231 Meadow St., Wilimansett, Mass.
- W2 — Henry W. Yahne, W2SN, Lake Ave., Helmetta, N. J.
- W3 — Maurice W. Downs, W3WU, 1311 Sheridan St., N. W., Washington 11, D. C.
- W4 — Edward J. Collins, W4MS, 1215 North 12th Ave., Pensacola, Fla.
- W5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
- W6 — Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.
- W7 — Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.
- W8 — Fred W. Allen, W8AER, 1959 Riverside Drive, Dayton 5, Ohio.
- W9 — F. Claude Moore, W9HLF, 1024 Henrietta St., Pekin, Ill.
- W0 — Alva A. Smith, W9DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
- VE2 — C. W. Skarstedt, VE2DR, 3821 Girouard Ave., Montreal 28, P. Q.
- VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
- VE4 — C. J. Campbell, VE4CC, 276 Ash St., Winnipeg, Manitoba.
- VE5 — J. A. Bettin, VE5YR, P. O. Box 55, Togo, 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.
- K4, KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.
- K5, KZ5 — Signal Officer, KZ5AA, Quarry Heights, Canal Zone.
- K7, KL7 — J. W. McKinley, KL7CK, Box 1533, Juneau, Alaska.

SUN RADIO The Home Of Nationally Known Radio Parts

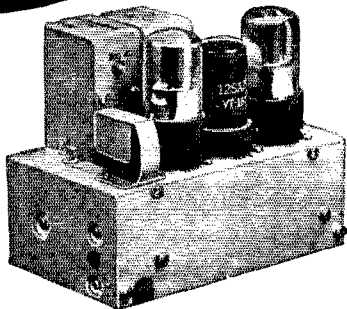
**WAR SURPLUS
EQUIPMENT--**

**At A Fraction of Their
Original Government Cost**



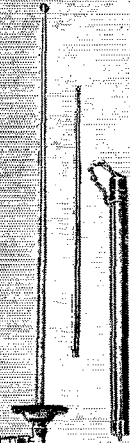
TRANSMITTER BC-375E

Here is the famous airborne transmitter made by General Electric Co. It's ideal for hams. Has 7 tuning units, antenna tuning unit, heavy duty 24-38 volt dynamotor. Complete with tubes but less cables. F.O.B. Boston or Chicago. Must be prepaid in full. Yours for . . . **\$46.45**



**CRYSTAL FREQUENCY
INDICATOR AND M.E.W. UNIT**

A plug-in sub-assembly of the AN type T-47/ART-13 Radio Transmitter. Consists of a Crystal (200 kc) Controlled Oscillator, and 50 KC Multi-vibrator Circuit, and Audio (1000 C.P.S.) Oscillator. Comes with TWO 12 SL 7 GT and One 12SA7 tubes. Less Plate Supply. Over-all dim. 6" x 3 1/2" x 5" . . . **\$7.95**



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ANTENNAS**

Telescopic Aerial—15 inches to 45 inches. . . . **99¢**

22-inch Aerial for 150 to 200 Mc.—with cable connector. **\$1.69**

Telescopic Aerial—from 14 inches to 9 feet, 6 inches. **\$2.69**

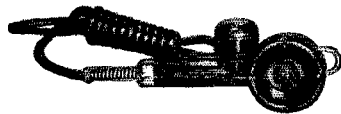
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U. S. Army brand new single button carbon hand microphone "Shure" type with push to talk switch. Enclose 30¢ to cover mailing and handling.

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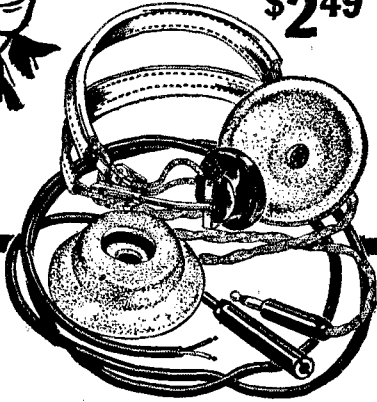
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All items F.O.B., Washington, D. C. All orders \$30.00 or less cash with order. Above \$30.00, 25 percent with order balance C.O.D. Foreign orders cash with all orders plus exchange rate.



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2640 St. George St., Los Angeles 27, Calif.

Sweepstakes

(Continued from page 31)

Additional Club-Member Awards

Certificate awards (besides the 'phone and telegraph Section awards) will be made through each club where three or more individual club members, or new hams invited and reported by such a club, in addition to sending a contest report, have their club secretary write Hq. listing their individual calls and scores and the total of such scores. Only the aggregate of scores confirmed by ARRL receipt of Contest Logs shall count for the club. If there are both club 'phone and c.w. entries ARRL will provide two certificate awards for the club to give its leading members. The sum of the scores of all club participants ('phone and c.w.) confirmed by logs will be added by the secretary, to count for the club!

A gavel with engraved sterling-silver band is offered as an award to that club whose officers or activities manager submit the greatest collective score from "SS" logs. Club members must send in full reports either direct or through the secretary to substantiate any club's claim on the gavel award!

Report Results

Report⁵ to ARRL, West Hartford, Conn., as soon as the contest is over. Use the log form shown in the example. List all operators⁶ whose work at your station is responsible for any part of the score.

All active ham operators are invited to take part and report. You will work a new bunch of stations, make new records for your station, get QSL cards (be sure to send one for each QSO), have a lot of fun, meet new friends, and perhaps rate an ARRL award at the conclusion. Do your best operating. **MAIL YOUR REPORT IMMEDIATELY AT THE END OF THE CONTEST TO INSURE THAT YOUR RESULTS ARE CREDITED.**

⁵ All hams are requested to submit lists, even if they only show a small score, on a postal to help support claims from other stations.

⁶ The highest individually-attained score of any one of the operators of amateur stations having more than one operator is the official score for such a station. The summary of scores must show all stations worked by all operators however, circling the entries of stations and/or Sections that cannot count in the official total. Awards will be based on the official total and will be made to the individual operator accredited with this total. To show the possible scores that can be built up by several operators at one station, such scores (all Sections listed by all points listed) may be shown parenthetically after the "official" score that counts toward a possible award.

Strays

"They 'dood' it — and is our face red too!"
Department:

Lafayette Radio, Inc., Boston, in a bulletin on a surplus Signal Corps receiver, states that the power requirements are "300-volts d.c. at 100-150 Mc." — *WINXJ*

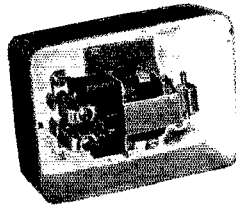
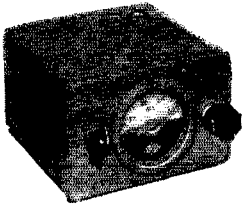
In May *QST*, W8ICO's test-oscillator description reads, "250 volts at 65 Mc. will handle the requirements." — *F. R. Crownfield, jr.*

V.h.f. auroral influence!

The Radio Association of Western New York is holding their annual hamfest, Saturday, November 9, 1946, at the Markeen Hotel, Buffalo, N. Y. Program starts at 2 p.m., turkey dinner at 7:30 p.m., followed by prizes, show and dancing.

**10-11 METER
GON-SET
CONVERTER**

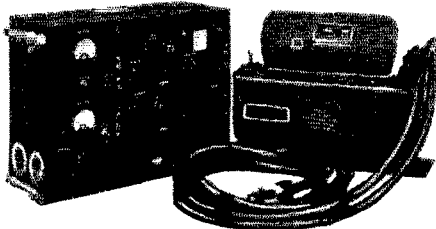
For fixed or mobile use. Built-in pre-selection. Precision design and construction. Tubes—6AK5—RF, 6AK5—Mixer, 6C4—OSC. OB2 Voltage Regulator. Complete handspread 27.30 MC. Output 1500-2000 KC. 8-1 Vernier. Illuminated dial. Connecting cables included. Weight 2 lbs. Single dial control. On-Off switch provided. Price complete. **\$39.95.** Special Noise Silencer, **\$8.25.** FM Converter, **\$9.97.**



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4209 Special 115 Volt 60 Cycle Motor Starting Type. Large 30 amp. Contacts DPST — **\$4.95.**

Ideal for primary circuits in high-power transmitters. Has many useful applications. Mycalex insulated. Black enameled steel case and cover.

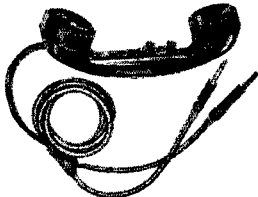


NEW BC 223A TRANSMITTER and PE 103A GENEMOTOR

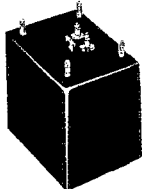
TRANSMITTER—801 Oscillator and 801 Power Amplifier. 2-6 Modulators and 1-46 Speech Amplifier. 4 XTAL. Frequencies and Master Oscillator on Selector Switch. 10 to 30 watts output. Self-Contained Antenna Tuning Unit. FREQUENCY—2000 to 2000 KC—Easily converted. Black wrinkle finish. POWER UNIT—6 or 12 volt DC Input. 500 Volts at .160 amp. or more output. Combination is ideal for ham rig or marine transmitter. All for **\$29.95 F.O.B. Los Angeles.**



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TYPE USED IN TANKS .95



AMERICAN MICROPHONE
Hand Set H22A/U—Mike, 100 ohm. Receiver. 3500 ohm — **\$3.95.**



SMOOTHING CHOKE
CASED 12HY 350 MIL. 40 ohm..... **\$3.95**

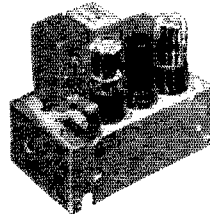
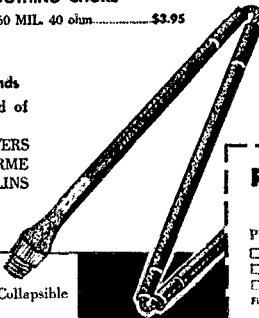
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- PIERSON MILLEN COLLINS

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11 Ft. Long — **\$1.35.**



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Component for ART-13 Collins Transmitter. Used for frequency meter—2-12SL7 and 1-12SA7 Tubes. Complete with Tubes Less Xtal **\$4.95.**



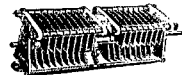
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**NATIONAL BRAND
TRANSMITTING TUBES**

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TYPE 872A **\$7.75 pr., \$3.95 ea.**



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Johnson—200FD200-Max. 13 Min. per Section—.045 Spacing—1500 Volt—**\$2.43.**

SINGLE SECTION
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DUAL SECTION
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Each Section 100 Max. 6 Min. 500 Volt..... **.59**
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Filter Cond. <input type="checkbox"/> Aerovox 15 mfd.	Variable Cond. <input type="checkbox"/> Johnson 200FD20	<input type="checkbox"/> Whip Antenna
<input type="checkbox"/> Aerovox 2 mfd.	<input type="checkbox"/> Johnson 250H15	<input type="checkbox"/> Type 872A Tube
<input type="checkbox"/> Sprague 2 mfd.	<input type="checkbox"/> Telradia 100	<input type="checkbox"/> Type 805 Tube
	<input type="checkbox"/> Telradia 40	
	<input type="checkbox"/> Telradia 15	

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They're light in weight, yet extremely rugged. Q factor is amazingly high, due to the almost total absence of insulating material in the electrical field.

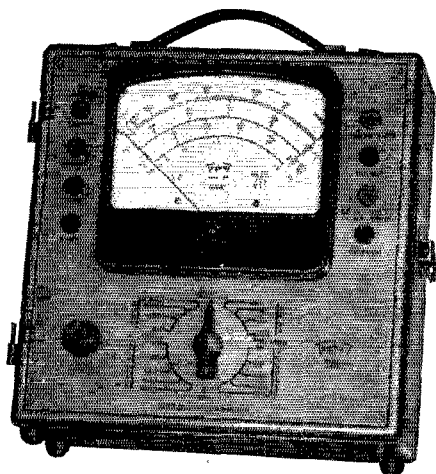
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Voltage: 5 D.C. 0-10-50-250-500-1000 at 25000 ohms per volt.
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Current: 4 A.C. 0-.5-1-5-10 amp. 6 D.C. 0-50 microamperes—
0-1-10-50-250 milliamperes—0-10 amperes.
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6 Decibel -10 to +15, +29, +43, +49, +55.
Output Condenser in series with A.C. volt ranges.

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All these features are incorporated in a smart looking gray crackle chrome trimmed metal cabinet. You will be proud to own a NC-46. Priced with a speaker (Plus State Tax)..... **\$107.40**

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All four of our "HAM SHACKS" carry a complete line of Antennas and Antenna accessories. Look over the list below and fill your needs.

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10 Meter Beams — 3-Element adjustable complete with Ladder Assembly..... **\$30.00**

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Hand-operated turntable for Rotary Beams will support largest type of Beam Assembly. Construction will permit full 360 rotation in either direction..... **\$21.90**

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4" — 0-1..... **6.94**
4" — 0-10, 0-25, 0-50, 0-75, 0-100, 0-200, 0-250, 0-300, 0-500..... **6.60**

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PREMAX Rotary Beam Kit RB-6109. Extremely light assembled weight, one man can erect it. Small mounting space required. Adjustable for use on 6-10-11 meter bands.

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★ ★ ★

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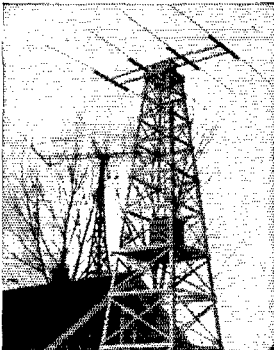
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Priced for the amateur.

Write for Bulletin T-101

SKY-LANE PRODUCTS

IRONWOOD, MICHIGAN

Foreign Notes

(Continued from page 38)

GREAT BRITAIN

September 1st saw the return of part of "eighty" to G amateurs, the frequencies 3500-3635 and 3685-3800 kc. becoming available on that date. The missing segment is not available under the Cairo regulations. With the full release of the 1715-1800-kc. band, British amateurs have most of the Cairo allocations (except, of course, the not-yet-retained halves of 40 and 20).

Portable privileges are again available in Great Britain, upon payment of an additional 10s. per year, with a power limit of 25 watts. The indicator /PP will be used. It is now also possible, as a result of representations made by R.S.G.B., for an amateur license to carry an alternate address, and when operating from that address the licensee must sign the designator /A. There is no charge for this privilege.

The VT-127-A

(Continued from page 37)

band, with correspondingly improved performance. The experimental equipment described herein was operated only in the 144-148-Mc. band in order to determine the operating characteristics of the tube under the most severe conditions. Calculated operating conditions for medium-frequency operation are given in Table III. In this table the power output represents tube output, and the actual useful power output would be less than this by the circuit losses.

Amateurs will find the VT-127-A a quite versatile triode for medium-power applications, and since it is available at a very low price through the surplus disposal channels it should find many uses in numerous amateur stations.

About the Author

• Gomer L. Davies, ex-W8AFW, joined our ranks in 1926. During the intervening years he strayed from the fold, doing stints with the Bureau of Standards (1923-1933), and the Washington Institute of Technology, as engineer, director of engineering and general manager (1933-1945). He is now actively engaged as president of the Davies Laboratories, Inc. Mr. Davies received his B.S. degree in 1929 from the Case School of Applied Science, Cleveland. His present-day pursuits are radio research and development.

**SWITCH
TO SAFETY!**

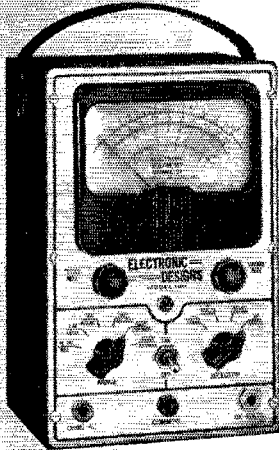


You Can Now SIGNAL TRACE with a "Pencil"*

PROVAC

featuring **EDIPROBE**

*Pencil-thin RF probe



The PROVAC electronic vacuum tube volt-ohmmeter permits the laboratory engineer and radio service technician to measure every voltage required in the design laboratory and radio servicing.

Measure R.F. with the same ease as measuring D.C. with the latest development in R.F. probes. It is no longer necessary to guess at which point the signal stops.

DC Ranges: 0 to 3-10-30-100-300 and 1,000 volts. All ranges have a constant input resistance of 11,000,000 ohms. Accuracy 3% ±

AC Ranges: 0 to 10-30-100-300 and 1,000 volts. Sensitivity: 1,000 ohms per volt. Accuracy 5% ±

Electronic Ohmmeter Ranges: 0-1,000 ohms, 0-10,000 ohms, 0-100,000 ohms, 0-1 megohm, 0-10 megohms, and 0-1,000 megohms.

R.F. Voltage ranges 0/3-10-30-50 Volts to be measured on 100 Volt range.

Bridge Amplifier Circuit Meter individually calibrated for use with set of test leads, signal tracer probe and batteries.

Features of the EDIPROBE

- Smallest R.F. probe made.
- Frequency range 60 Cycles to over 100 Megacycles.
- Effective circuit loading: 3 mmf. and 1 megohm.
- Can be used as an output meter.
- Can be used for measuring decibels.
- Checks condensers for open circuit.
- Works with any standard V.T.V.M.

PROVAC
Model ED 100 (with EDIPROBE) **\$59.50** VTVM Model 100 (without probe) **\$52.50** EDIPROBE (RF Probe) **\$9.85**

Jobbers and dealers write for exclusive Territory Distribution. Orders addressed to us will be credited to your nearest dealer.

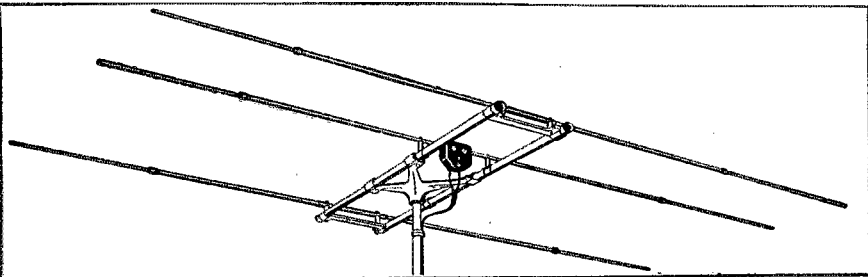
Write Dept. QK for FREE Technical Manual



EDIPROBE
\$9.85

ELECTRONIC DESIGNS, Inc.

IRVINGTON, NEW YORK



S/C LABS ADJUSTABLE ROTARY BEAM KITS 702A, 702B, 702C

Type 702A 27 mc to 29.7 mc (10 and 11 meter band).....\$44.95
Type 702B 50 mc to 54 mc (6 meter band)..... 29.95
Type 702C 144 mc to 148 mc (2 meter band)..... 24.50

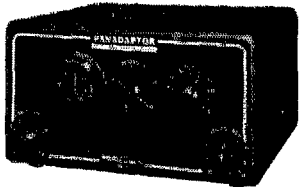
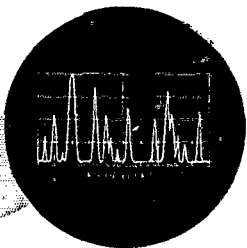
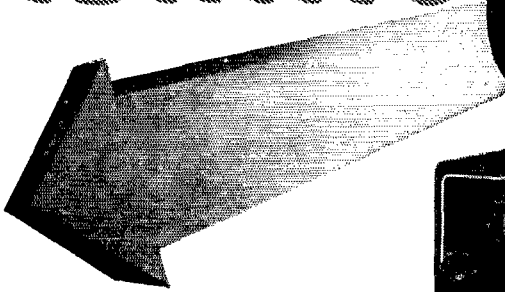
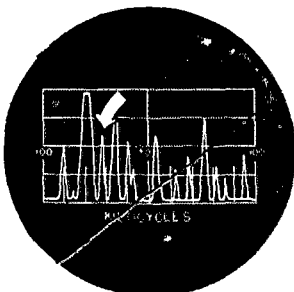
The new S/C LABS THREE ELEMENT BEAM presents a distinct high-gain directive antenna designed for 2, 6, and 10 meter amateur bands, adjustable in every respect and sound in mechanical design. Electrically and mechanically engineered to give the best in efficiency. The antenna is constructed of the finest grade aluminum, weight of entire beam is less than 15 lbs.

PRECISION AND ADJUSTABLE ANTENNA

Type 701A (23-44 mc) 10-meter amateur..... \$8.95
Type 701B (44-88 mc) Television 5 meter amateur..... 7.95
Type 701C (88-148 mc) FM 2 meter amateur..... 7.45
In stock, all types of coaxial cables, transmission lines and hookup wire.
SEE YOUR LOCAL DEALER.

S/C LABORATORIES, Inc., Dept. Q, 20-22 Van Wagenen St., Newark 4, N. J.

NO FISHING



Your fishing days are over O.M. — that is — fishing for replies to your CQs. A glance at the Panoramic screen shows band activity just before CQing and immediately after your QRT. Chances are that new signal between the two strong ones is the reply to your call. With just a quick twist of your receiver tuning dial—to

center the pip—you have your answer. Only with PANORAMIC Reception can you see at once each new signal as it comes on the air. Many of the PANADAPTOR'S equally remarkable features have been put down in a Handbook which you will find at your dealer when you go in for a demonstration of the PANADAPTOR.

PANADAPTOR... the seeing eye of radio. Buy it—then try to do without it!

The Panadaptor Model PCA-2 is a 10 tube electronically tuned superheterodyne with a self contained scope, complete with accessories and full instructions, for 115V, 50-60 cycle operation at only \$99.75 net. One Year Guarantee.

PANORAMIC

CABLE ADDRESS: PANORAMIC, NEW YORK

RADIO CORPORATION

242 250 WEST 55TH ST. New York 11, N.Y.

Exclusive Canadian Representative: Canadian Marconi, Ltd.

HAM SPECIALS

From Ham Headquarters

Order	Description	Net Price
.....	Panoramic Adapter PCA-2.....	\$99.75 Each
.....	Cabinet: 24 1/2" Wide, 29 1/4" Deep, 7 1/2" High, Gray Crackle Finish, Ideal for Transmitter.....	90.00 Each
.....	Choke: 300 MA Swing 9-19 henry. Smooth 9 henry.....	7.50 Pair
.....	Code Oscillator: Complete with Speaker, Telegraph Operated, MS-700.....	9.95 Each
.....	Coil Assembly: R.F. from Army Receiver BC-224M.....	.75 Each
.....	Condenser: 1x.1x.1 Mfd. 600-Volt Tobe Metal Case, Bathub.....	.49 Each
.....	Condenser: 100 MMF. Midget Variable.....	.50 Each
.....	Condenser: 2 Mfd. 1000-Volt, Oil Filled, Round Can, C.D.....	1.50 Each
.....	Condenser: 10 Mfd. 1400-Volt, Oil Filled, Rectangular Type.....	6.75 Each
.....	Condenser: 10 Mfd. 1030-Volt, Oil Filled, Rectangular Type.....	6.75 Each
.....	Condenser: 3 Mfd. 2000-Volt, Oil Filled, Rectangular Type.....	3.25 Each
.....	Condenser: 50 MMF.....	.50 Each
.....	Condenser: 3x3 Mfd. 600-Volt Oil Filled, Rectangular Type.....	.99 Each
.....	Condenser: 4 Mfd. 600-Volt C.D. Aluminum Can, Oil Filled.....	1.50 Each
.....	Converter: Gossett New 10-11 Meter, 20 Meters or 6 Meters.....	39.95 Each
.....	Crystals: IN 27.....	.50 Each
.....	Handy Talkie: Complete with Batteries, 3885 K.C. Frequency.....	49.50 Each
.....	Chassis: for Handy Talkie 611F.....	10.00 Each
.....	Meter: Westinghouse 2" D.C. M.A. 0-	

Order	Description	Net Price
.....	10-25-50-100-150-200-250-300-400-500 Meter: Burlington, 2" A.C. 0-150 2"	\$3.50 Each
.....	Round.....	2.25 Each
.....	Meter: Time Hour 110-Volt 60-Cycle.....	3.50 Each
MANY OTHER METERS UPON REQUEST		
.....	Mike: 117B Carbon Hand Mike.....	2.50 Each
.....	Receiver: BC 342 Frequency 200 to 500 KC. — 1500 KC — 20 MC AS 15.....	60.00 Each
.....	Relay: D.P.D.T. 6-Volt D.C. Coils, Leach 1/4" Silver Contact.....	1.75 Each
.....	Transformer: General Electric Modulation — 200 Watts.....	6.00 Each
.....	Transformer: Filament, 6.3 Volt at 1 3/5 Amps. Small Round.....	Each
.....	Transmitter: BC-223 Frequency 2000 to 3000 K.C.....	25.00 Each
.....	Transmitter and Receiver: BC-1335 F.M. Ideal for 10 Meter Mobile Operation 6 or 12-Volt input, 1 1/2 Watts Output. Dimensions 12 1/4" Long, 13 3/4" Deep, 6 1/4" High. Ready to go with Telephone Headset and (3) Crystals for 10-Meter Band.....	53.00 Each
MAIL ORDERS PROMPTLY FILLED		
Amateurs to Serve You		
(20% Must Accompany All C. O. D. Orders)		
Write to Dept. QST		
W6SCQ • W6UXN • W6NAT • W6VHZ • W6VWU		
WRITE FOR FREE BULLETIN #29		

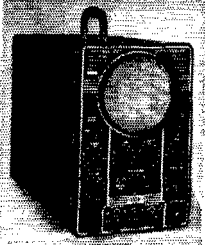
Radio Products Sales Company

238 WEST 15TH STREET
LOS ANGELES 15, CALIFORNIA
PProspect 7471

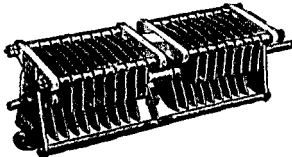
HELLO and GOOD BUYS!

I promised 'em to you and HERE THEY ARE!

DU MONT 274 5" OSCILLOSCOPE



For the lab, shack, and repair shop
New, accurate, low priced
5" scope.
14" x 8 3/4" x 19 3/4" \$99.50
115V 50-60 cycles.



JOHNSON 'E' DUAL CONDENSER

Stators mounted above to reduce capacity to ground. Heavy construction. 4500V rating.

Type	Capacity		Length	Price
	Max.	Min.		
50ED45	51	9	6 5/8"	4.77
70ED45	73	11	7 1/8"	5.37
100ED45	100	15	9 1/2"	6.18

THE PIXY SAVES YOU MONEY WITH THESE SPECIALS

- 807 Beam Power Tube JAN.....\$1.39
- 3 for 3.89
- Johnson 10 QS Antenna..... 5.85
- Johnson 20 QS Antenna..... 9.90
- Filter Condenser 4 mfd, 600 V,
GE Pyranol95
- 3 for 2.69
- Filter Condenser 10 mfd,
600 V, GE Pyranol..... 1.45
- Westinghouse 0-500 ma meter,
DC, 3" 4.75
- Brush Xtal phone, pair, type A 7.20
- Brush Xtal phone, single,
type B 3.99
- Amphenol 300 ohm twin lead
per foot03
- Cordwell Butterfly condensers,
14-11 mmf 2.40
- National ACN Dial..... 3.00
- Guardian adjustable overload
relay, X-100 7.70
- B & W Cadx connector..... 5.00



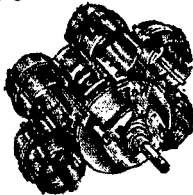
KENYON Modulation Transformer!

T-465 Max. Audio 300 W.
Pri. 9000 Ohms P to P.
Sec. 8000 ohms—250 ma.
6000—300 ma. \$14.50
4000—370 ma.

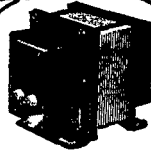
T-470 Max. Audio 500 W.
Pri. 9000 ohms P to P.
Sec. 8000 ohms—350 ma.
6000—400 ma. \$24.50
5000—500 ma.

Trade Mark

B & W 75W TURRET



Complete assembly mounted on positive action switch arranged for panel mounting. Specify end (JTCL) or center (JTCL) linked. Covers 80, 40, 20, 15, and 10 meters. \$938



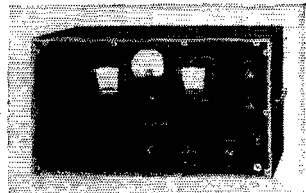
Westinghouse Filter Choke

Husky, fully shielded. 12 by @ 240 ma. Steatite insulated terminals.

\$245

Pixy specials, every one. Items you need at a price you can pay. I may be nameless but I sure know what hams want. Next month is the month somebody — a ham — wins a Super-Pro. Who will it be? Be sure to read December QST!

HAMMARLUND HQ 120-X



LIKE NEW! Were only used in a lab to test xtals. Reconditioned inside and out. .54-31 mc in 6 bands. Cal. band spread. Xtal filter, AVC, noise limiter, 12 tubes. Relay rack mounting. Limited quantity.
An amazing buy at— \$12875 less speaker.

Special speaker \$4.75



MILLEN 50 WATT EXCITER

Get on the air at LOW COST. Teams up perfectly with Sonar FM Exciter for 10 meter phone. Used by hams everywhere. Get yours now! Price includes set of coils for band specified less tubes. \$3750

Mail orders promptly filled — Please enclose 25% Deposit

SUN RADIO

& ELECTRONICS Co., Inc.

ESTABLISHED 1922

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EN MEXICO

La RADIOTECNICA, S. A. tiene en la Ciudad de México, uno de los más modernos laboratorios para el tallado de cristales de cuarzo y un fino equipo para la medición de frecuencias que es el primero de su clase en la América Latina. Manejado por ingenieros con más de 15 años de experiencia, nuestros productos son garantizados sin reserva.

Unidades de Cristales

Ofrecemos 16 TIPOS DISTINTOS DE UNIDADES DE CRISTALES DE CUARZO con una exactitud como se puede conseguir en cualquier otro lugar. Cualquiera que sea su necesidad, podremos surtirlos dentro de 24 horas si es necesario, en prácticamente todos los tipos desde la más barata unidad para afionado hasta la más exacta unidad usada en las estaciones "broadcast," de aviación o comerciales. Todos los precios se han establecido equitativamente de acuerdo con el trabajo técnico especializado que requiere y material que se usa. Por ejemplo: Unidades producidas de 150 a 350 pesos. Otras unidades comerciales de 25 a 115 pesos. Unidades para afionados de 3.5, 7.0 o 14 megacelos para usar con portabulbos octales o de 5 entradas a 15 pesos. Precios en moneda nacional.

Mediciones de Frecuencia

También ofrecemos un servicio de medición de frecuencias para las estaciones dentro del radio audible en la Ciudad de México. A petición hacemos mediciones sencillas, o por contrato anual podemos dar servicio diario, semanal, bimensual, mensual o trimestral. Todas las mediciones son hechas con referencia a un patron primario de frecuencia y equipo asociado de la General Radio Company y este comparado con la estación W W V de la National Bureau of Standards en Washington, D. C. Las mediciones en México, son hechas en colaboración con la Secretaría de Comunicaciones y Obras Públicas. Si desea información completa, sírvase escribirnos directamente.

RADIOTECNICA, S.A.

CIPRES 164

MEXICO, D.F.

RADIO COURSES

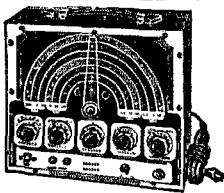
- RADIO OPERATING
- RADIO SERVICING

- CODE
- ELECTRONICS

• REFRIGERATION SERVICING

Personal Counselling Services for Veterans
Write for Latest Trade & Technical Catalog

Y. M. C. A. TRADE & TECHNICAL SCHOOLS
4 W. 64th Street New York City



FAST DELIVERY!
APPROVED Model A-200
SIGNAL GENERATOR
• 8 R.F. BANDS
100-250 Kc., 190-500 Kc.,
420-1000 Kc., 1000-3000 Kc.,
3 Mc.-9 Mc., 9 Mc.-25 Mc.,
18 Mc.-50 Mc., 27 Mc.-75 Mc.
Net Price — \$49.50
25% deposit with C.O.D. orders
SCENIC RADIO
53 Park Pl. — Dept. Q — New York 7

Ham Post!

George E. Burghard W-2GEC and
Joseph J. Stantley EX-W2SC in busi-
ness since 1919 invite you to visit their
HAM DEPT. with Payne W2LP and
Andy W2BPK. Write Dept. 2.



CONTINENTAL
SALES COMPANY

195-197 CENTRAL AVENUE, NEWARK 4, N. J.

The World Above 50 Mc.

(Continued from page 65)

evening from his high elevation at Bedford, N. Y. He has been heard on 235 Mc. by W2DZA at Teaneck, N.J., and by W2LXO at West Orange, N.J. He will continue on this schedule from the tower location as long as weather permits, and will carry on from his home location at Rye, N. Y., thereafter.

V.h.f. Reflections from Meteors?

Did you read the letter from W2IXK in this month's "Correspondence from Members" column? We invite your attention to his interesting report, which points to the possibility of still another propagation angle which will bear investigating. Any observations along this line are always welcomed by this department.

Strays

W3QP says *Brazos Bill's* suggestion in July "Strays" re use of XXYL complicates matters. He's for using XYF. Well, OMs, how about striking a compromise and dedicating XXYL to the use of young squirts whose YLs have given them the double-cross?

W4FEE, J. A. Chumley, is probably one of the few hams who have ever rejoiced over the possession of a "pink ticket."

After plenty of combat service, W4FEE found the world at peace, himself in the Canal Zone and still in the Army, and hams becoming hams again and not merely something of interest to draft boards. He applied to the military authorities for an amateur call and permission to work in the ham bands. All OK, they said, but you will have to present proof that you have heretofore held a ham call. No licenses were to be found but an intensive hunt turned up a "pink ticket" somewhat faded by several dunkings in the Pacific but legibly enough requesting one J. A. Chumley, W4FEE, to explain to the FCC how come he was operating outside the ham bands with a r.a.c. note?

This was solemnly presented as evidence and just as solemnly accepted. W4FEE is now KZ5AD, and working them high, wide and handsome.

— Benton White, W4PL

"New Apparatus" Department — Quoting *The Saturday Evening Post*, June 8, 1946: "A motor policeman will have only to tune in his microphone . . . Through a remarkable automatic apparatus, it will instantly relay his broadcast to every patrol car in the vicinity."

W1LIG, W5NM, W9GTL

FOR TOUGH JOBS

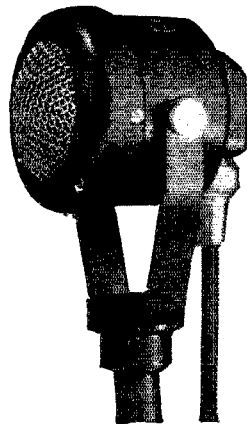
where an ordinary mike won't do

TURNER Model 99 Dynamic

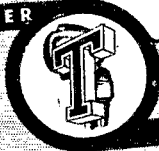
Here's a truly professional unit for professional results from your rig. The Turner Model 99 delivers crisp and clear under the most difficult operating conditions. Its precision built dynamic circuit withstands severe changes in climate and temperature with no loss of performance level. Response stays flat within $\pm 5\text{DB}$ from 30 to 9,000 cycles. Adjustable saddle fits any standard mike stand and allows semi- or non-directional operation. Gun metal type finish. Available in all standard impedances with level of -52DB at high impedance. Complete with 20 ft. removable cable set.

ASK YOUR DEALER OR WRITE

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TURNER



TURNER

Pioneers

in the communications field

Microphones

THE TURNER COMPANY
917 17th Street N.E.
CEDAR RAPIDS, IOWA

Complete Microphone Catalog
Write for Your Free Copy

Crystals licensed under patents of the Brush Development Co.

PREMAX

Vertical Antennas

Telescoping, Adjustable Tubular Types That Meet Every DX Requirement for the Amateur



WIDELY known and accepted in amateur, commercial and military fields for their dependable performance, Premax Tubular Metal Antennas are available to meet every requirement. Sizes range from 6 feet to 35 feet high and may be had in steel, aluminum, stainless or monel . . . with suitable mountings for any installation.

Ask your Radio Jobber for details and prices of these outstanding Antennas and Mountings.

Premax Products

Division Chisholm-Ryder Co., Inc.
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At
Your
Jobber

A Buy-word for Excellence

40

YEARS

DEPENDABILITY

1906

BRACH

1946

Special-purpose transmitting antennas designed for volume production to your own specifications. Collapsible—sectional—direction finding—radar and coaxial type. All sizes, lengths and materials. Consult us on your needs.

PUR-A-TONE
Reg. Trade Mark
ANTENNAS

ALL TYPES FOR

**AUTOS
HOMES
MARINE**

A.M. — F.M. —
TELEVISION

L. S. BRACH MFG. CORP.

200 CENTRAL AVENUE NEWARK, N. J.

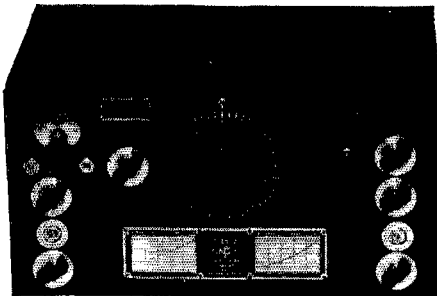


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**NATIONAL "HRO-5TA"
COMMUNICATIONS RECEIVER**

One of the Many "Bests" carried
by Kierulff's Ham Shack for you!



Try us first for
that hard-to-
get part

Do you want to be on our
mailing list? Drop a card
to Dept. BT with your name
and address.



Our Staff
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THE RADIO AMATEUR'S LIBRARY

These are the publications which every Amateur needs. They form a complete reference library for the Amateur Radio field; are authoritative, accurate and up to date.



<i>Title</i>	<i>Price</i>
<i>QST</i>	\$2.50 per year*
Operating an Amateur Radio Station	Free to members; to others 10c
The Radio Amateur's Handbook.....	\$1.00**
The Log.....	35c each; 3 for \$1.00
How to Become a Radio Amateur.....	25c
The Radio Amateur's License Manual.....	25c
Hints & Kinks for the Radio Amateur.....	50c
Lightning Calculators:	
a. Radio (Type A).....	\$1.00
b. Ohm's Law (Type B).....	\$1.00
A.R.R.L. Antenna Book.....	50c
The Minilog.....	25c
Learning the Radiotelegraph Code.....	25c
A Course in Radio Fundamentals.....	50c

* In the United States and Possessions—
other Countries \$3.00 per year.

** Postpaid in Continental U. S. A.—
\$1.50, postpaid, elsewhere. (*No stamps, please*)



THE AMERICAN RADIO RELAY LEAGUE, INC.

WEST HARTFORD 7, CONNECTICUT

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 30c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30c rate. Provisions of paragraphs (1), (2), (4) and (5), apply to all advertising in this column regardless of which rate may apply.

(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 vouch 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.

COAXIAL cable, RG8/U, 7c per ft., RG59/U, 6c per ft. See QST April, 1946, P. 51 for detailed description. Coaxial Cable Co., Box 19, Woodside, N. Y.

FOR SALE: transmitter, National 600 W, 'phone-c-w, 80, 40, 20, 10 meters. Complete \$700 or best offer. (Refused Govt. offer of \$1030). E. W. Merideth, M.D., W9JYS, 1432 Granville Ave., Chicago 20, Ill.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. One dollar each. Rex. Bassett, Inc., Ft. Lauderdale, Fla.

QSLs in colors. Stamp for samples. Glenn Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

W2PTS is former W8CJL.

FOR SALE: transmitter receiver combination, mobile type, for 10, 40 and 80-meter bands. \$125. To buy: we pay best prices for National, Hammarlund, Western Electric, Collins a/c, and Hallicraft transmitter and receivers. GI Radio Exchange, Box 431, Coral Gables, Florida.

WE have the machinery, skill and the desire to do an excellent job on that new equipment you are planning or building. We cut any size round or oblong holes for meters, speakers, dials, and transformers. We build special cabinets, parts for dial mechanisms, rotary beams, etc. We engrave or letter panels, dials, and meters. We duplicate most equipment in Handbook and QST. Write for information and prices. S & G Instrument Co., Box 1461, Tulsa 1, Okla.

WRL Transmitting kits—15, 35, 70, and 150-watt units—low priced. All parts and receiver, parts and recon. course. Leo offers best trade-in deal, and easy time payment plan. One of the country's largest parts supply houses. Write today for free catalog, special radio map offer, tube-base calculator offer, and other items. Leo, at World Radio Labs, Dept. HA, Council Bluffs, Iowa.

RADIO tubes, parts, condensers, free bargain lists. Potter, 1314 McGee, Kansas City 6, Mo.

COMMERCIAL radio operators examination questions-and-answers. One dollar per element. G. C. Waller, W5ATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

OLD amateur, commercial radio sets, parts, catalogs, wanted. Will trade new gear or pay cash. McMurdo Silver, Simsbury, Conn.

AMATEUR radio licenses. Complete code and theory preparation for passing amateur radio examinations. Home study course. American Radio Institute, Inc., 101 West 63rd St. New York City.

DELUXE QSLs. Samples, 10c. Refunded, Vern Slagle, W9VYS, 1704 Hale Avenue, Ft. Wayne 6, Ind.

FOR SALE: PR16 communications receiver with Jensen baffle and 17" speaker. F. Knapp, 6508 Montgomery Road, Cincinnati, O.

HERO Noise limiters, 2 tubes, variable control, easily installed. Drill one hole only. Complete with instructions, \$15.95. Radio Electronic Sales, 46 Chandler St., Worcester 2, Mass.

QSLs, samples for stamp. Henry L. Carter, Jr. W2RSW, 749 S. Plymouth, Rochester 8, N. Y.

U.H.F. hounds war surplus 826s, new, 85 watts to 200 Mc., \$7.10 postpaid. Gillingham, 164 Beechwood, Bogota, N. J.

NEW 24 Gs. \$2.25 each, postpaid. Send card for list of other stuff. W6GDS, 1656 W. 59th St., Los Angeles 44, Calif.

SELL: Patterson PR-10 communications receiver, R meter, 15-550 M., bandpass BFO, 10 tubes. Perfect mechanically and electrically. \$50. W2IAW, 118 Clara St., Brooklyn 18, N. Y. C.

BACK QSTs available: 1923-1942 inclusive. Some missing. Write for list. Fred Smith, W3CCD, 3423 Villawood Ave., Pittsburgh 27, Penna.

SELL: One Stancor 110C xmtr. Uses 4-6L6s instead of cathode modulation. 125 watts, tubes coils for 160-80-40-20, in deluxe cabinet with antenna relay. Also pair new 805s, pair 203As, pair new 866s, new T220, T55, Shure 702D, xtal mike, 1350-0-1350 @ 300 mill. xmtr, two 160 M. xtals, one 40 M. xtal. Make offer over \$150 for lot. Harry Cook, WSHFO, Duncan, Miss.

FOR SALE: New Collins ART-13 xmtr, 813 final. Complete with dynamotor and 28 volt, 200 amp. generator. First \$200 takes. Shipped f.o.b. W5LCK, W. Z. Ferguson, P.O. Box 102, Kosciusko, Miss.

SELL: Meissner Deluxe signal shifter with 10, 20, 40, 80 meter coils good condition, \$55. W2BZB-W3KNM, Doersam, Fallsdale, N. J.

QSLs-SWLS. Meade, W0KXL, 1507 Central Ave., Kansas City, Kans.

BEAM Elements: 1 1/4" dural element, 20 M. \$10.50; 10 M. \$5. Servo controlled rotary mechanisms. W9KOA/2, 375 Oak Place, Mineola, N. Y.

W2SFT is former W3GND.

AMATEURS, experiments, industrials and export accounts write for catalog and monthly bulletins. Buy the "4TB" guaranteed way and save. TAB, Dept. Z, 6 Church St., New York 6, N. Y.

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FOR SALE: New RK63, T55, 24G, 5BP1; chokes 5-25 hy. 500 Ma.; condensers 4 ufd. 3000 v., 2 ufd, 2000 v. E. P. Sadler, 90 Chippewa Road, Tuckahoe 7, N. Y.

ALIGNMENT service, communication receivers. Only precision work. Northern Electric Co., Ironwood, Mich.

"MICKY MOUSE" radar: consisting of regulated power supply, oscillator, amplifiers. Contains many scarce transformers, oil-filled capacitors, precision resistors of great value to amateurs. All in new condition. Only \$2.92 f.o.b. \$30 lbs. Write for details. Cambridge Electronics Corp., 208 So. Pulaski St., Baltimore 23, Md.

WILL pay cash for certain items radio gear manufactured before 1924. Catalogs, spark transmitter parts, receivers, etc. commercial and amateur. Send list, state make, model, condition. All replies answered. T. E. Tappan, Waverly, N. Y., W2AVD, ex-W8AVD.

FOR Sale: complete station; I K W. xmtr, etc. Giveaway price. All or part. Write for details, E. A. Farrell, 37 Hadwin St., Central Falls, R. I.

PRESELECTORS 10 to 20 meters, self-contained power supplies: \$19.95. 2-meter super-regen. receivers; \$22.50. Write for details. Constant Electric, 112 Cornelia St., Brooklyn 21, N. Y.

4520V CR 700 Ma. Kenyon, \$49.95. Practically all sizes transformers, chokes coils, E. W. coils, condenser Stancor 61.6 driver transformers, \$2.75. Xtal phones. Small, medium modulation transformers. Radio hardware. Waterman Pocketscopes. 70-70, 50-50 .07 inch transmitting variables, \$3.75. Vibroplex, Taylor Tubes. V-O-Ma. meter to 2000 V. \$26. Big stock meters. Inquiries answered. Kentucky Radio Supply, Lexington, Ky.

SPECIAL Ham holiday greeting cards, stationery, photocopies, quality QSLs. Samples, 25c. Kernz. Route 3, Fulton, N. Y.

NEW York area hams wanted to join our staff of hams serving as countermen. Excellent working conditions with congenial group. Stop in at our midtown branch and see Dave Ormont. Newark Electric Company, Inc. 115-117 West 45th St., New York City.

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SELL transmitters, receivers, meters and tubes. W3BQ, P.O. Box 18, Drums, Penna.

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SECONDARY frequency standard. General radio heterodyne frequency meter and crystal calibrator; Navy Type LR 3; brand new. Highest offer. W1030, Frazier, 21 Taylor St., Wollaston, Mass.

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WANTED: complete 20-meter 3-element beam, or parts for same. W2SBR, Riley Parsons, Raquette Lake, N. Y., ex-W8BXV.

WANTED: 20-meter bandspread coil set for HERO receiver, cash or swap. W6ZOU, Borgis, 1808 D St., Sacramento, Calif.

SURPLUS parts and ham equipment at fractional prices. Complete and varied stock of recognized manufacture. All components new and guaranteed. Send for free illustrated catalog of 1001 different items. Surplus Radio, Inc., 2-54 148th St., Whitestone, N. Y.

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RME-45 complete with speaker, \$150. J. Newman, 20 Waterman Road, Rosindale 31, Mass.

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10, 20, 40 meter, 250-watt radiophone, complete all-metal construction in two forty-inch relay racks, 809s, Class B modulators; P. P. #11s final, \$225. Will ship. Signal Booster, Meissner, two R.F. stages, \$35. E. Mauter, W8RJV/US.

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NATURAL color bakelite tubing; 3 ft. lengths, 3/8" and also 3/4" Heavy 3/4" OD. Impervious to moisture. Ideal for long insulators, antennas, cutters, and insulation. Any three lengths, \$1.00 postpaid. Bud Sluom, W8JO, Roscommon, Mich.

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FOR Sale: Supreme Mod. #563 audio signal generator, range 30-40000 cps, in perfect condition. \$25. Matzinger, Box 409, Red Bank, N. J.

WANTED: SX-28A new or used. Write details. James Williams, 310 Woodland Avenue, Lynchburg, Virginia.

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TWO SCR-211 frequency meters. Cardwells. Brand new. Complete with crystal and canvas bag, \$90. W9VEJ, R. Knoche, Lincoln, Ill.

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W0EFP selling out. Two composite c.w. telegraph transmitters, one kilowatt input to finals. Complete or will sell parts. All parts in very good condition and standard makes such as National, Cardwell, Hammarlund, Thordarson CHT, etc. Also antenna material and some audio components. No junk. Send postal for list of parts to Henry Anderson, P. O. Box 96, Pelican Rapids, Minn.

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QSLs, samples, literature free. Quick service. Sunland, Box 662, Hialeah, Fla.

PRESELECTORS, 10 to 20 meters, high gain. Write for free details. Constant Electric, 112 Cornelia St., Brooklyn 21, N. Y.

GE Fluxmeter, ultrasensitive photoelectric galvanometer, \$72, 20,000 ohm 25W resistors, %0.000 hundred, 0.002 µd tubular, \$2.20 hundred, 1-0-1 mill 2" GE meter, 9/7¢, Dual 0.5 µf GE 7500 V. Pyranol, \$1.21, 450 V. 0.450 A. Dual power supplies, \$21. All new. Write for bulletins. Lectronic Research, 5832 Hegerman, Phila., Pa. **SURPLUS bargains:** Pyranol capacitors 4000 working volts, 0.15 µf, 75¢; 0.25 µf, 85¢; 2 µf, \$3.35; 0-1 millimeters, 3 1/4" square case, \$2.50; write for list. Rubin Radio, Sycamore Ave., Shrewsbury, N. J.

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PRACTICALLY new Hallicrafters SX-36 high frequency receiver, audio frequency amplitude modulation. Kato Engineering, Mankato, Minn.

ATTENTION, Southern New York, northern Pennsylvania amateurs! Nice stock Hallicrafters receivers and transmitters nearby for your convenience. Also used receivers, etc. Pioneer Radio, Waverly, N. Y.

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SIGNAL Corps twisted pair approximately seventy ohms impedance, Carnua compound dipped, completely weatherproof, withstands burying, immersion, long suspensions, for receiving, transmitting with remote antenna, also fine for pa. and inter-communication lines, 88 cents per hundred, weight 3 lbs. \$8 per thousand; also several bargains Signal Corps transmitters converted to 110 A.C. Write for list. Madison, 1214 West 30th St., Los Angeles 7, Calif.

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JUST the thing for that mobile rig. D.C. generators operate from fan belt. Constant D.C. output. 550 volts, 250 Ma. and 12.7 volts, 0.6 amps. New, \$55. Slightly used, \$33. Also Sylvania 5 BPI tubes. New. Not rejects. \$7.95. Eugene G. Wile, 10 So. 10th St., Phila., Pa.

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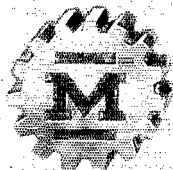
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WANT old copies of QST from first issue, Dec. 1915, through to June, 1919. Also about thirty QST binders in useable condition. Advice price and condition. Also issues of old government and amateur call books and lists of amateur and experimental stations: old ARRL pamphlets and publications such as lists of amateur stations, maps or lists of member stations and traffic routes, etc., and other old publications relative to amateur activities. Also old catalogues of amateur experimental radio equipment. Robt. L. Willits, W1PN, Rm 401, 683 Atlantic Ave., Boston, Mass.

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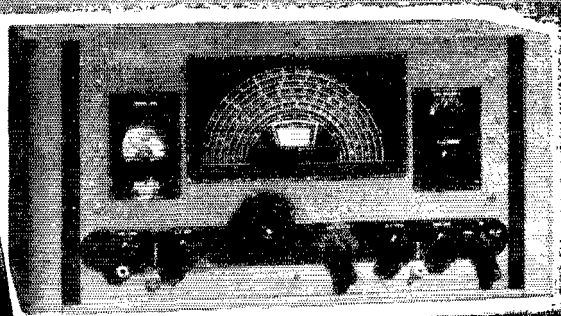
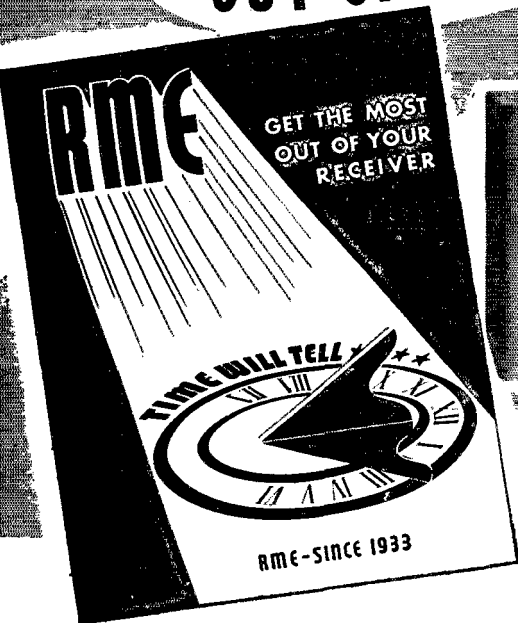


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COMPACT • POWERFUL • DURABLE
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Type 5562 has low drive characteristics—from 2 to 4.5 watts dependent upon plate input, frequency, and class of operation.

Type No.
5562.
(Actual Size)



GENERAL CHARACTERISTICS

Filament, 6.3 volts at 3.0 amps.	
Amplification factor	— 60
Transconductance	— 2500 micromhos
Direct Interelectrode capacitances	
Input to plate	.2 mmfds
Input	6.5 mmfds
Output	1.8 mmfds

MAXIMUM RATINGS	Class C Phone	Class C Telegraphy
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D.C. Plate Voltage	1250	2000 volts
D.C. Grid Voltage (Grid # 1)	250	350 volts
D.C. Grid Voltage (Grid # 2)	350	400 volts
D.C. Plate Current	100	125 ma
D.C. Grid Current	20	20 ma
Plate Input	125	175 watts
Screen Input	8	8 watts
Plate Dissipation	35	45 watts

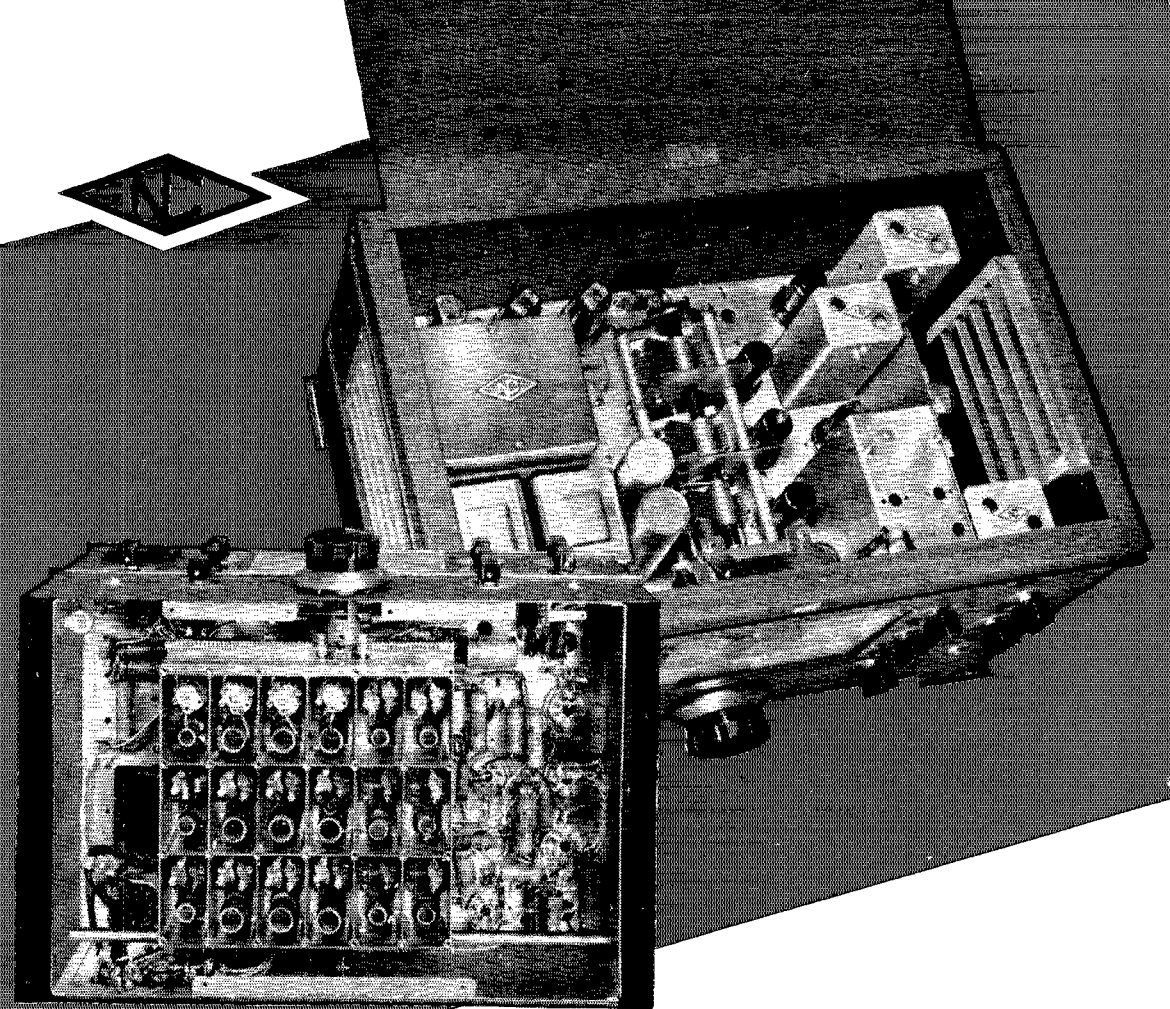
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ELECTRONICS COMPANY

NEWARK, 2  NEW JERSEY

\$10.00 ea.

Transmitting Tubes EXCLUSIVELY Since 1934



NC-2-40D

Beauty goes deep in the NC-2-40D. Deep inside the chassis parts of watchlike precision are assembled with painstaking care. Carefully designed mechanisms enable the controls to respond to your slightest touch. Thorough shielding helps circuits to develop the fine performance, stable operation and uniform response that you expect of a National receiver. We invite you to study the photographs above. They are pictures of quality.


NATIONAL COMPANY, INC., MALDEN, MASS.




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preferred type tubes


RCA POWER TRIODES

- 
- 810 —750 watts input up to 30 Mc.
 - 811 —220 watts output in Class B
 - 812 —225 watts input up to 60 Mc.
 - 8000—750 watts input up to 30 Mc.
 - 8005—300 watts input up to 60 Mc.


RCA MINIATURES

- 
- 3A4—Power amplifier pentode, fil. type
 - 3A5—HF twin triode, filament type
 - 6AK5—RF amplifier pentode, high trans-conductance
 - 6J4—UHF grounded-grid amplifier triode
 - 9001—Sharp cut-off UHF pentode
 - 9002—UHF triode osc. and detector


RCA ACORNS

- 
- 6F4—UHF triode oscillator
 - 954—UHF pentode detector or amplifier
 - 955—UHF triode detector or low-power oscillator
 - 958-A—UHF triode amplifier or low-power oscillator

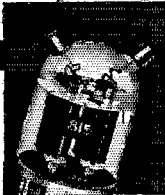
RCA UHF POWER TRIODES

- 
- 2C43—20 watts input up to 1500 Mc.
 - 826—175 watts input up to 250 Mc.
 - 8052-A—50 watts input up to 500 Mc.

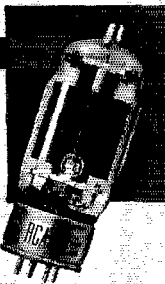
RCA RECTIFIERS

- 
- 5R4-GY—Full-wave, high-vacuum type. 250 ma. at 700 volts.
 - 816—Mercury-vapor type. Two tubes in full-wave circuit, 250 ma. at 1500 volts.
 - 866A/866—Mercury-vapor type. Two tubes in full-wave circuit, 500 ma. at 3100 volts.


RCA BEAM POWER TUBES

- 
- 815—68 watts input up to 150 Mc.
 - 829-B—120 watts input up to 200 Mc.
 - 832-A—36 watts input up to 200 Mc.

RCA P-P BEAM POWER TUBES

- 
- 807—75 watts input up to 60 Mc.
 - 813—500 watts input up to 30 Mc.

RCA CATHODE-RAY TUBES

- 
- 2BP1—Electrostatic deflection. 2" green screen.
 - 7GP4—Electrostatic deflection. 7" white screen.

RCA has a tube type for every amateur service and every active band. A few of the most popular types in each classification are listed. Power input figures shown here are maximum absolute ratings for class C telegraph service and, in general, are ICAS ratings.

There are also special types, such as voltage regulators, thyratrons, and the well-known receiving types in metal, glass, and miniature.

Your local RCA Tube Distributor has complete technical data on all RCA tube types. Contact him for further information, or write RCA, Commercial Engineering, Section A-21F, Harrison, N. J.

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