February, 1951
40 Cents
45c in Canada

QST

devoted entirely to

amateur radio

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

I landed him with a CARDAX

You could have heard it too, if you had been listening in.

"He said he heard me clearly...and liked the sound of my voice. That started it...and we've been together ever since. Now I wouldn't part with that E-V CARDAX for anything."

Yes...it's the first high level cardioid crystal microphone with Dual Frequency Response...gives you high fidelity for clear channel or rising characteristic for *extra crisp* speech signals that cut through QRM. Assures positive voice recognition. Also overcomes room background noise. Smartly styled, too!

CARDAX, Model 950 lists at $42.50

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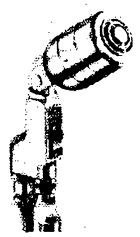
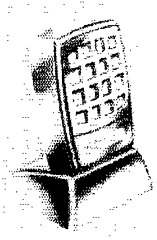


"630" DYNAMIC

The MERCURY

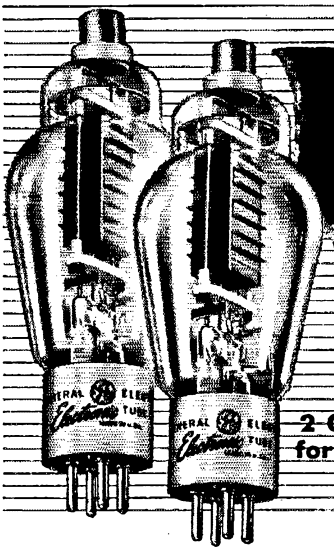


The CENTURY

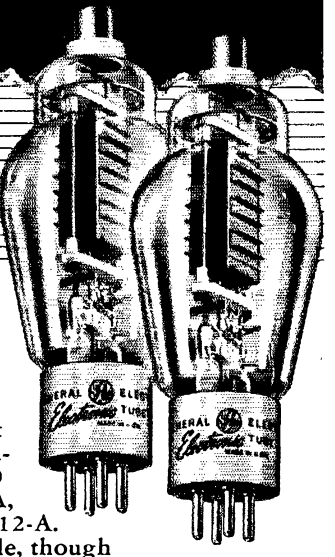
TOUCH-TO-TALK

SEND FOR CATALOG NO. 110

E-V Pat. Pend. Crystal Microphones licensed under Brush patents.



YOUR 4-FOR-1 TUBE BARGAIN



2 GL-811-A's for modulator **2 GL-812-A's for final**

Cost of all four approximates that of one "50-watter"!

Every dollar does the work of several, when you invest in these up-to-the-minute G-E triodes. They prove by their surpassing value, how much research and constant design improvement mean to your pocketbook's welfare as well as your rig's performance.

Think *first* of the new GL-811-A and GL-812-A for any service in your circuit —modulator, buffer, doubler, or final! Stronger construction than before gives increased toughness, longer life. Other new features —superior high-voltage insulation, improved radiating-fin plate structure—result in better electrical characteristics, such as a plate-dissipation top of 65 w instead of the earlier 55 w. This, in turn, means substantially increased output.

As you know, the two tubes are similar in design except for the amplification factor—160 for the GL-811-A, 29 for the GL-812-A. Both are versatile, though the "11-A" serves primarily as an a-f power amplifier and modulator (zero-bias in most cases), while the "12-A" is a center-of-the-target choice for modulated or unmodulated Class C r-f work.

Check the ratings below to see how much your money will buy when you beef up your output with four of these G-E economy triodes! Your G-E tube distributor will be glad to show you the tubes, quote you their low price. Or write *Electronics Department, General Electric Company, Schenectady 5, New York.*

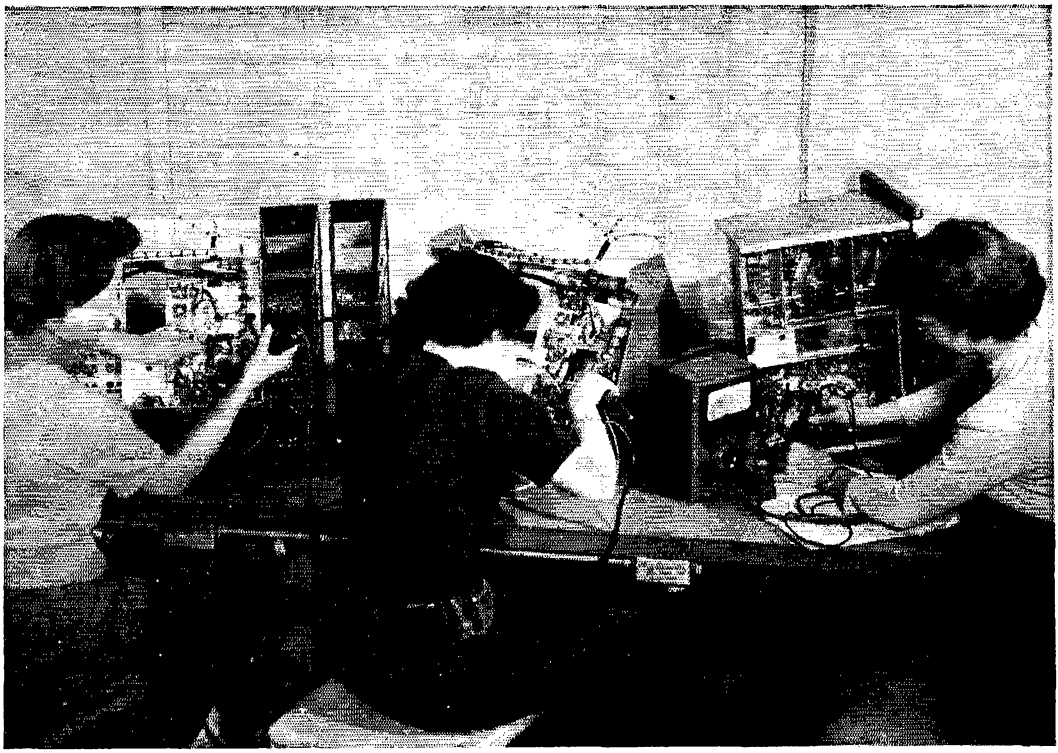
TYPICAL OPERATION, ICAS

	2 GL-811-A's, Class B Modulator Service	2 GL-812-A's, Class C Telegraphy
Plate voltage	1,250 v	1,500 v
Plate current	350 ma	346 ma
Grid bias	0 v	—120 v
Power output	310 w	380 w

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

184-KA2



The best final test of all

Early last November a limited run of 75A-2 receivers went through the planned procedures for assembly, inspection, test, packaging, and shipment to distributors for delivery to amateurs.

Production was then temporarily halted, to await the findings of the most revealing final test a receiver can have — for the condition in which it was received, and its operation in the hands of customers.

Minor bugs were uncovered, and have been eliminated for present and future owners.

The assembly line rolls again in January, 1951, and will be in full production in February.

You who have ordered will soon have your Collins 75A-2's.

FOR THE BEST IN AMATEUR RADIO, IT'S . . .

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, NEW YORK 18 **2700 West Olive Avenue, BURBANK**

QST

FEBRUARY 1951

VOLUME XXXV • NUMBER 2

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

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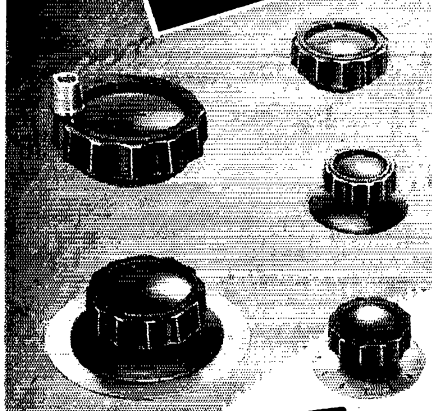
INDEXED BY
INDUSTRIAL ARTS INDEX

—CONTENTS—

New JOHNSON

KNOBS and DIALS

Distinctive! Versatile! Rugged!



Many Styles Available

Matching knobs in three sizes, 1⅛", 1⅝" and 2¾" diam., or assembled with phenolic skirts 1½", 2 1/16" and 3" diam., or with metal dial plates 1½", 2¾" and 4" diam. in various calibrations, and a spinner with the 2⅜" knob.

Other Types On Special Order

In production quantities, pointer types, friction disc vernier drives, special markings and calibrated dials, extra set screws, and other variations may be obtained.

Meant for the discriminating designer or buyer who seeks accessories in keeping with high grade equipment; apart from the too common, yet in quiet good taste.

Combining new, distinctive styling with unusually sturdy construction, these JOHNSON Knobs and Dials enhance the appearance of any electronic or electrical control equipment. The use of twelve flutes eliminates the usual octagonal, bumpy effect. Although essentially round, they retain excellent gripping surfaces. The "feel" is comfortable, positive, without sharp ribs or edges.

Knobs are molded of black phenolic material. Walls are extra thick for added strength and all types have heavy brass inserts. Metal dials are of nickel silver with beautiful chromium plating in satin etched finish. Visibility of dial readings is unusually good.

Knob Diam.	Shaft Diam.	Knob Only Cat. No:	Spinner Knob Cat. No.	Knob with Phenolic Skirt Cat. No.	Dia.	Knob with Chrome Dial Cat. No.	Diam.	Scale
2⅜"	¼"	**116-280**	**116-286**	**116-281**	3"	**116-282**	4"	0-100 180°
2⅜"	⅜"	**116-280-3**						
1⅛"	¼"	**116-260**		**116-261**	2 1/16"	**116-262**	2¾"	0-100 180°
1⅛"	¼"	**116-220**		**116-221**	1½"	**116-222-1**	1½"	100-0 180°
						116-222-2	1½"	0-10 270°
						116-222-3	1½"	1-7 180°
						116-222-4	1½"	On-off 60°
						116-222-5	1½"	Indicator

Write for illustrated sheet describing these exceptional JOHNSON Knobs and Dials.

JOHNSON *a famous name in Radio!*

E. F. JOHNSON CO. WASECA, MINN.

...GO PR

and KNOW WHERE *you are!*

"Looks like you're out of the band, old man. Of course, my receiver may be off but according to my readings you're . . . etc." — "There's a CW sig on you . . . better check your frequency" — "I can't find you since you moved up, Bill. You said you'd move up 25 kaycees but can't hear you there" — "Sorry, Charlie, I am monitoring the spot set for our sked but no soap. Guess you must be on the wrong frequency." — *How much of this kind of talk do you hear these days?* Plenty. Unless you are CRYSTAL CONTROLLED you can never be sure *where* you are. Get set to enjoy yourself this winter. Pick PR Precision CRYSTALS at your jobber's and KNOW WHERE YOU ARE!

20 METERS, Type Z-3, $3.75 • 40, 80 AND 160 METERS, Type Z-2, $2.75

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USE PR AND KNOW WHERE YOU ARE

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Section Communications Managers of the ARRL Communications Department

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

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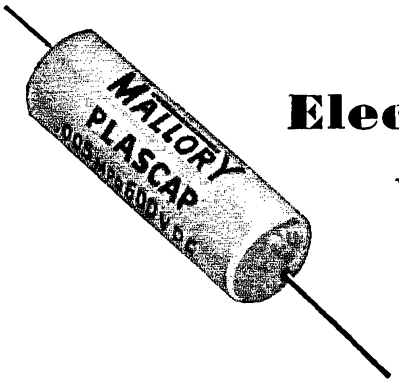

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Entrance of moisture into the cartridge of a paper capacitor invariably results in a decrease in insulation resistance (increase of DC leakage), and accordingly its ability to work properly as a by-pass, a coupling device, or as a filter is impaired.

Unfortunately, the entrance of moisture into a paper capacitor doesn't always show up as a well-defined fault such as a "shorted", or "open" or "intermittent" capacitor. Instead, the only outward sign of deterioration may be a gradual loss of sensitivity or stability in a communication receiver or other circuit in which paper capacitors are employed.

As a matter of fact, there are probably plenty of communications receivers operated day after day whose sensitivity and quality of performance has suffered severely as a result of undetected leaky paper capacitors.

In such receivers, paper RF by-passes, AVC filters, and interstage audio coupling capacitors in particular should be suspected. RF stage instability, IF regeneration, and loss of gain in these stages can often be traced to inefficient paper by-passes. The same may be said of sluggish or erratic AVC operation. And audio output distortion almost always means a leaky interstage paper coupler.

The importance of using only the best grade paper tubular capacitors in your equipment cannot be overestimated. Poorly sealed, moisture-leaking capacitors cannot be tolerated if maximum operating performance is to be obtained.

If there is any doubt at all about a paper tubular capacitor in your equipment, the safest thing to do is replace it with a new Mallory Plascap plastic paper tubular capacitor and forget your troubles. For the Mallory Plascap has exactly the kind of electrical characteristics you need.

Uniformly high initial insulation resistance plus positive case sealing against the effects of moisture has made the Plascap a capacitor which can be depended upon to put your equipment back into good operating condition, and what is more, keep it that way.

If you haven't used the Mallory Plascap yet, you've been missing a sure bet. Check your Mallory Distributor today. He'll be glad to help you.

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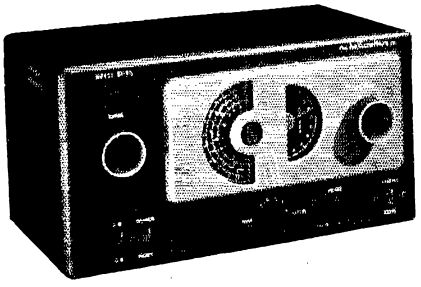

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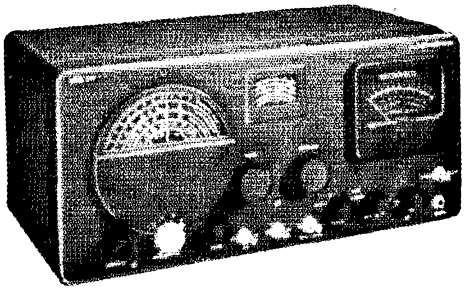

S-76 $169.50

NEW DUAL-CONVERSION RECEIVER WITH 50-KC I-F

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DUAL CONVERSION (1650 Kc and 50 Kc)—more usable selectivity than the best crystal.

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THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

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

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

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

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

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

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Plain Dealing, La.

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Alternate: George V. Cooke, jr. W2ORU
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Midwest Division

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New England Division

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Northwestern Division

R. REX ROBERTS W7CPY
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134 Dracena Ave., Piedmont 11, Calif.

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Fleming Road, Montgomery, Ala.

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JOHN R. GRIGGS W6KW
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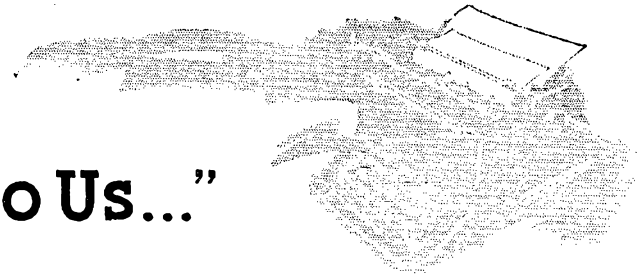
Alternate: Walter R. Joos W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division

A. DAVID MIDDELTON W5CA
9 Kay Road, Tijeras, N. M.
Alternate: Frank E. Fisher W5AHT/AST
104 E. 11th, Pawhuska, Okla.



"It Seems to Us..."

C.D. PROGRESS

Almost keeping step with expanded military defense measures enacted by the Congress in December, civilian defense activities spurted forward with the Presidential creation of a temporary Civil Defense Administration and appointment of former Governor Caldwell of Florida as its head, while as we write the House and Senate are substantially in agreement on the scope and extent of the program. Thus responsibility is removed from the aegis of the National Security Resources Board and placed in the new, specialized agency.

In our own specific field, things are humming, too. Right now the immediate problem is one of setting up frequencies for use by amateurs in civil defense communications, to the extent that they can be found. Primarily, this involves weighing the urgency of c.d. measures against known or contemplated military requirements, and determining what can be spared. The parties concerned — the military, FCC and the new CDA — are giving the problem intensive study. As we write at the turn of the year, there is still no information on what the decisions will be. Probably no official announcement will be forthcoming for several weeks; ARRL will of course distribute any news promptly to key field people such as SECs and ECs, and the dope will also be immediately on W1AW. In the meantime, the folks in Washington are keenly aware of the importance of telling us amateurs as soon as possible what we may expect in the way of frequencies, so that our planning may be realistic, and that is the end toward which they are working.

At this moment we have no reason to believe there has been any change in the analysis we conducted at length during our December issue discussion: 10, 6 and probably 2 meters are the most likely spots where frequencies can be made available. Certainly not the whole bands, of course. What we end up with may be spot frequencies here and there, or a chunk or chunks of a particular band — but as we see it at this writing, our planning can continue to look forward to the likelihood of frequencies in those portions of the spectrum.

Following the decision on frequencies will come the problem of regulations. They can't be simply the present amateur regs, of course; the nature of the service will be distinctly different. More than that, we believe there is no question but that there simply aren't sufficient amateurs in any city to handle all the c.d. communications tasks which will be assigned. For example, ARRL's SEC in one of our principal metropolitan areas is thinking in terms of 10,000 available operators for the civilian defense communications system; not even our largest cities can provide that many amateurs. It becomes a matter, therefore, of deciding what standards should be applied to non-amateur personnel volunteering in the communications field. There will certainly be other questions; for example, security clearance. Can amateur radio be given blanket authorization, or will there need to be separate applications and authorizations? These and other problems will require considerable study, in which ARRL will continue to be active in working with the c.d. people and FCC to come up with the answers.

Yes, things are humming. The task bids fair to be amateur radio's greatest challenge. The way to do your part is to register your interest and availability with your local ARRL Emergency Coördinator. Write Hq. if you do not know his name. Ownership of emergency-powered gear — or any gear, for that matter — is not necessary, nor is membership in the League. Your local c.d. plan will require many more operators than equipments, and your EC wants to know that *you* will be available to help amateur radio meet its responsibility.

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.

February 1926

. . . Acting on the recommendation of the recent Fourth National Radio Conference, the Department of Commerce has authorized amateur radiophone operation between 3500 and 3600 kc.

. . . Technical Editor Kruse reports on his tests of 32 commercial models of B battery substitutes. Points considered were economy, convenience, and performance.

. . . A 50-foot 2 × 4 mast that can be built and erected in 50 minutes is the handiwork of Don C. Wallace, 9ZT, and Boyd Phelps, ex-9ZT.

. . . Horizontal or vertical antenna polarization for short-wave reception? Technical Editor Kruse reviews the experiments of Dr. Greenleaf W. Pickard, whose conclusions favor the horizontal technique.

. . . F. J. Marco, 9ZA, describes a regenerative short-wave receiver designed around the newly-announced "Aero" plug-in coils.

. . . President Maxim's pre-1912 station, SNY, is featured in the station descriptions section. A DeForest "crochet ball" audion, a Tuska loose coupler with E. I. Co. slider, and a Mesco 8-inch spark coil contributed to the efficiency of this early station.

. . . A method of calibrating a wavemeter with a quartz crystal oscillator and auxiliary generator is described by Assistant Technical Editor John M. Clayton.

. . . Stations participating in the first amateur communication between the United States and Norway are 1YB, Dartmouth College, Hanover, N. H., and s1ALA, near Tromsoe.

. . . Harold P. Westman, 2BQH, gives pointers on constructing and adjusting a.c. relays.

. . . A circuit for filtering synchronous rectifiers is presented by Chauncy Hoover, 9AMU.

I.T.U. SECRETARIAT OPPORTUNITY

Announcement has been made by the Department of State of an opening with the International Telecommunications Union in Geneva, Switzerland, the seat of world radio regulatory matters. It is an opportunity attractive to anyone with a particular interest in the field of communications regulation and who would like the experience of working in an international organization abroad. The post is that of Technical Assistant in the Specialized Secretariat of the International Frequency Registration Board (amateurs will recall this as the permanent agency set up to engineer frequency assignments throughout the world as concerns primarily fixed and broadcast services).

Candidates must have a degree in physics or E.E., plus either five years' government or commercial experience in the radio communications field, or equivalent graduate study. A broad knowledge in the field of international regulation is required, as is knowledge of specialized terminology in at least one other language used by the Union. The salary range is $2620 to $3960, plus an expatriation allowance of $230 and an additional $180 for each child of school age, with starting salary probably near the minimum and eligibility for promotion occurring each three years. Any appointment will be probationary for one year. Transportation expenses of family and household effects to Geneva will be refunded by the Union.

Any interested party may obtain further data from ARRL Hq. or from the Telecommunications Division, Department of State, Washington, D. C. Applications must reach Geneva not later than March 1st.

Seventeenth Annual ARRL DX Contest

C.W.: Feb. 9th–11th, Mar. 9th–11th;
'Phone: Feb. 16th–18th,
Mar. 16th–18th

Amateurs everywhere are invited to take part in the 17th Annual ARRL DX Competition. There will be two week-end periods devoted to c.w. participation and two to 'phone. Special certificate awards will be given to the highest-scoring c.w. and 'phone stations for each country and each continental U. S. A. and Canadian ARRL section entered in the contest. Operators outside the U. S. and Canada will attempt to work as many W, K, VE and VO stations as possible. Exchange of serial numbers will be required. Complete rules and details on scoring appear on page 32 of January *QST*.

The contest periods will be divided for c.w. and 'phone as follows: first c.w. period will begin on Feb. 9th at 7:00 P.M. EST and end on Feb. 11th at 7:00 P.M. EST. The second c.w. period will be scheduled during the same hours from Mar. 9th to 11th. The first 'phone period will begin at 7:00 P.M. EST on Feb. 16th and end at 7:00 P.M. EST Feb. 18th. The second 'phone period will be scheduled during the same hours from March 16th to 18th.

Though not necessary for entry in the contest, ARRL will supply convenient report forms upon request. You may make up your own forms following the samples shown in last month's complete contest announcement. If you request report forms from Headquarters, please indicate whether you plan to enter the c.w. section, the 'phone section, or both.

If you are located in mainland U. S. or Canada, here is your chance to enjoy the thrill of long-distance contacts with the rest of the world and to compete for the special certificate awards. There will also be the opportunity to work new countries for the DXCC and other awards. If you are located outside the U. S. and Canada, you likewise have the opportunity to compete for an award and to pick up states for WAS or Canadian provinces for a WAVE award. It should be lots of fun!

OUR COVER

A close-up view of the 807 section of a new two-stage linear amplifier now undergoing performance tests in the ARRL lab. An early issue of *QST* will bring you complete constructional and adjustment data on this unit.

"Over the Hills and Far Away"

V.H.F. Propagation by Tropospheric Scattering

BY R. K. MOORE,* W2SNY

BESIDE being the title of five poems and at least one piece of music, "Over the Hills and Far Away" describes very well the way in which radio scattering in the troposphere can be important in v.h.f. work. Many of the v.h.f. contacts reported throughout the years, but not fully explained previously, may be explained by a new theory developed by Booker and Gordon.[1] Regular maintenance of "over the mountain" schedules can be explained by scattering, and many contacts over long distances are probably the result of this phenomenon.

There have been many cases of v.h.f. propagation over the longer distances which could not be explained by tropospheric bending, ducts or sporadic-*E*. Several experiments were conducted

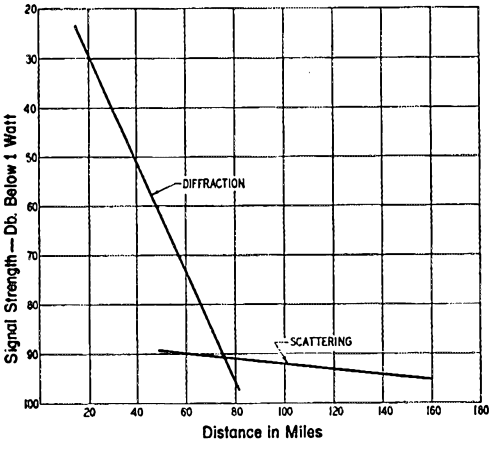


Fig. 1 — **Signal strength recorded at various distances on a frequency of 3000 Mc., showing a typical effect of tropospheric scattering. The steep curve is the signal strength resulting from diffraction. It will be seen that this signal dropped below that due to scattering at a distance of about 75 miles, and that scattering extended the range far beyond the "normal" at low signal levels.**

by the services during and after the war to determine quantitatively certain propagation phenomena. These experiments usually involved transmission over the sea or over flat country so that the conditions of the experiment could be accurately described. Precise weather data were collected along with the radio data so that the way in which the radio signal-strength data fit the theory could be calculated.

A number of times during these experiments signals were observed a good deal farther than the theories then in use predicted would be possible. In fact, the signal strength seemed to decrease as predicted out to a certain point, and from that point on the decrease was much smaller than expected. A typical example of this is shown in Fig. 1. The sharp break in the curve was apparently due to something not being considered at the time of the experiments but no explanation was given then. Recently this has been explained in terms of the scattering theory.

A signal propagated by scattering is always weak. When the receiver is close enough to the transmitter, the effect of the scattered signal is swamped by the effect of the direct (or diffracted) signal. This situation leads to the rapidly decreasing part of the curve in Fig. 1. Since the weak scattered signal does not decrease as rapidly with distance as the signal propagated beyond the horizon by diffraction, there is some distance at which the two are equal in intensity. Beyond this the scattered signal is more important than the diffracted one. This situation is a little different when a duct is present. Here the direct signal may be guided through the duct so well that it can be heard beyond the point at which the scattered signal would be lost in the noise; at such times scattering is not important. Hence we are led to the conclusion that v.h.f. signals heard beyond the usual range may be due either to a duct (or tropospheric bending) or to tropospheric scattering (provided the ionosphere can be disregarded).

If the conditions are not right for duct formation and there is no pronounced tropospheric bending, a signal heard beyond the normal range is probably due to scattering. The scattered signal fades much more rapidly than the direct- or duct-propagated signal; and even when the average signal is strong, "wobbling" may be due to the superposition of the scattered signal and the direct one.

Causes of Scattering

Scattering is caused by irregularities in the density and therefore the dielectric constant of the air. Probably the most familiar examples of this are the air pockets which plague fliers and the little whirlwinds everyone has seen near the earth's surface. Actually, similar and milder versions of these things are present nearly all the time throughout the lower atmosphere. We may consider that there are "blobs" of air, with dielectric constants differing slightly from the average, which are more or less packed together. These blobs may be of all sizes from a few inches across up to really big ones that can cause a large aircraft to drop.

Not much is known about the size of the blobs under different conditions nor by how much their

* % School of Electrical Engineering, Cornell University, Ithaca, N. Y.

[1] Booker and Gordon, *Proc. I.R.E.*, Vol. 38, p. 401 (Apr., 1950).

dielectric constants differ from the average nor the way in which they are distributed above the ground. There is some basis for believing that the blobbiness decreases as one gets higher above the surface but even this is not really well established. Since no very good meteorological instruments have been designed for measuring such small-scale irregularities in the air, it seems likely that some of our best information about them may come from radio measurements.

Even though very little quantitative information about atmospheric turbulence (blobbiness) is available, it does seem likely that blobs will be present at all times. During the daytime, the blobs near the earth probably are smaller than those at night. Farther up, we don't really know about their size. Certain types of clouds are indicative of a "blobby" atmosphere. Cumulus clouds, for example, are notorious for their internal turbulence. Whether this means that pointing a receiving antenna up at a large region of cumulus clouds will give stronger signals from a station in that direction is not known, but it might be interesting to try.

Most places in this country have less moisture in their winter air than in their summer air. The amount by which the dielectric constant of a blob differs from the average is likely to be less then, so scattered signals probably are weaker in winter.

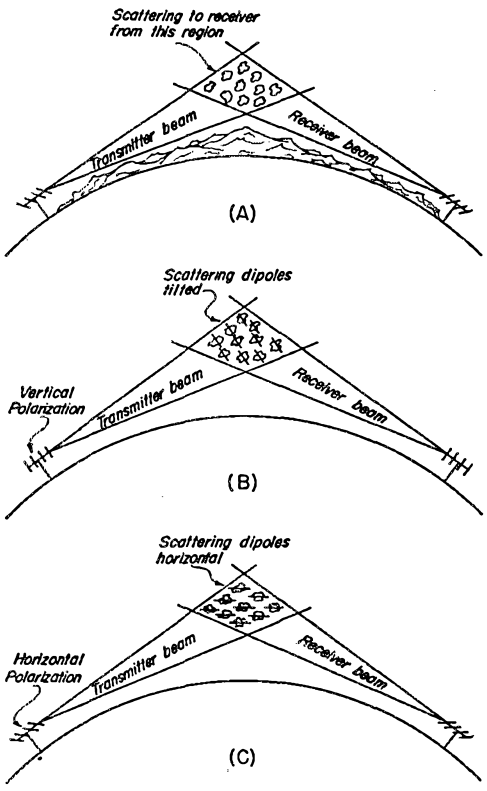


Fig. 2 — Tropospheric scattering from random "blobs" of air in the area where the transmitting and receiving beams intersect. This may be over a mountain range (A) or over smooth earth (B and C). The effects of vertical and horizontal polarization (B and C) show why horizontal polarization is superior over paths where scattering is important.

Antennas in the Sky

These blobs act as little antennas which retransmit part of the signal reaching them from a transmitter on the ground. Since they are present fairly high in the air, the signals transmitted from the blobs may be able to reach a receiver far below the line of sight for the transmitting station. This is shown at A in Fig. 2. In this case, turbulent air over a mountain range is shown retransmitting a signal received from one side to a receiver on the other side. Of course, we don't have to have a mountain range to take advantage of scattering from our blobs, for they can also be effective when the earth's curvature causes the two stations to be out of sight of each other.

If the blobs are small compared with the wavelength, they act like dipole antennas oriented perpendicular to the line of sight from the transmitter. If the transmitting antenna is vertical, the scattering dipoles are directed as shown at B in Fig. 2. If the transmitting antenna is horizontal, the scattering dipoles are horizontal, too, as shown at C. It can be seen that it is quite easy to be end-on to the scattering dipoles set up by a vertical antenna, and this means that the range using horizontal polarization may well be greater than with vertical polarization when scattering is the mode of propagation.[2]

If the blobs are bigger, they have a tendency to scatter the signal pretty much in the direction of the transmitted signal. That is, they act like beam antennas pointed in the direction from the transmitter to the blob. For any large broadside array (or antenna with reflectors), the beam width is inversely proportional to the length of the antenna in wavelengths (the bigger the antenna, the sharper the beam). This is also true of the large blobs. In fact, when the blob exceeds a certain size, the beam is so narrow that it misses a receiving antenna on the ground. In this case, unless you happen to be flying your receiver in an airplane at the right height, the scattering is of no use. The two situations for large blobs are shown in Fig. 3.

It can be shown that there is a best angle above the horizon for pointing the receiving antenna to receive scattered signals, and this has been verified by some experiments in which scattered signals from f.m. broadcast stations were studied at the University of Texas. Usually, this angle is pretty small so that pointing the beam at the horizon is good enough. With really small blobs, though, the best angle for reception may be appreciably higher than 10 degrees. While it probably wouldn't pay to put a vertical rotator on your antenna, it might turn out that someone

[2] The superiority of horizontal polarization for v.h.f. work over paths where tropospheric scattering is an important factor is confirmed by evidence gathered experimentally in amateur work. See "Antenna Polarization on 144 Mc.," January, 1950, *QST*, p. 15. — *Ed.*

with a smaller antenna (wider beam) would do just as well with his beam pointed toward the horizon as the fellow with the really sharp one, because the smaller antenna would pick up more signal from this optimum direction. This is useful only as an indication of what *might* happen, because there is at present no way of knowing in advance what blob size to expect. It is important to realize that this holds for the scattered signal only. If a signal propagated some other way is stronger than the scattered one, pointing toward the horizon will give best results.

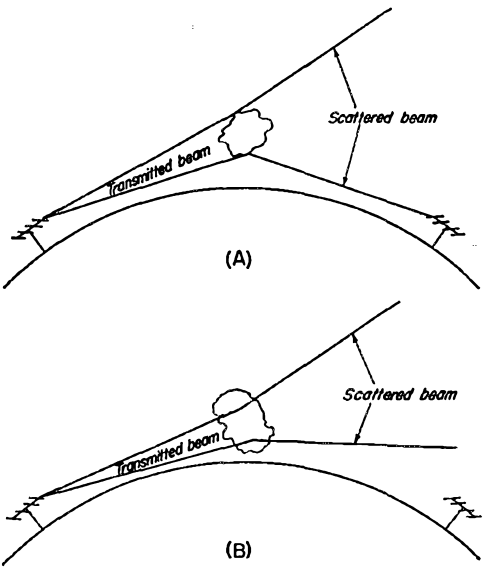


Fig. 3 — **Width of the scattered beam is inversely proportional to the blob size. At (A) a blob approaching the critical size returns only a small amount of energy. A too-large blob (B) has no beneficial effect.**

Fading Rate

The fading of the scattered signal should be fairly rapid. In fact, the so-called "wavery" c.w. signals which have been described from time to time on the more distant v.h.f. stations probably are due to scattering. The rate of fading is directly proportional to the speed of motion of the blobs and inversely proportional to either the blob size or the size of the antenna used for transmitting or receiving, depending on which is bigger. In fact, the period of fading is of the order of the time required to move across the antenna at a speed the same as that of the blobs. This holds for big arrays but does not hold true for simple dipoles or yagis. For high wind speeds and small antennas, the fading rate may turn out to be several cycles per second.

How Scattering Affects the V.H.F. Man

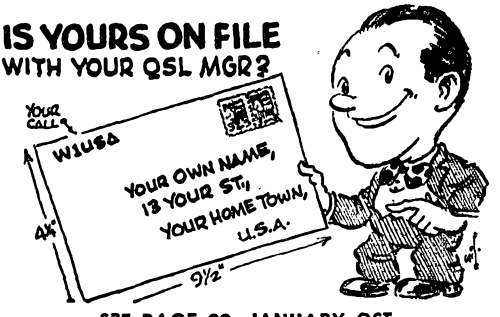
So much for the theory of scattering. Now let us see if we can draw some conclusions about the way this affects ham communication. In the first place, scattering makes possible ranges even over flat territory that would not be possible otherwise except by sporadic-*E* or by duct propagation. Since ducts are normally present only at night, this means that the effect of scattering on the range is likely to be greatest in the daytime. Since turbulence of the atmosphere is probably present all the time to some degree, scattering should also allow more consistent night work to ranges somewhat beyond the line of sight than the frequency of occurrence of tropospheric bending and ducts would indicate. It is important to realize, though, that any scattered signal is likely to be weak, and c.w. may be necessary to maintain the ranges made possible by scattering. Scattering undoubtedly explains the ability of some people to keep v.h.f. schedules over paths involving mountain ranges.

Secondly, it seems that horizontal polarization is definitely to be preferred to vertical polarization *for contacts by scattering*. This does not necessarily mean that the longest ranges will be achieved only by horizontal polarization, but it does mean that somewhat longer daytime ranges may be so achieved and that more consistent results at the intermediate ranges should be possible at night with horizontal polarization.

Thirdly, although there is an optimum angle above the horizon for receiving scattered signals, this does not mean that everyone should build himself a vertical rotator for his beam. For most applications, the beam pointed toward the horizon is plenty good. There may be times, though, when a less directive antenna pointed toward the horizon or a tiltable sharp beam will give better results.

So little is known about the size of blobs present in the atmosphere that it's really hard to say what bands will be most affected by scattering. The experiments mentioned first were made at 3000 Mc. and the University of Texas ones at 100 Mc. It is probable that 28 Mc. and all the v.h.f. and u.h.f. bands are affected, but just how much is not known.

We see from the above that some of our previously unexplained "over the hills and far away" contacts may now be explained by the scattering theory. None of the conclusions above should make for any great changes in the v.h.f. man's equipment or habits but they should help him to understand the reasons behind some of the contacts he makes.



SEE PAGE 90, JANUARY QST

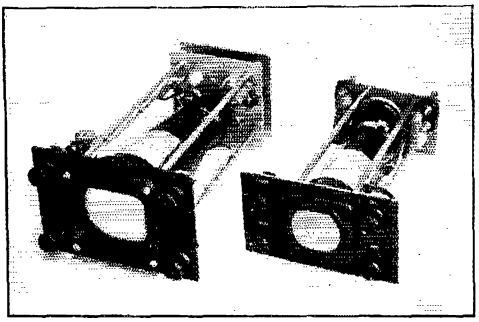
Electronic Instrumentation

Cathode-Ray Tubes as Metering Devices

BY M. H. DUNBRACK,* W1BHD, AND R. A. BRADBURY,* W1NUQ

DEVELOPMENTS in electronics since the war have brought about a new kind of thinking in instrumentation. Although the familiar instruments — voltmeters, milliammeters, etc. — which have been sufficient for most uses in the past will not lose their utility in the future, even today they are inadequate for many types of measurements. To supplement them, the oscilloscope is turned to as the tool that will give the necessary information. The 'scope can be used to make any measurement a meter can, and puts a much lower load on the circuit in doing so. It can be used to measure frequency, phase angles, percentage modulation; it can be used to show wave shapes and proper operation of doubler and tripler stages in transmitters. It can be used through the entire range of frequencies up to 50 Mc. before its limitations begin to be reached.

The principal disadvantage of commercially-available 'scopes is their large size and cost. They are entirely unsuitable for installation in the way small panel instruments are used, although they are excellent as test equipment. An ideal unit would be small and suitable for panel mounting, just like a milliammeter. There should be as few controls and parts as possible, and the c.r. tube face should be as large as practicable. The old 913 would be ideal in every respect except screen diameter — a one-inch screen is too small. The next choice is the 2BP1; its two-inch screen gives a pattern of usable size, although it would be far



Two versions of the "electronic meter." One uses the regular two-inch oscilloscope tube and the other a "stubby" three-inch tube (GL-3MP1). The mountings are small metal panels fitted with Millen bezels.

more convenient in such an application if its length could be reduced. Nevertheless it is the smallest tube that is practical, of all those currently available.

A panel-mounting unit incorporating the 2BP1 is shown in the photographs. It contains the basic assembly for operating a cathode-ray tube. It measures 5¼ inches wide, 3¼ inches high, and 9½ inches deep. The panel supports the focus, intensity, horizontal and vertical positioning controls, these being mounted symmetrically around the tube face. The input connectors

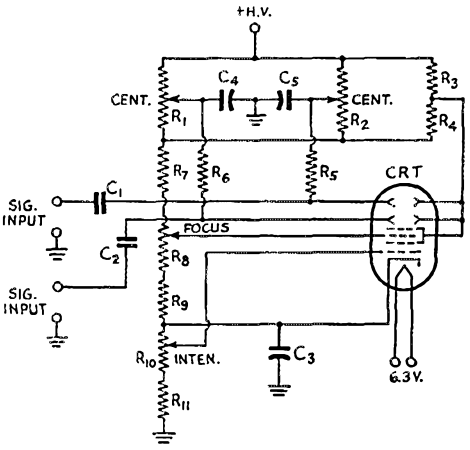


Fig. 1 — Basic circuit for the electronic meter. The same circuit is used for both the 2BP1 and 3MP1.
C_1, C_2, C_4, C_5 — 0.01-μfd. 1000-volt or larger rating according to high voltage used.
C_3 — 0.5 μfd., 200 volts.
R_1, R_2 — 3-megohm volume control.
R_3, R_4 — 82,000 ohms, ½ watt.
R_5, R_6 — 2.2 megohms, ½ watt.
R_7 — 0.75 megohm, 1 watt.
R_8 — 0.25-megohm volume control.
R_9 — 0.1 megohm, 1 watt.
R_{10} — 0.25-megohm volume control.
R_{11} — 0.27 megohm, 1 watt.

and power supply terminal strip are mounted on a bakelite panel at the rear of the 'scope. This terminal board is held firmly to the front panel by 8-inch brass rods. The tube is covered by a nicoloi shield. Placing the input connectors at the rear makes the leads to these terminals and to the deflecting plates quite short, so that the input capacitance is held to the order of 8 μμfd. The power supply needed is 500–1000 volts at 400–600 microamperes, and 6.3 volts at 0.6 ampere. Since the cathode of the tube is near ground potential, any 6.3-volt a.c. supply available can be used. The circuit diagram, shown in Fig. 1, is conventional in most respects. C_1 and C_2 are 1000-volt coupling condensers to keep B+ off the input connectors. Since the deflecting-plate sides of these condensers are already raised above ground by the B+ voltage, the maximum voltage that may be applied (d.c. plus peak a.c.) across these terminals is 1000 volts minus the "B" voltage applied to the 'scope.

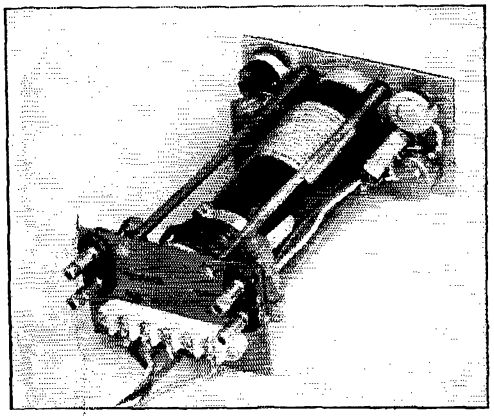
* % James Millen Mfg. Co., Malden, Mass.

The sensitivity of the 'scope is 65 volts per inch for the horizontal circuit and 40 volts per inch for the vertical, for a 500-volt "B" supply. The sensitivity is approximately one half (130 volts and 80 volts respectively) for a supply voltage of 1000 volts. Where very accurate voltage measurements are needed, the 'scope should be calibrated. This can be done externally or provisions can be made to plug the 'scope into a special calibrating socket where an accurately measured source of voltage can be impressed upon each set of plates.

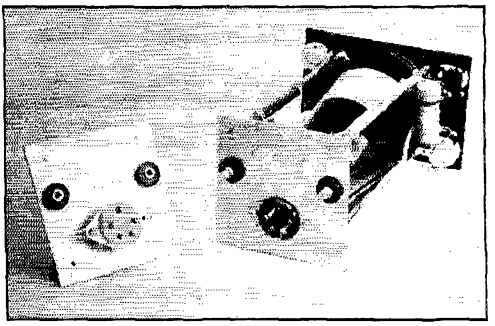
Many measurements consist of comparing one voltage with another, for which sweep circuits are not required. For this reason, and because it would increase both size and cost, no internal sweep was built into the unit. However, if a sweep is desired for keying or modulation checks, it can be taken from the 60-cycle line voltage through a suitable voltage divider.

Other Possibilities

After thinking the matter over some and investigating the specifications on the 3MP1, it was decided that a three-inch 'scope could be built without increasing the size too greatly. The 3MP1 is 8 inches long overall compared with 7⅝ inches for the 2BP1. The over-all dimensions of the 3-inch unit shown in the photographs are 10 inches deep, 6 inches wide and 4¼ inches high. The "B" voltage is 1000 to 2000 volts and the sensitivity is approximately 120 volts per inch per kv. of "B" voltage. Essentially the same design and construction is used in this 'scope as in the 2-inch unit, but it was decided to make this unit completely plug-in. Banana plugs were put on the power supply terminal strip and two special sockets were made to fit. One of these was mounted in the back of a small cabinet, while the other, of course, goes into the rig for modulation measurements. Other sockets could be made and installed in appropriate spots for tuning and neutralization measurements. Eventually it is hoped to have several 'scopes permanently installed.



The construction of the two-inch model is shown in this photograph. The assembly includes a nicoloi shield to protect the beam from stray fields.



The three-inch unit is completely plug-in. Mating socket assemblies can be placed wherever desirable in a transmitter or other equipment.

By comparing the size of the two units it can be seen that little more space is used for the 3-inch model than is used for the 2-inch unit. This is mainly due to the short bulb of the 3MP1. If corresponding improvements could be made in the design of 2-inch tubes, it may be possible in the future to get a 2-inch tube approximately 5 inches long. In that case a 'scope could be made with a maximum depth of about 6 inches.

The next logical step would be to eliminate the four controls on the front panel. This would reduce the size of the 2-inch unit to about 2½ inches square and the 3-inch panel would be reduced to about 3½ inches square — about the same panel areas as are used for mounting a meter. For a given "B" voltage on the 'scope, the controls are set once and left that way (provided the "B" voltage is constant) and there is no need to have them easily accessible. They could very well be midget potentiometers mounted on a panel at the rear of the tube, with provision made for screwdriver adjustment. It is also possible that they could be eliminated entirely in favor of a fixed resistance network. This would make the ultimate size of the indicator 2 inches square and about 6 inches deep. Of course, such a unit will have to wait for tube designers.

While there is some speculation in this article, it is hoped that the reader will realize that even now a compact 'scope can be built at very small cost. The uses to which such an "electronic meter" can be put, we believe, will be as many and varied as the uses which have been found for the grid-dipper.

Silent Keys

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

W2BVT, Elphege A. Lussier, Brooklyn, N. Y., N. Y.
W4EYK, George M. Williams, Columbus, Ga.
W4LTQ, George J. Parker, jr., Owensboro, Ky.
W7NHP, Harold J. Rhein, Great Falls, Mont.
W7OMD, ex-W6FEV, Milton J. Fetterhoff, Tobar, Nevada
W9FVD, Clarence J. Mueller, Franklin Park, Ill.
W9JZL, Elmer W. Everson, Evansville, Ind.
WØVGC, Henry F. Hekel, Denver, Colo.
JA2CT, Lt. Louis G. Selig, Signal Section, GHQ

Loop-Type Antennas for 75-Meter Mobile

A Novel System with Good Performance

BY HAROLD L. MITCHELL,* W4IBZ

A MOBILE antenna for 75 meters always presents quite a problem. It must be an electrical quarter wave at least and, since a physical quarter wavelength is impractical, some form of loading invariably is used. The part of any antenna that contributes the most to the radiated energy is that carrying the most current. Unfortunately, in a quarter-wave vertical this is the lower part. The placing of the loading coil at the bottom end results in most of the high current flowing through this coil, the current diminishing to zero at the top of the antenna. Therefore, various methods of center and top loading to bring the maximum current points higher up in the antenna have been used with fairly good results. However, it seemed possible to turn the antenna upside down and have the high current at the top. To accomplish this, the top of the antenna is grounded and the bottom insulated. This was approximated by bending the top of the vertical antenna down and grounding it at the tip of the windshield post, as shown in the photograph. The other end was mounted on the insulator of an antenna mount formerly used on a Jeep. Where the antenna comes through the back of the car, a hole has been cut and a piece of polystyrene mounted for the rod to feed through. The antenna rod itself is composed of sections that screw together and it can be disassembled very easily.

The trunk view shows the mounting of the fed end of the antenna.

* 311 South Monterey St., Mobile, Ala.

The antenna system is tuned to resonance by a series tuning condenser connected between the antenna and the output terminal of the final amplifier, as shown in Fig. 1. An r.f. meter with a 3-amp. scale also is connected in this circuit at this point to read antenna current. The parallel fixed and variable condensers were used as an expedient to secure the proper capacitance but, of course, a variable of appropriate maximum capacitance will serve equally well.

The tuning of the transmitter is conventional in every way. A milliammeter is plugged into a grid jack and the final amplifier grid circuit tuned to resonance, as indicated by maximum grid current. The plate circuit is then adjusted to the characteristic dip and the antenna tuning condenser adjusted for maximum antenna current. In this particular installation the current runs about 3 amperes with 45 watts input to the final amplifier.

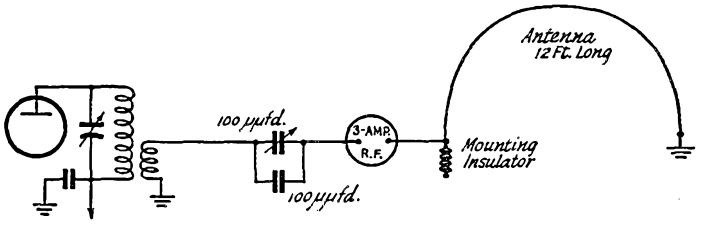
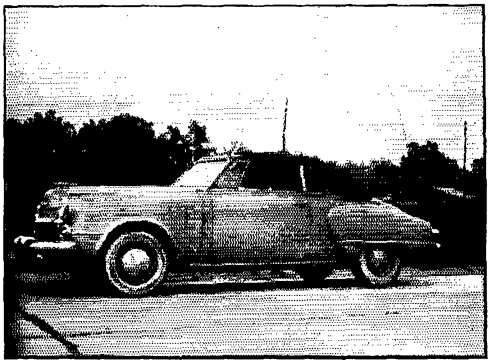


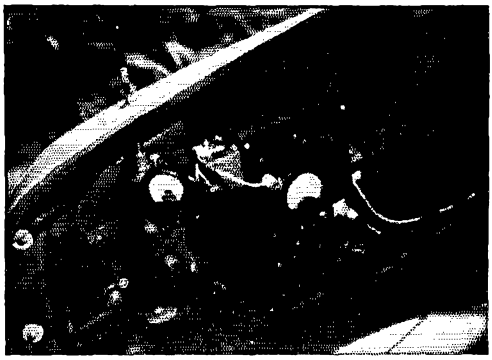
Fig. 1 — Sketch of the loop antenna and tuning and coupling system. The coupling coil in this instance has 3 turns 2 inches in diameter.

It is evident that the antenna and the body of the car in reality form a one-turn loop resonated by the condenser. The directional pattern theoretically should have a sharp null at right angles

(*Continued on page 90*)



W4IBZ's 12-foot whip is bent to form a loop. The forward end is securely connected to the top of the windshield post.



The antenna is mounted close to the transmitter in the trunk. The antenna tuning condenser is fastened to the side of the transmitter box.

Furlough in Monaco

The Story of 3A2AB

BY SGT. GUY L. KANE,* DL4FS, W9SRB, 3A2AB

I GOT the bug to put a real DX station on the air back in early 1950. It was my habit at that time to take an odd assortment of gear up Koenigstuhl Mountain, near Heidelberg, and operate when the QRM from the transmitter station where I was stationed became too great to fire up DL4FS from my quarters. I speculated that if I could take equipment to this high point in my car, I could also transport it to some of the countries where ham activity was either low or nonexistent. With this idea in mind the Countries List was carefully checked, leaving me with the prefixes HE, PX, and (at that time) CZ. HE was crossed off the list because the HB gang were keeping the little country pretty well populated so far as ham activity went.

Several letters of inquiry were sent to the respective Directors of Communication for Andorra and the Principality of Monaco. No reply was received from Andorra but the Ministere d'Etat of Monaco sent a very cordial letter stating that any time I desired to operate from his country he would be pleased to issue the necessary authority. In March a trip was made there in the company of DL4ND but we met with great disappointment when we were informed that the Prince of Monaco had not yet affixed his signature to the document ratifying the Atlantic City conference regulations. We were told, though, that permission to operate would be granted as soon as possible. This arrived in July in the form of a letter stating that I had been issued "L'indicatif D'appel" of 3A1B. In August I received a second missive stating that my call had been changed to 3A2AB (just why, I was never able to find out!).

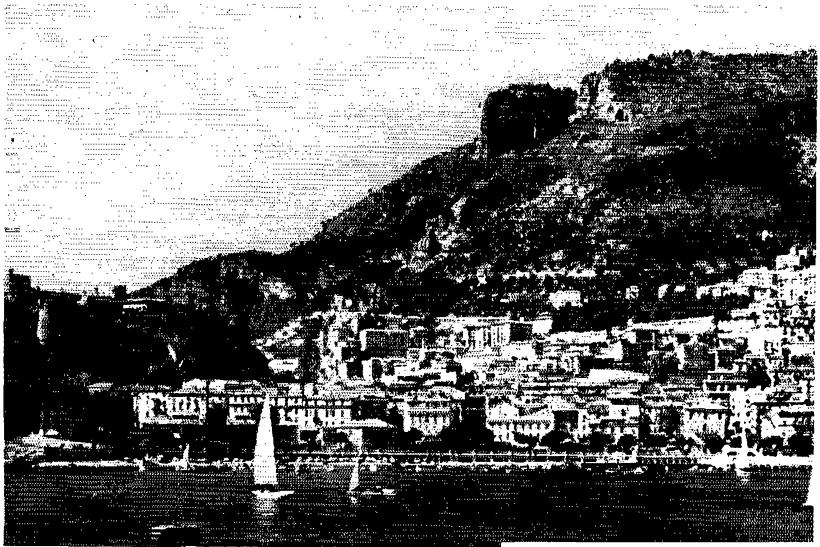
*B Co., 7774 Signal Bn., APO 403, % Postmaster, New York, N. Y.

Meanwhile, in July, after contacting my good friend Jean Wolff, LX1JW, the rig was taken to Luxembourg and put on the air as LX4FS for a few days' trial. The response from the W/VE gang was amazing and gave a preview of things to come when the time arrived to put 3A2AB on the air. The greatest lesson learned was the need to control the eager beavers who would go to any extreme to get a QSO. I'm sure W4NNN, W3BXE, W6SAI and others who have operated a rare DX station for a short period of time, trying to hand out as many QSOs as possible, agree that the W and VE ops are the best in the world and a great bunch of gentlemen. But let a new call be heard and you would swear you were sharing the band with a group of raving maniacs. It would be too much to expect that everyone can become a proficient DX operator overnight but the article [1] in September *QST* on DX operating techniques should be read — and reread — by every ham who aspires to the DXCC or any other DX award.

In September the gear to be taken on the expedition was packed. The receiver was a Radiovision "Commander" and the transmitter a World Radio Labs 175-watt "Globe Champion." In anticipation of giving the 'phone gang a new one also, the modulator and mike were packed along with plenty of spares, tools, and an assortment of antennas.

On October 1st I was granted a 30-day furlough. A hasty check across all bands left me with a very gloomy feeling as there wasn't a thing of note to be heard. Therefore, rather than risk a trip down to Monaco and not be able to work out, the receiver was taken to Luxembourg where the band was monitored daily for any

[1] Goodman, "Working DX," p. 40.



Nestled between the mountains of southern France and the blue Mediterranean, the Principality of Monaco is internationally known as a tourist center and site of the Monte Carlo Casino.

change in conditions. While enjoying the hospitality of the LX gang for a second time, I received a welcome telephone call from Don Ross, DL4UI (ex-SVØWB), who passed along the good word that he had been able to get a furlough starting on October 15th and wanted to make the trip to 3A-land with me. This news was certainly a change for the better because with Don as second op I could visualize 3A2AB being on the air 24 hours a day and really giving the gang a run for their money.

When the 15th rolled around Don and I were on our way. We had started with definite misgivings because radio conditions were still stinko. It is quite difficult for anyone who has never been in this part of the world to realize what it takes to go from one country to another, even without a car full of radio gear. With such equipment, traveling takes plenty of time and reams of paper work. Every border official is obsessed with the idea that the only reason any sane person would take such stuff into their country is for the purpose of selling it. Any argument to the contrary is considered a ruse to avoid paying customs!

After being held up for the best part of an hour at the French border while guards went through every piece of equipment and baggage we had, one particularly ingenious official, reaching the tiring point only very shortly before we had about decided our trip had ended in failure before it had even begun, reached into the transmitter and pulled out a VR-150. He then wrapped the rig with wire that looked as though it had been used to tow trucks, sealed same, and handed the rig back to us with the French equivalent of "Get going." Believe me, we did!

Southern France is, for the most part, a scenic stretch of country. However, when you are looking forward to more than 800 miles of driving in steady rain over roads you thought were found only in the most rural areas of Arkansas, your taste for sightseeing is definitely dulled. On top of this, gasoline at 70 cents a gallon leaves you counting the cash on hand when there is so much to be seen and enjoyed.

We arrived in Monaco on the afternoon of the 17th and went directly to the office of the Ministere d'Etat. He greeted us warmly, wished us success, and assured us the full coöperation of his office.

After looking over the list of hotels, we chose the Royal because of its superior radio location and its reputation for an excellent bill of fare. Luckily the genial manager, Mons. Crettaz, spoke perfect English. After a brief explanation of the purpose of our trip and a rather wild description of ham radio, he gave us all the assistance necessary in setting up the rig and stringing the antennas.

The power situation had been checked during the March trip and found to be 125 volts (more or less). But, as we were warned by Mons. Fromaget of Radio Monte Carlo, in some parts of the Principality this was 25 cycles and in others it was 42 cycles. Fortunately, our hotel was supplied with the 42-cycle variety. We crossed our fingers when the equipment was first plugged in and were relieved when the line voltage remained in the vicinity of 100 volts under full load. The only trouble outside of one blown fuse — which brought all the occupants of the third floor out into the hall giving us looks that would kill — was that when the elevator was running the voltage dropped below 80. The heating of the transformers from the low-frequency current was quite bad but we solved this by packing them in wet rags, which left us wiping the steam off the meters and dial facing every few minutes!

Once we had ironed out our antenna problems we found that our transmitter loaded perfectly. So, with the rig cranked up to about 125 watts, a very short and timid CQ was transmitted on 14,006 kc. at 1710 GCT. You could have heard a pin drop in our room as we sent the closing K and flicked the receiver back on. With both of us trying to squeeze into a single pair of headphones, we thrilled to "3A2AB DE W6IBD AR." Shakily, he was given a 569 report. Instantly, the band erupted into a madhouse of kilowatts calling everything from 3V3AB to 2A2TS! Listening certainly is a trait of the real DX operator because for an hour previous to our first call not a single W had been heard and the best we expected was a local.

For a few minutes after signing with W6IBD we felt like someone who had accidentally set off a charge of dynamite, blowing up everything around him and leaving him with nothing but a foolish look. After things quieted down to a mere bedlam we called CQ again, signing with U10. This was completely ignored, however, and we were unable to make another QSO for four or five minutes. But, after another try, the gang started moving up and we made consecutive contacts until the band went dead around 2000 local time (a nightly occurrence during our stay).

The next morning we were up bright and early,

♦

The luxuries of civvies and hotel living were the lot of the GI operators of 3A2AB. *Standing:* Sgt. Guy L. Kane, DL4FS; W9SRB; *seated:* Sgt. Don Ross, DL4UI, ex-SVØWB.

♦

calling CQ for an hour before we raised anyone. Although the Europeans and North Africans were heard with very strong signals, QSOs were few and far between in spite of good signal reports being received from all stations worked. At first we discounted this as being attributable to the funny call sign and the disbelief of the many amateurs who had been taken in previously by phoneys signing Monaco calls. However, this condition existed right up to our last day of operation and is due either to disinterest or to lack of operating ability on the part of many amateurs in this part of the world.

Our biggest letdown came when we found that on 20 we could work the W/VE gang only via the long way around, the mountains to our rear evidently cutting off signals from the other direction. Besides this, the band opened for Ws for only very short periods each day. As many contacts as possible were passed out in this direction but it was very exasperating going because even though directional CQ W and K̄N̄ were used, they were ignored completely by the ops over here who continued to call us on our frequency and during QSOs. In this respect the Gs and DLs were the biggest offenders with their 5-w.p.m. 10X10 calls zero beat on our frequency. I guess this is the accepted method of raising DX but it certainly becomes maddening in a very short time. The Ws stood out like the proverbial injured digit with their short snappy calls on whatever portion of the band we indicated we were tuning. And because of this the Ws netted more QSOs in an hour than the Europeans did all day!

One of the biggest faults of the Europeans was their habit of giving us all the dope on the TX, RX, WX, and everything else that came into their minds, slowing us down to a crawl when we were interested only in giving as many hams as possible a new country. Even though U10, D5, ML, etc. were used regularly, we were never left with our frequency clear of guys calling us. One particularly ignorant DL7 (he holds DXCC, incidentally) called us for four consecutive days for hours at a time, exactly zero beat, and perhaps wonders to this day why we didn't work him. Another of the inconsiderate habits prevalent over here is to call a DX station on his frequency and if he doesn't answer turn around and call CQ DX! One very loud G tuned his transmitter for approximately ten minutes exactly on our frequency and then without a break for listening called CQ DX for another five minutes. Then, after signing and hearing the hundreds of others calling us, he had the guts to turn around and call us also! For several days running one EA who couldn't raise us on our frequency after calling us several times would switch to A3 and play phonograph records for several hours, running what seemed to be 300 per cent modulation! Of course, there were a few top-notch ops over here who landed QSOs immediately by short calls off our frequency, but this type was definitely in the minority.

Don made the 'phone contacts and ran up against the same trouble that I did on c.w., only in spades. One particular QSO which left Don rolling on the floor was when a G3 said, "I don't believe I've worked a Monaco station before. Please QRX a minute while I check through my log." And another that really left him biting his nails was the operator who, after being given an R5 S9 report, came back with "The QTH here is London — I spell L-London, etc." The ops who took special honors for stupidity were those who came back with "OK on your QTH Monaco, OK on your name Don, OK on your rig 125 watts, OK . . . OK . . . OK."

We tried to work 'phone with the W gang but this was almost impossible because of the I and EA stations running heavy modulation and continually blanketing the band with their incessant whistling and playing of phonograph records. Despite this, W6s GRL, TT, TS, AM, ENV, MJT, VFR, W1FJN, and others were worked on voice.

On several nights, after 20 had gone dead, we tuned up on 40. Among the first stations raised was W2QHH. A sked was arranged for 80 and Howy made it a three-bander with his low power. Although excellent signal reports were received on 3.5 Mc., business was very slow and we felt the band wasn't worth losing sleep over. Oddly enough, on this band the mountains didn't seem to affect reception from Stateside.

We decided to QRT on October 24th because by this time conditions had reached a low low. We were reluctant to leave, knowing there were thousands still wanting to contact us. However, our budget was running pretty low at this time so we really didn't have much choice.

What proved to be the biggest thrill of the entire trip came during our last QSO when we were telling G6QB (of the British *Short-Wave Magazine*) of our intentions of leaving. Who should walk into the room (or the shack as we were calling it by this time, much to the discomfort of the manager!) but none other than the world-famous Leon Deloy of f8AB. We switched over to 'phone and handed the mike to Mons. Deloy and these two old-timers got together for the first time since 1923! Signals were S9 both ways and Mons. Deloy expressed amazement, making his first 'phone QSO, at the improvement in amateur radio since the days of spark gaps. Listening to Deloy and Tommy chew about 25-cycle sparks, Don and I rather self-consciously felt behind our ears to see if that wet feeling we had was real. We got quite a kick out of hearing his tale of the first trans-Atlantic QSO with Reinartz and Warner.

During our stay we made 581 QSOs. Half were with the W gang and half of these with W6s. This wasn't because of discrimination against other call areas but because the Sixes were the only stations heard for the greatest part of the time. East Coast QSOs didn't pick up until the fellows started aiming their beams southwest.

Returning to DL4-land, a policy of QSL for QSL was decided upon. If you were one of those worked and want a Monaco card, drop us yours

(Continued on page 90)

Happenings of the Month

COMMERCIALS IN AMATEUR BANDS

One of the things we amateurs must keep watch on is possible misuse of our bands by commercial stations. Hq. takes action as necessary on reports from you fellows in the field concerning non-amateur stations in our bands. Some of this operation is legal, some is not. How is one to know which is which? Let's see if we can separate the sheep from the goats in general terms as concerns our major bands:

10 meters: Exclusively amateur throughout the world. Please let Hq. know about any non-amateur operation.

11 meters: Shared here with scientific, industrial and medical services, and in some parts of the world assigned entirely to other than amateur use. So you might run across most anything, and it's probably okay.

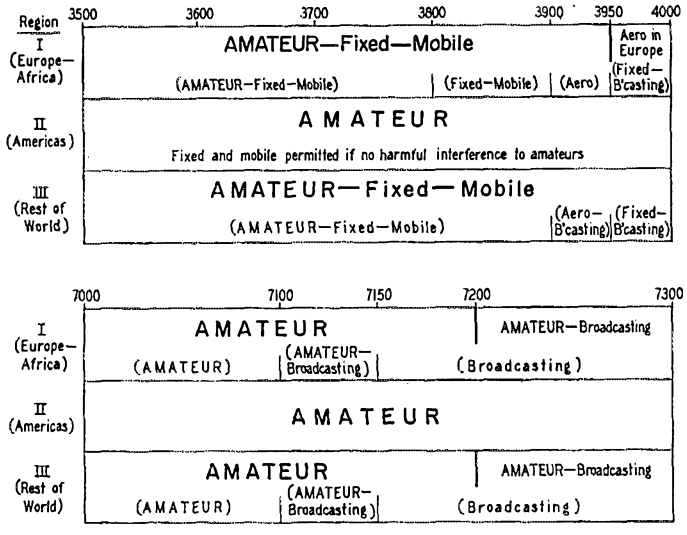
20 meters: Exclusively amateur throughout the world. But some folks — and you know who — don't pay much attention to their international agreements, so as a result we find a few Russian (and Communist China) stations operating in the 20-meter band, heard mostly on our west coast (actually, U.S.S.R. at Atlantic City said it was going to use 14,250–14,350 for its fixed service). Because it involves dealing with the Soviet, there's little chance of any success in filing formal complaints, but you might send dope to Hq., for information, concerning what stations you hear and on what frequencies. We'd also like to know, for action, about any other non-amateur operation in this band.

40 meters: Exclusively amateur in the Americas but rather thoroughly chopped up for broadcasting in other areas. Outside this hemisphere 7200–7300 kc. is available for short-wave broadcasting and there is nothing we can do about it. When the Atlantic City frequency table goes into effect in a year or so, 7150–7300 kc. will be broadcasting outside the Americas, with 7100–7150 additionally available to that service on a shared basis with amateurs! Thus because of the greed of foreign administrations for propaganda frequencies, the situation will become worse instead of better. Any broadcasting below 7200 now (or 7100 later) is illegal.

However, don't confuse foreign amateur 'phones with broadcasting. There are many Latin amateur 'phones in countries to the south. Each government has the right to specify how the amateur bands shall be whacked up as between modes of emission, and in most of Latin America the predominant (almost 100%) amateur interest in voice operation is reflected in most or all of each band being available for A3. This makes it a little tough on us, but is one of those things. (Incidentally, over the years attempts have been made to come to a compromise with the Latins, both informally and by means of international agreement, on what frequencies they would use for voice; these attempts have failed miserably, for any compromise with adequate U. S. exclusive c.w. space is unacceptable to the Latins, while any arrangement with A3 space adequate to the Latins is intolerable to us.)

Any commercial operation (other than broadcasting above 7200) anywhere in 40 meters is a violation of the regulations, so please post Hq. on whatever such you may hear.

80 meters: Exclusively amateur in the Americas.



Although not an exact chart of the complicated allocations tables, this illustrates accurately what foreign stations other than amateur are legally permitted in "our" bands. The entries in parentheses show Atlantic City provisions, not yet in effect.

However, there is quite a bit of commercial telegraph operation in this band by countries of Central and South America, taking advantage of the international provisions that a government may assign any frequency in derogation of the treaty so long as no interference is caused. Because of the mountainous terrain and considerable expense of maintaining landline communications there, radio is used extensively for internal short-distance circuits. Such operations have been going on in our 80-meter band for many years; mostly it is low power, but when propagation conditions are good we Ws hear the stuff, particularly along our southern borders. Does this operation violate international agreement? Technically, yes. If the interference is not intolerable, however, we suggest that we try to get along with it. Why? Because this entire question of the 80-meter band in the Americas is a very delicate one, and the existence of many complaints of interference to amateurs will indicate to the other countries that the present "arrangement" is unworkable and that at the next Region II conference the allocation ought to be changed to get some exclusive frequencies for their fixed services in 3500–4000 kc., something that almost happened at the Washington conference in 1949.[1] Make no mistake, however; we said, "if the interference is not intolerable." If there is actual and continued disruption of amateur communication on any frequency in this band from such Latin American operation, Hq. wants to know about it so proper steps can be taken for relief.

In the low end of 80 there are several South American broadcast stations operating in violation, and handling of this matter is already under way. At the top end, some aeronautical mobile stations may be heard from other regions, entirely legal (see chart); they are international air flights operating between the U. S. and Europe and, quite properly, using this channel after they cross into the European region some thousand miles or so east of New York.

In handling these matters, in order to have a good "case" Hq. needs more data than a single intercept. Occasionally a foreign transmitter will, in the process of being retuned for a new frequency circuit, temporarily develop a parasitic in our bands. We don't want to start international diplomatic machinery rolling for simply that. Should it be a consistent operation of any type, of course it merits complaint. So when you run across a station you think is in violation, note his frequency and the type of emission, as well as the call; then listen for him the next day and several days during the following week or so. If he's heard consistently, send your log dope to Hq. If you don't hear him again, forget it.

A word of caution: on the higher-frequency bands, if you run across an S9 "interloper," make sure it's not a receiver image. More than once we've been called upon to chase an invader out of our 20-meter band, only to find it was an image of a station operating around 15 Mc.

(*Continued on page 92*)

[1] *QST*, p. 39, September 1949.

FEDERAL COMMUNICATIONS COMMISSION

Washington 25, D. C.

PUBLIC NOTICE
December 21, 1950

RADIOCOMMUNICATION BETWEEN AMATEUR STATIONS OF DIFFERENT COUNTRIES

Communications between amateur radio stations licensed by the Federal Communications Commission and foreign amateur stations are permissible subject to the limitations of Section 1 of Article 42 of the Radio Regulations Annexed to the International Telecommunications Convention (Atlantic City, 1947). Section 1 of this article provides as follows:

> Radiocommunications between amateur stations of different countries shall be forbidden if the administration of one of the countries concerned has notified that it objects to such radiocommunications.

According to information obtained by the Commission from the Department of State, to and including October 13, 1950, certain foreign countries object to the exchange, internationally, of amateur radio communications and others impose specific limitations upon such communications. The names of the countries forbidding exchange, internationally, of amateur communications and countries imposing restrictions on such exchange, together with the terms of the restrictions, are hereinafter set forth.

ADMINISTRATIONS WHICH FORBID RADIO COMMUNICATIONS BETWEEN THEIR AMATEUR STATIONS AND AMATEUR STATIONS IN OTHER COUNTRIES:

Indonesia, Japan (excluding amateur stations of Allied Occupation Forces as authorized by the Supreme Commander, Allied Powers).

ADMINISTRATIONS WHICH FORBID ALL AMATEUR RADIO OPERATION: Indo-China, Iran, Lebanon, Netherlands Antilles, Thailand.

THE FOLLOWING ADMINISTRATIONS HAVE PLACED THE SPECIAL RESTRICTIONS NOTED ON AMATEUR RADIOCOMMUNICATIONS:

Australia (Commonwealth of): Amateur stations in Australia are authorized to conduct radiocommunications for purely experimental purposes with amateur stations in other countries and the administrations of which permit such radiocommunications.

Austria: The reception of foreign amateur station transmissions is permitted, but transmissions by Austrian amateur stations are strictly forbidden by the Allied control authorities in Austria.

Accordingly, United States amateur licensees are warned that international communications are limited by treaty as indicated above. The foregoing does not in any way modify and should not be confused with the provisions of Section 2 of Article 42 of the International Radio Regulations (Atlantic City, 1947) which prohibits the use of amateur stations for transmitting international communications on behalf of third parties except when permitted by special arrangements between the countries concerned.

This Notice supersedes and cancels Public Notices of October 12, 1949 (Mimeo. No. 41636) and November 4, 1949 (Mimeo. No. 42642).

Don't Pamper Your Harmonics!

Avoiding Damaging Harmonic Resonances in Amplifier Circuits

BY PHILIP S. RAND,* W1DBM

IT IS A well-known fact that no two amateur transmitters have the same harmonic content in the v.h.f. region, even though they were built from the same circuit diagram. As a matter of fact, the tube line-up and all the parts can be identical, but with a slightly different mechanical layout the harmonic generation will be quite

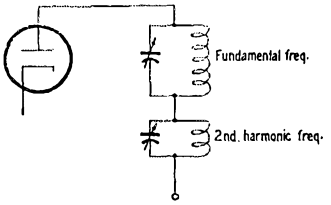


Fig. 1 — The tank circuit tuned to a harmonic may not be readily visible in an ordinary amplifier, but it is frequently there as a result of stray inductance and capacitance.

different. In an effort to learn more about this phenomenon the experimental breadboard oscillator-amplifier shown in the photograph was set up.

It was reasoned that the only possible difference between two r.f. amplifiers using the same circuit, tubes and voltages would be that one might have a secondary resonance in the v.h.f. region because of a combination of stray inductance and capacity resonating, by chance, at or near a harmonic frequency.[1] If this were the case it would be equivalent to having two tank circuits, Fig. 1, the first resonant at the fundamental and the second resonant at some harmonic frequency. With the proper conditions it might be possible to have nearly as much output at the second harmonic as at the fundamental.

Fig. 2 shows a typical 28-Mc. amplifier circuit that was set up to investigate spurious circuit resonances and their effect in increasing harmonic output. It also shows how a grid-dip oscillator was coupled to detect these unwanted resonances. The amplifier had tuned plate and grid circuits, link coupled, and was neutralized by a combination of inductance and capacity. It was driven by a push-pull 28-Mc. oscillator whose harmonic content had been carefully reduced to a minimum.

As shown in the photograph, all the usual TVI remedies had been applied except plate traps and shielding. Both oscillator and amplifier were mounted on a wooden breadboard so that they would be readily accessible for measurements and changes. A careful check with the grid-dip oscillator showed only one resonance point — 28 Mc. — in the complete range of the grid-dipper from 1.7 to 300 Mc. With grid drive and plate voltage applied, no harmonics could be detected with the usual crystal diode wavemeter. A Hallicrafters S-27 used as a field-strength meter read only S3 on the second harmonic, while the meter was pinned at 20 db. over S9 on the fundamental.

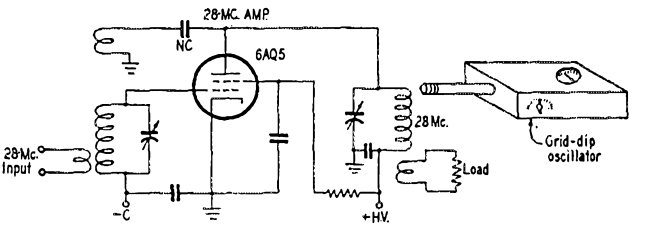


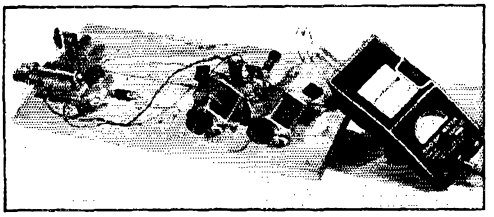
Fig. 2 — Circuit of the amplifier used for testing. As it was originally set up, no resonances except the desired one at 28 Mc. could be detected by the grid-dip meter.

In the next test a 56-Mc. resonance was artificially introduced in the circuit at the various points in Fig. 3 indicated by Xs. Each time the grid dipper was able to pick up and spot this resonance at the harmonic frequency and each time the power was applied to the amplifier the crystal diode wavemeter read off scale when tuned to the second harmonic and placed anywhere near the amplifier or any of its power supply leads. The field-strength meter indicated an *increase* of from 35 to 56 db. in harmonic output. This represents an increase of from 3160 to 398,000 times in power output at harmonic frequency depending on just where the unwanted resonance occurs in the circuit.

The highest harmonic output occurred when the 56-Mc. resonance was in the cathode circuit.

* % Laboratory of Advanced Research, Remington Rand Inc., South Norwalk, Conn.

[1] "TVI Tips," *QST*, October, 1949, p. 55.



The test set-up, showing the grid-dip meter coupled to read resonances.

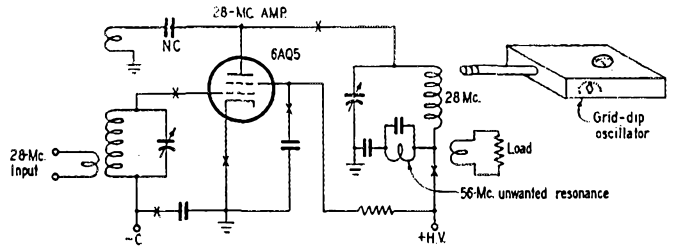


Fig. 3 — Resonant circuits simulating possible spurious resonances were inserted as shown and also tried at the points marked with an *X*.

To produce this resonance artificially, the cathode was connected to ground through a 1½-inch length of No. 14 wire. This was paralleled by a 150-$\mu\mu$fd. mica condenser. Fig. 4 shows the frequencies of the resonant circuits made by simply shorting the pigtails on various sizes of mica condensers.

Obviously, we would not intentionally put resonant circuits at harmonic frequencies in a transmitter we were building, but often they exist in the form of stray inductance and capacity. If they exist they must either be eliminated completely or at least detuned to some frequency far removed from a harmonic frequency. If two spurious resonances occur at about the same frequency simultaneously, one in the grid or cathode and the other in the plate or screen, the r.f. stage will take off as an oscillator, and we will have what is known as a beautiful case of parasitics. This is usually cured by inserting a parasitic choke in either the grid or plate to detune one of the resonant circuits and thus stop the parasitic oscillation. This procedure may or may not make the harmonic situation worse, depending on the frequency of the two resonant circuits that caused the parasitics.

The best bet is to investigate with a grid-dip meter and either eliminate any spurious resonances that might accidentally be there or detune them to some harmless frequencies.

Oftentimes the use of parasitic chokes may cause a resonance near a harmonic frequency and make the generation of harmonics much worse. It is better to change the layout so that shorter, heavier leads can be used, and to also use more effective by-pass condensers for the v.h.f. region.

Sometimes a resonance at harmonic frequency is composed of stray inductance and capacity within the final tank condenser and its resonant frequency can be varied by turning the condenser. If this is the case, be sure that the fundamental and harmonic tune at different dial settings. If they do not, adjust the number of turns in the tank coil so that the fundamental resonance falls as far away as possible from the harmonic resonance, or try a tank condenser of different physical shape or size, as this may have a different amount of stray inductance and capacity, and hence may resonate at a different frequency. The best tank condenser to use is the variable vacuum type — if you can afford it.

Troubles may be caused by a faulty by-pass condenser in the plate, cathode, screen, or grid circuit. By faulty, I mean one that has too much internal inductance in the v.h.f. region. It may be a fine condenser for audio or i.f. work, but at v.h.f. it looks more like a coil and condenser in series (Fig. 5). Try substituting a condenser of smaller physical size or try a Sprague Hypass.

If you use plate traps, be sure they are tuned for maximum attenuation of the harmonic in question, and not to resonate the circuit as a whole at the harmonic frequency. If the traps are tuned to the harmonic frequency with a grid-dipper after they have been wired in the circuit, they will produce greatly increased harmonics.[2] The only safe way is to tune them for minimum harmonic output while watching a f.s. meter.

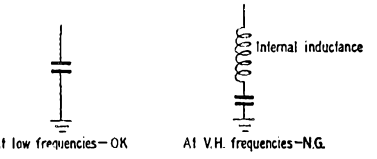


Fig. 5 — At v.h.f., "by-pass" condensers with their leads turn into an equivalent inductance. This occurs at all frequencies above which the combination of condenser and leads is series-resonant.

Oftentimes in the case of two and six meters, TVI, BCI, and even r.f. feed-back in speech amplifiers can be traced with a grid-dip oscillator to a resonant circuit tuned to the transmitter's fundamental frequency. This resonant circuit is made up of various stray inductances and capacities associated with the grid of the first audio stage in the offending receiver or a.f. amplifier and usually can be measured with a grid-dipper. W1PEA in Norwalk had a bad case of r.f. feed-back when operating on two meters. grid-dip oscillator showed that the first audio grid circuit was resonant at 150 Mc. By rearranging parts, this resonance was raised to over 200 Mc. and the r.f. feed-back disappeared.

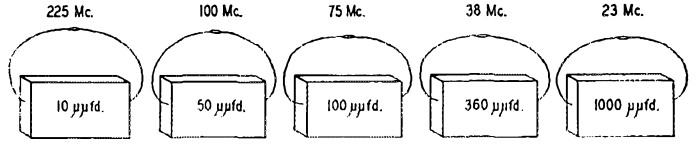


Fig. 4 — The familiar small mica condensers resonate, with the leads shorted, at the approximate frequencies shown. The resonant frequencies will increase if the lead lengths are made shorter and are not formed into a loop. However, in practical circuits long leads are frequently unavoidable — as when a tube element is by-passed, where the lead length includes the internal tube lead.

[2] See p. 34, *QST*, April, 1949.

The "Clemens Match"

Balanced Feed with Coaxial Line

BY JOHN F. CLEMENS,* W9ERN

ABOUT a year ago a new 3-element 10-meter rotary beam was under construction at W9ERN. A previous model, fed with 300-ohm Twin-Lead and a T-match, had just been taken down due to the unsatisfactory performance of the feed system, which exhibited a high s.w.r. and considerable unbalance of the feed-line currents. An experimental project was undertaken to devise a method of feeding the beam with coaxial cable to take advantage of the general availability and good weather characteristics of RG-8/U. The experimental work on the antenna was done on a scaled version at 300 Mc., fed with the smaller-sized RG-58/U.

A feed system finally evolved from these investigations which appeared promising. The system was then applied to the full-sized 10-meter beam and the entire antenna was installed and evaluated over an 8-month period. The results of operation over this length of time on ten meters confirmed the results with the 300-Mc. antenna. A description of the antenna feed system with the design data appeared in *Electronics* in October, 1950.[1]

A number of inquiries followed publication of this article, mostly from amateurs who wished to apply the system to amateur antennas. The original thought in the first article was the probability that the antenna feed system might be attractive for use on television receiving beams. *QST* requested information on the system since it apparently had greatest interest for amateurs and many amateurs would be reached only through *QST*.

Unlike several previous antenna feed systems, this one bears no resemblance to an alphabetical letter, either English or Greek; and therefore, for want of a descriptive name the system is called the "Clemens Match."

Fig. 1 is a drawing showing the method of assembling the feed system. All dimensions in Fig. 1 refer to the 29-Mc. 3-element "plumber's delight" beam and are inversely proportional to frequency. Thus, to use the system on half the frequency, all dimensions would be doubled. Theoretically, of course, to be exactly similar to the original even the diameter of the elements should be scaled to the new frequency; practically, only the lengths of the elements and longitudinal dimensions need be scaled. The effect of a different element diameter should be negligible.

An advantage of this method of feed is the simplicity of installation. The entire feed system can be prepared on the ground, rolled up, carried onto the roof, and fastened to the antenna. This is because the matching system itself is made of RG-8/U, without any additional tubing or clamps being required.

The simplicity of the system is evident from the drawing. The odd feature of the "Clemens Match" is that the center conductor of the coaxial cable is not connected directly to the antenna. Also, a decided advantage is the fact that it is not necessary to split the driven element and plumber's delight construction is therefore practical.

Principles and Construction

The general theory and development of the system may be explained thus: The impedance between two symmetrically located points on an antenna rises from zero, when the points are adjacent, to a very high value, when the points are at the ends of the antenna. By suitably locating two such points, we may have an impedance whose resistive component is equal to the characteristic impedance of the transmission line. The equivalent impedance between the two points may be represented as a resistance and reactance in series or in parallel. Suppose that these two points have been chosen so that the resistance component of the equivalent series impedance is the characteristic impedance of RG-8/U, or 50 ohms. These two points were obtained by experiment and are 20 inches each side of center in the antenna shown.

A coax cable may now be fed to the antenna, up along (or inside) the mast and along the boom to the center of the antenna. The shield of the cable may be connected to the center of the antenna, if desired, with negligible effect since the voltage at the center of the antenna is very low. The cable may then be fed along the antenna element out toward one of the driving points, and again, if desired, the shield may be bonded to the antenna element along their mutual length since such a connection will in effect only increase the diameter of the antenna element.

When the cable reaches one of the driving points, the shield must be well bonded to the antenna element. Current from one conductor of the transmission line, the coax shield, reaches one of the driving points by this connection.

The center conductor of the coax is extended, without shielding, and makes a "U" turn, passing back past the center of the antenna and so on to the other driving point. The center conductor enters a shield at this second driving point and the resultant coax cable continues along the antenna toward the boom and mast. The shield of this section of coax is bonded to the second

* % Electronics Research, Inc., Evansville, Ind.

[1] Clemens, "A Coaxial Feed System for Antennas," *Electronics*, October, 1950, p. 154.

driving point. This second section of cable is eventually short-circuited to form an equivalent capacitive reactance. In the antenna of Fig. 1 a 72-inch length of coax provides the proper value of capacitive reactance. The shield of the shorted coax section may also be bonded electrically to the antenna, mast, and boom, if desired, but it is essential that the shield be well connected to the antenna at the second driving point.

The entire assembly is almost perfectly symmetrical and as a result may be expected to be free of electrical unbalance effects.

The purpose of the shorted coax section is to provide a capacitance to resonate with the inductance of the exposed center conductor of the cable, which is the cross lead (42 inches long in Fig. 1) plus the small additional equivalent series inductance of the antenna element itself between the two driving points. All of these various capacitive and inductive components can be calculated once the two driving points have been experimentally determined. However, the determination of these quantities is only of academic interest since the experimental data were necessary to fix the 50-ohm feed points.

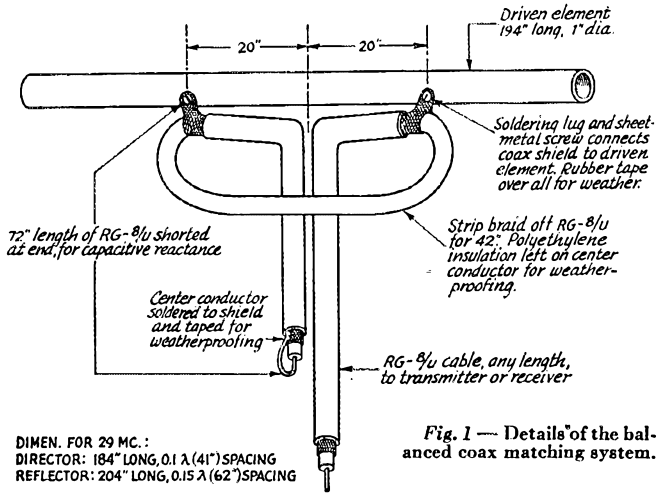


Fig. 1 — Details of the balanced coax matching system.

During the experimental work on the antenna, one model was tested with bare braid coax with the braid contacting the mast and antenna. The performance of this antenna was exactly the same when the braid was insulated everywhere except at the connections to the two driving points. Since the weatherproof feature of coax was a prime aim, the final installation was made with RG-8/U with the vinyl jacket intact, except for an inch or so at each connecting point where a heavy soldering lug was soldered to the braid and fastened to the antenna element with a self-tapping screw. The entire region of the connection was then taped with Scotch electrical tape to prevent the entry of water under the vinyl jacket. The cross lead was formed of 42 inches of coax center conductor from which the vinyl jacket and shield braid had been removed. The heavy polyethylene insulation was left on the center conductor for weatherproofing. After 8 months, which included a winter, the feed system was still in perfect condition. The 42-inch length of center conductor sags about 3 inches below the antenna element and from a distance the feed system looks like a T-match.

Both the feed line and the shorted capacitive section were wound in a slow spiral a turn or two around the antenna element for mechanical support and likewise spiraled around the mast and then taped in position.

Transmission-Line Pick-Up

Standing-wave measurements on the transmission line showed a perfect 1/1 match at 29 Mc., rising to approximately 1.5/1 at 28.5 and 30.0 Mc. Experiment then continued to determine the balance of the feed-line currents. Balance of the feed-line currents is essential to achieve maximum signal-to-noise ratio, since the beam and not the feed line does the receiving. One test for balance is the alignment between the direction of maximum radiation and the elements of the antenna, maximum radiation occurring perpendicular to the antenna element in a balanced antenna. This desirable condition was found to exist by tests with a field-strength meter and local receiver S-meters. The voltages at the two tips of the antenna were compared and found to be the same by dangling flashlight bulbs at each tip. The center conductor of the coax was then broken at the antenna where it emerged from the shield and the receiver in the shack went completely dead, demonstrating the lack of signal pick-up on the shield.

Several remarkable instances of the benefits of a balanced coax feed have been observed. For instance, when an electric appliance such as a sewing machine was operated in the house below the operating room, it was found that an S9 signal of perfect readability which was only slightly affected by the noise disappeared far below the noise when the shield was broken at the receiver even though the center conductor remained connected. The noise signal from the sewing machine also rose from S4 or so to S9+ when the shield connection was broken at the receiver.

The directional characteristic of the beam was just as pronounced on reception as on transmission, a further indication of balanced feed.

The same matching system should be applicable to other types of antennas, such as a 4-element beam or simple half-wave single element. It is possible that 50-ohm cable can be matched even to a half-wave dipole having a center impedance of 73 ohms, because the antenna is not broken but allowed to shunt the resistance component which can produce a 50-ohm equivalent series resistance by suitable selection of the

driving points. Lack of time has prevented work on applying the system to other antennas. There is reason to believe, however, that the same dimensions could be used on a 4-element close-spaced or even a wide-spaced beam with a negligible mismatch, say, less than 1.5/1. The reasoning behind this belief is that although the center impedance of the driven element varies appreciably as the number or spacing of parasitic elements is changed, the impedance between the tips of the antenna varies in the opposite direction. Therefore, there must be a region on the antenna where the impedance varies only slightly or actually remains constant and the two feed points, 40 inches apart, *may* be in this region.

Adjustment

Should anyone wish to determine exactly the correct feed points for any type of beam, a description of the test procedure will be helpful. A Micromatch is used to determine the s.w.r. on the transmission line. Instead of the shorted length of coax cable a small variable condenser may be temporarily used in series with the cross lead. Two feed points are arbitrarily selected and the coax shield is clamped to one, and one terminal of the variable condenser is clamped to the other. The center conductor is then connected to the other terminal of the variable condenser, power is applied, and the condenser is tuned for a minimum s.w.r. If this minimum value is not 1/1, the feed points should be relocated and the test repeated. In this way the proper points of feed may be rapidly located. The capacity setting of the condenser should then be determined and a length of shorted coax should be cut to provide the same value of capacitive reactance and this shorted stub is then used to replace the condenser.

The necessary length of cable for a closed stub is determined, once one knows the necessary capacitive reactance, by

$$X_c = Z_k \tan \theta = -\frac{X}{Z_o},$$

solving for θ. The electrical angle θ will always be between 90 and 180 degrees and may then be converted to inches of coax by the formula

$$D = \frac{32.8\ V_p}{f}\theta$$

where D is the length in inches, θ is expressed in degrees, f in megacycles, and V_p, the propagation velocity, as a fraction. (V_p for RG-8/U is 0.66.)

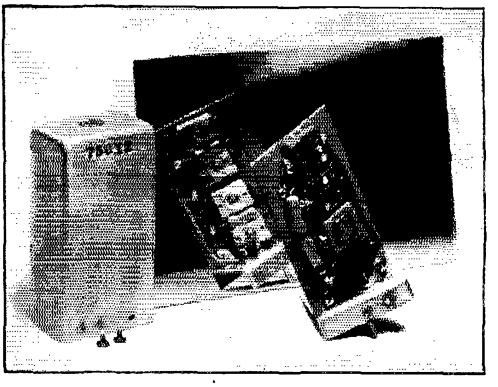
The series-resonant circuit formed by the shorted coax capacitor, the antenna and cross-lead inductance and the antenna radiation resistance is a low-Q circuit and therefore has a negligible effect on the over-all bandwidth. In other words, since a parasitic beam is a relatively high-Q narrow-band device, the matching circuit will not affect the bandwidth of the system to an appreciable degree.

A standing wave will always exist in the shorted capacitive stub but the values of voltage reached are well within the ratings of RG-8/U for even a kilowatt of r.f. The currents in the shorted section will exceed the rating of RG-8/U with transmitter powers of over 100 watts or so. The obvious remedy is to use an open-circuited coax capacitor section, which will suffice for over a kilowatt of r.f. This change will require subtracting a quarter-wave-long section from the capacitive section and then leaving the coax open-circuited. The number of inches of coax equivalent to 90 degrees at the operating frequency may be computed and subtracted from the length originally determined. In Fig. 1 the shorted coax section may be shortened by 67 inches, leaving an open stub 5 inches long (f = 29 Mc.). The open end should be well taped for weatherproofing.

The benefits of coaxial cable will be greatly appreciated by anyone who has attempted to use Twin-Lead under adverse weather conditions. The loading of the coax-fed antenna is unaffected by rain or ice and the feed line may be wrapped around the mast without harm.

Packaged Audio Phase-Shift Network

The audio phase-shift network has often been a stumbling block in the path of an amateur building phase-shift type single-sideband transmitting and receiving equipment. Many have built and adjusted their own networks, of course, but there has been a need and demand for an inexpensive preadjusted unit. That demand can now be met by the No. 75012 Phasing Network recently announced by the James Millen Manufacturing Company, Malden, Mass.



Designed by Donald Norgaard, W2KUJ, and described in the November-December issue of *GE Ham News*, the network will give an unwanted-sideband suppression of at least 39 db. over the range of 225 to 2750 cycles and thus is useful for practically any amateur s.s.b. receiving or transmitting service. — *B. G.*

United States Naval Reserve

Top Electronics Units Commended

The following Naval Reserve Electronics Companies have been named the outstanding Reserve electronics units in their districts for the year 1950.

Naval District	*Company & Amateur Call*		*Location*
First	1-2	K1NRA	Malden, Mass.
Third	3-20	K2NRW	Ramsey, N. J.
Fourth	4-6	K3NAC	Stroudsburg, Pa.
Sixth	6-22	K4NRK	Sarasota, Fla.
Eighth	8-45	K5NAN	Harlingen, Texas
Ninth	9-166	K9NAG	Downers Grove, Ill.
Eleventh	11-8	K6NBG	Pomona, Calif.
Twelfth	12-6	K6NRM	Modesto, Calif.
Thirteenth	13-23	K7NAQ	Great Falls, Mont.
Fourteenth	14-1	KH6NR	Pearl Harbor, T. H.
Potomac River Naval Command	W-5	W3USN	Washington, D. C.

The achievements of these units from the standpoint of training, personnel, and administration have been recognized by letters of commendation forwarded to each district winner by the Chief of Naval Personnel.

Ethel Mae Smith, RM3, USNR, hands an incoming message to Cmdr. Ivan H. Loucks, USNR, W3GD. The QSL cards represent QSOs at W3USN, Naval Reserve Training Center, Washington, D. C. "Radioman" Smith is W3MSU, ex-W7FWB, and a founder of the Young Ladies' Radio League. She is employed as a civilian electronics specialist at the Naval Research Laboratory. Cmdr. Loucks is commanding officer of Volunteer Electronics Company W-1 (W3PZA), Washington. He is known in ham circles as Chief of the Amateur Branch, State-Local Government and Amateur Division, Federal Communications Commission.

Training by Television

On October 10, 1950, the Special Devices Center of the Office of Naval Research, Sands Point, New York, in association with the Director of Training, Third Naval District, inaugurated the first of forty-two weekly television programs for training Naval Reservists in nineteen training centers in the New York area. These programs are one-half hour each and are carried as a public service by WOR-TV. During the forty-two weeks, various types of format will be used. Some programs will originate in the Special Devices Center studio, and others from a destroyer anchored off Gravesend Bay, Brooklyn. All programs are designed strictly for training purposes and make no appeal to the usual home audience.

Amateur Clubs Share Reserve Facilities

The following listed amateur radio clubs have accepted an invitation to hold their meetings at local Naval Reserve activities. These are in addition to the clubs mentioned on the Naval Reserve page, December 1950 *QST*. NRTC indicates Naval Reserve Training Center; NREF indicates Naval Reserve Electronics Facility.

Amateur Club of Gary (Ind.)	(NRTC, K9NRV)
Anderson (Ind.) Radio Club	(NRTC, K9NRZ)
Arrowhead Radio Amateur Club	(NRTC, Duluth, Minn., KØNRN)
Dubuque (Iowa) Amateur Radio Club	(NRTC, KØNR)
DuPage Radio Club	(NREF, Downers Grove, Ill., K9NAG)
Genesee County Radio Club	(NRTC, Flint, Mich.)
Hannibal (Mo.) Amateur Radio Club	(NRTC, KØNBK)
Mo.-Kans. Radio Assn.	(NREF, Pittsburg, Kans., KØNAX)
North Iowa Radio Transmitting Assn.	(NREF, Mason City, Iowa, KØNBQ)
Oakland County Amateur Radio Club	(NRTC, Pontiac, Mich., K8NAK)
Oshkosh (Wis.) Amateur Radio Club	(NRTC, K9NRO)
Quad City Amateur Club, Inc.	(NRTC, Moline, Ill., K9NRD)
Western Illinois Radio Club	(NRTC, Quincy, Ill., K9NRA)

Emergency Operations

During November floods at Reno, Nevada, the Nava Reserve Training Center (K7NRU) at that city provided walkie-talkie communications, water pumps and amphibious ducks, and assisted generally with evacuation of goods and personnel from downtown and suburban areas.

Naval and Marine Corps Reserve Training Center (K6NRW), Bakersfield, California, established emergency operations for the duration of the Kern River high-water threat, November 20th-21st. Assistance was provided to the California State Highway Patrol, Kern County Supervisors, Fire Department, Disaster Council, and Pacific Gas and Electric Companies.

During the severe storms which hit New England in late 1950, both electric power and telephone service were disrupted at the Naval Reserve Training Center (K1NRQ), Lawrence, Massachusetts. Emergency radio equipment provided the only direct means of communication.

The District Engineer, Louisville District, Corps of Engineers, USA, has requested the assistance of radio amateurs

(Continued on page 92)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Now and then we are confronted by some soul-searching individual who poses the apparently simple question, "Say, chum, just how does one go about getting the most kicks out of DXing, anyway?" Now we can refer him to W1DX's apt summation of this "thing" in our September, '50, back number which covers the subject well; also in lieu thereof we might list a few prime considerations on the negative side, the observance of which should certainly assist one to derive the *least* enjoyment from amateur radio's DX angle. Such as, to wit:

— Keep as few statistics on your operation as possible. Card indexes, complete QSL files, and an accurate log are strictly for the novice.

— Develop a strong prejudice against some phase of DXing such as 'phone, c.w., QRO, QRP, newcomers, and so forth. Your scorn may soon turn you to stamps or crocheting.

— Be content with nothing but high power so that when suddenly stuck with a TVI/BCI-ridden QTH you'll QRT rather than QRP.

— Build your station strictly around one ham band so you'll not be tempted to work others when your favorite goes out on a TVI or sunspot binge.

— Build and repair as little of your gear as you can. It's safer to call up the factory than risk soldering-iron burns.

— Keep your code speed as low as the law allows since that stuff can't possibly be fun.

— Specialize in haphazard operation at your station. The "look how sloppy I can transmit and still work DX" attitude always impresses one's listening public.

— Make a strong attempt to stay far out-of-date in keeping up with the state of the art. C.w. break-in and single-sideband 'phone advantages belong solely to commercials.

— Ignore neighbors with interference problems as TVI and BCI are too often the fault of manufacturers. Neighbors are usually cranks with public-nuisance complexes, anyway.

Well, don't be too piqued if you can't bat a perfect zero on this talent test. Jeeves & Co. are already having trouble with their own 1951 resolutions along these lines.

What:

A somewhat bulksome tome might be condensed from the wails of anguish emitted by DXers bearing on the prevalent mediocre conditions. One local built a b.c.-set converter for *twenty* and it took him a week to ascertain that it was working. But things really aren't that bad. In fact they may be on the mend. **KX6AA** (14,018) was the 100th country worked by W2JBL's 45 watts and vertical whip, for instance. George's others: **3V8AN** (14,050), **TF3SF** (14,020), **LX1AS** (14,040), **CR7BB** (14,005). **VQs 2JN** (14,070) **4IMS** (14,058) **4KRL** (14,000), **MF2ABE** in Trieste (14,010), **CR5AC** (14,010), **ZS3Q** (14,065), and **ZE3JJ** (14,092). Somebody once told us that a vertical will outperform a horizontal under poor ionospheric conditions — very well could be . . . . . **FF8AC** (14,018 t3), **FM7WF** (14,002), **FY7YB** (14,008), **EA6AM** (14,026), **TA3AA** (14,006), **PK1TM** (14,038), **YS1O** (14,016), **ZC4XP** (14,041), **ZE3JP** (14,008), **UO5KAA** (14,022 t6), and **UAØKAB** (14,002) are reasons why DL4FS prefers his rhombic. **UAØKAB** QSLd quickly, by the way. Guy was told by YU1CAG that YU1WEZ is a privateer. DL4FS was hoping to put 3A2AB on the air once more sometime in early '51 which could be right now . . . . . W5FXN has been pretty busy but caught up with **OQ5BQ** (14,015) while still chasing **VK1RF** (14,080), **VK1RB** (14,080), **VP8AT** (14,000 t7), **W5OEU/KW6** (14,063), **UF6AC** (14,082), and **CR7BC** (14,140). Jim is curious about one CA1DJ . . . . . W6ALQ captured OQ5NK, VP1AA, VP1NW, PJ5OK, and OE3CC while W2OLU ran into the mysterious **LA4ZZ** (14,100) . . . . . While we don't think time-of-QSO has as much possible universal value as frequency, we're willing to list any submitted. The hour of the day that a West Coast station works an Asian usually means nothing to the East Coast, and vice versa. Anyway, WØFID bagged the following (EST): SP1JF (0946), HP1BR (1822), KS4AC (1852), and CN8EG (1744) . . . . . W5MPG wrapped up **EA8BC** (14,075), **FF8JC** (14,031), **EAØAB** (14,065), **CR7CR** (14,002), **CR6AW** (14,035), and a CR5 while W4CYY contacted EA9AP, CR5AD, 9S4AX, and YO2BF. "JB" recently won a battle with some kidney-stone QRM . . . . . GC2CNC (14,070), **VS2CP** (14,110), **VU2MD** (14,038 t8), **UC2KAB** (14,022), and **CR7AG** (14,067) were hauled in at W8JYS while W1FPS adds VQ2GW, FY8AC, an FF8 and a YS1. Ray would like some pitch on CR4SS . . . . . KP4KD and KP4HU increased power to 35 watts on their joint enterprise, KP4KB, and reached 88 countries with folks such as ZC4AA, ET9X, PK6VK, and FQ8AC . . . . . VQ9FD (14,030) is a nice one noted by W4CYY, and **ZS2MI** (14,005) is back at it from Marion Island according to W5FXN . . . . . HS1VR (14,001 t8 QRH) and **YJ1AA** (14,060) were being stalked by KV4AA . . . . . The So. Calif. DX Club has been making out okay as indicated in their *Bulletin:* **YI3s CZY** (14,015) **BFS** (14,014) **BAD** (14,012) **ECU** (14,114) **DYN** (14,049) **MBC** (14,030), **ZS8MK** (14,117), **FB8ZZ** (14,030), **IS1CNQ** (14,077), **FD3RG** (14,040), **PK7EK** (14,129), **EQ3B** (14,073–090), **ZD6EF** (14,051), and **LZ1KY** (14,020 t5). Editor W6SYG records that the band is frequently wide open in the morning out thataway. Gads, those guys must have a pipeline to Iraq! . . . . . The *DXer* of the No. Calif. DX Club adds others: **FB8AX** (14,050), **IT1AQS** (14,012), **VS7MG** (14,090), **FP8AL** (14,040), and **YK1AB** (14,090). More morning work. Greely may have had DXing in mind

* DX Editor, *QST*. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

when he was haranguing young men to go West . . . . . EL2P (14,060) with 75 watts to a long wire, ZS7C (14,025), and AC3SQ (14,090) have been attracting large followings.

In the 'phone division, DL4FS nailed down the elusive FN8AD (14,285) and W4CYY has been hearing a good signal from EQ3FM (14,085–120) . . . . . ZS9F (14,160), ZS3F (14,315), VP2GG of the Windwards (14,157), XZ2SY (14,330), and VQ4RF (14,365) answered W5MPG's new 3-element array . . . . . W4ENA/JAØ on Iwo was worked by W8EBC and AR8BC puts a good signal into Kansas according to Mr. A. Rugel. The Lebanon item can most often be found around 14,170 . . . . . The aforementioned *DXer* and *Bulletin* apparently have been concentrating on the dot-and-dash method but the latter makes mention of ZS9S, VR1E, and VR1F (14,168).

While not exactly starring in its 14-Mc. supporting rôle, *forty* has nevertheless provided some diversion. VP5BH (7018 t7) has ably taken over representation of the Caymans we are notified by W5GEL, and FW8AA of Wallis is reported by the *Bulletin* to be scheduling FK8AC on this band. The boys are trying to interest him in the joys of DXing . . . . . DL4FS chatted with VP5BF (7025), VS7NG (7020), UQ2AL (7003), ZD4AB (7016), and SP1JF (7018) . . . . . W3JAK managed OA4BG, CN8EM, FA8DA, SP1CM, and UQ2AX while youngster W5QKN broke into the DX angle with HK4DP and YN3CP . . . . . Somebody's electric blanket terminated the efforts of W9ABS to raise FO8AH (7050 t7c) and W8UOD puts the finger on W1FAX/KW6 (7010) who comes through around breakfast time . . . . . W9ESQ has a nice gathering in YV5DO, CN8EJ, HH2CL, FM7WF, HC2IH, ZE2JN, HR2HZ, ZS3K, VP7NQ, HK5HN, TI2PZ, KG6GU and others . . . . . WØFID works Africa and the Caribbean around midnight EST and W9KQB has pushed his BC-459 to fifty-six 7-Mc. countries . . . . . The So. Calif. DX Club's special forty-meter DX test brought to light the activity of VP8s AJ AK AI AR, VR2AA, PK4DA, FK8AB, the shady MX1AF, UAØVB, UAØKBB, VS2CH, FA8BG, and ZK1AZ.

W2ZVS's beam broke down in a gale to decimate our report for *ten* on this trip. But not before Dixie had reeled off confabs with MD2GC, MI3XX, CR6AV, KJ6AJ, ZEs 2KH 3JT, VQ2VR, and ZS8A . . . . . Another New Jersey sharpshooter, W2AEB, glommed onto ZS7C, ZEs 1JE 2JL, ZP5IB, EA8AX, FF8AH, VQ2DR, and ZS3O. If the price of coax ever declines sufficiently it would appear advantageous for the truly deluxe DX station to feed a W2 skywire for 28-Mc. work and a W6 antenna for satisfactory 14-Mc. results . . . . . A 98.54% QSL average is still held by W4MKB with 135 verified from 137 worked. CR5UP and ZK2AA cards are still en route . . . . . On c.w. W8EBC encountered W4IKC/KW6 . . . . . OX3BD and HC2KB console each other around 28,050 kc.

There's lots to chortle about re *eighty* and if you have a dearth of neon signs and power leaks in your surroundings you might make hay. W9AND made it forty-one 3.5-Mc. countries with SM5ABP (3503) and also raised Gs 3CKL 5DQ 5VB 6GM 8JR and ZLs 1HM 2BD 3NE . . . . . CN8EJ is about to fire up on 3563.475 (!) kc. with a Vee. Moroccan regs permit hamming in the 3500–3625 kc. range only, making it tough to flag down 75-meter W 'phones. Except for forty meters where the 7200–7300 kc. range is unavailable, the CN8 frequencies run close to our own . . . . . W9HUZ knocked off ZLs 1CI 3OP 4IE and KH6PL while W2PEO collected SP1JF (3510) . . . . . W4BRB contributes a juicy list of stuff worked and in the works: FY7YA, FY8AC (3515), YN1AA (3525), KS4AC (3512), VP6CDI (3515), LU7AZ (3513), VP5FR (3510), ZS3K (3515), EK1AO (3508), VP1AA (3501), ZLs 2DZ 2AFZ 3BC and 4GJ near 3515, and Europeans HA4SA, G3AZY, G2DOW, G5KT and DL7AH between 3510–3520. Gene learns, via VK3YP and KP4HU, of ZK2AB (3533) and FO8GH (VFO near bottom edge) . . . . . W2QHH landed 9S4AX, is skedding ZB2I on 3567, and has shipped a 3547 rock to EA6AF.

W1BB reports *one-sixty* QSOs with EK1AO, G6GM, and G3PU . . . . . Sufficient indication that DX on this band is more than somebody's pet chimera is the fact that W4NNN was reported heard in New Zealand during last season's c.w. activity. Bob is now situated in Iowa and is shopping about for a good DX QTH . . . . . If you've room for an antenna for the low band, you might refer to page 52 of January *QST* for particulars on the 160-meter DX tests.

HB9EU holds many DX awards in addition to DXCC membership and is one of the more well-known Swiss stations on DX frequencies. Rudi and Mrs. Faessler here inspect a few tools of the trade.

Where:

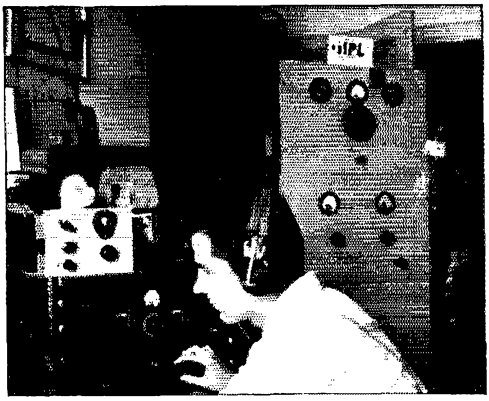
If you think you're having a deuce of a time raising DX, pray take a peep at our accumulation difficulties in the QTH department. They can almost be counted on the digits of one paw, by golly . . . . . Because of his leaving Tripolitania, H. T. "Butch" Orrell, MT2E, advises that he has surrendered MD2/MT2 QSL bureau duties to MT2DZ who answers to the address: Peter Keller, P. O. Box 260, Tripoli, Tripolitania, North Africa . . . . . We have it from the NRRL that LA4ZZ/MM's operation is unauthorized so somebody might use the QTH given below to inform him of the fact . . . . . If you work an IT1 you'll probably find him in the I1 listings in the *Call Book* as only the prefix was changed on Sicilian calls.

EA8BE	Eduardo 4, Las Palmas, Canary Islands
EQ3FM	APO 205, % PM, New York City, N. Y.
FF8AC	Yvon Rangin, Box 19, Port Etienne, Mauritania, F. W. A.
HR2JM	John B. Morrison, American Consulate, San Pedro Sula, Honduras
I5A	(Ex-MS4A) (QSL via I1OJ)
LA4QC	(QSL via NRRL)
LA4ZZ	(QSL via WØYRN)
LJ2Z	Box 3009, Oslo, Norway
LJ3B	Box 3009, Oslo, Norway
MB9BL	G. S. Beamish, H. Q. Klagenfurt Garrison, British Troops in Austria, Austria
MF2ABE	(QSL via RSGB)
MI3RP	APO 834, % PM, New York City, N. Y.
Ex-MT2E	H. T. Orrell, Eastern Telegraph Mess, Aden, Aden
OE13LL	QSL Bureau, APO 777-A, U. S. Forces in Austria, Austria
PK1RI	A. Te Riet, P. O. Box 127, Djakarta, Republic of Indonesia
SVØWX	Wm. J. Koster, % American Consulate, Salonika, Greece
VK1RF	(QSL via WIA)
VP8AP	(QSL to GM3EYP or via RSGB)
YU2DGE	Box 48, Belgrade, Yugoslavia
ZC4AA	(QSL via RSGB)
ZD2DYM	Frank Dymond, Nigeria Signal Squadron, Lagos, Nigeria
ZE3JT	P. O. Box 2106, Salisbury, Southern Rhodesia

Still copying solid through the QSB are W2s AEB JBL ZVS, W5s FXN NWB, W6s ALQ AM, W8CVU, W9s CFT HUZ, WØYRN, DL4FS, KP4KD, and Mr. Phil Bates.

Tidbits:

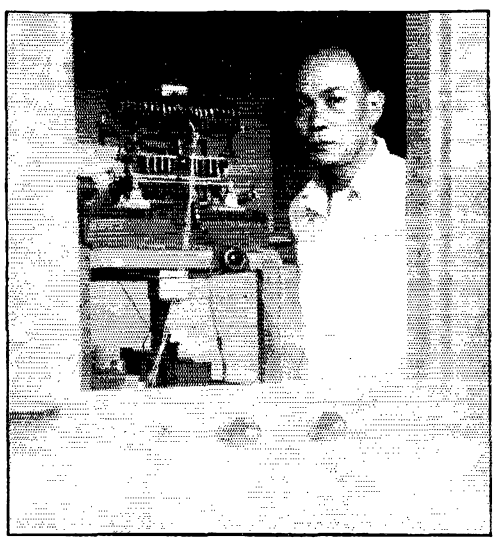
Conditions permitting, W4RXP and W1PVF will ride the airwaves out of St. Pierre (FP8) come this June or July . . . . . MS4A finished a three-month sojourn in Italy and returned to Somaliland where he will resume activity as I5A, I5 being the new label for Italian Somaliland. This from W2AEB who also brings good tidings in word that ZS9F is again active . . . . . KP4KD hopped



Still trying to promote some HV-prefixed operation for the DX gang, Johnny Martelli listens to the W/VE anvil chorus at the controls of his widely-worked I1PL of Bologna.

over to KV4 and had a pleasant visit with KV4AA. The two hadn't hooked up personally for some 27 years. Ev discovered things in sad shape at KV4AO but the boys got everything perking again in time to hit the 3.5-Mc. nets. KP4KD and KV4AA were shipmates a long time back when operating the Navy's NAU and made the XYLs strictly second fiddle in the chin-wagging department . . . . . Much too late to do any good but ZS1KF told W5FXN he was fixin' to work some portable in ZS8 in December and January. If you snagged him, bully for you! . . . . . ZD4AH will head for ZS-land in April or May, learns W4MKB. Grev will do his darndest to use up the 1300 QSLs furnished by Joe which is surely okay by us. The ZD4AHs have a first harmonic now just a few months old . . . . . We regret to hear via W3ADZ from ZL2KY that Bill Hall, ZL2BH, recently entered the list of silent keys. Bill was quite well-known throughout the world of DX . . . . . CN8EJ received his "greetings" from the Vatican on behalf of HV1A but that wasn't the end of the story. Jim was telling MD2AC about the deal when who horns in on the QSO but an HV1A! He didn't linger long, however, upon learning that the jig was up. According to CN8EJ, CN8s EO ES ET and EW will soon be QRT, leaving CN8s EE EF EG EH EJ EM and EX to handle the U. S. division of French Moroccan activity. CN8EJ is looking forward to contacts with S. Dak., Mont., Idaho, Utah, Wyo. and Nev. for the purpose of securing his WAS certificate . . . . . "Conditions are quite poor. . . . The Ws are banging in good on 40 meters so maybe I'll have to try that band. Have been extremely lucky in this QTH and several times have made WAC in one day on 20 fone. The DX Hogs over here fight for EQ3FM's 20 watts!" With these lines SV9WX seems to cover the Greecian DX situation quite adeptly. Bill puts 35 watts into an 807 which feeds a doublet and he receives with an SX-28 . . . . . You diploma chasers may be interested in the Belgian W-10-BAS award (Worked Ten Bruges Amateur Stations). It will be given to any amateur who submits proof of contact with ten Bruges amateurs since January, 1951. Qualified as Bruges stations are all licensed amateur stations situated within the limits of the Bruges district and some of these are ON4s AJ DJ DZ IA IB IC IG IH IK KF LC LO LV OD OO PU UM and YA. No QSLs are required; merely submit a list mentioning the calls of the stations worked along with date, time and frequency band to The Bruges Gang, U. B. A., P. O. Box 38, Bruges, Belgium, enclosing five IRCs for return postage . . . . . DL4FS of LX4 and 3A2 renown is hard at work trying to swing a deal for some Andorra operation. So far the PX authorities evince little enthusiasm in correspondence with Guy, we are told by W6AM . . . . . Sixty-one countries have so far been contacted by CM9AA's mobile. We'd like to hear other claims in this respect. Sooner or later we expect news of a mobile DXCC accomplishment . . . . . W6BES takes time out to advise that, contrary to a previous "Where" item, he does not handle C1RL QSLs. [I'd like to handle one with our call on it, Boss — *Jeeves.*]

Pressure of work has curtailed Bud's DX activities . . . . . DL7AH is in need of but one more state for his WAS, that being Utah. This one seems to be in great demand these days. We may be able to provide a useful service to WAS-hunters if DX men in the following states will notify us of their activity and most-used frequencies: Wyoming, Montana, South Dakota, Arkansas, Vermont, Delaware, Nevada, and the aforementioned Utah. These, judging by the overseas mailbag, appear to be the toughies . . . . . W6JVE, ex-W9IVN, hears that one of the KX6AA operators is returning to the States. This probably won't affect the on-the-air status of the station . . . . . CO6AJ expects to be off the air for a few months and desires to pass along his best regards to DX buddies through this medium . . . . . All due MT2E QSLs are en route destinations now and Butch is QRX in Aden awaiting assignment of a new call. This may be VS9E. Incidentally, he writes that MD2WY was never licensed and cards for the fellow must remain undelivered . . . . . LA4QC on Queen Maud Land in Antarctica has been keeping in touch with home through LAs 7Y and 2B. The NRRL states that the station consistently employs both 'phone and c.w. Chaps handy with the Norwegian lingo will have the jump on this one . . . . . HR2JM is wondering where all his overdue QSLs have gone. John recently fired up in San Pedro Sula and does well on 'phone with 25 watts to an 807W with a doublet radiator. HR2JM expects to remain active for approximately six months before acquiring a new QTH and possibly a new prefix — 100% QSL is guaranteed



Tan Koon San of PK4KS gazes past his final at the cameraman in the backyard. PK4KS was one of the first postwar PKs and succeeded in keeping the 10-meter boys in a state of high excitement for a lengthy period. (*Photo courtesy W8SYC*)

. . . . . LJ2Z has held the calls W2API, W6FZQ, and W7JHS and informs us that LJ isn't a new country unless one needs Norway. Charlie is another sure bet for a QSL . . . . . OE13LL sends us a card from Salzburg's vicinity bearing the claim "highest ham in the world" upon it. This would refer to the call letters we presume and he must be right, by gosh. Still a long way to go to pass up old EAR96, though . . . . . Written upon one of his famous Donald Duck QSLs, CX2AJ sends us word of a week's visit to Argentina where he and LU2CW had a merry go-around. CX 'phones are fairly plentiful nowadays but where are all those old-time CX c.w. ops hiding? . . . . . We see that W6SR's team licked W6MHB's outfit in the No. Calif. DX Club's recent DX Test by a score of 53,622,-175 to 29,875,260 — sounds like a Yankee-Red Sox baseball game. W6UZX was high man with 400 QSOs in 91 countries. This was a two-month battle and 21 members

(*Continued on page 92*)

In Search of the Ideal Electronic Key

A Further Advance in Bug Design

BY ROY E. BRANN,* W6DPU

AMATEUR radio seems to be approaching the goal in its search for the ideal electronic key. The multivibrator type is being abandoned because of its susceptibility to transient effects. Small voltage pulses that find their way into the circuit sometimes shorten the mark or the space. The search is narrowing down to some form of the key first described by Bartlett,[1] W6OWP.

Later [2] there was a modification of this circuit that at first seems to be the answer. It is simple and smooth in operation, and what more could one ask? Well, to begin with, Turrin says in his article, "Because C_1 does not charge instantaneously through R_4, Ry_1 cannot be a fast-acting or high-speed relay." Obviously, to use a fast-acting relay requires a reduction in capacitance at C_1. On the other hand, we hear complaints that relay spring tension has a great influence on the mark-space ratio and on the repetition rate or speed in words per minute. This is true because (in the above-mentioned designs) the RC network brings C_1 to nearly complete discharge before Ry_1 operates.

Figure it out. Twenty-five w.p.m. is 5 dashes per second; i.e., the dash pulse interval is 0.2 second. If the discharge resistance is 2 megohms, and the capacitance is 0.02 μfd., then $RC = 0.04$ second and the dash pulse interval is 5 RC. In 5 RC seconds the charge remaining on the capacitor is less than one per cent of the initial value. Good timer design calls for the use of not more than 2 RC, so that the tube grid passes through cut-off rapidly enough that the time interval is determined largely by the circuit constants and as little as possible by the tube and relay conditions. The conclusion is that while C_1 should be made smaller, the circuit time constant should be increased, but without increasing R.

Cathode-Follower Charging

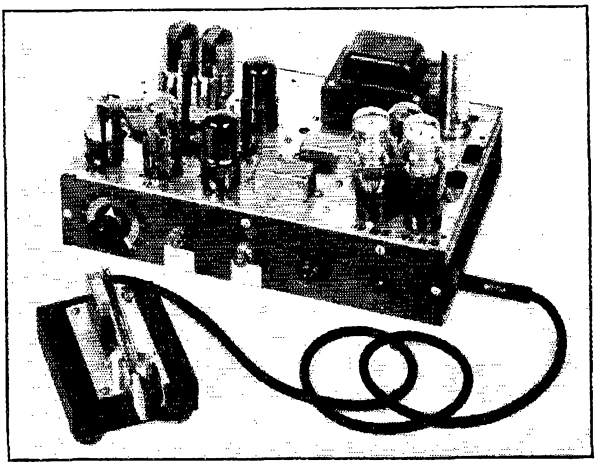
The only solution is to find an electronic means for amplifying the time constant of an RC network. This is easily accomplished by using a cathode-follower arrangement to supply the charging voltage for the RC network. The resistor is returned to the cathode of the cathode-follower stage instead of to a point of fixed voltage. Using a 6J5 or half of a 6SN7, we obtain an increase in time delay of approximately 20 more than that obtained with the resistor returned to + 250 volts. This makes possible the construction of a key in which the pulse interval for dashes is roughly 1 RC, thus permitting operation on the most nearly straight portion of the capacitor charge curve.

It should be pointed out that simple RC timing networks can be used in electronic timers in either of two ways: The free end of the capacitor, where the control tube grid is connected, can be driven in a positive direction and allowed to return to zero exponentially, as is done in the references cited above. Or the free end of the capacitor can be driven in a negative direction and allowed to rise exponentially. This second arrangement is preferred for precision timing work because the input impedance of the control tube does not become a part of the RC network. During the

* 717 Orange Grove Ave., Alhambra, Calif.

[1] Bartlett, "Further Advances in Electronic-Keyer Design," *QST*, Oct., 1948; "Feed-back," *QST*, Jan., 1949, p. 10.

[2] Turrin, "Debugging the Electronic Bug," *QST*, Jan., 1950.



The circuit is the important thing in the W6DPU electronic key, and normally one can make use of parts on hand to obtain the desired results.

timed interval the grid is driven into grid current cut-off — instead of positively into grid conduction. The second arrangement is the only one that can be used with the new cathode-follower timing circuit here described, as the exponential rise is always in a positive direction.

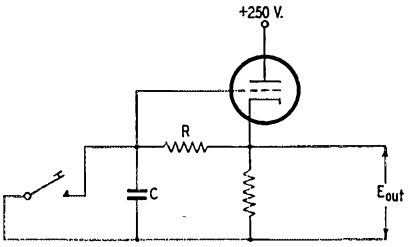


Fig. 1 — A cathode-follower charging circuit for amplifying the effect of an *RC* network. The output voltage will reach a given value much later than if the capacitor, *C*, were charged through *R* directly from the 250-volt source.

The electronic key is not a simple electronic timer. It has two timed intervals. The primary interval is the pulse interval, which determines the repetition rate or speed of transmission (words per minute). The subinterval is the mark duration or interval during which the transmitter is keyed. The subinterval is shorter than the primary (pulse) interval by an amount equal to the intraletter space.

It was pointed out that it is desirable not to allow the input impedance of any control tube to become a part of the *RC* network. This means that the control tube for the subinterval must be isolated from the *RC* network — which presents no problem at all where the cathode follower is used — simply choose the cathode-follower cathode as the driving point for the subinterval control-tube grid.

Circuit Operation

Fig. 2 shows how this new timer circuit is used in an electronic key. To make a dash, C_1 is brought to complete discharge through the key lever. At this time six things happen simultaneously: (1) C_1 discharges; (2) grid of cathode follower is lowered to ground potential; (3) cathode of cathode follower is lowered to about plus 15 volts; (4) pulse tube is cut off; (5) the d.c. amplifier is cut off; (6) keyer tube is cut on. The keying relay pulls in and the pulsing relay drops out. The transmitter is keyed and C_1 starts to charge.

The charging voltage is supplied from the cathode of the cathode follower, which is always more positive than its grid. As soon as the cathode approaches + 135 volts, the d.c. amplifier comes into operation and cuts off the keyer tube. This is the end of the mark, but the cathode voltage continues to rise; and when it approaches + 150 volts, the pulsing tube starts to conduct and the pulsing relay pulls in. When the pulsing-relay contacts close, this will be the start of another dash if the key lever is still held closed to ground. Or if it is closed to + 90 volts, a dot will be next, since the cycle will be started at a point on the C_1 charge curve where the dash pulse interval is half completed.

Fig. 3 is the complete circuit of the key. The d.c. amplifier could be eliminated from the circuit, but then it would be necessary to provide a relay with normally closed contacts and to key through these back contacts. This is undesirable, since the back contacts can never receive as much pressure as the front contacts; also, the back contacts are closed while the tubes are warming up, and the time-delay protection normally provided by any tube keyer is lost. In operation the d.c. amplifier causes the grid of the keyer tube to pass rapidly through cut-off, so that the spring tension on Ry_2 has little effect on the mark-space ratio. The voltage-regulator tubes are important to the circuit, since a constant supply voltage insures that the space following the dots will be equal to the space following the dashes — and that the first mark of a series will be the same as the rest. The series dropping resistor, R_{16}, should be adjusted so that the VR tube current is never less than 5 ma.

Controls

There are three controls in the circuit:

1) The SPEED control, R_1, varies the pulse interval of dots or dashes. The pulse interval is divided into mark (dot or dash) plus space. Since speed or repetition rate is the reciprocal of pulse interval, a large pulse interval makes a slow sending speed.

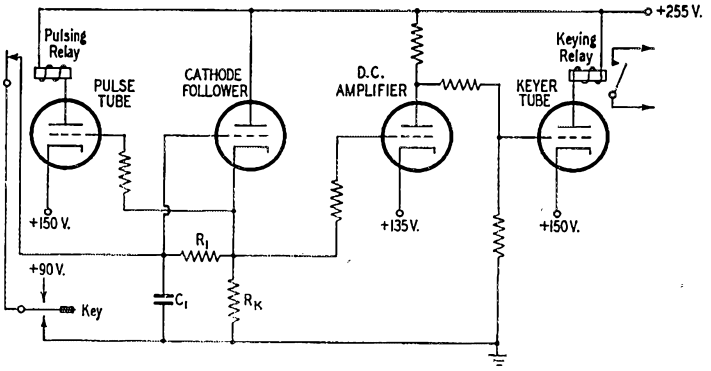


Fig. 2 — The basic circuit of the electronic key.

2) The SPACE control, R_{10}, controls the intraletter spaces. If this control is varied while the others remain fixed, the variable space will be subtracted from the fixed pulse interval. Hence, increasing the space decreases the mark duration. Since the dot pulse interval should be

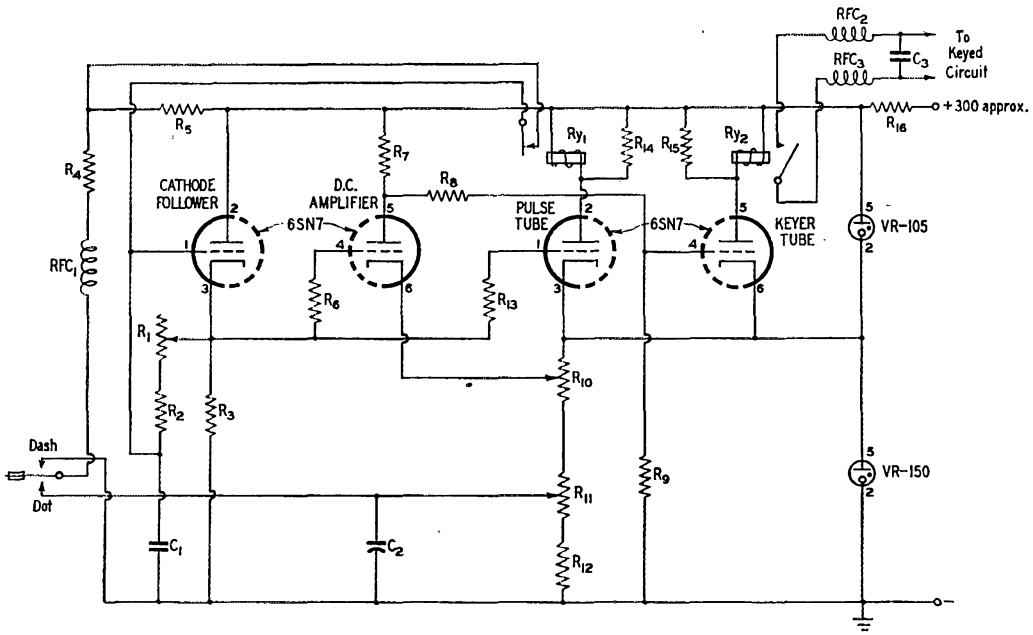


Fig. 3 — Wiring diagram of the electronic key.
C_1 — 0.01-μfd. mica, preferably low temperature coefficient.
C_2 — 1.0-μfd. paper, 200 volts.
C_3 — 0.001 μfd.
R_1 — 2-megohm linear potentiometer.
R_2 — 1.0 megohm.
R_3 — 0.1 megohm, 1 watt.
R_4 — 560 ohms.
R_5 — 4.7 megohms.
R_6, R_9 — 2.2 megohms.
R_7, R_{14}, R_{15} — 0.1 megohm.
R_8 — 0.82 megohm.
R_{10}, R_{11} — 5000-ohm wire-wound potentiometer, 4 watts.
R_{12} — 10,000-ohm wire-wound resistor, 5 watts.
R_{13} — 0.56 megohm.
R_{16} — Dropping resistor depending upon supply voltage. See text.
RFC_1, RFC_2, RFC_3 — 2.5-mh. r.f. choke.
Ry_1, Ry_2 — Fast-acting plate-circuit relays, 5000- to 10,000-ohm coils.
Tube heaters should be biased to approximately +75 volts (junction of R_{11} and R_{12}).

one-half the dash pulse interval, a change in space length would produce a change in dot duration proportionally twice the change in dash duration.

3) The DOT-DASH RATIO control, R_{11}, determines the ratio of pulse interval (dot) to pulse interval (dash). This ratio should be set at 1/3 and the control locked in place. Thereafter, adjustments of the space control and of the speed control can be made without affecting the dot-dash ratio — provided that the electronic key uses relays fast enough so that the relay operating time is negligible compared with the pulse interval.

The function of R_5 is very interesting. Without it in the circuit, the capacitance of the cable leading to the key lever will initiate another short dot at the end of a character. R_5 keeps the cable capacitance charged when the key lever is open and prevents the spurious dot. Incidentally, if your key lever contains a key-click filter, remove the capacitors or they will aggravate the condition mentioned above. They are not needed, since the key lever contacts break no current. Although there is no break, there is a make; and an r.f. choke in series with R_4 will make the initial current rise less steep. Even if your key lever is built into the unit, and there is no long cord, R_5 is of value in eliminating the effects of a.c. hum pick-up and of any minute leakage to ground in the wiring or relay contact springs.[3]

When the key lever is pressed, it is intended that R_4 should limit the current through its contacts. Without C_2 this would not be so on dots, since R_{11} and its adjacent components would be in the discharge circuit; and the use of fast-acting relays would be impractical. In other words, C_2 serves as an accumulator of current for the quick discharge of C_1 to the proper voltage for dots.

Touching the key lever drives the current in Ry_1 instantly to zero, and at the end of a mark the current in Ry_2 drops rapidly to zero. The result would be large inductive kicks within the relay coils except for R_{14} and R_{15}, which retard the collapse in magnetic field. If you want fast relay operation, guard against making R_{14} too small, for obviously the armature can't drop out until the field collapses. A small value of shunting resistance makes for a sluggish drop out of the relay.

Adjustment

An ohmmeter connected to the keyed output terminals will give a deflection proportional to the duty cycle of the transmitter, which is the

[3] To install R_5 in the key described by Turrin, connect it from the key-lever armature to B−.

ratio of mark to pulse interval (mark plus space). To produce code that sounds like an automatic tape transmission, after adjusting the dot-dash ratio to ½, set the space control to yield a dot duty cycle of 0.5 (50 per cent). The dash duty cycle will consequently be 0.75 (75 per cent).

There are those who aver that they like the sound of the code better with the dots and dashes slightly heavy — for instance with a duty cycle of 0.6 for dots and 0.8 for dashes. And as a matter of fact, using these settings, one's own fist may seem to be more pleasing. But, after all, where radio communication is concerned, it is the man on the receiving end who must be satisfied. The receiving operator usually hears interference of various kinds along with the signal; and his chief interest in the signal is its readability. Considered in this light, the intraletter spaces are equal in importance to the dots; hence the optimum adjustment is to make them equal in time duration — a dot duty cycle of 0.5.

But the most important adjustment to be made is the dot-dash ratio, which must be set exactly ½. This deserves some discussion. If the attempt is made to set it by ear, you may get it close enough and again you may not. Unless this ratio control is properly adjusted, the basic rhythm in the code will be false. The more you use the electronic key, the more conscious you will be of what constitutes perfect rhythm — and you will be dissatisfied without it.

If an electromechanical impulse counter is available, it can be connected to the keyed output terminals. Key dashes for five seconds and note the count — then key dots for five seconds and note the count again. Adjust the ratio control until the counter registers twice as many dots in the counting interval as dashes.

But the quickest way of all is to connect an ohmmeter to the keyed output terminals. Set the speed control to 20 w.p.m. or more. Swing the key lever to make dashes — adjust the space control to give an average reading of ¾ full scale on the meter. Next, swing the key lever to make dots — then adjust the dot-dash ratio control to give ½ full scale reading. This is not a precision method because of the difficulty of reading the meter as the pointer vibrates and because of a slight difference which may exist between the space following the dash and the space following the dot. But it is rapid and will satisfy most amateurs.

If you used small high-speed relays, these settings will remain correct for a wide range of speeds; sluggish relays will cause the mark-space ratio to drop noticeably as the code-speed setting is advanced. Best operation is obtained by using the fastest relays obtainable or by employing circuit modifications to accelerate relay operation, such as by substituting a pair of pentodes for the twin triode actuating the relays.[4] Choosing relays for this circuit then becomes a matter of compromise, for wiping contacts are most desirable in relays — yet the lightest and fastest relays usually have solid contacts.

The limitation on usefulness of high speed relays is determined by the fact that C_1 must be fully discharged before Ry_1 drops out, if erratic operation is to be avoided. In 10 RC seconds a capacitor will be 99.99 per cent completely charged or discharged. The circuit of Fig. 3 shows C_1 = 0.01 μfd. and R_4 = 560 ohms; hence 10 RC = 0.056 milliseconds. It is unlikely that you will ever find relays fast enough to give pulses this short. Conclusion: Don't hesitate to use high-speed relays.

An interesting check on the speed of Ry_1 is to connect the ohmmeter to the keyed terminals and a 50,000-ohm variable resistor across the dot key lever terminals. With the key set to produce ½ full-scale ohmmeter deflection when the resistor is at zero ohms, gradually increase the resistor value until a downward shift of average pointer position is noticed. With a good fast-acting relay this will be obtained with as little as 5000 ohms. If Ry_1 is sluggish, increasing the value up to 50,000 ohms may not produce any effect on the ohmmeter indication.

Calibration

Some may wonder how we ascertain the words-per-minute figure for calibrating the speed control. This is not difficult. After adjusting the ratios as explained above, swing the paddle to dashes and count for five seconds by the clock. The five-second dash count is the number of words per minute. The foregoing method is based on the relation: speed in bauds equals 0.8 times speed in words per minute. This conversion factor is the one contained in the International Telecommunications Treaty and is used by W1AW for the calibrated tape transmissions.

"Words per minute" is only an approximation, however, and those who wish to can calibrate their speed control in bauds. The signaling speed in bauds is equal to the number of code elements per second. Since a speed of one baud is one code element per second, one dot per second will be 2 bauds, and one dash per second will be 4 bauds. By counting dashes for four seconds you have the transmission speed directly in bauds.

Using the Key

In using this or any other self-completing electronic key at slow speeds, an annoying situation may appear which is very disturbing to the operator. He will go through the motions of sending a letter such as "G," where a terminal dot is preceded by one or more dashes, but sometimes the "G" comes out "M" — the dot doesn't form. This may be the result of pushing the key lever faster than the speed for which the key is set; or it may be the result of a bad habit into which the operator has fallen. He fails to hold the paddle in the dash position for the full time of the dash.

(Continued on page 94)

[4] In the model shown in the photograph, W6DPU uses a pair of 12A6 tubes in place of the right-hand 6SN7 in Fig. 3. All values remain the same — the screens of the 12A6s are connected to Pin 5 of the VR-105. — *Ed.*

New Life for the Q5-er

BY DOUGLAS R. JORDAN *

SOME time ago, *QST* introduced to its readers the idea of using a BC-453 as a selective amplifier on the tail end of the communications receiver.[1] Since then "Surplus Sam's" has been hounded by an increasing number of fellows who want to know just who or what hides under the fifth layer on 20 or 75. In almost every case complete satisfaction, often accompanied by considerable amazement, was the immediate reaction of the proud owner of a Q5-er; that is, after the initial simple conversions were completed and the junior op's train transformer "borrowed" for the filament supply.

It does not take many weeks of operation, however, for the glitter and gleam to disappear, as the deficiencies of the 453 become more apparent. One of the most obvious faults is the uselessness of the set on the 10-meter band if auto ignition QRM is at a high level. Weak signals often are masked by the hum and background noise, or a microphonic 12A6 may ping at the drop of a pin. Strong locals pound through to overload the receiver unless the r.f.-i.f. gain is backed down. And, of course, the audio quality leaves a lot to be desired.

After removing umpteen small machine screws and carefully studying the maze of wiring "below deck," it was decided that a conversion could be successfully made that would bring the 453 onto a level with communications receivers, and at the same time neither involve too many additional parts nor difficult work. In brief, the major changes are these:

1) Replacement of the 12-volt tubes in the r.f., mixer, and i.f. stages by 6-volt equivalents, with heaters all wired in parallel.

2) Removal of the 12A6 to make room for a 6SQ7 second detector, a.v.c., and first audio.

3) Replacement of the 12SR7 second detector-b.f.o. by a 6J5 b.f.o.

4) The addition of a 6F6 audio stage and an output transformer to drive an 8-inch 'speaker.

5) The use of a 1N34 crystal diode as a shunt-type noise limiter.

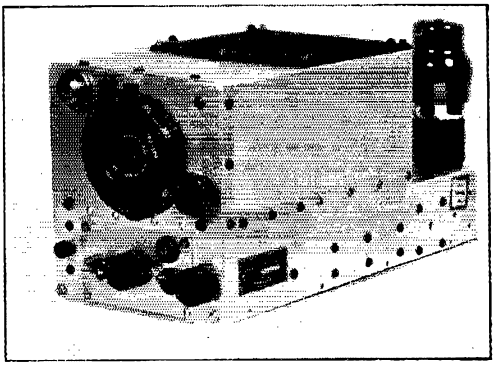
After modification, the revised 453 has individual noise limiter, b.f.o., and a.v.c. on-off switches, separate r.f. and audio gain controls, and a b.f.o. pitch control. A coax connector is installed in place of the original antenna terminal for neater station appearance and to prevent spurious pick-up. The 6F6, output transformer, and 'phone jack are mounted on the rear portion formerly mounting the dynamotor, and the 'speaker and power terminals are on the back. The particular model used was a BC-453-B, but the conversions seem applicable to any of the series.

* 71 Norwalk Ave., Buffalo 16, N. Y.

[1] "Technical Topics," *QST*, January, 1948.

Preliminary Work

Conversion begins with the removal of the audio output transformer (*ES-691027*), the B+ filter choke (*5634*), the three-section filter condenser (*5413*), and the heater filter choke (*5546*). This will uncover two mica condensers on the chassis floor: a 0.006 μfd. (*4091*) and a 0.001 μfd. (*4114*); these no longer will be necessary, nor will either of the power connectors, which can be taken off quite readily by ripping out several of the prongs. All associated wiring to plugs and components should be removed during this part of the operation, with but two exceptions. One is



The revised Q5-er (BC-453) has front-panel b.f.o. control, a noise limiter, separate r.f. and a.f. gain controls, and optional a.v.c. The original antenna binding post has been replaced by a coaxial fitting. These changes do not require too many new components, and they greatly increase the usefulness of the unit.

a red B+ lead going to the 7000-ohm bleeder resistors (parts *5895*) from the B+ filter; this lead will be long enough to connect directly to the B+ pin of the new power input plug. The other is a yellow screen-voltage lead running into the main part of the set from the 0.22-μfd. filter condenser; move this lead over and attach it to the top junction of the bleeder resistors. The bottom connection of the bleeder circuit, the black B— lead, should be fastened to the chassis with a machine screw after the filament filter is removed.

Throughout this conversion it is best not to have too many loose wires around — they tend to get lost. Therefore, enlarge the rear hole with a chassis punch and install a four-prong socket for the new power-input plug. By running the red B+ lead to one prong, and connecting another prong for B— to a soldering lug mounted to one of the socket bolts, all of the high-voltage wiring changes from supply to receiver will be completed. Unless the power supply used involves a grounded center tap on the heater transformer, the third prong of the power terminal may also be connected to ground, the fourth prong being used as the "hot" side of the heater line.

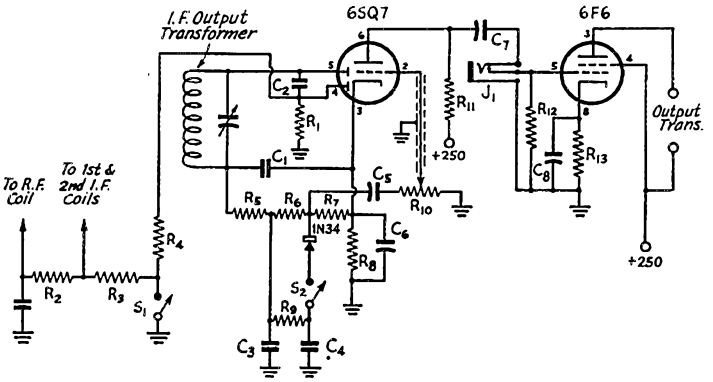


Fig. 1 — Revised second-detector and audio circuit, showing how the noise limiter is added.

C_1 — 200-$\mu\mu$fd. mica or ceramic.
C_2, C_3 — 100-$\mu\mu$fd. mica or ceramic.
C_4 — 0.01 μfd. (see text).
C_5 — 0.05 μfd., 200 volts.
C_6 — 15 μfd. (in original set).
C_7 — 0.1-μfd. paper.
C_8 — 10-μfd. 25-volt electrolytic.
R_1 — 2 megohms.
R_2, R_7 — 0.15 megohm (one in original set).
R_3, R_{11} — 0.1 megohm (one in original set).
R_4, R_9 — 1.0 megohm.
R_5, R_6 — 47,000 ohms.
R_8 — 2700 ohms.
R_{10} — 0.5-megohm potentiometer, compact.
R_{12} — 0.22 megohm.
R_{13} — 470 ohms, 1 watt.
All resistors ½ watt unless specified otherwise.
J_1 — Closed-circuit jack.
S_1, S_2 — S.p.s.t. toggle switch.

Other parts which may be completely eliminated are the 3-μfd. condenser (*7582*) located on the front panel, and the 5-μfd. condenser (*6350*) fastened to the side above the second i.f. socket. The latter condenser is a plate-circuit by-pass; its removal did not affect operation and permitted sliding over the three-section condenser above the i.f. output transformer to make room for new terminal strips. A slight relocation of these strips, however, would permit this by-pass to remain. Finally, the box in the front panel may be worked loose, and all wires leading to it removed, to make space for the front-panel controls.

The B.F.O.

Work can now start on the 12A6 socket, which will take the 6SQ7, and also on the 12SR7 socket, for the 6J5 b.f.o. To work on the 12A6 stage, unfasten the three-section condenser directly above it and carefully push the unit out of the way. All wires to this socket are removed, except for a white heater lead running from Pin 7 to Pin 7 of the 12SR7; this is kept for the new heater line. By running a lead from the heater prong on the new power plug to Pin 7 of the 12A6 socket, and grounding Pin 8, the heater circuit for the 6SQ7 will be completed.

Move now to the 12SR7 socket. Pins 8 and 1 were grounded originally and are left as is. A grid condenser from the center terminal of the b.f.o. transformer will be found connected to Pin 2. Remove this lead and ground the pin, thereby completing the 6J5 heater circuit. The other end of the 0.1-megohm grid-leak resistor (tied to Pin 3) should also be disconnected, and all wires to Pins 3, 4 and 5 removed. Leaving connections as is on Pin 6, run a wire between that pin and Pin 3, which will connect the plate of the 6J5 to the B+ circuit. (Pin 6 is not used on a 6J5, and thus serves as a convenient tie point.) The grid condenser from the b.f.o. transformer can now be swung over to Pin 5, and the 0.1-megohm grid leak connected from Pin 5 to ground.

The b.f.o. pitch control uses the antenna input trimmer located on the front panel. This is wired in by first disconnecting the wire from the r.f. coil and removing the small neon glow lamp attached to the side; then the stator plates are connected to Pin 6 of the 6J5 with a lead running along the chassis side. To complete the stage, the b.f.o. switch is installed by running a line from one pole of a s.p.s.t. switch on the panel to the junction of the 20,000-ohm resistor from the top terminal of the b.f.o. transformer, the 0.05-μfd. condenser, and the red B+ lead; the other switch terminal is grounded.

Second Detector, A.V.C., A.N.L., and First Audio Circuits

Fig. 1 shows the revised second detector circuit. That terminal of the i.f. output transformer previously connected to the diode plate (Pin 4) of the 12SR7 is now connected to Pin 5 of the

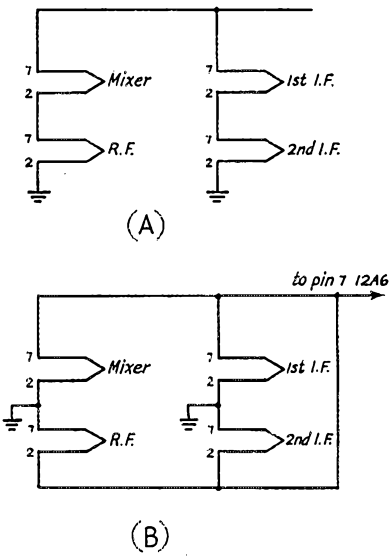


Fig. 2 — Original (A) and revised (B) heater wiring diagram.

A bottom view of the converted Q5-er.

6SQ7 diode. Space is saved by locating the coupling condenser, C_2, under the b.f.o. transformer. The a.v.c. diode load, R_1, is the original 2-megohm grid resistor for the 12A6. It can be found on the resistor strip between the 12A6 and 12SR7 sockets. On the opposite end of the same strip is a 1500-ohm 12A6 cathode resistor; using a pair of long-nose pliers and a pointed soldering iron, this can be removed and the new 2700-ohm cathode resistor, R_8, substituted. It should be noted that both R_1 and R_8 will have their resistor-strip pins away from the 6SQ7 grounded, without changing the original circuit wiring. C_6, the cathode by-pass, is a 15-μfd. "can" condenser above the first i.f. tube socket, and formerly used in the 12A6 stage. Returning to the a.v.c. circuit, R_4 is connected to a 0.1-megohm resistor found in the resistor group mounted between the 12K8 and first i.f. sockets. The original ground connection to this 0.1-megohm resistor is broken and R_4 connected in its place, as shown in Fig. 1. A line runs from this junction to switch S_1 on the front panel.

Two more resistors no longer needed should also be pulled out, as well as any associated leads or ground connections still tied to their pins: these are 0.1-megohm and 0.51-megohm resistors found on the strip between the output i.f. transformer and 12SR7 sockets. This will remove the last of the original second detector circuit components. They are replaced by two 0.47-megohm resistors, R_5 and R_6; by putting R_6 nearest the 12SR7 socket and the junction of R_5 and R_6 on the side toward the center i.f. can, a neat wiring job will result. The ground lead at C_3 is connected to Pin 1 of the first i.f. tube. R_7 can then be installed, and by lifting C_1 over the 12SR7 socket, a sufficiently rugged "floating" connection between R_7 and C_1 can be made. The 1N34 limiter, C_4 and R_9, and the audio coupling condenser, C_5, all are tied to terminal strips above the i.f. output transformer; leads are then run to S_2 and R_{10} on the panel. C_4 is the 0.01-μfd. section of the three-section condenser previously located over the second i.f. output and now above the second i.f. socket; this section is unused originally.[2] It was found necessary to shield the lead from R_{10} to the 6SQ7 grid to prevent coupling near the oscillator section of the receiver. Finally, the 0.1-μfd. audio coupling condenser, C_7, can be placed directly behind the bleeder resistors and connected to the 'phone jack.

[2] In some units. In others it is a 0.05-μfd. unit. — *Ed.*

Audio Output Stage

By giving a hack saw an invigorating workout, the shock mounting can be removed from the rear corner, and room made for the 6F6 stage. The 'speaker tips are located on the back next to the power plug while the cathode by-pass, C_8, is placed next to C_7. If the output transformer is to be placed on the chassis rather than in the 'speaker baffle, it may be mounted directly above the hole left by the dynamotor plug. In selecting this transformer, one with a 7000-ohm primary and suitable secondary should be used. If feedback occurs between the audio stages, shielding the grid lead from the 'phone jack will probably straighten things out.

Completing the Conversion

The remainder of the heater circuit is easily finished. Only a few changes are needed to alter the original wiring of the first four stages, shown in Fig. 2A, to that required for 6-volt operation, Fig. 2B.

After a bit of experimentation, the cathode circuit of the r.f. and first i.f. stages, shown in Fig. 3A (with gain control added), was changed to that of Fig. 3B. R_{14} and R_{17} are located in the resistor group between the 12K8 and second i.f., while C_{10} is the condenser removed from the front panel. The lead from R_{17} to R_{15}, found on the strip between the 12K8 and first i.f., is removed

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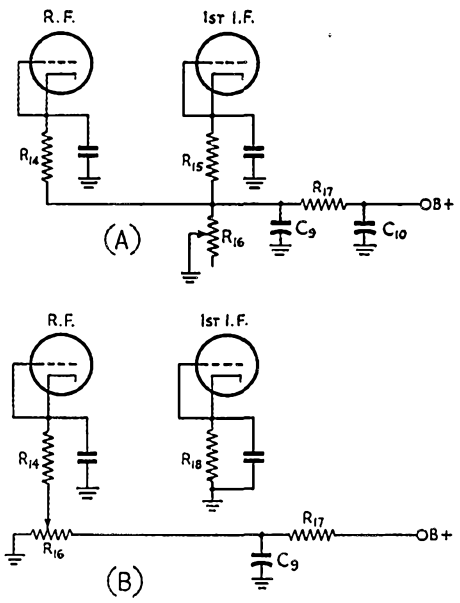


Fig. 3 — Original (A) and revised (B) r.f./i.f. gain control circuit.
C_9 — 0.05 μfd.
C_{10} — 3 μfd.
R_{14}, R_{15} — 620 ohms.
R_{16} — 50,000-ohm potentiometer, compact.
R_{17} — 0.36 megohm.
R_{18} — 1500 ohms.
All but R_{16} are components in the original set.

• Technical Topics —

Design Limits for "High-Output" Grid Modulation

THE Lippert idea of utilizing the duty cycle of speech in controlled-carrier modulation as a means for increasing power output without exceeding plate-dissipation limits [1] is an intriguing one, especially in connection with grid [2] modulation. In grid modulation of the ordinary type the plate loss limits the output long before the plate-voltage and plate-current limits are approached, simply because the plate efficiency is so low. It is therefore of some interest to determine just how much of a power increase is possible.

It is not altogether easy to find a satisfactory answer, because speech is a highly variable thing. For the same peak amplitude its energy content will vary with different individuals. Also, no two people speak at exactly the same rate, and when we are dealing with a system in which the ratio of "off" time to "on" time is a critical factor in design, just how the talking is done becomes highly important. In such a case the only approach appears to be to search for an average by experimental measurement.

The possible output is primarily limited by tube ratings: maximum permissible plate dissipation, plate voltage, and plate current. The plate dissipation rating is based on the amount of heating the tube can stand, and the way in which the heat is generated enters into the rating. For example, in plate modulation the instantaneous power loss in the plate varies over the modulation cycle; at the peak of 100 per cent modulation it is four times the loss at the carrier level, and at the modulation trough it is zero. When the loss is varying at an audio-frequency rate the thermal inertia of the plate is great enough to filter out the instantaneous variations and leave only the average heating to consider, just as a power-supply filter takes off ripple and leaves only d.c. But, if the rate at which the plate loss varies becomes quite slow, the plate temperature will tend to follow the changes in much the same way that a d.c. milliammeter will follow changes in current that occur no more rapidly than a few times a second. In such a case the average heating over a moderate period of time may not exceed the rating, but nevertheless there may be many times during such an interval when the plate temperature is too high for safety.

Turning now to plate-current and plate-voltage ratings, we suggest that, as limits for design purposes, they be based on the peak values that occur during plate modulation, since it would appear to be inherent in these ratings that the peak conditions represent safe operating values. This assumes, of course, that in using one or the other, or both, of these peak values the rated plate dissipation is not exceeded. The peak values are twice the carrier values as given in the tube manufacturer's operating conditions for plate modulation.

An Experimental Check

In an effort to determine operating limits, experimental data were taken on an 807. This tube was chosen for several reasons: It is widely used in amateur transmitters; the voltages and currents are in a convenient range for experimental work; it was anticipated that a tetrode might be less likely to maintain linearity with increased voltage and current than a triode; and finally, it seemed more probable that an 807 would break down, at higher-than-normal voltage and peak current, than some other types of tubes that might have been selected. The published plate-modulation operating conditions for the 807 call for a plate voltage of 600 volts and a plate current of 100 ma. Doubling both gives 1200 volts and 200 ma. as the limiting values for grid modulation. In grid modulation the d.c. plate voltage does not vary, but the 200-ma. figure represents a peak current that is reached only at the peak of the modulation cycle: in terms of the plate milliammeter reading with an amplifier that is operating linearly the current would be 100 ma. when the 200-ma. peak is being reached.

In talking design limits of this order, the question immediately arises as to whether the tube would be capable of linear operation to a peak current of 200 ma. Testing under normal conditions of modulation would be impracticable, since the plate efficiency with grid modulation is known to be about 33 per cent at the carrier level, while the plate input at 1200 volts and 100 ma. would be 120 watts. However, a method was devised for testing the operation without running the plate dissipation beyond a safe level, and it was found that with screen modulation the 807 will operate linearly up to a peak current of 200 ma. With proper adjustment, equally linear operation can be secured with plate voltages ranging between 800 and 1200 volts.

A controlled-carrier system was then set up and a check made on the plate dissipation with average speech. Measurement under static conditions showed that the 807 plate does not show color in a dim light at the normal rating of 30 watts, but that careful inspection will show just a trace of reddening around the plate supports at 40 watts. Although this is ⅓ more than the rated dissipation, it was used in the checks because it was ob-

[1] Lippert, "'A Constant-Modulation' 'Phone System," *QST*, April, 1950.

[2] By "grid" modulation is meant any system in which the modulating signal is applied to a grid electrode — control grid, screen, suppressor, etc. The power output in all such systems is determined by the *peak* power that can be obtained with satisfactory linearity, whether the system is conventional or one of the many "high-efficiency" or "high-output" types.

servable. With no modulation, the "resting" input was set to make the plate dissipation roughly half the rated value, so the tube had a reasonable chance to cool off between intervals of full modulation. When the system was adjusted so that during periods of continuous talking the plate dissipation just reached 40 watts, it was found that the ratio of peak power input to plate dissipation was, in round figures, 5 to 1.

We believe this ratio to be a reasonable basis for design in such systems. In the case of the 807, it means that plate dissipation rather than plate voltage or plate current is the determining factor, and the d.c. input at the modulation peak should not exceed $5 \times 30 = 150$ watts. This figure applies, incidentally, only when the peak efficiency is at least 66 per cent, which was the highest efficiency we were able to obtain with careful adjustment of plate loading, excitation, and modulating voltage. Lower peak efficiency will call for a corresponding reduction in plate power input.

There is no very definite correlation between the plate milliammeter reading and peak plate current, in the case of speech. However, it was observed that when the controlled-carrier system was adjusted so that the modulation was 100 per cent at the same time that the peak input reached its maximum permissible value, the plate current as read by the meter usually ran between 30 and 40 per cent of the peak current. Thus if the plate voltage is 1000 and the permissible peak input is 150 watts, the peak plate current will be 150 ma. and the plate milliammeter reading on a voice peak will lie between 45 and 60 ma.

Power Output

With maximum modulation on a controlled-carrier 807 operated as described above, the equivalent carrier output is one-fourth the peak output, or 25 watts. This is a 66 per cent increase in power over straight screen modulation, where the power input is limited to 45 watts, 30 of which are dissipated in the plate, the other 15 being carrier output. The increase is worth while although it does not come up to the plate-modulation ratings. Operating at the maximum voltage and current ratings of 1200 volts and 200 ma. peak gives a carrier power output of 40 watts, which is very close to what plate modulation will give. However, with average talking the plate shows color if the modulation level is high for several seconds — the duration of a sentence, for example.

Similar limits, especially with respect to plate voltage and plate current, apply to "supermodulation" as analyzed by O. G. Villard, jr.[3] In this system the output is determined by the peak output of the "peak tube," since the carrier tube contributes nothing at the peak. (This point has been confirmed in an experimental trial of the system.) However, the average dissipation in the peak tube is lower than it is in controlled carrier, so with an 807 as the peak tube it would appear safe to use the 1200-volt 200-ma. peak limits. With sine-wave modulation the *average* plate current of the peak tube will be under 60 ma. in this system when the 200-ma. peak is being reached, and will be less with voice modulation. The equivalent carrier output, with 1200 volts on the peak tube, is 40 watts. While lower plate voltage can be used, power output is sacrificed in the same proportion, since the peak current cannot be increased without exceeding the tube ratings.

A somewhat smaller tube can, of course, be used as the carrier tube, since it can be adjusted to supply a 40-watt carrier with about 66 per cent efficiency (for linear modulation downward) and thus the plate dissipation at carrier level is only 20 watts. But, if a pair of 807s is assumed for both "supermodulation" and controlled carrier, the comparison is a carrier equivalent of 40 watts for the former against 50 watts for controlled carrier. Whether the varying carrier of the controlled-carrier system is equally as effective in actual communication as the steady carrier of supermodulation is a question that can only be decided by on-the-air experience. — *G. G.*

[3] Villard, "Supermodulation — An Evaluation and Explanation," *QST*, December, 1950.

HAMFEST CALENDAR

MICHIGAN — Saturday, February 24th, at the Rowe Hotel, Grand Rapids — Annual Midwinter Hamfest sponsored by the Grand Rapids Amateur Radio Association. Formal program starts at 8:00 P.M. but doors open at 3:30 P.M. for swapping gear and gab. Eating facilities for out-of-towners. Special program for YLs and XYLs. Admission by ticket, 50¢ in advance, 75¢ at the door. Write GRARA, P.O. Box 333, Grand Rapids, Mich., for tickets or further information.

ONTARIO — The annual banquet of the Frontier Radio Assn. of Windsor will be held at the Norton-Palmer Hotel, Windsor, on Friday evening, February 16th, at 7:30 o'clock. Guest speaker will be Great Lakes Division Director John H. Brabb, W8SPF. A special program of entertainment has been arranged. Registration and dinner, $2.50. For further information write Walter Guillot, VE3BUR, % Frontier Radio Association, 86 London St., West Windsor, Ontario.

WWV-WWVH SCHEDULES

FOR the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WWVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, indicating warning, unstable conditions, or normal.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier is modulated by a seconds pulse which is heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

Station WWVH, operated to provide coverage of the Pacific area, broadcasts on an experimental basis on 5, 10 and 15 Mc. The program of broadcasts on the three frequencies is essentially the same as that of WWV.

WANTED — RADIO COMMUNICATIONS MEN

The United States Government has openings for radio operator-technicians who are interested in careers in radio communications and general electronics involving extensive overseas assignments.

Applicants should have the following qualifications: (A) Two years' active radio experience in the design, construction, and maintenance of transmitting and receiving equipment and the ability to copy code at fifteen words per minute, preferably on a typewriter. (B) Knowledge of radio wave propagation and practical design and construction of antennae. (C) Over age 21 and able to pass a thorough physical examination. (D) Willingness to serve overseas extensively and in any location required.

Current starting salaries for nonsupervisory radio operator-technicians range from $3100 to $3824 per annum. Leave, promotions, employee benefits, transportation and baggage allowance, cost-of-living differential allowances, etc., in addition to basic salary, are in accordance with current government regulations. Interested personnel are requested to write a brief application letter to Box 73, C/o Administrative Headquarters, the American Radio Relay League, West Hartford 7, Connecticut. Considerable duplication of effort will be avoided by the applicant if the following outline is adhered to:

1. Experience and training.
   a. Number of months radio training and type (college, service schools, technical or trade school).
   b. Number of years radio experience and type (military, merchant marine, commercial, government).
   c. Amount of this experience in telegraphy and amount in construction or maintenance.
   d. Present radiotelegraph code speed.
   e. Present or past radio licenses, including amateur.
2. Age and marital status.

If your initial application appears promising, you will be sent full application forms upon which detailed information can be entered.

PHOTO INTELLIGENCE SPECIALISTS

There now exists a limited number of vacancies in United States Air Force Headquarters at the Pentagon for electrical and electronics engineers with education and/or experience in radar or airborne communications and search equipment who also possess photo-interpretation experience or potential, in the following jobs with grades and salaries listed:

Photo Intelligence Specialists GS-9 ($4600-$6400 starting salary).

Civil Service grades assigned will depend largely on education and/or equivalent experience in the field of electrical or electronics engineering. Photo-interpretation experience is desirable but not absolutely required. Every effort will be made to place qualified applicants in positions commensurate with their education and experience. Inquiries regarding these positions and requests for the required Civil Service application forms should be made to: Photo Intelligence Section, Reconnaissance Branch, Directorate of Intelligence, Headquarters, United States Air Force, Washington 25, D. C.

V.O.A. TECHNICIANS

The Voice of America has a continuing need for experienced radio men, including studio, recording, field (remote pick-up), maintenance and transmitter technicians, for New York City and also for overseas points. Applicants must

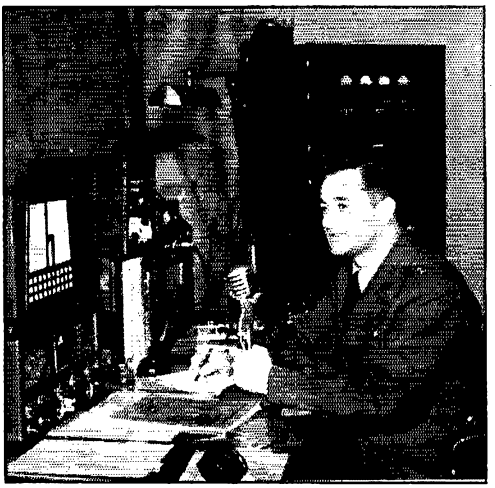
(*Continued on page 96*)

M.A.R.S.

WHETHER it's advice on how to fly a plane, install and operate aerial-mobile equipment, or plan and run a fixed-station system, members of MARS-Air Force need have no hesitation about calling on their new Chief.

Capt. Charles C. Mack, who has been named head of the Air Force portion of the Military Amateur Radio System, brings the enthusiasm of an airborne amateur radioman plus experience as Continental Air Command MARS Director to his new Washington job. He replaces Maj. Raleigh H. Ralls who, having completed his tour as MARS director, has been assigned to a classified Air Force project.

Capt. Mack's calls are AF2BRJ/W2BRJ, which soon will be modified to fit his new geographic location. Readers of *QST* will recognize W2BRJ as an ardent exponent of v.h.f. work and a high scorer in 1950 Field Day activities. "I could have made a much higher score," Capt. Mack says, "but I didn't handle any messages, and I shut down operation after only five hours' work." All contacts were made aerial-mobile from a C-47, using an ARC-3 transmitter and a battery-powered two-meter converter to a BC-348 receiver.



Capt. Charles C. Mack, AF2BRJ/W2BRJ.

As might be expected from such an active v.h.f. enthusiast, one of the first MARS-Air Force projects Capt. Mack plans is the proposed direct-relay radioteletypewriter circuit linking Continental Air Command (CONAC) at Mitchel Field, New York, Headquarters USAF at Washington, D. C., and Eastern Defense Air Command at Newburgh, New York. The project was started several months ago but press of other activities disrupted completion of the channel. "This circuit will provide an absolutely reliable QRM-free channel and excellent back-up for our established military circuits," the new MARS chief said.

Air Force-MARS has requested that a frequency be assigned in the vicinity of the two-meter band. Eighteen SCR-522s are available and will be spotted on the CONAC-Washington-EDAF triangle. Should the MARS frequency not be immediately available, Capt. Mack plans to initiate the circuit as an amateur facility.

A native of Maine, Capt. Mack was associated with the Raytheon Manufacturing Company before enlisting as a cadet in the Air Force in 1941. He was commissioned a second lieutenant in August, 1942, and served as a fighter pilot during the war, including two years in Iceland.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

THE international situation being what it is, our thoughts turn ever more to civilian defense and war emergency communication. All over the country emergency communication planning is being stepped up, and every day the Headquarters mailbag is full of questions dealing with this phase of amateur endeavor.

"What bands should we plan for?" is frequently asked. The editorial in December *QST* gives as complete an answer as could be formulated today, on the basis of what is known in Washington, though we may have more definite word soon. Numerous amateur groups, taking into account all the factors in their own situations, have come up with more specific answers. Many, considering the practical angle of a number of mobile units already in operating condition there, have gone ahead with planning based on utilization of the 10-meter band.

Others, having already experienced difficulties with DX interference during their initial workouts on 28 Mc., have started looking for something better. Several of these have come up with the decision to use the 50-Mc. band as the best compromise between availability of equipment and effectiveness of their group in covering a desired service area.

This approach, for our money, has much to recommend it. It's a simple matter to set up for 6-meter mobile, for instance. There are commercial converters available for that band, and if one wishes to build his own, any of several relatively simple single-conversion designs may be used effectively in conjunction with a mobile broadcast receiver. A 2-tube r.f. section will do the trick for a transmitter, and most 10-meter gear could be modified fairly easily to work on 6. Coverage is good, and skip-distance interference is relatively rare, compared to 28 Mc.

Of the two major v.h.f. bands, 144 Mc. is thus far getting much the bigger play. On the basis of equipment already in being, it has a numerical superiority over 50 Mc., but if gear is to be built especially for the job at hand more gear per dollar can be made for the lower band. Especially as regards mobile receivers, 50 Mc. has a considerable advantage. On the basis of security, however, 144 Mc. is probably the best bet of all.

Where the 144-Mc. band is given a place in initial planning, the question may arise of what to do about the modulated oscillator and superregenerative receiver. Hundreds of compact economical-to-operate transmitter-receiver combinations, many of them veterans of WERS days of World War II, are still around. Should they be pressed into service in our 1951 plans?

In anything but an emergency of the gravity of the present one, we'd say no. As the result of its all-too-clearly-demonstrated inadequacies, that type of gear has been banished from the 2-meter picture almost everywhere. With the tremendous improvement in operating effectiveness that accompanied the change to stabilized transmitters and selective receivers, few of us mourn the passing of the wobbling transmitter and the

* V.H.F. Editor, *QST*.

2-Meter Standings

	States	Call Areas	Miles
W1HDQ	16	6	650
W1IZY	14	5	570
W1MNF	14	5	570
W1BCN	13	5	500
W1CTW	12	4	500
W1KLC	12	4	500
W2BAV	21	7	1175
W2NLY	18	6	750
W2PAU	15	6	740
W2DFV	13	5	350
W2CET	12	5	405
W2DPB	12	5	500
W2QED	12	5	365
W2FHJ	12	5	-
W2QNZ	12	5	-
W3NKM	17	7	660
W3RUE	16	7	760
W3LNA	14	7	720
W3KWL	14	6	480
W3GKP	13	6	610
W3OWW	13	6	600
W3KBA	13	6	-
W3KUX	12	5	575
W3PGV	12	5	-
W3LMC	11	4	400
W4HHK	15	6	660
W4JDN	13	6	-
W4IKZ	13	5	720
W4JFU	13	5	650
W4CLY	12	5	720
W4FJ	12	5	700
W4MKJ	11	5	650
W4OXC	10	5	500
W4JFV	9	5	830
W5JTI	14	5	670
W5ML	8	3	725
W5ERD	8	3	570
W5VY	7	3	1200
W5AJG	7	2	450
W5FBT	6	2	500
W5FEK	6	2	500
W5IRP	6	2	410
W5FSC	5	2	500
W5JLY	4	2	650
W6ZEM/6	1	1	415
W6GGM	1	1	300
W6YYG	1	1	300
W8WJC	20	7	775
W8BFQ	20	7	775
W8WXV	18	8	1200
W8UKS	18	7	720
W8EP	17	7	-
W8WRN	16	6	670
W8RWW	14	7	500
W8WSE	14	6	620
W8CYE	12	6	-
W8CPA	12	-	650
W8FQK	11	7	-
W9FVJ	18	7	790
W9UCH	18	7	650
W9EQC	17	7	820
W9SUV	17	7	-
W9WOK	15	5	690
W9NFK	12	7	690
W9FPE	11	5	800
W9UIA	11	6	540
W9GTA	11	5	540
WØNFM	14	7	660
WØEMS	13	5	1080
WØZJB	12	7	1097
WØIHD	12	5	725
WØWGZ	11	5	760
WØHXY	8	3	-
WØJHS	7	3	-
VE3AIB	12	6	600
VE1QY	11	4	900
VE3BQN	6	4	540
VE3DER	6	4	450
VE3BOW	6	4	415
VE3BPB	6	4	-
VE3EAH	5	4	380

rushbox receiver. We can hardly be expected to welcome them back with open arms.

But, on the other hand, we have a job to do. If the simple gear will help to get it done quicker or more completely, then perhaps we should put it to work. There are a number of short-distance jobs where it may serve very well, but in areas where there is extensive 2-meter activity, the potentialities of the simple gear for causing severe interference should be reckoned with. It would take only a few such stations to mess up an area plan pretty thoroughly, if they were operated carelessly.

Perhaps the answer is to restrict their use to that portion of the band above 146 Mc., at least while we continue normal operation. Most of our routine operating is being done in the first megacycle, and with narrow-band techniques 144 to 146 should be enough for almost any locality. If the QRM machines are kept at the middle or higher they should cause no serious trouble. Crystal control and selective nonradiating receivers should be used wherever possible; they are well worth the extra trouble their construction involves, but we feel that the urgency of the cause justifies the use of any sort of equipment that can serve a useful purpose.

December Doings

As is usually the case, December was a period of generally low v.h.f. activity, the downward trend having been accelerated this season by widespread antenna damage suffered in the severe storms of late November. The 50-Mc. band was open for sporadic-*E* skip communication on several instances, but too many of the 6-meter gang seem to be of the opinion that skip openings are exclusively a springtime phenomenon, and the December sessions found only a handful of stations taking advantage of the opportunities that came along. It has been mentioned many times in these pages that sporadic-*E* skip develops either side of the *shortest* day in the year as well as the longest. The December openings are not as frequent or as widespread as those of June, but it is certain that if there were as many stations on hand in the winter period as in the summer, the number of DX contacts made on 50 Mc. in December would be far greater than is now the case.

During the evening of Dec. 14th, W4MS, Pensacola, Fla., and W4NUW, Chattanooga, Tenn., were putting fine signals into W1 for more than an hour, the latter managing it with 10 watts input. There was E_s over much of the country on the 16th and 17th, as evidenced by hundreds of very short-distance skip contacts made during ARRL's 10-meter WAS Party, but few contacts were reported on 6. W1GJO, Westminster, Mass., who worked W4JVP, Greenville, N. C., on the afternoon of the 17th, reports that the W4 was in for an hour after, calling CQ after CQ without results. W4MS worked VE3AET at 5 P.M. EST on the 18th, and W5AJG and W5MJD between 6:45 and 7 P.M. on the 21st. The band was open to other areas as well, and WØs INI, JOL and UQM were heard between 5:50 and 7:30 P.M.

From Barranquilla, Colombia, HK1DX reports that 50 Mc. was open to Argentina on the 6th between 8 and 8:30 EST, and briefly around 8:10 P.M. on the 15th. There was evidence of E_s in this country around that time, indicating that sporadic-*E* contacts with South American stations still may not be beyond the realm of possibility.

Things were extraordinarily quiet on the 144-Mc. front during December, if the lack of mail from the 2-meter gang is any indication. One of the few reports of unusual conditions we have on hand is from W9FVJ, Toledo, Ill., who says that the evenings of Dec. 16th and 17th brought good signals from up to 150 miles to the east. W9ASM, Indianapolis, Ind., W9JYB, Victoria, Ill., and W9ITU, Avon, Ill., were worked. The loss of the 16-element array at W9ZHL, Terre Haute, Ind., has had a bad effect on the activity in the

Standings as of December 25th

WØZJB	48	W5ML	44	W9ZHB	48
WØBJV	48	W5JLY	43	**W9QUV**	48
WØCJS	48	W5ONS	43	W9HGE	47
W5AJG	48	W5JME	43	W9PK	47
W9ZHL	48	W5VV	42	W9VZP	47
W9NJT	48	W5FAL	41	W9ALU	46
		W5NHD	41	W9QKM	46
W1CLS	46	W5GNQ	41	W9RQM	45
W1HDQ	46	W5FSC	41	W9UIA	45
W1CGY	45	W5HLD	40	W9UNS	42
W1LLL	44	W5HEZ	35		
W1KHL	43			WØQIN	47
W1HMS	43	W6WNN	48	WØDZM	47
W1LSN	41	W6OB	48	WØNFM	47
W1EIO	40	W6UXN	47	WØINI	47
		W6IWS	41	WØTKX	47
W2RLV	45	W6OVK	40	WØKYF	44
W2BYM	44	W6TMI	40	WØJOL	44
W2IDZ	43			WØJHS	43
W2AMJ	42	W7HEA	47	WØPKD	43
W2MEU	42	W7ERA	47	WØHVW	42
W2GYV	40	W7BQX	45	WØMVG	41
W2QVH	38	W7DYD	45	WØIPI	41
W2FHJ	37	W7JRG	42		
		W7BOC	40	VE3ANY	42
W3OJU	45	W7JPA	40	VE3AET	32
W3NKM	41	W7FIV	40	VE1QZ	32
W3JVI	38	W7CAM	40	VE1QY	31
		W7KFM	40	HC2OT	26
W4FBH	46	W7ACD	35	XE1GE	19
W4EQM	44				
W4QN	42	W8QYD	45		
W4FWH	42	W8NQD	42		
W4CPZ	39	W8YLS	41		
W4OXC	39	W8CMS	41		
W4MS	39	W8LBH	38		
W4BEN	35	W8RFW	37		
		W8UZ	37		
W5VY	47	W8WSE	36		
W5JTI	44				

Calls in boldface are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.

Southern Illinois-Indiana region. Charlie's antenna was 110 feet above ground at the top, and it gave him unusual extended-local coverage.

Regularly-maintained schedules over distances of up to 150 miles in various parts of the country indicated that there is not as much seasonal variation in this type of work as many think. This is particularly true in work over rough terrain, where tropospheric scattering may be the principal factor in getting through. Many inland paths that are remote from large bodies of water or other natural features that might make for favorable propagation during the warmer months will show only slight variations in average signal level from one season to another. W9FPE, Willard, Wis., reports that the signals of WØHXY, St. Cloud, Minn., 150 miles to the west, while not hitting the very high levels occasionally noted in the warmer months, have maintained almost the same average signal level so far this winter. Even when the temperature dropped as low as 20 degrees below zero in a recent cold wave, signals of normal character were swapped over this path.

Your conductor, in work regularly with W2SFK, Glens Falls, N. Y., has found the same to be true. Really strong signals have never been heard over this 110-mile mountainous path, but communication of a sort is nearly always possible, winter or summer.

50-Mc. WAS Award No. 6 Issued to W9NJT

He had worked all 48 states some time back, but getting the necessary confirmations was something else again. One hard-to-work state was represented on his log only by a fellow who had since dropped out of ham radio. But finally another in the same state was worked, and he came through with card No. 48. So special 50-Mc. WAS award No. 6 goes to Donald L. McCaskell, W9NJT, Watertown, Wis. Don is the second W9 to win a 50-Mc. WAS award, and the first from his state.

The special certificate issued for 50-Mc. WAS is pictured on page 40 of January *QST*. Each certificate is numbered, and the winner's name and call are inscribed by hand in beautiful Old English lettering. No representative of W1, 2, 3, 4, 6, 7, or 8 has yet made the grade. Will someone from one of these areas qualify for No. 7?

A Butterfly Oscillator for 420 Mc.

Oscillator instability is a sore spot in many 420-Mc. converter designs. If a narrow i.f. bandwidth is to be used (and only with sharp receivers can the best signal-to-noise ratio be obtained) mechanical and electrical stability are of major importance. There are few variable condensers on the market that will do a satisfactory job in tuning a 420-Mc. receiver oscillator, and even with the best tank circuits there may be considerable trouble with vibration and hand-capacity effects. Uniformity of output across a band 30 megacycles wide is not easily obtained, yet there cannot be much variation in oscillator injection without affecting the performance of the mixer.

One of the best solutions to the oscillator problem lies in the butterfly type of tank circuit, combining inductance and capacitance in a single unit that is mechanically rigid. Fred Smith, W1KCQ, Waltham, Mass., uses a simple two-plate butterfly that can be duplicated readily from scrap material. Dimensions of the metal plates are given in Fig. 1. The stator (left) is mounted on pillars at three points, these same spots serving as connecting points for the tube plates and plate voltage. The 6J6 oscillator socket should be as close as possible to the split end of the stator plate. The rotor plate is fitted onto a ⅜-inch polystyrene rod, which is, in turn, driven by a ¼-inch shaft of the same material. The shaft turns in a panel bushing of standard design.

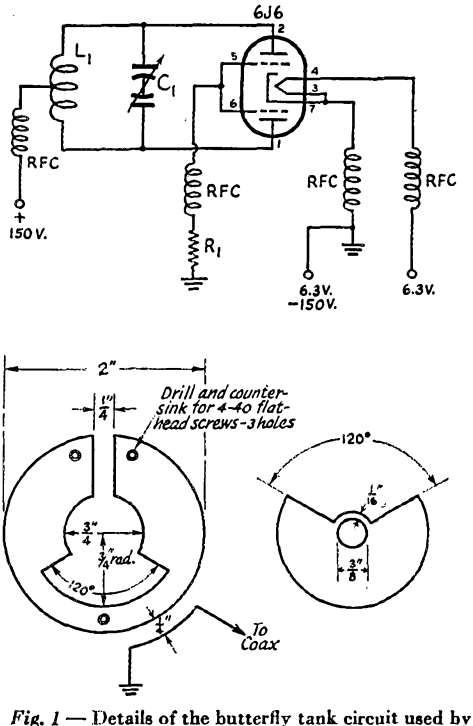


Fig. 1 — Details of the butterfly tank circuit used by W1KCQ, and suggested schematic diagram for use in a push-pull oscillator.

C_1, L_1 — Butterfly tank.
R_1 — 10,000 ohms.
RFC — 6 turns No. 20 enameled wire, 3/16-inch diameter, 5/8 inch long.

The oscillator assembly is supported with the plates vertical on a sheet of insulating material. Shielding is preferred, to reduce hand capacity effects and make it possible to control the oscillator injection. W1CLS, also of Waltham, has built a 420-Mc. converter using a coaxial-line crystal mixer and a butterfly oscillator of this design. He mounts the oscillator assembly in a small utility box. Coupling to the oscillator, if needed, may be done with a loop of stiff wire about one inch long near one inductance arm of the butterfly. For best stability the coupling should be the minimum

(*Continued on page 98*)

{Continuing the ARRL Series on Amateur Operating}

V.H.F.: Why—How—When?

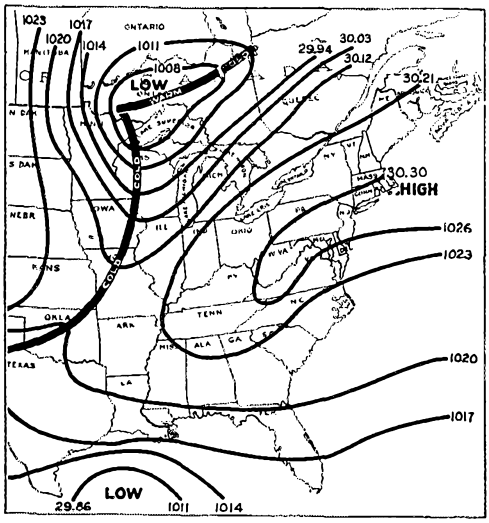
BY EDWARD P. TILTON, W1HDQ

PART II *

IT is possible to make contacts on 50 Mc. and higher without having the slightest knowledge of wave propagation, but the fellow who goes about it in this way misses at least half the fun. Knowing something of the means by which his signals may reach distant points can be an important tool for the v.h.f. man. The information to follow will not qualify the reader as an ionospheric physicist but it represents about the minimum he should know in order to make good use of the many propagation vagaries he will encounter in the world above 50 Mc.

Tropospheric Bending

Most of the variations in conditions observed on lower frequencies are the result of varying ionization of the upper reaches of the ionosphere.



The area of maximum bending of v.h.f. waves usually follows the trailing edge of a large slow-moving high-pressure area. This map appeared in the morning papers of October 3, 1950. VE1QY, Yarmouth, Nova Scotia, worked W4CVQ, Fayetteville, North Carolina, on 144 Mc. at noon on this date.

At 50 Mc. and up the lower atmosphere (the region where our weather variations show up first) gets into the act. As a result, propagation on the v.h.f. bands is tied up closely with observable weather effects to a much greater extent than is true of our lower bands.

The normal state of affairs in the troposphere is a gradual reduction in temperature with height, amounting to about three degrees for each 1000 feet of elevation. When this "lapse rate" is less, or, as may often occur, an actual temperature inversion is set up, we have a condition whereby v.h.f. waves are prevented from taking off into space at the normal radiation angle. Instead they tend to travel along the earth's surface, bending over considerable obstructions and making signals audible far beyond the visible horizon.

This happy condition may be the result of an influx of warm air from the south, overrunning cold air that may have had its origin in polar regions. The two types of air may retain their individual characteristics for many days as they move across the country. V.h.f. DX may be worked along the air-mass boundary until the masses become thoroughly mixed. The area of maximum bending is usually closely associated with the trailing edge of a large and slow-moving high-pressure area, and consequently such DX is often predictable from a study of daily weather maps showing pressure distribution.

The convection that takes place along our coast lines and near other large bodies of water in warm weather is another great aid to v.h.f. propagation. The quick cooling of the earth's surface after sundown, with the air aloft retaining its heat longer, is the cause of the invariable pick-up in signal level that takes place at dusk. Heating of the upper air, before the sun warms the earth appreciably, is the factor behind our familiar early-morning v.h.f. DX.

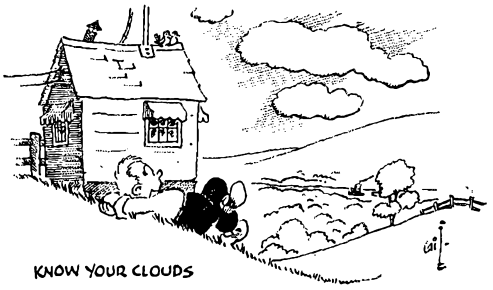
Atmospheric phenomena such as these make possible communication on 50 Mc. over distances up to 300 miles or more, but it is on higher bands that the effects become most interesting. Above about 100 Mc. a sort of duct effect begins to show, whereby v.h.f. waves may be propagated as if in a gigantic waveguide, losing almost nothing in signal strength over tremendous distances. Just how far this condition may be maintained is not precisely known, but examples of tropospheric communication on 144 Mc. over distances well in excess of 1000 miles give some clue as to the possibilities. This phenomenon is not in evidence on 50 Mc. but is relatively frequent on 144 Mc., indicating the likelihood that DX far beyond our present limits is possible on 220, 420 and higher amateur assignments.

Fortunately, tropospheric phenomena are easily observed and quite readily predicted, once we become familiar with common weather signs. The ambitious v.h.f. man soon learns to correlate such evidence as changing trends in temperature and barometric pressure, cloud formations, wind direction and visibility. By forming the natural habit of watching the weather, and by studying the daily weather maps now appearing in many

* Part I appeared in January *QST*.

newspapers,[1] he is soon able to tell with reasonable accuracy what is in store on the v.h.f. bands.

Tropospheric DX varies with the seasons. It is most common in spring and fall, when the days are warm and the nights cool. September and October, known variously as the "hurricane



season" and Indian summer, combine the attributes of good v.h.f. weather to the greatest degree of any of our seasons. Warm weather is generally better than cold, but even in midwinter a change from clear cold weather to milder temperatures and increased cloudiness will be accompanied by improved v.h.f. propagation.

Aurora Effect

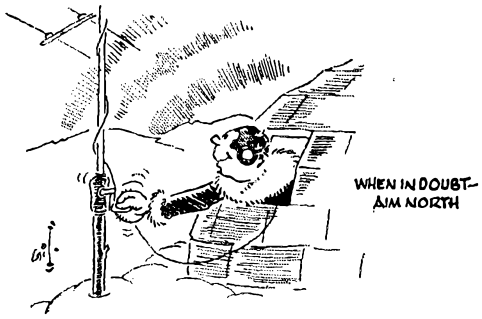
To the occupant of 3.5, 7 or 14 Mc. the appearance of an aurora is the signal to knock off for the night. The ionosphere storm with which the aurora is associated may wipe out communication on these bands almost entirely and even a mild disturbance will turn normally strong signals into wavery will-o'-the-wisps. But to the v.h.f. fraternity an aurora is an opportunity for some of the most interesting fare on the menu. The experienced operator on 6 or 2 is constantly on the alert for signs of an ionosphere storm. When he hears wavery signals on 75, or a dribbling sound on the carriers of 10-meter 'phones, he turns his beam into the north, plugs in his key, and prepares to have himself a time on c.w.

A visible aurora is a sure tip-off, if the disturbance develops at night and the visibility is good, but many aurora openings come in daylight, or during conditions of low nighttime visibility, so careful listening is the safest bet. The diffused nature of the reflections from the auroral regions causes pronounced distortion of the received signal. Modulation of any sort is turned to unintelligible mush, making straight c.w. the only satisfactory means of communication. Voice or tone modulation may be partially readable on 50-Mc. signals at times, but it is often difficult to tell whether a 144-Mc. signal is being modulated at all, and c.w. becomes an absolute necessity.

The optimum antenna heading is approximately north, though this may vary for stations in different true directions. Working one far to the east may require a northeasterly heading; one to the west may come in better with the array shifted to the northwest. The location of the aurora governs this also, though the most common bearing will be toward the north magnetic pole. Occasionally aurora effect may be spread well over the sky, extending up to or beyond the zenith. In such instances there may be only a slight improvement in signal strength when the beam is turned north. This condition is most common around the peak of the solar cycle, when sunspot activity is spread well over the sun's surface, instead of being concentrated near the solar equator.

Ionospheric disturbances are predictable with a fair degree of accuracy on a short-term basis. The Central Radio Propagation Laboratory of the National Bureau of Standards issues a weekly forecast of the probable dates of ionospheric disturbances for the ensuing three-week period. This information is transmitted nightly by the ARRL Headquarters station, W1AW, during the regular information bulletin periods.

Aurora propagation is particularly intriguing to the v.h.f. man in that it provides opportunities for work into areas that may be difficult to reach by other forms of propagation. The distances between 200 and 500 miles, seldom worked on 50 Mc. by either tropospheric bending of sporadic-*E* skip, are right in the best range for aurora work. Stations out to nearly 1000 miles may be worked on both 50 and 144 Mc. on rare occasions, but hops under 600 miles are most common. Whether or not aurora reflection is possible on 220 or 420 Mc. is a question that is waiting for some enterprising v.h.f. men to answer.



Aurora effect is observed most frequently in northeastern U.S.A. and bordering Canadian provinces, less often west of the Mississippi, and rarely in the South, though experience has shown that it may occur anywhere in the country. Like other solar-caused propagation phenomena, aurora recurs on a 27-day cycle coinciding with the turning of the sun on its axis. The most frequent and pronounced disturbances usually occur in the months of February, March, September and October. It is most common in the early evening hours, and after midnight, though it has been observed at all hours and during every month of the year.

[1] The daily weather map may be obtained on a subscription basis from the Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. The price is 30 cents a month or $3.60 per year.

Unlike some other forms of v.h.f. work, aurora DX work does not require a good location. The chances are that if you can see the aurora you can bounce signals off from it. The most important requisites are a high-gain antenna (preferably one with a good front-to-back ratio), a fair amount of power, a clean-keying c.w. system, and a sensitive and stable receiver.

Sporadic-E Skip

This is the phenomenon that makes life interesting for the fellow on 50 Mc. who is so situated that he has little or no chance of making regular contacts under normal conditions. Patchy concentrations of ionization in the *E*-layer region are often responsible for the reflection of 28- and 50-Mc. signals — the popular "short skip" that provides such fine contacts over distances of 400 to 1300 miles on these bands during the early summer months. It is most common during May, June and July, with a lesser period in December and January, but it has been observed in all months, and at all hours of the day and night.

Multiple-hop effects may appear, when ionization develops simultaneously over large areas, making possible work over distances of 2500 miles or more. Observation of conditions on 28 Mc. provides a good check on the possibility of 50-Mc. openings. If 10-meter *skip* signals are heard coming in from a distance of 400 miles or less it is practically certain that 6 is open in the same direction, but probably at a distance of 600 miles or more. The shortest skip yet observed on 50 Mc. is in the neighborhood of 300 miles. Contacts in the 700- to 1200-mile range are most frequently and easily made.

Sporadic-*E* openings may develop very rapidly, the signals breaking through on 50 Mc. within a few minutes after the first sign of the phenomenon appears on 28 Mc. The presence of sporadic-*E* ionization is difficult to detect by observation on frequencies lower than 28 Mc., though unusually short skip on any band is a good sign. On marginal openings, 50-Mc. signals may appear and fade out again in a matter of a minute or less, while at the peak of the season there may be strong steady signals for hours at a time. Since it is largely unpredictable, at our present state of knowledge, sporadic-*E* skip is of high "surprise value" and it is in this capricious nature that much of the appeal of communication by this medium lies. The experienced v.h.f. enthusiast never tires of trying to outguess the ionosphere, and make the most of every opportunity that comes along.

The upper limit of sporadic-*E* reflection is not known exactly. Until recently it was thought to be in the vicinity of 100 Mc., but several instances of long-distance work on 144 Mc. show evidence of having come about by this medium.

F_2-Layer Reflection

Much of the communication on 28 Mc. and lower frequencies is carried on by means of reflection from the F_2 layer. This highest of the reflecting regions of the ionosphere is also capable of producing 50-Mc. DX around the peak of the 11-year sunspot cycle. At the low point of the solar cycle, such as the period we were entering in 1941, the maximum usable frequency (m.u.f.) may go as high as 28 Mc. only during short periods in the spring and fall, whereas it may reach 60 Mc. or higher at the peak of the cycle.

Though there were isolated reports of long-distance reception on 56 Mc. in the '30s that may have resulted from F_2-layer reflection, the first authentic instances of F_2-layer two-way work on amateur frequencies above 30 Mc. occurred in the fall of 1946. DX of world-wide proportions was worked on 50 Mc. in 1947 and 1948, as we passed over the peak of the cycle, and it has continued through the present, in the more favorable areas of the world, though we are more than two years past the peak.

In the higher latitudes there are m.u.f. peaks each spring and fall, with a low period during the summer and a slight falling off during the mid-winter months. At or near the Equator conditions are less variable, and the average m.u.f. is higher. North-south paths generally show higher m.u.f. than east-west ones, except near solar activity peaks.

Fortunately, F_2-layer m.u.f. is often readily determined by observation, and means are available whereby it may be estimated quite accurately for any path at any time. It is predictable for months in advance,[2] enabling the v.h.f. worker to arrange schedules with distant stations at propitious times. With numerous signals to be heard between 28 and 50 Mc., it is possible to get a fair idea of the m.u.f. by listening carefully in this range. The length of the skip on 28 Mc. also provides a good m.u.f. indication. When strong steady signals are heard from 1000 miles or less one may be certain that the m.u.f. is getting close to 50 Mc. in the same direction. Daily observation will show whether the m.u.f. is rising or falling, and once the peak for a given month is determined, it can be assumed that the next high point will follow approximately 27 days later.

The working range via F_2 skip on 50 Mc. will be roughly comparable to that on 28 Mc., though the *minimum* distance is somewhat greater on the higher band. Two-way work has been done on 50 Mc. over distances ranging from 2200 to 10,500 miles. The maximum frequency for F_2-layer reflection is believed to be in the vicinity of 70 Mc.

Rebound and Scatter Effects

Operators who use the 10-meter band are familiar with the condition whereby signals may be heard over distances of 50 to 1000 miles or so by a sharp-angle rebound from the ionosphere. This effect is most pronounced when directional arrays and high power are used. For best results the beams at both ends of the path must be aimed in approximately the same direction, generally toward the area of highest m.u.f. It is most pro-

[2] *Basic Radio Propagation Predictions*, National Bureau of Standards, available from Supt. of Documents, Washington 25, D. C., $1.00 per year.

nounced when the m.u.f. is just *above* the operating frequency, so it is relatively rare in v.h.f. work. It may be observed on 50 Mc. as the m.u.f. rises above that figure, a condition likely to occur only for short periods around the sunspot cycle peak. Similar rebound effects are seen occasionally in sporadic-*E* work.

North-South 50-Mc. Work

In recent years it has been observed that when there is a pronounced ionospheric disturbance in the evening hours the 50-Mc. band may be open for long distances in a north-south direction the following day. Examples are contacts made by 50-Mc. stations in northern U.S.A. and bordering Canadian provinces with various South American countries, notably Ecuador and Argentina. Experience indicates that such openings occur most frequently around 10 A.M. local time. Contacts have been made by this means when the predicted m.u.f. was as low as 36 Mc. They have been most frequent in October, November, February and March. This effect was also noted in work between Europe and South Africa.

Reflections from Meteor Trails

Probably the least-known means of v.h.f. propagation is that resulting from the passage of meteors through the signal path. Reflections from ionized meteor trails may show up as sudden bursts on very weak signals, or they may bring in other signals not ordinarily heard. The short duration of a single meteor trail burst renders the phenomena useless for long-distance communication ordinarily, but meteor showers of considerable magnitude and duration may provide fluttery 50-Mc. signals from distances of 1000 miles or more.

Developing V.H.F. Activity

The foregoing discussion shows that the v.h.f. man has no lack of variety to add spice to the routine operation of his station, but such DX opportunities should be kept in their proper perspective. We have seen that DX, whether it be measured in thousands or hundreds of miles, can be as much of a challenge to the v.h.f. man as to any other, and its successful conquest can bring an equal degree of satisfaction. In this continual extending of our operating range lies a basic appeal of v.h.f. endeavor. To build a better beam or a more efficient receiver; to make changes in the rig to get a little more stuff into the antenna; to extend the *minimum* working range, regardless of conditions — these are the constant aims of the more ardent v.h.f. enthusiast. But his efforts may come to naught if there is no consistent activity on the bands in which he is interested.

To be the most fun, and to be productive of the best all-around results, v.h.f. activity must have continuity. In the ideal situation there would always be someone on the band of our choice; someone waiting to talk with us whenever the spirit moves us to throw the switches. Obviously, this is not often possible, particularly in areas where the population is sparse and amateurs are separated from one another by many miles, but by proper coördination of effort, even a relatively small group spread over a large area can keep things going at an interesting level.

If there is not sufficient amateur population in a given area to sustain spontaneous activity throughout the year, there are numerous ways of promoting a reasonably good substitute. At your local radio club, or in the course of contacts on other bands, talk up your v.h.f. interest. The chances are that you will find others that will be glad to work with you. Arrange a schedule (one night a week will do for a starter) when everyone interested will make an effort to be on the air at an appointed time.

Then *keep* the schedule, and see that others do likewise. Don't just turn on the receiver and listen across the band to see if anyone is on, only to abandon the idea if nobody is heard. Get on the air and make some noise, and if you hear someone else on give him a call, even though he may be just across town. Hams are gregarious creatures; there is nothing like hearing a few fellows on chewing the rag to encourage others to do likewise. The opposite is even more true; nothing discourages a budding v.h.f. enthusiast like listening to several megacycles filled with nothing but receiver noise.

Make schedules with stations near the edge of your working range. Such schedules, kept religiously by both parties, will net contacts far more often than would be guessed from random observation. Send information on any scheduled operation to ARRL for use in "The World Above 50 Mc." and include any news, tidbits or helpful hints that might be useful to other v.h.f. men.

There are many other ways to develop and maintain interest and activity, but they all revolve around a sense of responsibility and consideration for the other fellow. We should be ready and eager to make the most of DX opportunities when they arise, but let's not allow DX chasing to become the sole end in view. We need regular use of our bands to make them really worth while. It is the job of every dyed-in-the-wool v.h.f. man to see that no step is left untaken that will contribute to that end.

Strays

The following is reprinted — without comment! — from the question and answer section of Dr. Paul Popenoe's syndicated newspaper column, "Modern Marriage."

> *Q.* Any . . . suggestions as to how a serious-minded girl can meet marriageable men?
>
> *A.* Try becoming a radio "ham." There are several hundred thousand of them in North America. They are likely to be a serious and intelligent lot of fellows. Many are unmarried. Get someone to set you up with an outfit. You can get in touch with all the hams within 30 or 40 miles. Invite them to drop in and criticize your hook-up and give you further suggestions.

Correspondence From Members-

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

C.W.

Touro and Spring Sts., Newport, R. I.

Editor, *QST:*

After working on ham bands since 1935, first on c.w. and then later on 5-, 2½-, 2-, and 10-meter 'phone, have just lately returned for a second go at c.w. on 40 meters and do you know I am enjoying it. I am in the radio and TV business and get tired of talking all day to customers. To come home and talk on 'phone is too much. I find that c.w. just fits the bill. It relaxes me. Maybe it will help other talked-out business men. Hi!

— *F. E. Evans, W1JFF*

DX CONTEST QSLs

Apartado 299, Guatemala, C. A.

Editor, *QST:*

I answered a pretty large pile of QSLs from the 1950 ARRL DX contest. The job would have been easier if the Ws and VEs remembered there are several pages of log for each contest day, and put not only the date but also the time of QSO on their QSL. Most of them did remember, but many didn't. How about it this year?

While airing gripes, would it do any good to remind certain operators that when a foreign station calls a directional CQ or a particular station, he wants that locality or station and not anybody else "in case you don't get him"?

— *Roberto W. Engel, TG9AD*

PEACE PIPE

1406 Venice Blvd., Los Angeles 6, Calif.

Editor, *QST:*

Re the cover of December *QST* — I am wondering who is trying to help sell that pipe tobacco. I don't think that anything like that should be put on the cover. I believe ARRL is now too darn commercial so let's not go into selling tobacco.

— *Norman Lefcourt, W6IRT*

A SUGGESTION

14220 Gramatan Ave., Cleveland 11, Ohio

Editor, *QST:*

The editorial "The Service Headquarters" in the October 50 issue was excellent. So was the editorial "League Control" in the April '50 issue. Perhaps these will have some effect on our dissident elements in ham radio. . . .

In my experience, those hams who complain loudest about bias on the part of the League are those who don't take the trouble to read the editorials or the Board Minutes. True, they're not easy reading.

I have a suggestion along this line, however. That is, to carry out the newspaper method of writing even more than is being done at present. It would take more space. But even frequent subject headings interspersed in the detailed Board Minutes would make for easier reading.

— *James B. Bamberg, W8OPX*

HI!

2029 Longwood Ave., Los Angeles, Calif.

Editor, *QST:*

Being here in Los Angeles, I have the call of W6JAO, and the television station on Channel 2 was at one time W6XAO. The other day a neighbor came over to complain about his TV picture. He said that he saw my call letters spelled out on his screen and wanted to know how much power I was running on TV. After my explaining to him about the difference in calls he complained that he no longer could get the channel. Looking into the matter I found that his 300-ohm line was torn in two. However, we are all straightened out now, and he no longer sees my call on TV. The FCC has granted the station a new call, KTSL.

— *Michael Furgiuele, W6JAO*

QSL CARDS

53 East 7th St., Holland, Mich.

Editor, *QST:*

Anyone who has any trouble with the ink running on his QSL cards when being filled out should immediately experiment with a different type of fountain pen. I myself have found a cheap ball-point type pen to do a perfect job on any kind of card stock.

— *Rus Sakkers, W8DED*

CODE PRACTICE

420 West 66th St., Chicago 21, Ill.

Editor, *QST:*

I received my ticket in May, 1950. I sincerely believe your code practice each nite deserves all the credit since I had no other means of learning code. Thanks loads!

— *Don Allen, W9KJI*

THAT BOOK!

River Ridge, Hanover, N. H.

Editor, *QST:*

Re W1LVQ's article "General Operating" in the November *QST*, he states in the opening paragraph ". . . the XYL has picked up a good book and settled down for the evening."

Kindly rush the name of that good book; I wish to get several copies for the XYL here!

— *Richard C. Dunham, W1EWF*

[Editor's Note: "How to Live Alone and Like It."]

VISIT SWAPPING

Box 308, Culpeper, Va.

Editor, *QST:*

Could you find me two hams from the United Kingdom or a ham and his XYL who would like to spend a brief visit in the U. S. as house guests of a W? .

The gimmick is this. I want to visit Europe someday, but probably won't have enough money to do so on a tourist basis — hotel accommodations are too expensive. There must be UK hams in the same boat.

Our house is small, and we would not be able to accommodate more than an absolute maximum of two visitors. I am twenty-five. They (or he) should be in the same age group. The only other conditions are that they should pay at least part of their board and that they help with their part of the extra housework. We won't be able to put on a "show," so they will have to be resigned to living as one of the family.

I'd be especially tickled if they had never been to the U. S. before.

— *George L. Thurston, W4MLE*

SWITCH TO SAFETY!

Hints and Kinks For the Experimenter

CATWALK FOR BEAM ADJUSTMENT

ANYONE who has plans for a new rotary beam antenna will be interested in the rugged mounting arrangement shown in Fig. 1. It is the final realization of a dream that many hams have had, namely a rotary beam that is both safe and easy to adjust while it is in its operating position.

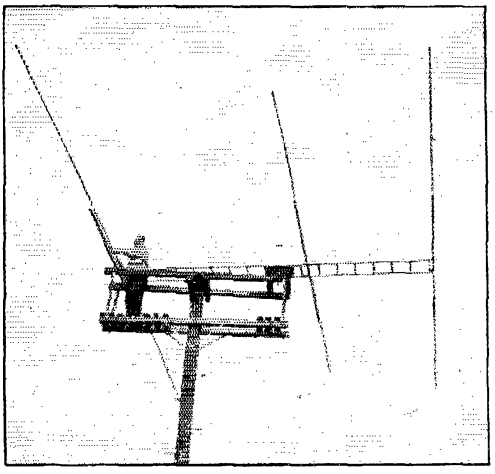


Fig. 1 — A solution to the old problem of how to adjust the beam while it is 50 feet above ground. The secure-looking individual on the catwalk is W4BAD.

The photograph shows the details of the mounting at the top of a 50-foot pole. A catwalk is built between two 10-foot crossarms, with two more crossarms providing a guard rail and additional support for the entire structure. The thrust bearing that supports the antenna is mounted at one end of the structure, so that by merely rotating the antenna, almost any part of it can be reached from either one end of the catwalk or the other.

An 18-foot ladder is used as the boom, and the elements are mounted on 12-foot lengths of kiln-dried fir 2 by 3. — *George Tamer, jr., W4BAD*

IMPROVED PERFORMANCE IN SURPLUS RECEIVERS

THE performance of some surplus receivers, notably the BC-348 and BC-342, can be improved by the following simple operations: First, replace all of the 0.01-μfd. by-pass condensers with new mica or ceramic units. The condensers in the original equipment *look* like mica condensers because they are enclosed in a black bakelite case, but actually they are paper, and as they grow older they develop leakage sufficient to reduce the over-all performance of the receiver. Next, apply a liberal coating of "Lubriplate," which is available in most hardware stores, to the bearings of the main tuning condenser, and — in the case of the BC-348 — to the gear train in the bandswitch. This will eliminate the tendency to instability that sometimes develops in these receivers because of corrosion of the moving parts in the h.f. oscillator tuning mechanism. — *Paul E. Griffith, W2SOY*

QSL CARD DISPLAY SIMPLIFIED

MANY methods of displaying QSL cards without damage to either the cards or to the surface on which they are mounted have been proposed, but almost all of the tricks have fallen short in one respect or another. About the best solution to the problem is to use Carter's rubber cement on the back corners of the cards. It will bond them to almost any surface, and when it becomes necessary to remove or relocate them, they will come off easily if a thin-bladed knife is slipped behind them. The adhering cement can be rubbed off with the fingers, leaving both the QSL card and the mounting surface unmarred. — *Merritt F. Malvern, W2ORG*

NOVEL SWITCHING SYSTEM

THE circuit shown in Fig. 2 eliminates the possibility of applying plate voltage to a transmitter before the filaments are lighted, a common hazard in most transmitter control systems.

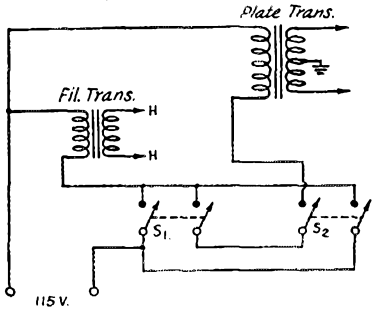


Fig. 2 — A novel switching system for the low-power rig. No matter which switch is thrown first, the filaments come on, and the second switch will then turn on the plate supply. S_1 and S_2 are double-pole single-throw toggle switches.

With the connections shown the filament transformer is energized, no matter which switch is thrown first. Whichever switch is thrown second will apply plate voltage. In the reverse operation, the first switch thrown OFF will turn off plate voltage, the second will turn off filament voltage. — *R. L. Baldwin, W1IKE*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
JOHN E. CANN, W1RWS, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
L. G. McCOY, W1ICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

Best DX . . . in ARRL's 17th International DX Competition. During February and March ARRL has traditionally scheduled its annual DX Contest, and this year is no exception. In this hemisphere conditions are those of the winter season when many have time for some intensive operating. We can hope that radio propagation will be favorable . . . and we suggest that the possibilities of the lower-frequency amateur bands not be overlooked. On this part of the propagation cycle "eighty DX" may well approach what it was some twenty or more years ago. Impressive scores didn't start to come (with growing contest popularity) much before 1930, but the DX flourished, as always brought to the fore by announcement of a special activity. Purpose of the test has always been to focus the attention of all the fraternity on DX possibilities, and add to the operating enjoyment the possibility of finding a new country or station not worked before. So note the dates, and *here's luck and DX!*

The log form that was optional two years ago has become standard and we have distributed as many as possible on request, to make participation as easy as possible and to help systematize the work for the contest checking crew. See page 32, January 1951 *QST*, for full details on rules and participation.

Copies of Operating Aid No. 5, the *ARRL DX Operating Code*, are available on request. Its points were arrived at after consulting a cross-section of DX operating amateurs in this country, and the societies abroad. Aimed at discouraging the poorer practices that have driven some hams from DX work, there has been intensive distribution overseas — and foreign societies are cordially invited to ask for copies of this aid where additional distribution without translation can be utilized. The seven points for overseas amateurs conclude with the thought that DX amateurs avoid working W-VE amateurs who are constant violators of the principles expressed in the code. In the contest work coming up, may we ask participants:

1) To make calls *short*.

2) To keep in their government's frequency band limits, on penalty of disqualification.

3) To keep your signal *clean* of clicks, feedback, splatter, etc.

4) To include *honest* reports as the first part of serial numbers, and honest power figures in the latter section of these exchanges.

5) To observe carefully any tuning instructions of DX stations . . . such as 15U or 25D indicating the kc. up or down from the given frequency to call.

6) To call DX stations *only* after they call CQ, send QRZ?, or sign SK.

A word concerning *sportsmanship* should here be said. *How one operates* is much more important to the participant than what the score is. We continually have questions about rules and working that make us confident that whatever a small number of DX-greedy individuals may do to label themselves *for their tactics* with the general body of those participating, the larger number are decent and good amateur citizens who will be able to take the operating test in stride. Each contestant in taking part in an ARRL activity must automatically subscribe to all contest rulings and decisions as final as well as certify on his log that he has played the game squarely. We call upon all who take part to live up to the spirit as well as the letter of the contest rules and FCC regulations, and must invite attention to the fact that the customary self-policing and FCC measures and award committee disqualifications will be invoked to keep contest work in bounds.

On Getting Replies to CQs. Through the years we have many times mentioned the practice of *excessive CQing* as inefficient, stupid operating. A recent letter gives us one more example with the suggestion that new and old hams use *short* CQs or short *directed* calls with break-in. There's virtue in the old "three times three" call and the acceptable modern practice mentioned in *Operating an Amateur Radio Station* which recommends that CQ be "sent not more than 5 times without interspersing one's station identification with the length and number of repeated calls carefully limited." A W4 sent us the new example (how to waste one's operating time) from observations made in the 7-Mc. band and taking place right in the enlightened year 1950!

8:48 P.M.: CQ sent 42 times (identification), CQ 41 times (identification), CQ 5 times (identification), CQ 25 times (identification), K. *113 CQs in one transmission! No answer.*
9:00 P.M.: CQ 37 times (identification), CQ 15 times (identification), K. *52 CQs in one transmission! No answer.*

A word to the wise. . . .

Club TVI-BCI Committees. The radio club is a top agency for assisting amateurs in any community to meet common local problems. High among the other services for members is the club maintenance of an interference committee which centralizes the availability of test equipment, assists in public contacts and promotional pub-

licity to assure best public understanding and relations, arranges technical committee demonstrations of essential TVI-BCI reduction measures, etc.

In January, 1950, *QST* (page 62) suggestions for forming such a committee were given. This is just a reminder that the ARRL CD will supply on request the ARRL mimeographs covering the following: (1) Typical Solutions to BCI; (2) BC Interference . . . ice-breaker for a ham's neighbors; (3) Television Reception and Interference, FCC 48-1803; (4) About Television Reception . . . facts for the TV receiver owner; (5) TV Interference Remedies; (6) Bibliography of *QST* References to TVI Reduction. Ask, by number, for the type your committee can use. — *F. E. H.*

HIGH CLAIMED SCORES — 1950 SWEEPSTAKES

The pace set during the first week end of the Seventeenth ARRL Sweepstakes indicated a good possibility that new score records would be set by both c.w. and 'phone participants. A combination of unfortunate circumstances, however, combined to thwart the efforts of many contestants during the second week end. Violent wind and snowstorms raged in many areas. Loss of power forced stations off the air in some instances; in other cases, contestants dropped out of the Sweepstakes in order to take part in the more important business of handling emergency traffic. Those hams who were in a position to continue SS activity found themselves plagued by an ionospheric storm that caused contacts per hour averages to suffer. Despite these bad breaks, numerous SSers doggedly continued making contacts and came up with some excellent scores.

Listed below are the highest claimed scores received. The listings show score, number of contacts, and number of sections worked. All figures are *claimed* by the contestants and are subject to further checking. Final results will appear in an early issue of *QST*.

C.W.

W4KFC	171,900-956-72	W1JYH	113,600-640-71
W6IFW	167,040-933-72	W2IOP	113,334-642-71
W9RQM	159,930-890-72	W8OYI	113,160-656-69
W3BES	158,419-893-71	W3VES	111,738-639-70
W9OLU	149,632-843-71	W5DWB	109,695-618-71
W3DGM	145,590-844-69	W3FQB	109,288-625-70
W7KEV	138,000-803-69	W5ZD	107,713-618-70
W4KFT	133,960-788-68	WØPHR	106,425-645-66
W3EIS	133,032-771-69	W3AEL	105,625-650-65
WØPNQ	132,300-735-72	W4ILE	104,669-664-65
W5USN[1]	130,988-756-70	W3JTC	103,850-620-67
WØTKX	128,510-724-71	W6CUF	103,140-574-72
W3JTK	125,650-718-70	W9WEN	103,096-616-67
W4IA	124,863-714-70	W9WFS	102,465-606-69
W1AWX	122,150-700-70	W3EQA	101,974-575-71
W9NII	120,750-690-70	W6JFJ	101,915-610-68
W3FQZ	120,700-681-71	W5BLU	100,650-617-66
W3GRF	115,920-672-69	W5FVO	100,081-604-67
W2BXA	115,316-673-69		

'PHONE

W6QEU	122,832-854-72	WØPRZ	41,676-304-69
W4CYC	59,850-430-70	W8NOH	40,425-231-70
W5FAG	56,437-323-70	W3LTU	39,060-315-62
W6YX[2]	56,097-414-69	W7PUM	39,060-248-63
W5SMA	52,140-316-66	W7EYD	38,940-265-59
W3DHM	50,552-357-71	W4CPG	38,285-300-65
W1ATE	46,584-326-72	W3KQU	34,510-250-70
W6CHV	43,890-261-66	W4LIM	33,396-256-66
W8AJW	42,043-251-67	W6AM	32,562-243-67
W4AGB	32,004-253-63	WØDEI	27,504-191-72
W7MLJ	31,620-257-62	WØRQK	27,280-178-62
W6BTE	30,475-230-53	W5RXC	26,847-240-57
W9ZTO	29,120-182-64	KH6MG	26,649-213-63
W8PYP[2]	28,086-231-62	W6KJK[2]	25,300-230-55

[1] W5LNU operator. [2] Multiple-operator entry.

MEET THE SCMs

Ellen White, W6YYM, took office as SCM of San Diego October 16, 1950, filling the post left vacant by the resignation of W6BWO. While not the first member of her sex to hold such a post, she is presently the only woman SCM in the League's field organization.

Obtaining her first license in July, 1946, she has held the calls W2RBU, KH6QI, and W6YYM, and now possesses first-class 'phone and second-class telegraph tickets.

A versatile ham, Ellen takes part in Field Day and YLRL Contests, maintains membership in the Soledad Amateur Radio Club, the San Diego Amateur Radio Club, and the YLRL, and holds, or has held, several offices in these organizations. She is active as ORS and Official Observer and has earned her RCC certificate.

The station at W6YYM, located in the dining room, consists of 6L6-807 rig for 7 Mc., 6J5 VFO-6AU6-6AC7-807 for other bands, and a homebuilt superhet receiver. Bands in actual use are 3.5-, 7-, and 14-Mc. c.w. and 3.85-Mc. 'phone. Antenna is a 66-foot center-fed doublet.

Ellen, the XYL of W6YYN, has the distinction of being the third member of her family to hold the position of SCM; her father-in-law, W6APG, and her brother-in-law, W6CHV, are former SCMs.

In the past she has held positions as radio announcer, engineer-announcer, and transmitter engineer at broadcast stations in San Diego and Honolulu. At the present time Ellen is attending San Diego State College, where she is majoring in physics.

A.R.R.L. ACTIVITIES CALENDAR

Feb. 3rd: CP Qualifying Run — W6OWP
Feb. 7th: Frequency Measuring Test
Feb. 9th-11th: DX Competition (c.w.)
Feb. 14th: CP Qualifying Run — W1AW, WØTQD
Feb. 16th-18th: DX Competition ('phone)
Mar. 2nd: CP Qualifying Run — W6OWP
Mar. 9th-11th: DX Competition (c.w.)
Mar. 13th: CP Qualifying Run — W1AW, WØTQD
Mar. 16th-18th: DX Competition ('phone)
April 1st: CP Qualifying Run — W6OWP
April 14th-15th: CD QSO Party (c.w.)
April 19th: CP Qualifying Run — W1AW, WØTQD
April 21st-22nd: CD QSO Party ('phone)
May 5th: CP Qualifying Run — W6OWP
May 16th: CP Qualifying Run — W1AW, WØTQD
June 8th: CP Qualifying Run — W6OWP
June 9th-10th: V.H.F. Contest
June 19th: CP Qualifying Run — W1AW, WØTQD
June 23rd-24th: ARRL Field Day

In late October over eight inches of rain fell within 48 hours in northern California and southern Oregon, precipitating emergency conditions throughout that general area. Last month's *QST* covered the Oregon part of the story. In California there were two storms about two days apart. The first one centered about the city of Eureka, causing all telegraph and telephone service to be lost, isolating the city from all contact and surrounding it with flooded areas. EC W6SLX, assisted by W6EQQ, maintained communications with W6NL, W6ATO and W6CXO in San Francisco. Traffic was handled for the Red Cross, Western Union, Associated Press and many individuals.

As if this were not enough, a few hours later another storm of even greater severity hit the area north of Eureka, centering about Crescent City, which was completely isolated by tremendous floods. All power, lights, gas, telephones, wire services and transportation were completely crippled for several days. In addition, buildings were partially or totally destroyed, the sea wall was damaged, barges broke loose and ran amok in the harbor, and several small ships were sunk. Relief of all kinds was badly needed.

The Crescent City Red Cross chairman is a ham — W6WVS. He set up a low-powered emergency rig on 75 meter 'phone and operated it on his automobile battery for about 7 hours, continuously running his car to keep it charged. Contact was made with W6BJO in Loleta, also isolated, who in turn contacted W6BWV in the same city. It was W6BWV who got into San Francisco. W6BWV was heard calling W6ATO by W6PRR who 'phoned ATO and the latter took over and handled Red Cross traffic from noon until 3 P.M., when W6NL took over for the next three hours. After that W6CXO got on the air and handled traffic the rest of the evening and again the following night, by which time the situation was under control. W6s EQQ, SLX, CWR and FYY also assisted from time to time.

A lead editorial in the *Humboldt Standard* on November 7th paid tribute in glowing terms to the amateurs who participated in this emergency, saying in part: "During the recent storm . . . these amateur radio operators and their system did valiant service in keeping this region in contact with the outside world. They were, indeed, the sole line between this region and the remainder of California at times and, equally important, the sole facility available for communicating with residents of isolated areas cut off by disabled telephone lines or flood waters."

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On November 19th, W6LRQ was alerted by the Red Cross chapter in Bakersfield to assist in an emergency arising from a cloud burst and flash flood which threatened Bakersfield with flood conditions. W6VQS was already in communication with W6GS. W6LRQ took over as NCS on 3885 kc. Amateurs throughout the San Joaquin Valley stood by on 3885, as well as amateurs throughout the central and southern part of the state. W6DDE, W6CMN, and W6CE in the Los Angeles area were standing by in case it was necessary to tie in with established c.w. nets. The flood situation was critical in the Bakersfield area until 2000 Sunday night. Visalia was critical until about 2100 when the levee broke and the St. Johns River started over the flat lands. Red Cross traffic was maintained to Kernville all day Sunday and throughout the night until 1930 when one telephone line was made available by repairs. On Sunday afternoon W6DUF went into the disaster area of Kernville with an ambulance, radio jeeps, his personal car with a boat on top and another car and boat. W6TA, W6WBY and W6AUQ stood by at their own stations. W6GQP handled the ten-meter mobile circuit consisting of W6s GSX PXV HBV and GRA, and this net was linked with the 75-meter net via W6DSD. The 75 'phone net was secured at 2217 as all looked under control in the valley; however, at 0300 Monday W6DSD was called by the Kern County Sheriff's office to contact Kernville regarding weather and what was needed. Due to skip conditions, this contact had to be established through W2QYG in New Jersey to K6BII. W6VQS in Kernville could not read Bakersfield so K6BII acted as relay and traffic regarding immunization material was handled to guard against an outbreak of typhoid. The traffic circuit on 75 was maintained until 2220 Monday night. During the day Monday W6ZZC handled the net continuously and did an excellent job. W6GS went into Kernville with his mobile rig on Monday and maintained contact with W6VQS.

Much traffic was handled. On Sunday W6LRQ handled 139 transmissions and on Monday 43 transmissions in a few hours. Those stations participating not mentioned above include mobile W6s KPA and WG, and fixed W6s ASV ARE BZF BGE BTE CAN CHI DBX DXM DDG DUZ EAN EZP EKY EWQ FEE FIS GCS GGU GSL HHE HYG IEM IGJ JJE JDN JPV JPS LDD MYS MJG NCP PSW PNG QON RJE SJF TO UHN VJQ VTZ VLY WGO WUD WMU YCS ZYR ZXR ZEK and ZKX.

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Flood conditions continued to pester California throughout November and into early December, necessitating action by AREC units all over the state. On November 21st–22nd and December 3rd–4th, the American and Yuba rivers carried the waters from the high Sierras in cresting devastating floods. Amateur radio furnished the communications in directing rescue work. W6GDO set up a station at Red Cross headquarters in Sacramento on 29 Mc., with W6s GDO JBA ETD HQF GHN GQS IHX MIW TGS and W5HLQ as operators working in shifts. Mobile units were manned by W6s KME BVK GKW LVC GDE WHG and WLI on the same frequency. Walkie-talkie units were operated by W6s BND and JEQ in directing work on repairing levees. Fixed stations who were active included W6s ZYV IHX AK LNN BVK SIG MYT KME MIW ILZ GWT YV HSB HTS YMZ and KRX. W9JPT and W9QYZ assisted in helping keep the channel clear of QRM. The operating indicated the need for additional equipment, especially mobiles. W6KME is to be commended for the long hours of work he put in. Red Cross officials were high in their evaluation and praise of the work done by amateurs in this emergency.

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Ice jamming in the Bow River in Calgary, Alberta, caused flooding of the city in what amounted to an emergency of major proportions in early December. At 0015 December 2nd (it always happens in the middle of the night) VE6AO telephoned VE6TK, Calgary EC, and advised him that the situation was getting serious. VE6TK immediately contacted the city police and was advised that they required the assistance of the Calgary AREC. Within a half hour the control station and six mobiles were active. VE6JK was control on 28,259 kc. and 3815 kc. simultaneously. VE6AO assisted at control and VE6OD stood by on 3815 to clear the channel. Mobiles were VE6s AW JV UB HQ FK and WT. The temperature was −22 degrees. The mobiles, nevertheless, were on duty until 0500, keeping control advised of water levels throughout the city, new breakthroughs at the levee, and other useful information.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W.	*'PHONE*
7100 kc. (day)	3875 kc.
3550 kc. (night)	14,225 kc.
14,050 kc.	29,640 kc.
28,100 kc.	

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060 kc.; *'phone* — 3815, 14,160 kc.

That morning a special meeting of the city council resulted in the AREC being asked to install a station at City Hall and another at Fire Headquarters. Dynamite had been totally ineffective in breaking up the ice jam, and more trouble was expected. During that afternoon VE6AY set up at City Hall and VE6XX with the assistance of VE6AC set up in the Fire Hall. Early that evening the city engineer went with VE6WT/mobile on a tour of the river, maintaining continuous contact with City Hall. It was determined that a flood of major proportions would hit Calgary at about 2200. Meanwhile, VE6EA, EC at Edmonton, had

VE6TK holds a mike in one hand and a flashlight in the other as VE6AW points out an object of significance during a regular patrol of the Calgary AREC during the Calgary flood in early December.

been contacted and advised of the trouble and had agreed to come down to help (a mere 200 miles) along with another mobile, VE6EH. These two mobiles maintained constant contact with VE6OD during the trip down. The flood struck at about the predicted time, but no great trouble was experienced. However, the following day (Monday) a breakthrough occurred at 2300 at a very critical point. Only prompt action in reporting it by VE6WT enabled a bulldozer and sandbag crews to effect repairs before too serious a flooding had taken place.

And so it went, all through the week, with constant vigil being kept by the AREC units all day and often far into the night. Not until Thursday of that week did the Bow River cut a new channel for itself elsewhere on its course so that the pressure on critical city areas was relieved and the AREC gang could relax. A grateful city paid tribute to its AREC organization with publicity in the local papers, and the City Commissioner told EC VE6TK, "I have just told Mayor Mackay that the headlines should have read 'Hams Save Calgary from Flood.'" Other amateurs participating not mentioned above: VE6s BR PQ XF WG KX JH GC AP RO GR EX NW NF WL and TX. Says EC VE6TK: "Of one thing we are now sure: 'IT CAN HAPPEN HERE.'"

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On December 2nd a tornado ripped through Greenville, Ill., fifty miles northeast of St. Louis. All communications out of the city were severed by the storm. As soon as it could be determined that assistance was needed, W9YZE and W9UZU of the Granite City AREC drove their mobiles to Greenville to assist. In short order, with the assistance of W9RVT, they set up a control station at the City Hall to handle all police and rescue communication. W9TCB in Highland acted as a relay point for out-of-town traffic, routing to W9DJG, Alton EC, who was in touch with the St. Louis newspapers by telephone. W9YIY and W9BAE also assisted in relaying traffic. By midnight W9s TSS WDD LWH and EKP were also in the area with their mobiles. W9UQT and W9GOZ arrived in town the next day and set up W9GOZ as a fixed station on the Illinois Emergency Net frequency of 3940 kc. W9UQT also used his mobile for the same purpose when needed. The Civil Air Patrol of Southern Illinois provided emergency generators and worked with the amateurs in handling this emergency. W9RVF, WØBAP and WØNNF also assisted.

THE GREAT LAND HURRICANE OF 1950

The dawn that came on Saturday morning, November 25, was a gray, windy and wet one throughout the northeastern United States and southeastern Canada. In some areas the wetness was in the form of swirling snow, in others driving rain. Everywhere there was wind of near-hurricane force, toppling trees across power and communications lines, blowing roofs off houses, blocking transportation. Winds reached a velocity of 100 m.p.h. in some places. Old Mother Nature was really on the warpath, and facilities of the Amateur Radio Emergency Corps were alerted and taxed to the utmost to maintain uncertain and sporadic communication due to power, telegraph and telephone failures.

Each AREC unit which was alerted had its own story to tell about its part in the emergency operations which took place throughout Saturday, Sunday and in some cases on into the following week. In the east, once the wind had stopped blowing and power and regular communication were restored, the need for our services quickly terminated; but in western Pennsylvania, Ohio and other near-mid-western states a blanket of snow up to 30 inches with drifts of six to eight feet in some places slowed down recovery of normal communications necessitating continued emergency operation into the early part of the following week.

The complete story cannot be told, nor is it available. We shall attempt to summarize on this page the operations conducted by various AREC units on the basis of reports received (which were many), realizing that many incidents must go unreported and that many of the thousands of amateurs who took part in one way or another -- by standing by, by helping to clear emergency channels, by handling traffic — will go uncredited.

New England

The New England Emergency Net on 3975 kc. was alerted by W1AHX at 3 P.M. on Saturday afternoon. At 5 P.M. net control was turned over to W1SS who carried on until after 10 when he lost commercial power and went on emergency power. W1QGJ took over until 3 A.M., then W1SS got his power back. W1AVP in Vermont on emergency power rendered valuable assistance in relaying traffic. Traffic continued to flow into Sunday, with most operators getting little sleep. Emergency communications were handled for the state police, the Board of Health, railroads, Western Union, power companies, the Red Cross and the telephone company, in addition to the usual assortment of personal messages. Stations rendering outstanding service in the New England Emergency Net were W1s AVP, AHX, DFS, GMH, ITU, IXC, JNC, MLJ, MIJ, MCS, NLO, OQT, PZX, QOL, QGJ, QQY, RNA, RNZ, SPK, SS, TJ, TN, VV, W2AOR.

In Vermont, AREC organizations in Chittenden, Rutland, Addison, Windsor, Windham and Orleans counties were active both locally and through liaison stations in the Vermont 'phone and c.w. nets and the New England Emergency Net.

While no emergency was apparent in some of the counties represented, all stations were able to assist by providing liaison contact between the various local (ten meter) nets and statewide 'phone and c.w. nets, as well as with regional traffic and emergency facilities. Amateurs reported as being on the job by Vermont SEC W1RNA were W1s AHN, ATZ, AVP, AXN, AZV, BJP, BNS, BRO, CCF, CI, ETE, FPS, IAP, IT, JMO, JNC, MLJ, NLO, OKH, PRE, PZX, QCT QNM, QKK, QVS, QXU, RMX, RNA, RNZ, RPR, RRK, RYL, RWX, SEL, SIO, SVT, SPK, TBG, TEW, TFB, TJ and W2BNP/1.

The Connecticut State Police Amateur Auxiliary of the AREC was active on 3640 and 29,680, both emergency-powered and mobile, and succeeded in handling a lot of official traffic. In addition, AREC units in Norwalk and Stamford were reported as being very much alive and on the job. In Norwalk the EC was out of town, but operations proceeded smoothly without him, a simple matter of applying long practice to reality. The efficient way in which the AREC in Norwalk swung into action was an inspiration both to the Norwalk Red Cross and the public. By 9:15 A.M. Saturday morning operators were arriving at the Red Cross station, W1SGZ, carrying cans of gasoline for the emergency generator and spare batteries for the mobile units. By 9:30, W1DBM/M was on his way to the waterfront area to report on conditions from his mobile-equipped station wagon, closely followed by additional mobiles under control of

W1PEA, W1QBO and W1RMW. Meanwhile, W1MGX W1RKA, W1KGE and W1SYZ kept W1SGZ on the air. W1KEC, W1DAZ, W1PBH and W1SLP operated from their home stations. With this setup, the mobile units cruised throughout the city and surrounding area, always keeping in touch with the control station, W1SGZ, and reporting conditions and indicating the need for services at various places. In addition, contact was maintained with surrounding towns by amateur radio, for most communications lines were down. The AREC received most favorable publicity in the local newspaper as a result of the some twenty hours of operation put in.

In Stamford the AREC under EC W1PCZ was also active using three mobiles and a fixed station at Red Cross headquarters. Their operation started Saturday morning and continued until midnight, during which time they materially assisted the Red Cross in relaying disaster reports to headquarters. Mobiles on duty were W1VY, W1PCZ, W1UJB and W1FTM. W1NOA/1 was the call used at Red Cross headquarters which was operated by W1LZC, W1SEM, W1NOF, W1NOA, W1SPO and W1NER. The local U. S. Naval Reserve Training Center loaned a generator for the occasion.

New Jersey

The New Jersey 'Phone Net was in operation throughout most of the emergency, handling whatever traffic was required and effecting liaison with isolated points. Several of the stations in the net were operating with emergency power. In Elizabeth, the Union County AEC Net was put into action on Saturday morning under EC K2BG. W2GIZ, the club station of the Union County Amateur Radio Association, was placed in operation at the Elizabethtown Red Cross Chapter, and mobile units were put on patrol. Other units were set up to link the refugee center with police and Red Cross headquarters. The AREC gang also set up emergency generators for power, since the Red Cross headquarters was without electricity as a result of the gale. Amateurs cited by the EC as having participated included W2s CCY, CQD, EUI, HVK, IHR, KOJ, LOP, PIX, PIY, ZVO and W3QVI.

In South Jersey, the Burlington County Emergency Net was called upon for aid by the Red Cross, and within an hour was in operation with seven stations participating. Portable emergency-powered equipment was rushed to and set up at Red Cross headquarters by EC W2PWP and W2FKM, and constant communication maintained with that headquarters. W2ORS maintained constant communication with K4USA in Washington until the emergency was declared over at 0430 Sunday. K2BG and W2ZEB assisted at W2ORS. Other stations reporting in and assisting included W2s ALA, BDL, HV, ZI, SXT. W3s DVC and ELI.

Pennsylvania

In the Lehigh Valley area EC W3PYF and EC W2ZVW got their combined AREC organizations into action as a result of high winds and flood threats. With control station at Red Cross headquarters in Bethlehem mobile units were set up at scenes of disaster and at shelters during winds when telephones out gave Red Cross constant communication with critical points. W3HA in Lehighton gave hourly reports on river conditions to W2ZVW who relayed on 10 meters to Red Cross headquarters. Other coöperating amateurs were W2ZPF and W3s NF, PQX, PZG, PZL, QBF and QLC.

The Susquehanna Emergency Net under the guidance of EC W3UA functioned for 36 hours. It served as the only source of communication in repairing and returning to service the interconnecting high tension system of northern Pennsylvania. Mobile units were assigned to substations where needed. Many hours of outage were saved by use of SEN members. The Corps of Engineers and the Pennsylvania Railroad were also served during the course of operation. Constant radio communication was maintained with Red Cross headquarters in Washington, but no traffic was required to be handled. SEN members who took part are W2s AVD, PWN, RMH, YI, VW, W3s AFR, CHR, DEC, IBM, IPE, JDM, JZB, LJB, LNW, LUA, MFD, MIB, PUZ, QPU, TIZ, TOD, UFP, W4s OLL, PHL. Other assisting stations were W2QAA, W3s AQT, BFF, BHK, BRC, BSH, DIS, DKT, HFZ, KLG, KOV, KPP, KSJ, KXP, OGN, PHF, PUO and RKW.

In the Pittsburgh area a network sprang up on Saturday morning to meet the need for emergency communication as a result of a thirty-inch snowfall which crippled transportation and raised havoc with communications facilities. W3AQK and W3CUM started operations on 29,300 kc., the frequency of the Allegheny Valley-Kiski Radio Club. Before it was all over, 120 hours had elapsed and over 50 amateurs had played a direct part in a major disaster. W3AQK was net control, assisted by W3FPH. A tremendous amount of traffic was handled (111 by W3OMA alone). Most of the traffic handled was of a personal nature, but the Red Cross and other relief and utility agencies were also involved. The Emergency Coördinators of Allegheny, Westmoreland and Armstrong counties were actively engaged in this operation, as was the SEC himself. Those reported as being active: W3s AAX, AQK, BSO, CTN, CUM, CVT, FPH, GRX, IDO, KBI, KFB, KJZ, KQU, KSP, LAT, LBP, LMM, LOE, LPQ, LUX, MGB, MWJ, NBQ, NRK, NYH, NYI, OB, OC, OEL, OIT, OMA, OOM, PPF, PQP, PQR, PWQ, PY, QES, QEX, QKG, QIY, QPJ, QPQ, UCJ, W5JIF, W8s BNJ and EZM.

Ohio

In Ohio, where snow and high winds were general throughout the state and emergency conditions were widespread, nets were in operation on all bands, 160 through 2 meters. The list of stations participating in the Ohio emergency looks like a complete list of Ohio amateurs, to say nothing of the many amateurs outside the state who participated.

The Ohio Emergency Net on 3860 kc. went into operation on Saturday, November 25 and stayed in operation until Thursday afternoon, November 30. W8UWT did the bulk of net controlling, although W8EQ, W8AJW, W8CTO and others assisted from time to time. During this time, 108 stations were logged as reporting in to render assistance in one way or another.

The Northern Ohio Emergency Net on 160 meters was also active. This net was called together at 0800 Saturday morning by net manager W8ETS and carried on for three days as W8ETS, W8ZMH and W8ZQH alternated as net control. 35 stations participated. Out-of-state traffic was handled on 75 meter 'phone and on 80 and 40 meter c.w. via W8NIE, W8SWI and W8DFD. W8DGK and W8VDG performed liaison with the 10-meter net. Some 74 messages were originated and handled by members of the net.

The Akron gang was alerted at 0725 Saturday by a request from EC W8PBZ in Cleveland to W8BFH in Akron. By 1000 a net was set up on 29,130 kc. controlled by W8ZXN and contact made with the Cleveland organization, W8DMJ and W8YHO acting as liaison. W8VKK worked as liaison to Youngstown, where relay contact was available to a great many other Ohio communities as well as to communities in western Pennsylvania. Later in its operation, the net established additional liasion with eleven additional Ohio towns. Liaison contact was also established with nets operating on other bands, namely 160 meters (W8DOT and W8KMN), 80- and 40-meter c.w. (W8VQI and W8EXI), 75-meter 'phone (W8s OAC, BFH, SAF, DOT and LGM) and 20 meters (W8NYP and W8LBH). Most of the traffic handled was personal "worry" messages, but some of them concerned food and other relief supplies, rescue operations and contact with towns or parts of towns isolated by loss of communication. The net was active for 55 hours and handled 238 messages. In spite of the good job done, W8ZXN says "we learned . . . enough to know we all need some training in procedure and net operation."

In the Cleveland area EC W8PBZ was alerted at 0710 Saturday morning by W8TMA, and by 0745 the Cuyahoga County Net was active on 29,160 kc. A short time later another net was set up by W8AJH on 28,900 kc. to check in the stations who were rapidly reporting in. Both net control stations had lists of Jeeps, ambulances, cars with chains, doctors, available milk supplies and other useful data. Eleven mobiles were on the job and proved their worth by performing tasks that could not be done by fixed or even portable stations, in some cases combining transportation with communication. One mobile unit burned up 64 gallons of gas in an all-day job, traveling 300 miles and in the course of the day digging 65 cars out of snow banks. Local nets were active on 2, 10, 20, 40, 75, 80 and 160 meters. The EC was net control on 10 meters but the other bands were adequately taken care of by assistant ECs who selected net controls so that the operations might proceed smoothly.

There is insufficient room on this page to give specific

mention to each of the more than 350 amateurs who participated in the Ohio emergency. All who were reported to have done so will receive recognition in the form of ARRL Public Service Certificates. A good job, gang.

Canada

In Burlington, Ontario, SCM VE3IA spark-plugged a group of amateurs into a kind of action which took city officials completely by surprise. Toronto EC VE3IL and Ontario SEC VE3KM were on hand to assist, and within an hour of offering their services a network of amateur stations was in operation, including mobiles and emergency power. VE3IA set up at police headquarters while mobiles VE3IL and VE3AKL were dispatched to strategic communications points. Operation was conducted until 0400 Sunday. Amateurs from the vicinity who took part were VE3s ABP, BIK, BNQ, BPE, BTE, DGZ, DHZ, and DHG in addition to those already mentioned.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....236	G2PL.....226	WØYXO....224
W8HGW.....232	W2BXA....226	W3GHD....223
W6VFR.....229	W6ENV....225	W3CPV....223
W3BES.....229	W6EBG....224	

RADIOTELEPHONE

W1FH.....195	VQ4ERR....185	W2BXA....173
XE1AC.....188	PY2CK.....182	W9RBI.....173
LU6AJ.....186	W6DI.....181	W1JCX.....172
	W8HGW....181	

From November 15 to December 15, 1950, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

VK4RF.....128	OK2XF.....105	WØBBS.....100
VK3NC.....120	PAØDA.....102	OE1FF.....100
KG6DI.....119	W6MUF....102	VE3ADM...100
G2AJF.....117	W3MDE....101	G8UK.....100
OH2NB.....113	W8YHO....101	W7HXG....100
I1ADW.....105	VP5FR.....101	OH2QQ.....100
VE3SR.....105	W5RX.....100	

RADIOTELEPHONE

W1GKK.....114	W3KTF.....108	W3GHD....102
ON4AR.....111	W7HLB.....107	I1NK.....101
	G2AJF.....104	

ENDORSEMENTS

W3KT.....220	W2DKF....170	VE3AAZ....140
W6TT.....210	KV4AA.....168	W6DUB....140
W8BRA.....202	W3BXE....168	W4AZK.....140
W3JNN.....201	W7PGS.....165	G3YF.....140
W6SYG.....200	W6EHV....165	W7HIA.....137
W6MVQ.....200	W8HFE....163	SM7MS.....134
PY1GJ.....192	W6EYR....160	W4AIS.....132
W6CUQ.....190	KH6CD.....160	IS1AHK....132
W3DKT.....190	WØTJ.....157	VK4FJ.....130
W6PB.....190	W2RGV....154	W5NMA....130
KH6IJ.....180	W3LPF.....151	W6CEO.....124
PY1AHL.....180	KZ5CP.....151	W3KQU....124
W1CLX.....180	W5CEW....150	W6ZBY.....121
W9MXX.....178	W7DET.....150	VK5RX.....121
W9AEH.....176	W3ALX.....150	W2AUH.....116
KH6QH.....175	PY20E.....150	W1APA.....112
W9FKC.....174	W5ACL.....143	W5FXN....111
W8BKP.....173	SM6HU.....142	W8CED....110
W2PWP.....173	W5LGG.....140	W5MET....110

RADIOTELEPHONE

W1NWO.....170	W4HA.....140	W5NMA....129
G8IG.....151	W3JNN.....139	W4JCK.....121
PK4DA.....150	W7HIA.....133	WØTJ.....118
CE3AB.....145	W2RGV....130	I1AXD.....112
W6AM.....142	W2NHZ....130	G6LX.....110
G6AY.....141	W2AEB.....130	

ELECTION RESULTS

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

Hawaii	John R. Sanders, KH6RU	Jan. 14, 1951
Minnesota	Charles M. Bove, WØMXC	Feb. 17, 1951
Michigan	Norman C. MacPhail, W8DLZ	Feb. 17, 1951
Western Pennsylvania	Ernest J. Hlinsky, W3KWL	Mar. 17, 1951

In the Western Massachusetts Section of the New England Division, Mr. Victor W. Paounoff, W1EOB, and Mr. Henry Baier, W1NY, were nominated. Mr. Paounoff received 77 votes and Mr. Baier received 65 votes. Mr. Paounoff's term of office began Nov. 10, 1950.

ELECTION NOTICE

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

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

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

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

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

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

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

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

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

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Maine	Feb. 1, 1951	Manley W. Haskell	Apr. 15, 1951
Los Angeles	Mar. 1, 1951	Virge A. Gentry, jr.	Resigned
Wyoming	Mar. 1, 1951	Marion R. Neary	Resigned
Missouri	Mar. 1, 1951	Ben H. Wendt	Resigned
Yukon *	Mar. 1, 1951	W. R. Williamson	Mar. 17, 1949
Alaska	Mar. 1, 1951	Charles M. Gray	Sept. 15, 1950
Wisconsin	Mar. 1, 1951	Reno W. Goetsch	May 12, 1951
Iowa	Apr. 2, 1951	William G. Davis	June 16, 1951

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

BRIEF

Our apologies to W6MVQ, whose call and countries total of 190 should have appeared in the DXCC list on page 46 of December *QST*. We have been very careful to include Dick's call and new total in this month's DXCC box.

TRAFFIC TOPICS

We write in the middle of the Christmas traffic rush, which this year appears to be greater than ever as a result of the additional load of traffic for GIs overseas and at training camps throughout the states. On top of the rush of traffic, we have been plagued with the most unfavorable kind of propagation conditions. The reactions on the amateur traffic-handling fraternity have been interesting to observe. Some throw up their hands and stay off the air. Some handle whatever they can in the time they have and refuse to worry about the rest. The old "war horses" keep plugging, plugging, and eventually clear their hooks, be it midnight or 4 A.M. before they get to bed. Individuals harassed by the increased flow have proposed a system of priorities and even boycotts on certain types of traffic.

In spite of all this, a good job is being done. Many of the NTS nets have expanded their operation to a seven-night-per-week basis until the load dies down to normal again. New stations not heard in traffic circles for many years have reappeared to help. 'Phone nets are taking a great share of the load, too. We'll get by, fellows, as we always have. The overseas GI traffic is of the greatest importance and gives us the greatest satisfaction in handling, especially when it is done with efficiency and dispatch — but other traffic must be handled, too. Everything that is originated must be handled somehow. If some of it is delayed, our consolation is in knowing that we have done the best we could. Most of it is reaching its destination in good time, thanks to the extra efforts of those many amateurs who are seeing to it that the traffic gets handled.

—•••—

We have received a registration for the "Broken Toe" Net which we feel deserves more than a simple listing in the Net Directory. Excerpts from the registration information follow: "This is one of those abusive, scathing, indignant and vituperative denunciations you are expecting. We find that our net is not listed in 'Whose Zoo,' 'What the Well-Dressed Station Wears,' 'Done and Broadstreak' or even the 'Nut Directory.' This is to advise you that our net is organized as follows:

Executives: We are all executives — nobody works.
Net Managers: All of us.
Frequency: Quite often.
Days: Nights too.
Time: Not particular.

"We guarantee that any message filed with us will be delivered — eventually." The net consists of MacLean (W4OZC), MacLean (W4PMN), MacLean (W4PIK), MacLean (W2BZU), and *Kerr* (W2BZL). We thank OM F. MacLean, W2BZU, for this novel registration. If the truth be known, we suspect that many nets are similarly organized but won't admit it.

—•••—

National Traffic System News. The big news on NTS right now is that nice shiny new certificates are available for regular participants at the regional and area level. They are issued by the net manager, but not upon request. Far from it. If you see an NTS certificate on someone's wall, you will know that he *worked* for it, that he served for a period of at least three consecutive months as NCS, representative or liaison station at least once per week, and that he carried out such duties successfully to the satisfaction of the net manager. The regional net certificates are similar to Trunk Line certificates, with green border and sunburst in the center. Area net certificates are the same design but have a lavender border. Sound gaudy? They look swell.

Section net certificates? Yes, we realize that section nets are an important part of the NTS, and section net certificates are available from your SCM if he wants to issue them — have been for years. If you are interested in them, get your net manager to get after the SCM to make some available. He can get them from Headquarters. The usual method of issuance is by the RM or PAM through the SCM and bearing the latter's signature.

The Winter Emergency and Traffic Bulletin, which should have reached most leadership appointees and net control stations long ago, contains a summary of NTS activities up to about the end of November — a summary much too long to reproduce here. We have extra copies of this bulletin for anyone who is interested and has not received one — as long as our supply holds out. Also, mimeographed cross-indexed net directories are available upon request.

In general, the National Traffic System is going along in good shape this year as last year. The three area nets are functioning pretty much according to system with occasional personnel troubles. At regional level, there is the usual assortment of difficulties occasioned by lack of representation from sections for which there is a great deal of traffic and inability to locate suitable "thru" stations on a regular basis. It is all very fine to volunteer on the spot, and this is a great help — but it is a *system* only if your services can be depended upon, or only if you will take the responsibility of seeing that the service promised is rendered, either by yourself or someone acting in your place. Otherwise, there is the spectre of a net without an NCS or without a representative from or to another net.

Many traffic handlers do not understand NTS. We have a special mimeograph available just for them. Even if you are not part of the system, it will benefit you in your traffic handling if you thoroughly understand NTS. It is not complicated, but it is big in framework to accommodate as many amateurs as want to participate. If you do not know how NTS works or how to report into NTS nets at the various levels, you should get a copy of this mimeograph and study it. NTS nets can become valuable traffic outlets to you if you use them right. Otherwise, you slow them down and make them less effective. You are welcome to QN1 NTS nets if you have traffic and if you do it right. You are even more welcome to become a part of NTS.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for November traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	137	1424	1256	139	2956
W6CE	17	683	644	31	1375
WØZJO	19	587	541	41	1188
W4PL	5	585	565	20	1175
W6DTW	6	5	994	0	1005
W1NJM*	16	468	54	406	944
W9DGA*	59	398	309	72	838
W6QIW*	814	4	1	3	822
KG6FAA	262	272	211	48	793
WØAY	28	347	321	51	747
W6JZ	9	357	347	26	739
KG6DI	430	185	0	105	720
W7CZY	1	344	265	89	699
W2RUF	12	354	251	51	668
W9QLW*	15	284	361	4	664
W9ESJ	17	352	176	77	622
W9DUA*	1	348	156	83	588
W1AW*	9	279	18	261	567
W7IOQ	24	259	231	28	542
W1LVQ*	0	269	12	257	538
W3NHI	181	186	137	31	535
W9TT*	13	252	235	26	526
W9QLW**	3	260	253	5	521
W1BDI*	5	253	6	252	516

The following made the BPL for 100 or more *origination-plus-deliveries:*

W9UMS/9	275	W1RWS*	161	W1NJM	118
W9YB*	200	W1ICP*	132	W2OUT	104
W6GYH	168	W9DGA	123		

A message total of 500 or more or 100 or more *origination-plus-deliveries* will put *you* in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

* October Traffic
** September Traffic

BRIEF

Billie Adels, W6HBO, merits two unusual distinctions. Not only is she the only woman radio operator in the United States Merchant Marine, but also she is the only American woman to regularly operate a ham radio station aboard ship. For six years "Sparky," as her fellow sailors call her, has been operating radio stations aboard American and foreign ships. Billie thoroughly enjoys her work and her efficiency and determination have won her the respect and admiration of all the men with whom she has worked.

• 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 — The Abington Twp. ARA is trying for 100 per cent Class A tickets. The Club also demonstrated a radio-controlled boat at the Philadelphia Area Council of Radio Clubs' Hamfest. The Lancaster RTS set up a station at the local hobby show with AEC members operating. AXA lost his antennas and chimney in the big blow. EU reports his skywires also were wrecked. PDJ lost all but one emergency antenna but got on 3610 and 3875 kc. with emergency power during the storm. Our two "gals" make the BPL. ELI is QRT, as he is back on active duty with the Navy. The Northeast Radio Club raised $40 by an auction of spare parts for the *Braille Technical Press*. PST received his Class A ticket. RAE has a new Lysco TVI-less transmitter. QIR will tie the fatal knot in June in Drexel Hill. CAU (OO) found three lads with a.c. notes and one out in foul territory. General comments are that the hams attending the PACRC Hamfest had a good time. The main attraction was W3KMH-TV, with a tremendous pile of gear on display. HNW showed his TVI-less transmitter along side of a TV set. The only TVI was from an emergency rig operated by the Frankford Radio Club 50 feet away. The West Philadelphia Club had emergency gear on display and others had demonstrations. Apologies to those not mentioned, as I am writing this from memory. The trick contests brought a bit of merriment into the affair. The sober part was supplied by Messrs. Budlong and Martin, who spoke on Civilian Defense. The PACRC supplied communication for a Philadelphia vs. Santa Monica, Calif., chess match. Many ham antennas bit the dust during the Nov. 25th storm, most spectacular of which was CBT's 100-ft. tower. HFD, CPV, OCU, FZQ, and UKI are known to have lost beams. DHM, ORU, and AIZ lost long-wire supports. Power was off in many sections for several hours. Hams provided valuable emergency communications. Traffic: W3CUL 2956, NHI 535, AXA 94, PDJ 78, OML 5, WTS 16, QEW 12, BIP 4, CAU 4.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — Members of the Washington Radio Club, at the Nov. 11th meeting, enjoyed a visit to the Byron Laboratories, Inc., the largest sound-film labs on the East Coast. QPL Conducted the members through the different sections of the studio and plant, explaining all the methods of manufacturing and processing of sound films and cartoons. At the second November meeting the Club featured a "Radio Scavenger Hunt" and gabfest. Subject of the Nov. 7th meeting of the Chesapeake Amateur Radio Club was "The Theory and Applications of the Radiosonde" with demonstrations and slides, and the speaker was J. R. Cosby. At the second November meeting, LXK gave a talk and demonstration on "High Frequency F.M. versus A.M." The Rock Creek Amateur Radio Association held a "Social Session" at its Nov. 24th meeting. MFJ is doing some nice DX on 7 Mc. Friends of COR are grieved at the news of his passing away. CQS has been in the hospital but now is recovered and will be back on the air shortly. PLP is on 28-Mc. 'phone and 14-Mc. c.w. IZL is using new clamp tube modulation. ONB recently spent some time in Europe. CVE has a new p.p. 807 rig for 3.5-, 7-, and 14-Mc. c.w. UF is rebuilding. FQB did very well in the SS Contest. AKB is back on the air, mostly on 3.5 Mc. IYE has a DX score of 210 confirmed, and is using an 813 with 250 watts and no TVI. Traffic: W3GZH 255, LZM 162, FWP 158, ONB 128, PTZ 104, ECP 76, CVE 47, JZY 40, MCG 38, AKB 14, IZL 7.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — Many reports of lost beams, towers, and antennas were received this month. Our sincere sympathy is extended to K2AZ, who lost his tower, beam, rig and QTH. W2ZI recently returned from an extended tour of Cuba, visiting many Cuban stations and radio clubs. ZYX would like to have some active South Jersey stations for the S.N.J. Net which meets on 3650 kc., 7:00 P.M. Mondays, Wednesdays, and Fridays. BAY is building a new QTH and expects to move soon. Anyone interested in monthly transmitter hunts sponsored by the SJRA, please contact PAU or UKV. BLR, UKS, and ABJ keep 160 meters active. WJE's new QTH is in English Creek, N. J. The Cumberland County Radio Club's Christmas Party was very well organized. Many good prizes were given away. Traffic: W2ZBW 147, ORS 81, CSA 42, ZI 35, EBW 31, ASG 16, PFT 14, ZYX 8, CFB 4, HAZ 2, RFF 2.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV. RM: RUF. November 20th marked another milestone in achievement for the Syracuse Emergency Radio Communications Assn. when its station, CRD, in the Syracuse-Onondaga Chapter Building, officially became one of four key stations in the great coast-to-coast American Red Cross Amateur Radio Communications Net. This station will be on call 24 hours each day to serve the American Red Cross on a nation-wide basis and will be responsible for disaster traffic coverage for all of New York State, New England, and part of Canada. The occasion was observed with a banquet at which Allen R. Richter, 4PHL, engineer in charge of the Telecommunications Engineering Department of the National American Red Cross, was the featured speaker. EMW now has 179 countries confirmed. QHH has raised his total to 201 postwar with his 35-watter. AOR handled railroad traffic between Northern New York and Rutland, Vt., during the recent hurricane. CR likes his new three-band Gonset converter. CPN has a new Collins 32V-2 and worked VK3HG on 3.5 Mc. with a 7-Mc. doublet. The KBT Club held its annual Monte Carlo night. New ECs are ABC and CRH. New Asst. ECs are ZOO, WOE, CDX, LZ, SJY, CWZ, EHD, CUY, TST, PUV, and SGN. UHI, ORI, RPO, PBU, and IRU are operating on 420 Mc. ZZS has joined the Rochester Mobile Club. ZDW won the Club's Hidden Transmitter Hunt held recently. 7OLV looks for mobile stations on the high frequency end of 28 Mc. Approximately 50 stations have called into the New York State Emergency 'Phone Net which now meets at 9 A.M. each Sunday on 3920 kc. YGW is in Japan and looking for the gang on 14 and 28 Mc. QY is using a "halo" antenna on 144 Mc. TEX is using a 144-Mc. converter working into a Gonset converter. RARA is planning two rigs to cover from 160 to 2 meters for its club station. The Rochester Emergency Net fellows had all their nets working on 3.5, 3.85, 7, 28, and 144 Mc. for the test. MA has made DXCC with 117 countries on 'phone. QCP makes it with 119 on 'phone. BLP has confirmations of the following on 3.85-Mc. 'phone: KL7, VP7, ON, VP9, VO, CM, HI, G, F, OX, HH, KH6, VP5, JA, XE, CN8, PA, ZP, KP4, GM, KS4, HB, VP4, and KV4, as well as WAS and all Canadian Districts — all this with 750 watts and a folded dipole 60 feet high. WVX has changed from n.f.m. to triggered modulation. OTW has swapped his call for CJV. The Ladies Auxiliary of the RARA now has 5 XYLs in its membership: WOW, POT, BEN, ZRO, and UTH. Traffic: (Nov.) W2RUF 668, COU 244, DJF 95, QHH 53, PGT 41, SJV 41, HYQ 36, AOR 29, RUT 25, FCG 18. (Oct.) W2RUF 335, RUT 214, COU 179, PGT 40, FCG 35, BKI 33, VMS 28, EMW 6, YRF 5.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — As this report is being written, Western Penna. is digging its way out of the worst snow-storm in many a year. Your SCM wishes to thank all of those who so untiringly and faithfully gave their services to aid communications in the emergency. From up Oil City way, LST sends in the following: LST finally made the v.h.f. boys take notice by getting on 144 Mc. After years of silence BRC has resumed activity with a 32V-2 transmitter. RBB still is sticking to 3.5 Mc. DIL is sporting a new station wagon. OOF has gone TV. LFX still is working VKs before breakfast. OGM and JCQ are heard on 28-Mc. 'phone. LKE likes 3.85-Mc. 'phone. LID has moved to South Carolina. THZ is b.c. engineer and recently moved to Oil City. Further up north, BOZ writes that he and LPV, PMY, NQA, and OMK have 3.85-Mc. mobile rigs. RMM and OMK both work for Sylvania. Congrats, PMY and KYW, on the new jr. operators. QVL is a new addition to St. Marys and now is ORS. Down Uniontown way, the Fort Necessity Amateur Radio Club has a new secretary, QYH. PIE has been initiated into the 144-Mc. ranks. WVE has raised his antenna with good results. QYH is building a 28-Mc. rig. PQR has a fine 'phone patch in working condition. Ex-LAC has received his old call, 3BTR. UHG is chasing TVI and RUC is now TVI-free. FTO will be in his new shop soon and PIE is erecting a twelve-element 144-

Mo. antenna. AAX now is sending out the *ATA News* of the Amateur Transmitters' Association. UHN has a new job as EC of Washington County. BKS is operating fixed portable in W7-Land in Las Vegas, Nev. IWH says his new QTH is the tops. We hear that MIZ is on the sick list. OB uses teletype to get his weather reports. The Steel City gang is heard on 144- and 28-Mc. 'phone. LOR has a new VFO. MTP says he is an expert on n.f.m. TVM fell and broke both ankles. UAK is responsible for KWH's good DX records. QXZ is working on his 829B all-band rig. JT says adjusting bias voltages keeps him from working DX. QVL is new ORS in St. Marys. Traffic: W3NRE 475, VNL 48, KWL 29, ODU 10, QVL 5.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — GSB, unable to work from apartment building, has gone mobile in his new car. KMN has a new jr. operator. GVK is getting ready to go 'phone shortly. JYF is operating portable from Purdue, where he will graduate in June. LBL has returned to action after a recent illness. New officers of the Elgin Amateur Radio Society are FNR, pres.; PQH, vice-pres.; FRP, secy.-treas. The St. Clair Amateur Radio Club is active in emergency planning and BA, KUC, JED, CJJ, ZBT, OHK, APX, and YHW are mobile. MEM is a new ham in Elgin. WEA, KJ, QN, and NN are active in Civil Defense work around Des Plaines. NIU is busy remodeling his house. BGA bought a farm home in the Ozarks. KJ is in big demand as a dinner speaker. LRA moved to Evanston. LWQ, a new ham, is confined to bed but will be heard from shortly when the fellows get things set for him. APK and ERU are new additions to the Army. BEN now is in Freeport and active again on ILN. UBP is fighting TVI. YIX is planning a pair of 811s in final. PK enjoys the gang on ILN. SXL reports using HK-57 in final in new rig. It is reported that the neighbors have discovered JMG's clothesline and put him on the inactive list. New officers of CIRC are SXL, pres.; JRX, vice-pres.; CFV, secy.-treas. TRD, editor of *Radio Amateur Call Book*, was a recent speaker at the North Suburban Radio Club. JNC is moving back to Minnesota. KYA got his ticket in July and works 7 Mc., but plans a rig for 28 and 144 Mc. shortly. KYO broke into traffic this month and is 28-Mc. mobile. Traffic: (Nov.) W9YIX 254, BUK 127, FRP 76, PEK 63, QN 58, KJ 33, SXL 32, KYO 27, FNG 18, PK 16, FKI 10, FED 6, YTV 5, JNC 4. (Oct.) W9DUA 588, ED 17.

INDIANA — SCM, W. E. Monigan, W9RE — Bill Hibbert, ex-9ENJ, now is 6KAW, 417 N. Baltimore Ave., Monterey Park, Calif. Muncie reports a 2-meter net on 146.8 Mc., also that radio school is going strong. From South Bend comes news of a Great Lakes Net on 1883 kc., operating on Tues., Thurs., and Sat. nights at 1830. NCS is ACQ; Alt. NCS is KPZ. 8CNI wants stations in the Great Lakes region to call in. The annual banquet of the Michiana Amateur Radio Club was held Dec. 9th at the Mayfair Restaurant in Mishawaka. About 126 amateurs and their friends were present and report a fine time. CVO, TBE, and NMW made Class A. ZVF says he went to W4-Land on business. BBC is recuperating from an automobile accident. New officers of the Evansville Club are HX, pres.; DGA, vice-pres.; AZL, secy.; QLW, treas. The Club also operated 9UMS/9 at the West Side Fall Festival and handled 275 messages. DGA has 110 stations in DXCC; also a WBE certificate from RSGB. BKJ says his transmitter location was too cold so he moved same down to the fire. QIN operates on 3656 kc., HEN on 3905 kc. Any Indiana station can break in after roll call to handle traffic, ragchew, or just to say "hello," so don't be hesitant, fellows, you're welcome any time the nets are on. PAM is BKJ, RM No. Ind. is RCB, RM So. Ind. is DGA, and SEC is PHV. In those localities without an EC, send your applications to PHV. If your locality has an EC, register your equipment with him and ask for your place in his emergency system. Traffic: W9DGA 362, QLW 330, TT 282, UMS/9 275, JUJ 85, BKJ 43, DOK 42, PMT 21, YME 15, NZZ 10, RE 9, BSZ 8, K9WAA 8.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: YYY. PAM: ESJ. RMs: CBE, LFK, and CWZ. GI traffic from Japan is reported as heavy by ESJ and others. IQM worked 160 stations in the SS. Waupaca operators led the Point gang in the SS intra-club competition. HDZ has double trouble — TVI and BCI. ADM is not in the Navy as erroneously reported here. MLT, a transfer from Minnesota, holds OO, OBS, and OPS appointments. LaCrosse is well represented on 3.85-Mc. mobile with GPU, SFL, LKL, GCT, MMP, OGT, and PKY; all using Master Mount antennas. OVO reports the following as Asst. ECs: LIK, Sturgeon Bay; EFR, Algoma. SDK, ex-8ARJ, is back handling traffic on WIN Net. GPI completed new NLP beam for 14 and 28 Mc. ALG reports that HMX was host at the November NWRC meeting in Bloomer. CWZ received Class A ticket. The Mancorad Club elected BZU, chief op.; QFC, asst. chief op.; RKT, keeper of the log and treasurer; FMH, operations mgr. and EC. Mobile and emergency equipment is at the head of the Club's activity list. KXK worked 369 in 65 in the SS. ERW worked 239 in 60. The Wisconsin Valley Radio Assn. had 18 members reporting activity in the SS, for a club score of 351,760 pts; FPE keeps Wisconsin on the 144-Mc. map. He has his beam south and east daily with a three-minute call at 1200. New officers of the Point Radio Amateurs Club are CFL, pres.; BTD, vice-pres.; BCC, secy.-treas. With his beam motor repaired, CIZ is back on 28 Mc. JEK is EC for Baraboo and vicinity. CSU, national high in the September Frequency Measuring Test, now is OO and OPS. CBE has been doing a swell job with the Central Area Net on 3670 kc. HEL has his Class A ticket. Traffic: (Nov.) W9ESJ 622, SUF 368, CBE 272, IQM 30, IXA 30, IQW 21, HDZ 18, NRP 17, CIH 15, UIT 10, MLT 9, GPU 5, RQM 5, OVO 4, SDK 3. (Oct.) W9GPI 37, IQM 28.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Rev. Lawrence C. Strandenaes, WØJWY — SEC: SSW. Asst. SEC: RRW. PAM: EOZ. RM: LHS. VSK writes that the club station in Valley City is BOR and runs 20 watts on 28-Mc. 'phone and 25 on 3.5-Mc. c.w. President of the Club is BBK, vice-president is HAI, and secretary is CDK. VLC reports that at a meeting held last fall the following were elected officers of the Grand Forks Club: RGT, pres.; DM, vice-pres.; and VLC, secy.-treas. YIZ has a 160-meter whip on his car. NBS recently was awarded his WAC. The International situation being what it is, all of us must become more emergency conscious. Get those portable or mobile rigs built now before parts become still more scarce and keep in good working order the rigs you have. Coöperate with your EC and get organized locally to handle any emergency. Section ECs: SSW, RRW, AZV, CAQ, TSB, UBB, ZCM. Traffic: WØLHB 14, JWY 6.

SOUTH DAKOTA — SCM, J. S. Foasberg, WØNGM — ZSJ, Mitchell Radio Club, now is on the air with ART-13 and was host to the Huron Club recently. NJQ, formerly of Worthington, Minn., now is located in Brookings, S. D. The Sioux Falls Amateur Radio Club is organizing into the Sioux Valley Club, to include hams in nearby South Dakota and Minnesota towns. The South Dakota 'phone net has shifted to 3885 kc. FSD, formerly of St. Cloud, Minn., now is located in Sioux Falls. Members of the Mitchell Club have gone overboard for clamper tube modulation, with HYV, HDO, SDE, FJS, and GCP using that method. GCP vacationed in Oregon for six weeks and kept in touch with the gang on 7 Mc. HDO is conducting 5-nights-a-week code practice on 29 Mc. ZRA has dusted out the BC-610 for the winter season. MPQ has new 10-beam mounted. After doing nothing all summer, RWE and RRN expect to erect beams on the coldest day of the winter. PHR is being congratulated on his election as Alternate Director.

MINNESOTA — SCM, John B. Morgan, WØRA — Acting SCM, Charles Bove, ØMXC. Asst. SCM, Jean E. Walter, ØKYE. SEC: BOL. PSD was in Minneapolis visiting various ham stations and also attending school there. ORJ has a new 300-watt final on 3.85 Mc. and a new final on 28 Mc. Also a dandy 28-Mc. beam atop a 40-foot windmill tower. LUP is a new ham in Fergus Falls. LMQ now is KH6AEF in Honolulu and looking for the boys on 28 Mc. The Red River Radio Club had its first meeting with election of officers. OYM is president, HIV vice-president, and CAQ secretary-treasurer. QYZ gets a lot of traffic on 28 Mc. from the Islands and Japan and relays it to the 75-meter net. EPJ has a new 10-meter beam on a 50-foot windmill tower. JDO is recovering nicely from his recent illness. TF, of Dundas, is building a new house on Orchard Lake at Farmington. ATD has erected a new 2-, 6-, and 10-meter stacked beam. PKO is in the process of building a kw. NQK is building a half kw. on 'phone. HY built an audio oscillator with a range of 20 cycles to 20 megacycles. BGY has his new rig on the air. OMC is having a lot of fun experimenting with clamper tube circuits. VNB now is checking into the two 'phone nets. EPJ is checking into all three traffic nets. Lil Dedon, of Duluth, visited the Twin Cities and attended the St. Paul Radio Club. The Minneapolis Radio Club, Inc., had a big dinner and dance at the Andrews Hotel. The Minneapolis Radio Club elected the following officers: YPN, pres.; FDS, vice-pres.; GOP, secy.; and JZX, treas. The Hennepin County mobiles have formed an emergency mobile unit to fit in with the Civil Defense plan. They will operate on 29,640 kc. and will be monitored 24 hours a day at the Hennepin County Sheriff's office. Reports from ECs have been very few this month, so please get them to BOL by the first of the month. CDI is a new ham in Two Harbors. JVD has a new 28-Mc. beam. A radio club has been organized at the U. of M. at Duluth. Traffic: WØITQ 199, KFF 164, YBM 125, EPJ 94, HEO 82, MXC 50, RJF 48, BGY 29, MRX 28, AIH 25, UCV 22, ORJ 20, AAS 16, RXL 12, VNB 12, PVS 8, FIT 4.

DELTA DIVISION

ARKANSAS — SCM, Dr. John L. Stockton, W5DRW — ASO has emergency rig using Command receiver, 6C5 crystal oscillator, and 807 on 3695 kc. FPD has emergency power for his home station using gasoline generator. DI is on 28-Mc. mobile. ONL has been off the air considerably because of the illness of his father. Hope that he recovers

soon, Dick. PUN has a new rig using 829B final. The reorganized Little Rock Club has been named AMRAD and holds meetings every other Monday at 112 Gaines St. PYU is active with OZK Net again. SED is on 28-Mc. 'phone. AQF, FPD, LQN, and PYU are new ECs. PYU received certificate for the highest Arkansas score in the 16th Annual DX Competition. PZC is active on 3.85-Mc. 'phone and is a new member of the Arkansas emergency 'phone net. MRD wishes to express his appreciation to FAG, NNE, EB, and WRS, who helped him with an emergency message. Mr. M. S. Pearce of Danville passed away Nov. 19th and the family did not have the address of a son who was moving from St. John, Kans., to Albuquerque, N. Mex. Through the efforts of these amateurs he was located and contacted his family. I would appreciate reports from club secretaries on the activity of clubs and members of the clubs. We all regret the death of W5DUV's eleven-year-old son in an explosion. Traffic: W5DRW 181, FMF 112, MRD 54, LUX 33, ONL 19, PYU 15, EA 14, RWJ 5, IGM 2.

LOUISIANA — SCM, Robert E. Barr, W5GHF — PLQ is the latest to become 3.85-Mc. mobile. KTD/mobile had a collision with a mule on the highway south of Shreveport. QFC turns in a good report as OO. Thanks to RIQ for an excellent Barksdale Field activity report. Hams active at the Air Base include HFB, RIQ, RAH, and K5AIR. OXF serves as the civilian traffic link between Ramey A.F.B. in Puerto Rico and Barksdale. ZAB is beginning to line up civilian personnel for the MARS in the State under the new rulings. RKZ's XYL insists that he go on 'phone. ZS operated mobile during a hunting trip through South Texas. IYO has FB patch in Shreveport. The Monroe gang held housewarming ceremonies for the new club-house in West Monroe. EB had a painful leg injury which kept him from work but allowed him quite a bit of Sweepstakes operating time. HEJ sold his mobile equipment. QH, JFF, and ZS argue TV with CEW. KUZ again is active in West Monroe. BLQ has a new receiver. BMM has a new rig for the high-frequency 'phone bands. The Pelican Net is averaging 30 in attendance this winter. QIX, PUV, RDD, and ADM are 28-Mc. hams in Cotton Valley. KKT has FB 28-Mc. 'phone in Rodessa. MHZ again is operating in Baton Rouge. BLQ and staff are eliminating line noises in West Monroe Area. BMM and his brother, CGC, carried mobile equipment with them on Gulf fishing trip, keeping schedules with JWI at Buras. ZAB is building a kw. rig for a polio victim. Traffic: W5NG 129, GHF 42, QFC 2.

MISSISSIPPI — SCM, J. C. Wallis, W5DLA — IHP recently was appointed disaster communications chairman of the Red Cross Chapter at Natchez, and will be assisted by KHB, KZM, and LPL. The power company and local taxi company will add to the set-up. IHP is building new 4-125A amplifier driven with a Lysco Transmaster. HKT has moved to Mobile, Ala. JNR and FQL are setting up b.c. station at Centerville. RKO is active in the TXN Net. RGM is tuning up the rig for 3.85-Mc. 'phone. JHS has 28-Mc. mobile job going FB with seven watts input. WZ visited PGG near Tupelo recently. KYC and GXO were recent visitors on the Gulf Coast. MJL is a student at "Ole Miss." Heard recently on 3.85 Mc. were CQJ, RY, and VJ. OMK is the proud papa of a new daughter. Congrats to Walt. By the time you read this we will be well into the new year. I wish for all a Happy and Prosperous New Year. Traffic: W5JHS 140, WZ 60, MGR 6, RKO 3.

TENNESSEE — SCM, D. G. Stewart, W4AFI — The Kingsport Amateur Radio Club was host to Director Canfield, 5BSR. On his trip brief stops were made at Chattanooga and Oak Ridge. OQ5DQ was a recent visitor to the F. C. Club. NIQ accepted a position in New Jersey. DFR was snow-bound in E. Tenn. without mobile gear. Route Manager NNJ is back on after some delay in getting set up at new QTH. The Davidson County Ten-Meter Emergency Net is experiencing good attendance and activity with regularly-conducted emergency drill sessions. EC AEE requests more mobile and portable gear. OGG made a nice score in the recent SS. OOA is new OPS and was active in the SS as well as chasing 7-Mc. DX. PMR is maintaining regular schedules with DL4PD. PL vacationed in Florida. NDE has been appointed EC for Oak Ridge to fill the vacancy created by OJZ, who is moving to California. BAQ operated into traffic nets with portable gear from Alabama. He reports regular AREC drill sessions are being conducted in Memphis. KMH operated mobile on a recent vacation trip. Our SEC, FDF, has a tremendous job and it behooves each and everyone of us to get behind him and make AREC in our section 100 per cent. Those of you who do not belong should sign up. AREC at this time is of utmost importance and it is imperative that FDF be informed as to activity and status of all members. Traffic: W4PL 1175, APC 205, BAQ 66, AEE 52, LUH 30, AFI 25, CXY 23, OGG 19, HHQ 16, NIQ 14, RDK 7, DFR 6, NDC 4, FHP 3, OOA 3, PMR 2.

GREAT LAKES DIVISION

KENTUCKY — Acting SCM, I. W. Lyle, jr., W4KKG — KYN, KYB, and KYC are rolling along in fine style. KYN needs stations to QNI Lexington, Bowling Green, and Frankfort. BXU always is QNI on KYN. MWX and CDA are doing good jobs as RMs. WWT is consistently high in traffic handling. FKM has some TVI but is working on it. MDB, with his new electronic key and 32V-2, sounds good. MGT also has 32V-2 and an electronic key. NWQ is a good operator on KYN. OXT is QRL school work attending U. of L., but makes KYN regularly. FR, in new QTH, put up new beams; the wind tore same down! PQU is tuning up the new rig on 28 Mc. PSJ is back on the air after rebuilding. KLP is on all bands daily. OYG hit the 100-countries-worked mark recently. VP is active in MARS. PRT is MGT's father-in-law. SEH is a newcomer to Kentucky. BVT says the bug is getting rusty! NBY is active on KYN and KYB. RQV reports in with a nice total. BAZ, as EC, is doing an excellent job and obtaining good publicity for amateur radio. I will be glad to mention every active amateur in Kentucky if you will just drop me a card at the end of each month. Does TVI have you down? Try 3.5 Mc. with low or medium power. You may be surprised. Pour some oil on that mike or key and get back in the swim in 1951. Suggestion: How about each Kentucky club appointing someone to make a report to the SCM each month for its members? Traffic: W4WWT 216, NBY 90, BAZ 87, MWX 43, OXT 40, CDA 33, RQV 23, BXU 16, MDB 14, NWQ 14, KKG 10, FKM 7, MGT 4.

MICHIGAN — SCM, Robert B. Cooper, W8AQA — Asst. SCM/c.w.: J. R. Beljan, 8SCW. SEC: F. E. Gary, GJH. RMs: UKV, YKC. PAMs: TTY, YNG. November brought some very active amateurs into action when communications were disrupted by sleet and snow. The organizational work by TTY, aided by CSI, WNT, YLB, BY, ZAZ, GJX, and HYQ deserves special mention. These stations, with the State Police, Broadcasters, and the Conservation Department, worked into established amateur net outlets to relieve a serious condition during the annual deer-hunting season when normal facilities were out of service. YLA reports a reorganizational move on the part of the Marquette County gang. JUQ reports the transfer of IW from Allegan to Washington. YKC is getting his 813 rig under way. TIC is working on TVI elimination with good results. SWG is doing the ground work for a club in the Niles Area. RTN is doing a fine job as the Station Activities Manager for the Red Cross station, ACW, in Flint. UKV's new rig is seriously hampered by a temporary antenna. 2RTZ is spending the holidays in N.Y.C. but will return to the W8 fold after New Years. QBO/ATB reports fair success with the YLRL on 3900 kc. at 0600 EST. FX can eliminate TVI but only after very substantial efforts. EXZ has been improving his station and expects some very good results with his new SX-28. TQP is maintaining schedules with "SH" during his daughter's college term. DLZ reports COF, CTC, BJD, HWN, VTG, QQN, QAM, and FSW as the back-bone of the Mobile Corps for the GREN. BVY made a nice showing in the last Frequency Measuring Test. COW and DXH are working on an antennascope. EJD is operating 300 watts with full break-in. FSZ reports GBN as a new call in the Lansing Area. MCV is using a 7-Mc. center-fed doublet on 3.5 Mc. with good results. NOH spent 30 hours in the SS and has a possible score of 40,425. WVL also was heard during the SS. QGZ asks for critical reports of the n.f.m. transmitter he is using for OBS work. DQB has left the U.P. for the winter and is in Detroit. Traffic: (Nov.) W8YKC 188, ZWM 166, SCW 148, SWG 107, ACW 89, UKV 86, RJC 77, NOH 71, DSE 66, DAP 48, YNG 48, WVL 46, QBO/ATB 44, YGS 42, FX 40, EXZ 37, TTY 35, JUQ 34, IV 32, UGD 28, AQA 26, BII 20, TQP 20, DLZ 19, TZD 19, BVY 18, COW 18, EJD 18, CPY 14, UES 13, LR 11, ZHB 10, DQB 8, ZCI 8, FSZ 4, OAF 3, MCV 2, QGZ 2, FWG 1. (Oct.) W8BDF 222, MGQ 31, BVY 30, YLA 4.

OHIO — SCM, Leslie Misch, W8HGW — Asst. SCMs, C. D. Hall, 8PUN, and Jack Siringer, 8AJW. SEC: UPB. RMs: DAE and PMJ. PAMs: PUN and AJW. The amateurs of Ohio really came to life during the recent blizzard emergency. UPB truly did a remarkable job. UWT, Acting NCS of the Ohio Emergency Net on 3860 kc., proved to be an able Net Control. UWT wishes to express his sincere thanks to the many out-of-district operators who aided considerably in traffic-handling and keeping the frequency clear, such as 4DLX, 5GHF, 5BUX, 5JBZ, K3USA and and many others. PBZ, EC for Cuyahoga County, has submitted a list of about 100 stations who participated in that Area during the emergency. He was NCS of the ten-meter net. ZXN, of Akron, submitted a list of stations active in that Area. This group was on the air 55 hours and handled 238 messages. WAB sent along 14 calls of stations active in the Columbus Area. The new W8 QSL Manager is NGW. JNF, retiring QSL Manager, did a splendid job during his two-year period of service and all of us extend our sincere thanks and best wishes to Bill. JFC now is up to 109 countries. YCP is increasing power from 25 to 500 watts. Francis probably will make BPL every month in the future. Newest net in the Cleveland Area is the "Teen Age Net," composed of FTD, FTB, FUD, FCX, and FJR. DAE had 320 contacts in 58 sections in the SS. ATK is battling TVI. LBH was aeronatuical mobile on 28-Mc. 'phone. EZE is experimenting with 450-foot-long wire antenna. ICC has worked 102 countries on 28 Mc. The Ohio Council of Ama-

teur Clubs meeting was held in Columbus on January 13th. AQ worked PY7WS, HR1AT, and VP5BF on 3.5 Mc. The Cuyahoga County Groundwave Contest produced the following winners: Locals — DTD, CTI, SQU, and MXO. Out-of-county — DMJ, LVR, CLR, and BFQ. The Case Tech. Radio Club was very active in the SS Contest. DGG now is on 3.85 Mc. ZQU is going mobile on 3.85 and 28 Mc. Appointments are available for OBS, OES, OPS, ORS, and OO. If interested, drop your SCM a postal. FJX has a new rig on 3.85 Mc. UZ has been quite active on 50 Mc. WRN finds present u.h.f. conditions poor. Cleveland a.m. stations gave the amateurs considerable publicity during the recent snow storm. TMA needs but one card for DXCC. We're a little short of news this month because the various club bulletins did not arrive. It is advocated that secretaries of the various clubs drop the SCM a line of their club's activities. Traffic: W8YCP 332, SG 280, DAE 225, AJW 142, UPB 132, DXO 95, CBI 54, BFH 48, RN 37, ZQH 35, EQN 27, WE 25, QIE 17, GZ 16, WAB 15, FKO 11, AQ 9, EZE 6, PMJ 6, DZO 5, LBH 5, ATK 4, ET 3, DFD 2, URD 2, ZJM 2, ZQD 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM, George W. Sleeper, W2CLL — SEC: NJF. Your new SCM wishes to thank all for the vote of confidence and hopes to be able to fill the shoes of EQD, who did so much to build up the section. The AEC and NYS did another outstanding job in providing election-return service for WNYC and again beat the press by two hours and more. Welcome to 8GST, recently transferred from Michigan. The Albany Amateur Radio Assn. had a splendid exhibit at the recent Albany Hobby Show. Commendation goes to ILI and his Rensselaer County AEC for the fine service performed for the Red Cross during the disastrous November storm. Appointees should watch for endorsement dates in order to avoid loss of appointment. Congrats to SOX on his reëlection as Director of the Division. All members of the section are urged to apply for any of the various appointments. A certificate of appointment is a confirmation that you are active, interested, and willing to do your part to further the interests of amateur radio. NJF has been appointed SEC, with ILI as his assistant. NJF will coördinate the whole section, with ILI handling Albany, Schenectady, Columbia, Greene, and Rensselaer Counties. AEC activity is increasing in importance and all stations are urged to be ready when needed. The SCM would like to hear from all radio clubs in the section for news and to arrange a schedule of speaking dates. Additional traffic stations are needed for NYS and other NTS nets. 'Phone stations are urged to become part of the fast-growing N. Y. State Emergency 'Phone Net, which meets every Sunday at 9 A.M. EST on 3920 kc. Appointments made were NJF as SEC, ILI as Asst. SEC, ANB and DSU as OPS, NVB as EC for Pelham, QIS as EC for Windham, and EFU and BRS as ORS. Traffic: W2CLL 157, LRW 143, TYC 120, BRS 61, CEV 61, KBT 18, FVP 5.

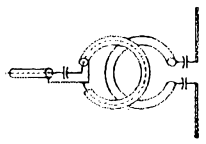
NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, W2OBU — Asst. SCM, Harry Dannals, 2TUK. SEC: BGO. RMs: PRE, BYF. The Amateur Radio Emergency Assn. of New York has been established to weld together, under one head, all emergency radio facilities and operators in the New York Counties, and is set up with a comprehensive staff of directors and advisers to assist the SEC in overall emergency work. Henceforth the AREA of N.Y.C. and the AREC will be synonymous within city limits and information regarding organization, procedure, policy, and the handling of problems pertaining to emergency work will be available to any like ham organization for the asking. All AREC members in N.Y.C. are AREA of N.Y. members, with the following well-known hams comprising the staff: HF, Manhattan; SJC, Bronx; BIV, Brooklyn; VKF, Staten Island; and SYW, Queens. The AREC rendered emergency service during the L.I.R.R. wreck and the storm with hurricane gales and torrential rains that caused millions of dollars of damage. Coverage was given the Coast Guard station at Short Beach; the Red Cross was aided in its survey of the situation. Plans for use of Army "Ducks" in evacuation work at Seaford by Red Cross were handled by AREC. Four days and three nights were given to the N.Y.C. Fire Department with mobile stations working with Fire Telegraph Bureau repair crews to maintain fire-box coverage when more than 2000 fire-alarm boxes were out of service. It is pointed out, then, from these disasters that they can happen again and the viewpoint is to have our amateur emergency facilities built up in large numbers. The greatest need for more mobile units is apparent. The NYC-LI traffic net, NLI, with BYF as RM, still is in need of stations all over the section. In the Suffolk County Club, MZB has been called into the Navy. Nassau County reports its greatest increase in AREC members ever. In Queens County the UHF Club in Jamaica reports the following officers for 1951: QPQ, pres.; NZJ, vice-pres.; ZXQ, secy.; OTA, treas.; with DVK and QPQ as delegates to the Federation of L. I. Radio Clubs. 6DRN now is a resident of Levittown. ELM is a new ham on Staten Island. KTF requests Baldwin hams to contact him or local Civil Defense Headquarters to register with CD. The Mid-Island Club's station, UBW, made its first transmission handling SET traffic. YBT now has Class A license. PQG has resigned as Queens County EC as he has moved nearer to Teterboro, N. J. SYW has assumed his job. AOD has built a fifteen-element beam for 420 Mc. RTZ, in town over the holidays, reports into NLI, 2RN, and SSN Nets. NFU was appointed OBS to cover local 144-Mc. schedules. BNX received OES certificate. VHS is Alternate EC for Kings County. WDP has joined the ranks of u.h.f. experimenters and received OES appointment. IN, Bronx representative to AREA, is initiating a bang-up AREC program to build emergency net on 144 Mc. PF made an extended visit to KP4-Land. BO invites new members in the Domestic Overseas Net, 3700 kc., daily between 2100 and 0400, with traffic handled anywhere. JBQ has new MB-150 and promises more NLI traffic work soon. EQW, twin brother of YCW, is happy with brand-new ticket. 5PG, now 2PN at Flushing, is operating 28-Mc. mobile. BIV, new EC for Brooklyn, reports nets are forming there and asks for more 28- and 144-Mc. mobile and fixed stations. Traffic: W2VNJ 286, BO 252, OUT 180, OBU 113, EC 105, MQB 50, IAG 28, IN 24, LGK 24, DIC 20, TUK 15, VBT 12, UGZ 11, PF 10, OAF 8, BIV 7, JBQ 5.

NORTHERN NEW JERSEY — SCM, Thomas J. Ryan, jr., W2NKD — This is the first report following the gale which hit the East Coast. Congratulations on a job well done, fellows. The results of your wonderful action will be felt throughout the section as we continue along the road toward complete emergency preparedness. Further news on progress made will be coming your way via your County and City ECs, following a meeting held in Elizabeth on Dec. 18. A major result of the meeting was the publication of an Emergency Manual of Operation for the Northern New Jersey section. Those desirous of copies should contact the SEC. LOP now is equipped with PE-75 for emergency power. EGM is doing great organizational work as EC of Ocean County. CTI now is mobile on 3.5 and 14 Mc. He operates on all bands. Pictures no artist could paint: EGM with a bum leg climbing tree to replace antenna blown down during storm! New officers of the Garden State ARA: BTG, pres.; FZY, vice-pres.; LMB, secy.; EOH, treas.; GUM, chief engineer. CUI continues to knock off high traffic totals. HIK has his mobile units in constant action. They had quite a work-out during the storm. CCY and JMX have been appointed Asst. ECs of Roselle Park. TZF, EC of Union City, has appointed FAV Asst. EC. They conduct North Hudson 2-meter net every Sun. at 9:30 A.M. on 146.8 Mc. The Bloomfield Radio Club now has a.c. generator for club use. The Club conducts code classes on 28 Mc. and has 22 mobile units numbered among its members, who own a surplus BD-72 switchboard and EE-8 field 'phones, and hold monthly emergency drills. Morris Township Police were assisted during a drill by DAE, OYH, K2BI, WKL, and RKB. FGN was Net Control at Headquarters. K2CM, Morris County EC, was relay station from hilltop. ZBY held an EC and AEC meeting Nov. 20th in Hackensack Red Cross Building. New officers of NNJRA are UOU, pres.; DZA, vice-pres.; MBE, secy.; DOZ, treas. New members of the Club are TP, TJZ, ZDH. Rev. Albert Martin, BWO, has been elected first president of the newly-formed Jersey City ARA. Other officers are FVB, vice-pres.; ZSA, secy.; ECO, act. mgr.; and NAK, AEC officer. NBN assists NAK with AEC work in Jersey City. Working with them are YYM, ZAL, FVB, and NGX. UWK has organized Bergen County into 11 areas, each with its own EC. GWY, of Glens Falls, visited NIY and worked mobile while in the Teaneck Area. New AEC members in the Lakeland ARA are BDL, RQI, YOP, SEZ, GJE, ARQ, DYK, QEU, and RGV. Latest DX at RGV include EA6AF, ZM6AK, FQ8AC, EA9AP, VP8AJ, CE7ZG, and ET9X. TTA is in AEC in Morris County. OO appointment went to VYB; ORS endorsement to KUS. New ECs are IQG, Nutley; ENU, Madison; DME, Middletown Township; and K2BI, Morris Plains Area. Traffic: (Nov.) W2CUI 189, LMB 164, CGG 116, NCY 70, WCL 56, LOP 38, ANG 36, EGM 13, NAK 11, OUS 11, IIN 5, LOP 5, OXL 5, CFB 4, RGV 4, CJX 2. (Oct.) W2BUX 28, NAK 25, CTI 15, EGM 15, CJX 4.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — NYX reports a great deal of 28-Mc. activity in Waterloo, with both mobile and fixed stations. SWI now has two 55-ft. poles up for his 75-meter antenna, thanks to assistance of SRR and NYX. QVA tells us to watch out for his traffic report for December. BDZ, BGQ, and CGY are new members of TLCN. YTA is reporting in on CAN. AQL, SVD, and NWF are ECs. RUP is operating 'phone and c.w. on all but 50 and 144 Mc. Wayde Drennen, 65 years old and blind, has received his ham ticket after only eight months interest in ham radio. His home is Sioux City. YMH has new 70-ft. tower. ZLD now is looking at Channel 6 instead of being in it. Like PP, his motto is "if'n you can't lick 'em, join 'em." YNW, EOL, and ENS are home after a month in the Navy. POY has a new shack which will be used for future club meetings in Sioux City. RTI is new club secretary. SEF is a member of the Milwaukee R.R. emergency radio

(*Continued on page 64*)



MANY of us have occasion to wish for a feed method for a rotary antenna which would eliminate the need for brushes or the nuisance of twisted feed-lines. Inductive coupling does very nicely to accomplish these aims besides allowing for a quick and easy method of eliminating standing waves. The question of how to go about using this method has bothered many of our brethren so here is a brief outline of procedure.

First of all, the size of loops to use for the inductances is governed by three factors: *One*, the loops should be large enough so that they will provide the necessary coupling without being physically too close together. This is important to prevent shorting them due to wobble in the rotating loop and also because small changes in spacing have a greater effect on the terminating impedance of the transmission line when the loops are close together than when they are far apart. *Two*, the inductances should not be too large because the Q of the system is directly proportional to L and too high a Q restricts the frequency range. Q's of 2 to 5 are good. *Three*, the spacing between loops of given size is governed by the impedance transformation desired. That is, if you wish to step-down from 50 ohm (RG-8U transmission line to 8 ohm), the loops will be close together whereas if an impedance step-up is required, the loops will be far apart. Therefore, for a big impedance step-down the loops may have to be bigger in diameter in order to keep them from getting too close together. Under these conditions, the Q may be too high for the bandwidth desired. If a big impedance transformation is desired rings whose inductances are proportional to the impedances involved may help by allowing them to be operated in the same plane. It is also desirable to avoid big transformations in the loop system by employing another kind of impedance matching device before or after the rings, such as T match or a quarter wave matching section.

Now it is important to know what impedance your antenna looks like at its input terminals. Bear in mind that if the system is properly tuned this will be resistive. Now if you use the formula $C=\frac{1}{2\pi fQR}$ where R is the antenna impedance and Q is some desirable Q, say 4, a value of C can be found which will resonate the secondary loop at the operating frequency. As an example, if F is 29 mc. and R is 50 ohms, C is found to be 27.5 uuf. Now a loop is constructed at the operating frequency. "Terman's Radio Engineering" has a chart which lets you make the ring from knowledge of the inductance but the cut and try method may be used. A grid-dipper is handy to find out if your loop inductance is correct by putting C across the loop terminals and checking the resonance. In our case, the loop is found to be 13" in diameter of ⅜" copper tubing. C is now made up of two condensers each 2C connected in series with each antenna terminal. 600 volt micas with short leads may be used for antenna powers up to 200 watts.

If the impedance transformation desired is not greater than about 3 to 1 the primary loop may be made the same size and resonated with the same capacity. All that remains is to connect your transmission line in series with the loop and condenser and adjust the coupling until the SWR on your line is a minimum. Who knows? You may be able to make it zero. In our practical case, we can match RG8U with about 1½" between the loops.

As a further refinement the primary loop may be made a coaxial affair to provide electrostatic shielding between the loops. The C in the primary may be slightly different to resonate the loop but the action should otherwise be the same.

And incidentally our GS insulators are ideal for supporting your rings.

M. H. OXMAN, W1NYU

net. The Iowa Great Lakes Amateur Radio Club was formed in Spencer Oct. 12th. The Davenport Club, with the assistance of MCK in Des Moines, gave a demonstration of the ability of ham radio to function in the Civil Defense program. The City officials in Davenport talked with Governor and Mrs. William S. Beardsley and officers of Civil Defense for Iowa, in Des Moines. Operation was on 160 meters from Davenport and 75 meters from Des Moines. Traffic: (Nov.) WØSCA 358, RUP 105, QVA 68, YTA 31, NYX 3. (Oct.) WØQAO 23.

KANSAS — SCM, Earl N. Johnston, WØICV — Some of you by now have attended one of the Civil Defense meetings in Topeka, Wichita, or Salina. Keep up on CD matters and League activities by being active in some of the nets. Again we urge you to have some emergency-powered equipment, especially portables and mobiles. NEI/1, now in the Signal Corps, is operating from Mt. Washington, N. H., with a BC-610, 700 watts input, and 240' long-wire antenna on 3.5-, 7-, and 14-Mc. c.w. and 28-Mc. 'phone. ALD constructed a new Viking rig and is on crystal 160-meter 'phone and e.c.o. other bands. OAQ, of Leavenworth, is handling traffic on 7 Mc. DRB, of Olathe, is active on TLAP and reports DLE is a new c.w. station there. FDJ is NCS on TEN Friday nights and handles QKS quite a bit. IPI, of Olmitz, has given up 50 Mc. for Uncle Sam's Army. MUY, of Salina, has new 28-Mc. beam. CGB is new licensee there. INW gave a demonstration of beams at CKRC meeting; he also built new all-band converter. CKRC's annual ladies' night banquet was a big success with 43 present. NI is on the air with a Kansas National Guard Armory in Topeka. The KVRC now meets there. HBL, a newcomer to 3.85 Mc., is keeping the band hot. HS, of Topeka, is set up in new QTH with 120-ft. tuned doublet. TID, TEM, and CFY are new mobiles in Topeka on 28 Mc. Traffic: WØNIY 166, FDJ 85, DRB 63, BNU 30, EJQ 30, ICV 24, OAQ 20, GCJ 12, TDW 12, LIX 7, KXL 4, YZF 3.

MISSOURI — SCM, Ben H. Wendt, WØICD — The HARC AEC group held a meeting with Red Cross officials in the Kansas City Area to work out communication problems. The Club also is working with local authorities with respect to the Civil Defense set-up. The SMARC is working on a Bill to be presented to the State Legislature, which is designed to secure automobile license plates for amateurs with call letters instead of the customary numerals on them. VRF, the SEC, reports activity throughout the section in AEC work. The reports of the ECs from Fayette, Joplin, Kansas City, Wyatt, Springfield, and St. Louis show a total of 165 AEC members in these areas. Fourteen Assistant ECs are on the job in these areas working coöperatively with the ECs to make Missouri well prepared for any emergency. A complimentary letter was received from the Central West Utilities Co. for alerting the HARC AEC mobile group, when a break in a gas main caused an acute emergency in the Clay County Area. Thanks to VRF and TNA. ARH has received his Old Timers Club certificate from ARRL. KIK reports 39 contacts in the recent CD Contest. QMF is looking for better reports and more contacts now that the old grid drive problem has been eliminated. OQY has taken over NCS for MON in the St. Louis Area, in addition to being active in the regional net. DEA made new friends and many contacts in the Sweepstakes, with 154 'phone contacts and 174 on c.w. GCL still is staying with 3.85-Mc. 'phone. Traffic has slacked down during the past month for QXO. JST has QSYed from Columbia to Kansas City. Appointments and renewals in the section are as follows: VRF as SEC, KIK and QXO as ORS, TPK and QXO as EC, SOM as OPS, and QXO as RM. Traffic: WØQXO 263, WAP 59, DEA 35, OUD 22, ICD 8, QMF 8, ARH 2, GBJ 2, GCL 2.

NEBRASKA — SCM, Scott E. Davison, WØOED — It is with a heavy heart that we report the death of FAM on Nov. 15th. YDE has taken over as Assistant NC on 3.5-Mc. c.w. KDW is back on the air with a BC-696. CBH says to tell the gang to get busy on license-plate legislation. TIP is active in both Nebraska and High Plains Nets. BLM is new call at Ogallala. 144-Mc. activity is good in Omaha with nightly round tables. BBX has mounted a five-element beam above his 14-Mc. antenna. LRD has announced his engagement. AY again bangs out another outstanding BPL. RYG, FQB, and AY visited the SCM recently. All emergency units over the State are shaping up very nicely. VQO now has a TVI-free rig. WBE works for the telephone company. VEC has moved into his new home. IAJ is active at North Platte. I would like to acknowledge the FB certificate of honorary membership in the Ak-Sar-Ben Club issued to me. Get those EC applications into JED right now. We also want more members in the nets. Take your pick: 1.9, 3.7, or 3.9 Mc. Get in touch with FMW, AY, or KJP respectively. YDE and KDW are sporting new ORS appointments. The North Platte gang, led by GPX, BBS, OHK, ODB, ERM, ZOQ, EWO, CBH, and KON turned in a fine performance in their simulated emergency try-outs. We would like to have a QSL from all licensed YLs and XYLs in the State for our records. Traffic: WØAY 747, IXL 162, CBH 53, BLM 41, FMW 32, SAI 25, YDE 22, DMY 21, JDJ 21, LJO 14, IAJ 10.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — The small (?) hurricane in November furnished a good opportunity for an actual test of our emergency operations. According to reports received, the gang responded nobly. The State Police net was in operation, as were mobiles and fixed stations in Norwalk, Stratford, Hartford, Danbury, and other locations. Nice work, fellows. AOS was all set in the storm, as he always uses his own power, and did not know the commercial lines were down. HYF has quit his job at WLIZ and is working in Ridgefield. APA still is hunting DX and has 112 confirmed. CTI, EC of Norwalk, was out of town during the storm, but says the gang did all right without him. NJM is building a "Corkey." The Greenwich Amateur Radio Club, newly organized mainly for the establishment of a radio net for use of the local Defense Council, already has a 500-watt transmitter and receiver installed in the local Town Hall. This seems to be the first installation of its kind in the section, and might be a forerunner of more installations in connection with local Civil Defense plans, if and when it is decided that amateur radio will be the service to function in bombing attacks if the telephone lines are destroyed. It could be a real spot for the hams to show their value. Traffic: (Nov.) W1NJM 375, LV 212, BDI 156, BVB 91, AW 78, AYC 74, VB 50, FOB 37, CTI 35, GVK 27, KYQ 26, ADW 19, DJV 18, AOS 11, OJR 11, IJT 4, HYF 1. (Oct.) W1IHYF 82. (Sept.) W1AW 101. (Aug.) W1AW 231. (July) W1AW 207. (June) W1AW 333.

MAINE — SCM, Manley W. Haskell, W1VV — The Pine Tree Net frequency was changed to 3569 kc. effective Nov. 20th, in compliance with a request from ARRL. All other nets operate on schedules and times as noted in December *QST*. The SCM and SEC IGW attended a meeting of the Eastern Maine Amateur Radio Club in Bangor. QEQ acted as toastmaster and had all the amateurs introduce themselves. Col. Averill, of the Maine National Guard, and the SCM and SEC were speakers. Maine amateurs were on the job during the emergency of Nov. 25–26. Much traffic was handled to and from Vermont, which was hard hit and without power. Emergency units were used, some for continuous service. EFR hits 3.85 Mc. with a small rig to use new Class A ticket. PTL, PAM for Maine, has new HRO-50 to help run the Seagull Net. SFZ is new ORS, LRG is new OBS, and ITU is new OPS. PYY matched final to antenna and increased outside signal 300 per cent! LBJ was in the hospital for a short stay but now is out and feeling OK. DEO has come up from 50 Mc. and works out on 3.85 Mc. with 600 watts. BOK and SJN are both "Call Firemen" in their towns. Portland's PAWA held its yearly baked-bean supper at Duck Pond Grange Hall early in November. QQY and his XYL, GE and his XYL, and VV made a visit to "Gartersnake Haven," the QTH of PU, skipper of the Deep Sea Dragnet. Traffic: W1NGV 186, QUA 159, LKP 156, LBJ 125, LRG 86, VV 70, PTL 38, ITU 32, SFZ 30, QQY 29, HYH 26, EFR 21, BTY 20, QEK 18, AFT 17, BKU 14, RPT 12, IGW 11, KDE 11, SRQ 11, QDO 9, PYY 7, KEZ 3, SJN 3, SWX 3, SUK 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New ECs: MOJ, Medway; INC, Melrose; DWO, Millis; DFS, Somerville; KWD, Weymouth; QGJ, Woburn. New OPS: QGJ. New OBS: WU. The following have renewed appointments: SH, MD, BWH, MZR, IPZ, RBZ, and JOJ as ECs; EHT as OBS; JOJ as OES. RSE is head of Radio Communications for Civil Defense in Whitman. AYN is his assistant. 9KPK visited in Foxboro. Stations on 144 Mc.: HVC, PBC, JOL, KWD, and LPB. On 3.5-Mc. c.w.: ATX, ACA, and KKP. JCX has been on 3.85-Mc. 'phone. New hams in Brockton are TAR and TAV. DBE is on 3.85-Mc. 'phone. JLR moved to Lexington. RCA writes from Carlisle, Pa., where he is stationed. MAL writes that he has not been active for the past two years as he has been suffering from cerebral palsy. SAI has rig in his car on 28 Mc. and worked 5 stations on his way to Boston. BGW is working DX on 3.5 Mc. TCG has 75 watts on 28 Mc. MOJ has mobile rig on 3.85 Mc. SGW, in Weymouth, is on 7, 3.5, and 3.85 Mc. The South Shore Radio Club had an auction with AKY doing his stuff, also ARRL night when our Director, BVR, presented ALP with his Alternate Director's pin. NF has been doing some radar experimenting. NYU gave a talk before the Quannapowitt Radio Assn. on "Proper Matching of Feeders to the Rig." RGY is working DX on 28-Mc. c.w. JCK says that AHP, ATX, FGT, QKM, and UE have been reporting in to the Eastern Mass. Net. Congrats to EOB, the new SCM for Western Mass. and his new SEC, JYH. The T-9 Radio Club held a Christmas Party at HBG's QTH. NKW is on 7 Mc. and has NC-57. SMO has Class A license. PU reports that the Deep Sea Dragnet handled traffic from AVP in Rutland, Vt., during the recent gale. KKJ lost his antenna for 3.85 Mc. and has schedule for MPP with PS by 'phone patch. DMS reports into ESN, SSN, and Maine State Net. NWL is active in Deep Sea, Sea Gull, and Fish Nets. FGT is working into 1RN and is on 144 Mc. some. JFS has receiver for 1.8 Mc. built by NCT. GW and BWA are on 28 Mc. HXN put up three-element beam. TY has new beam. The Eastern Mass. Radio Assn. had a ham exhibit at the Hobby Show in Boston, using the call SS/1. A special program dedicated to radio amateurs all over the world was broadcast over WRUL direct from the Hobby Show by SS and QHC of WRUL. SIX got the beam up at his new QTH. HCH has transformer trouble. JOJ is on 14-Mc. c.w. and is working

(*Continued on page 68*)

THE LEADERS use Eimac TUBES

ARRL DX CONTEST SCORES

W8BHW	W1ATE	W2SAI	W4KFC
Rolf Lindenhayn	Chad Knowlton	J. Dawson Ransome	Vic Clark
1950: 365,807 pts., 499 contacts	1950: 243,004 pts., 514 contacts	1949: 313,200 pts., 600 contacts	1950: 365,454 pts., 514 contacts
1949: 390,450 pts., 475 contacts	1949: 223,040 pts., 468 contacts	1947: 135,774 pts., 397 contacts	1949: 365,160 pts., 479 contacts

It is generally agreed that of all amateur activities the DX Contest puts the greatest strain on men and equipment. Hour after hour of peak performance is demanded from each.

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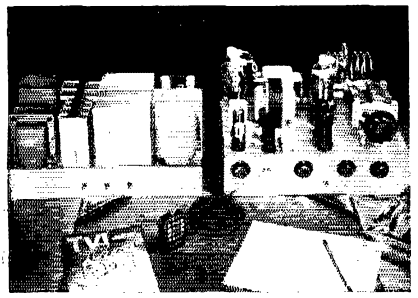

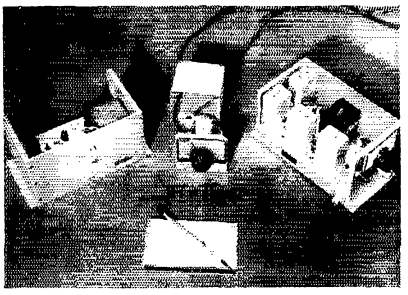

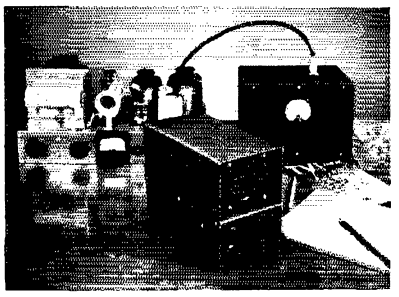

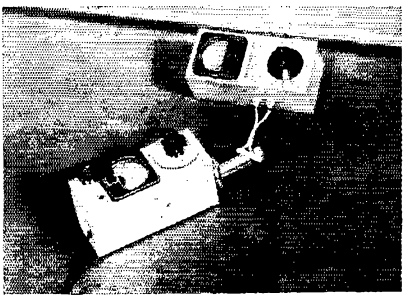

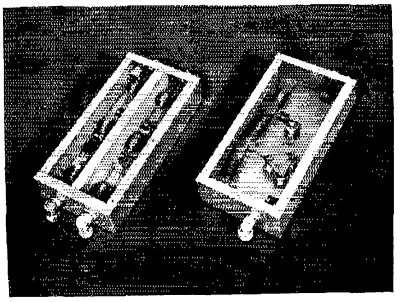

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(*Continued from page 64*)
on v.h.f. gadgets. SH has new Plymouth with rig on 144 Mc. The Rooster Net meets on 144 Mc. with RM, SH, KCT, DW, OEJ, and LYL. IPZ has rig on 3.85 Mc. in his car. SM is on 7 and 144 Mc. The Newton Emergency Net had the following on this month: BL, EK, EYI, FUR, HLX, JOW, KVF, OMU, PWV, QSG, RM, and SIT. EHT is working on 50, 14, and 3.5 Mc. and is rebuilding all rigs. Look for Skipper 7HUV on 28,720 kc. BWH is designing a rig for Field Day. NBS/PYI writes from Rio de Janeiro and wants to be remembered to all the gang. Traffic: (Nov.) W1EMG 293, SS 202, TY 139, JCK 96, LM 91, PU 63, KKJ 49, DMS 45, QJB 43, NWL 16, PYM 14, MRQ 9, WU 6, PKW 5. (Oct.) W1FGT 122, DWO 38, JFS 12, DHX 2.

WESTERN MASSACHUSETTS — SCM, Victor W. Paounoff, W1EOB — SEC: JYH. RM: BVR. Net frequency is 3725 kc., Mon. through Fri., at 7 and 10 P.M. The slow speed net meets Mon. and Fri. at 6:30 P.M., same frequency. Ten-meter 'phone net meets on 29.4 Mc. Thurs. at 9 P.M. All are invited. Now that I have had a chance to review the records, these are my findings. Out of 384 ARRL members we have 15 ORS, 6 OPS, 4 OOs, 2 OBS, and no OES. This does not seem to me to be a large enough percentage of appointees when you consider the over-all "on the air" activity prevalent in our section. Enjoy the distinction of holding one of the appointments for which you can qualify. Apply for application blanks directly to me. Receive the bulletins pertinent to the appointment and get the latest inside dope. New appointments are EHH as EC for Fitchburg-Leominster and HOD as Asst. EC for Holyoke. There was no communication emergency during the big wind this month but JAH and NY monitored WMN and the Holyoke AEC gang was alerted. RO and IZN have appointments in Civilian Defense Comm. Committees. JYH lost beams during the storm. No other damage was reported by the gang. BVR is chairman of Comm. sub-committee of Westfield Red Cross. AZW is reported recovering from a heart attack. HNE finally took the fatal step; he was married Oct. 28th. RDB is too busy with school. RHU had his fling with the rifle range and wants to get back to work. MOK reports that WBZA-FM has donated a transmitter to the Holyoke Emergency Corps to be used for Red Cross and Civil Defense communications. The AEC there plans to convert it to 144 Mc. This donation is greatly appreciated and it will be put to good use. Traffic: (Nov.) W1EOB 156, BVR 105, AZW 9, GVJ 6, RZG 4, BDV 3, JAH 2, MOK 1, RHU 1. (Oct.) W1GVJ 9, RDB 9.

NEW HAMPSHIRE — SCM, Norman A. Chapman, W1JNC — SEC: KYG. RM: CRW. The NHN meets on 3685 kc., 7:00 P.M., Monday through Friday. The NHEN meets on 3685 kc., 6:30 P.M., Friday; and on 3890 kc., 1:00 P.M., Sunday. Let's check in and give these nets our full support. Advise the SCM if you are active and would like a League appointment. If interested in emergency work and membership in the AEC, contact your SEC. 6MMG, ex-1MMG sends his 73 to TA, BFT, FTJ, ANS, NLW, and the gang. Have you heard EWF on the air with his new Collins 32V-2? BST is plenty busy these days with CAP activities. Hang on to your grid-dipper, boys; FTJ and RBX are new Class A license-holders. GMH finds time to check in on three nets. SWD is waiting for that last QSL for WAC on 7 Mc. Watch out, Asia, KTV has his new 28-Mc. rhombic beamed your way. Hope by now that you have recovered from "The Big Blow" of Nov. 25th, and that all skywires are back in place. The NEEN is to be complimented on the way it handled its important emergency traffic. Those participating were MCS, GMH, KYG, JNC, AXL, and BST. Traffic: (Nov.) W1PFU 38, QJX 21, JNC 20, GMH 14. (Oct.) W1QJX 26, RFP 5.

RHODE ISLAND — SCM, Roy B. Fuller, W1CJH — RM: BTV. PAM: BFB. The RIN meets Monday through Friday at 1900 on 3540 kc. The Rhode Island Net personnel met at AQ Club Headquarters to plan for the coming heavy traffic season. Those present were BTV, BBN, CPV, HLY, RVO, and QR. The ECs of this section met at the Armory on North Main St., Providence, with SEC MIJ presiding. They discussed the weaknesses that appeared during the last national emergency tests, and have decided that an intercity 3.5-Mc. c.w. net would be most reliable during certain parts of the day. HRC reports activity on s.s.b. and the building of new test gear. LKC reports regularly to RIN now and is a reliable traffic outlet. The NAARO held its annual elections in November and the following were installed: BFB, pres.; RVQ, vice-pres.; NCX, secy.; LWA, treas. DU1VVS is looking for R. I. contacts on 28 Mc. around 1900. He is the former QOG, so keep an ear open. Traffic: W1BBN 138.

VERMONT — SCM, Burtis W. Dean, W1NLO — RWP is on 3.5 Mc. with a BC-457. RLS, RNA, SCE, KRV, and RPR have Class A tickets. TEU, TEW, TFB, and TFW are new Vermont hams. BRO and OKH are using supermodulation. SET has HRO-50. Congratulations to the Vermont gang on the FB job of handling emergency traffic following the hurricane of Nov. 25th and 26th. SPK, assisted by CI, RRK, TFB, and 2BNP/1, furnished outside contacts on 3.5- and 7-Mc. c.w. on emergency power for 40 hours. AVP operated on emergency power in the N. E. Emergency Net. AAJ stood by on 3.85-Mc. 'phone with emergency power. Traffic was handled to Burlington for Western Tel. & Tel. via OKH (QNM, 2nd op.), QQN and TBG. Those taking part in CCEN operations were QQN, OKH, QNM, QVS, NLO, BRO, QXU, RMX, RPR, AXN, SEL, TBG, TEW, Dick Stowe, and Leonard Poirier. PZX, QKK, RNA, BJP, AZV, QQN, AHN, ETE, TJ, MLJ, JNC, CCF, JMO, RNZ, RYL, and QCT reported into Vt. 'phone net. Reporting into VTN were RNZ, SPK, QVS, BNS, PRE, IAP, SVT, and RNA. Standing by were ATZ, FPS, and SIO. Traffic: (Nov.) W1AVP 135, RNA 84, IT 72, PXZ 35, NLO 32, AXN 19. ELJ 7. (Oct.) W1KRV 90, IT 40, OAK 40, RNA 32, AVP 22, QXU 18, NLO 7, AXN 4.

NORTHWESTERN DIVISION

ALASKA — SCM, Charles M. Gray, KL7IG — EC: RU reports things are beginning to take shape in Ketchikan. They have four members and are affiliated with the O.E.N. on 3865 kc. AGM received his ticket in August and is on with an HT-9 and Super Pro. AAD, AEL, and AAI have the Rat Island Net going on 7-Mc. c.w. The Anchorage Radio Club has been reactivated with AGU, pres.; AEG, vice-pres.; and RE, secy.; and expects 100 active members. The new Radio Inspector arrived in Juneau and is on with 180 watts on 3.85 and 14 Mc. with the call MF. PI has been working plenty of DX with 500 watts and HQ-129 receiver. TI is doing fine on c.w. with DX but is disgusted with n.f.m. AEQ and VUV are leaving for Anchorage. If you want your QSL cards, please send postage to QSL Manager FM, Box 73, Douglas, Alaska. Traffic: KL7RU 15, AGM 11.

IDAHO — SCM, Alan K. Ross, W7IWU — Twin Falls: Very sorry to lose JMX to Montana, but that section will gain a good man. Good luck in your new job at KRJF in Miles City. New EC for Twin Falls is OQT. St. Anthony: LQU is dickering with his bankroll about buying a new rig. He sold his Globetrotter to a Rexburg ham. Hayden Lake: FIS has been busy winterizing cabins and cars, but is on the Gem Net when work allows. Boise: New Gem State Radio Club officers are IYG, pres.; MZG, secy.-treas. 160 meters is very active with quite a few Boise and Nampa hams on, including KJO, OCR, ORJ, IWU, GPM, LKE, MOH, and MFC. The FARM Net is active on 3935 kc. at 7 P.M. — make good use of it; get to know the gang. Move your traffic there or on the Gem Net. MKS, Nampa, has been meeting with both nets. Would like more personal letters from more of the Idaho gang. Traffic: (Nov.) W7EMT 41, FIS 12, IWU 5. (Oct.) W7GHT 286.

MONTANA — SCM, Edward G. Brown, W7KGJ — Our favorite heckler, LCM, shut-in Mayor of Huntley, the little country metropolis, attended Billings Club meeting via his home station. Members dispensed with club business and were entertained by the Mayor, who has quite a collection of poems, stories, and ham gossip. Skip conditions in this area have curtailed the local nets severely and a few stations are dropping out. Remember, we are all in the same boat, so don't give up; conditions surely will improve soon. The Glacier Club has disbanded temporarily because of loss of members but expects to begin meetings again in a few months. BNU has a new rig and says, "No more chirps, I hope." KUH has gone to Oklahoma to attend maintenance classes for the CAA and will be there for about three months. CT has his new kw. rig nearly completed. All stations handling traffic are requested to send monthly report to the SCM even if only one message is handled. It counts toward our usefulness to the public. FMV is home again after being away all summer. KGF and LBK now are on 160 meters. Traffic: W7KGJ 108, CT 29, BNU 15, CV Q4, LBK 2.

OREGON — SCM, J. E. Roden, W7MQ — GXO is new PAM, replacing HDN, resigned. DIS says that TVER activity is at a high peak. TVER mobiles did a nice job on Halloween in assisting the Washington County Sheriff's Office. OZL is teaching in high school in Burns. PAA is new call for Burns High School. NQA is new EC for Burns Area. BSY is busy keeping the gang around Oakridge interested in AEC activities. NQD is new ORS. JRU is complaining about the bad skip in his area. AHZ is new OEN 'phone net outlet in Junction City, after getting his Class A license. ESJ wants Oregon League Officials to take more interest in LO-Nite. AIZ is back on the air with an HT-9. AMX now has 201 countries and 40 zones to his DX record. LVN is traveling over a great deal of the Northwest and is keeping in touch with the gang via mobile. EQI looked through LVN's mobile log book and has decided to install mobile in his car. AJN is doing a remarkable job assisting ESJ in keeping OSN active and on the map. KDU now has a new aluminum 40-foot pole for his new antenna, working on 14 and 7 Mc. JZM has left to work for CAA in Alaska. MTT has received his Class A license. EBD has been called by Uncle Sam. FTA has lost a corner reflector from his beam. KEN had a hard time keeping his tower up through the big storm. ORX is new OO, Class III. BGG has moved to Salem. Traffic: W7IIV 92, ESJ 91, MQ 70, OHX 69, AJN 67, HDN 62, GNJ 43, HLF 35, NOJ 28, BSY 21, GUR 16 JOP 12, KTG 8, MBE 6, DZT 4, OVO 2.

WASHINGTON — SCM, Laurence Sebring W7CZY — SEC: KAA. RM: JJK. CWN moved to a new location and has his shack in the basement. DGN made a fine score in the SS. DDQ reports that the ARAB Net meets at 8 P.M. on 29 Mc. He is building a carrier-control modulator. DRA

(*Continued on page 70*)

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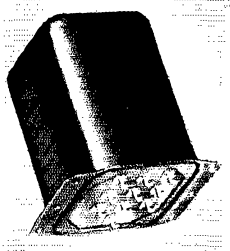

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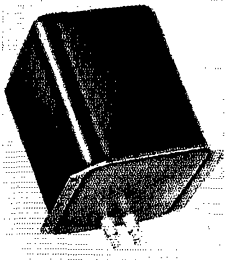
Catalog No.	Max. Pri. VA	Secondary A-C Load Volts	D-C Volts after filter	D-C Ma. CCS	D-C Ma. ICAS
P-45	185	675-0-675 575-0-575	400 500	250	325
P-67	250	900-0-900 735-0-735	750 600	250	325
P-107	310	1150-0-1150 870-0-870	1000 750	250	350
P-1240	360	1425-0-1425* 600-0-600	1250 400	150 200	200 260
P-1512	550	1710-0-1710 1430-0-1430	1500 1250	300	425
P-2520	915	2820-0-2820 2260-0-2260	2500 2000	300	425
P-3025	1850	3450-0-3450 2850-0-2850	3000 2500	500	700

*Both secondaries may be rectified simultaneously



FILTER REACTORS

Catalog No.	Inductance in Henries	Max. D-C Ma.	D-C Resistance, Ohms	Insulation Volts RMS
R-67	6	700	35	10,000
R-105	10	500	40	9,000
R-65	6	500	35	9,000
R-103	10	300	40	7,500
R-63	6	300	35	7,500

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Catalog No.	D-C Ma.	Insulation Volts	Inductance in Henries
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SR-500	500	10,000	.02 to 1.5 Hy

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CRYSTALS

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is rebuilding his rig. ACF has been under the weather again, as has the SEC KAA. KTL is working on a mobile net for the Vancouver Area. NWP built a new rig after the old one fell apart. LAG is at Veterans Hospital, American Lake, Washington, and would appreciate hearing from the gang. IOQ handles trans-Pacific traffic. BEE has 28-Mc. mobile. FIX reports band conditions are very bad on the nets. KCU is planning to be a female Rip Van Winkle if traffic does not pick up. ZU is building a Tesla coil. BX checks into three nets. FRU keeps his hand in the traffic game with a few schedules. EVW keeps a receiver on the Tacoma emergency net frequency of 29.3 Mc. The cold weather is keeping JZR busy. CSK and CZY have new jr. operators. The Cascade Radio Club has its trailer on wheels and on the air, complete with auxiliary power. The Walla Walla Valley Club has its club-house nearly complete. Traffic: W7CZY 699, IOQ 542, FIX 75, KCU 70, JZR 68, ZU 43, FRU 36, BX 19, EVW 11, LVB 8, APS 6, EQN 5, ETO 2, CWN 1.

PACIFIC DIVISION

NEVADA — SCM, Carroll W. Short, jr., W7BVZ — SEC: JU. ECs: HJ, KTH, MBQ, JVW, VO, TJY, ZT, and KOA. RM: PST. OPS: JUO. NWU has low-powered rig on 7 Mc. JUO worked 141 stations and 59 sections in the SS on 'phone. KEV worked 803 stations for a score of 138,000. PST reports NSN operating Mon. through Fri. at 7:15 P.M. on 3660 kc. UB is building "Dream Rig." MBQ works 10- and 160-meter 'phone. TFF is on 28-Mc. mobile. MZP, KLK, and CX were in the SS. 6NY now is 7OXX. JU is working on a 3.85-Mc. mobile rig. JLV is on 28 Mc. QYK has low power on 3.85 Mc. KOA has 3.85- and 28-Mc. mobile. ZT has 304TLs with 900 watts on 3.85 Mc.; also 850 watts to clamp-modulated 813s. NCR, LYV, MWF, and OHJ are on 28-Mc. mobile in Las Vegas. 3BKS/7 is new in N. Las Vegas. KUP, in the Air Forces, operates MARS station in Washington State. LXF has controlled-carrier modulated on 3.85 Mc. IRX has new all-band antenna. KTB, LWJ, and MAH have ART-13s on the air. TQZ has handy-talkies on 28 Mc. CX has new housing for mobile gear — a new Buick! Traffic: W7ZT 63, OXX 8, JU 7, KLK 6, BVZ 2.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — SEC: UTV. ECs: CER, QIE, IXJ, NOE, TFZ, and FTG. A prepared and unified emergency set-up is becoming a reality under the able guidance of UTV. All ECs in the section are actively engaged in construction of 2-meter portable and mobile equipment. Most of the gear has been bought by city and county funds set aside for Civilian Defense and will be made available to the hams free of charge under the supervision of the EC. CER and IXJ are new EC appointees. CIS received an endorsement for ORS. ZDB, with the able assistance of his OM and YQN, moved a 48-foot 600-pound telephone pole to his new QTH. BPT is active on MTN, RN6, and Early Bird Transcon Nets. NW is active on RN6, PAN, and TEN Nets. HC is a representative to PAN and TEN and is active on RN6 and MTN. QIE used portable equipment in a parade. Boy Scouts picked up messages and QIE sent them during the course of the parade; he also gave the local VFW a demonstration of amateur emergency operation with JKC doing the operating. On 144-Mc. mobile in South San Francisco are ZXS, JIV, MMG, FYK, QIE, YVE, GXF, and JBS. William E. Evans, of Stanford Research, was guest speaker at PAARA's December meeting. IUV is looking for a slow-speed net and is very active on 7 Mc. The SCCARA elected the following officers for 1951: WGO, pres.; UTV, vice-pres.; QBO, secy.; FON, treas. CFK, HC, and BPT were elected to the Board of Directors. Traffic: W6NW 307, HC 197, BPT 177.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, Charles P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, LMZ, OJW. The City of Berkeley has appointed ZC as communication coördinator for the Radiological Survey Corp., a part of Civil Defense. This group is a special one and concerns only one phase of work. Those interested for Berkeley may get in touch with Mel Chunn, 901 Grizzly Peak, Berkeley, phone LA 4-6386. Between 8 and 5 you may call TH 3-2740 ext. 244. The November meeting of the Central California Radio Council met at the home of the Oakland Radio Club in the American Red Cross Building, 9th and Fallon. Present at this meeting were CHI, UTV, WOW, CTH, ZLT, HC, and GHI, representing their respective clubs. New officers of the NBARA are as follows: ZZF, pres.; WXU, vice-pres. and treas.; HUY, secy.; AFC, editor; HUY, associate editor; ZJD, printing. The SARO Transmitter Hunt held on Nov. 12th was a great success. CBF, NQJ, and QWX were the hiding team. The hunt was won by the team of K6AY and UHM. DDO has plans for 3.85-Mc. rig in his new Plymouth. EE reports the Civil Defense program is moving along smoothly. The Mission Trail Net, Inc., is an organization of amateur radio stations desiring to handle messages free of charge for the general public, especially in times of emergency or disaster. Interested amateurs are invited to join and check in with us nightly on 3804-kc. c.w. at 7 P.M. PST and/or 3854-kc. 'phone at 7 P.M. PST. DTW makes BPL again this month. He reports he worked

(*Continued on page 72*)

"You can't beat Sylvania Tubes for long life and great performance,"

says Philip J. Crist, W3NNX

Mr. Crist, one of Baltimore's most active Hams, is also widely known for his regular morning program on Station WFBR during which he salutes the Hams. Naturally you'd expect this expert to be a booster of Sylvania Radio Tubes . . . and he is. Says he:

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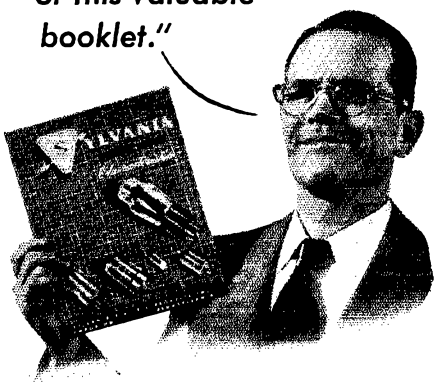

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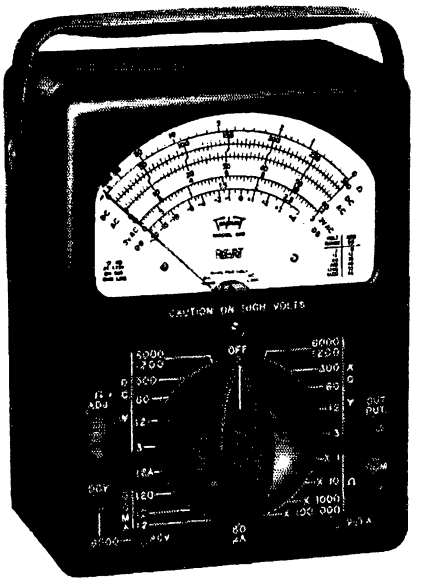

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his 100th country and his station is complete with auxiliary power. JZ has made BPL twice in a row. YDI is getting his share of TVI. RRH was elected to the board of the Mt. Diablo Radio Club. ITH finds time for a few QSOs in each month. OJW is chasing DX on 7 and 14 Mc. PB is building new final for each band to help lick TVI. EY bought himself a TV set to keep the XYL happy. DUB is moving back to Oakland. OBJ says, "Let's be prepared." EJA is working days now and is getting a chance to work some night DX for a change. ELW claims his rig now is free of TVI. Remember that we all now have two jobs on our hands. Civil Defense communications and peacetime emergency communications. The first comes under CX and the second under OBJ. Let's plan today to sign up. Let's do our part today. Traffic: W6DTW 1005, JZ 739, QXN 84, RRH 63, YDI 2, TI 1.

SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone: JU 7-5561. SEC: NL. Phone: PL 5-6457. We regret to say that for the first time in eight months NOT a SINGLE club in this section, nor any responsible individual in those clubs, sent in news for this column as they usually do. It is impossible to edit this column without this assistance. This criticism includes the Central California Council of Radio Clubs, whose November minutes included disapproval of the fact they had received no publicity in these pages. May we point out that since the original meeting of the CCC of RC, NO news of its activities has been received for publication. The origination of this organization was reported briefly in this section in July 1950 *QST*. Five individuals, however, reported. They are the reliable W6s SWP, HQN, and JCG, as well as the always dependable KG6s DI and FAA. SWP reports that his traffic total has gone to the basement because of swing-shift work and the recent very severe storms. HQN has been moving and is eagerly awaiting his Class A ticket. JCG reports in on the Mission Trail and RN6 Nets with a BC-458 on 7 Mc. and a BC-696 on 3.5 and 3.85 Mc. He occasionally reports in on NSN, OSN, and American Legion Nets. Being in an apartment house, his antenna is disguised as a clothesline. Congratulations to Clark Cox, KG6DI, who, in addition to all the traffic he handles, somehow manages to work a right good bit of DX. Clark recently sent in to ARRL 122 country confirmations. KG6FAA is newly reactivated with Pete as chief operator, while Hank and Al are the assistant operators. Clem is the director. This station is active on MARS frequencies as A1FAF. Conditions, although poor during the month, permitted 73 'phone patches. PGY now is able to be up and about for short periods after his long and serious illness. He operated in the SS Contest while in bed and ran up an excellent score. *San Francisco:* EC is BYS, phone BA 1-6157. *Marin County:* EC is KNZ, 168 Woodbine Drive, Mill Valley. *Eureka Area:* EC is SLX, 3236 "S" St., Eureka. BYS has been rapidly increasing the total membership of the SF AEC, and is closely collaborating with the Disaster Council. This is an important work and merits YOUR participation. The San Francisco Radio Club meets the fourth Friday at 1641 Taraval St. The High Frequency and Amateur Mobile Society meets the second Friday at the local Red Cross Building, 1625 Van Ness Ave. All are welcome. The Marin Radio Amateurs' Club meets the second Friday in the Engineering Lecture Room, Marin College, Kentfield. The Humboldt Radio Amateurs' Club meets the second and fourth Fridays in the YMCA rooms, rear of Municipal Auditorium, entrance on "E" St., Eureka. The Sonoma County Radio Amateurs' Club meets the first Wednesday in the Tap Room of the Grace Bros. Brewery on Second St., west of the Freeway in Santa Rosa. Traffic: KG6FAA 793, KG6DI 720, W6JCG 30, SWP 14, HQN 8, ATO 4.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W6ZF — Asst. SCMs: Northern Area, 6YNM; Central Area, 6CKV; Southern Area, 6SUP. SEC: KME. ECs: Met. Sacramento, AUO; Walnut Grove, AYZ; Dunsmuir, JDN; Mount Shasta City, EWG; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OBS: AF, BTY. PAM: ZYV. OES: PIV, GHE. OOs: ZYV, YNM, BTY, GDO. YV. OPS: JDN: Nets: Sac. Emergency (city), AUO NCS, Sac. Valley Emergency Net, BTY NCS, EID ANCS. Sac. Valley Section (traffic), ZYV NCS. Mother Lode, UNT NCS. *Northern Area:* The Mount Shasta Amateur Radio Club requested EWG be appointed EC for Mount Shasta City. JDN aided wife of S.P.R.R. station agent in Chowchilla flood emergency by contacting FEE. *Central Area:* GERC held Nov. meeting at CKV's residence; HBM was guest speaker and discussed emergency work. GERC's annual Christmas Party was held at WVR's. HNL now has Class A. TSR completed his Meissner Sig. Shifter and is building 300-watt PA. GVA and HNL handle traffic nightly on 28.9 Mc. GUV has new 10–20 antenna. ZUJ moved to Redding. DPC at Oroville and AYU in Sierraville are on 160. *Southern Area:* MARS is holding meetings bi-monthly now. In spite of illness, MYT manages Sac. outlet for MTN. ETD is new Asst. NCS for SVS. HWP/6 is using BC-696A at Florin. WC is now at Sac. Sig. Depot with VFO-807. GDJ worked his 205th country — YK1AB! IAP's new QTH is 3571 Bodega Ct., Sacramento. PIV is recuperating from surgery at Good Samaritan Hospital, L. A. QDT finally blossomed with ART-13 mobile. A8I has 75 mobile ready for his monthly trips. It is reported

(*Continued on page 74*)

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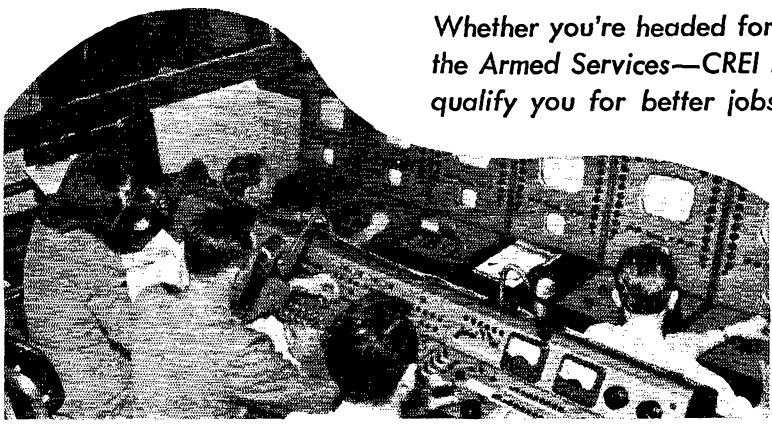

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that QKJ is the grandpappy of turning out new hams. I'm proud of the way amateurs in the section responded in the call to emergency. Your commmunities, towns, cities, and State are proud of you! Thanks to all. You make the Sacramento Valley section the best in the West! Traffic: W6ZF 102, MYT 65, KRX 27, JDN 26, GDJ 6, GDO 4, ETD 3.

SAN JOAQUIN VALLEY — SCM, E. Howard Hale, W6FYM — SEC: FYM. ECs: CQI, FIP, GCS, GJO, HIP, HZE. Asst. ECs: ARE, HBL, IEM, MOU. OBS: EXH, GRO, OHT. ORS: HU, GJP, GRO. OPS: GRO, IEM. OES: PSQ, UWY. OO: FKL, GRO. ASV is chairman of disaster communications for Tulare County and has done a fine organizational job there with GCS appointed EC and a bunch of the gang throughout the County to aid him in the AEC program as Assistant ECs. GRO's dad is recovering from a very serious operation. GRO still is trafficking on 3975 kc. EXH puts out ARRL Bulletins each Thursday at 1900 and 1945 on 144.9 Mc. and at 1930 on 7155 kc. FKL expects to have 1-kw. rig for 7-Mc. c.w. finished by spring, and he has just received new OO appointment. As this goes into the mail we have an incomplete report of stations active in the Modesto Area during the recent floods. CF/M, ERE/M, GKX/M, AXI, GNU, and GWQ were participants. FGJ has new 32V-2. KCA is a new call in Visalia. IFE, CTU, and ONK have joined Uncle Sam's Navy. JPS is proud pop of a new jr. operator. The MARS Net is active in Fresno. K6BP is horizontal on 144 Mc. How come? Activity in the Taft Area is booming, according to UJ, GJP, and HZE. The Taft Amateur Radio Club was formed Nov. 29th with about 20 members. SAR and FZM report from Hanford and Armona that activity is increasing in that area also. Traffic: (Nov.) W6UJ 211, GRO 135, GJP 3, FYM 2. (Oct.) W6GRO 101. (Sept.) W6GRO 60.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Herman P. Jolitz, W4DCQ — PAM: DLX. SEC: ZG. MRA is now 2FKH in New Jersey. LQB and LQC have moved to New Orleans but are going to school at Mars Hill and operating portable. EDA took time out to work in the last CD Contest while getting his big rig on the air. As A4EDA, Bob was station of the month in the 3rd Army Area. IMH and EDA have schedule Mon. through Fri. at 9:00 P.M. on 3605 kc. The Kinston Club station, OIX, has officially folded. A few of the 3.85-Mc. mobiles on the air are DLX, HUW, DCQ, HGC, DSK, and CYB. GKG has missed quite a few meetings of the N.C. Net because the children (and Walt) like Hopalong on his new "Peek-A-Boo Box" (this name copyrighted by ANU). NZS is working the CAP frequencies in Goldsboro and pouring a signal into Charlotte. KUV is getting out FB with fine remotely-located beam. The only trouble is his boom is so long it radiates as a long-wire antenna. HBQ has his new 813 rig on the air and doing OK. LWU has been on 160 meters for about 30 days and with 40 watts has been working Maine to Florida, North Carolina to Nebraska. He and RRH are forming a new 160-meter emergency net on 1895 kc. All interested should contact LWU or RRH for details. RA is operating NC in the "wee sma hours" after putting the b.c. transmitter to bed. From the reports, DLX has a good receiver as well as the ability to operate for he hears 'em when the rest of them don't on the North Carolina Net. Traffic: W4EDA 19, DLX 14, DCQ 6, CVQ .

SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT — The Charleston Radio Club has moved from the Naval Base to the Civil Defense Building downtown. CSH has left Charleston. AUL is on 14- and 28-Mc. mobile. GFP also is on 28-Mc. mobile, along with NQP and GIT. MPR now is on 28 Mc. GCW and EOZ are on 160 meters. HEV is on duty at Camp Gordon near Augusta, Ga. FM has new 28-Mc. beam and battery-operated rig. RZC is a new ham in Winnsboro. MVX is new to 3.85-Mc. 'phone. RPR is a new ham in Greenville and is on 7 Mc. After installing high-level negative peak limiters HWZ and AZT can work within 10 kc. of each other on 3.85-Mc. 'phone with both running a kw. and only three blocks apart. EDQ is new South Carolina 'Phone Net Manager. HXZ, former manager, has moved to Hot Springs, Ark. Traffic: W4ANK 310, FM 51, AZT 28, BPD 11.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — Simultaneously with the SS the PVRC conducted an intra-club contest of W3 versus W4 members. The W4 gang lost to the W3s. NNN now is ØBSY. The snowstorm in the Midwest and New England found the Virginia 'phone net and the emergency gang ready. VFN was busy for 13 hours handling emergency traffic Nov. 26th. FV, NAD, NV, and ONV took turns at the NCS post with the following stations QNI: GR, JAQ, CQW, OYP, 1WA, PQO, YEJ, QDX, JDJ, OKM, PWX, JAB, BTL, JFV, JHI, MUP, LMB, WG, NUU, OQX, and 3BYF/4. Those from other nets were CVQ, CRI, EOZ, 1KON, 2CSA, and 3USA. New officers of the Richmond Amateur Radio Club are 1YC, pres.; MK, treas.; IWW, secy. New hams in Richmond are RSB and SCM. KAO has recovered from pneumonia. Class A tickets have been issued to PEZ and JOT. OVI is slinging the call 2FFJ while attending Cornell U. FJ and CYW have in-

(*Continued on page 76*)

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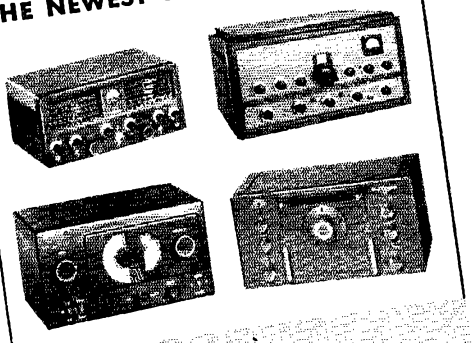

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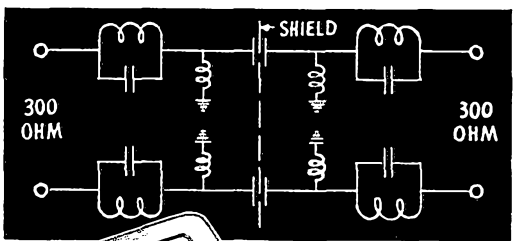

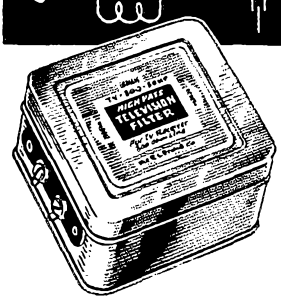

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stalled teletype systems on 144 Mc. Good reports from NAD, our SEC, indicate favorable progress with local community and county officials who are including ham emergency organizations in Civil Defense planning. The mayor of Falmouth, Va., was host to the Mayor of Falmouth, Cornwall, England, His Honor Albert Victor Baker, with VFN holding a round-table welcome at ONV, where messages from 15 mayors and town supervisors were conveyed to His Honor. CVO is sporting new portable rigs in his airplane. AAM resigned as EC of Fairfax County. QDX was active as 7MCW on WSN and WART, and resumes his activity as ORS and OPS on VN, VFN, 4th Region, EAN, and CAN. LAP moved to Annandale with a new 32V-2. RXP, ex-1ORN, is new to Alexandria. MWH is new RM. Congratulations to Headquarters for their fine selection in KVM as operator at W1AW. Traffic: W4FF 211, FV 132, MWH 99, NAD 71, MUP 64, NUU 60, LK 52, PWX 46, CFV 42, NKV 42, KFC 34, JXQ 26, KYD 24, QDX 24, BCI 17, CVO 15, RYS 14, IYI 8, GR 5, KMS 4, PAS 2.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — DFC reports two new amateurs in Princeton, YYC and YCZ. DWA is operating portable from there. WSL had an enjoyable visit from 4PJU and his XYL. ELX keeps schedule with 4UR in Marietta, Ga. 1QVF operated mobile while deer hunting in West Virginia. VPO also operated mobile and got a large buck. SKD visited QHG, who has new 'phone modulation monitor. FHG is a new amateur in Omar. AUJ, OXO, and DFC are the reliable men on WVN c.w. net, while MCR, DYP, and QHG keep the 'phone net in order. About 50 stations are members of the WVN c.w. and 'phone nets. WSL, DHT, WVF, and EP have reliable 28-Mc. ground-wave net. ZFB operations are limited because of classes at W.V.U. ZOW is on the air from Ft. Monmouth, where he is employed. ALR visited Charleston amateurs. CSF and BWK and work interferes with operation of their rigs. VCA has new 28-Mc. beam. GBF finds the Frequency Measuring Tests interesting and devotes time to improving his equipment. FMU has excellent emergency plan approved and in operation in Monongalia County. Traffic: W8AUJ 481, QHG 46, MCR 27, DFC 24, BWK 9, JM 8, DYP 5, SKD 4, YMN 3.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SEC: KHQ. RMs: LZY and ZJO. It is with deep regret that I report the death of VGC, SCM of Colorado during World War II days and affectionately known as "Heck" to his many friends. Heck was an ardent 28-Mc. ham and was known far and wide for his unusual sense of humor. ZJO still makes BPL every month. IC reports the MARS (AF) net in Colorado meets Thursdays at 2100 on 3497.5 kc. A total of 150 messages was handled from Fitzsimmons General Hospital through the Sky-High Net and IC, EKQ, PNK, and OTR on Thanksgiving. HJX is trying mobile and has VFO on 3.85, 14, 27, and 28 Mc. GQY has close-spaced beam stacked 10 over 20, three-element, and is ready to give 14 and 28 Mc. a bad time. QDC is working on a Clapp oscillator and is trying crystal-grinding in case it doesn't work. YL operator WVG reports the Coffee Club members are very helpful to a beginner and sends a card to prove it. Those mentioned especially were 5SB, DDM, and AML. The Colorado Emergency Net is speeding up its operations and is becoming quite an efficient net. A new 28-Mc. net has been organized in Denver and suburbs with the name the Sky-High Net. WLN is Net Control. Our director, DD, gave a talk at the Denver Radio Club based on the editorial in December *QST*. Please send in your certificates for renewal or endorsement if the date is near or past expiration. Traffic: WØZJO 1188, IC 119, HJX 35, KHQ 30, LZY 14, GQY 11, QDC 11, OWP 6.

WYOMING — Acting SCM, A. D. Gaddis, W7HNI — HDS is at Mayo Clinic. GOH is moving and rebuilding antenna. FLO is keeping the boys in line on the Pony Express Net. GSQ is moving transmitter to shop. JDB is with the Navy in Guam. GZG is keeping Laramie on the map. NOU is mining coal and burning up final tubes. HLA rebuilt 807 stage and antenna. MWS is keeping Cheyenne warm. GS is working some traffic. AEC is on both Wyoming nets with c.w. ATJ has new 160-meter rig. NVX is on 3.5-Mc. c.w. with a good signal. AMU, HX, and AXG are on the Wyoming c.w. net. OWZ keeps schedules on 144 Mc. Traffic: (Nov.) W7GS 12, OWZ 8, GZG 2, HLA 2, HNI 2. (Oct.) W7OWZ 28, HDS 22.

SOUTHEASTERN DIVISION

ALABAMA — Acting SCM, Percy Sexton, W4HFL — INU, who is leaving for military service, was guest of honor at an Oyster Fry given by the Mobile Club. HA has 140 countries confirmed on 14-Mc. 'phone and has ART-13 ready for emergency. Those of us who have been in doubt as to what to do about rebuilding, going mobile, building an emergency rig, what band, etc., should read "It seems to us" in Dec. *QST*. MVM got 25-w.p.m. CP certificate. PRS now is Class A. GJW has new 32V-2 rig and is making a long-term study of 3.5 Mc. during ionospheric storms. GYD and LEN took part in recent SS Contest. AIL is new member of AEC. OKJ is Blount County EC. LEN is

(*Continued on page 78*)

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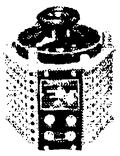

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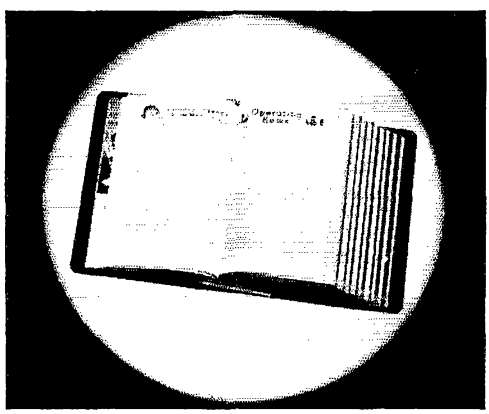

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SEC, replacing MBA. DAQ has 1st-class radiotelephone license. SLJ, editor of the *Azalea Net Breeze*, a monthly of the Amateur Radio Club of Mobile, reports that "seven Mobile hams report in on the Alabama 'phone net daily while only one station reports in on the c.w. net." MKV is back on from Decatur. HFL now is mobile. KUX, Tuscaloosa, wants 144-Mc. contacts in this area. 5PNA/4 operates from U. of A., Tuscaloosa. NPZ is rebuilding. MVM is an active OO in the Mobile Area. The AENP meets nightly at 6:30 P.M. CST on 3955 kc. LEN is Net Control Station. LEO is back on 3.85 Mc. OUW is working 7 Mc. GHZ keeps weekly schedules with Germany on 28 Mc. LCI operates 14-Mc. 'phone from Anniston. GUP is in Oxford now. Traffic: AENP 82, W4GJW 75, LEN 28, MVM 23, BFM 5.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — Please, everyone, send me your reports on fair traffic. CQZ and KJ are CDC appointees. Did you know that IP is back from Panama? Our shut-in friend, PMN, who lost his rig from electrically-caused fire, is going strong again with an 813 final and selsyn-controlled tuning, thanks to his brother, OZC. Which reminds me that there are enough hams in the MacLean clan to have a real family net. Rejoice with PNS in his escape from injury after a 43-ft. tumble from the top of the PJU tower. DGW, IZ, IQV, BRB, and OGI report good results in the SS Contest. Gainesville: DGW, ANCS on Palmetto Net, has stowed the kw! Miami: IYT made WAS on 28 Mc., thanks to new three-element beam. Hear this — SAT is new 14-yr.-old brasspounder. Jacksonville: New JARS officers are EEZ, CGG, PNA, and GZJ, and NMG as activities manager. Quite a bit of traffic is moving this year but it is still below last year. If 7:00 P.M. is too early on 3675 kc. why not hit the 10-P.M. schedule? How many want a 9 P.M. schedule? There is quite a bit of 3.85-Mc. mobile operation now and reports are needed. With possible CDC activities coming up, a well-rounded program of mobile nets will pay off. HWA, RTJ, OBB, and others are working around the State well and the emergency frequency could be set aside now and then for mobile tests on 3.85 Mc. Traffic: W4OGI 123, OCG 102, LMT 74, KJ 69, IYT 20, FWZ 19, DES 15, DGW 14, AYX 12.

WESTERN FLORIDA — SCM, S. M. Douglas, jr., W4ACB — Acting SCM, Eddie Collins, W4MS/RE. ACB has been so tied up with work that MS/RE is pinch-hitting for him. RZV has high power on 28 Mc. RYA keeps the ground waves hot into Pensy. PQW is on 50 Mc. HJA has his mobile gear going again for AEC. FHQ has v.h.f. gear now. SDT is newest Pensy ham. 8AW has new five-element beam. PRP has new HRO-50. EQZ keeps 3.85 Mc. going. PAA has new bug to keep 7 Mc. hot. PLA keeps nightly 28-Mc. round tables going. BFD keeps busy on all bands. VR is our most consistent 7-Mc. man. LT keeps the kw. on 3.85 Mc. AGB was heard running up an FB score in the SS Contest. PLE has new speech expander going FB. QK has mobile gear ready for AEC. ODO enjoys new "antenna 'scope." DAO and DXQ are back on 7 Mc. again. NOX is heard on 14-Mc. 'phone. NN keeps busy with the East Florida Nets. MFY enjoys the 3.85-Mc. 'phone nets. MS is busy with 144- and 420-Mc. gear. JPD is heard on 28-Mc. 'phone. HIZ keeps busy at CAA job. I will be on the lookout on 3.85 Mc. for any of the gang. Traffic: W4AXP 68.

GEORGIA — SCM, James P. Born, jr., W4ZD — New officers of the Atlanta Radio Club for 1951 are MZO, pres.; OPS, vice-pres.; NQO, secy.; PDR, treas.; ORI, act. mgr. HDC resigned as editor of *The Atlanta Ham*, a post he has held for four years. NQO is confined to the hospital. JUF has a new harmonic — it's a boy. LJB is on the air after an absence of one year. KXX has moved to Redan, Ga., and hopes to be on the air soon. Next month will round out my first year as SCM. In all fairness to others there will be a complete clean-up of all 'phone as well as c.w. appointees who have failed to fulfill their obligations with their appointments. So come on, fellows, let's get those reports in. PBF has a new 2.5-kw. gasoline-driven emergency power supply. KWC is building a 500-watt c.w. transmitter using Collins 310B-1 exciter. He now is running 200 watts on all bands, c.w. only. AQL is active in all the emergency nets in this section and is building a new 28-Mc. rig. RNK has moved to Rossville and hopes to contact the Atlanta Area soon on 7 Mc. That is, as soon as he recovers from injuries received in a race with a falling tree. The tree won. BOC and HZG lost their beams in the recent high winds. Both are rebuilding and hope to be on in several weeks. MTY has moved to Atlanta from Burnt Mountain. New members of the Cracker Net are BB, EPM, MAL, OHH, OMF, and K4FAD. Traffic: W4KOR 38, HZG 14, MTS 10, ZD 9, AQL 3.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES. ES has resigned as NCS of the 3925-kc. AEC net. New NCS is KP4JA/KP4, Metropolitan Radio Amateur Club, San Juan. The BARC affiliated with ARRL. CP is screen-modulating 803. KZ and JM are using BC-610s on 3.85 Mc. LV is on 420 Mc. KV4AO's cootie-key sounds FB. AZ has 350-foot Zepp. IT changed direction of 80-meter antenna to favor San Juan. AEC stations monitor 50.28 Mc. for IT's 15 watts and two-element beam. FF, KZ, HZ, and ES are listening on 144 Mc. CC, DJ, HN

(*Continued on page 80*)

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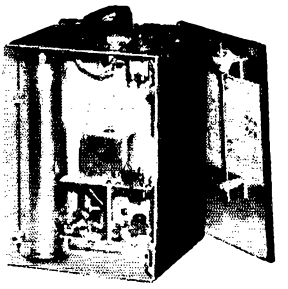
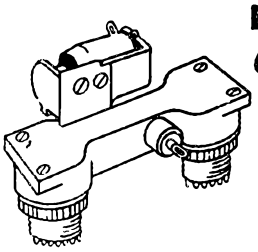


FCC demands frequency and stability tolerances. Avoid the "pink ticket" with this brand new cavity oscillator which makes a useful Citizen's Band (460-470 mc) freq. meter and signal generator — in fact it can measure frequency in any range harmonically related to its fundamental. Also makes a hot 1-meter-plus amateur xmtr/rcvr within the 240 mc band, or a UHF high-stability converter oscillator. Contains gold-plated resonator for stability, two 955 tubes, antenna, canvas carrying case, 9½ x 6¾ x 6½" aluminum cabinet with handle and compartment big enough to take an AC power supply. We include technical and constructional data for Citizen's Band freq. meter. Weight 10 lbs. $1.95.

EXTERIOR EXPOSED TO ELEMENTS, INTERIOR LIKE NEW

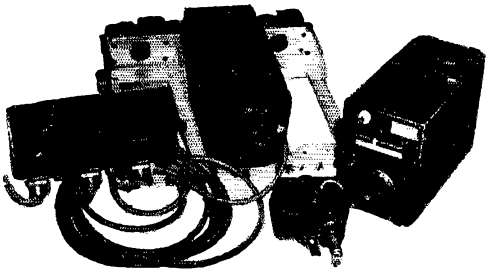


BRAND NEW! NEVER BEFORE OFFERED! ALLIED CONTROL RAX-1
6 VOLT MOBILE COAXIAL RELAY, ONLY $3.79 (WORTH $8.08)

Radio Shack scoop! Allied Control Co. coax changeover relay at less than half the regular dealer net price! For mobile, stationary, 2-way radio use. Handles maximum of 75 W of r.f. to 150 mc when inserted in 52-ohm RG-8/U cable. Mounts anywhere (dashboard, etc.). Encased DPST relay contacts. Coil rated .46 amps, 13 ohms. Takes 2 standard 83-1SP coax connectors. New, individually boxed! 2 x 2⅞ x 1¾" overall.

Order No. RAX-1-QST Mobile Coaxial Relay — **$3.79 Ea.**
Order No. 83-1SP-QST Coax Connector (takes 2) — **.62 Ea.**
Order No. RG-8U-QST Coax Cable, per foot — **.14 Ft.**

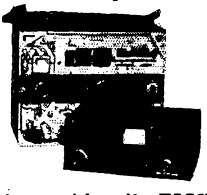
A RECENT SPECIAL PURCHASE of SCR-274N COMMAND GEAR!



These units are complete with TUBES and crystals, some in black crackle finish, others in plain aluminum. Some may have slight dents, but ALL ARE UNUSED and in excellent, like-new condition. NOTE: the xmtrs make topnotch VFO's, CW and Phone xmtrs. Quantities LIMITED.

Order No.	Fig.	Type	Description	Price
R-625	A	BC-450A	Remote control unit	**$0.75**
R-633	B	BC-451A	Control Box	**.49**
R-656	C	BC-453	190-550 kcQ-5'er	**12.95**
R-577	D	BC-456	Modula or w/o dyn'r	**1.95**
R-651	E	BC-457	Xmtr, 4-5.3 mc	**7.95**
R-655	E	BC-458	Xmtr, 5.3-7 mc	**7.95**
R-658	E	BC-459*	Xmtr, 7-9.1 mc (40M)	**12.50**
R-657	E	BC-696A	Xmtr, 3-4 mc (80M)	**12.50**
*Navy T-22/ARC-5				
R-0455	F	MC-215	15 ft tuning cable	**1.00**

SCR-522 Xmtr/Rcvr $29.95

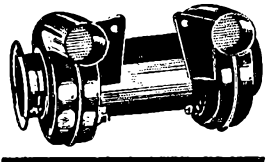


Complete with all EIGHTEEN tubes, the SCR-522 is the most useful piece of gear in the fast-disappearing surplus market. Covers 100-156 mc range thus ideally suited for navigation, airport control, railroads, police, rural phone, taxi communications. Also makes a top-rated xtal-controlled 2-meter VHF rig. 10 watt output. EXCELLENT condition, and our price is the lowest in the U.S.A.

Order No. R-0198 **Only $29.95**

SCR-522 DYNAMOTOR (PE-94)
Order No. R-0198A **Only $2.50**

Delco Dual Blower $14.85



WORTH $15 MORE!

Brand NEW, built by Delco division of General Motors, easily worth TWICE our low pre-Korea price! Powerful continuous-duty 115V 60 cy AC motor; 62W input, 120 cfm free volume air delivery! Over-all 10¾" x 5⅞" x 6¼"; 11 lbs. Ideal for cooling, ventilating, draft-boosting, drying, suction, humidifying. A giant, exclusive value!

Order No. R-0460 ..... **$14.85**

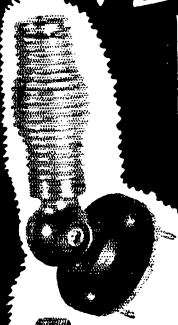
GIANT 1951 CATALOG

Just issued! 172 pages BIG, one of the few all-new mail order catalogs to be released this year! A gold mine of product information and listings for hams, labs, industry. 3 index pages! Lowest prices! Write TODAY for your free copy!

The RADIO SHACK Corp.
167 WASHINGTON ST., BOSTON, MASS.

MOBILE RIG?

ANTENNAS *Master Mobile* MOUNTS



MASTER MOUNTS

● Hefty shock absorbing springs. Two types, straight and double tapered. Body Mounts fit any body contour. Bumper Mounts clamp to bumper in few seconds. Cad plated. Heavy bakelite or micarta insulation.

● **MODEL 132 — Body Mount.** Shipping weight 3½ lbs. Net price **$8.75**

● **MODEL 132X — HEAVY DUTY.** Same style as 132 Net price **$9.85**

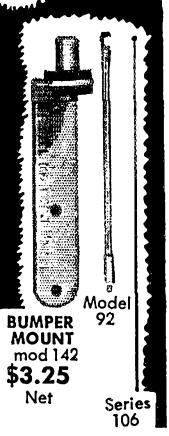
● **MODEL 138 — BUMPER MOUNT.** Shipping weight 3½ lbs. Net price **$6.55**

● **MODEL 138X—HEAVY DUTY—**Same style as 138 Net price **$7.65**

● **MODEL 142 — BUMPER MOUNT.** Less spring insulated for direct mounting for Series 100 antenna. Shipping weight 2 lbs. Net price **$3.25**

BODY MOUNT mod 132 **$8.75** Net

BUMPER MOUNT mod 138 **$6.55** Net



BUMPER MOUNT mod 142 **$3.25** Net

Model 92 Series 106

MASTER WHIP ANTENNAS

● One piece designed and tapered to prevent excessive swinging. Stainless steel.

MODEL	Overall Length	Net Price
Threaded 3/8" studs for all Mounts.		
100-60S	60"	$4.95
100-72S	72"	4.95
100-78S	78"	5.00
100-86S	86"	5.15
100-90S	90"	5.20
100-96S	96"	5.25
Plain End 3/16" Diameter (Fits Model 92 Extension)		
106-60S	60"	$4.15
106-72S	72"	4.15
106-78S	78"	4.20
106-86S	86"	4.35
106-90S	90"	4.40
106-96S	96"	4.50

MASTER EXTENSION — Model 92 Chrome plated. Provides 18" adjustment for Series 106 Antenna. Shipping weight 14 ozs. Net price **$3.25**

MASTER ALL-BAND ANTENNAS

● AB/W20 20 Meter Coil Net price **$8.75**
● AB/W40 40 Meter Coil Net price **8.75**
● AB/W75 75 Meter Coil Net price **8.75**

EXTRA COILS

● M-20 Coil.....Net price **$3.30**
● M-40 Coil.....Net price **3.30**
● M-75 Coil.....Net price **3.30**

MASTER "75" MOBILE ANTENNA

● Center-load. Chrome plated.
● May be used for 10 meter operation.
● Length: 8' 10" overall. Weight: 28 ozs. Shipp. wt. 3 lbs. Net price antenna **$8.75**

MASTER CIVIL AIR PATROL ANTENNA

● 2374 KC.....Net price **$9.95**

M-75 ANT. does not incl. mount

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and IT are able to transmit on 144 Mc. DJ is building 144-Mc. crystal-controlled converter. AK is ORS, OO, and AEC member. KD received Ramey certificate. GX, FF, and KY are new AEC members. ES has HFS. NJ has new tower for 28-Mc. beam. Colegio San Jose students have requested KP4AA as the call for their club station. IO is building 500-watt 'phone transmitter. KW is testing all-band bandswitching mobile. CM2ELL is a new ham in Habana. Traffic: KP4DJ 12, IT 5, AK 4, KD 1.

CANAL ZONE — SCM, Everett R. Kimmel, KZ5AW — AW, CG, PC, WG, and WJ met with the newly-appointed Director of Civilian Defense for the Canal Zone, in a preliminary discussion of amateur radio communications. Mobile operation on all authorized ham bands is now permitted for KZ5s — and /MM too. CG received appointment as RM and added a 14-Mc. beam to his antenna farm to squirt c.w. in the right places. WA has his Class A ticket. WJ sold his big rig to FJ. WJ plans to return to the air later with lower power, probably p.p. 955s. WJ also is AH5WJ, first civilian MARS station here. A number of KZ5s received Public Service certificates for Florida hurricane participation. GM moved to another high spot on Ancon Hill. Captain "Gregg" of KZ5AA, Army MARS officer, will brief the CZARA gang on that subject soon. Sound movie radio training films draw a big attendance at CZARA meetings. Traffic: KZ5LR 4.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Virge A. Gentry, jr., W6VIM — SEC: SCN. PAM: MVK. RMs: CE, CMN, DDE, FYW, JQB, and LDR. William F. Mulvihill, SCN, was appointed SEC Nov. 25th. SCN's mail address is 14931 Hesby St., Van Nuys, Calif. Bill replaces ESR, who resigned Nov. 10th. KEI was appointed EC for the City of Los Angeles on Dec. 4th. KEI's jurisdiction excludes the AEC nets of CWS, DQO, MVK, ZVV, TFC, and WKO. Your SCM regrets to announce his resignation, to be effective not later than Dec. 31, 1950. I am forced to resign because of a business transfer to the Northern Texas section. I have enjoyed serving the Los Angeles section as SCM. Any success that I've had in this capacity certainly is due to your loyalty and coöperation. If you support your next SCM as you have me, you will have done your part to provide the activity required to keep amateur radio "on the air." This is my last Station Activity report. 73, and I hope to contact all of you from W5-Land. PJ has a new three-element beam on 14 Mc. CUF and GQH have "Worked All States" and were presented prizes by the Long Beach Club. JPO joined the Long Beach mobile net on 28 Mc. GKM rebuilt with VFO control. FE and NSX have gone mobile. Sorry to hear that RO has been in the hospital. VMA found that a lot of TVI can be eliminated if the final is redipped after shifting frequency. BES made 185,000 points in the fall CD Party. RQU moved two doors west of DTY. KG6ET, ex-W6RET, has returned to this section from Guam. He has recovered from the shock of seeing the deluge of TV antennas. DLR and FZO are employing controlled-carrier screen-grid modulation with a 6Y6G controlling 4E27s and 4125As. CUF, BJU, UQQ, and UYW worked EA2AB. It's a grim situation when DGB watches TV more than he operates. The fact that HCC now has a YL has nothing to do with his sudden interest in mobile work. HYS finally decided to use a prop-pitch motor to rotate his beam. IDM has had transmitter trouble. JMY has a new 200-watt final. SW has a new mobile rig and BXP has a new oscilloscope. ANT moved to Chatsworth. AFR continues to be one of the most effective OBS in this section. FYW and POD relayed valley flood traffic. MSG went into the Navy and left his rig with WZW. CMN is back with the SCN. TFC was appointed EC for the San Fernando Valley. He replaces SCN, who now is SEC. All radio amateurs are urged to join the AEC now regardless of your amateur or ARRL status. This must be done to provide the power required to retain our bands in view of the growing international situation and shortage of radio frequency spectrum. Our amateur bands are being watched with envious eyes by other radio services. Now is the time for you to provide the activity required for amateur radio to remain a service in the "interest, convenience, or necessity" of the public. The following amateurs serve this section as Emergency Coördinators so that you may be free to use the amateur bands in any manner that you wish consistent with necessary regulations: COZ, CWS, DCB, DDE, DQO, EUR, HKD, KEI, KSX, MVK, QNW, RIT, RNN, TFC, TSN, WKO, WOU, ZVD, ZVV, and SCN. Traffic: (Nov.) W6CE 1375, GYH 448, LDR 420, JQB 187, CMN 142, DDE 132, BHG 40, HLZ 40, FYW 37, MU 28, BES 14, AM 8, AFR 7, ANT 7, HYL 6, COZ 2. (Oct.) W6QIW 822, GWB 37.

ARIZONA — SCM, Jim Kennedy, W7MID — As many of the gang have trouble getting their antennas to load up on both ends of the 80-meter band, the c.w. net frequency is being changed from 3515 to 3800 kc. Because of the small attendance this net won't be a nightly affair, but will meet at 7:15 P.M. Tuesdays and Thursdays, right after the 3865-kc. emergency 'phone net roll call. This will enable the 'phone boys to slide down and brush up on their c.w. This isn't strictly a traffic net but is a spot where the c.w. gang can meet and get acquainted, so drop in some night. All

(*Continued on page 82*)

BOB HENRY, WØARA, OFFERS YOU:

LOW PRICES: I sell to you as cheap or cheaper than you can buy anywhere.

COMPLETE STOCKS: Collins, Hallicrafters, National, Hammarlund, RME, Millen, Harvey-Wells, Meissner, Gonset, Meck, Johnson, RCA, all other amateur receivers, transmitters, beams, TV, AM-FM, Polic-Alarm and Monitoradio, high fidelity amplifiers and speakers, test equipment, tubes, parts, etc. I can supply nearly any equipment shown in any catalog or advertisement and at lowest prices.

BEST TRADE-IN ALLOWANCE: Customers in all parts of the USA trade with me because I allow so much. Tell me what you have to trade and what you want. I also buy equipment.

TIME PAYMENTS: You can order anything on terms. I finance the terms myself to save you time and bother. Customers everywhere in the USA find my terms best. Write for details.

QUICK DELIVERY: Mail, phone, or wire your order. It will be shipped promptly. I can be reached nearly 24 hours a day, 7 days a week.

TEN-DAY TRIAL: Try any communications receiver ten days — if you return it your only cost is shipping charges.

PERSONAL ATTENTION: The Butler store is run by Bob Henry, WØARA, and the Los Angeles store by Ted Henry, W6UOU. We make the deals ourselves. We finance the time payments ourselves. That way we have the lowest overhead and can do more for you. That's why YOU AND I CAN DO BUSINESS. Write, phone, or visit either store. Export orders solicited.

73,

Bob Henry
WØARA

Butler 1, Missouri

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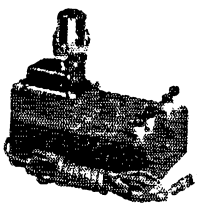
LOOK

POWER SUPPLY SCOOP!



Utility power supply, 350 volts dc @ 50 Ma., 6.3 volts @ 2 Amp., black crackle chassis 6¼" x 5" x 2". Has choke and 2-section filter, AC switch and line cord, a wonderful buy, less No. 80 rectifier, only..... **$2.25**

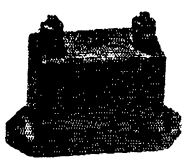
BEACON RECEIVER

For any remote control application, BC-341-F, 2-tube, 140–160 MC. receiver. Ultra-sensitive plate-current relay in set can be used to control external circuits, open doors, etc. Handsome aluminum cabinet, circuit printed inside. Uses 12C8, 12SQ7, or 6B8, 6SQ7 (tubes not included). **$2.25**

8/8/8 MFD. 500 V. D.C.

Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 5" x 3⅝" x 2¼". A one-time buy..... **$1.95**

5000 VOLT MICA



The best bargain we have ever had — .0004, 5000 volt transmitting mica, regular $14 value, mtg. centers 2⅝", 1¾" high.

39¢

FILTER CONDENSER SPECIAL

6 MFD 600 WVDC G.E. Pyranol condenser, has mounting lugs, new, 4¾" high, 2¾" x 1¼". Buy several at this price..... **95¢**

All prices F.O.B. Cincinnati
20% deposit on C.O.D. orders

73, Jule Burnett, W8WHE

Steinbergs

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speeds are welcome. NDJ, in Wickenburg, checks into the San Diego Net regularly and handles lots of Arizona traffic on 3.5 Mc. PUM and OLB were heard going to town in the WAS Contest. LKT now is married. Congratulations, Bruce. The Arizona gang had a nice get-together at Coolidge, and a unique "cool kilowatt" rig was exhibited by 6APW/7. New calls on 3.85-Mc. 'phone recently are MAL, NAP, and KWB, the latter two with new QRO finals. OIF also is back on after rebuilding his final. Traffic: W7OIF 8.

SAN DIEGO — SCM, Mrs. Ellen White, W6YYM — Asst. SCMs: San Diego County, Thomas H. Wells, 6EWU; Orange County, Shelley Trotter, 6BAM. ECs: San Diego County, VJQ; Orange County, DEY. RM: ELQ. The AEC Headquarters, in the House of Charm, Balboa Park, has been open for club meetings since December. DEY reports plans are being made to install emergency equipment on 3.85, 7, and 28 Mc. at Santa Ana Red Cross Headquarters. The SD YLRL members are sporting new club badges of original design, and the San Diego Club plans to have its new buttons after the first of the year. Just recently a new amateur radio club was formed in Fullerton, the Fullerton Radio Club. Newly-active on SSN are QKY, ECP, and FMZ. What some people won't do for a QSL card: SKZ reports sending OQ5BW a pair of lightning arresters for Christmas! The San Diego gang welcomes the familiar and friendly face of BOS, of Escondido, from behind the counter of a local ham supply house. IZG is new ORS appointee. FCT, active on SSN, also finds time to bowl in the Industrial League. YYN caught eight hours of SS for 20 sections and 63 contacts with all of 20 watts on 7 Mc. The XYLs of KW and DIN are studying for their tickets. ERZ is very QRK with his 20 watts in Berkeley, regularly scheduling his OM, EWU. VJT should be settled shortly in new QTH — complete with soundproofed "hamshack." Traffic: W6ELQ 294, BAM 157, IZG 33, FCT 12, FMZ 8.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green W5BKH — Acting SCM, Joe G. Buch, 5CDU. SEC: AAO. RM: GZU. PAM: ECE. NTEN, with JOG the new NCS, still leads in Trophy Competition. NIC is the Alternate NCS for NWTEN. New ECs are EEF, FZB, JPM, RHC, and 9IPA/5. The Lubbock Club, with JQD at the helm, turned in a fine solution to the SET problem. The Amarillo Club soon may have a new club-room with emergency power supply in the Red Cross Building. The annual get-together of the East Texas Club at Caddo Nov. 11–12 was enjoyed by all present. The Big Spring Club celebrated its renewal of affiliation with the ARRL by holding Open House to the AEC Dec. 2nd with Vice-President NW being present. BGT, of Amarillo, wants 144-Mc. contacts. QDF, a new ORS, put in 19 hours for a WAS in the Sweepstakes. ROH is new OPS and secretary of the Big Spring Club. The Central Texas Amateur Radio Club elected JLU, SAT, and RUM as president, vice-president and secretary, respectively. PUQ had the Cub Scouts in for a successful demonstration of ham radio. KOT is a new member of NTX. GGC put up a 67-foot vertical antenna, while GBS is using new mobile units for 3.85 and 28 Mc. MQF has a new SX-71 and APW a BC-610. New calls noted were SDB, SGE, SCP, SAT, SBB, and SDL. The Dallas-Fort Worth Section of the Institute of Radio Engineers announces the next Southwestern I.R.E. Conference meeting will be held on the campus of Southern Methodist University, Dallas, Apr. 20–21, 1951. The Student Branch of the I.R.E. at Southern Methodist University is acting as joint sponsor. Traffic: (Nov.) W5LSN 428, GZU 329, ARK 99, BKH 99, HUU 73, QDF 63, GER 42, WB 35, LEZ 32, IWQ 29, JOG 15, LGY 11, ECE 9, MYH 6, RDG 5, AQE 3, NLC 3, PCN 3, IGU 2. (Oct.) W5LSN 402.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM. RM: FOG. PAM: ATJ. News is scarce this month. A lot is going on but everyone is too busy to report, I imagine. HXU has his old call back and we expect to hear from him before long. IGO and OM Claude expected to take HXU out for Thanksgiving Dinner but found Harold had prepared the turkey and "fixin's" himself. Such accomplishment should place Harold on the eligible list of some "gal." FME continues to care for Camp Polk traffic on OLZ. GVV is back on OLZ, which gives Enid a nice representation. MQI broke the bottleneck on traffic at Oklahoma City by joining OLZ and is doing a nice job, as is LCN at El Reno, who works both nets and helped with Oklahoma City traffic. Attendance on OPEN has been excellent throughout the month. It is nice to see how smoothly the net proceeds with FOM as NCS. Nice job, Dutch. PA is heard from now via a 6L6 and expects to have the big rig going shortly. We've sure missed you, Doug. Two-meter activity is increasing but we have no reports on where or how. EHC has been off the air for receiver overhaul. KL7VO is a new instructor at the CAA Air Center; so is W5JFY. Traffic: W5MRK 122, AHT 104, PCQ 69, FOM 64, MEZ 29, MQI 22, NXQ 17, ADB 4.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — Acting SCM and PAM, Dick Matthias, 5BIW. SEC: PLK. RM: NKG. PAM v.h.f.: FAG. Your SCM expects to be away for a few months and has asked BIW to be Acting SCM. PLK has a receiver on 3885 kc. at all times. NKG

(*Continued on page 84*)

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To Couple Driver Plates to Amplifier Grids

Type No.	Driver	Output	Turn Ratio, Pri. to ½ Sec.	Class	Pri. M.A.	Dimensions H.	W.	D.	Price
A-2920	6C5, 1H4, 30, 49	Single 1J6, 19, Push-Pull 30, 49	2.5:1	B	10	1⅝	2 13/16	1½	$1.62
A-2921	6F6, 2A5, 42	PP6F6, 2A5, 6L6	1.7:1, 1.5:1, 1.3:1	AB	35	2	3¼	1⅝	2.29
A-2922	6A6, 6C5, 6N7, 46	Single 6A6, 6N7 Push-Pull 46	5:1, 4:1, 3:1, 2.5:1	B	20	2	3¼	1⅝	2.65
A-3120	500 ohm line	Class B Grids 15 Watt Capacity	1:.75, 1:.85, 1:1, 1:1.25, 1:1.45,	B		3 1/16	2⅝	3⅝	6.76
A-3121	500 ohm line	Class B Grids 30 Watt Capacity	1:1.75, 1:2, 1:2.25, 1:2.5, 1:2.75, 1:3	B		3 1/16	3	3¾	7.79
A-3123	PP6A6, 53, PP6C5, 6N7 6J5	PP6N7, 6A6, 53, PP6L6, T21	5:1*	B / AB2	15	3⅛	2⅝	2⅝	3.23
A-3124	6F6, 46, 59, 2A5, 42	PP46, 59, PP6L6, 807	2.2:1	B / AB2	30	3⅛	2⅝	2⅝	3.23
A-3125	6F6, 2A5, 47, 42	PP6L6	1.4:1*	AB2	40	3½	2 15/16	3⅛	4.53
A-3126	PP2A3, 6L6, 45, 6V6, 6F6	PP800, 203A, 811, 812, 812A, RK18, RK58, T20, TZ40, T55, 807, 809, 838, 845, 35, 100T8	2:1	B	40	3⅛	2⅝	2⅝	3.67

MODULATION TRANSFORMERS

For Specific Applications

Type No.	Output Tubes	Ohms Impedance Pri.	Ohms Impedance Sec.	Max. M.A. Pri.	Max. M.A. Sec.	Watts	Dimensions H.	W.	D	Price
A-3008	PP6AQ5, 6V6, 6F6, Single 6A6, 6N7, 53	10000 c.t.	4000-5000 7500-10000 12000	70	60	10	2¼	2⅞	2⅛	$1.91
A-3109	PP2A3, 6A3, 6B4, 6L6, 45, 46, 59	6000 c.t. 3800 c.t. 3000 c.t.	5000-8000 10000	80	100	25	3⅛	2⅝	2¾	4.53
A-3110	PP6L6, 807, RK41, HY56, HY61, HK24	6600-3800 c.t.	4000-5000 7500-10000 12000	175	150	60	4¼	3½	3¾	7.79
A-3113	PP-800, 809, TZ-40, T-55, HK-54, RK-31, HY-40, 811, 807, 812	15000-6900 c.t.	3000-4000 5000-6000	250	300	175	4⅝	3 13/16	5⅝	11.76

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Type No.	Pri. Impedance	Pri. M.A. Per Side	Sec. Impedance	Max. Sec. M.A.‡	Watts	Dimensions H.	W.		Price
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A-3105	2000-20000	150	2000-20000	150/300	60	3⅞	3½	4½	8.53
A-3106	2000-20000	220	2000-20000	220/440	125	4⅝	3 13/16	4⅝	11.91
A-4007	2000-20000	250	2000-20000	250/500	300	7¼	6⅝	5⅝	33.52

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Johnson Aluminum Chassis uses reinforced gussets and multiple spot welds in corners. This with close fitting butt joints assures a chassis suitable for any application. All chassis are made of high quality 14 to 18 gauge aluminum with straight, sharp bends.

Type No.	Size	Price	Type No.	Size	Price	Type No.	Size	Price
195-350	7 x 5 x 2	$ .82	195-361	13 x 7 x 3	$1.47	195-373	17 x 10 x 5	$2.94
195-351	7 x 7 x 2	.91	195-363	10 x 14 x 3	1.97	195-374	17 x 11 x 2	2.00
195-352	9 x 7 x 2	1.03	195-364	15 x 7 x 3	1.76	195-375	17 x 11 x 3	2.29
195-353	9½ x 5½ x 2	1.00	195-366	17 x 4 x 3	1.62	195-376	17 x 12 x 2	2.29
195-354	10 x 5 x 3	1.12	195-367	17 x 7 x 3	1.91	195-377	17 x 12 x 3	2.68
195-355	10 x 8 x 2½	1.23	195-368	17 x 8 x 2	1.76	195-378	17 x 12 x 4	3.09
195-356	11 x 7 x 2	1.06	195-369	17 x 8 x 3	2.03	195-379	17 x 13 x 2	2.44
195-357	12 x 7 x 3	1.32	195-370	17 x 10 x 2	1.91	195-380	17 x 13 x 3	2.82
195-358	12 x 8 x 2½	1.32	195-371	17 x 10 x 3	2.20	195-381	17 x 13 x 4	3.23
195-359	12 x 10 x 3	1.62	195-372	17 x 10 x 4	2.56	195-382	17 x 13 x 5	3.67
195-360	13 x 7 x 2	1.21						

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P-3162	150	3⅞	3⅝	3⅝	7.06
P-3163	250	4⅝	3 13/16	4	9.55
P-3164	300	4⅝	3 13/16	4⅜	11.43
P-4065	1000	7¼	6⅝	5⅝	26.46

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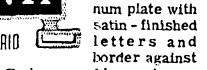

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is taking over NJR's job as RM until Larry recuperates from his recent illness. Your SCM visited PLK, FAG, and BIW on Dec. 1st. The Sandia Radio Club elected officers as follows: IH, pres.; WRS, vice-pres.; FPB, secy.; QPK, treas.; MSG, monitor. FAG made 325 contacts in 70 sections for a score of 56,840 in the 'phone section of the Sweepstakes. JXH and his XYL visited your SCM en route to Utah. PTF visited Juarez, Mexico, recently. MSG is taking a course in microwave electronics at U. of N.M. QKJ is rebuilding his rig. The Mesilla Valley Radio Club heard a talk by SAZ on "The Noise Figure in a Cascode Amplifier" at its November meeting. BIW is trying to hold schedules on 14-Mc. 'phone with 2UVF, whose son is a physics professor at State College. NXF took part in the CD Party and SS with low power. K5WSE, from White Sands, is on 3.85-Mc. 'phone. RMJ is holding a schedule with PXN every evening at 7 P.M. SE is working with Indian Service. MMX is operating with an NC-240D and Lysco on all bands. GYS is putting up a new 10–20 array. QIV is active on 7 Mc. with a pair of 807s. At the Sandia Radio Club meeting of Nov. 27th, Director-elect A. David Middleton spoke on ARRL activities in the 1920s. FVO was appointed head of the v.h.f. activity. The 75-meter 'phone net meets at 1800 Tuesday and Thursday evenings, in addition to Sunday mornings. Traffic: (Nov.) W5ZU 30, NXF 20, NKG 15, PLK 15, SMA 7. (Oct.) W5ZU 48, A5ZU 36, W5QKJ 9.

CANADA
MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — EC: FQ. Acting RM: EY. The Maritime Traffic Net (M.T.N.) meets Mon., Wed., and Fri. at 1900 AST on 3715 kc. EY is Net Control. BC has been doing a bit of 3.8-Mc. mobile work with LT and JK. The HARC ended a very successful year with a social evening. EO and LK are back on 28 Mc. ET again won the DX Contest in the Maritime 'phone section. LW is on 3.5 Mc. An excellent report arrived from VO via SWL Ron Peddle, jr. The following calls are all prefixed by VO: 1A, our first ham, still is active. 1B, having lost his fine 14-Mc. beam, still does well with doublet. Ex-1D now is VE3DJN. 1I is quite active on 14- and 3.8-Mc. mobile and won the trophy for Field Day work. 1O, NARA secretary, is on 28, 14, and 3.8 Mc. 1P has 500 watts, both 'phone and c.w. 1S is on regularly with nice quality 'phone. 1T won the trophy for VO-Land in the BERU Contest and is active in AFARS Net. 1U is on 7 and 3.5 Mc. 1Y, on 14 and 3.8 Mc., is building a 350-watt rig. 1AB is active on AFARS Net. 1AF has a nice 14-Mc. beam. 1AG is on 28-, 14-, and 3.8-Mc. 'phone. 1AH is on 3.8 Mc. 1AK is DX man on 14- and 3.5-Mc. c.w. 1AM is out for DX with new VFO. 1AN has new TBS-50 and HRO. 1HD is active on 3.5 Mc. Traffic: VE1FQ 56, MK 24, EY 16, DB 4.

ONTARIO DIVISON

ONTARIO — SCM, G. Eric Farquhar, VE3IA — With sincere regret the passing of IY on Nov. 16th is recorded. Bert began hamming in '30 and made many loyal friends. A shut-in for two years he kept in touch with the gang. A member of the Ontario 'Phone Club, bobby soxers and shut-ins, he will be greatly missed. AZH still keeps nightly schedules with his brother in Winnipeg. The new QTH of BAH is Marathon, 180 miles east of Ft. William. BLY spent Christmas holidays from college clearing traffic. PH is a regular in the Northern Net on 3842 kc. BUR sends a nice report and heads the traffic list for November. BFR is Assistant EC in Camp Borden. WY enjoyed a vacation in Florida and now is back in harness. WK says conditions on 7 Mc. are the worst ever in 28 years of hamming. GI has new frequency standard. DBJ sports new rig. BER occupies new shack. November, the month of club elections, gives the following: Ottawa Amateur Radio Club: KH, pres.; BCL, vice-pres.; AP, secy.; 2AM, treas. Nortown Amateur Radio Club, Toronto: AEJ, pres.; AAW, vice-pres.; BSX, treas.; BVC, secy. Hamilton Amateur Radio Club: BPE, pres.; BVR, vice-pres.; BFF, secy.; VJ, treas. The Ottawa gang held an excellent banquet and dance. Ham radio was called into emergency at Vanwagners Beach when winds of hurricane force swept waves of Lake Ontario far inland, undermining houses. The Mayor of Burlington holds high praise for the ARRL Emergency Corps and comments on the efficient and quiet manner in which the gang stepped in to provide facilities. ABP, AKL, BIK, BNQ, BPE, BTE, DGZ, DHG, IA, IL, and KM took part. Thanks to all from Chief of Police Smith and Mayor Craig, Burlington, and Alex Reid, CGM. Traffic: VE3BUR 163, NI 104, ATR 89, IL 89, IA 78, BUY 53, GI 33, AYW 32, WY 31, AZH 28, KM 28, WK 24, YJ 24, PH 7.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — QV is back on 28 Mc. with 100 watts to 829B final in new rig. CK also has new rig with a pair of 304THs in final and AR-88 receiver with semi-vertical folded dipole. MG has taken down the 28-Mc. beam for the winter and is using

(*Continued on page 86*)

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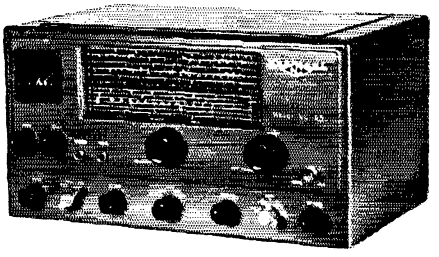

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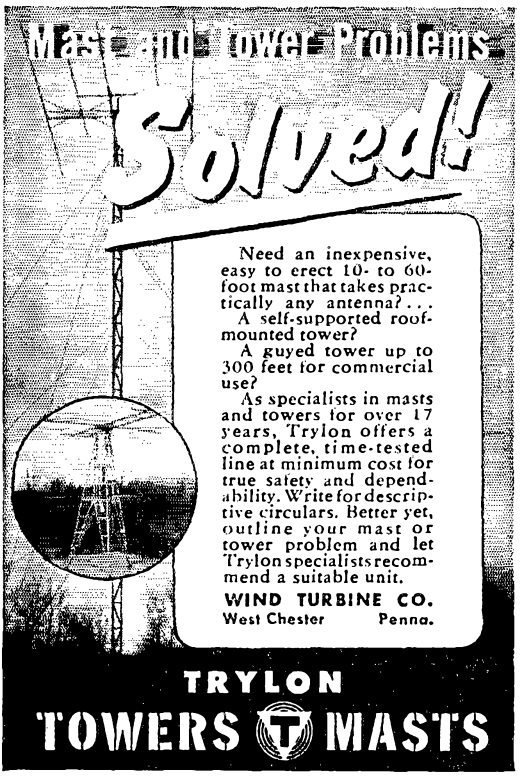

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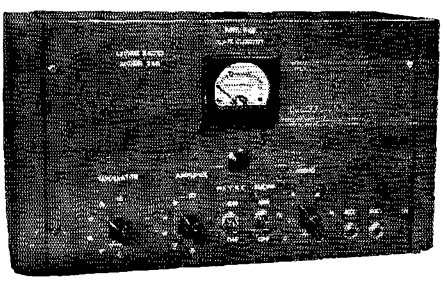

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folded dipole. KG put up new four-element 144-Mc. beam at the old QTH. DI now has more time for DX and rag-chewing. BI is back on the air from St. Lambert using VFX-80 on 28 Mc. with R1155 receiver and converter together with folded dipole. AKJ maintains schedules and handles a fair amount of traffic. QN reports ten new members registered on the occasion of the ARRL Annual Emergency Test, Oct. 14–15. LO reports that AGG, in Drummondville, is ironing out bugs from his new 'phone rig. EC reports that AHK has portable on his bicycle using battery transceiver on 3.8 Mc. TR addressed the St. Maurice Valley Club at its last dinner. APE is a newcomer in the St. Maurice Valley Area, and ZZ recently visited many of the boys in that Area. Phyllis, at CA, continues to schedule VE8SF, and other VE8s call in with traffic. OK, ex-VE1KJ, has 10 watts on 3.5 Mc. in Longueuil. BV complains he is stuck at 145 countries. ACM now has tower up 70 feet. KZ worked ET9X on 14-Mc. c.w. and he was appalled when he looked at his keying in a 'scope. XX lost his 1000-ft.-long-wire antenna to thieves, and now is scratching his head to get new skywire on 3.85 Mc. Traffic: VE2CA 47, LO 29, AKJ 17, QN 17, GL 14, EC 7.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — Heartiest congratulations to PV and VJ on the arrival of a jr. operator. LZ claims band conditions are poor for frequency-measuring. The Calgary AEC, under the leadership of TK, did a commendable job during the recent flood when the Bow River went on the rampage. OD recently acted as Net Control for Saskatchewan Net because of poor conditions. EO reports a nice score in the SS Contest. SY, QB, and XY are to be commended for nice work in connection with the search for a lost child in the Jasper Area. IZ is a new call in Vegreville and seems to be getting out well with 70 watts. LW, also of Vegreville, has trouble getting 100-kc. oscillator to work. GH is attending the University in B.C. and claims he will be back on 28 Mc. as soon as he has flunked his exams. SS has passed his Class A exam and is building a VFO. HI recently visited Edmonton and obtained all the dope for his EC appointment. Traffic: VE6OD 50, MJ 14, EO 9, MB 5.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — Officers for 1951 of the British Columbia Amateur Radio Assn. are KC, pres.; JB, vice-pres.; and JT, secy. To the retiring president, AC, who gave us our 8th ARRL Convention and many picnics, and to his staff we all wish to extend our thanks. The University of B.C. Amateur Radio Assn. has its rig working right down to 28 Mc. with a mean thousand volts on an 807 buffer. The Nanaimo ARC has started an Island Net and is looking for more members on the Island. The frequency is 3625 kc. and the time is 1800 PST, Tuesdays, Thursdays, and Saturdays. AAA and FY are confined to the hospital. AEC is leaving us for W6-Land. UT has joined the ORS ranks and is active on Trunk Line "I." US, who did such a good job in organizing the South West B.C. EC, has taken over the SW B.C. since moving to Vancouver. BJ, who has worked hard as EC for the SW area, has too much work but will keep up his AEC work. His very active Five O'clock Net will be ready for action. It has been rumored that DZ has the beam up for 28 Mc. ZF has his sixty-foot poles up and is active on 7 Mc. LP has been heard on 3.8 Mc. and really was busy during the SS Contest. 5DP now is 7ST. Welcome to Vancouver, Jimmie. Traffic: VE7UT 106, YI 34, AOQ 24, ZF 10, XA 8, AKG 5, BQ 2.

YUKON — SCM, W. R. Williamson, VE8AK — CF was heard on 3.8 Mc. with 5 watts. CA is getting around with VFO on c.w. KJ is a new call around Whitehorse. CU is on at Watson Lake. HV is QRT but will be on soon as a VE4. Sorry you're leaving, Harry. DM, at Bear Creek, is on c.w. AO should be on more as OM Winter ties up his car. CI is set up in new quarters near Mayo. BN sure is working those 813s. BT is heard on 7 Mc. Let's hear some more, Frank. The joint amateur club in Whitehorse, with servicemen and civilians, is coming along fine. Traffic: VE8HV 8, BN 2.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — PAM: FA. GQ gave ham radio a nice boost when interviewed on CKY's Table Hop program. FN is a new call heard on 7 Mc. LG is new at Flin Flon and has applied for AEC membership. He sends along a nice report of doings around Flin Flon. EQ is rebuilding for 14 and 28 Mc. EO has a new rig going and new 10-meter beam. JF is on 3.5 Mc. occasionally with HT-18. JT, BR, and FF are new on 7 Mc. Thanks, Larry. HG works TXN on 7230 kc. RW has new VFO and p.p. 807s going on 7 Mc. RO worked ZS1X and CN8DV on 3.85-Mc. 'phone, and before midnight too! FU has new AR-88 receiver. BT plans to screen modulate 814 on 3.8-Mc. 'phone. NI is on 3.8-Mc. 'phone and 3.5-Mc. c.w. with an AT-7 and 20-meter beam. XP has new VFO. FA is winding plate transformer for 813. He used emergency receiver for two weeks while repairing big one. Traffic shows an increase. Is yours reported? Traffic: VE4AM 134, HG

(Continued on page 88)

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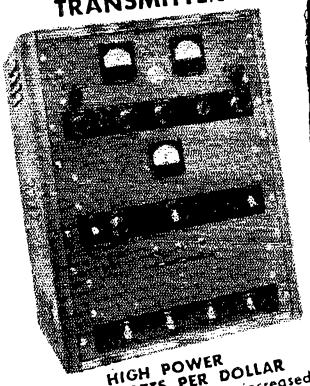

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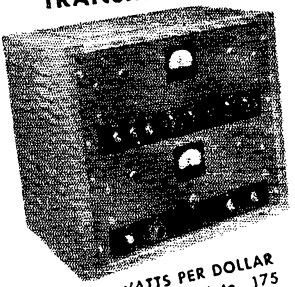

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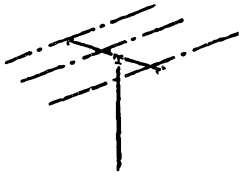

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86, FA 65, GV 16, GP 9, CI 8, QD 5, LF 4, DQ 3, GQ 3, PA 2, GK 1, HA 1.

SASKATCHEWAN — SCM, J. H. Goodridge, VE5DW — New appointees are DR and JI as ECs and PJ as OBS. JI reports into the N.D. State Net and also gets out well on 28-Mc. 'phone with cubical quad. LD is a new call at Porcupine Plain. PJ has folded dipole for 28 Mc. FR and LE are new members of the 'phone net. CH and TE join the c.w. net. The SARC is organizing the Emergency Corps in its area under the EC, DR. A demonstration of the use of a small transmitter-receiver was well received by City Officials. MA is going to town with s.s.s.b. Those known to have taken part in the SS were BB, CO, DW, and LV. JV has moved to Moose Jaw. This is my last report, gang. HR, your SCM-elect, will carry on. Many thanks to those who have supported my efforts to promote ARRL activity in the section. Let's all support Hal, my successor, especially in connection with the Emergency Corps. 73, gang. Take it, Hal! Traffic: VE5JI 48, YF 31, MA 27, PJ 26, HR 11, LL 9. DS 6, DW 6, EE 4, FR 3, BH 2.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/WØTQD will be made on February 14th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7215, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP only* will be transmitted on February 3rd at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from December *QST*
Feb. 1st:	*A Sharp I. F. Amplifier.* . . . , p. 13
Feb. 3rd:	Qualifying Run, 2100 PST, from W6OWP only
Feb. 6th:	*Design for Communication*, p. 21
Feb. 9th:	*Universal S. W. R. Measurements.* . . . , p. 27
Feb. 12th:	*TVI Tips*, p. 30
Feb. 14th:	Qualifying Run, 2130 EST, W1AW, WØTQD
Feb. 15th:	*"Supermodulation" — An Evaluation.* . . . , p. 33
Feb. 20th:	*"Supermodulation" — An Evaluation.* . . . , p. 37
Feb. 23rd:	*Two Unusual 144-Mc. Antennas*, p. 42
Feb. 26th:	*The World Above 50 Mc.*, p. 61
Feb. 28th:	*Operating News*, p. 68

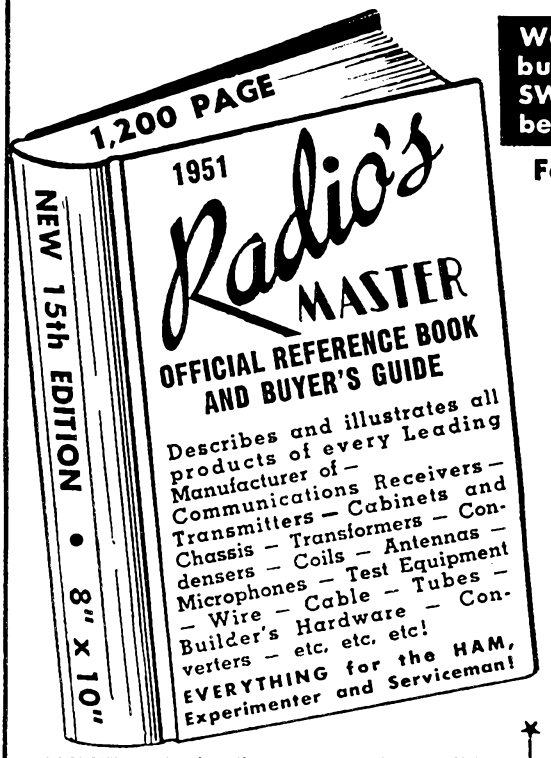
Strays

VE2NU lost all his QSL cards and logbooks during a recent fire; fortunately, he was able to save his receiver and transmitter. Bob would be deeply appreciative if all those hams who have worked him in the past would send him duplicate QSLs.

SWITCH TO SAFETY!

LAST CALL! GET YOUR $9.50 FOR $1.50

BIL HARRISON'S AMAZING "FREE MONEY" OFFER!



We thought we had enough printed but bargain-wise Hams, Engineers, SWL's, PA's, Experimenters, etc., have been grabbing them up like hotcakes.

For only $1.50, you get —

	Your own personal copy of the world famous Radio's Master Buyers Guide, priced by the publishers at —	$5.50
AND	Four Credit Slips, each worth $1.00 on orders of $5 or more.	4.00
PLUS	All you can save with this book and Harrison's low prices!	$$.$$
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Your HAM HEADQUARTERS since 1925! As Authorized Factory Distributor for all leading manufacturers, we give you fast and dependable mail order service — immediate deliveries from our huge stock! And our prices are guaranteed to be the lowest obtainable anywhere!

YOU'VE undoubtedly seen previous editions of this indispensable book at the right hand of important Engineers and busy Purchasing Agents. Now, here is your opportunity to put it to work for you — to save you real money and time in your purchases of Radio-Electronic equipment and parts.

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• We can now pay the highest possible prices for good clean microwave test gear. We can also use certain plumbing, thermisters and bolometer elements, as well as specialized cavities and VHF gear.

WESTON LABORATORIES
Weston 93 Massachusetts

Loop-Type Antennas

(*Continued from page 18*)

to the direction of travel of the car. In practice, however, this has been found to be so sharp and the remainder of the pattern so broad that not too much directional effect is noticed. An interesting sidelight is that the windshield post itself carries so much r.f. that an r.f. indicator consisting of a microammeter in series with a 1N34 crystal has been mounted on the dashboard and connected across about 10 inches of this post to give an indication at the driver's seat. This indicator is mounted below the dash just to the left of the steering post.

After the installation had been completed, a test run was made from Mobile to Tuscaloosa, Alabama, a distance of slightly over 200 miles. From departure at 9 A.M., until arrival about 2 P.M., continuous communication was maintained with the home station. Many other amateurs joined in the test and excellent reception was reported by all of them, some as far away as Arkansas and Georgia. The results have exceeded our expectations and we believe other amateurs may get some ideas from the design to help carry on their own experimenting. It is reasonable to suppose, however, that a metal-top car might have some influence on the operation of the system.

Furlough in Monaco

(*Continued from page 81*)

via the DL4 QSL Bureau, APO 757, New York City, and we'll see that you receive one direct in return.

When is 3A2AB going to be heard again? Early in 1951, we hope. In the meantime, if anyone knows anybody in the Andorra government who can get us permission to operate from there, we're all for it!

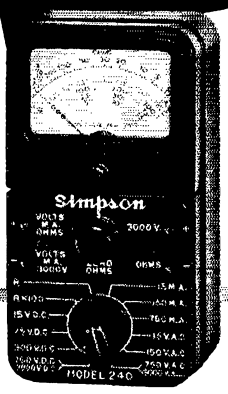
We would like to express publicly our heartfelt thanks to Mons. Passeron of the Ministere d'Etat, Mons. Fromaget of Radio Monte Carlo, and Mons. Crettaz, our host, for making our expedition a successful one.

Strays

After the big blow of Nov. 25th had subsided and the rain had slackened, W3FQZ got out his ladder and went up on the roof to survey the damage. He was just getting things cleared up a bit when the wind picked up and the rain started again. George decided it was time to quit — but the wind had blown the ladder down. It took quite a bit of stomping and shouting to attract the attention of Mrs. W3FQZ, who went next door for help. George had a few more bad moments when he realized that the rescuing neighbor was one with whom there had been a bit of unpleasantness in the matter of TVI!

W. Ben Wimberly
(W9IXD)

well-known amateur says: "For quick, accurate trouble shooting around my ham shack, the Simpson Model 240 Hammeter is indispensable. I've used Simpson equipment for many years."



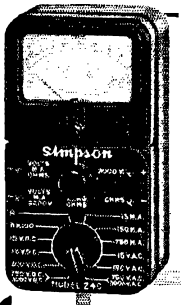
RANGES: *Model* **240**

AC VOLTS: 0-15, 150, 750, 3000 (1000 ohms per volt)
DC VOLTS: 0-15, 75, 300, 750, 3000 (1000 ohms per volt)
DC MILLIAMPERES: 0-15, 150, 750
OHMS: 0-3000 (center scale 30)
0-300,000 (center scale 3000)
ACCURACY: DC 3%—AC 5%
SIZE: 3"x5⅞"x2½".
WEIGHT: 1¼ lbs.
SHIPPING WEIGHT: 2½ lbs.
AMATEUR'S NET PRICE . . $24.60
Leatherette Case 5.00

WORLD FAMOUS SIMPSON HAMMETER IS FIRST WITH RADIO AMATEURS

The famous 240 Hammeter—named by the radio "ham"—is world renowned for its ruggedness and accuracy. It was designed for the additional voltage and sensitivity required in radio testing.

A favorite with "hams" because of its maximum voltage range of 3000 AC or DC, the 240 was the first self-contained pocket portable built expressly to check high voltage and all component parts of transmitters and receivers.



A worthy companion of the Hammeter is the Model 230 volt-ohm-milliammeter, with a maximum voltage of 1000 AC or DC. Its ranges are adequate for most line voltages, for telephone, teletype, and general purpose testing.

RANGES: *Model* **230**

AC VOLTS: 0-10, 250, 1000 (400 ohms per volt)
DC VOLTS: 0-10, 50, 250, 1000 (1000 ohms per volt)
DC MILLIAMPERES: 0-10, 50, 250
OHMS: 0-1000, 0-100,000
ACCURACY: DC 3%—AC 5%
SIZE: 3"x5⅞"x2½"
WEIGHT: 1¼ lbs.
SHIPPING WEIGHT: 3 lbs.
AMATEUR'S NET PRICE $23.40
Leatherette Case 5.00

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P-7253 spring base rear — mount antenna **$22.50**

New Gon-set Tri-Band Spread Converter... **$47.60**

MOTOROLA P-69-13 or 18-ARS receiver with special noise limiter for use with any converter having 1440–3000 KC. **$60.00**

3–30 famous Gon-set converter complete to connect to the P-69-13 or 18-ARS receiver. **$39.95**

P-327-E Fire wall loud speaker.... **$5.00**

The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

NOTE: *This Receiver and Transmitter is equipment which has been returned from the field, modified and rebuilt for Amateur Service.*

For further information write to:

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Attention: Harry Harrison, W9LLX, *Tel.* Taylor 9-2200 Ext. 161

BROAD BAND TEN METER CONVERTERS . . . $16

(postpaid)

These RF24 three tube units really perform. Pops up your set immeasurably, especially such models as the BC-348, BC-342, etc. Actually covers 20–30 Mc.—output 7.5 Mc.—measures 5 x 7 x 10½. Spare tubes, coax fittings and instructions furnished. Needs no alteration to perform. Requires 200–250 V. 18 Ma + 6.3V at 2 amp. Used but guaranteed to work.

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HAVE SKILL, ACCURACY

SEND and RECEIVE CODE this EASY — FASTER WAY! The CANDLER SYSTEM has developed expert Amateur and Commercial Operators, and Code Speed Champions. In a few weeks you can pass the code examination for license. You can send and receive with amazing skill and speed, without tension. Long hours of practice unnecessary to acquire proficiency. The WAY YOU LEARN is ALL IMPORTANT! By simple progressive lessons Candler teaches you at home to send and receive as easily as you talk or read — FAST, ACCURATELY. SEND Now For FREE BOOK — explains how fine amateurs and radiotelegraph experts learned code and developed skill and speed.

CANDLER SYSTEM CO.

Dept. 4-B, P. O. Box 928, Denver 1, Colo., U. S. A. and at 121 Kingsway, London, W. C. 2, England

Happenings

(*Continued from page 23*)

Summing up, what Hq. wants to know about is:

80: Consistent cases of harmful interference from non-amateur stations.

40: Any non-amateur operation except broadcasting outside the Americas above 7200 kc., and other than U.S.S.R. stations.

20: Any non-amateur operation other than from U.S.S.R.

10: Any non-amateur operation.

At the same time, remember two things: These matters move slowly, often involving diplomatic red tape, so don't hope for immediate action. Also, because of the world situation, it may not be possible to get relief at all in some instances (e.g., U.S.S.R.). But let's keep a watchful eye on our bands and insofar as possible ensure that no interlopers make illegal use of them.

U.S.N.R.

(*Continued from page 29*)

and Naval Reserve activities in establishing an emergency reporting system for weather and flood data. Types of messages to be handled fall into two groups:

1) reports of river stages, weather and rainfall; and

2) reports of flood protection works.

Coverage of forty-one emergency communication points throughout Indiana, Illinois, Kentucky and Ohio is involved. An initial test was held on November 16, 1950. The purpose of this test was to collect weather and river data from amateur radio stations at outlying points and to forward them to the District Engineer's Office in Louisville. The following were designated as collection points for traffic: Naval Reserve Training Centers at Louisville (K4NRY), Terre Haute (K9NRY), Evansville (W9USN), and Indianapolis (K9NR), and ARRL Emergency Coördinators W3BAZ at Louisville (3565 kc.) and W8UPB at Cincinnati (3725 kc.). Naval Reserve stations guarded 3610 and 7120 kc., as well as Naval Reserve frequencies.

How's DX?

(*Continued from page 32*)

took part . _ . _ . _ Which reminds us of a pretty potentious suggestion we heard concerning the problem of boosting on-the-air club activity. A point system is worked out on an annual basis for all ARRL activities including DXing, traffic, v.h.f., home construction of gear, and contests. The member with the highest aggregate point total is recompensed for his year's light bills from the club treasury . _ . _ . _ The So. Calif. DX Club is in there pitching, too, and their *Bulletin* specifies the possibility of a VR7AA showing up from Nauru Island. This is a British mandate just west of the Gilberts. These W6s also speak of working or hearing one AC4328 in an aircraft over Japan. This would dispute OE13LL's claim both literally and figuratively! . _ . _ . _ Here's an idea that might make for a little easier operating. It has been suggested that there should be a terminal signal after a CQ to mean "Don't reply exactly on my frequency — I won't answer" and that the signal be "KO," to mean "Keep off," "Knock off" or some other obvious slogan. It would only be used instead of "K" at the end of a CQ, or at the end of a QSO when you're going to stand by for other calls. During a QSO, "KN" would carry the usual burden. Whaddya think?

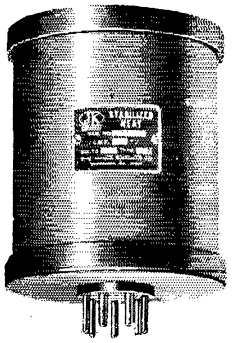
— • • • —

Jeeves would like to know how one goes about assembling the "complete QSL file" recommended in our lead this month. Very simple. You study hard, get your license, get on the air and work one station. Then you QRT and wait for his QSL. If he comes through you sell your gear and quit while you're even.

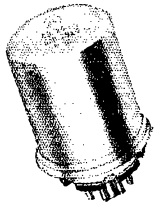
Announcing! A NEW AND IMPROVED OVEN . . .

the JK07E

with Thermostat Sealed In Helium



JK07E



H-18

Here's another important JAMES KNIGHTS development, the JK07E Oven. It features a thermostat that's sealed in a glass envelope that has been filled with helium. Contact arcing is eliminated—temperature differential is greatly minimized by providing closer thermo-coupling to the thermostat! In addition, it's completely dust and tamper proof!

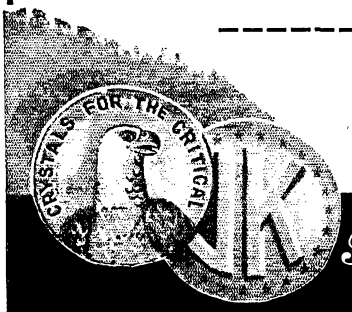
The new design results in greater frequency stability—longer life—greater reliability than is possible with mercury thermostats! The JK07E is available with either a 6.3 volt 10 watt heater, or a 115 volt 12 watt heater. It's broadcast, FM & TV, F.C.C. approved!

Additional JK07E Specifications

Will hold any JK type crystal except H-6, H-18T and H-19 • Normal operating temperature 50° C ± 2° C • Will hold any temperature as much as 75° C above the ambient • Supplied complete with Johnson No. 237 Socket.

Also Ideal As Frequency Standard When Used With JK Stabilized H-18

The JK07E, when used with the JK H-18, 100 KC Crystal, or similar type, is also ideal for extremely accurate frequency measurements.



JK Stabilized H-18 Specifications

Frequency Range: 80 KC to 2 MC • Hermetically sealed metal holder • Wire mounted silver plated crystal • Octal base.

Complete Information On Request

The James Knights Company

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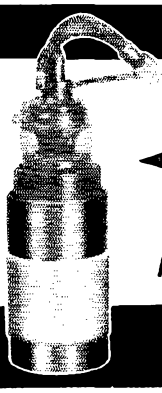


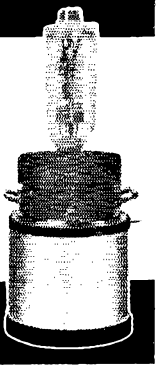
SPECIAL TUBE SOCKETS

For high power tubes Gates has designed several very attractive tube sockets.

← To the left, a socket for the Eimac 3X2500 tube.

To the right, a socket for such tubes as the 889R, 891R,→ 892R and others.

Available in small or large quantities at proportional prices.



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- Positions available in Research and Production to transform a design into a working communications or radar unit.
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- Previous industrial or servicing experience preferred.
- Rates for this job from **$340** to **$417** per month for a 48-hour work week.
- Housing is no problem in Baltimore.

WRITE: *J. Siena, Engineering Personnel Supervisor, Bendix Radio Division, Bendix Aviation Corporation, Towson 4, Maryland*

MORE SIGNALS PER DOLLAR
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Self-Supporting
STEEL TOWERS
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ATTRACTIVE—*NO GUY WIRES!*

- 4-Post Construction for Greater Strength!
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WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

The VESTO Company
101 Main St., Parkville, Mo.

Ideal Electronic Key

(Continued from page 36)

This doesn't seem necessary — and isn't — except as an aid to developing the proper wrist motions. A single dot is struck purely by reflex action. So when the dash position is cut too short, there is a likelihood of hitting the subsequent single dot too soon — with the result that the dot is never made. The remedy is always to go through the motions of holding the dash position until the dashes are completed. Your electronic key will maintain perfect timing in case you fail now and then, but try not to let it happen too often.

Q5-er

(Continued from page 39)

and the connection between R_{17} and R_{14} broken; then the appropriate leads are run to the gain control on the panel. I.f. gain is held down by replacing R_{15} with the 1500-ohm cathode resistor taken out from the 12A6 stage.

A 3- to 30-μfd. mica compression trimmer is mounted behind the original antenna trimmer (now the b.f.o. control) and used as a new antenna trimmer. It is supported on a single ¾-inch spacer bolted to the side wall and is adjusted through a ¼-inch hole in the side wall. The "stator" side of the condenser is connected to the lead from the r.f. coil previously soldered to the stator of the original antenna trimmer.

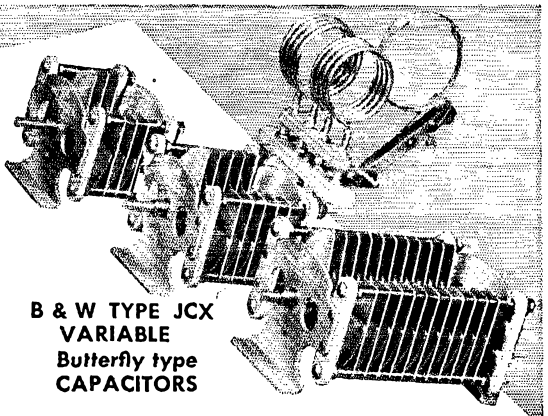
If 15/16-inch diameter gain controls are used, there should be no difficulty in making all the parts fit on the front. The noise limiter switch and r.f. gain control are mounted in holes enlarged from those left by the original knob and shafts on the small panel. To fit in the other two switches, however, new holes are drilled. The a.v.c. switch is mounted vertically in a hole with a center line ⅞ of an inch from the bottom of the panel, while directly above it, mounted horizontally, is the b.f.o. on-off with its center 1 9/16 inches from the bottom. It is necessary to remove some metal around the edges of the opening if back-of-panel nuts are used to regulate shank-extension distance, but this is readily done with a small file.

To remove the antenna post for the coax connector, the ceramic antenna condenser is disconnected and the tuning unit carefully tilted back. The hole then is enlarged with a reamer to provide ample clearance for the pin terminal, and by mounting both units of the connector on the panel front, nothing need be "broken off" the tuning condenser to make things fit. The small machine screws which held the mica condensers removed from the back have the same thread size as those used to secure the tuning unit. It is possible, therefore, to use one of these smaller screws and make the upper left-hand condenser mounting hole serve both for refastening the condenser and securing the coax fitting.

By purchasing a special spline coupling now available from several dealers, the problem of the

(Continued on page 96)

Greater EFFICIENCY and POWER in less SPACE



B & W TYPE JCX VARIABLE *Butterfly type* CAPACITORS

Compactness, symmetry and ability to withstand high d.c. voltages, make these new B&W Variable Capacitors outstanding favorites among the amateurs, experimenters and engineers.

Having only one fourth the frontal area of their larger companions—CX types, these smaller units have been designed to do a big job in tight places. Heavy rounded edge plates permit ratings of 2000 volts d.c. unmodulated and 1250 volts d.c. in modulated final amplifier circuits. Voltage rating measured at 30 megacycles.

Used with any B&W "B" or "BX" type air-inductors, the combination results in a versatile, variable capacitor-inductor assembly, hard to beat at any price and tops for efficiency. See your dealer or write today to Dept. Q-21.

Amateur Net Prices: JCX25E $6.60 • JCX50E $8.10 • JCX100E $10.80

B&W **BARKER & WILLIAMSON, Inc.**
237 Fairfield Ave. Upper Darby, Pa.

Thousands of America's *Hams* MUST BE ON THE BEAM!

NEW EICO instruments and KITS give you Laboratory Precision AT LOWEST COST!

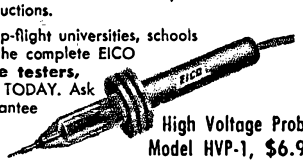
5" Push-Pull Oscilloscope
Model 425-K, Kit, $44.95
Model 425 factory wired, $79.95

Vacuum Tube Voltmeter
Model 221-K, Kit, $25.95
Model 221, factory wired, $49.95

It's smart ham sense to cut your test equipment costs—without sacrificing quality. That's why more hams than ever before are building their own precision instruments with EICO KITS.

For top-notch laboratory-precision equipment, EICO gives you the newest efficient designs and circuitry and the finest quality brand-name electronic and mechanical components. Each EICO Kit is complete with pre-punched chassis, cabinet and etched panel. For rock-bottom cost, you do the simple assembly in one easy evening with the EICO simplified instructions.

EICO Kits and Instruments are acclaimed and used by the top-flight universities, schools and original equipment manufacturers from coast to coast. See the complete EICO line of superlatively engineered, handsome VTVM's, scopes, **tube testers, signal and sweep generators,** etc—at your favorite jobber TODAY. Ask him about the EICO Make-Good Guarantee—the strongest guarantee in the Industry! Write NOW for your free latest Catalog 2-Q.
Prices 5% higher on West Coast. Due to unsettled conditions, prices and specifications are subject to change without notice.



High Voltage Probe,
Model HVP-1, $6.95

EICO ELECTRONIC INSTRUMENT CO., Inc.
276 NEWPORT STREET, BROOKLYN 12, N.Y.
©1950, Electronic Instrument Co., Inc., Brooklyn, N.Y.

ENGINEERS WANTED

THE National Union Research Division, one of the largest organizations in the country devoted to Vacuum Tube Research, has openings for Electrical Engineers and Physicists. The work involves research, design, and development of subminiature, secondary emission, cathode ray, and other more highly specialized types of vacuum tubes and their associated circuits and equipment.

WHETHER you have a background of electron tube or circuit design, or are a recent graduate and interested in our field, we would like to hear from you. If you are seeking a permanent, interesting position in electronics, send your complete resumé to:

Personnel Department

NATIONAL UNION RESEARCH DIVISION

350 Scotland Road **Orange, N. J.**

JACOBS ADJUSTABLE SEPARATOR

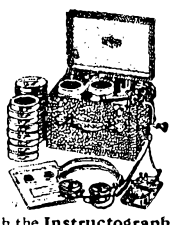
U. S. Patent No. 1,950,170 — March 6, 1934 — others pending

Made of Lucite for the rapid and efficient construction of open 2-wire R. F. feedlines. Provision is made to give spacings from ¼" to 6". Light in weight, but rugged. Price: $5.00 per dozen.

CHARLES F. JACOBS
P. O. Box 408, Church St. Station
New York 8, N. Y.

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher.** Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.



ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System.** Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS

main tuning control is easily solved. A look through the junk box, however, might reveal an old-type knob with a long ½- or ¾-inch diameter shank, with the setscrew placed close to the end. By removing the cable fitting and enlarging the hole to a suitable size, such a knob can be easily attached to the spline shaft. Actually, a tuning knob is more of a refinement than a necessity when the receiver is used as a Q5-er, so don't lose any sleep over it.

It will be noticed that tuning through a 'phone signal produces a rough hiss within a few kilocycles either side of the carrier frequency, caused by the narrow bandwidth of the i.f. The 0.006-μfd. mica condenser removed from the set will help by-pass much of this disturbance when connected between C_5 and ground.

As for new power requirements, a supply capable of delivering 250 volts at up to 90 ma. and 6.3 volts at 2.2 amp. is necessary. Removal of the 6F6 will cut the maximum B+ drain to about half that value.

Converted in this manner, the BC-453 combines the high-selectivity advantages with many of the features of the communications receiver, thereby increasing its utility as a Q5-er. It should be noted, too, that the set forms a complete but inexpensive basic i.f. strip for a homebuilt system. Just to illustrate this point, a small tuning unit covering from, say, 3 to 8 Mc., could be built in a utility box placed on top of the 453. Then, a plug-in coil or bandswitching converter covering 20, 11, 10 and 6 meters, either tunable or crystal-controlled, could be added, resulting in a compact receiving set-up incorporating the image rejection, coverage, and selectivity found only in the higher-priced receivers now available. Go to it, fellows, the possibilities are tremendous.

U.S.A. Calling

(Continued from page 42)

have 2 or 3 years of commercial technical radio experience, or equivalent, at least one year of which must have been in a studio or recording operation. Salaries range from $4,200 to $5,400, depending upon qualifications. Applications must be made on Standard Form 57, available from the Civil Service Commission in New York City or any first- or second-class postoffice outside N.Y.C.; mail to Department of State, Personnel Branch, 250 West 57th St., New York, N. Y. (Please do not telephone, as the office is not equipped to discuss personnel information in response to such calls.)

Strays

Quick action by two Atlanta hams recently saved an automobile from complete destruction by fire. Spotting the burning car near his home, and with no telephone nearby, Galen Clements, W4NWH, raced to his own car and transmitted a "mayday" distress call on his mobile rig. Across town he was heard by Lee Connell, W4NQO, who in a few seconds made the necessary 'phone call and had the fire department on the way. The blaze was extinguished with only minor damage.

Astatic's Synabar Model DR-10 Unidirectional Cardioid Crystal Microphone

ASTATIC'S Synabar Microphone uses a special sintered metal to cancel out 15 db front to back, making it, for practical purposes, dead to sound from the rear. Excellent frequency range, from 50 to 10,000 c.p.s., is further enhanced by a Response Selector switch, which provides choice of ideal pick-up characteristics for either crisp voice or general voice and music. The Synabar's crystal element has a special METALSEAL protection against moisture or dryness. A high impedance microphone, it has an output level of —54 db. It has a satin chrome finish, is furnished with detachable cable connector and 20 feet of single conductor shielded cable, and is available in models with or without off-on switch.

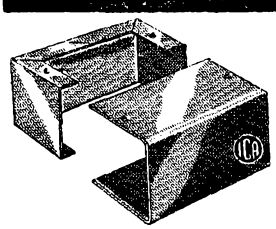
DR-10 .....List Price $37.25
DR-10-S*.....List Price 39.95
*With off-on switch

Now Available For Immediate Delivery

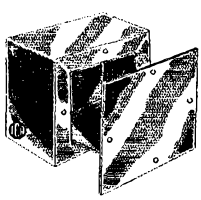
Astatic Crystal Devices Manufactured Under Brush Development Co. Patents

THE Astatic CORPORATION
ASTATIC
CONNEAUT, OHIO
IN CANADA CANADIAN ASTATIC LTD. TORONTO, ONTARIO

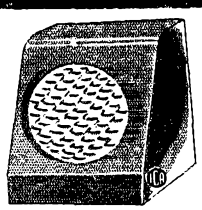
insuline Metal Goods for every use!



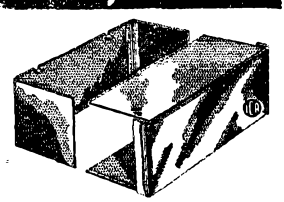
"FLEXI-MOUNT" ALUMINUM CASES



UTILITY CABINETS with built-in chassis

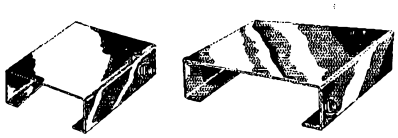


MIDGET SPEAKER CASES

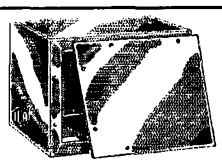


CHANNEL-LOCK ALUMINUM BOXES

SLIP COVER ALUMINUM BOXES



MINIATURE OPEN END ALUMINUM CHASSIS



ALUMINUM UTILITY CABINETS

Just a few of the hundreds of different styles, sizes and types available. Write Dept. Q for complete catalog

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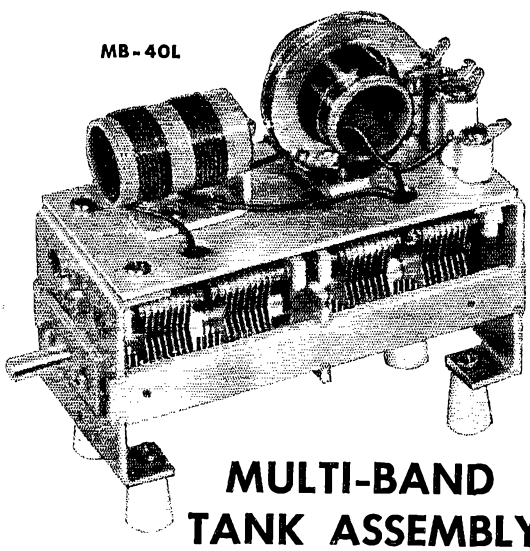
INSULINE BUILDING • 36-02 35th AVENUE • LONG ISLAND CITY, N. Y.
West Coast Branch and Warehouse: 1335 South Flower Street, Los Angeles, Calif.
Exclusive Canadian Sales Agents: CANADIAN MARCONI COMPANY, Montreal

NATIONAL

Proven
Dependable
Quality



MULTI-BAND
TANK ASSEMBLY

A completely redesigned version of the popular, unique, low-power multi-band tank which tunes all bands from 80 through 10 meters with a 180° rotation of the shaft and without changing coils. This version features improved mechanical construction and an electrostatic shield to aid in the elimination of harmonics. Choice of impedances assures uniform loading over entire range. (See article in December, 1950 issue of QST, p. 77) $12.90 net.

National
EST. 1914
NATIONAL COMPANY, Inc.
MALDEN, MASSACHUSETTS

50 Mc.

(Continued from page 45)

that will give satisfactory mixer performance.

The bandspread can be varied by adjusting the spacing between the stator and rotor plates. The closest practical spacing will allow a coverage of about 405 to 470 Mc. with the plate dimensions shown. The circuit shown can be adapted to use as a superregenerative detector, by feeding the output of a separate quench oscillator into the grid circuit at the junction of the grid choke and R_1. A 680-$\mu\mu$fd. by-pass is connected on the cold side of the plate r.f. choke and the audio taken off at that point.

The World Above 420 Mc.

Before the December issue of *QST*, containing a description of the 420-Mc. TV set-up of W1BHD, had been out many days Mel received several letters from amateur TV experimenters. One was from W1MUX in near-by Wayland, who has a flying-spot system nearly ready to go and is working on receiving equipment. W1BHD has copied his TV pattern on 35-mm. film. By means of a 35-mm. projection head he projects the pattern into the camera, doing away with the necessity for bright illumination of the TV pattern.

W1BHD is in the process of compiling a list of all active amateur TV stations, with the details of the equipment actually in use or under construction. If you are transmitting amateur TV, or preparing to do so, Mel would like to hear from you. His address: 148 Glendale St., Everett 49, Mass.

Strays

Members of the Hattiesburg Amateur Club proudly display the new call letter license plates now being issued to Mississippi amateurs as a result of the club's work in getting the special tags approved by the state legislature. *L. to r.:* Past President Lou Wicht, W5FGE; ARRL Section Emergency Coördinator Floyd C. Teetson, W5MUG; President M. W. Kirkpatrick, W5KYC; Secretary Ken Bloom, W5PDM; and W. C. Parker, jr., W5HVA.

INTERMODULATION METER

Model 31

- *Completely Self-Contained*
- *Direct Reading For Rapid, Accurate Measurements*

To insure peak performance from all audio systems; for correct adjustment and maintenance of AM and FM receivers and transmitters; checking linearity of film and disc recordings and reproductions; checking phonograph pickups and recording styli; checking record matrices; adjusting bias in tape recordings, etc.

GENERATOR

LOW FREQUENCY: 60 cycles.*
HIGH FREQUENCY: 3000 cycles.*
LF/HF VOLTAGE RATIO: Fixed 4/1.
OUTPUT VOLTAGE: 10v. max. into high impedance or +5 DBM matched to 600 ohms.
OUTPUT IMPEDANCE: 2000 ohms.
RESIDUAL IM: 0.2% max.
*(*Other frequencies on special order)*

ANALYZER

INPUT VOLTAGE: Full scale ranges of 3, 10 and 30 volts RMS. Less than one volt of mixed signal is sufficient for operation.
INPUT IMPEDANCE: Greater than 400 K ohms.
INTERMODULATION: Full scale ranges of 3, 10 and 30%.
ACCURACY: ±10% of full scale.
OSCILLOSCOPE connection at meter.

MEASUREMENTS CORPORATION
BOONTON NEW JERSEY

WANTED: Hammarlund Super pro Receivers SP-400X & SP-400SX in good condition

State: Best price, pre-or postwar Model, condition.

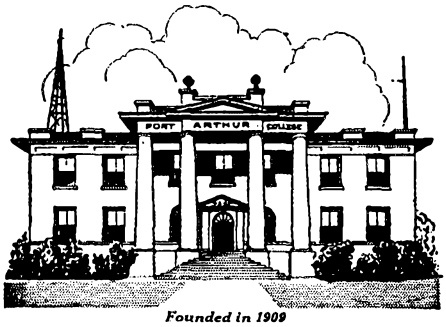
BOX 175 QST

RADIO COURSES

- RADIO OPERATING
- RADIO SERVICING
- CODE
- FM TELEVISION

Preparation for Civilian, Maritime, Army and Navy license requirements.
Personal Counselling Services for Veterans
Write for Catalog T.Q.

YMCA **TRADE & TECH. SCHOOL** 229 W. 66 St., N. Y. 23 ENdicott 2-8117



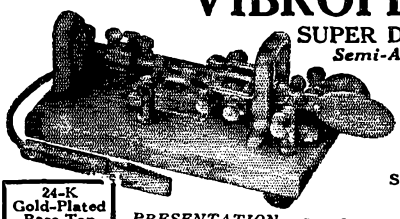
Founded in 1909

RADIO TELEPHONY
RADIO TELEGRAPHY
RADAR & LORAN

Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for $40.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details.

PORT ARTHUR COLLEGE PORT ARTHUR TEXAS
Approved for G. I. training

Anyone Can Be a
Good Sender with a
VIBROPLEX
SUPER DELUXE
Semi-Automatic
KEY



Jewel Movement
Touch Control
Super-Speed Control

24-K Gold-Plated Base Top $29.95

PRESENTATION

Speed Range From Dead Slow to Lightning Fast

Thousands have become good senders with the Vibroplex. Many who thought they never could make the grade have found it easy with this Super DeLuxe Vibroplex key. No matter what sending faults you may have Vibroplex will have you sending like the best in almost no time. Brings out natural ability you didn't know you had. So don't give up the idea of being a good sender – **it's easy with a Vibroplex.** Other models $12.95 up. Left hand models, one dollar more. Order yours today! At dealers or direct. FREE catalog.

Headquarters for new portables, all models and styles of types. Also rebuilt Standard and portable typewriters with ALL CAPITAL letters and other styles of types. QUICK SERVICE. Order direct from us.

THE VIBROPLEX CO., INC.
833 Broadway New York 3, N. Y.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) 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 100 words in any one issue nor more than one ad in 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.

Please note the 7¢ rate on ham-ads is available to ARRL members only.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs. 100, $1.50 up. Stamp for samples. Griffeth, WJFSW, 1042 Pine Heights Ave., Baltimore 29, Md.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, W7LCM.

QSL's high quality, fair prices. Samples? W7GPP, R. D. Dawson, 1308 F. Street, The Dalles, Oregon.

CRYSTALS: Bassett Type 100A precision low-drift units made to your exact specified frequency within the 80 or 40 or 20 amateur bands, at $1.50 each, plus postage. Rex Bassett, Inc., Bassett Building, Ft. Lauderdale, Fla.

QSLS. Have you seen them yet? Samples today. Your best bet: Larry's QSLs. Opportunity, Washington, P. O. Box 59.

QSLS. Very attractive. Best in printing and prices. Kromekote or any other stocks. Stamp for samples. W4LXJ, Roop, Radford, Va.

WANTED: Marconi coherer magnetic detector. Multiple tuner; DeForest responder and other gear prior to 1920. Franklin Wingard, Rock Island, Ill.

QSLS! TAprint, Sumrall, Mississippi.

QSL'S, SWL'S. Meade, WØKXL, 1507 Central Avenue, Kansas City, Kansas.

CALL-Letters painted on ties, color? $2.50. T-shirts. Size? $1.75. W. F. Yates, W9LIQ, Box 347, Heyworth, Ill.

WANTED: Complete or nearly complete files of Eastern, Western, and Southern Editions of QST. These contain only the particular regional Operating Department Reports, down to late 1942, and omit reports from other areas. Begin with January, 1935 issue and end with December, 1942, both inclusive. Must have both covers and be in good condition. Sumner B. Young, WØCO, Route 3, Wayzata, Minn.

QSLS, modern. Sample booklet 12¢. Stamps okay. Westerners see samples at leading Ham stores. W6GFY, van Groos, 1436 N. Serrano, Hollywood 27, California.

CANADIANS: 40 designs, photos, cartoons and conventional QSL cards. Showing of type faces to aid in designing your own card. 10¢ (refunded with order) brings yours. W. John Chivers, Drawer 38, Grimsby, Ontario.

QSLS. Distinctive samples. Noble Press, Chatham, Mass.

CONVENTION! ARRL. National Convention in Seattle, July 27, 28, 29th, 1951. Plan your vacation in the Great Northwest during Seattle Centennial year. The time of your life! General Chairman: W7RT, 1921 Atlantic St., Seattle 44, Wash.

PHONE patch schematics, practical discussion. $1.00. Nichols, W1MRK.

BEAMS and antenna elements. Send a card for full information. Riverside Tool Co., Box 87, Riverside, Illinois.

QSLS: Uncle Fred QSLs. Three colors and up. Rainbow map QSLs. Special DX QSLs. Bargain QSLs. Samples rushed. 10¢. Uncle Fred, Box 86, Lynn, Penna.

QSLS? SWLS? Modernistic? Cartoon? Photographic? Deluxe? QSL samples, 3¢. Sakkers, W8DED, Holland, Michigan. Immediate QSL service! QST ad CQ renewals. Subscriptions appreciated. Slightly used bargains: DB-22A, $65; VHF-152A, $69.95. Rus Sakkers, W8DED, 53 East 7th St., Holland, Michigan.

WANTED: Teletype 1/60TH HP synchronous motor. W6ITH, Moraga, Calif.

WANTED: AN/APR-4 receivers and tuning units; APR-1, APR-5A, ARC-1, ARC-3, R-89/ARN-5A, TS-174/U (and other "TS-" and "IE-" equipment), ARR-5, ARR-7, RBL-3, BC-348, ART-13, radar and other surplus; General Radio, Boonton, Ferris, other top-quality equipment wanted, especially for 100 to 6,000 Mc. region; also 707-B, other special-purpose tubes, magpies, klystrons, iconoscopes; Tech Manuals. Describe, price in first letter, Littell, Farhills, Box 26, Dayton 9, Ohio.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

QSLS and SWLS cards. Enamel and mirror finish cards, and also Multi-Color flash cards. Samples. The Rainbow Press, 816 Maple Ave., New Philadelphia, Ohio.

FOR Sale: Collection ancient wireless and radio items dating back to 1902. Sell as whole or part. Thousand of old items must be cleared out fast. Stamp, please, for list. W6LM, Wrightwood, Calif.

QSLS: Samples for stamp. Harrison, 8001 Piney Branch Road, Silver Spring, Maryland.

FOR Sale: HF-10-20, used 6 months. Like new. $50.00. W9JQQ, 24 Forest, Park Forest, Chicago Heights, Ill.

SELL: I.R.E. Proceedings 1950 file, $12.00 F.o.b. W2EC, 169 Buckingham Road, West Hempstead, L. I., N. Y.

WANTED: ART-13 speech amplifier and CFI unit complete with crystal. F. Cecchi, 218 Burrell, Blairsville, Penna.

WANT: Micamold XTR1. Send for swap list. Samkofsky, W2VSF, 527 Bedford Ave., Brooklyn, N. Y.

SELL: BC-654 (SCR-284) portable receiver transmitter, 3800–5800 Kc. VFO, 'phone, c.w., crystal calibrator, tubes, key, good used condition, $38.50. TCS Equipment. Want: RA-34 rectifier. T. Howard, 46 Mt. Vernon St., Boston 8, Mass. (W1AFN).

WANTED: HQ-129X Hammarlund or similar receiver. Will swap three silver plated cornets. Hall Barrett, 615 Jefferson St., Cookeville, Tenn. W4PVD.

SELL: QST complete 1931. Date CQ 1945. Date Amertran transformer 6200 VCT, 700 Ma. Best offer. W2HHF.

SELL: Lysco models #175 and #129, 15 watt input, 75 mtr and 10 mtr mobile fone xmitters, slightly used, with tubes, $21.00 each. Ralph Cabanillas, W2BNJ, 355 West 84th St., New York City.

TRAFFIC and/or Contest c.w. rig. Open rack custom construction includes VFO, bandswitching exciter, deluxe tube keyer breakin, two 75-watt 815 finals and one 600 watt with PP 8005's, two antenna tuners. Pretune three bands and bandhop with flick of the switch. A buy at $250.00 complete. W1JE, 83 Whitmarsh Ave., Worcester, Mass.

HRO-7R complete, perfect condition, deluxe cabinet, 480 Kc. to 30 Mc. Sonar tape recorder with equalizing pre-amplifier, nearly new. Two handy-talkies (BC-611), 3885 kc. used, but operate nicely. Also RCA signal generator WR-67A, just like new. Make an offer. Cash preferred. W2VKG, William Tyrrel, 7401 Ridge Boulevard, Brooklyn, N. Y. TErrace 6-4044.

SELL: RCA 155C 'scope, Triplett 1696A modulation monitor. Kravitz, 7919 20th Avenue, Brooklyn 14, N. Y.

SPECIAL: Key click filter, 39¢. Dubl-X conical array including 100 ft. all copper Twinex, $8.49. IN34 Crystal, 75¢. Free "TABOGRAM," amazing Bargains. Wanted: Tubes: top dollars paid. 1N21B/23B; 304TH/TL, 450TH/TL, 250TH/TL, 4E27/257B, 3E29/829B, all FG/KU types, 6J6, 6AG5, 6AK5, any others. Send list, best price. "TAB," 109 Liberty St., New York City.

FOR SALE: Hallicrafters SX-71 receiver, $140.00, new receiver less than four months old, in perfect condition. Also 30-watt transmitter and modulator, in good condition. Hammariund made, with final coils, crystals and JT-30 Mike, $65.00. J. Cotter, W1SXT, 622 Columbia Road, Boston, Mass.

BC-348-O, was new. Converted. $85.00 prepaid. J. M. Hansen, 1312 Ralston, Reno, Nevada.

FOR Sale: Meissner EX signal shifter. Used only 12 hours. Complete, with coils, power supply and full instructions. Only $80.00. Lloyd Hunt, W5RDQ, Box 622, Clarendon, Texas.

FOR Sale: Complete station, now on air, at a good buy. Collins 32V1 transmitter, HQ-129-X (speaker) EV 611x mike, Vibroplex key, 'phones, manuals, ant. relay, and a few miscellaneous parts and tubes. All for $510.00 cash F.o.b. Fayetteville. Will ship express collect. Signed W5OXR, Universal of Arkansas, Box 1001, Fayetteville, Arkansas.

SWAP: Blonde finish Epiphone professional guitar and deluxe case for ham gear. Cost $200.00. W5LCG, 3834 Chippewa, Baton Rouge, La.

LETTINE 40-watt transmitter. Like new condition. See data in QST ads. Best offer takes it. W4ROK, 7722 Nesbitt Drive, Norfolk, Va.

CRYSTALS: Our eighteenth year manufacturing precision crystal units for Marine, Aircraft, etc. Television markers. Regrinding service. Request catalogue. R. E. Nebel Laboratory, 1104 Lincoln Place, Brooklyn 13, N. Y.

SELL house, installed rigs, 3 bedrooms, full basement, patio, 2-car garage, 50 ft. steel tower. 8JK rotary beam, 813 A1-A3 40/8-/160. PR 813 ON 20 A1 and PR 4-250 on 10/20 A3. All DE TVI'd. DXCC 30 minutes. New York. Occupy March $16,900.00. Walt Knoop, W2PXR, 189 Oakwood Drive, Packanack Lake, N. J.

NEW crystals for all commercial services at economical prices, also regrinding or replacement crystals for Motorola, Link, G-E, and other commercial types. Over fifteen years of satisfaction and fast service! Eldson Electronic Co., P. O. Box 31, 1802 North Third St., Temple, Texas. Phone 3901.

WANTED: Trade-ins on new receivers, transmitters, converters and test instruments. We stock National and RME receivers, RME converters, Gon-Set converters, Harvey-Wells transmitters, National and Barker & Williamson parts, James Knights crystals, Simpson meters and test instruments, aluminum tubing, some war surplus, and Hy-Lite Antennas. 100 Kc. crystals, $2.95. Art A. Johnson, W9HGQ, Art A. Johnson Sales, 1117 Charles St., Rockford, Illinois.

SELL: Perfect all-band 800 watt transmitter. 807 stage 812H's final, 2000 volt supply. Address inquiries to Tony Zespy, WØVJC, Grand Forks, North Dakota.

FOR Sale: Collins 32V2; Collins 75A1 RCA audio OSC W54A; Dumont 3-in. scope Model 164E; Boonton megacycle meter Model 59; Hickock Sig. Gen. 288X; Triplett Tube Tester Model 2413; Simpson Wavemeter and modulation meter Model 380; James Knights xtal freq. standard Model FS-344; Solar Exam-Eter Mod. CF; Weston Multimeter Mod. 663. Best cash offer takes all or any item. Name your price. W8UJB, 1302 First National Tower, Akron 8, Ohio.

SELL: Workshop 10 and 20 meter 3-element stacked beam array, Mod. 2419, includes instructions, mounting plates, fittings, used 6 months. Cost $181.00. Will sacrifice for $85.00. Complete Hammarlund Super-Pro SP4OOX, excellent condition, make offer. W3ALX, 934 Wyoming Street, Allentown, Penna.

SALE: No room for HQ-129X, $100.00. VHF 152A, $55.00. Like new. Richard Barnes, W9HUJ, 2012 Excelsior Ave., Hopkins, Minn.

FOR Sale: All new: two 250THs; one RCA surplus KW modulation xformer; one 304TH; one 2X15 mfd. 8000 v oil cond; 25 and 50 M 100 and 200W resistors; three 866As; one 3½ Westinghouse meter; three T&L pads; one 13 x 17 x 3 AC chassis; one 150 $\mu\mu$f 2 in spac. condx. and some BC-375 parts, used. H. Sibilla, 1441 Goffe St., St. Clair, Mich.

BUSINESS relationships are on a personal basis when you deal with Carl, WIBFT, at Evans Radio, Concord, N. H.

FOR Sale to highest bidder. "The Year-Book of Wireless telegraphy and Telephony, 1915." Marconi Publishing Corporation, New York. In sound condition. Contains large wireless map of the world. Write to Mrs. C. T. Hewitt, 3974 Highgate Road, Muskegon, Mich.

BARGAINS: New and used transmitters, receivers, parts: Globe-King $299.00; HT-9 $225.00; Temco 75GA $250.00; Collins 75A1 $295.00; new 150-watt 'phone $199.00; SX-42 $189.00; NC-173, HQ-129X $139.00; SX-43 $129.00; ART-13 $119.00; RME-45 $99.00; HT-6 $85.00; Meck T-60 $85.00; RME-69 $69.50; VHF 152A $69.00; SX-24 $69.00; NC-100 $59.00; Globe Trotter $57.50; HT-17 $32.50; New Bud VFO 21 $39.50; New Meissner signal calibrators $24.95; S-38 $29.95; MB-611 $29.00; 90800 exciter $29.50; 3–30 or 10–11 converters $25.00; XE-10 $19.95; and many others. Large stock trade-ins. Free trial. Terms financed by Leo, W9GFQ. Write for catalog and best deal to World Radio Labs, Inc., Council Bluffs, Iowa.

PROSPECTIVE opening, ARRL staff. Applications for Contest Checking Post will be welcomed. Accuracy required and average proficiency with typewriter. Contest work a desirable but not required background. Amateurs 18–30 years preferred but all applications given careful consideration.

WANTED for WIAW post. An amateur with constructional and maintenance experience, also ability to set a good procedure example when on the air, is invited to apply. Mention ARRL organization-operating background or appointments, if any, if available and interested, also other radio experience, in writing for details and application form. In all cases indicate age, please. Handy, ARRL.

SELL: BC-221AK freq. meter with book, 3 IF trans. and RF assem. from BC-453, good 803, 811, 829, 832 tubes, 1000 cycle bandpass filter, impedance-matched, tube-coupled, power, cabinet. Inquiries answered. W2IA. G. M. Applegate, 1572 Pennington Road, Trenton, N. J.

FOR Sale: Used A.C. Instructograph with manual, 10 tapes and oscillator. $22.00. W2FSM, Ed Swanson, 21 Holmes Place, Lynbrook, L. I., N. Y.

FOR Sale: one complete portable wire recorder Model 80. also wire recorder mechanism Mod. 79 with portable case; one AE1 RF signal generator 1 year old, all in first class shape. Will sell or trade any or all for ham receiver and transmitter. Donald Clark, W7OHG, 19 N. W. Main, Blackfoot, Idaho.

WANTED: Collins 75A-1. State your lowest price Railway Express prepaid. W1DBS, John Savonis, 11 Dwight Court, New Britain, Conn.

QSLS, SWLS. They're better. Samples. C. Fritz, 1213 Briargate, Joliet, Ill.

SELL: 1500 volt 500 Ma. supply with overload relay; PP 812A final complete with commercial coils for all bands. All offers considered. E. Johnson, W2ZWA, 120 Alexander St., Princeton, N. J.

FOR Sale: Several Raytheon 4D32's and 4D22's brand new in original cartons, at $14.00 each. Sacrifice, $69.00. Maguire 75 meter mobile 'phone xmitter, for aircraft or auto. Complete with all accessories including power supply at $25.00, brand new in sealed carton. B. N. Gensler, W2LNI, 136 Liberty St., New York City 6, N. Y.

FOR Sale: DC power plant, 24–32V .20 amp, Briggs & Stratton, condition like new. Org. spare parts kit, org. shipping crate. Radio shielded. $55.00. F.o.b. Dayton. Hubert V. Wolfe, W8LAX, R. #5, Box 360, Little York Rd., Dayton 5, Ohio.

FOR Sale: HT-9 trans. with 10–20–40–160 meter coils; VHF-152A converter, HQ-129-X receiver; 3-element Workshop rotary beam with rotar and 22 ft. steel tower. Am moving. Must sell my station. Complete, for $500.00 xw W1HWD, Roger Dumont, 13 High St., Brockton, Mass.

WANTED: "S" meter for Hallicrafters S-40 with or without case. Ray Westcott, W7NOM, Ontario, Oregon.

250-watt AM xmitter, factory custom-built. $175.00. '46 model, in grey 4 ft. cabinet. Not interested in trades. Write for full details. W9DSV, Daniels, Box 261, Webster, Wis.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Meissner, Gon-Set, others. Reconditioned S-38, $29.00; SX-43 $119.00; SX-42 $179.00; S-40A $69.00; NC-57 $69.00; NC-173 $139.00; NC-183 $199.00; HQ-129X, $129.00; RME-45 $89.00, DB22A, HF-10–20, VHF152A, SX-25, SX-28, SX28A, SX-62; HT-18, NC240D, HRO7, BC-610, Collins 32V1, 32V2, 75A, others. Terms. Shipped on trial. List free. Henry Radio Store, Butler, Mo.

SELL untanked distribution transformers 1.5 KVA, 7200 VCT-120/240 Volts, $15.00 each. F.o.b. Power Electric Co., Box 267, Jackson, Mississippi.

SELL: 150-watt pair 807's final with 3" meters. Power supply 750 volt 200 Ma., 350 volt 150 Ma. plus bias. Each on 10½" panel. Well engineered units complete with tubes, $45.00. Dick Rice, W9LOC, 703 S. Charter St., Monticello, Ill.

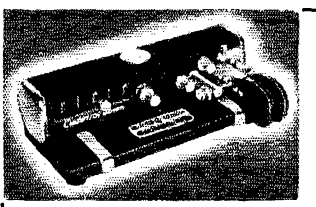
WANTED: Electrical Experimenters, Wireless Age any wireless apparatus before 1920 especially Electro Importing, Wireless Specialty, Marconi, QSTS before 1920. Sell: SE-1420, Grebe CR-9. L. Rizoli, W1AAT, 100 Bay View Ave., Salem, Mass.

CLEANING house! Sell: Best offer or trade following: PCA-2T-200 Panadaptor; TN-18/APR4 300–1000 Mc.; TN-19/APR4 975–2200 Mc.; Lampkin micrometer freq. meter; extra Boehme automatic keying head; Dynatron Freq. Meter in walnut case, 6" vernier dial; R-80-X GE recvr; 89–807–76–6A6 A1-A2-A3 xmtr 160–80–40 xtal/vfo rig 10 x 12½ x 10 with handles; T-85/APT5; Black Box 6L6-807 xmtr (Jan. '49); 24v exide 34 lb. bat. new-dry; 8½ x 10 x 19 steel chassis pwr supply 900v 2 866, bridge connected provision for 4 866 for h.v. Needs: Modern tube checker, signal generator, drill press, Q meter, etc. F. E. Handy, c/o ARRL.

SELL: Sonar VFX-680 complete with tubes. Perfect condition: $10.00. A. H. Hardwick, W2VQ, Orange, New Jersey.

FOR Sale: SX-28A. Recently aligned; in perfect condition. $115.00. William T. Corl, W3OPR, 1503 Hickory Lane, Rosemont, Pennsylvania.

FACTORY custom-built 250 watt AM transmitter, $200.00, Millen oscilloscope, $20 D104 mike and chrome desk stand, 2 months old, $12.00 60' 72 ohm KW twin-lead $3.00. W9DSV, S. R. Daniels, Box 261, Webster, Wisconsin.



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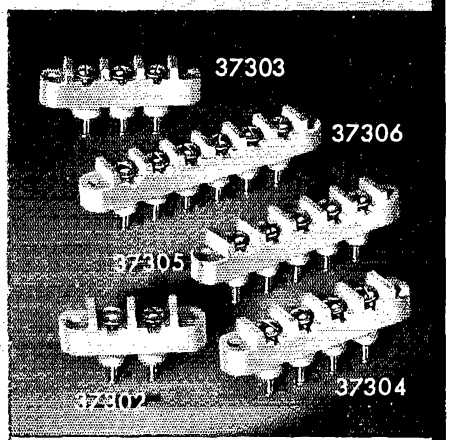

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Insure permanently smooth, close control. Widely used in industry. All ceramic, vitreous enameled; 25, 50, 75, 100, 150, 225, 300, 500, 750, and 1000-watt sizes.

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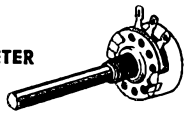
For loading transmitters or other r.f. sources. New, rugged, vitreous-enameled units are practically non-reactive within their recommended frequency range. 100 And 250-watt sizes, 52 to 600 ohms, ±5%.

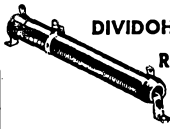
TYPE AB POTENTIOMETER



It's quiet! This Type AB Potentiometer has a resistance unit that's solid molded. As a result, the noise level often becomes less with use. Has a 2-watt rating, good safety factor.

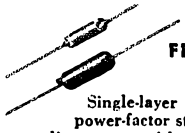
BROWN DEVIL WIREWOUND RESISTORS

Dependable vitreous-enameled units, in a size small enough to fit most installations. Easily mounted by 1½" tinned wire leads. Three sizes: 5, 10, and 20 watts. Tolerance ±10%.



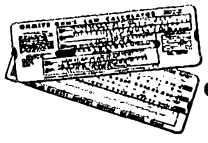
DIVIDOHM ADJUSTABLE RESISTORS

These wirewound resistors, with one or more adjustable lugs, provide a convenient means of obtaining odd resistance values. Stock units made in 10, 25, 50, 75, 100, 160, and 200-watt sizes, in many resistance values.



RADIO FREQUENCY CHOKES

Single-layer wound on low power-factor steatite or bakelite cores, with moistureproof coating. Seven stock sizes for all frequencies, 3 to 520 mc. Two units rated 600 ma, others rated 1000 ma.



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Favorite of engineers everywhere! Solves Ohm's Law problems with one setting of the slide. Also has parallel resistance and slide rule scales.

To countless thousands of technical men all over the world—engineers, designers, and servicemen—the name OHMITE has become synonymous with *dependability*. There is good reason for this overwhelming opinion. Every OHMITE product is carefully designed and constructed to give *extra* performance and long life under severe service conditions. When you need dependable resistance components, play safe and specify OHMITE.

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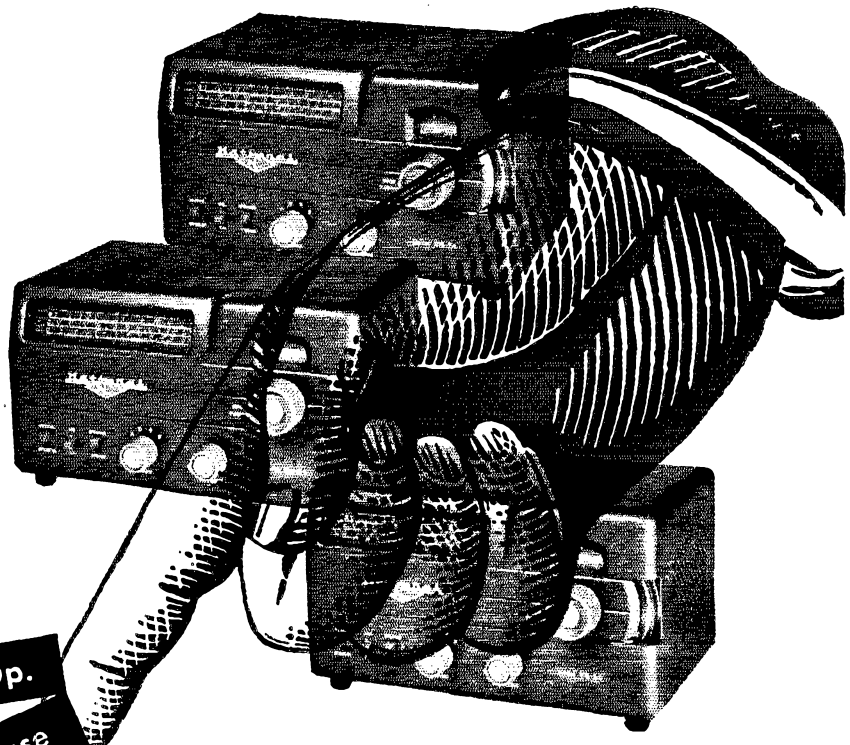

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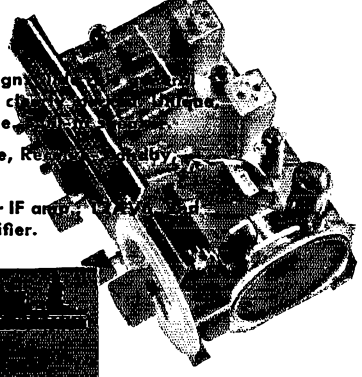
TUBE COMPLEMENT: 12BE6, converter; 12BA6, CW osc. — IF a[illegible] det. — 1st aud. — A. V. C.; 50C5, audio output; 35Z5, rectifier.



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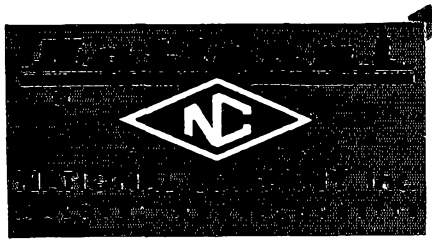

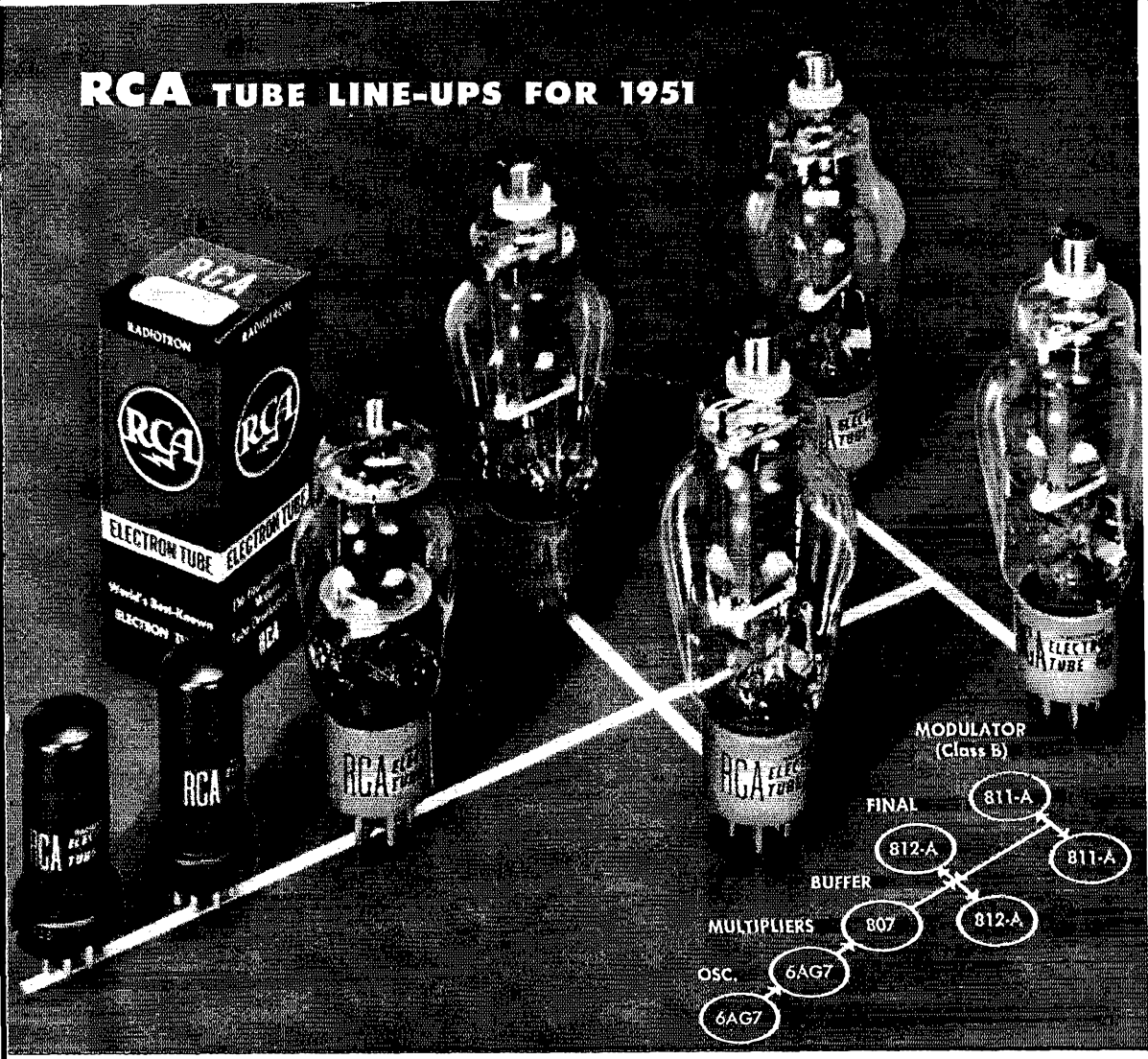

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CIVIL DEFENSE FREQUENCIES *Announced*

In mid-January the Federal Communications Commission issued a public notice specifying frequency bands which are now earmarked for use by amateurs in civil defense communications in the event of war. They are:

1800–2000 kc. (under the existing restrictions as concerns Loran)

3500–3510 and 3990–4000 kc. (Two 10 kc. bands)

28.55–28.75 and 29.45–29.65 Mc. (Two 200 kc. bands)

50.35–50.75 and 53.35–53.75 Mc. (Two 400 kc. bands)

145.17–145.71 and 146.79–147.33 Mc. (Two 540 kc. bands)

220–225 Mc.

(The Commission also stated that the band 1750–1800 kc. will continue to be available for use by qualified amateurs authorized to participate in the Disaster Communications Service.)

Actual regulations covering amateur participation in civil defense communication remain to be worked out (the task is already in process). Meanwhile we amateurs have not only the positive assurance that frequencies will be available but we know in advance what these frequencies will be. Planning can now proceed apace. It is obvious that 10, 6, 2, and 1¼ meters are the basic spots for local planning. The low-frequency assignments (1.8 and 3.5 Mc.) will probably be available only for certain medium-distance circuits in special cases.

NOTHING IN THIS ANNOUNCEMENT IN ANY MANNER ALTERS PRESENT AMATEUR RULES OR REGULATIONS. It is simply a notice of intent to make these frequencies available for civil defense communication by amateurs in the event of war and a resultant shutdown of normal amateur activity.

This action by our Government indicates the extent to which our operations and potentialities are held in regard at Washington. It is now up to us to show we merit that confidence. The first step *you* should take is to notify your ARRL Emergency Coördinator of *your* willingness to pitch in and help shoulder amateur radio's responsibility.