

June 1953

40 Cents

45c in Canada

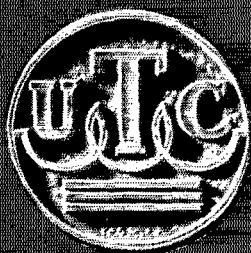
QST

devoted entirely to

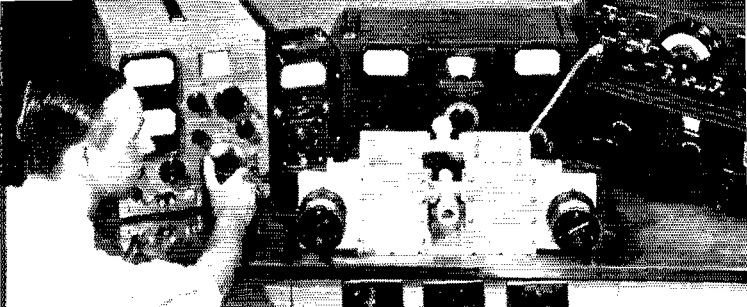
amateur radio

PODUNK
1953
FIELD DAY

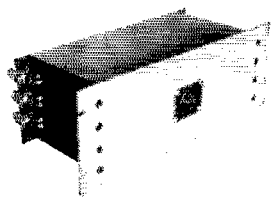




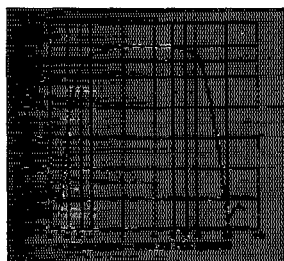
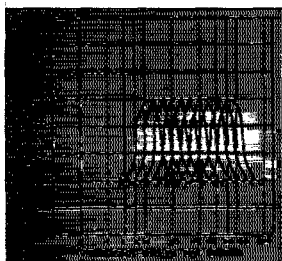
for SPECIALIZED FILTERS



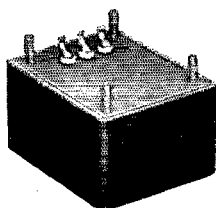
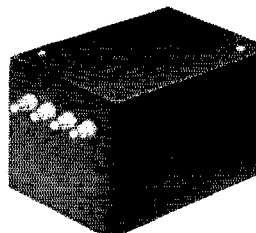
Desires of experience in the design and production of specialized filters have resulted in the building of fine plants for the production of these filters. The UTC was directly the largest line of producing specialized filters with 24 facilities in the following general areas: designs include a wide variety of case materials, dimensions and wiring methods to permit maximum performance in design. The manufacturing facilities, illustrated below, are one of the finest plants of special filter design in present conditions.



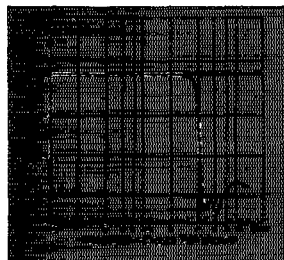
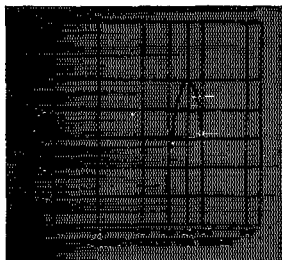
These low frequency band pass filters are held to 1 DB tolerance at the 3 DB crossover... 600 ohm... 4 filters per 7½" rack panel.



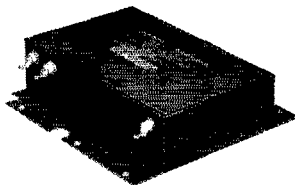
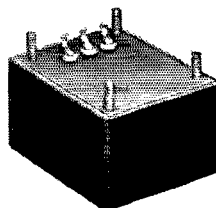
This ultra low frequency filter has a band pass range of one cycle to 10 cycles... 50,000 ohms... 700 cubic inches.



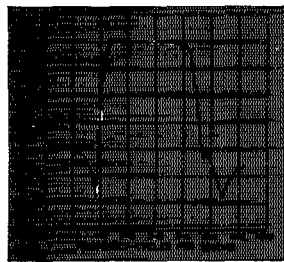
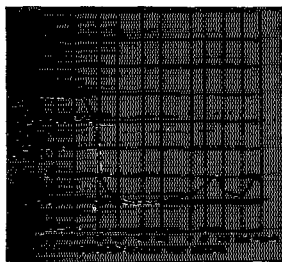
This 600 ohm miniaturized 1 KC band pass filter is housed in a case only 1" x 1¾" x 2½".



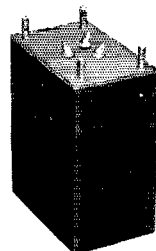
This 600 ohm miniaturized low pass filter is housed in a case only 1" x 1¾" x 2½".



This power line filter provides correct output voltages from sources of 50 to 400 cycles... noise attenuation is from 14 KC to 400 MC... 29 cubic inches.

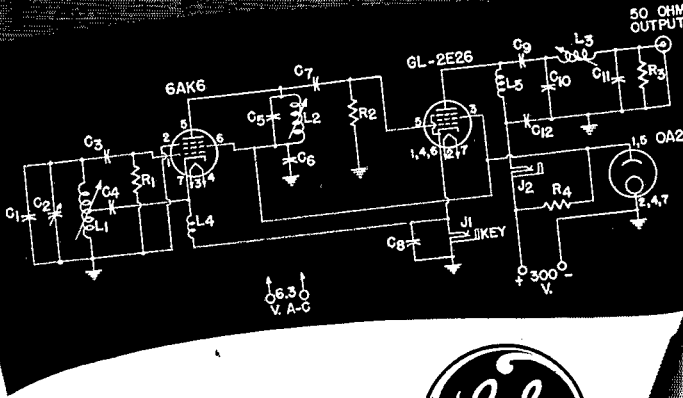


This band pass filter is designed for sharp cut-off at both ends of the range... 10,000 ohms... case dimensions 1¾" x 2½" x 3¼".

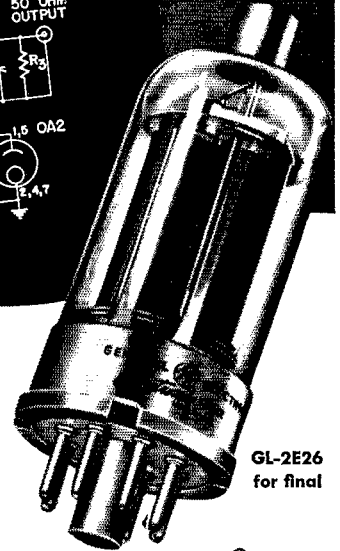


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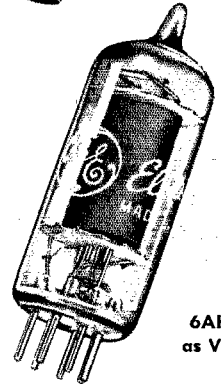
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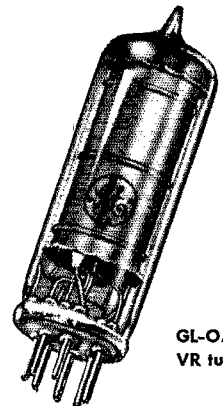
THE 3 TUBES TOGETHER cost very little more than a pair of swimming trunks, and your G-E distributor has them all. Instructions for building the rig, and a complete list of components, were given in G-E Ham News, Vol. 5, No. 2. If your copy has been mislaid, write for another.

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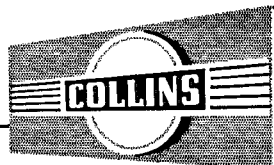
When keeping a sked or checking into a net, just set your dials to the desired frequency and you're in contact.

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JUNE 1953

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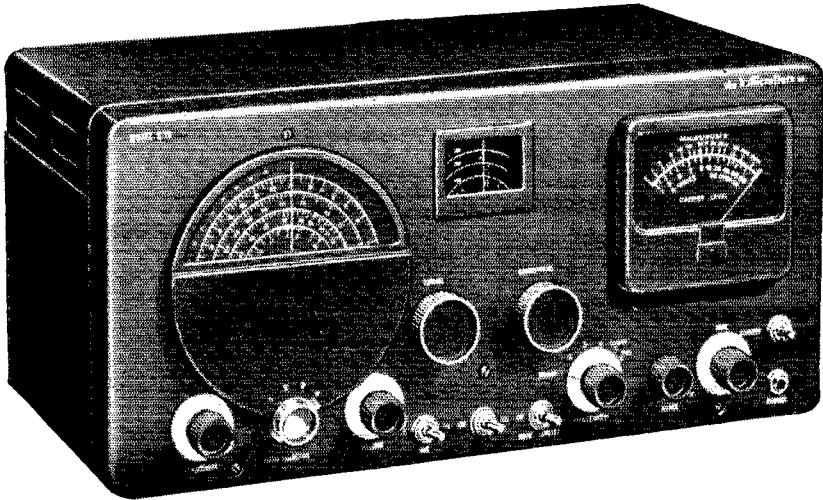
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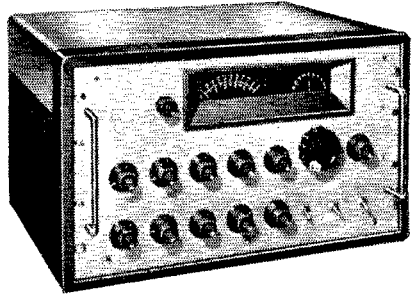
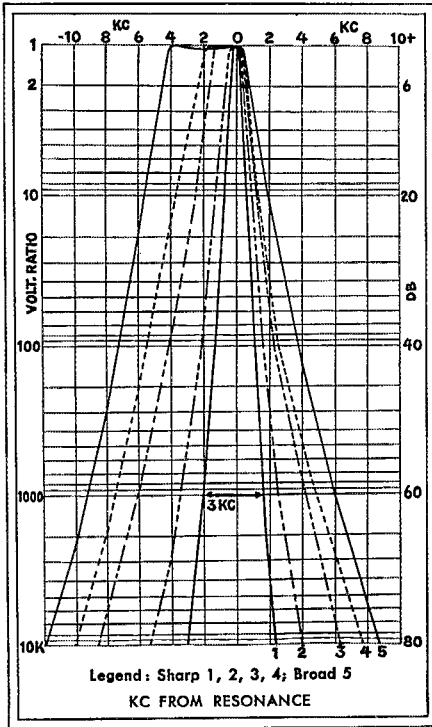
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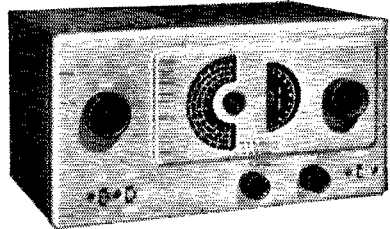
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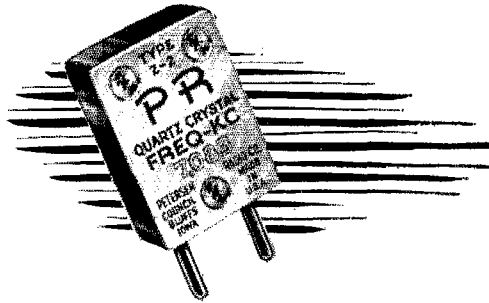
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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports 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 Amateur Radio Emergency Corps (ask for Form 7).

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

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

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

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GEORGE V. COOKE, JR. W2OBU
88-31 239 St., Bellerose 26, N. Y.
Vice-Director: Thomas J. Ryan, Jr. W2NKD
1082 Anna St., Elizabeth 4, N. J.

Midwest Division

WILLIAM J. SCHMIDT W0OZN
306 S. Vassar, Wichita, Kansas
Vice-Director: James E. McKim W0MVG
1404 S. Tenth, Salina, Kansas

New England Division

PERCY C. NOBLE W1BVR
37 Broad St., Westfield, Mass.
Vice-Director: Frank L. Baker, Jr. W1ALP
91 Atlantic St., North Quincy 71, Mass.

Northwestern Division

R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont.
Vice-Director: Karl W. Weingarten W7BG
3219 N. 24th St., Tacoma 7, Wash.

Pacific Division

KENNETH E. HUGHES W6CIS
3105 Crest Haven Drive, Sacramento, Calif.
Vice-Director: Richard F. Czelkowitz W6ATO
243 Colon Ave., San Francisco 12, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Gus M. Browning W4BPD
135 Broughton St., S. E., Orangeburg, S. C.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
740 Lafayette St., Denver, Colo.
Vice-Director:

Southeastern Division

LAMAR HILL W4BOL
104 Myrtle, Cochran, Ga.
Vice-Director: Ernest W. Barr W4GOR
911 Rosemary Ave., SW, Atlanta, Ga.

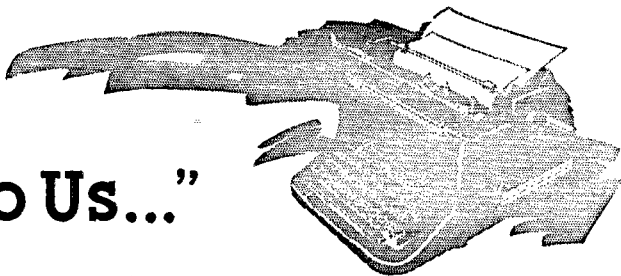
Southwestern Division

JOHN R. GRIGGS W6KW
3502 Chesapeake Ave., Los Angeles 16, Calif.
Vice-Director: Walter R. Joos W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division

A. DAVID MIDDLETON W5CA
9 Kay Road, Theras, N. M.
Vice-Director: Carl C. Drumeter W5EHC
5824 N.W. 58th St., Oklahoma City 12, Okla.

"It Seems to Us..."



FIELD DAY

There's nothing like an ARRL Field Day . . .

Absolutely nothing!

Sure, we have the Sweepstakes, the V.H.F. QSO parties, DX competitions, CD parties, and a lot more. But Field Day is unique. We know pretty well how the home station performs. We can zero our VFO on the net frequency as quick as a wink. We can rotate our beam on Pakistan almost without looking at the indicator. But Field Day is another story. Chances are, we are going to have to tune someone else's receiver, flick the switches on someone else's rig, maybe even slap someone else's bug. The chair will be uncomfortable, the table height different from what we're accustomed to. And all the while we're being plagued by the buzz of vibrators, the putt-putt of generators, others going on or off watch stopping to kibitz and see how we're doing, the clicks and receiver overloading from more of our crew on another band.

So, granted — when we're operating in Field Day we aren't at our best. Neither is the equipment, in most cases. Yet who among us would prefer a quiet week end at home to the orderly confusion of a FD set-up? Even the rain, a Field Day tradition, fails to dampen spirits, though everything else may be soaked.

That's the way it should be. Field Day is a test of communication performance from gear quickly assembled and put in operating condition as it might be were there a disaster or other emergency. And so, underlying the apparent gaiety of a week end in the open is the deadly serious purpose of preparation and experience by a group of service-minded hobbyists who take no stock in a more complacent view, "it can't happen here."

In 1953, as in the past, the ARRL Field Day is looked forward to as the operating event of the year by clubs and by individuals. See you in FD, June 20th and 21st!

THE NATIONAL CONVENTION

Houston, which we're told is the fastest-sprouting city in Texas and the South's largest metropolis, is the site of the 1953 ARRL National Convention. Keeping in pace with the progressive city is the Houston Amateur Radio Club and its more than 30 committees which have been working on convention planning for over a year. With Dr. Charles Fermaglich,

W5FJF, as Convention Chairman, these amateurs have arranged a program of interest to persons engaged in practically every phase of our hobby. Most of you have read the convention story in May *QST*. There should be little doubt that there is lots in store for you at Houston.

An ARRL National Convention is an event all amateurs hope to attend and an event that each of us should experience. By all means plan a trip to Houston for the week end of July 10th-12th. This year's affair promises to be one of the biggest and best ever.

GENERAL COUNSEL SEGAL

Back in the June, 1928, issue of *QST* there appeared a "Stray" recording the appointment of one Paul M. Segal, 9EEA, of Denver, as ARRL General Counsel — at the magnificent sum of \$1 per year. "PMS" was then director of the Rocky Mountain Division and even in the days before his formal appointment as our standard-bearer in legal matters he was distinguishing himself in the successful handling, for the League, of "anti-amateur" local ordinances, one in Wilmore, Ky., and another in Portland, Oregon.

In these twenty-five years Paul Segal has been intimately associated with the growth and progress of the American Radio Relay League. His guiding counsel has been a priceless asset in more aspects of our affairs, and more often, than most amateurs probably realize. Beyond the more striking evidences of his participation, such as handling state supreme court cases involving amateur antenna heights, or redrafting the League's instruments of government, or representation of the amateur at an international telecommunications conference, lie the everyday problems nonetheless important — educating a city's fathers to defeat an undesirable ordinance with restrictive effects on amateurs, consulting over perhaps a period of weeks on a proper course for the League to follow in an FCC conference or Department of State hearing, and often some such thing as getting out of a Texas jail an amateur put there by an overzealous cop who was suspicious of mobile operation.

Whatever may be the immediate problem, Paul Segal has given of his best to the League. We think that is because of his own dedication to the basic amateur principle: "not for the reward, but for the love of the game."

Ham radio appears to be crashing all fields. We've already seen W9HPJ's call in *Dick Tracy* and now WN6PYG/1 shows us where W6OPU received a plug in recent *Mickey Mouse* doings.

— . . . —

Excerpt from the *Wall Street Journal*, via W2RUK, having to do with a newly unveiled nut-cracking machine recently put to work by Northwest Nut Growers:

"The walnut is grabbed in mid-air and at that precise fraction of a second an electrical impulse of approximately 65,000 volts at 5000 amperes shatters the walnut shell. . . ."

That's a lot of watts in a nutshell or quite a run at the polls, however you choose to look at it.

— . . . —

When high voltage and heat ruined a special-make tube socket and put New Britain, Conn., TV station WKNB-TV off the air for most of an evening it was amateur radio that came to the rescue. Telephone calls and telegrams sent forth all along the Eastern seaboard failed to locate a replacement. Then W1DF, *QST* Technical Editor, who was apprised of the situation around midnight, dropped over to ARRL's West Hartford lab and came up with a satisfactory socket.

— . . . —

What is believed to be the first all-transistor amateur station was demonstrated at the April 1st meeting of the Morris Radio Club. Operating on ten-meter 'phone, the station consisted of a two-transistor a.m. crystal-controlled transmitter and a two-transistor superregenerative receiver. Contacts were established between this station and mobile units of the club within a radius of half a mile. Credit for the receiver goes to W2ZKE; other participants were K2AQM, W2GFE, W2GNE, W2NOH, W2YCX, W2YTH and W2ZKE. — W2GNE

— . . . —

VE4LC tells us of an application of ham ingenuity that enables VE4VJ, 25-year-old cerebral palsy patient, to keep up with the best of them on c.w. despite the fact that he cannot manually operate keying gear. After investigating the possibilities of foot keying and getting negative results (insufficient speed), Jim hearkened back to September, 1950, *QST* wherein is described "A Simple Voice-Operated Keyer for Automatic Break-In," by J. L. Flanagan, W1SJT.

VE4VJ added a preamplifier and a power supply to make the unit entirely self-contained and operational directly from a chest-set microphone. By juggling the time constants in the relay control-tube circuit, Jim sets the relay action at a point where it faithfully follows dits and dahs articulated into the mike. He's no slow-poke now!

Has anyone yet successfully applied this "no-hands" technique to mobile c.w. operation?

COMING A.R.R.L. CONVENTIONS

June 20th-21st — Rocky Mountain Division, Estes Park, Colo.
 July 10th-12th — National Convention, Houston, Texas
 Sept. 19th-20th — New York State, Buffalo, N. Y.

HAMFEST CALENDAR

CALIFORNIA — Sunday, June 28th, at Coyote Point, San Mateo — the 7th Annual Hamfest and Picnic of the San Mateo County Amateur Radio Club. The program will begin at 10:00 a.m. and close at 5:00 p.m., and will feature activities for the OM, YL and XYL. Two main attractions will be 75- and 2-meter transmitter hunts. Have yourself a pleasant day by attending with your family. A picnic lunch should be brought. Admission free; registration \$1.50. Further details are available from W6ZBS, 200 42nd Avenue, San Mateo.

FLORIDA — Sunday, June 28th, at Sanders Beach, Pensacola — the Pensacola Amateur Radio Club will hold its annual hamfest. Several hundred amateurs and their families from the Southeastern states are expected to attend. Contact Vernon Colley, W4QK, 1517 East Moreno St., Pensacola, for further data.

ILLINOIS — Sunday, June 28th, in Thatcher Woods near Oak Park — a picnic will be held for all v.h.f. men. Food and drinks should be brought, as none will be available on the premises. Leo Heuer, W9OKF, 531 South Crescent Ave., Park Ridge, will supply further information.

KANSAS — Sunday, June 14th, in Kenwood Park, Salina — the Annual Hamfest-Picnic of the Central Kansas Radio Club. Information is available from E. E. Gemmill, 123 W. Crawford, Salina.

MISSOURI — Sunday, June 14th, at Lake Ozarks State Park near Eldon — the Missouri Emergency Net Picnic. Bring your own picnic lunch. Admission free. All hams, XYLs and YLs are invited. Details will be furnished by Paul Cooper, W8TGG, 315 West Third St., Eldon.

SASKATCHEWAN — Saturday and Sunday, June 27th and 28th, at Lake Waskesiu in the Prince Albert National Park — the Official Saskatchewan Hamfest will this year be sponsored by the Northern Sask. Amateur Radio Club. A full program of entertainment has been arranged for the whole family at a spot well known for its excellent facilities for swimming, fishing and hiking. The registration fee of \$3.00 per adult covers the banquet. Accommodations must be arranged for separately, but a variety of cabins is available at prices ranging from \$9.50 for three days to \$7.50 per day. Dr. J. Carriss, VE5SD, 11 Knox Block, Prince Albert, will answer inquiries.

WYOMING — Saturday and Sunday, July 18th and 19th, at the South Fork Inn, 20 mi. west of Buffalo on Highway 16 — the Casper Radio Amateur Club will hold a hamfest. All hams are welcome. Write to Betty Ross, W7IDO, 1152 South Willow, Casper, for details.



Our man **A** claims that signal-strength reports of "20 db. over S9" and the like are meaningless and should be thrown out of ham radio. **B** says they have a useful purpose because they permit an operator to evaluate antenna and transmitter performance. Who is right?

(Please turn to page 54 for the answer)

Automatic Multiband Mobile Antennas and Mobile Antenna Characteristics

BY A. M. PICHITINO,* WØEDX

• What does a bandswitching mobile transmitter buy you if you have to get out of the car to change antennas every time you want to change bands? That's a question a lot of mobile enthusiasts have asked. Here's how to get multiband antenna operation without switches or any mechanical devices — using a tuned-circuit network that does the switching automatically!

The author also presents some badly-needed information, based on practical measurements, on the characteristics of "eight-foot" whip antennas in the 10- to 75-meter range.

IN recent years amateur mobile operation has gained rapidly in popularity, and further activity has undoubtedly resulted from the opening of the 40-meter and 15-meter bands to 'phone operation. Almost all amateur activities are encompassed in mobile operation: emergency, experimental, construction, rag-chewing, DX, and even freedom from TVI!

Several months ago, in undertaking the development of a mobile transmitter, it was concluded that the design objectives of operator convenience and wide flexibility were of paramount importance. Bandswitching of all bands was, of course, a must; and it was also decided to provide true single-dial control, with all r.f. stages gang-tuned. In addition to operator convenience, gang tuning of high-Q circuits would reduce power supply requirements. However, it made detailed knowledge of mobile antenna characteristics necessary, because coupling circuits had to be designed to cancel reactances which could detune the transmitter final amplifier if permitted to remain uncompensated.

Experience had shown that one of the greatest problems faced by the mobile enthusiast was that of efficiently coupling to and loading the mobile antenna. Obviously, it accomplishes little to have a bandswitched transmitter if separate loading coil taps and/or additional loading components must be hung outboard and attached or adjusted with each band change. We decided to provide individually tailored coupling circuits for each band, to be within the transmitter, and to require no tuning or adjustment. Again, we were faced with the problem of having detailed knowledge of mobile antenna characteristics — that is, the nature of the loads the transmitter would be required to work into. Since the litera-

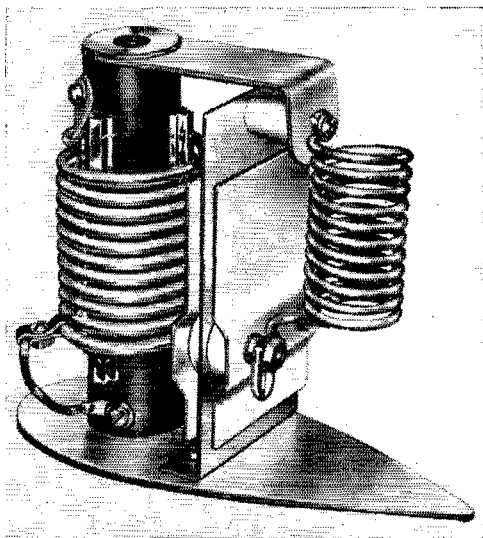
ture lacked the information we required, it was necessary to undertake a mobile antenna measurement program.

This paper will describe the measurement technique, the antenna characteristics and the theory and development of fully automatic multiband antennas.

Measurement Technique

A typical mobile antenna with spring base was mounted on a 1950 Ford automobile at the left rear, slightly above the rear compartment lid. This mounting was chosen as being representative of a popular and satisfactory position. Later measurement of a bumper mount showed little practical difference.

The measurements were made with a General Radio type 916A r.f. bridge, with a National HRO receiver as the detector. The bridge, detector and operator were too bulky to fit inside the rear compartment, and since it was desired to conduct measurements with the compartment lid down — no volunteers stepped forward at this time! — it was decided to measure the drive-point impedances (at the coax fitting at the base of the antenna mount) through a section of transmission line which would permit remote location of the measuring equipment. As is well known, an electrical half-wavelength of transmission line or multiple thereof acts like a 1:1 transformer and thus repeats the load. In order to isolate the transmission line (RG-8/U



A commercial version of the two-band network.

*Chief Engineer, E. F. Johnson Company, Waseca, Minn.

coax) electrically from the automobile, it was formed into a coil where it left the car through the left rear fender (back-up light removed), the coil being tuned by a variable capacitor to the measurement frequency. This isolation filter, a parallel-resonant circuit of high Q , offered high impedance at the measurement frequency and thereby electrically detached the transmission line from the automobile.

With the car in an open area in position for measurement, the transmission line, with the isolation network installed and tuned, was placed on the ground in a straight line away from the rear left quarter of the automobile. The transmission line was then cut so that it would have an electrical length of a half-wavelength or multiple at the measuring frequency. This line was $\lambda/2$ at 75 meters, $3\lambda/2$ at 20 meters and 3λ at 10 meters. The free end of the line was then connected to the r.f. bridge, which was driven by a Viking transmitter and VFO. This measurement set-up is shown in Fig. 1.

Care must be observed in making measurements through line sections and isolation filters because too much of a change from the frequency for which the line is cut or the filter is tuned will

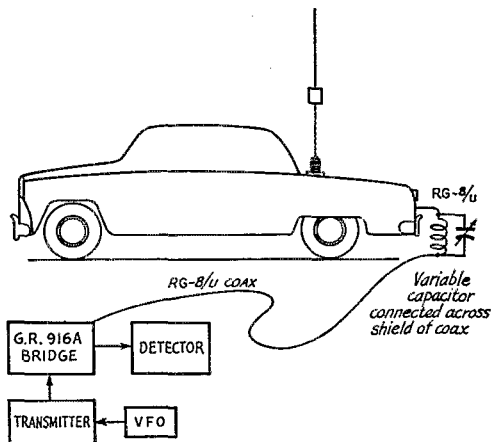


Fig. 1 — The mobile antenna installation and test set-up used in making impedance measurements.

introduce errors in the measurements. These are due to reactances introduced by the line and filter, resulting in impedances which should not be attributed to the antenna itself.

Measurement Results

Figs. 2, 3 and 4 show the results of measurements on the 75-, 20- and 10-meter bands, respectively. In general, the resistance values are higher than one might expect from figures previously published in the amateur literature. On the assumption that this might have been caused by unusually high ground losses, we laid a system of copper ground radials over 60 feet long under the car and repeated the measurements. There was no appreciable difference with or without the ground radial system.

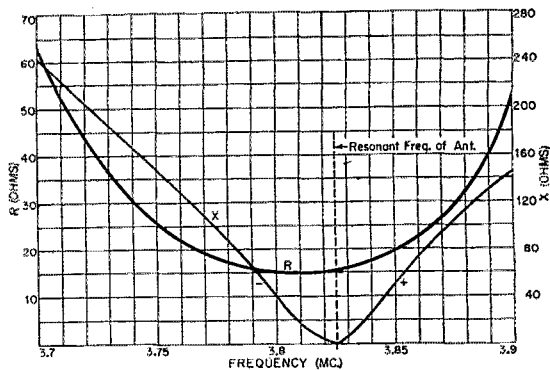


Fig. 2 — Resistance and reactance over the 75-meter band, measured through a half-wave line of RG-8/U. In this and in the curves of Figs. 3 and 4 the resistance of the transmission line used for remote measurement has been subtracted from the total measured resistance.

It should be remembered that what we are measuring at the base of the antenna is the drive-point impedance, which includes the radiation resistance of the antenna, loading coil and antenna losses, ground losses, automobile I^2R and radiation losses, and connection losses. Since the antenna radiation resistance (which produces practically all of the radiated field) is a small part of the R values shown, particularly on 75 and 40 meters, the importance of maintaining low contact resistances and good bonding cannot be overemphasized. The transmitter power is delivered to R and the greater the value of antenna radiation resistance with respect to R , the greater will be the radiated power.

Note that the 10-meter plot, Fig. 4, shows the reactance changing from plus to minus above the resonant frequency of the antenna and the opposite effect below the resonant frequency. This is caused by reactance introduced by the transmission line. Actually, the 28-Mc. reactance curve would be quite flat over the range shown and would show no crossover within this range.

It can be seen that the 75-meter reactance curve is quite steep near resonance. This shows why it is necessary to retune these antennas when the frequency is changed just a few kilocycles. Cancellation of just a few ohms reactance at 75 meters requires more capacity or inductance than is normally provided in the usual coupling circuit, hence the inability to load over a range of more than ± 10 or 15 kilocycles.

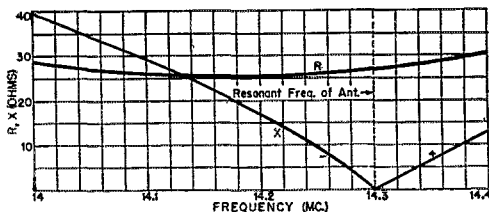


Fig. 3 — Resistance and reactance over the 20-meter band, measured through an RG-8/U line three half-waves long.

The 40- and 15-meter antenna characteristics lie between those shown for 75 and 20 and 20 and 10, respectively.

Application of Data

Having obtained the desired data, we applied it to the design of the coupling circuitry. We had previously determined that a fifteen- to seventeen-foot length of coax would be a satisfactory transmission line from the dash-mounted transmitter to the rear-mounted antenna. Knowing the drive-point impedances at the base of the antenna, we had only to transfer these impedances through the fifteen feet of coax to find the feed-point impedance at the input end of the coax. This was most easily accomplished by the use of a Smith Chart.

Series-tuned coupling circuits were employed to cancel the feed-point reactances. Sufficiently high Q was used in the coupling circuits to effect good loading throughout the bands. In order further to guarantee adequate reserve coupling

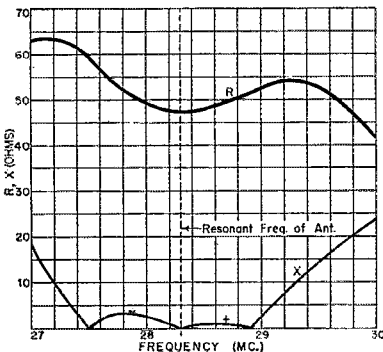


Fig. 4 — Resistance and reactance over the 10-meter band, measured through an RG-8/U line three wavelengths long. The reactance is positive in the region from 27 to 27.5 Mc. and negative between 28.9 and 30 Mc.

capability, concentric coupling and tank coils were utilized, thus providing the maximum coupling coefficient.

The finished equipment has shown excellent loading capability and flexibility on all bands — 10, 11, 15, 20, 40 and 75 — which indicates that the antenna measurements were of sufficient accuracy for practical design application.

Automatic Multiband Antenna-Tuning Networks¹

This discussion covers the theory and operation of multiband antenna-tuning networks which, in conjunction with appropriate antenna elements, provide transmission and reception on more than one band. This type of antenna provides fully automatic multiband operation with only one antenna and transmission line, without the use of mechanical switching devices. Adjustable network elements permit easy and accurate tuning in the installed position.

¹ The described networks and ramifications are covered by patents pending.

In Fig. 5A, which shows a dual frequency antenna with the lower of the two frequencies designated F_1 and the higher F_2 , the conductor length X plus Y , is so chosen as to be resonant at F_2 .

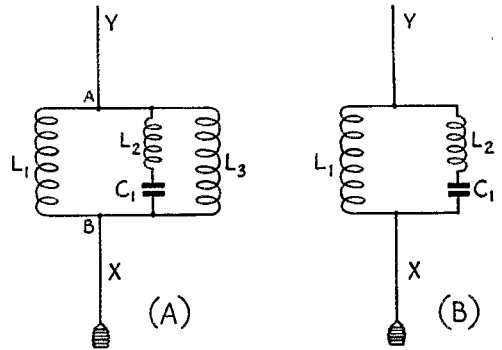


Fig. 5 — Development of the two-band automatic switching network.

The values of L_2 and C_1 are such that series resonance at F_2 occurs between terminals A and B . Since a series-resonant circuit offers zero impedance at the resonant frequency, terminals A and B are electrically short-circuited, thus still leaving the conductor, X plus Y , resonant at F_2 .

Because there is zero impedance across terminals A and B at F_2 , circuit elements L_1 and L_3 may be placed across terminals A and B without effect on the antenna behavior at F_2 . Circuit element L_3 is of a value which, in conjunction with L_2 and C_1 , forms a parallel-resonant circuit across terminals A and B at F_1 . A parallel-resonant circuit presents infinite impedance across its terminals so that the combination of L_2 , C_1 and L_3 is effectively not connected across terminals A and B at F_1 .

The magnitude of L_1 is selected so that in conjunction with conductor X plus Y the system is resonant at F_1 . The parallel combination of L_1 , L_2C_1 and L_3 , in itself, is not resonant at F_1 .

In practical application, either C_1 or L_2 is made variable to provide adjustment at F_2 . L_1 and L_3 are combined in their parallel equivalent and the resultant inductor made variable to provide adjustment at F_1 , as in Fig. 5B.

In the amateur case, conductors X and Y may be lower and upper portions of a center-loaded Master Mobile antenna with L_2C_1 series resonant at 10 meters and L_1 having a value which provides over-all resonance at 20 meters. The adjustments are made by shorting L_2C_1 , grid-dipping L_2C_1 at the center of the 10-meter band, removing the short and checking over-all antenna resonance on 10 meters. (This last step is not necessary with Master Mobile or other similarly dimensioned antennas.) If the over-all system is not resonant, the top of section Y should be trimmed until resonance is obtained. The tap on L_1 should then be adjusted so that the over-all system is resonant on 20 meters. The system is broad enough to cover the whole of the 10-, 11- and 20-meter bands without readjustment.

(Continued on page 108)

Methods for Compact Construction

Packing the Most into the Cubic Inch

BY YARDLEY BEERS,* W2AWH

CIVIL DEFENSE appears to require a large amount of portable radio equipment with a range of not more than a few miles. Also, many amateurs who may prefer DX operation from their home stations may look mainly to local contacts in mobile operation. While traveling, these local contacts can be valuable sources of information concerning the sights of interest and preferred restaurants. At the same time, many prefer apparatus which is very compact and can be inserted or removed from a car very easily.

In an earlier article¹ this author showed that miniature equipment with transmitter power of a few watts could give reliable communication for distances of several miles and therefore could serve these needs. With these thoughts in mind he has built a number of such miniature transmitters and receivers. While these are not suitable for exact duplication, on the whole they have been reasonably satisfactory; therefore the author believes that the techniques which have been employed might be of interest to others. The main part of this article will be devoted to a discussion of these techniques. Then they will be illustrated by a brief description of a 144-Mc. transmitter-receiver. The transmitter, crystal-controlled and having four stages, and the receiver, a five-tube superheterodyne, are contained in a single 4 × 5 × 6-inch box.

*Associate Professor of Physics, New York University. Address mail to 4 Ploughman's Bush, Riverdale 71, New York.

¹Beers, "The Wavelength Factor" (Part III), *QST*, August, 1952.

Separate vs. Combined Units

Considerable space and weight may be saved when the transmitter and receiver are built as a single unit. The minimum amount of metal for a single box that houses both is always less than the amount required for separate boxes. Second, with very low-powered equipment a single audio-frequency amplifier with suitable switching can serve for both. Third, the send-receive switch may be built into the unit, and thus the use of a separate control box and some long cables may be avoided.

On the other hand, two disadvantages of a single unit must be admitted. If either the transmitter or receiver should prove unsatisfactory and need to be rebuilt completely, usually the other one has to be destroyed. Also, single-unit construction is practical only when the combined unit is small enough to fit into a convenient location. The use of subassemblies avoids the first of these disadvantages of single-unit construction, but requires space and weight approaching that of separate-unit construction.

The Shape Factor

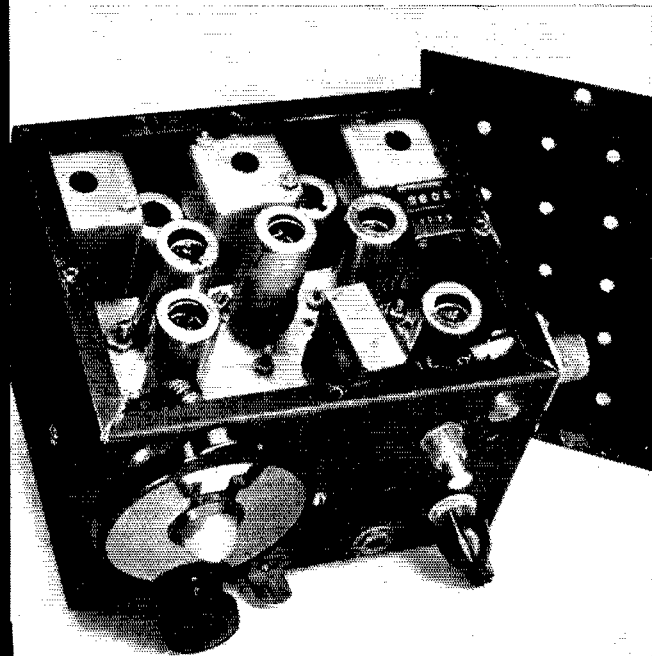
Another principle to be followed comes from the mathematical theorem which states that the rectangular box having the minimum surface area for a given volume is one with all three dimensions equal. A second theorem states that if one of the dimensions is fixed, the surface area is minimum when the two remaining dimensions are made equal. Because the height is generally controlled by the vertical dimensions of the components, the second of these theorems is more directly applicable. But since the height is generally considerably smaller than the other two dimensions, the first theorem suggests

◆

You might think it unlikely, if not impossible, that a 2-meter crystal-controlled transmitter and a superhet receiver could be built into a 4 by 5 by 6 box — but here's the evidence that it can! Not too crowded in this view, either.

◆

QST for



that the most compact arrangement possible would employ a deep chassis with half of the parts mounted upward and half downward.

To be sure, deep chassis make assembly and wiring more tedious. However, it is possible still to abide by the principles that each component (except tube sockets) be removable independently of all other components and that each soldered joint be accessible for soldering with an iron or gun having a power of at least 100 watts. (By the way, let no one suffer the illusion that midget soldering irons should be used on midget equipment!). Furthermore, with modern soldering guns having their own illumination, soldering in deep chassis is considerably easier than it was formerly. At any rate, the amateur and experimenter can tolerate somewhat poorer access than a commercial production line.

The Chassis

A lot of space is wasted in cabinets where the chassis does not make contact with all four walls of the cabinet. Practically all of the many cabinet-chassis combinations available commercially² are unsatisfactory in this respect. Therefore often one must make his own. A compact arrangement can be obtained using commercial "utility" cabinets and mounting the components on a homemade chassis that does make contact with all the walls. Perhaps this should be called a "deck" rather than "chassis" since it is sufficient to have vertical sides merely big enough for a few screw holes. Access to the wiring is achieved by removing the bottom of the cabinet.

Another evil which is likely to result from an arrangement in which the chassis does not make contact with all four walls of the cabinet is that it invites bad shielding. The common procedure with such arrangements is to bring all cables through the rear of the cabinet without bonding the shielding to the cabinet, while the principles of good shielding require that shielding on all cables be bonded firmly at the point of entry, into the cabinet. If this bonding is done, currents induced in the cable shielding will be forced to flow on to the outside of the box, while if the shielding is not bonded at the point of entry these currents may enter the cabinet and be coupled to the circuit therein. In some cases serious leaks can result from this cause. In fact, the author knows of one piece of military electronic equipment which failed to work entirely until one leak of this type was fixed.

Incidentally, the author has devised a simple and satisfactory but not very aesthetic way of bonding the shielding of a cable to a cabinet or chassis at the point of entry. First, a hole barely large enough to clear the cable with its outer insulation stripped off is drilled in the wall at the desired point. Two holes to accommodate machine screws are drilled on opposite sides of the first hole. Two large soldering lugs, bent in the middle at right angles, are then fastened to the wall with

²Notable exceptions were the blank receiver cabinets sold by the National Company. Unfortunately, these do not seem to be listed in their recent catalogs.

• If you're building something that has to be really compact, here are some good suggestions for getting the most gear into the least space. To prove the point, the pictures show how the author got a five-tube superhet and a four-stage crystal-controlled transmitter, both for 2 meters, into a 4 by 5 by 6 box.

the "fingers" outward. The lugs are oriented in such a way that they surround the outward projection of the cable hole. Then the cable, with its outer covering removed for a suitable length, is inserted and the fingers of the soldering lugs are pinched on to it. Solder is applied to the lugs and to the exposed portion of cable shielding. Finally, to give the cable additional strength and to prevent a sharp bend at the edge of the soldering lugs, the whole assembly is wound with a layer or two of electrical tape starting from the wall and extending an inch or so beyond where the outer covering has been stripped off.

Metering Methods

In none of the author's miniature equipments have meters been built in, and only in a few cases have pin jacks for external metering of grid and plate currents been incorporated. The principal reason has been economy of space. Also, the conventional metering methods often are not very sensitive in indicating the performance of low-powered amplifiers, especially in the case of high-frequency multipliers. It was necessary, however, when the equipment was first assembled to be sure that none of the tubes was run beyond its ratings. For this purpose the plate currents have been found by measuring with a volt-ohmmeter the voltage drop across some resistance already in the circuit. For example, the d.c. voltage drop across the modulation transformer has been used for this purpose. For tuning the circuit we use the following accessories:

1) An output indicator consisting of a rectangular coil connected in series with a 1N34 crystal and a pair of pin jacks, the jacks being shunted by a suitable by-pass condenser. The coil has between one and five turns, and its area is about a square inch. One edge of the coil is tightly laced to the antenna lead. A 0-1 milli-ampere meter, usually the basic meter of a volt-ohmmeter, is plugged into the pin jacks when this indicator is used.

2) Some absorption wavemeters. These need not have indicators built in nor do they need complete calibrations. Usually it is adequate to obtain a few points by coupling these to an existing transmitter.

3) A traveling r.f. indicator which is made by a very simple modification of a volt-ohmmeter. An extra terminal is mounted near the existing common (negative) terminal, and a 1N34 crystal is connected between them. Then a piece of flexible wire — sometimes one of the regular test

leads — is connected between the new terminal and whichever of the positive terminals gives the desired sensitivity. The wire is bent into a convenient shape to serve as a pick-up loop to be coupled to the circuit under test. For measurement of the wavelength one of the absorption wavemeters, (2) above, is coupled also to the loop, and its knob is turned until a deflection is obtained.

A grid-dip meter could be used in place of the absorption wavemeters and the traveling r.f. indicator, but it would be more expensive and it would not be convenient for portable operation when there would be no 115-volt line available to plug it into.

Adjusting Circuits

The procedure for lining up a transmitter is to couple the traveling indicator (3) to the oscillator coil and tune the oscillator for maximum deflection. Then it is coupled to the first amplifier, and this circuit is tuned for maximum. Then, with the indicator still coupled to the amplifier, the oscillator tuning is retouched in the hope of getting a further increase in the indication. This procedure is repeated with all the other amplifiers except the final one. If there is any question of any stage's being tuned to the wrong harmonic of the oscillator, the absorption wavemeters are employed.

For tuning the final amplifier, the built-in output indicator, (1) above, is used instead of the traveling indicator. It may also be used as an indicator in neutralizing this stage, and in the transmitter illustrated, it was at least as sensitive in this application as a milliammeter in the grid circuit. This output indicator is also useful for checking the over-all performance of the transmitter. Upon amplitude modulation, the meter should remain steady or kick upward slightly; it should never kick downward. For changing frequency within a band this is the only one of these devices required: all circuits are retuned to cause it to indicate a maximum.

Aligning a Receiver

This same procedure may be adapted for preliminary alignment of the r.f. circuits of a receiver. First, with the help of a wavemeter and the traveling indicator, respectively (2) and (3) above, the local oscillator is tuned to the *signal* frequency. Then the indicator (3) is shifted to the mixer circuit, and this is tuned for a maximum. If there is an r.f. amplifier, the local oscillator is coupled to it with a temporary link circuit, and the procedure used with the mixer circuit is repeated. After these circuits have been tuned, the local oscillator is tuned to its proper frequency. For final alignment, all circuits are peaked on a strong signal.

One other feature which is found to be a virtual necessity on the combined transmitter-

receivers is a switch for turning on the transmitter oscillator when the receiver is in use so that the transmitter frequency may be located on the receiver dial. This is an invaluable aid in operating. Also, the signal derived this way often is useful in receiver alignment.

A 144-Mc. Transmitter-Receiver

The photographs show a unit which illustrates most of these ideas. It was designed for general portable use, both mobile and otherwise, with the possibility of short-period operation from batteries. Therefore it was designed for use with a telephone handset. Also, it was designed in such a way that with the help of a soldering gun the frequency could be shifted to 220 Mc. with a minimum of difficulty, but this feature has not been exploited as yet.

The r.f. section of the transmitter has three 6J6 tubes and, with one exception to be discussed in detail below, employs the circuit used by the Livingston Radio Club.³ The receiver has a 6J6 local oscillator-mixer, two 9003 i.f. stages at 10 Mc., and a 1N34 second detector. More i.f. gain could have been obtained with 6BA6s, 6AK5s, or 6AG5s but at the expense of greater power consumption. A 6AQ5 with suitable switching serves as a modulator in transmitting and as an a.f. amplifier in receiving.

The equipment is housed in a 4 × 5 × 6-inch box with the 4 × 6 top and bottom removable.⁴ Most of the components are mounted on a deck halfway between top and bottom. The space above and below the deck is just barely enough to accommodate the seated height of 6J6 tubes. Originally it was intended to mount the transmitter tubes downward with the circuits on top of the deck and the receiver tubes upward with their circuits below, and in this way stray coupling between them could have been avoided. The deck would have been bent when necessary to provide a little extra clearance for the 6J6 tubes. In previous units, "local" bending of a chassis or of a deck is a trick which has been employed to advantage. However, after assembly was started the plan was changed — for no very good reason — and all of the tubes were mounted upward. No difficulty has been experienced with stray coupling. Because of the greater height of the 6AQ5, its socket is mounted on a separate bracket below the main deck, and the tube protrudes through a hole. The audio tube and the 6J6 converter are mounted at the front of the deck.

The r.f. section extends across the center of the box, while the i.f. amplifier extends across the rear. Because of the great height of the i.f. transformers, the i.f. amplifier had to be mounted on a separate deck. On the front panel, at the left, is the local-oscillator tuning dial. The mixer circuit is tuned with a ceramic trimmer mounted on the deck; this circuit is quite broad and does not need to be retuned for individual stations. Also on the panel is a double-circuit telephone jack for the handset and above it a pair of pin jacks for connecting a pair of headphones in

³ Ehrlich, Wells, and Preston, "A Compact Portable 2-Meter Emergency Station," *QST*, April, 1952.

⁴ On some commercially available boxes the 4 × 5-inch sides are removable.

parallel with the handset receiver. A four-pole double-throw send-receive switch is in the right-hand bottom corner. The pin jacks in the upper right corner are for the output indicator, (1) above, and the push-button switch is for turning on the crystal oscillator with the receiver in use, as mentioned earlier. On the right side of the box is the coaxial antenna connector and, not visible, a d.p.d.t. slide switch for choosing between the two crystals mounted internally. The weight of this apparatus is approximately five pounds. About a pound could have been saved if an aluminum box had been used instead of a steel one.

The present design contains one flagrant violation of good practice. Several components can not be replaced without disturbing other components although all soldered joints can be reached with a soldering gun. It is probable, however, that if suitably chosen new components had been used this bad feature could have been eliminated without resorting to a larger box. As it was, most of the components in the present apparatus came from the junk box, and in many cases they were not the most compact available. In one case a 2-watt resistor was used when a $\frac{1}{2}$ -watt one would have been adequate. The worst-suited components were the i.f. transformers. These were war surplus of unknown origin. Modern ones designed for f.m. broadcast receivers would have been much better; they are considerably smaller in size and would have permitted mounting the i.f. amplifier on the main deck. Furthermore, the electrical performance would have been better since these modern ones are double-tuned while the present ones are only single-tuned.

The tube line-up in the transmitter circuit of the Livingston Radio Club is as follows: one-half 6J6, harmonic crystal oscillator using an 8-Mc. crystal with output on 24 Mc.; one-half 6J6, frequency doubler; 6J6 push-pull frequency tripler; and 6J6 neutralized push-pull final amplifier. In the present circuit the order of frequency multiplication is interchanged: the second half of the first 6J6 is a frequency tripler while the second 6J6 is a parallel-connected frequency doubler. While a push-pull circuit is often preferred to a

parallel one at high frequencies, there are several arguments in favor of the present arrangement. In the first place it has been supposed that greater output from a multiplier chain is obtained by placing the highest multiplying factors as early as possible in the chain. Whether this is always true the author cannot say, but with his home station transmitter operating on 21 Mc. from a 3.5-Mc. crystal, considerably more power is obtained by tripling and then doubling than by using the reverse order. And the present 144-Mc. apparatus produces the same 7 ma. of grid current in the final amplifier as reported by the Livingston Radio Club with their arrangement. Second, if operation is attempted on 220 Mc., the first two tuned circuits need not be touched with the present apparatus, while the output of the second 6J6 is tuned as a tripler and, of course, the final amplifier is tuned to the new frequency. Third, the parallel-tuned multiplier avoids the need for a split-stator condenser and is somewhat easier to assemble.

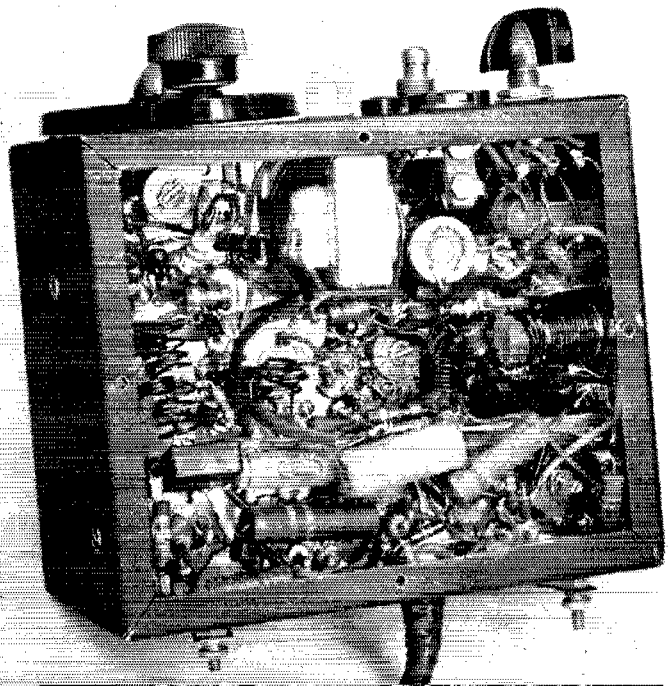
Performance

Satisfactory contacts of several miles over broken terrain have been obtained from the home location using an indoor dipole on the second floor of the house. Good performance is obtained using a "transformerless" 110-volt B supply. From the car, similar results have been obtained using the b.c. whip as a three-quarter wavelength antenna. From a mountaintop location a 59+ report was obtained over a 60-mile path with the help of a portable 4-element beam. Reports, however, indicate that the modulation leaves something to be desired. On receiving, some trouble has been experienced from aircraft signals on the image frequency, but usually this is not serious, and if the author had to choose between the present image troubles and a superregenerative receiver, he would choose the former.

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Here things are really packed in! But, as the author points out, every soldered joint is accessible. Also, considerable space could be saved by using the newer miniature components instead of older types, many of which came from the junk box in this case.

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How To Live Longer

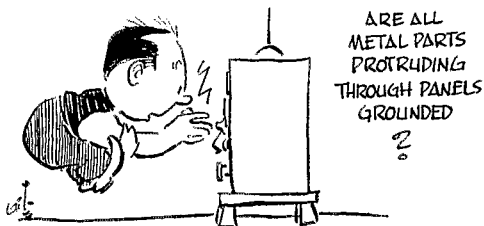
Safety Technique for Ham Equipment

BY DONALD H. MIX * WITS

SEVERAL years ago, shocked by the sudden death by accidental electrocution of one of its foremost members, the Headquarters staff held a series of conferences. The object was to study current ham practices, particularly in regard to transmitter construction and adjustment, and to formulate a set of rules that should minimize chances of accidental injury or death. This set of recommendations was published in the March, 1939, issue of *QST*. Although we continue to lose good, but not always careful, hams at the rate of about three a year through high-voltage accidents, we hope that the publication of the ARRL Safety Code has served to save the lives of many others. For this reason, we feel that it is worth while to remind all hams, once again, that any piece of electrical gear is capable of dealing out sudden death.

TVI, still "just around the corner" when the Safety Code was first published, has not been without its beneficial influence on the design and construction of ham gear. Not only has it forced us into the production of cleaner signals, but the requirement of shielding enclosures has made ham rigs vastly safer to operate and work around. Today, the greatest hazard probably is the one that lurks around the test bench with its upended chassis and temporary power leads. This should be borne in mind when reading the recommendations that follow.

There are two ways by which the danger may be minimized. The first is that the operator train himself to follow a procedure of operation and adjustment that will minimize his chances of coming in contact accidentally with any exposed high-voltage point. The second consists of methods of construction that will provide a minimum



of exposed high-voltage points with which contact can be made. The second should actually be considered supplementary to the first to reduce the hazard, should the operator forget. It is seldom possible to construct a piece of equipment that can be handled indiscriminately with any degree of safety while the power is turned on. Of course, no ham knowingly will touch a danger point with the power turned on. But by following

* Assistant Technical Editor, *QST*.

• Over a period of years a goodly number of hams have met death at the hands of their equipment. The really surprising thing is that there have not been more of them, considering the high voltages often used in transmitters. Especially in these days when thousands of new hams are coming into the game with limited background in things electrical, it is important to make every one of them realize the very real danger of death or serious injury that may lie in wait behind an innocent-looking panel.

This article deals with the things that every operator should observe in building and operating his equipment with a minimum of danger not only to himself but to the rest of his household. Read it carefully and make a firm resolution that you won't be the next one!

certain rules, the chances of a thoughtless act having a tragic result can be minimized.

Rules for the Operator

A) Kill all power circuits completely before touching anything behind the panel or inside the chassis or enclosure.

The easiest way to make sure that this rule is followed is to make the operation of turning off all power a simple one. A single main switch should be provided that cuts off all power from the equipment. The use of *one* plainly-labeled switch for this purpose, instead of several individual switches for various circuits, obviously not only makes it easy for you to become automatic in eliminating all danger, but it also makes it readily possible for someone else not familiar with control-circuit details to cut the power off quickly should you forget and get "hung up" across the high voltage.

Toggle switches and other similar spring-operated switches, or relays of the sort most frequently used by hams for power control, are not sufficiently reliable for this important purpose. While automatic interlock circuits are fine as secondary devices to help protect you in case of forgetfulness, don't let your life depend on them. They have been known to fail, particularly when they control relays that may stick closed at any time.

There are at least two devices for cutting off all power to the transmitter that are about as foolproof as anything could be. The arrangement is shown in Fig. 1. A and B are similar circuits for two-wire (115-volt) and three-wire (230-volt) systems. S is an enclosed double-throw knife

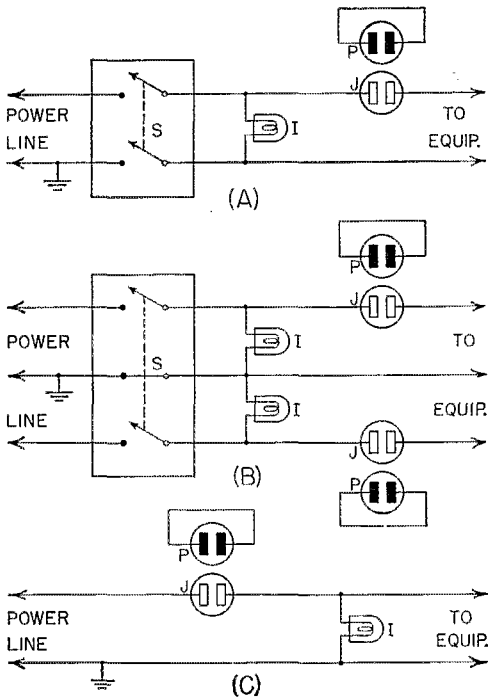


Fig. 1—Reliable arrangements for cutting off all power to the transmitter. *S* is an enclosed double-pole knife-type switch, *J* a standard a.c. outlet, *P* a shorted plug to fit the outlet and *I* a red lamp.

A is for a two-wire 115-volt line, B for a three-wire 230-volt system, and C a simplified arrangement for low-power stations. All are discussed in detail in the text.

switch of the sort usually used as the entrance switch in house installations. *J* is a standard a.c. outlet and *P* a shorted plug to fit the outlet. The switch should be located prominently in plain sight and members of the household should be instructed in its location and use. *I* is a red lamp located alongside the switch. Its purpose is not so much to serve as a warning that the power is on as it is to help in identifying and quickly locating the switch should it become necessary for someone else to rescue you.

The outlet *J* should be placed in some corner out of sight where it will not be a temptation for children or others to play with. The shorting plug can be removed to open the power circuit if there are others around who might inadvertently throw the switch while you're working on the rig. If you take the plug with you, it will prevent someone from turning on the power in your absence and either injuring themselves or the equipment or perhaps starting a fire.

Those who are operating low power and feel that the expense or complication of the switch isn't warranted can use the shorted-plug idea as the main power switch. In this case, the outlet should be located prominently and identified by a signal light, as shown in Fig. 1C.

The test bench ought to be fed through the main power switch, or a similar arrangement at

the bench, if the latter is remote from the rig.

B) Never permit anyone else to switch the power on and off for you while you are working on equipment.

Always do the power switching yourself. Having someone else do it is too risky, even though you are giving the orders. There's too much chance of a misunderstanding and, after all, you don't want to make someone else bear the responsibility for your execution.

C) Never put your hands into any gear without first using a grounded probe at all exposed points.

Bleeder resistors, even though conservatively rated, are not infallible, and a fully-charged filter condenser can be just about as lethal as the supply with the power turned on. The probe will also serve as a secondary line of defense in case you should forget to turn the power off. Short-circuit the power supply with the probe instead of your arms. Always jab a bare terminal with the probe before changing plug-in coils. This is a good habit to form, even though you may be using parallel feed in your present rig. It may save your life some day when you're working on another piece of gear of your own or belonging to someone else. Touch the probe to all exposed points just in case a burn-out makes one point cold while others are still hot.

The sketch of a suitable homemade probe is shown in Fig. 2. The handle of the probe ought to be long enough so that you don't have to put your hand close to the equipment to use it. A total length of about 18 inches should be safe. The insulating handle and wire are to save you in case the ground lead opens up. It is obvious,

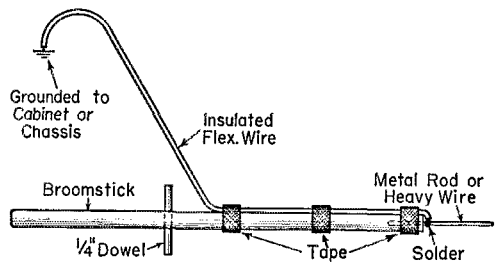


Fig. 2—A homemade insulated grounding probe. Such a device should always be used to ground exposed high-voltage points before touching anything behind the panel. It serves to protect the operator against charged filter condensers or if he forgets to turn the power off.

of course, that you must be sure that there is a solid circuit between the grounding point of the probe wire and the negative terminal of the plate supply (and positive terminal of the bias supply).

If you are working on gear on the test bench, make sure that power supplies and probe are connected to the same ground and that you use the probe at each power-input terminal before touching anything underneath the chassis.

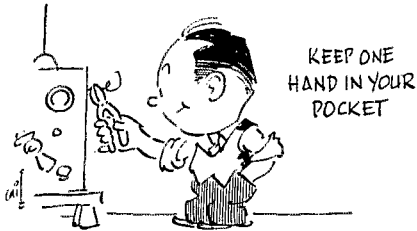
D) When shooting trouble, make sure that you are well clear of the gear before turning on the power.

Don't place yourself in an awkward or unbal-

anced position while you push the key with one hand and try to stretch around a corner to see what's happening behind the panel. If you should slip or lose your balance, you might fall into the high voltage. Use a push button, or other momentary-contact switch on the end of a cord for power control, so that you can keep yourself well in the clear. The push-button-type switch opens automatically and this might at least keep you from frying if an accident happens.

E) Stay clear of grounded metal while you're working on the rig.

Don't lean against the cabinet, chassis, or other grounded metalwork. And, above all, don't



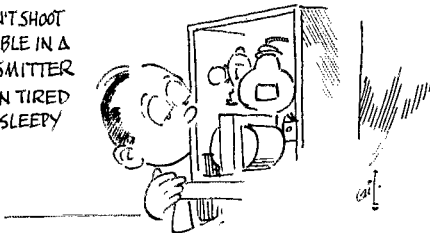
wear headphones while you're working on equipment or changing coils. While the voltages in a receiver, exciter or speech amplifier may not be above 250, your chances will still be pretty slim if your head is at one end of the circuit. A good rule to follow is to keep one hand in your pocket. There will be less danger of a shock passing through a vital part of your body. If the rig or test bench is in the basement, you ought to provide a rubber mat around it.

F) Never adjust variable links by hand.

Adjustable links can be highly dangerous with a series-feed tank circuit. Not only does manual adjustment bring your hand too close to the tank coil, but the clearance between the link and the tank coil is never very great, making contact between the tank coil and link all too easy. If the coil design doesn't provide a means of fitting the link with a panel control, use a long stick for adjustment. Shielded links or links grounded at one side or a center tap will prevent high voltage from appearing unexpectedly on the link cable.

G) Don't work on equipment (or try to change plug-in coils) when you're tired or otherwise not up to snuff mentally.

DON'T SHOOT TROUBLE IN A TRANSMITTER WHEN TIRED OR SLEEPY



Mental or physical fatigue is invariably accompanied by a certain amount of absentmindedness. Wait until you are fully alert.

H) Use special care when checking tank circuits with an absorption wavemeter.

The use of absorption wavemeters in checking tank-circuit resonances and harmonics has become everyday practice, and yet what could be more dangerous than a bare coil stuck in a hot tank circuit while the operator watches the indicator rather than where he is putting the coil? Use a well-insulated link line between the tank and wavemeter coils and ground the case of the wavemeter (which should always be of metal) with a clip lead.

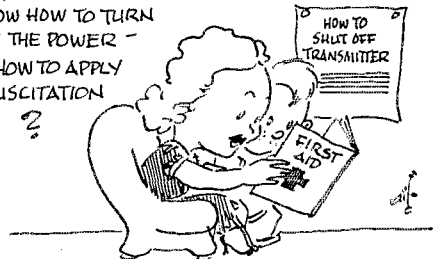
I) Never pull test arcs from the transmitter tank circuit.

This warning really shouldn't be necessary, of course. It is singled out from other foolhardy conduct around a transmitter only because a great many of us have a natural temptation to do it. The r.f. may not cause anything more than a nasty burn, but an r.f. arc isn't an insulator and can easily conduct d.c. through a pencil or screwdriver. Play safe and resist the temptation.

J) Teach members of your household how to apply artificial respiration.

Many lives have been saved after electrical shock by the prompt and proper application of artificial respiration by a bystander. The usual methods used by physicians in detecting life in

DO MEMBERS OF YOUR HOUSEHOLD KNOW HOW TO TURN OFF THE POWER - AND HOW TO APPLY RESUSCITATION



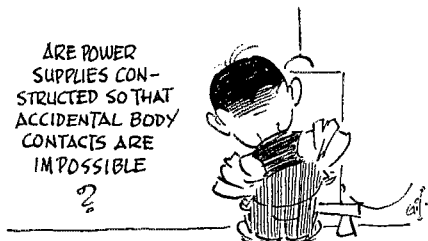
victims of accident often do not apply in the case of electric shock. Cases are on record where victims, apparently dead, have been brought around after as much as four hours of seemingly hopeless pumping. Regardless of other indications, hope should not be given up until there is definite indication of rigor mortis. Prompt action is highly important. Don't wait for a pulmotor to arrive. Instruction sheets can be obtained from your local Red Cross office and often at fire or police stations. If possible, always have someone else in the room while you're working on equipment.

However, a most-important point is that everyone should be warned of the danger of contact with a person who has been injured and who may still be in contact with the high voltage. Make sure that members of your household understand that the power *must* be turned off *first*. There have been several instances where women and children have been killed or injured in attempting to remove an unconscious person still in contact.

Equipment Design and Construction

So much for the rules of operator conduct in the presence of electrical equipment. If they are followed religiously, there is small chance of an

ARE POWER SUPPLIES CONSTRUCTED SO THAT ACCIDENTAL BODY CONTACTS ARE IMPOSSIBLE ?



accident. However, forgetfulness is a part of human nature and the unfortunate part of it is that electricity has no sympathy for a first-time offender. The first moment of forgetfulness may be your last! Therefore, it is the sensible ham who will construct his equipment so that it won't be easy to get hurt even if he forgets.

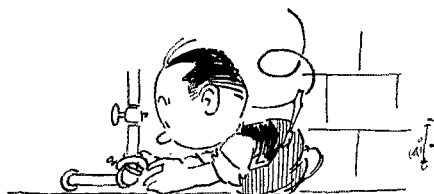
1) Panel Controls and Metering

It shouldn't be necessary to point out that every control shaft extending through the front of the panel should be at ground potential. To make certain of this, ground every control shaft to the panel either directly or by the use of panel-bearing units wherever an insulating shaft coupling is used. The frames of key or metering jacks must be fastened to the grounded panel. Never mount them with insulating washers. This, of course, essentially dictates metering and keying in the cathode or center tap.

If you want metering in the positive leads, use meter switching instead of jacks. Meters, unless connected in the cathode or centertap lead, should be recessed so that there will be no danger of contact with the adjusting screw.

2) Power Supply

Enclose all power supplies, or construct them so that contact with any part of the circuit is impossible. You don't want to stick your knee



THE CABINET SHOULD BE GROUNDED TO A WATER PIPE OR OTHER GOOD EARTH CONNECTION

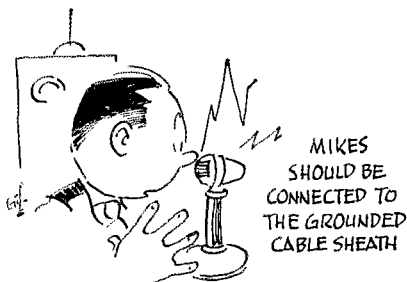
into the power supply while you're concentrating on keeping clear of the r.f. units. Power supplies seldom need adjustment, and there is no reason why they can't be enclosed. However, most modern power-supply components are designed so that they may be mounted with their terminals protruding under the chassis where there is normally little chance of accidental contact. Rec-

tifier plate caps should be of the insulated type. Similarly there should be no exposed terminals. Use insulated plug-type connectors designed for the proper voltages at the test bench as well as at the rig. In using these connectors, make sure that all live connectors are of the female type. For example, always use a female connector on the power-supply chassis, and another at the transmitter end of the cable. Use a male connector on the transmitter chassis.

All negative plate-supply and positive bias-supply terminals should be connected to the chassis and the chassis connected to a water pipe or other good ground connection. Then there will be no chance of your serving as a ground wire should some component break down, making the chassis hot. For the same reason, all transformer and choke cores and other metalwork not normally a part of the electrical circuit should be grounded to the chassis. If the power supply is to be mounted above other units, its chassis should be provided with a bottom cover plate.

Every power supply should be equipped with a conservatively-rated bleeder resistor. If the bleeder resistor is placed on top of the chassis for ventilation, cover it with screening or perforated metal.

In these days of TVI, it is good practice to use shielded wire for external power cabling. If the shielding is grounded, it will protect you in case of an insulation breakdown.



3) R. F. Units

The requirement of grounded shielding enclosures for TVI makes the use of coil switching highly desirable for the sake of convenience. It also provides a great factor of safety. Since it is almost impossible to change a plug-in coil in a shielded rig without making contact with grounded metal as well as the coil, it ought to be made a general rule to use parallel feed in all circuits where plug-in coils are used. If you must use series feed, use coil switching. However, it doesn't do much good to use parallel feed if there are other exposed high-voltage points in the vicinity of the coil. Use insulated plate connectors for tubes with cap terminals, insulated plate leads, and place r.f. chokes under the chassis or cover up choke terminals and those of blocking condensers.

Pi-section tank circuits do not provide a d.c. path to ground in case the blocking condenser

(Continued on page 110)

QRM Rejection the Simple Way

A Low-Cost Method of Cutting Down Interference

BY LEWIS G. McCOY,* W1ICP

ASK any ham what his biggest operating headache is and nine times out of ten it will be the same story — QRM. It can be doggone discouraging to have contact after contact messed up by interference. However, we don't have to grin and bear it! There are methods of improving receiver selectivity that, when applied, will help relieve the interference problem. The method we are going to discuss is one which uses a device applied to the audio end of the receiver. It is a simple and inexpensive means of eliminating an interfering signal. There is nothing new about this gadget — it was first described in *QST* in 1939 by W1VW.¹ But like many good gimmicks in amateur radio, such items need to be revived from time to time, to let the newer crop of amateurs know that such devices exist.

The hetrofil (heterodyne-filter) consists of three variable resistors, two fixed resistors, two paper condensers, a headphone plug and jack. The total cost of the unit is \$3.50 and it can be put together in about one hour's time. However, before discussing actual construction details, let's talk about receiving for a minute so we'll have a clear picture of what the hetrofil will accomplish.

As we know, a c.w. signal is not modulated. To hear one, we must insert another signal into the receiver and beat the two signals together to hear the c.w. signal. That's why we need a beat frequency oscillator in a receiver. To get a clear picture in our minds, let's assume that we tune the beat oscillator signal to one point and leave

it there. If we tune a c.w. signal to the same frequency, the two signals will be zero beat and neither will be audible. As we tune the c.w. signal away from the fixed b.f.o. signal, the c.w. signal will beat against the fixed signal, causing an audio note that we can hear. The pitch of this audio note will depend on the frequency difference between the fixed signal and the c.w. signal. If it is 1000 cycles (1 kc.) we will have a 1000-cycle audio note. If it is 2000 cycles we'll have a 2000-cycle note, and so forth. For practical purposes, it can be said that the average receiver has an audibility range of from zero beat to approximately eight to ten thousand cycles.

Keeping the idea of a fixed b.f.o. signal in our minds, let's carry our thinking a little further. Suppose we have two c.w. signals separated by 2000 cycles. They are close enough to interfere with each other, and if we want to copy just one of them, our problem is to get rid of the interfering signal. If we tune the interfering signal so that it is zero beat with the b.f.o., the beat frequency becomes so low it can no longer be heard. By the same process, we can tune the interfering signal to such a high pitch that we cannot distinguish it. These two methods are tricks old-timers use in cutting down QRM. This method of tuning out interference works fine when there are only two signals present but what happens when there are three signals coming in together? Here is where we can put the hetrofil to work.

The hetrofil can be adjusted to eliminate any audio beat note that appears in the 300- to 8000-cycle range. Using three signals for an example,

* Technical Assistant, *QST*.

¹ Woodward, "Hetrofil — An Aid to Selectivity," *QST*, Sept., 1939, p. 11.



View of the filter ready for use. The plastic box makes a neat chassis and also serves to keep dust off the parts.

let's put one at 2000 cycles, one at 4000 cycles, and the other at 6000 cycles. We can dispose of the 2000-cycle note by tuning it to zero beat with the b.f.o., thus getting rid of one of the interfering signals via the tuning method. This leaves us with signals having a 2000-cycle note and a 4000-cycle note. Let's assume that the 4000-cycle signal is the one that is interfering. We adjust the hetrofil so that the 4000-cycle note is attenuated, and now we have our 2000-cycle signal free of QRM. If it is the 4000-cycle note we wish to copy, we can adjust the hetrofil to take out the unwanted 2000-cycle signal. This is one example of eliminating two interfering signals. If the receiver in use has a crystal filter, the hetrofil can be used in conjunction with the filter to improve the selectivity of the receiver. We have only talked about getting rid of c.w. interference but the hetrofil will also serve well in cutting down 'phone heterodynes. In the case of a 'phone signal being heterodyned, the hetrofil is adjusted to reject the unwanted beat.

Construction

It was decided to use the lid of a plastic icebox dish for the chassis. These plastic boxes are available in all dime stores and are easy to work with,

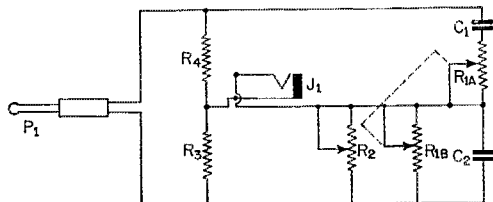
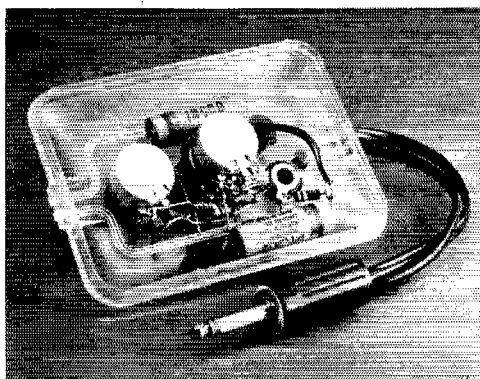


Fig. 1 — Circuit diagram of the audio heterodyne filter.

- C_1, C_2 — 0.1- μ fd. paper.
- R_{1A}, R_{1B} — 10,000-ohm dual variable (IRC No. Q11-116 and M11-116).
- R_2 — 50,000-ohm variable (IRC No. Q11-123).
- R_3 — 150 ohms, $\frac{1}{2}$ watt.
- R_4 — 330 ohms, $\frac{1}{2}$ watt.
- J_1 — Single-pole open-circuit jack.
- P_1 — Two-way headphone jack.

although some caution should be observed when drilling the material. If too much pressure is applied to the drill, the plastic is likely to crack. In the hetrofil shown in the photographs, the location of the mounting holes was marked and then drilled with a small drill. The holes were then enlarged with a larger drill.

Before actually wiring the hetrofil, first determine if your receiver has high- or low-impedance output at the headphone jack. Your receiver instruction book may give this information in the description of its audio section. If it doesn't, it is a simple matter to check the circuit diagram of the receiver and see if it is high- or low-impedance output. If the headphone-jack leads are connected to the secondary of the audio output transformer, the receiver has low-impedance output. If the headphone leads are capacity-coupled to the plate of the audio tube, the receiver is high-impedance output. Most of the



Bottom view of the audio filter showing placement of parts. A rubber grommet is used to prevent chafing of the input plug leads. R_2 is at the left.

present-day receivers have low-impedance output. If your receiver has low-impedance output, the values shown in Fig. 1 are suitable. If the receiver has high-impedance output, R_3 should be 6800 ohms and R_4 should be 15,000 ohms. This is to provide a better match between the output of the receiver and the input of the hetrofil, and thus minimize any loss in receiver volume caused by the use of the hetrofil.

With the hetrofil viewed as in the bottom view photograph, the following terminals on R_{1A} , R_{1B} , and R_2 all are joined with [a single wire: the two right-hand terminals on R_{1A} , and the two right-hand terminals on R_{1B} . A lead is run from this same wire to one of the terminals on J_1 . Also connected to this terminal is one side of C_2 . The other lead of C_2 is soldered to the left-hand terminal on R_{1B} . Also connected to the left-hand terminal of R_{1B} is a lead from the left-hand terminal of R_2 , one side of R_3 , and one lead from P_1 . One lead of C_1 is connected to the left-hand terminal of R_{1A} and the other lead to a junction of leads from R_4 and P_1 . The two remaining leads from R_3 and R_4 are connected to the remaining terminal on J_1 .

Operation

After the hetrofil is wired, the plug, P_1 , can be plugged into the headphone jack on your receiver. Then plug your headphones into the hetrofil and the unit is ready for use. You will probably notice a slight decrease in audio with the hetrofil in use but most receivers have audio volume to spare. Tune the receiver until you find two signals of nearly the same beat note (this should be easy!). Pick out the signal you wish to copy, and adjust the dual potentiometer, R_1 , to minimize the undesired signal. After you've reached the minimum response point, adjust R_2 for further attenuation of the interference. This last adjustment will be broad, since the setting of R_2 is not as critical as that of R_1 . You'll find that when the hetrofil is properly adjusted, an interfering signal is greatly reduced in volume. Once you become accustomed to using the hetrofil, many of those uncompleted QSOs will be "100 per cent copy."

Magnetostriction Devices and Mechanical Filters for Radio Frequencies

Part I—Magnetostriction Resonators

BY WALTER VAN B. ROBERTS, * W2CHO

IRON is, of course, the most commonly used magnetic material. But nickel is also strongly magnetic, as is easily seen by the way it sticks to a magnet. In addition, nickel is relatively strongly magnetostrictive; that is, the length of a piece of nickel will change when it is magnetized. The actual amount of change is very small, not over one part in 20,000, but even this small amount is large compared with what is found in most magnetic materials, and is sufficient to be put to practical use.

Fig. 1 shows how the length of a piece of nickel wire varies with its magnetization. The same sort of curve applies to other magnetostrictive materials, except that the amount of change is usually

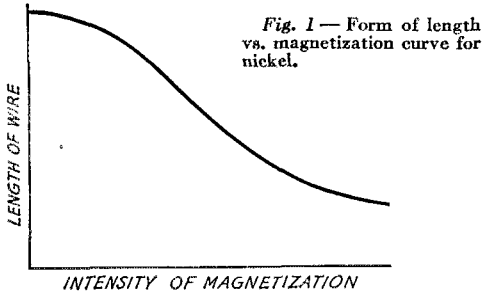


Fig. 1—Form of length vs. magnetization curve for nickel.

much smaller and some materials lengthen instead of shrinking when magnetized.

Fig. 2 shows how mechanical vibrations can be produced in a nickel wire by means of magnetostriction. The permanent magnet is placed near enough to the wire to cause it to shrink about half the maximum possible amount. Then when current flows in the coil it will either decrease or further increase the amount of shrinkage, depending on whether the magnetizing effect of the coil opposes or aids the field of the magnet. If the current is alternating, the length of the wire will vary at the frequency of the current. The constant field of the magnet will be called the magnetic bias, and the field of the coil will be called the driving field. (The bias could also be produced by a d.c. component of current in the coil, or by permanent magnetization of the nickel.) Thus, the magnetic bias and the driving field correspond somewhat to the voltage bias and signal voltage on the grid of an amplifier tube.

If the frequency of the driving field is not near the natural frequency of vibration of the wire, the variation in the wire length will be extremely small. But if the piece of wire in Fig. 2 is one inch

• Recent developments in the field of mechanical resonators may foreshadow increasing applications in our amateur gear, especially in high-selectivity receivers and single-sideband filters. This is a "get-acquainted" article, outlining the principles of magnetostrictive and mechanical resonators and showing how they are applied. There is plenty in this and in subsequent parts of this article to whet the experimenter's appetite—especially since some of the currently hard-to-get materials may be more readily available in the near future.

long and the frequency of the driving current is about 100 kc., a much greater amplitude of vibration occurs. The one-inch length of wire has a natural frequency of longitudinal vibration at about 100 kc. When the driving-current frequency is made to match the mechanical resonance of the wire, considerable mechanical power is transferred to the wire and the vibration of the wire reacts upon the driving coil just as though the wire were a sharply tuned electrical circuit loosely coupled to the driving coil. This reaction can be observed by connecting the driving coil to a *Q*-meter. Then when the frequency of the *Q*-meter is slowly shifted through the resonant frequency of the wire, the apparent *Q* of the coil takes a sharp dip. The sharpness of the dip depends on the mechanical *Q* of the wire resonator.

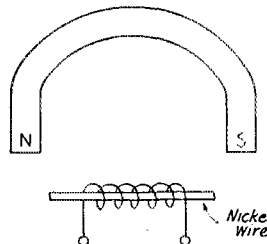


Fig. 2—Longitudinal type magnetostrictive resonator.

The term "mechanical *Q*," as applied to a mechanical resonator, means the number of cycles of vibration required for the amplitude to die down to 4.32 per cent of its original amplitude after the driving force is removed. (This same definition applies to the *Q* of a tuned circuit). In general, the *Q* of a mechanical resonator is much higher than that of the best tuned circuits and this is one of the great advantages of mechanical resonators.

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Ferrite Resonators

The use of nickel and other metal rod resonators in the manner illustrated in Fig. 2 is nothing new, but has not been very widespread because resonator materials known heretofore have been

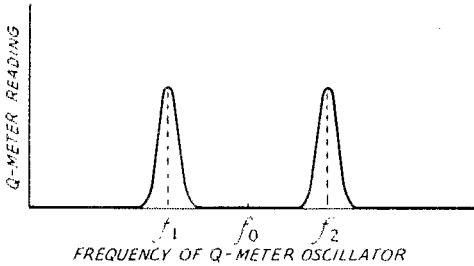


Fig. 3 — Q-meter response as the driving frequency to a pair of coupled circuits, both tuned to the same frequency, f_0 is varied. The peak separation increases with the coefficient of coupling.

metallic and hence cause large eddy current losses which spoil the Q of the driving coil. Also, the mechanical Q of a nickel resonator is only a few hundred. (Many metals have mechanical Q s up to ten thousand, but are not magnetostrictive). There has recently become available, however, a new group of magnetic materials, called ferrites, that are much better adapted to magnetostrictive resonator use. Ferrites are more in the nature of ceramics than metals, and may have

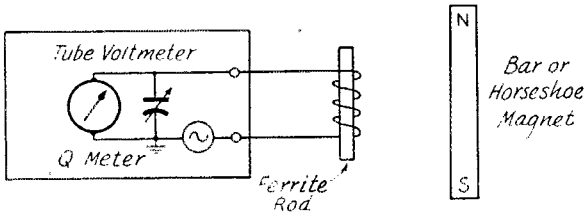


Fig. 4 — Set-up for measuring the coefficient of coupling between a tuned circuit and a ferrite-rod magnetostriction resonator.

high electrical resistivity so that eddy-current losses are negligible. Their mechanical Q is of the order of several thousand, and some are strongly magnetostrictive. Their permeability is usually high and when a ferrite resonator is put in a coil it may greatly increase the Q of the coil itself. The longitudinal vibration frequency of a ferrite rod is about 103 kc. divided by the length of the rod in inches.

Ferrites are made by mixing powdered Fe_2O_3 with various proportions of other metallic oxides, pressing to the desired shape, and firing at 1300 to 1400 degrees C. The mix can also be extruded in the form of rods or tubes. After firing, it is too hard and brittle to machine. It can be ground or cut with a diamond saw. The permeability, magnetostrictive activity, and improvement of coil Q are determined by the proportions of the oxides forming the ferrite. No one composition makes all these quantities maximum; the composition to use depends upon the job

it has to do. A good magnetostrictive ferrite can be made of "equi-molar" proportions of iron and nickel oxides; i.e., 159.68 grams of Fe_2O_3 and 74.69 grams of NiO . More detailed information about ferrites may be found in the September, 1950, issue of the *RCA Review*.

Coefficient of Coupling

When two electrical circuits of low losses are tuned to the same frequency (f_0) and coupled together, two resonant frequencies are found in the system. For example, if one of the circuits consists of a coil and the variable condenser of a Q-meter, then as the frequency of the Q-meter is varied, two peaks of the meter will occur as shown in Fig. 3. If the second circuit is sufficiently low-loss, the coefficient of coupling between the two circuits is given by $\frac{f_2 - f_1}{f_0}$.

Now let the second circuit be removed and a ferrite resonator (suitably magnetically biased) put in the first coil, as shown in Fig. 4. With the coil tuned to the same frequency (f_0) as the resonator, the Q-meter will behave exactly as before.

Hence, the quantity $\frac{f_2 - f_1}{f_0}$ may be defined as the coefficient of coupling between the coil and the ferrite. This quantity is a more useful measure of the magnetostrictive activity of the material for circuit calculations than the "magnetostrictive coefficient," which merely gives the amount of stretch or shrink in length that can be produced by magnetizing. The coefficient of coupling can be decreased by removing the resonator more or less from the coil or by decreasing the bias, but cannot be increased beyond an upper limit determined by the nature of the material. This limit is of the order of 10 per cent for ordinary coils and ferrites made for good magnetostriction.

From the coefficient of coupling it is easy to show that a coil with a ferrite resonator in it (Fig. 5A) is equivalent to Fig. 5B. Here L is the inductance measured at a frequency far from the ferrite resonance and k is the coefficient of coupling measured as described above. The condenser and resistor give the equivalent circuit the same frequency and Q as the ferrite resonator.

Ferrite Oscillator

Probably the simplest use of a ferrite resonator is as the frequency control element of an oscillator. Fig. 6 shows a suitable circuit. In the absence

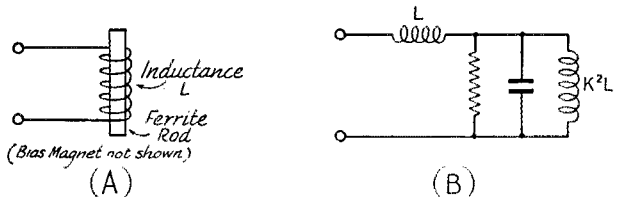


Fig. 5 — The equivalent circuit, B, of a magnetostriction resonator coupled to a coil.

of vibration of the resonator there is nothing but inductive reactance between *P* and ground, and therefore oscillations cannot occur. Just above the resonant frequency of the ferrite, however, the total effective reactance between *P* and ground is capacitive (see Fig. 5B). The circuit will then oscillate if *L* and *C* are tuned to the ap-

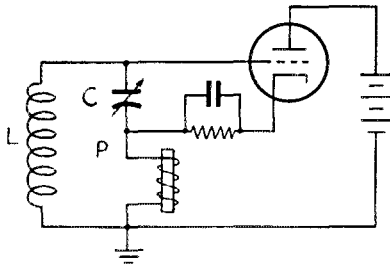


Fig. 6—Magnetostriction oscillator using a ferrite rod.

proximate frequency of the ferrite—that is, provided there are not too few turns on the ferrite coil, the tube transconductance and coil *Q* are not too low, and the coefficient of coupling between the ferrite and its driving coil is not too small. The cathode resistor provides initial grid bias which makes oscillation start more easily. The magnetic bias not only affects the ease of starting but will also be found to have some control over the frequency of oscillation, perhaps to

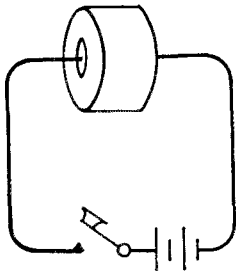


Fig. 7—Method of permanently magnetizing a ferrite torus.

the extent of a per cent in some cases. With this circuit, oscillations should be obtainable up to a few hundred kc., using a 6J6 tube running about 2 mils plate current per plate, even with the ferrite driving coil reduced to a very few turns.

Permanent Bias

A rod of steel or nickel can be permanently magnetized so that it becomes a bar magnet with north and south poles at its ends. Rods of cobalt ferrite can similarly be permanently magnetized. Unfortunately, however, the kind of ferrite that has good magnetostrictive action is demagnetized so easily that the poles at its end, created by magnetizing the rod, act to demagnetize it as soon as the magnetizing field is removed. This drawback does not occur when there are no poles developed by magnetizing. For example, if a ferrite torus (or any piece of ferrite with a hole in it) has a wire passed through the hole and connected briefly to a battery of 1½ to 6 volts, as shown in Fig. 7, the ferrite will be magnetized

with closed loops of magnetic flux linking the wire. No free poles are produced so the magnetization remains and can be used as permanent bias for resonator operation in the modes of vibration that require a bias of this sort.

To produce permanent circular bias by means of a flash of current requires that the ferrite have a hole in it. However, it is possible to produce a certain amount of "circular bias" in a solid piece of ferrite by means of magnets, as shown in Fig. 8. Here two horseshoe magnets are put together except for a gap that is considerably smaller than the ferrite to be magnetized. The ferrite is placed against the gap as shown, then moved away. As a result of the easy saturation of ferrite, a small permanent circular bias remains. However, it is much better to use the current method if there is a hole in the ferrite.

Vibrations Using Circular Bias

The simplest type of vibration that uses circular bias is the radial vibration of a ferrite torus with

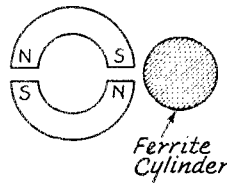


Fig. 8—Inducing permanent circular magnetization in a ferrite cylinder or disk.

a toroidal driving winding on it. The flux produced by the winding alternately adds to and subtracts from the permanent bias flux, thus causing the circumference of the torus or ring to vary at the frequency of the driving current. As the circumference varies so must the radius, and the actual motion of all parts of the ring is in and out from the center. To give an idea of dimensions, a thin ferrite ring one inch in diameter would resonate in this mode at about 65 kc., and for other diameters the frequency would be equal to 65 divided by the diameter in inches.

The maximum possible coefficient of coupling between a tuned circuit and a ferrite resonator is

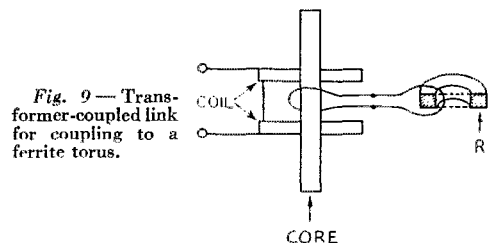


Fig. 9—Transformer-coupled link for coupling to a ferrite torus.

obtained when the coil is wound toroidally on a radially vibrating ring and the bias is optimum. A toroidal winding of many turns is a nuisance to put on, especially since it must not be tight on the ring, which would interfere with the vibrations. However, a few turns may suffice for some purposes. For example, oscillations can be produced in the circuit of Fig. 6 if point *P* is connected to ground by a single short piece of wire passing through a ferrite ring. This might be called a

"one-turn toroidal winding." Of course, oscillations are obtained more easily if several turns are used. The effect of a multiturn winding may be obtained to some extent by transformer action,

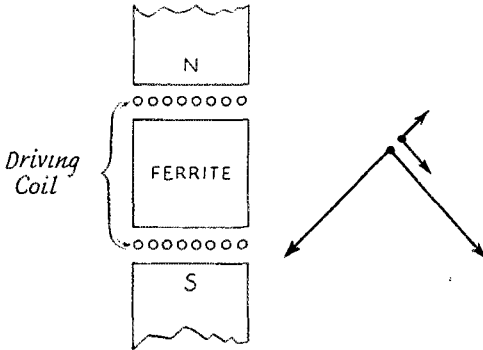


Fig. 10 — Crossed bias and exciting fields result in shear stresses in a ferrite rod of rectangular form, as shown by the vector diagram at the right.

as shown in Fig. 9. Here a multiturn winding, consisting of two "pies" on a magnetic core, acts as one winding of the transformer while a turn or two of wire around the core acts as secondary winding and is connected to a one-or-more turn toroidal winding on the ferrite resonator ring, *R*. This arrangement works very much as if the many turns were wound directly on the resonator; that is, provided a good high-permeability core is used, such as a piece of high-permeability ferrite. The core, of course, does not vibrate mechanically; it acts only in the ordinary way as the core of a transformer.

Crossed Fields

So far it has been assumed that the driving flux alternately adds to and subtracts from the bias flux. What happens if these fluxes are at right angles to each other? One way to figure this out is to suppose we have a square piece of ferrite with a bias field across between one pair of opposite edges and a driving field at right angles, as shown in Fig. 9. The bias field may be represented by a large vertical vector and the driving field by a small horizontal one. But it is equally possible to consider the bias vector as composed of two large diagonal vectors and the driving field as the resultant of two small diagonal vectors, as shown. It is now seen that along one diagonal the fields aid and along the other diagonal they oppose.

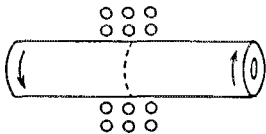


Fig. 11 — Coupling to a ferrite cylinder in shear vibration.

Thus, the effect of the driving field is to distort the square into a slightly diamond shape. Such a distortion is called a "shear" and the perpendicular arrangement of bias and driving fluxes can be

used to drive resonators whose vibrations set up shearing stresses. Perhaps the simplest example of such a resonator is a cylinder or pipe vibrating torsionally; that is, one end rotates one way while the other end rotates in the opposite direction. The center does not turn but the greatest shearing stress or twisting force occurs there. Fig. 11 shows a ferrite tube, permanently biased as previously explained, with a driving coil located over the node of motion (shown dotted). The frequency of a torsional resonator of this sort depends only on its length, and for ferrite the frequency in kilocycles is approximately 65 divided by the length in inches. (It is just a coincidence that a magnetostrictive ferrite has approximately the same frequency for a torsional resonator of length *L* as for a radially vibrating ring of diameter *L*.)

Another example of a vibration mode involving purely shearing stresses is shown in Fig. 12A. Here the outer portion of a disk rotates in one direction while the inner portion rotates oppositely. Between these rotations is a ring of no motion which is called a "nodal ring." This type of vibration might be called concentric shear because the motions are in concentric circles and

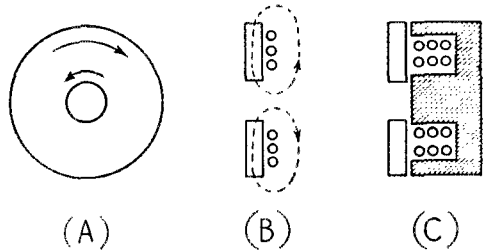


Fig. 12 — Another type of vibration in a ferrite torus. B and C show methods of coupling to the vibrator.

the stresses are pure shear. The frequency depends on the size of the hole. If the hole is very small, the frequency for a ferrite disk is approximately, in kilocycles, 215 divided by the diameter of the disk in inches. It will be noted that it is independent of the thickness. If, on the other hand, the hole occupies most of the disk, the frequency becomes approximately 131 divided by the difference between outer and inner diameters. Fig. 12B shows how a flat coil is placed against one side of the disk to drive it in the concentric shear mode. The dotted line represents a typical line of driving flux. The bias flux lies in concentric circles within the material, thus being at right angles to the radial driving flux. A better coupling can be obtained by enclosing the driving coil in a "pot" of magnetic material, as shown in Fig. 12C, and a still further improvement should result from using another similar driving system on the other side of the disk.

The second part of this article, to appear in a subsequent issue, will discuss applications of mechanical resonators and the use of ferrites in filters. — EDITOR]

The Electronic Voltmeter in the Amateur Station

Practical Suggestions for Testing and Servicing Equipment

BY MACK SEYBOLD,* W2RY1

THERE is an old philosophy among engineers, probably dating back to Archimedes, which states "if it can be measured, it can be fixed." Problems in a variety of fields will yield solutions if an appropriate yardstick is applied. When the magnitudes of the variables involved are measured and recorded, a practical comprehension of the forces at play will often be established. Many times, when an apparent dead-end street has been reached on a development, design, or maintenance problem, an attack with measuring equipment quickly opens up a new road through the problem, and the solution is reached with ease.

In problems that arise from amateur equipment, the primary points of attack are on voltage, current, resistance, capacitance, inductance, and time. The latter three, especially where the time factor represents high frequency, are measurable with oscilloscopes, frequency meters, inductance and capacitance bridges, signal generators, and

the like, and much can be learned of circuit behavior with equipment of this type. Some of these r.f. devices are almost indispensable, and the minimum equipment required of the amateur by the FCC includes a meter capable of checking the frequency of the emitted signal. The other high-frequency gadgets are helpful in building and maintaining a station, and a program to construct such equipment assures progress in the development of a station.

Fortunately, much of the behavior of high-frequency radio equipment can be evaluated by measurement of d.c. in the circuits. If equipment is available to measure d.c. voltage, resistance, and low-frequency a.c. voltage, not only the d.c. and low-frequency a.c. circuits can be kept under control, but the high-frequency portions of the equipment can also be controlled.

An ideal meter for making d.c. measurements would produce no change in operating conditions when placed in a circuit to be tested. It would have infinite resistance and zero shunt capacitance. To be flexible enough to handle most

* C/o Tube Dept., RCA Victor Division, RCA, Harrison, N. J.

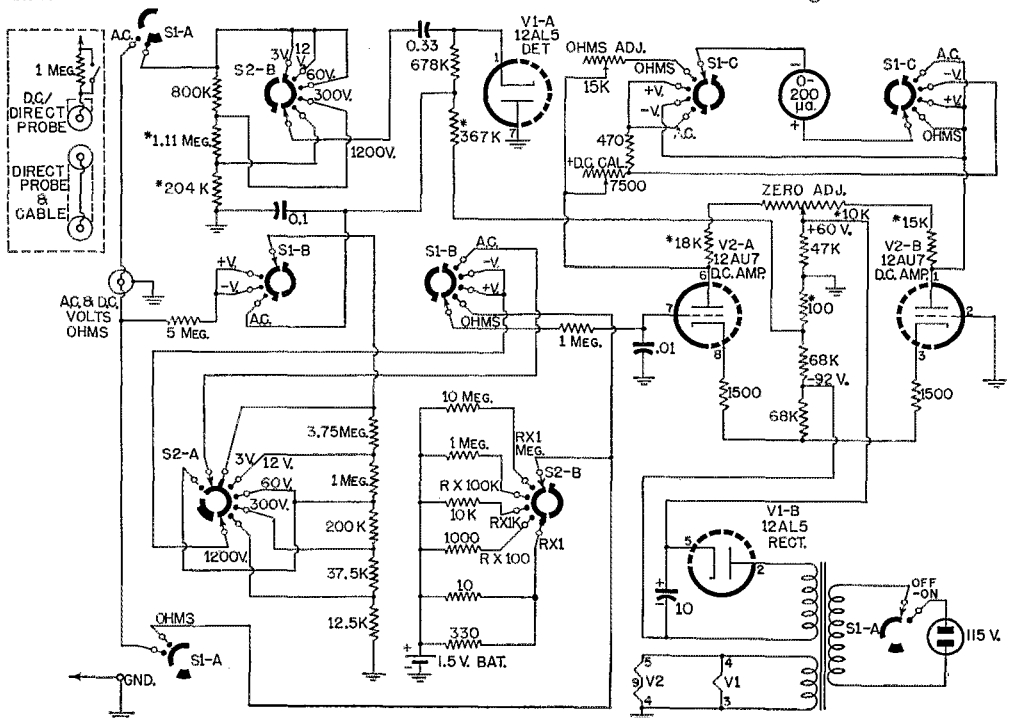


Fig. 1—Amateurs who are inclined to build their own v.t.v.m. might wish to employ this circuit, used in the RCA Junior Voltohmmyst. A 200- μ a. meter movement is required. Values marked * are subject to variation in individual instruments.

jobs, it would have a range from 1 to 30,000 volts. A practical meter, of course, would have to be a compromise, because some small amount of power must be consumed to deflect the needle. Meters that take the least power also are the most expensive to buy, are somewhat sluggish, and are extremely delicate. A practical meter is one that is sensitive, yet rugged.

Amplifier-Meter

A rugged meter-movement can be made into a sensitive measuring device by incorporating a vacuum-tube amplifier in the system. In this way, a meter movement that might require 1 milliwatt for full-scale deflection could be made to deflect equally with 1-microwatt input to the amplifier; this change represents a power-sensitivity gain of 1000. With the addition of the amplifier, the instrument approaches the ideal condition of being able to be placed in a test circuit without changing the characteristics of the circuit. For example, in a high-resistance circuit, a 1000-ohm resistor carrying 1 ma. of current would have a 1-volt drop. If the usual 1000-ohms-per-volt meter having a 1-volt scale and an internal resistance of 1000 ohms were used to measure this voltage drop, the meter would read 0.5 volt, which is a 50 per cent error. If a vacuum-tube voltmeter having 11 megohms internal resistance were used, however, the drop across the system would be 0.999 volt and the measuring device would read within a gnat's eyebrow of the correct value of one volt.

Another feature of the vacuum-tube voltmeter is the ease with which it can be adapted to a variety of measurements. Modification of the input circuits and set-up of various conditions by means of a switch makes it possible to perform a number of operations and encompass a wide range of readings with one instrument. For example, a 1-megohm resistor can be used in the tip of the d.c. probe. The resistor isolates r.f. from the vacuum-tube meter-amplifiers, and only about 2 micromicrofarads shunt capacitance is

• Nowadays the vacuum-tube voltmeter is one of the most generally-useful pieces of measuring equipment that a ham can own, having, with modern circuits, outgrown the "crankiness" that once featured its performance. Here are some tips on how to use it in checking receiver and transmitter performance and in locating faults in amateur gear.

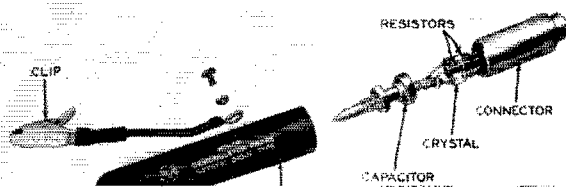
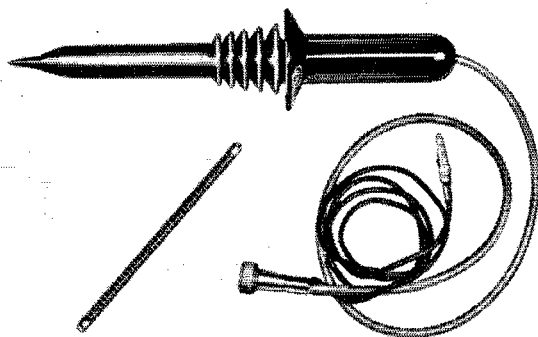
applied to the circuit being tested. Thus d.c. voltage readings can be taken right at the control-grid terminals of r.f. oscillators and amplifiers. Some of the later designs of vacuum-tube voltmeters also have the ability to measure a.c. in the presence of d.c., as well as being able to measure d.c. in the presence of a.c. Fig. 1 gives the circuit diagram of a representative vacuum-tube voltmeter, and Fig. 2 shows the details for the high-voltage and demodulator probes which add to the usefulness of the equipment.

The vacuum-tube voltmeter, whether a commercial unit or a home-built device, is a versatile yardstick for comprehensive control of transmitters, receivers, and amateur gadgets during design, development, and maintenance operations.

Equipment Servicing

The d.c. voltages at specific junctions in a circuit reveal a great deal about the behavior of the circuit. The published diagrams of almost all commercial electronic equipment show the voltages at the important component terminals. These voltages are measured with high-resistance meters on equipment that is functioning properly. In the servicing of these devices, one of the first operations is to check the voltages in the sections that are suspected of functioning improperly. The path to the defect is often discovered by finding a voltage that differs from the published value. Then, the defective component is actually

♦
 Fig. 2 — Safety First! Experimenters who habitually apply ordinary test leads to high-voltage transmitter circuits can improve their life expectancy by using a high-voltage probe as shown at top. The lower photo shows the construction of a crystal diode probe for demodulating r.f. signals. (Photos courtesy of RCA)



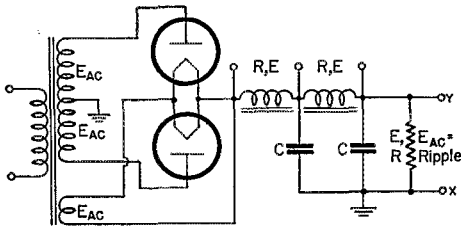


Fig. 3 — Power supply. Points to measure for evaluation and control of components.

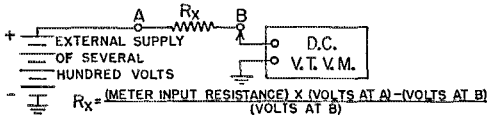


Fig. 4 — Measuring resistance above 1000 megohms with an external voltage supply.

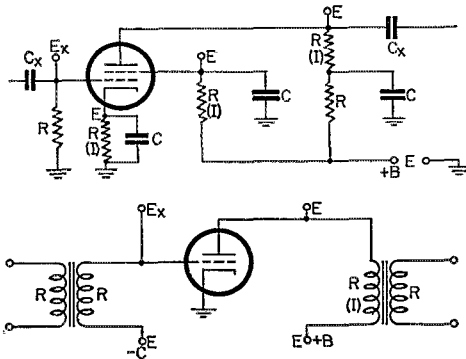


Fig. 5 — Class A audio amplifiers, resistance-coupled and transformer-coupled. If E_x varies as the input signal-level is changed, the No. 1 grid is drawing current, and the stage is either being overdriven or the biasing voltage between grid and cathode is inadequate. The d.c. voltage, E_x , is measured with a v.t.v.m. that is unaffected by a.c. when d.c. is being measured. A.c. voltages are measured to ground.

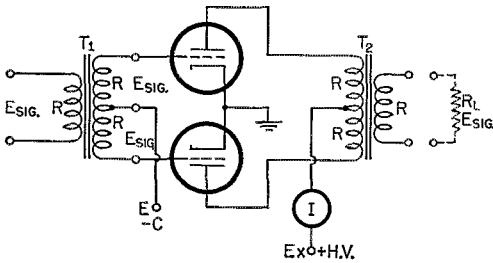


Fig. 6 — Class B modulator. Turns ratios on T_1 and T_2 can be determined by feeding a 6.3-v. a.c. signal from a filament supply line to one winding, and measuring the output voltage on the other winding.

E_{sig} : The modulator can be checked by applying an audio tone signal (WV is a convenient source) to the amplifier, loading the output transformer secondary with a resistor, R_L , of the correct value, and reading E_{ac} across the resistor. Watts output = $\frac{E_{ac}^2}{R_L}$. During the power-output test, record the input signal so that conditions can be reproduced for trouble-shooting tests.

E_x : Power-supply regulation can be checked here, comparing zero signal to maximum-signal voltages.

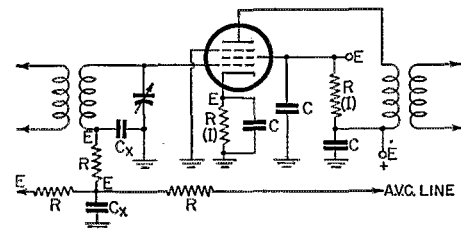


Fig. 7 — Class A r.f. amplifier. Plate, screen, and cathode voltages are checked as indicated. Voltage on the a.v.c. line with no signal will run between -0.2 and -1.5. With strong signals, it will increase to -3 or more volts. Leakage at C_x will impair normal a.v.c. action.

Fig. 8 — Pentagrid converter. Other mixer circuits may involve a separate local oscillator. In any case, the No. 1 grid voltage (E_x) developed in the oscillator section indicates the behavior of the oscillator. Plate and screen voltages and current should be near the published value for the particular tube used.

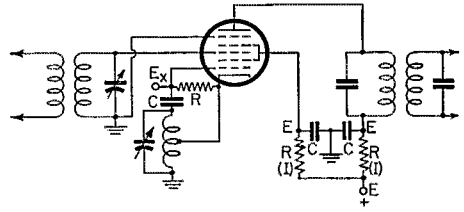


Fig. 9 — Beat-frequency oscillator. This is a typical grounded-plate circuit used for b.f.o.s and local oscillators. Amplitude is checked at E_x .

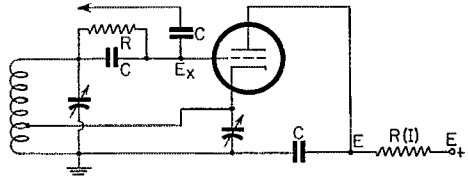


Fig. 10 — VR-tube regulators. R_L = equivalent load resistance. E_2 = voltage rating of the VR tube. E_1 should exceed E_2 by at least 50 per cent. $\frac{E_1 - E_2}{R}$ should not exceed 40 milliamperes if R_L is ever disconnected. R_L should be high enough in resistance to maintain ionization glow in the VR tube.

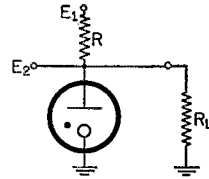


Fig. 11 — Crystal oscillator. A number of different circuits are utilized as crystal oscillators, but all can be checked for operating values as shown here. Activity of the system should be periodically checked at E_x .

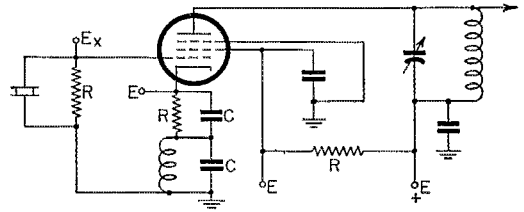


Fig. 12 — Frequency doubler. The d.c. voltage at E_x indicates the amount of drive. It is important to maintain the correct screen voltage in doubler and amplifier circuits.

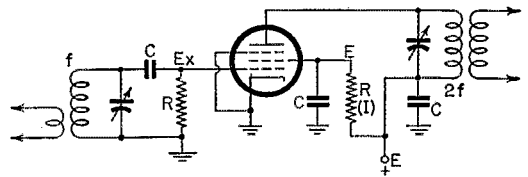
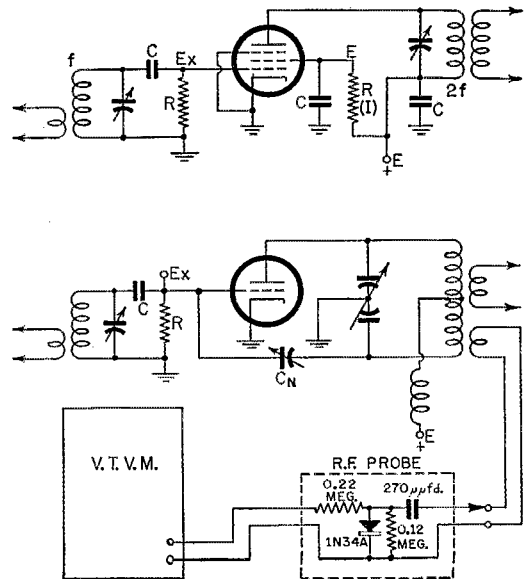


Fig. 13 — Class C amplifier. An r.f. probe can be used as a neutralizing indicator by coupling to the plate tank with a two-turn link.



located by resistance measurements or leakage measurements.

A similar record of voltage measurements in home-built equipment can save time and worry when difficulties arise. When a device is complete and operating properly, spot the circuit diagram with the observed values of voltage, and keep the diagram handy for subsequent servicing. Also, when equipment is still in the developmental stage, a running record of the voltages available at strategic points is often valuable.

In Figs. 3 through 13, the diagrams of the basic circuits used in amateur transmitters and receivers are marked at the strategic voltage points. In these diagrams, capacitors and resistors are also indicated. A knowledge of the value of each resistor helps in tracking down a short, open, or leakage path. The value of resistors also may change with time and temperature. Capacitors in which high-resistance leakage will cause circuit failures are marked C_x . All other capacitors are subject to the more general problems of short and open circuits.

General Procedure

"Safety-first" procedures should be followed when any electrical equipment is used. When voltage is measured with a vacuum-tube voltmeter, the safest and most practical approach is to take the readings with respect to a common ground. In many vacuum-tube voltmeters, one side of the circuit is connected to the chassis and metal case. This arrangement provides for maximum r.f. shielding and eliminates hazards due to short circuits inside the instrument. When such an instrument is used, however, the metal case is at the same potential as the "ground" lead; this lead, therefore, should not be connected to any point which is at appreciable voltage above

ground. The voltage between two points above ground can be determined safely and easily by point-to-ground measurements and the simple process of subtraction or addition. For example, it may be desirable to measure the grid-bias voltage in a resistance-coupled cathode-resistor-biased amplifier stage. Off-hand, it would seem that the voltage across the cathode resistor is the bias voltage, but this is not necessarily true. There may be tube-gas current flowing through the grid-return resistor which will make the grid more positive, or there may be contact-potential current flowing which will make the grid more negative.

With a vacuum-tube voltmeter, it is possible to check the voltage between grid and ground, and then subtract or add this voltage to the cathode-resistor bias voltage to get the total effective bias voltage. The d.c. plate and screen current in the tube can be determined by dividing the cathode-to-ground voltage by the value of the bias resistor.

When measuring resistance or capacitor leakage, disconnect one terminal of the component before making the measurement. Be sure to discharge larger capacitors before attempting to check for leakage with the ohmmeter.

Fig. 3 shows the measuring points for examination of power supplies. The output ripple voltage, if troublesome and in the order of a volt or more, can be measured with the a.c. probe. Modern vacuum-tube voltmeters employ d.c.-isolated a.c. facilities which allow direct measurement of a.c. even when d.c. is present. For lower levels of ripple, an audio amplifier connected across the terminals X and Y, and suitably isolated from the d.c. voltage, may be utilized to check the hum level.

(Continued on page 110)

TABLE I

Capacitance (μ f.)	Insulation	Voltage Rating	Resistance* (megohms)	Scale	Charging Time*	Scale
0.001	paper	600	>1000	R \times 1 meg.	$\frac{1}{2}$ Scale Flick	R \times 1 meg.
0.002	mica	600	>1000	"	$\frac{1}{4}$ "	"
0.006	paper	600	1000	"	$\frac{1}{2}$ "	"
0.01	"	600	1000	"	$\frac{1}{2}$ "	"
0.04	"	600	>1000	"	3 secs.	"
0.05	"	600	>1000	"	4 "	"
0.1	"	600	1000	"	8 "	"
0.25	"	400	200	"	20 "	"
1.0	"	600	500	"	60 "	"
1.0	"	600	500	"	6 "	R \times 100K
4.0	electrolytic	450	20	"	25 "	"
4.0	"	450	20	"	5 "	R \times 10K
10	"	450	40	"	10 "	"
20	"	150	35	"	20 "	"
20	"	25	50	"	20 "	"
25	"	450	10	"	20 "	"
40	"	50	8	"	30 "	"
100	"	50	15	"	60 "	"
100	"	12	15	"	10 "	R \times 1K
1000	"	—	3	R \times 100K	15 "	R \times 100

* The values given for resistance and charging time are only typical values for the guidance of the experimenter. They should not be considered as limits or quality end points.

A Single-Package Mobile Unit for 28 Mc.

Combining the Converter and Transmitter for Compactness and Convenience

BY ROBERT F. TSCHANNEN,* W9LUO

IT is the author's belief that there is many a ham who has denied himself a mobile installation because he has preferred not to clutter up his new car. This is an understandable attitude. Certainly, if we were to examine a typical 10-meter mobile installation, we would see the reason. The layout usually consists of a separate converter, separate transmitter, control box, dynamotor, rear-mounted whip antenna and, of course, the auto receiver. Accompanying these units is usually a rather extensive assortment of interconnecting cables. The use of such individual appendages may sometimes be an advantage and, if reasonably high power is used, they may be quite necessary. It is seldom easy to remove or install such a complete system.

If one is willing to accept a few compromises it is possible to assemble the complete converter, transmitter, and controls in a small single package, and operate the unit from the existing auto-receiver power supply, using the standard 56-inch automobile whip antenna. The single-package mobile unit described does just this. It is small and compact, mounts with three screws and can be installed or removed in about one minute. The panel space needed is only 2 by 7 inches. If you dislike drilling holes in the new car, this is the rig for you. Costwise, the unit appeals to the OM's pocketbook; because it is quite inconspicuous, the XYL is not likely to object, either. Of course, the absence of the long rear-mounted whip antenna makes you less the object of curiosity of neighbors and local citizens.

There was a mention of compromise above. Just what is the nature of the compromise? The output capability of a typical auto receiver with 6X4, 7Y4, or 6X5GT rectifier is about 230 to 250 volts at 70 ma. A few receivers which provide 8- to 10-watt audio capability employ synchro-

• W9LUO describes here a compact 10-meter mobile unit that includes the converter as well as a 10-watt plate-screen-modulated rig — all operating from the b.c.-radio power supply, and using the car whip antenna. It should have appeal to the would-be mobile ham who shudders at the idea of drilling holes and running cables which usually characterize such rigs, since only three mounting screws are required. It can be installed in a matter of minutes.

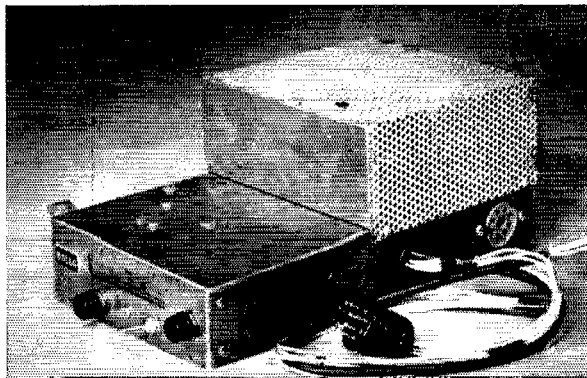
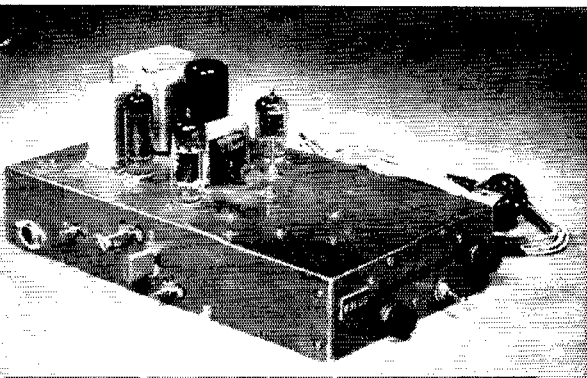
nous vibrators and can deliver 240-265 volts at 100-120 ma. with ease. In most cases, the receivers with 70-ma. capability can be adapted to provide final-amplifier input powers of 6 to 10 watts and also the necessary current for a Class B modulator, r.f. and a.f. driver stages. Care must be taken, however, to keep the current drain on all stages at a reasonably low value. Therefore, we are somewhat limited on input power when we operate from an auto-receiver vibrator supply.

The other compromise is in the use of the standard 56-inch automobile whip antenna instead of a 96-inch rear-bumper type. The 75-meter mobile hams load 96-inch whips at the center, or at the base, with quite satisfactory results. A 56-inch whip antenna, which is a little more than $\frac{1}{8}$ wavelength on 10 meters, can be loaded to 29 Mc. in the same manner. We can couple directly out of a pi network and tune out the capacitance of the short transmission line and also that of the antenna, the reactance of which is capacitive when shorter than a quarter wavelength. The radiated field from the 56-inch antenna is, of course, somewhat less than that from a 96-inch type, but we have kept the system simple, clean-cut, and compact. The receiving

* 412 East Maple St., Lombard, Ill.

Transmitter and modulator tubes are mounted on top of the chassis. The transmitter-adjustment controls and the crystal are accessible along the side. The output connector is toward the rear. The slug screw on top is the mixer output adjuster.

This compact unit contains both a converter and 10-watt mobile transmitter for the 10-meter band. On the front are the converter tuning control, filament switch and h.c.-h.f. switch. Along the side are the microphone connector, power cable and the test jack, J₄.



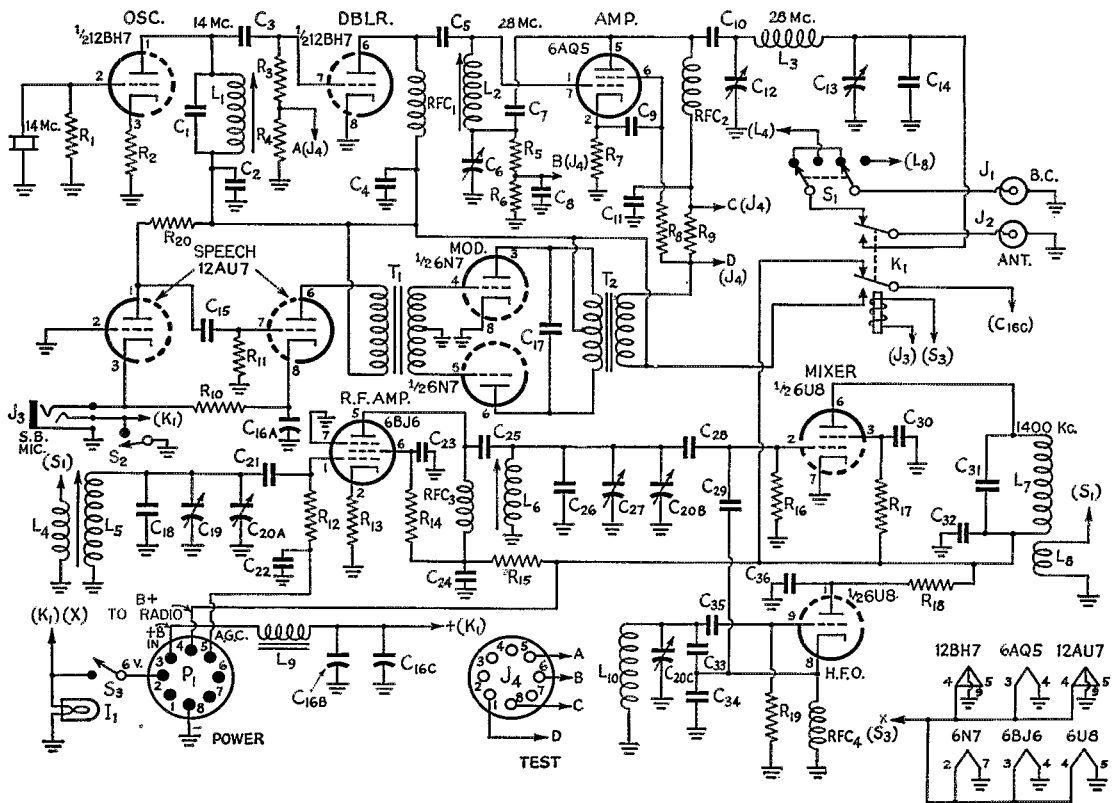


Fig. 1—Circuit of the mobile converter-transmitter unit for 28 Mc. The circuit is powered from the car-radio vibrator supply through P_1 . (See Fig. 2.) Power is switched by the relay K_1 . J_4 provides terminals for checking grid current of the doubler stage, and grid and plate current of the output stage.

- C_1, C_7 —22- μ fd. silvered mica.
- $C_2, C_4, C_8, C_9, C_{10}, C_{11}, C_{22}, C_{23}, C_{36}$ —0.001- μ fd. disk.
- C_3, C_{28} —47- μ fd. silvered mica.
- C_5, C_{21}, C_{25} —100- μ fd. mica.
- C_6 —390- μ fd. (max.) mica trimmer.
- C_{12} —75- μ fd. midget variable.
- C_{13} —100- μ fd. midget variable.
- C_{14} —220- μ fd. mica.
- C_{15}, C_{24} —0.01- μ fd. disk.
- C_{16A} —20- μ fd. 25-volt electrolytic.
- C_{16B} —10- μ fd. 350-volt electrolytic.
- C_{16C} —20- μ fd. 350-volt electrolytic.
- C_{17} —0.001- μ fd. 1000-volt mica.
- C_{18}, C_{26} —56- μ fd. silvered mica.
- C_{19}, C_{27} —6- μ fd. ceramic trimmer (Centralab 829).
- C_{20} —3-section 35- μ fd. midget variable (see text).
- C_{29} —1 μ fd. (twisted-wire or similar).
- C_{30}, C_{32} —0.005- μ fd. disk.
- C_{31} —68- μ fd. mica.
- C_{33} —110- μ fd. silvered mica.
- C_{34} —91- μ fd. silvered mica.
- C_{35} —39- μ fd. silvered mica.
- R_1, R_3, R_{14} —47,000 ohms, $\frac{1}{2}$ watt.
- R_2, R_7 —47 ohms, $\frac{1}{2}$ watt.
- R_4, R_6, R_{10} —1000 ohms, $\frac{1}{2}$ watt.
- R_5, R_{19} —22,000 ohms, $\frac{1}{2}$ watt.
- R_8 —10,000 ohms, 1 watt.
- R_9 —22 ohms, $\frac{1}{2}$ watt.
- R_{11} —1 megohm, $\frac{1}{2}$ watt.
- R_{12}, R_{18} —0.22 megohm, $\frac{1}{2}$ watt.
- R_{13} —82 ohms, $\frac{1}{2}$ watt.
- R_{15} —4700 ohms, 1 watt.
- R_{17} —0.1 megohm, $\frac{1}{2}$ watt.

- R_{18} —4700 ohms, $\frac{1}{2}$ watt.
- L_1 —3.7 μ h.—28 turns No. 28 enam., $\frac{3}{16}$ inch long on $\frac{1}{4}$ -inch iron-slug form (CTC LSM form).
- L_2 —1.5 μ h.—18 turns No. 28 enam., $\frac{1}{16}$ inch long on $\frac{1}{4}$ -inch iron-slug form (CTC LSM form).
- L_3 —1.25 μ h.—8 turns No. 16, $\frac{1}{2}$ -inch diam. 1 inch long.
- L_4 —2 $\frac{1}{2}$ turns on same form as L_3 , spaced $\frac{1}{8}$ inch from L_3 .
- L_5, L_6 —0.3 μ h.—8 turns No. 16 enam., $\frac{3}{4}$ inch long on $\frac{1}{4}$ -inch iron-slug form (CTC LSM form).
- L_7 —175 μ h.—140 turns No. 30 scramble-wound on $\frac{1}{2}$ -inch iron-slug form (CTC LS-4 form).
- L_8 —25 turns wound over L_7 .
- L_9 —2-hy. 100-ma. low-resistance filter choke (Stancor C-2304).
- L_{10} —0.3 μ h.—5 turns No. 16, $\frac{5}{8}$ -inch diam., $\frac{1}{2}$ inch long, approx.
- I_1 —6-volt dial lamp.
- J_1 —Auto-receiver antenna connector (cable to h.c. input).
- J_2 —Coax connector.
- J_3 —3-way microphone jack.
- J_4 —Octal female connector.
- K_1 —6-volt d.p.d.t. relay.
- P_1 —Octal male connector.
- RFC $_1$, RFC $_2$, RFC $_3$ —Approx. 250 μ h. (video peaking coil).
- RFC $_4$ —1-mh. r.f. choke.
- S_1 —D.p.d.t. wafer switch.
- S_2 —Push-to-talk switch on microphone.
- S_3 —S.p.s.t. toggle.

performance is, of course, quite good with the 56-inch antenna.

The Converter

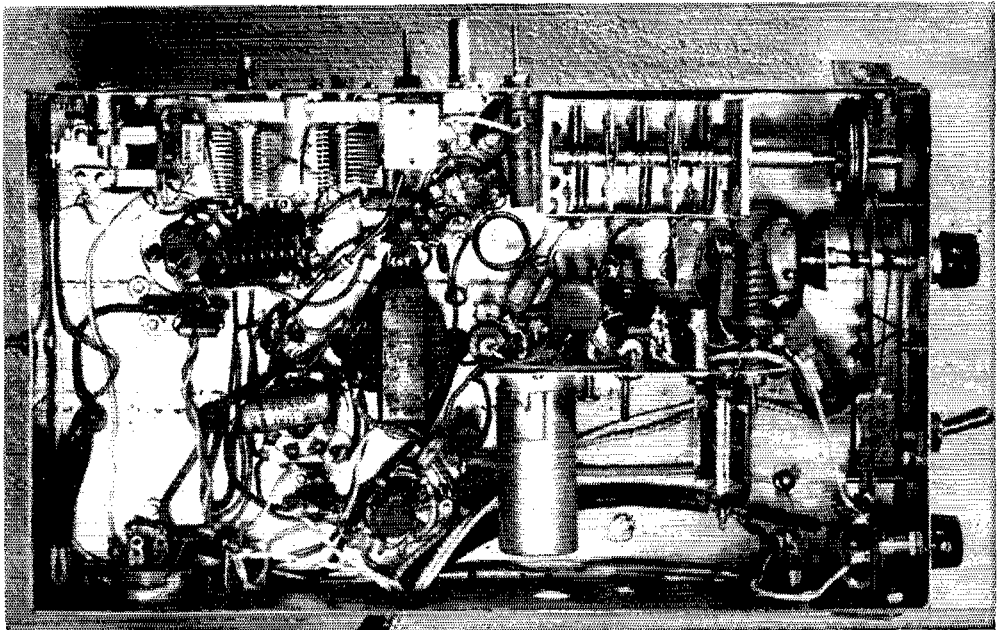
Now examine the circuitry of Fig. 1. The converter section is designed to tune from 26.3 to 30.2 Mc. and to spread this range over the full length of an illuminated slide-rule type dial. Bandsread tuning is achieved by padding, thereby reducing the percentage capacitance change produced in the full rotation travel of the tuning gang.

The 3-gang tuning capacitor, C_{20} , was obtained from a surplus GI television tuner, Type 44.¹ Each of the first two sections of the gang, C_{20A} and C_{20B} , has a maximum capacitance of about 34 $\mu\text{fd.}$ and a minimum of about 5 $\mu\text{fd.}$ The oscillator section, C_{20C} , has a maximum of about 32 $\mu\text{fd.}$ Alternatively, a 3-gang tuning capacitor, such as used in f.m. receivers, might be employed, provided appropriate variations in padding capacitors and coils are made.

The 6BJ6 amplifier tube was selected for several reasons: (1) low grid-plate capacitance, which is desirable for good stability; (2) the remote-cut-off characteristic, which is desirable if the tube is to be a.g.c. controlled; (3) low current requirements; (4) reasonably-low equivalent noise resistance. This figure begins to become significant at about 30 Mc., and low values are desirable for best signal-to-noise performance. The cathode resistor, R_{13} , is not by-passed, to reduce the effects of tube-capacitance changes

¹ The GI tuners employing this gang condenser have been available at a very reasonable figure from Newark Electric, 223 W. Madison St., Chicago, Ill.

Bottom view of the 10-meter mobile unit. The converter circuits occupy the right-hand portion of the chassis with the 3-gang tuning unit above and the two tubes mounted on a bracket below. The components of the transmitter circuits are mounted along the upper flange of the chassis toward the left. The change-over relay is in the upper left-hand corner.



with variation in the gain control. It also helps to stabilize the amplifier.

The 6U8 triode-pentode tube provides very good oscillator and converter action at these frequencies. The Colpitts circuit in the high-frequency oscillator operates at approximately 1.4 Mc. above the signal frequency, and the mixer output (and the b.c. receiver) is therefore tuned to this frequency.

The circuit is arranged so that the B supply for the converter is turned off while transmitting. A push-to-talk switch, S_2 , actuates a 6-volt d.c. relay, K_1 , which switches B supply and antenna connections for transmitting and receiving.

The Transmitter

The r.f. portion of the transmitter begins with a 12BH7 dual triode. One section functions as a 14-Mc. crystal oscillator; the second section serves as a doubler. The 12BH7 has been found to produce more output than a 12AU7 or 12AT7. The choice of a 14-Mc. crystal was made with the idea of achieving maximum drive at 28 Mc. from a single tube with low power-input requirements. Although 14-Mc. crystals are not so popular as 7-Mc. units, the circuit simplicity and low-current requirements for the r.f. drivers are believed to warrant the slight additional expense.

Low-power beam-tetrode tubes, such as the 6AQ5, which are adaptable as final amplifiers, usually have comparatively low grid-plate capacitance. However, this is seldom small enough to permit straight-through operation without some indication of instability. There are many expedients that help reduce the tendency toward

self-oscillation, but probably none is more effective than neutralization. The usual problem of neutralizing tetrodes with low grid-plate capacity is conveniently solved by use of the capacitance-bridge method of neutralization shown in the ARRL *Handbook*. However, the neutralizing capacitor, C_7 , which is usually a variable, is made fixed and the capacitor C_6 is made variable. This capacitor is a compression mica trimmer, one side of which is grounded. The unby-passed cathode resistor, R_7 , also helps to stabilize the amplifier.

The pi network in the final amplifier is conventional. The comparatively-high capacitance on the antenna side of the network most effectively provides coupling to a low-impedance antenna. (The 56-inch whip antenna has a resistive component of impedance of the order of 10 to 15 ohms in the 10-meter band.)

Modulator

In the audio portion of the unit, the combined cathode currents of both sections of the 12AU7 flows through a single-button carbon microphone providing the necessary polarizing voltage. The by-pass capacitor, C_{16A} , should preferably be 20 μ f. or more, because the impedance from cathode to ground of this tube must be low or the 12AU7 will function as a cathode-coupled multivibrator. The 6N7, operated Class B, is well suited as a modulator, since it possesses high output capability and operates with low idling current in absence of audio drive.

A double-pole double-throw wafer-type selector switch, S_1 , selects normal auto-radio operation or 28-Mc. mobile operation. Of course, only the push-to-talk switch, S_2 , is used during a normal QSO. A single-pole single-throw toggle, S_3 , controls filament power.

Test points which permit checking the doubler grid current, and the final-amplifier, grid and plate currents are provided. These test points terminate in an octal socket, J_4 , mounted on the side of the chassis. The socket is so located that the test points are readily accessible when the unit is mounted in the car.

Power Supply

The usual car radio has a resistance-capacitance power filter. To eliminate the voltage drop through this resistor, an inductance-capacitance filter, consisting of L_9 , C_{16B} and C_{16C} , built into the mobile unit, is substituted. The modification in the car-radio circuit is shown in Fig. 2. Fig. 2A shows the alterations for those receivers using a synchronous rectifier, while B indicates the connections for units using a tube rectifier.

The dashed lines show the connections that must be cut in the typical circuit. The resistor, R , is removed. Usually, the B lead to the output audio stage is taken off at the rectifier side of this resistor. This connection is transferred to the output filter condenser, C , where the B lead to the other stages customarily is connected.

An octal or Jones socket, J_1 , should be mounted in a clear spot on the side of the auto-receiver chassis. The leads brought to this output socket should preferably be shielded, especially the B-supply leads, since vibrator hash may be present on these leads and be "sprayed" into adjacent leads or near-by components. A single-pole double-throw switch may be added in the a.g.c. lead, as indicated by X , in case it is desired to switch off the a.g.c. control for weak-signal reception. The a.g.c. control on the r.f. amplifier will be found very useful when working locals.

Construction

The chassis pan for the complete unit is a standard $7 \times 11 \times 2$ -inch item. The shield cover, which is principally used for tube protection, is about $5\frac{3}{4}$ inches deep, $2\frac{3}{4}$ inches high, and made to span the chassis.

The drive mechanism for the "slide-rule" dial is somewhat unique. This type of dial was chosen because it was desired to have an illuminated scale on the chassis. The essential idea is shown in the sketches of Fig. 3. The tuning knob drives a $\frac{1}{4}$ -inch shaft which has been undercut to about $\frac{3}{16}$ inch near the end. The undercut portion of the shaft drives a dial cord connected to the pulley on the shaft of the gang condenser. The drive shaft is supported in the front flange of the chassis with a shaft bushing and, at the rear, with a small bracket with a $\frac{1}{4}$ -inch clearance hole. The dial pointer rides on a small angle bracket which projects about $\frac{1}{4}$ inch in back of the front flange of the chassis. The angle bracket is secured to the

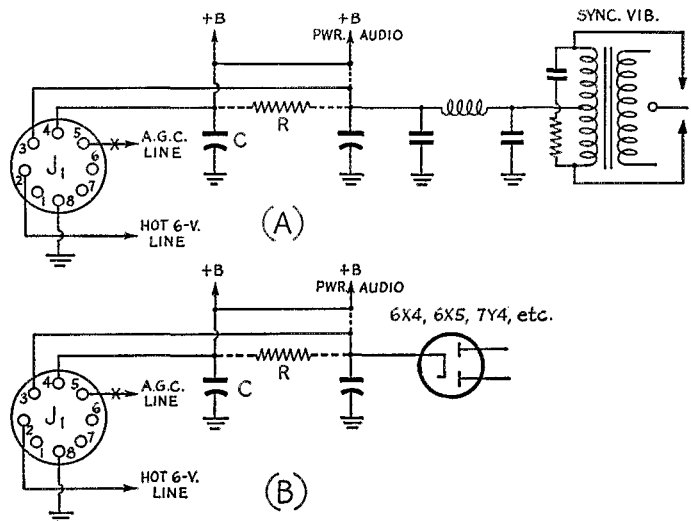


Fig. 2 — Circuits showing the alterations in car-radio power circuits to provide outlet connections for the converter-transmitter. A is for systems having a synchronous vibrator, while B is for those employing tube rectifiers.

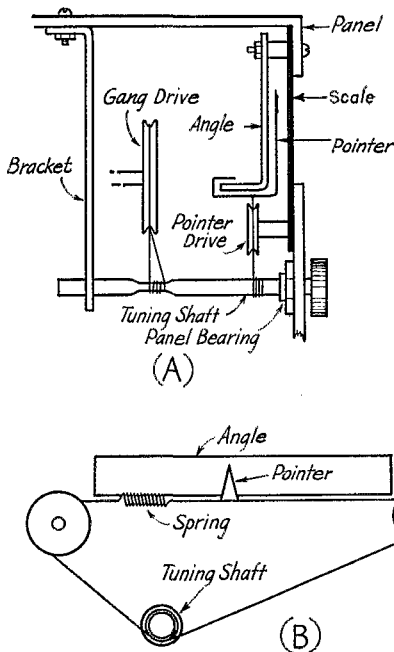


Fig. 3—Sketches showing (A) side view, and (B) front view of the essential plan of the homemade dial mechanism for the mobile converter tuning control.

front edge of the chassis by two small machine screws. The dial pointer is driven from a dial cord wrapped around the $\frac{1}{4}$ -inch-diameter section of the drive shaft. Two $\frac{3}{8}$ -inch-diameter idler pulleys are appropriately mounted on the front chassis flange so as to guide the cord driving the pointer.

The dial window is a rectangular slot $\frac{3}{16}$ inch wide and 3 inches long, which is centered near the top of the front chassis flange. The window is covered with a piece of translucent plastic or a piece of buffed celluloid. The material may be cemented in, or held in place with small machine screws. A buffed surface will permit calibration figures to be written in, and will also assist in diffusing the light from the pilot lamp which is mounted about 1 inch in back of the dial scale.

An angle bracket about $1\frac{1}{4}$ inches high and $3\frac{1}{2}$ inches long under the chassis is used to mount the tube sockets and other principal components of the converter, as shown in the bottom views.

Occupying a panel space of only 2 by 7 inches, the 10-meter converter-transmitter unit is installed easily under the dashboard of any car.

A $\frac{3}{8}$ -inch foot is bent back at the bottom of this bracket and tapped for two 4-40 or 6-32 machine screws. The tapped holes simplify the mounting of this assembly after components are wired in place. The bottoms of the sockets for the 6U8 and 6BJ6 tubes face the side of the tuning condenser; the slug-tuned coils and tubular trimmers are also mounted on the bracket on the side nearest the tuning gang. The air-wound oscillator coil, L_{10} , is soldered directly across the rear section of the gang terminals. Leads long enough to reach B+, filament and gang terminals should be provided before securing the bracket in place. The mixer plate coil, L_8 , is mounted just to the rear of the 6U8 tube and is tunable from the top of the chassis.

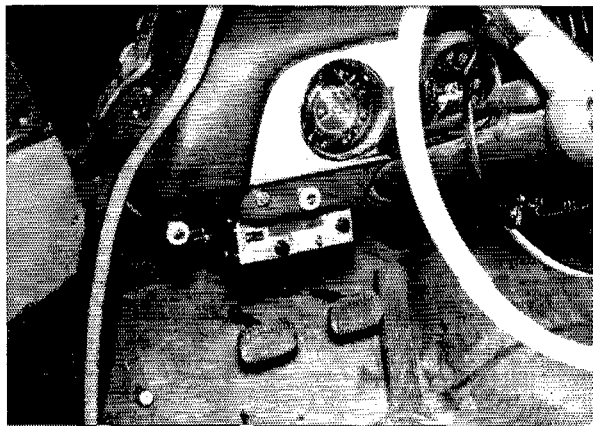
The r.f. portion of the transmitter lies to the rear of the tuning gang. The oscillator and doubler coils, as well as the crystal socket, final-amplifier and antenna-tuning condensers, are mounted on the side flange of the chassis to make the controls accessible. The antenna-input connector is located on the same flange near the rear of the chassis. The antenna- and B-supply-switching relay, K_1 , is near the antenna-input connector.

The modulator and driver transformers are placed on the top side of the chassis. The filter choke is mounted underneath, just to the rear of the 6U8 tube. The power-input cable of the unit enters on the right-hand side, a little to the rear of center; the shielded antenna lead for the auto receiver also exits at the same point. The antenna lead and also the power leads should be made no longer than necessary.

Aligning the Converter

After the unit has been wired and checked, we can begin the alignment of the converter. Apply the required supply voltages and compress or stretch the oscillator coil, L_{10} , until the oscillator covers the range of 27.7 to 31.6 Mc. This is most conveniently done in conjunction with a communications receiver or an accurately-calibrated grid-dipper. Connect the converter output lead to the input of the auto set to be used or, alternatively, to the antenna terminals of an available b.c. receiver. Tune the b.c. receiver to 1400 kc. and set the volume at a reasonable level. Next, set the tuning gang for maximum capacitance and obtain a weak signal at about 26.3 Mc. from a grid-dipper, VFO, signal generator or an identified crystal-oscillator harmonic. Adjust the an-

(Continued on page 116)



BOARD MEETING HIGHLIGHTS

The Board of Directors of the American Radio Relay League, Inc., met in Hartford, Conn., on May 8th and 9th to examine and appraise the progress of League affairs and to chart a course for the ensuing year.

After an examination of civil defense communications activities, by formal resolution the Board encouraged greater participation by individual amateurs in the Radio Amateur Civil Emergency Service, and defined League policy to stimulate maximum use by the Federal Civil Defense Administration of all existing amateur facilities including ten-meter operation and more liberal application of matching funds. It instructed the Planning Committee to study facilities provided under RACES leading to a more effective participation by amateurs at local, state and national levels. Increased monies were made available for organizational travel by SCMs and SECs, looking largely toward RACES activities, and these voluntary field workers were urged to make as full use of travel funds to the extent their time permits.

A yearly Merit Award was established for outstanding technical contributions by an amateur to the radio art, and cash awards were set up for the three *QST* articles adjudged outstanding each year. A new Public Relations Committee was appointed with President Dosland as chairman, and asked to study a possible project of further acquainting the general public with the amateur position in TVI matters.


Referred to the General Manager was a series of recommendations of the Membership & Publications Committee looking to further increasing and strengthening League membership. This Committee was continued for another year, and asked to study the feasibility of reprinting the amateur history, *Two Hundred Meters and Down*, and a "new equipment" section in *QST*.

On the administrative side, the Board appointed Northwestern Division Director R. Rex Roberts, W7CPY, as an additional member of the Executive Committee. It gave its formal approval to the new Rules & Regulations of the Communications Department. During the meeting, notice was given of intention to propose amendment, next year, of parts of the Articles of Association to clarify eligibility requirements for director candidates. The Board indicated its desire to hold a 1954 meeting in Denver, Colorado.

A formal resolution was again adopted to express to the Field Engineering & Monitoring Bureau of FCC the League's continued gratitude for the excellent cooperation extended the amateur service. Additional bouquets were presented to all volunteer League field organization administrative workers for their continued fine performance, to General Counsel Segal on the completion of 25 years' service in that post, and to Mrs. Cecilia Hatch of the Hq., also to commemorate a 25th anniversary on the staff.

The meeting was significant also from the standpoint of what it did *not* do. Apparently as a reflection of strong sentiment among members and amateurs generally that the Federal Communications Commission should provide a breathing spell from its continued series of proposals for changes in the amateur rules, the Board offered no suggestions of its own for regulatory amendments this year.

Happenings of the Month



NEW F.C.C. CHAIRMAN

In April President Eisenhower named Commissioner Rosel H. Hyde as the new chairman of FCC. A career employee, Mr. Hyde joined the old Federal Radio Commission in 1928, and rose through the ranks of the legal staff, becoming general counsel in 1945 and a commissioner a year later. With the exception of George Sterling, W3DF, Chairman Hyde because of his long experience and contact with League representatives probably is more familiar than any other Commissioner with the amateur service and its special problems. His selection is, therefore, a particularly happy one from the amateur viewpoint. The appointment is for one year, which is currently interpreted in Washington quarters to mean that the new Chairman has that long to prove he can reorganize FCC policies and procedures to the satisfaction of the new administration, in lieu of bringing in an outsider to do the job.

John C. Doerfer, former head of the Wisconsin Public Service Commission, is the newest FCC commissioner, having been named by President Eisenhower to replace the recess appointment of Eugene H. Merrill.

Former Chairman Paul Walker is expected to remain as Commissioner until the expiration of his term in June, at which time another new member will undoubtedly be named.

LICENSE PLATES

Three more states have been granted call letter license plate privileges since last month's report. They are Kansas, Oregon and South Dakota.

The Governor of Kansas signed a license plate bill on April 3rd authorizing the issuance of the new plates effective January 1, 1954. Much credit is due the Kaw Valley Radio Club of Topeka for its part in spearheading the drive.

The Portland Amateur Radio Club, with able assistance from many Oregon amateurs, successfully sponsored call letter plate legislation. The

bill was signed by the Governor on April 10th. No information is at hand on when the plates will be available.

A special committee in South Dakota initiated a license plate bill and followed up with personal contacts with the Governor and legislators. The bill was made law in late March. As in the case of Oregon, no word has been received as to when amateurs may apply for the new call letter plates. WØs RRN, NGM and GQH are known to be among those who participated actively in this undertaking.

STAFF NOTES

We regret having to report that Harry Paston, W1DJV, Assistant Secretary and later Asst. Circulation Manager at Hq., has left to become a manufacturer's representative covering the state of New York. Joseph A. Moskey, W1JMY, has now transferred from the Communications Department to become Asst. Circulation Manager dealing with the many problems of distribution of *QST* and other ARRL publications through newsstands and radio jobbers, and promotional activities allied thereto.

Phil Simmons, W3VES and ex-W9VES, has joined the Hq. gang as Communications Assistant, handling the administrative details of contests and other operating activities, awards, LO bulletins, etc. Phil's calls are well known to contest enthusiasts, as he has been active in ARRL field organization work for some years.

We should also report that former Assistant Secretary Richard L. Baldwin, W1IKE, much to our regret, has left to become a sales engineer covering upper New England for an electronics manufacturer; at this writing the vacancy at Hq. has not been filled.

SALT LAKE CITY EXAM

The examination schedule published by FCC indicated an engineer will be in Salt Lake City, Utah, on June 13th to conduct amateur examinations. Because of the increasingly large number of applicants, the date has been changed and amateur exams will instead be given on Friday, June 19th, at Henager Business College.

OFFICERS' REPORTS AVAILABLE TO MEMBERS

Each year the officers of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members. The cost price is 75 cents per copy, post-paid. Address the General Manager at West Hartford.

Strays

W5PB, who recently shot rounds of 68, 70 and 72 within a two-week period, takes up the golfing challenge issued by W2KG, W4HB and W4JQ in March *QST* on the condition that they tote their clubs to the 1953 ARRL National Convention in Houston next month. *Fore!* . . .



Hints and Kinks

For the Experimenter



SOLDERING FEEDERS TO THE ANTENNA

A COMMON method of tapping the feeder to an antenna is shown in Section A of Fig. 1. The heat applied in soldering this type of joint tends to anneal the copper wire at points A and B at either end of the wrap, and may ultimately cause the antenna to snap during some period of unusual strain. Electrically the joint is OK, but mechanically it may be hazardous.

Section B of Fig. 1 illustrates a better mechanical way to connect the feeder. First the feeder is wrapped twice around the antenna wire, then once around itself to form a strain-relief loop which holds the feeder wire without pulling on the actual contact wrap. Then the wrap itself is started by winding two rather wide-spaced turns, followed by six turns close-wound. Adding two more wide-spaced turns completes the wrap, and it's ready for soldering. Good resin-core solder (no other flux) is applied *only* at the two center close-spaced turns, taking care to keep both solder and heat confined close to these two turns and away from either end of the joint.

Similarly, Section C of Fig. 1 shows a good way to dead-end the antenna in an eye-type insulator. First, a "round-turn" is taken through the eye; that is, the antenna wire is looped twice through the insulator before bringing it out to wrap around itself, thus forming the dead-end. According to old power-line lore, four turns of this wrap following a round turn will hold all the wire will hold. However, in this case, four or five double-spaced turns are followed by four or five close-spaced turns to give even more mechanical strength and permit soldering a feeder to the antenna without danger of annealing the antenna wire at critical point A. The feeder should be looped once through the insulator eye and wrapped around itself once or twice to take any possible strain off the soldered antenna joint. The end of the feeder wire is then interwound with the spaced turns of the antenna dead-end and

soldered *only* at one or two turns in the center of the spaced wrap. It would be a good idea to hold point A with pliers while soldering to keep heat well away.

The feeder-tap joint shown in B of Fig. 1 was used in an old single-wire-fed Hertz, one end of which was tied to a very unstable tree. This antenna was recently taken down and the joint carefully examined. It showed no signs of deterioration, and was apparently as strong as ever after nearly 21 years aloft. — *Don Devendorf, W8EGI*

RIPPLE FINISH WITH KRYLON SPRAY

A RIPPLE finish that is both durable and professional in appearance may be obtained with the aid of clear Krylon spray. The chassis or panel must first be brush-painted with ordinary black enamel and the spray should then be applied while the enamel is still tacky. The ripple effect will become more pronounced as the thickness of Krylon coating is increased. — *Ernest Weiss, W2ZDI/5*

INCREASING THE SENSITIVITY OF GRID-DIP METER FREQUENCY MEASUREMENTS

WHEN obstructions such as partitions, partial shields, etc., prevent adequate coupling between a variable tuned circuit and a grid-dip meter, try the following stunt.

First, tune the dipper to the estimated frequency of the circuit to be checked. Next, tune a receiver — with the b.f.o. turned on — to the frequency of the meter. Now, swing the tuned circuit through its tuning range. If the setting for the grid-dip meter has been properly estimated, and providing that the meter is not completely shielded from the tuned circuit, the frequency of the g.d.o. will be pulled as the resonant frequency of the circuit approaches that of the meter.

A change in g.d.o. frequency will be indicated by a change in receiver beat note.

The above system permits a frequency measurement to be made even with coupling conditions which prevent any noticeable dip in g.d.o. grid current. The scheme also allows r.f. signal generators and other types of variable oscillators (as long as they are not too well shielded) to assume the frequency measuring duties of a grid-dip oscillator when the latter is not available. — *Dave Tobias, W2JTE*

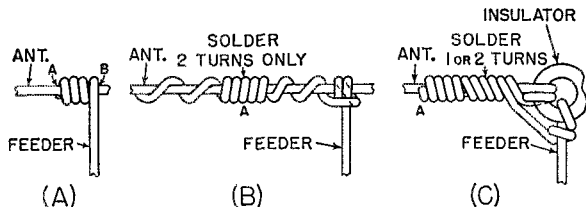


Fig. 1 — Correct (B) and incorrect (A) methods of connecting a feeder to an antenna. Section C shows an approved system for dead-ending an antenna in an eye-type insulator and also shows how the feeder should be attached.

Build Your Own Steel Tower

Sturdy Sky-Hooks for the Beam Antenna

BY W. J. SHEEHAN,* W1IXI

THE steel towers described in this article are the result of past disappointments with different kinds of supports for rotary antennas. At one time or another, the author has used all sorts of structures, including telephone poles, guyed wood masts and wooden lattice-type towers. The telephone pole and any type of mast requiring guys are always inconvenient when mounting and adjusting beam antennas, while the lattice tower needs regular servicing to prevent deterioration.

When the new dual 10- and 20-meter beam was built at W1IXI, it was decided to procure a windmill tower which, of course, would be weather-resistant and self-supporting. There are many of these unused towers gracing the landscape locally, so it was thought that there should be no problem in picking one up at little cost. However, when the owners were approached, there was an unexpected reluctance to part with these monuments to a bygone era. "It goes with the place"; "My grandfather put it up"; "I like to see it when I come out"; "I'm going to put my TV antenna on it," are typical of the various reasons given.

A little investigation indicated that a homemade tower shouldn't be an impossible task by any means. As a result, the two towers shown in the photographs were built. The first attempt was a 30-foot job, erected at the home QTH. This

• If the farmers in your area refuse to part with their windmill towers, why not build one? W1IXI proves it can be done.

turned out so successfully that a 60-foot tower was later built along the same lines for W1LOS. The cost of materials for the 30-foot tower was approximately \$42, while stock and hardware for the 60-footer totaled about \$140, both exclusive of the foundation. This is considerably under the cost of a manufactured tower and is even less than a wood-lattice structure, considering that a certain amount of costly millwork at the lumber yard is usually necessary.

All of the structural material used is known as "hot-rolled" steel and was purchased at a local steel-supply house. Both angle stock and flat strip come in 22-foot lengths. The steel bolts and nuts were purchased at a hardware store. The two tables show the size and amount of material needed. The lengths of the diagonals are given to serve as a guide. It is best to measure these individually after the horizontal spreaders have been installed to allow for variation.

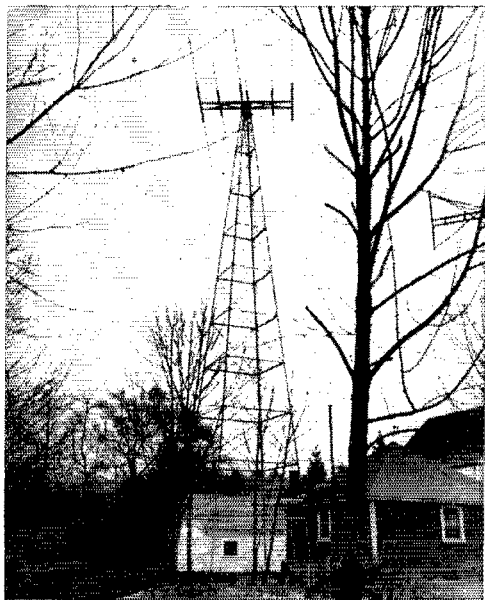
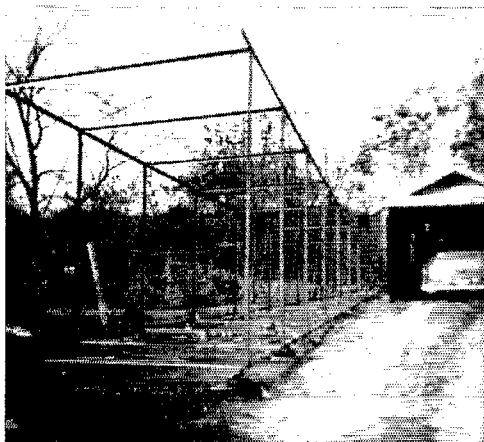
Tools

The job of cutting and drilling the steel is really not an overpowering chore if you have, or can borrow, the proper tools. The cutting is done with a hacksaw and a supply of good-quality

*111 Summer St., South Walpole, Mass.



A homemade 60-foot windmill-type tower assembled on the ground (below) and after raising at W1LOS (right). (Photos courtesy W1UPL)



blades with 18 teeth per inch. The bolt holes are made most easily by drilling first with a $\frac{3}{16}$ -inch drill and then reaming out with a $2\frac{1}{64}$ -inch drill ($\frac{1}{4}$ -inch and $1\frac{3}{32}$ -inch for the 60-footer). A portable electric drill is a practical necessity and a lot of time can be saved if you have two — one for each drill size. Needless to say, the drills should be kept sharpened. High-speed drills will hold their cutting edges much longer than cheaper drills. The members to be joined should be clamped together with C clamps or plier-grip-type wrenches, and drilled at the same time.

Assembly

Considerable thought was given to the method of assembly. Vertical assembly involves endless climbing up and down and hoisting the material and tools. Also, there is a problem in drilling the assembly holes accurately and, in fact, even in devising some way of reaching the points where holes must be drilled. After consideration of all factors it was decided to assemble the towers on the ground and raise them after completion.

For assembling the tower choose the levellest area available. First, splice the leg sections together, using 4 bolts at each splice (2 on each face), and lay a pair of them out, with the inside of the angle facing upward, approximately in the eventual relative positions. Block them up, if necessary, to make them lie level on the ground.

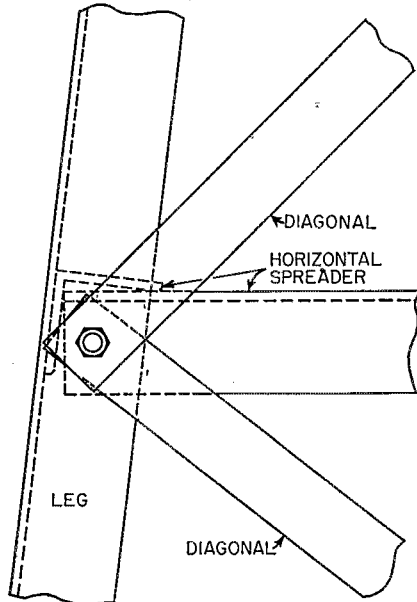


Fig. 1 — Sketch showing how the horizontal spreaders and diagonal braces are assembled. The horizontal member is fastened inside the leg, while the diagonals come on the outside. The head of the bolt is inside.

Measure off and mark the positions of the horizontal members. Clamp the bottom horizontal piece in place and drill the bolt hole at each end. Do the same with the top horizontal member. Put the bolts in with the heads on the

60-FOOT TOWER		
Horizontal Cross-Members (4 each) $\frac{3}{8} \times 2 \times 2$ in. angle		Diagonal Braces (8 each) $\frac{3}{8} \times 1$ in. strip
Bottom	11 ft., 5½ in.	12 ft., 6 in.
Second	10 ft., 4½ in.	11 ft., 6½ in.
Third	9 ft., 3¾ in.	10 ft., 7½ in.
Fourth	8 ft., 2¾ in.	9 ft., 10 in.
Fifth	7 ft., 2¾ in.	9 ft., 0 in.
Sixth	6 ft., 1¾ in.	8 ft., 2 in.
Seventh	5 ft., 1¼ in.	7 ft., 6 in.
Eighth	4 ft., ¾ in.	6 ft., 11 in.
Ninth	2 ft., 11¾ in.	6 ft., 6 in.
Tenth	1 ft., 11¾ in.	4 ft., 8½ in.
Top	11¼ in.	
<p>Legs (4) Each section (3) 21 ft. (12 inch overlap) $\frac{3}{8} \times 2 \times 2$ in. angle</p> <p>Ladder rails (2) — Each composed of 2 sections 22 ft., 1 section 9½ ft. (6 in. overlap) $\frac{1}{2} \times 1 \times 1$ in. angle</p> <p>Ladder rungs (36) — $\frac{1}{2} \times 1$ in. strip, each 8¾ in. long (see text for spacing).</p> <p>Top plate — $\frac{3}{8}$ in. steel, 12 in. square. First horizontal 18 in. from bottom; others spaced 6 ft.</p>		
<p>Material</p> <p>$\frac{3}{8} \times 2 \times 2$ in. angle — 25 22-ft. lengths.</p> <p>$\frac{1}{2} \times 1 \times 1$ in. angle — 6 22-ft. lengths.</p> <p>$\frac{3}{8} \times 1$ in. strip — 34 22-ft. lengths.</p> <p>$\frac{1}{2} \times 1$ in. strip — 2 22-ft. lengths.</p> <p>Steel bolts and nuts — 120 $\frac{3}{8}$ in. 16, 1¼ in. long. — 100 $\frac{1}{2}$ in. 20, $\frac{3}{4}$ in. long.</p>		

inside and bring the nuts up fairly snug. Using a machinist's protractor, check the angles between the crosspieces and the legs on each side, and adjust until the angles on each side are equal by hitting the end of one leg with a hammer. This is quite important to make sure that your tower will be standing vertically and not leaning when you put it up. As soon as the angles have been equalized, tighten up all four bolts. Then the remaining horizontal members can be clamped in place at the levels marked and drilled and bolted fast.

Assemble the second side in the same manner. In the case of the 60-footer, it is advisable to assemble the second side with the inside of the angle facing downward, since it is difficult to flop it over after completion.

The remaining two sets of horizontal spreaders are clamped (in a vertical position) to the first side and drilled and fastened. Then, the second side is lifted onto the ends of these and likewise drilled and bolted, while the angles are checked to make sure that everything lines up properly.

Diagonal Bracing

In placing the diagonal bracing strips, drill the first hole $\frac{3}{4}$ inch from one end of the strip. Place it over one of the bolts at the second horizontal spreader from the bottom. Then, swinging the lower end of the diagonal over the lower bolt, carefully mark the center of the second hole. Drill and fasten the second end of the diagonal. Progressing up the tower, place one similar diagonal across each bay. Repeat this procedure

30-FOOT TOWER

<i>Horizontal Cross-Members</i> (4 each) $\frac{1}{8} \times 1\frac{1}{2} \times 1\frac{1}{2}$ in. angle	<i>Diagonal Braces</i> (8 each) $\frac{1}{8} \times 1$ in. strip
<i>Bottom</i> 6 ft., 8 $\frac{3}{4}$ in.	8 ft., 3 in.
<i>Second</i> 5 ft., 6 in.	7 ft., 5 in.
<i>Third</i> 4 ft., 3 $\frac{3}{4}$ in.	6 ft., 7 $\frac{1}{2}$ in.
<i>Fourth</i> 3 ft., $\frac{3}{4}$ in.	6 ft., 0 in.
<i>Fifth</i> 1 ft., 10 $\frac{1}{2}$ in.	5 ft., 7 $\frac{1}{2}$ in.
<i>Sixth</i> 7 $\frac{1}{2}$ in.	1 ft., 6 in.
<i>Top</i> 3 $\frac{3}{4}$ in.	

Legs (4) Bottom section — 22 ft.; top 8 ft., 6 in.
 $\frac{1}{8} \times 1\frac{1}{2} \times 1\frac{1}{2}$ in. angle (6 in. overlap)

Ladder rails (8) — $\frac{1}{8} \times 1 \times 1$ in. angle, each 22 ft. long.

Ladder rungs (18) — $\frac{1}{8} \times 1$ in. strip, each 8 $\frac{3}{4}$ in. long, spaced 14 in. center to center.

Top plate — $\frac{1}{8}$ in. steel, 4 $\frac{1}{2}$ in. square.

First horizontal 13 inches from bottom; others spaced 5 ft., 6 in.

Material

$\frac{1}{8} \times 1\frac{1}{2} \times 1\frac{1}{2}$ in. angle — 10 22-ft. lengths.
 $\frac{1}{8} \times 1 \times 1$ in. angle — 2 22-ft. lengths.
 $\frac{1}{8} \times 1$ in. strip — 15 22-ft. lengths.
Steel bolts and nuts — 72 $\frac{3}{8}$ in. 18, $\frac{3}{4}$ in. long.
— 4 $\frac{1}{2}$ in. 18, 1 $\frac{1}{4}$ in. long.
— 72 $\frac{1}{4}$ in. 20, $\frac{1}{2}$ in. long.

on each side. The second set of diagonals is fastened in the same way, except that the second hole in each strip is drilled $\frac{1}{16}$ inch short of the bolt. The bolt at this end is removed, and the four holes lined up with a drift pin (or prick punch), the members are then clamped, the drift pin removed, and the bolt reinserted and tightened up. This procedure tightens the diagonals and assures good rigid bracing. To prevent rattling in the wind, the diagonals should be bolted together where they cross with a $\frac{1}{4}$ -inch bolt, $\frac{1}{2}$ inch long.

The bottom ladder rung of the 30-foot model is placed with its center 12 inches above the bottom end of the ladder and the remainder of the rungs spaced 14 inches, center to center. The rails are placed against the tower with the inside of the angles facing outward and the rungs are bolted on across the outer surfaces. The bottom end of the ladder comes 3 $\frac{1}{2}$ inches below the lower edge of the *second* horizontal member.

In the case of the 60-foot tower, the bottom of the ladder was bolted to the second horizontal spreader. Four rungs were evenly spaced between each following pair of spreaders, the spreader itself serving as the fifth rung in each bay.

To guard against rust, the tower should be covered with good-quality paint. I used red metal tank primer for the first coat and water-tank aluminum paint for the second coat. I loosened up all of the bolts, one at a time, so that I could get some paint down in between the members where they overlapped.



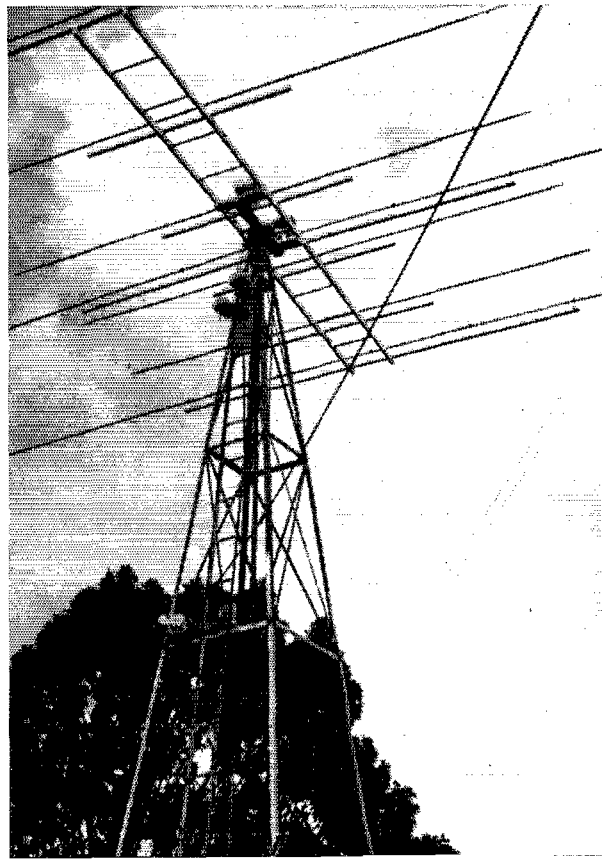
WIXI's dual beam mounted on the 30-foot tower.

Foundation

The footings for the foundation for the smaller tower were made from $\frac{3}{16}$ -inch 2 × 2-inch angle stock, 6 feet long, with $\frac{3}{8}$ -inch-thick 12-inch-square steel footings welded at the bottom end. These were set in 5-foot holes (leaving a projection of about a foot) and the holes filled with rocks. The footings were tilted to correspond with the slope of the tower and held in place with a wood frame. Then cement was poured into the holes.

The foundation for the 60-footer consisted of four holes about 2 feet in diameter and 8 feet deep, filled with concrete in which long hook bolts were imbedded. Base plates were welded to sections of angle and these were fastened down with the hook bolts. The legs of the tower were then bolted to the projecting angle pieces.

Before raising the 30-foot tower, a plumb bob was centered in the top of the tower and a stake driven in the ground at the center of the foundation. Then the tower was placed with two legs against a pair of the base angles. The tower was lifted manually to an angle of about 30 degrees and pulled up the rest of the way by a car with tow ropes fastened to the top of the tower. Another pair of ropes was used at the back of the tower to ease it into place after passing the center of gravity. It happened that there was a 35-ft. crane available when it came to raising the 60-footer. But it should be possible to lift the top end with an auto-wrecker crane to the point where it can be blocked up and then raised the remainder of the way with a tow.



Pulse-Operated Relays for the Ham Transmitter

Simplified Power Control and Antenna Switching

BY CARL H. ERICSON,* W2PPL

THE control of amateur radio transmitters through the use of relays is a practice that is becoming progressively more common, and it is not without a sound engineering basis. By using relays, rather than direct switching, a number of advantages can be realized, among which are greater flexibility in control, better interlocking, greater personal safety and simpler remote control.

Since the war, most amateurs have availed themselves of the large number of relays on the surplus market. However, most of these are designed for d.c. operation, requiring a rectifier supply. On the other hand, a.c. relays have a tendency to hum and, because of the high current inrush with the broken magnetic circuit, they close with considerable force and resultant noise. Both of these effects are sources of annoyance when operating on 'phone.

It appears that amateurs have been overlooking a good bet in the relays introduced a couple of years ago for use with low-voltage remote control of residential lighting circuits. These relays are of the type sometimes known as "remembering" relays, because they operate by pulses of current, rather than by a continuous flow and do thus "remember" the last pulse. A plunger operates in a two-winding solenoid, one winding closing the contacts, while the other opens them. Either coil circuit need be closed only momentarily to operate the relay. Most of the time, therefore, the relay windings

already fully loaded to its rating, may be used to energize the coils.

General Electric manufactures a relay of this sort that is known as the Type RR-2 which sells for about three dollars. (Several other firms are producing similar types.) Considering the

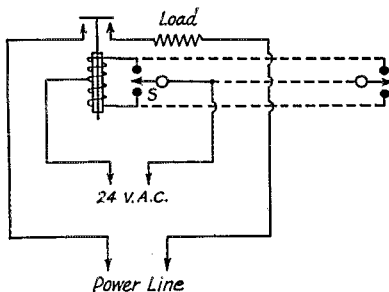


Fig. 1—Basic circuit of control by a momentary-contact relay. S is a double-pole push-button switch. Independent duplicate controls may be added by paralleling, as shown in the dotted lines.

are not energized and this, of course, eliminates the hum. Also, since current is drawn only instantaneously, a very small transformer, or one

* 727 Moore Ave., Kenmore 23, N. Y.

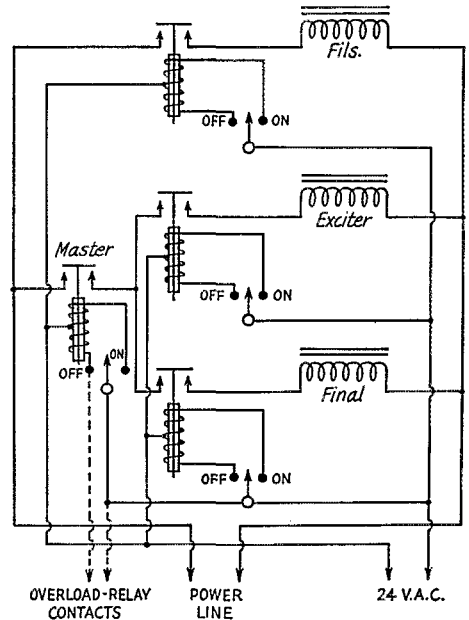


Fig. 2—A typical transmitter control system, including individual relays for each circuit and also a master control for switching all except filament circuits simultaneously. Overload control may be added as shown in the dotted lines.

fact that these relays are rated to handle 15 amperes at 115 volts, or 5 amperes at 277 volts, they are hard to beat in watts per dollar, even in the surplus market. The RR-2 is designed for 24-volt operation and draws 0.3 ampere at this voltage. However, it seems to give good positive action on as low as 12 volts. With 24-volt supply, the relay can be controlled reliably up to a distance of 1500 feet without the use of excessive control-wire size.

Another advantage of this type of relay is that duplicate control stations are easily added. Control stations at the rig and at the top of the rotary-beam tower, as well as at the operating position, are often desirable. Fig. 1 shows the basic circuit. The control switch, S, is of the

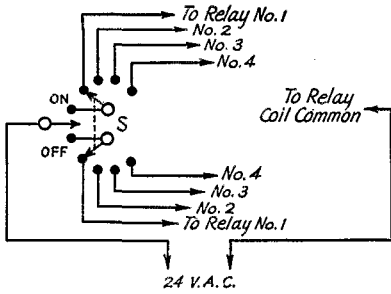


Fig. 3 — Switching system for using a single push-button control (see text).

double-throw push-button type. (GE type RSS-1 is an example.) Any number of duplicate independent control points can be tied in merely by paralleling the control switches (shown dotted).

A typical transmitter control system is shown in Fig. 2. A separate relay is used for each circuit (filament, exciter plate and final plate), so that each may be turned on or off at will during adjustments. A master relay is also included so that both high-voltage circuits may be controlled by a single switch during regular operation. An overload relay (contacts closing on overload) may be used to operate the master control merely by connecting the overload-relay contacts in parallel

¹ Skitzky, "The QH (Quick-Heading) Beam Antenna," *QST*, June, 1952, p. 50.

with the off contacts of the master relay, as shown in the dotted lines.

If it is desired to operate all relays from a single push-button control, the relay-coil circuits can be wired through a rotary switch to select the desired circuit to be operated by the push button, as shown in Fig. 3. The master relay can be wired into a separate circuit, or through one pair of the rotary-switch contacts, as desired.

The mounting of an RR-2 relay is simple, although it does require a rather large hole. By inserting the barrel end of the relay into a 7/8-inch hole, it will latch into place by means of two spring catches in its sides. In the original form, it is not weatherproof. However, with a layer of Scotch electrical tape and coats of spar varnish, it can be protected against the elements.

Once weatherproofed, the relay looks like a natural for antenna switching, particularly for antennas of the quick-heading type,¹ since it has a contact-to-contact capacitance of less than 1 $\mu\text{fd.}$, and a closed-circuit contact-to-coil capacitance of approximately 2 $\mu\text{fd.}$

In conclusion, I might point out that a little experimenting with junk-box relays will quickly provide an over-current relay that will trip at any desired current. By paralleling the winding with a variable resistance, a front-panel adjustment can be obtained. Obviously, if the relay is not connected in the negative side of the high-voltage line, it will have to be insulated for the full voltage of the circuit.

• Technical Topics —

Ham-Band Transmitting Loops

IN the article, "Ham-Band Transmitting Loops," by Richard R. Hay, W4LW, appearing in *QST*, September, 1952, I find the statement that "engineers who have been consulted about this antenna system say that its effectiveness will depend upon the ratio between ohmic losses and the radiation resistance." This is true but, by and large, for any loop used by amateurs, it is not the ohmic loss in the antenna that we are concerned with, but rather the reduction of ohmic losses in the circuit or transducer that is used to couple the radiation resistance to the feed system. It was further pointed out in this article that good results were obtained with the square loop. That this statement is not wishful thinking or just happenstance, it might be interesting to compare the radiation efficiency of a small loop with that of a half-wave dipole, both operating at the same frequency.

The power radiated by the magnetic dipole is equal to the power radiated by the electric dipole as shown by the following equations:

$$P_e = \frac{40\pi^2 |m_e|^2}{\lambda^2}; \quad P_m = \frac{40\pi^2 |m_m|^2}{\lambda^2}$$

where m_e and m_m are the moments of the electric and magnetic dipole respectively. For small elements, the moments (and thus powers) are equal.

The electric dipole can be compared with the half-wave dipole as follows: The familiar equation for the far field is expressed by

$$F = K \sqrt{\frac{P}{R_r}} \frac{1 - \cos G}{\sin G}$$

in a plane which is normal to the axis of the dipole where K is dependent on units, P is power fed to the dipole (watts), R_r is radiation resistance (73 ohms for half-wave dipole), and G is the electrical length of dipole (from center of feed to end) = 90 degrees for half-wave dipole. Now consider G to be very small; that is, approaching an electric dipole. The trigonometric terms in the above equations may be expressed as a series expansion thusly:

$$\begin{aligned} \sin G &\approx G \\ \cos G &\approx 1 - \frac{G^2}{2} \\ 1 - \cos G &\approx \frac{G^2}{2} \end{aligned}$$

(Continued on page 184)



Correspondence From Members -

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

VE 'PHONE

Box 55
Salisbury, N. B.

Editor, *QST*:

I would appreciate your publishing this letter as a means of explanation to Novices who feel that the VEs are unfair in using a portion of the Novice band for 'phone contacts. This letter is being prompted by the letter from WN1WPT, which was published in the April *QST*.

Although our 'phone band covers from 3725 to 4000 kc., all except a very few of us use from 3800 to 4000 kc., as a matter of courtesy to the W stations, except to answer CQs. This leaves us only 75 kc. for domestic 'phone operation. Of course there are a few who do not observe this custom, but this type of person is to be found in any group. If we were to discontinue using the lower part of our 'phone band, we would not have enough of the spectrum available to us to make 'phone operation worth while; therefore I believe that we VEs are doing all that should be expected of us in this matter.

The VE 'phone operators also have their problems, such as c.w. QRM (both VE and W) on the 'phone bands. If the same courtesy were observed in this matter as we observe on the American 'phone band, our lot would be much happier and possibly some gentlemen's agreement could be reached with respect to the Novice band. I realize that the c.w. band covers the complete 75-80 meter band, but cooperation is a necessity, if we are all to operate successfully.

I wish to emphasize that the opinions expressed here are purely my own and not necessarily those of all VEs, and are intended only as an explanation of the problems which the VEs have to face.

— Gerald W. B. Tail, VE1ACV

c/o Radio Station CHWK
Chilliwack, B. C.

Editor, *QST*:

Lee Warner, jr., WN1WPT, is indeed a new ham. When he says that VE stations are ruining his hobby and that he would like to see us lose some more of our dwindling frequency allotments, he is too new to realize that Canadian amateurs, numbering several thousand, were given the extension of twenty-five kilocycles. This was to compensate for the frequencies we lost to American amateurs on 75 meters and other bands. It is well to advise WN1WPT and any other misguided Novices that the Canadians were there first; that the reverse is true when he says that we are operating in his band.

So far as this station is concerned, it would do well for ARRL to consider the rights and opinions of Canadian amateurs, for they are being ignored. What greater proof of this statement can be found other than the placement of Novices in the Canadian 'phone band? Besides this, American teletype stations are operating in our 'phone band. Something should be done in favor of Canadian amateurs.

— Robert W. Service, VE7AA

KEYING INDIVIDUALITY

4557 S. Chelsea Lane
Bethesda 14, Maryland

Editor, *QST*:

W2VVO, in his letter in April *QST*, fears that the advent of automatic keys may wipe out the individuality of amateur sending; I hope that I can set his mind at ease. Having worked many other amateurs using auto-keys, I can assure him that the differences in fists among the newer gadgets are almost as large as they ever were. We must remember that the operator still has control over several variables in code formation: dot-to-dash speed ratio, mark weight, and inter-

letter and interword spacing. The variety of fists that can be acquired by only slight variation, conscious or otherwise, in these characteristics alone is large enough to prevent the dull uniformity that W2VVO and others have shunned. The positive argument for auto-keys, however, is that they do prevent atrocious extremes of individuality — those fists that are a chore to copy and a discredit to their owners.

Probably few amateurs attempt automatic keying with the idea of developing a fist indistinguishable from tape. My own satisfaction lies rather in an increased ease of sending and a greater enjoyment of the natural rhythm of c.w. operation. Several well-known auto-key operators have fists that are easily recognizable, yet a joy to listen to. "Tape-like?" No. Beautiful? Yes indeed. But it is unnecessary to take my word for it; a little listening on the c.w. bands will bear me out. Let us hope that W2VVO will not break up his Audiotron after all.

— G. Franklin Montgomery, W3FQB

LOWER POWER

928 Maple Ave.
Salisbury, N. C.

Editor, *QST*:

I have never written in to the League before, but since it's supposed to be of, by and for the amateur, I thought I would try.

I would like to know how someone else feels about this. I am very much in favor of a lower power limit on and above 20 meters. I run about 175 watts and I think it will do as much as a kw. A lower limit, say 200-300 watts, would cut down on QRM and emphasize operating techniques, rig performance, and a good antenna. . . .

— George H. Wellman, W4SMO

Heydon Cottage
Somerset, Bermuda

Editor, *QST*:

I agree 100 per cent with the article in April *QST* written by some W9s from Bloomington, Ind., regarding power. A kilowatt is definitely not necessary to carry on a QSO.

The majority of foreign stations' power is limited to 150 watts, their QSOs are just as successful as the fella's running a kilowatt.

Would like to work the gang in Bloomington, Ind.

— Martin Crider, VP9AV

"ECONOMY" POWER SUPPLY

Worcester, Mass.

Editor, *QST*:

Being a loyal follower of *QST*, I have taken advantage of your many helpful articles on accessories for increasing the efficiency of my S-15 receiver. While I realize this receiver is not in common use these days, you might remember it as being the first subheterodyne receiver to use parallel UX-201As in the local oscillator circuit.

Last night I finally completed my new 9-tube 5 kilocycle i.f. selective amplifier (described in *QST* for April 1954). As suggested by the author, I powered this unit from the power supply accessory plug on the rear of the receiver chassis. After checking to see that the unit drew power properly, it was wired into the normal receiving set-up.

As is my usual practice, I allowed several hours for the amplifier to warm up, age components, and stabilize oscillators. When I returned from the second feature, I was greeted at the door by a roomful of evil-smelling smoke. As soon as I could find a flashlight, I discovered that something had happened to my receiver. It had a large brownish spot on one side of its cabinet. Lifting the lid I had trouble in finding just where the power transformer had been. Where it must

(Continued on page 136)

On the Air with SINGLE SIDEBAND

A High-Level Mixer

With 7- and 21-Mc. 'phone now available, a pertinent topic of conversation among the s.s.b. gang these days is that of multiple-band operation. Thus the following description of a BC-457 conversion to a mixer, sent in by Dr. Milton Schwalbe, W4VP, of Louisville, Ky., is quite timely. Any low-level 4-Mc. s.s.b. signal can be fed in, and the resultant 7-Mc. output can be fed to the antenna or used to drive a big amplifier. The same principle is applicable to other bands by working out appropriate crystal frequencies and coil-condenser combinations. When crystal and exciter frequencies are mixed to obtain output at their sum frequency, the original sideband appears in the mixer output. However, when the mixer output is the difference of the input frequencies, the sideband is inverted. This may be especially useful when the exciter has no provision for switching sidebands, as in some of the crystal-filter jobs.

As shown in Fig. 1, the output of a 12A6 crystal oscillator on 3.3 Mc. is fed to the control grids of paralleled 1625s. The output of the 4-Mc. s.s.b. exciter is injected at the screen grids of the mixer. The plate tank circuit of the mixer is tuned to the sum frequency, 7.3 Mc.

The three sockets at the rear of the BC-457 chassis will accommodate the crystal, a 12A6 crystal oscillator, and the 4-Mc. plug-in coil, L_1 . Remove the flexible shaft under the chassis that couples the front and rear variable condensers. The front condenser is used to tune the plate circuit of the 1625s. The rear condenser (C_{63}) will tune the plug-in coil to resonate the screen-grid circuit to the 4-Mc. excitation frequency. The padding condenser across the plate tuning con-

denser of the 1625s is disconnected and not used. The former grid circuit air-spaced padder (C_{60} in the shield above the chassis) and the former grid coil will serve as the output circuit of the 3.3-Mc. crystal oscillator. Shaft couplings to adjust the various condensers can be brought out without encountering any serious mechanical difficulties.

With power supplied as indicated in the schematic, tune C_{60} and check with receiver or absorption wavemeter for crystal-oscillator output on 3.3 Mc. Detune C_{60} on the high-frequency side so that the 1625 resting plate current with no s.s.b. excitation runs about 100 ma. Connect the s.s.b. exciter and, using steady tone input, tune

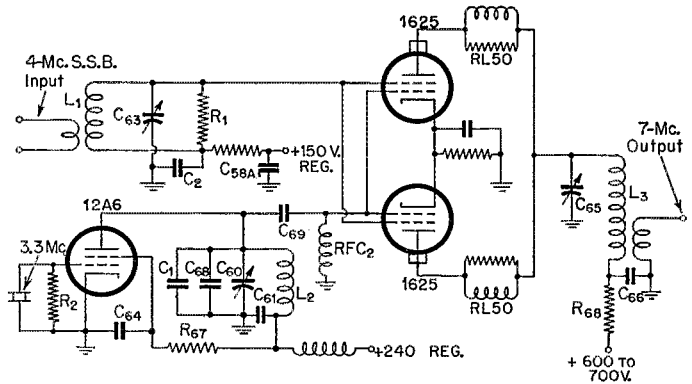


Fig. 1 — The BC-457 as W4VP's 40-meter mixer.

New Parts:

- C_1 — 220 μfd .
- C_2 — 0.01 μfd .
- R_1 — 4700 ohms.
- R_2 — 0.1 megohm
- R_3 — 300 ohms, 10 watts (1625s cathode).
- RFC $_1$, RFC $_2$ — 2.5 mh
- L_1 — 20 turns No. 22 enam. on 1 $\frac{1}{2}$ -inch diam. plug-in form. Link is 5 turns at cold end.

BC-457 Components:

- C_{58A} , B — .05-.05 μfd .
- C_{60} — Oscillator padding.
- C_{61} — 0.006 μfd .
- C_{62} — Oscillator tuning.
- C_{64} — 0.002 μfd .
- C_{65} — Amplifier tuning.
- C_{66} — 0.01 μfd .
- C_{68} — 3 μfd .
- C_{69} — 50 μfd .
- R_{67} — 51,000 ohms.
- R_{68} — 20 ohms.
- R_{73} — 51 ohms (1625s screen decoupling).
- RL50 — Parasitic suppressor.
- L_2 — Oscillator coil T $_{53}$. Use "A" winding as is, after removing surplus leads.
- L_3 — Amplifier coil T $_{54}$. Trim down to 10 turns evenly spaced. Add 3-turn link at cold end.

The informal s.s.b. dinner in New York City during March was attended by these representatives from all of the W call areas. A stranger in back of the camera is explaining why he thinks s.s.b. isn't here to stay.



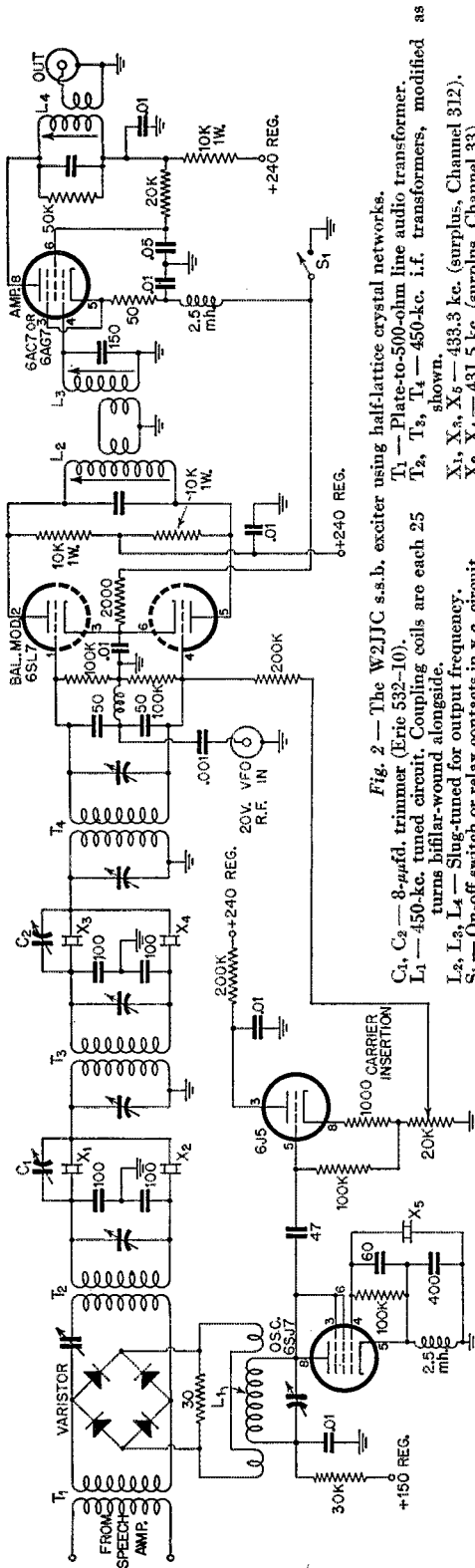


Fig. 2 — The W2JJC s.s.b. exciter using half-lattice crystal networks.
 T1 — Plate-to-500-ohm line audio transformer.
 T2, T3, T4 — 450-kc. I.F. transformers, modified as shown.
 X1, X2, X3, X4 — 433.5 kc. (surplus, Channel 312).
 X5, X6 — 431.5 kc. (surplus, Channel 33).
 S1 — On-off switch or relay contacts in v.c. circuit

C_{63} for maximum 1625 plate current. Using a dummy load, tune C_{65} for maximum mixer output on 7.3 Mc. The 4-Mc. injection level is controlled by varying the audio gain control of the s.s.b. exciter. This can be adjusted by monitoring the output signal on a receiver (if you have a delicate ear) or, preferably, by 'scope and the two-tone test. In W4VP's set-up an r.f. output of about 15 watts can be obtained before flattening of the peaks is apparent.

A Half-Lattice Crystal-Filter Exciter

W2JJC has a new exciter design that is passed along by W2AMB, Fred Huff, of Jackson Heights, L. I., N. Y. It borrows ideas from several designs and, if you haven't kept up with the s.s.b. literature, it is suggested that you acquaint yourself with the Weaver-Brown articles in the June and August, 1951, issues of *QST* and the crystal-filter article by Good in the October, 1951, issue. You can also get some ideas from the W7BMF exciter shown in this column in April.

The circuit is given in Fig. 2. The transformer T_2 is opened in the primary for a series-tuned connection, since the varistor (four germanium diodes) modulator wants to look into a low impedance. The "bifilar" windings on L_1 , in case you aren't familiar with the term, are simply two interwoven windings, with the left-hand end of one winding connected to the right-hand end of the other. You can find a picture of such a winding in Fig. 5, page 23, of the January, 1948, issue of *QST*. The crystals do not need to be the exact channels shown — any combination of channels that gives the necessary 1.8-kc. separation should be satisfactory.

— B. G.

Strays

Have you heard about the careless ham who caught a hot 2000 volts off his final tube's plate cap, came down from the ceiling and started hitting the bottle?

The Voice of America has vacancies for unmarried radio engineers to operate its new million-watt standard-band stations in Okinawa and the Philippines. A shortage of family-type housing precludes consideration of additional applications from married engineers at this time.

Salaries range from \$4323 to \$5909 per year, depending upon education and experience, plus allowances and transportation.

Applicants must be between 25 and 35 years of age, holders of first-class radiotelephone licenses, and must have had at least three years' experience with standard-band or short-wave broadcasting transmitters.

Apply to Office of Facilities Manager, International Broadcasting Service, Department of State, 251 West 57th St., New York, N. Y.

1953 ARRL Field Day Rules

Annual Test for Emergency-Powered Stations, June 20th-21st

FIELD DAY packs more solid fun and enjoyment into a week end than any other ARRL operating activity. This annual event is a test of emergency-powered stations in the field operating under conditions often approximating those encountered in an actual emergency. Radio clubs and organized groups function as teams in setting up and operating single- or multi-transmitter stations independently of normal power facilities. If you're not going out with a club this year, but own a mobile rig or gear that can be set up afield, get out alone or with a friend and enjoy the fun. Check out your transmitter and send us your report. Clubs in particular are urged to get every mobile unit owned by their members into the field and to report their aggregate-mobile scores!

The procedure for making Field Day contacts is as follows: call "CQ FD" on c.w. and "CQ Field Day" or "Calling Any Field Day Station" on 'phone. During contact give each station a signal report and the name of the ARRL section in which you're located, and stand by to receive similar information. Score your contacts according to the rules listed here and send a report of your FD activities to ARRL Headquarters.

One change has been made in the rules for this Field Day: in the Hawaii and Alaska sections FD will start and end on Pacific Standard Time. Heretofore stations in those areas did not end operation until two and a half hours or more later than continental U. S. and Canada. The change should allow them to make more contacts during the closing hours. *Rules for stations in all other sections are the same as those of last year.*

Be sure to get the added points to your score for originating a special Field Day message. Many clubs have a session in advance to brief members on efficient operating practices, including order of message parts. The FD message will give you and other participants practice in handling traffic, and will convey information to your SEC or SCM that will enable him to evaluate emergency facilities. Normally the message should be sent to a station in your state or section so your SEC or SCM will receive it quickly.

If you haven't started preparing for Field Day, *start now!* Convenient reporting forms are available upon request from League headquarters. You may make up your own report forms but please be certain to include all the required information. Mail your reports on or before July 15th.

ARRL extends to all participants its best wishes for a happy, happy FD!

Rules

1. **Eligibility:** The Field Day is open to all radio amateurs in the sections listed on page 6 of this issue of *QST*.

1953 Field Day

Starts 4:00 P.M. Local Standard Time,* June 20th
Ends 4:00 P.M. Local Standard Time,* June 21st

* Not Daylight Time

(If in Hawaii or Alaska, see Rule 5)

2. **Object:** For portable and mobile stations to work as many stations as possible; for home stations to work as many portable and mobile stations as possible.

3. **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Contest Committee.

4. **Entry Classification:** All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or non-club group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations operating from emergency power; "E," home stations operating from commercial power sources. Thus a club group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 1C classification.

Portable stations are those installed temporarily, for FD purposes, at sites away from customary fixed-station locations. Portable equipment or units must be placed under one call and the control of one licensee, for one entry. All control locations for equipment operating under one call must lie within a 1000-foot diameter circle.

Club or group participation is that portable-station work accomplished by three or more licensed operators.

Unit or individual participation is that portable-station work accomplished by either one or two licensed operators.

Mobile stations are complete installations including power source and antenna, mounted in or on vehicles and capable of being used while in normal motion. If they utilize antenna supports not normal or suitable for use during motion, installations must be classified as portable instead of mobile. Each mobile entry call must be different from any other FD station participating.

Home-station participation is that work by fixed amateur stations not operating portable or mobile.

A transmitter used to contact one or more stations may not subsequently be used under more than one other station call during the Field Day period.

5. **Field Day Period:** The Field Day starts at 4:00 P.M. Local Standard Time (*not* Daylight Time) June 20th and ends at 4:00 P.M. Local Standard Time (*not* Daylight Time) June 21st. (Hawaii and Alaska sections use Pacific Standard Time.) All contacts must be made during this period. Class C stations may cross a time-zone line but may not receive credit for more than 24 hours of operation if they do so.

6. **Bands:** Each 'phone and c.w. band is regarded as a separate band. The following (and additional u.h.f.-s.h.f. bands) constitute separate bands: A1: 1.800-1.825 1.875-1.900 "east" or 1.900-1.925 1.975-2.000 "west," 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.45, 26.96-27.23, 28.0-29.7, 50-54 and 144-148 Mc. A2, radioteletype and frequency-shift keying are grouped with A1, in the bands where they are allowed. A3: 1.800-1.825 1.875-1.900 "east" or 1.900-1.925 1.975-2.000 "west," 3.8-4.0, 7.2-7.3, 14.2-14.3, 21.25-21.45, 26.96-27.23, 28.5-29.7, 50-54, and 144-148 Mc. All forms of voice transmission will be grouped with A3, in the bands where they are allowed. (In Canada and Cuba, their respective 'phone bands apply.)

The use of more than one transmitter at one time in the same band is not allowed.

7. **Exchanges:** Signal reports and ARRL section (or specific location) must be exchanged in proof of contact.

8. **Valid Contacts:** In Class A, B and C, a valid contact is a completed exchange with any amateur station. In Classes D and E, a valid contact is a completed exchange with any

(Continued on page 122)

• On the TVI Front

INTERFERENCE AIDS AVAILABLE

ARRL is pleased to announce the availability of the following items as aids to the interference elimination programs of affiliated clubs. Please address your requests to Communications Department, ARRL.

ARRL Affiliated Club Program re TVI Committees (CD-16): On formation and composition of club TVI Committees. Some suggestions on organization are given which should be followed by all clubs.

QST References to TVI Reduction (CD-4): A bibliography listing articles dealing with TVI reduction that have appeared in QST. The list is conveniently indexed as to specific phases of TVI elimination.

Kiser Reprint No. 1: "TV Interference Problems." Generalized comments on i.f. and image interference; troubles with poor locations and the "amateur alibi" used by some technicians.

Kiser Reprint No. 2: "TV I.F. Interference." The predicament of the amateur operator and the diathermy-using doctor; the technician's role and the manufacturer's duty regarding i.f. interference difficulties.

FCC on TV Reception and Interference: General information on the allocation plan, reception limits, types of interference, and suggestions to servicemen and dealers.

The Approach to the TVL (CD-8): How to reach a friendly understanding with a complainant.

New York Times News Release: For local publicity (with proper credit line) . . . covers the story of 21-Mc. operation and helps educate the public in their responsibility.

Your TV Receiver (CD-8): Directed toward the TVL, readable and informative.

Radio Interference; Its Sources, Determination, Remedies (CD-25): Sources of BCI, solutions — directed to BCLs.

Progress Report on TVI Committees: Turner reprint from February 1953 QST. Summary of first year's experience in FCC sponsorship of local committees.

Publicity: Typical letter-to-the-editor and sample committee item to aid in formulating local publicity.

TVI Complaint Form: Sample form successfully in use by the Washington (D. C.) Television Interference Committee.

TVI Quiz: 20-question multiple-choice quiz with a comprehensive answer and discussion sheet. Excellent item for stimulating group interest.

TVI Film: 16-mm, silent black-and-white film, in use till further TVI visual aids are developed. (Requires advance booking.)

TVI Log Sheet Introduction: Well-written understandable letter for TVLs to aid in logging their interference symptoms. (In use by Sioux Falls Amateur Radio Club.)

ADDENDUM: ROSTER OF TVI COMMITTEES

On page 16 of March QST this department presented a comprehensive state-city listing of local TVI committees based on data collected by FCC regional managers. Subsequent correspondence to Hq. from club officials has indicated that the following committees also are very much in business:

California: Cities and towns "in shadow" of Mt. Diablo — served by Mt. Diablo Amateur Radio Club TVI Committee (W6RVC committee chairman).

New Mexico: Albuquerque and vicinity — served by Sandia Base Radio Club TVI Committee (W5RFF club secretary).

A.R.R.L. TVI DEMONSTRATION TO "BARNSTORM"

During the past year ARRL has sponsored a series of lectures on TVI by Philip S. Rand, W1DBM, now Technical Consultant to our staff, in a number of cities throughout the country. The aim has been primarily to acquaint servicemen and dealers with the problems involved, and through the use of slide projector illustrations to show how to determine from the picture pattern the probable source of interference. The demonstration gear, prepared by the ARRL Technical Department as a major project last year, is most essential to the effective telling of the TVI story but, unfortunately, its bulk has prevented the arranging of as many showings as would seem desirable.

The League has now purchased a station wagon in which the equipment can be easily transported. This has made possible scheduling the talk and demonstration for a "barnstorming" tour this summer of the central portion of the country, to be undertaken by QST Technical Assistant L. G. McCoy, WIICP, who has assisted Mr. Rand in previous appearances. The tentative itinerary, consisting of cities where low-band v.h.f. channels are in operation, follows:

June 15th, Rochester, N. Y.; *17th,* Buffalo, N. Y.; *19th,* Cleveland, Ohio; *22nd,* Detroit, Mich.; *24th,* Milwaukee, Wis.; *26th,* Davenport, Iowa; *29th,* Minneapolis-St. Paul, Minn.

July 1st, Omaha, Nebr.; *3rd,* Kansas City, Mo.; *6th,* Springfield, Mo.; *8th,* Oklahoma City, Okla.; *10th-12th,* Houston, Texas (ARRL National Convention); *14th,* New Orleans, La.; *17th,* Memphis, Tenn.; *21st,* St. Louis, Mo.; *23rd,* Indianapolis, Ind.

Affiliated clubs in these cities have been notified in advance so they can make plans for sponsoring local meetings, to include servicemen and dealers as well as amateurs.

A similar tour is planned for early autumn to cover the southeastern part of the country.

SAN FRANCISCO COMMITTEE REPORTS SUCCESS

We are indebted to SCM R. F. Czeikowitz, W6ATO, chairman of one of the TVI committees operating in the San Francisco area, for the following progress report:

"Our committee, numbering 20 investigators, has been active for 14 months. During this period, the committee has satisfactorily and completely cured almost 100 per cent of all TVI complaints received by the local FCC office. The few exceptions (numbering six) have been cases where the complainant was using only built-in or rabbit-ear type antennas which filters were unable to protect against fundamental blocking because of the weak TV signal at the receiver. This record is possible only because of the very fine coöperation accorded the committee by the sales representatives and service managers of eight well-known manufacturers."

Handling TVI Complaints Due to Poor TV Sets

BY E. M. SHOOK,* W5IT

• Appearing originally in the West Gulf Division Newsletter for February, 1953, this article by the coauthor of "The Dallas Plan for TVI" (June, '51, QST) straightforwardly states the amateur's position in handling TVI complaints attributable to inadequate receiver design.

THE ideal procedure for an amateur to follow is to get his transmitter deloused *before* television reception is attempted in his community. Then, as television receivers surround him, he should operate his transmitter as many hours as possible to make sure that any TVI involving his transmitter will show up quickly. The quicker, the better, for all concerned. The amateur can take the *first* complaints one at a time and do a more thorough job of showing or convincing the public of the facts. Let us say he will have an even start with those who would mislead the TV viewer into believing he had the very best thing money could buy; or with those who would mislead the TV viewer into believing that any and all troubles with the TV set are directly due to the "so and so" amateur down the street. Using methods described later in this paper, you can show the complainant that the trouble is due to the inability of the TV set to reject legally authorized amateur signals. Convince him that he *should* be able to use his TV set without interference from your rig and that the dealer or manufacturer had sold him a TV set without all the necessary parts in it. Be sure you encourage him to demand satisfaction from his dealer. Continue the operation of your debugged transmitter as many hours as possible. If you agree with him to stay off the air during his favorite programs, he will never force the issue with his dealer. If you fix these first defective TV sets, you will set a pattern for yourself that will take you entirely away from your amateur operation and run you bankrupt in addition. If you shut down through fear of these first complainants when you know your transmitter is clean, you are a coward and don't deserve the privileges won for you by your predecessors. You will also be betraying those amateurs who come after you. The overwhelming advantage you have is knowledge. Use it wisely and you will render a great public service as well as help save amateur radio.

No amateur is going to prepare for the storm as recommended above. The amateur not yet swamped by TVI probably won't even bother to

read this. He is going to wait until the inevitable happens and then look around for suggestions. If you have read this far, you are probably swamped and are looking for help. What can be done at this late date? Muster a little more courage and join the crusade. It is assumed your transmitter is clear of harmonic and spurious radiations in the occupied TV channels.

Two quotations are given to illustrate further the need for the amateur to get going. Dr. Dan Noble in the November-December, 1952 issue of *Motorola Newsgram*, writing of development of industrial radio equipment, said in part, "All Motorola men are ordered to keep the feed-back loop from engineering to production, to customer, back to engineering in a high state of activity. Every field report of failure, limitation, or sub-standard performance receives sharp and worried attention until tests either establish the fault as an exception or result in a design change to yield permanent improvement." Mr. Rigsby, representing RCA at the ARRL West Gulf Convention in 1951 at Austin, said, "I recommend you get back on the air and let the chips fall where they will."

If your transmitter is free from harmonic and spurious radiations in the occupied TV channels, the following procedure is recommended to you *as an individual* or *as a group*. It has been tested and proven to be adequate to keep the feed-back loop in a high state of activity and to make sure the chips fall in the right place. Every action you take and every word you speak to your complainants should have only one objective — directing him back to the dealer from whom the TV set was purchased. The dealer quickly will be forced to complete the feed-back loop back to production and engineering. If you engage in fixing the TV sets or in violent arguments with the TV viewer or the serviceman, you will be interrupting the all important feed-back loop.

The procedure is:

- 1) Regain or gain your complaining neighbor's confidence. Under no circumstances enter into violent or angered argument with him. Speak slowly and calmly with conviction and assurance. Even if his TV set is at fault, it is wise to delay such a statement until he has seen at least part of the evidence you are to show him.
- 2) Be firm but be fair. Show him, by tests and in words which he might understand, the evidence you are able to produce. The evidence easiest for him to grasp is another TV set operating without difficulty but closer to your transmitter than

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* 227 West Woodin Blvd., Dallas, Texas.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

The majority of YLs are of the "operator" type — it is on-the-air operation which intrigues them most, whether they be engaged in nets, contests, or just plain rag-chewing.

A smaller group of YLs not only operate but build the equipment they use. Their pride and satisfaction in building and servicing their own gear is so keen that they strongly encourage more YLs to enjoy this phase of the hobby.

Let's see what the experiences of three YLs of the latter group have been.

W5LGY, Helen M. Douglas:

"There is much in store for the YL who builds and/or maintains her own equipment. Shortage of funds and a desire to know what makes everything tick made me learn to build and repair my equipment. Anyone with the money can purchase factory-made equipment to use in the shack, but fun can come from buying parts and putting them together to make them work. It takes time, study, patience and effort to be successful.

"Learning to know what to do when there is trouble has enabled this amateur to find many friends. When you do get into trouble, let it be known. The OMs are anxious to help you get back on the air. If you cannot do it by radio,

*YL Editor, QST. Please send all contributions to W1QON's home address: 318 Fisher St., Walpole, Mass.

tune the bands until you find two hams who are discussing radio construction. Write to them. They have sent me many needed diagrams, parts, and scheduled many QSOs to give more assistance. They stand by for you while you make the changes. Some have driven miles to help me put up an antenna or to check the work I had done on the rig. This has enabled me to meet them and their families. One ham's wife even wanted to do the climbing because she would not fall off the roof as easily as her OM would. She was not a ham.

"In all, I enjoy building and maintaining my own equipment because of the satisfaction that comes from learning how to do things for myself and from putting such knowledge to purposeful use."

VE3DEA, Denny Denmark:

"Before I knew anything about radio, a circuit for a small battery receiver intrigued me so much that I took an aluminum sink strainer for a chassis and an old breadbox for a cabinet and wired a set that worked — my 'Kitchen Model'. On the way to school one day, my daughter bragged about the set to a boy across the street. A ham himself, he came over to see it. His help and encouragement led me to study for and pass the license examination.

"My station gives some indication of my fondness for building. Whatever equipment I have is home-built, although I have settled for a commercial receiver, as one requires an exceptionally good receiver for DX work, I think. My station shall never be 'complete' — I want to add more and more. I can't imagine going to the surplus shops and not having the need of buying something. I love to get all dirty and dusty delving through the bargains in condensers, resistors, etc. (I've made up enough filters to supply the army.) There is no 'junk box' in my shack. It is not junk to me — it's very valuable stuff.

"There is a kind of competitive challenge in building and maintaining your own gear. It allows you to prove to yourself you can get results when you want to."

Then we have an interesting story from the pen of W1QJX, Charlotte Spaulding.



W1QJX at work on a ten-meter converter and power supply. Charlotte finds it a challenge to build and maintain her own equipment.



VE3DEA has built four transmitters, various power supplies and miscellaneous equipment. With frequent reference to *QST* and the *Handbook*, Denny hopes she has completely de-TV'd her newest rig—a hand-switching job for 10, 20, 40, and 80 meters.

"To tell you properly how I came to build some of my radio gear, I must begin by acknowledging a very huge debt I owe to a great many people. I would like to express to all these radio amateurs my sincere thanks and very deep gratitude for their generosity with time, know-how, gear, and patience in helping me to become a ham and participate so fully in this hobby.

"I entered amateur radio in reverse. I fell in love with radio, its theory and practice long before I ever knew radio amateurs existed. A fit of curiosity led me to explore our radio set's vitals, and from that day I was a gone goose. I studied what books I could find. When going got tough, I took a radio course. Friends answered endless silly questions, gave advice and encouragement. I built my first transmitter and power supply. Since then I have built several power supplies, an audio oscillator, modulators, and am now constructing a ten-meter converter and transmitter.

◆
 Even the "squirrel cage" which houses W5LGY's rig is home-brew. Atop the rack is a 3-tube receiver. The first panel contains a 100-watt 'phone-c.w. rig; the second, an 80-meter VFO and BC-459; the third, a 15-watt 'phone-c.w. rig. The bottom panel contains two power supplies and a line filter.
 ◆

"All this is fun and a great source of satisfaction to me, but its real value is the ability it gives me to make my own repairs and keep myself on the air. I have a feeling of security and peace of mind in knowing that I can remain a going concern. Occasionally a spell of envy overtakes me for those who just flip a couple of switches to get on the air. This occurs when I have just burned, sliced, or shocked some part of my anatomy. But it doesn't last long. I like things the way they are."

The words of these YLs should encourage us all to learn more about the equipment we operate, and, we hope, stimulate a desire to actually do some building of our own.

Keeping Up with the Girls

W1YYM, Ellen, is the third YL (of whom we've heard) to pass the Extra Class exam. . . . All YLs are invited to join the "Tea Party" daily on forty 'phone—7205 kc. at 1100 EST. W8HLF, Arlie, is NCS. . . . OM W6ONK is happy to report his XYL, Bonnie, is now KN6AHA. . . . W8CDQ sails in June for a summer in Europe. Liz anticipates visits with several European YLs. . . . A Chicago YLRL unit has been organized by W9GME, Grace. The twelve charter members are W9s AYX BCB GME KXY MYC OTM OTO SEZ SPI SSL, WN9s TIX and WOJ. . . . All YLs in the vicinity of Newark, N. J., interested in establishing a YLRL unit in the city are requested to contact W2IQP Lil. . . . Newly-licensed W1YCU, Judith, is fifteen and a sophomore at a Worcester, Mass. high school. . . . W4UMM, Sarah, is on 10 'phone from Atlanta, Ga., and W0HBO, Barbara, is on 40 and 80 from Kansas City, Mo. . . . W4VDL and her OM, W4VDK, of Mobile, Ala., both have Seeing-Eye dogs who stay close at hand even when Eileen and Earl are operating in one of the several nets they check into daily. . . . KH6TI, Dell, has left Honolulu and will reside in W2-land for awhile. . . . W1UPZ, Helen, received an S-76 receiver as a result of the many hours she spent assisting at an amateur radio exhibit in a Boston department store. . . . Norfolk, Va., now has three active YLs—W4TVT, Claire; W9KXL/4, Bobby; and W4LAS, Mabel. . . . The N. Y. C. YLRL substituted an afternoon at the theater for its regular February meeting. Their March meeting was held at the N. Y. C. Public Library. . . . CR7LU would like it known that she QSLs

(Continued on page 122)



He Makes What We Hams Use



ART COLLINS, W0CXX
Collins Radio Company

ALTHOUGH s.s.b. has been getting a big play at W0CXX lately, Art operates c.w. and f.s.k., too. He's likely to be on any band from 3.5 Mc. through 28 Mc. where you can work him almost any night or week-end. The call W0CXX was 9CXX when it was assigned in 1923 and 9CXX immediately became a well-known call. Early QSOs that gave Art the biggest kick were on 20 meters with 1QP and 6TS. Just the day before, on January 22, 1925, these stations had established on that band the first daylight coast-to-coast contact. Art was also one of the pioneers on 5 and 10 meters and worked both 21-Mc. c.w. and 7-Mc. s.s.b. on their recent opening days. Ham-shack wallpaper includes an A-1 Operator Award; W0CXX can qualify for both WAS and DXCC. Art likes to recall how he was helped by friendly amateurs when building his first transmitters. That he returned the help is known to all of us, since talks by Art Collins at conventions and articles written by him for *QST* — like the pi-network story in the February, 1934, issue — have inspired many a ham to build a better rig.

AFFILIATED CLUB PROGRAMS

As a note to the many new officers of ARRL-affiliated clubs, this is the time for you to check up on the availability of training-aid items for use at your fall meetings. In addition to the many films and filmstrips now in circulation, we're happy to announce the addition of a brand new slide collection. This slide series is devoted to the *Amateur Radio Emergency Corps*, with emphasis on its organization and functions. Rules for booking training-aid items, as well as a list of all available material, can be obtained upon writing the Communications Department, ARRL, attention Training Aids.

Preview — DX Contest High C.W. Scores

Almost without exception participants in the 19th ARRL International DX Competition remarked on the poor conditions. The *claimed* scores we've received to date, however, would seem to indicate the bands weren't in such bad shape after all! A tabulation of high W/VE scores, multipliers and contacts is shown below:

W2SAI...	320,829	229	467	W3ALB...	115,420	145	266
W3CTJ...	272,160	210	432	W3KT...	112,398	143	262
W4KFC...	258,512	214	404	W1BFT...	109,737	137	267
W4ESK...	244,728	206	396	W9IOP...	107,856	144	255
W3MSK...	243,009	201	403	W6RW...	107,304	136	263
W2AGO...	230,442	199	386	VE2WW...	105,264	136	258
W3DHM...	212,040	186	380	W7PGS...	102,684	129	266
W2WZ...	209,790	189	370	W7PGX...	101,304	134	252
W3LVF...	208,512	192	362	W6PB...	101,010	130	259
W8ZY...	194,394	181	358	W8PQQ...	100,947	133	253
W6IBD...	190,650	175	362	W8ACE...	100,584	132	254
W5ENE...	167,790	170	329	W9NDA...	100,500	134	250
W3JTC...	166,725	171	325	W0DAE...	96,390	126	255
W6AM...	162,825	167	325	W6TT...	93,330	122	255
W8FGX...	158,436	162	326	W6LW...	91,113	121	251
W8BTI...	148,365	157	315	W3LYE...	88,011	127	231
W8HGW...	141,816	152	311	W3EQA...	87,552	128	228
W3BVN...	141,410	158	299	W6PYH...	87,483	121	241
W1LOP...	131,400	146	300	W2FBA...	83,916	126	222
W4HQN...	130,011	151	287	W9HTZ...	83,814	122	229
W1RY...	129,150	150	287	W1BOD...	80,968	116	234
W3GHS...	127,449	147	289	W3JTK...	79,860	121	220
W6CYL...	122,320	139	294	W6WB...	78,309	113	231
VE3ZW...	119,196	132	301	W6VDG...	77,970	115	227
W4BRB...	118,548	148	271	W4DCZ...	76,360	115	222
W3MFW...	117,504	144	272	W9GRV...	76,167	117	217

Here are top scores outside W/VE:

KG4AF...	545,292	81	2244	ZE3JP...	67,896	46	492
KV4AA...	341,510	71	1608	FF8AG...	67,716	44	513
VP9BF...	297,480	67	1480	YN1AA...	66,385	55	403
VP9BDA...	289,640	63	1455	PJ2AA...	63,936	41	512
KH6MG...	339,552	72	1574	OA4N...	60,759	43	477
OE3AG...	215,280	69	1040	PY1ADA...	58,338	42	463
KP4JE...	200,202	61	1094	KB6AY...	58,053	37	523
KH6PM...	200,064	64	1042	CO2BM...	56,790	30	631
KZ6BS...	199,013	71	937	CT1DJ...	48,246	34	472
XE2OK...	147,539	49	1011	YV5FH...	37,758	42	301
KH6ER...	141,708	49	964	F8VJ...	33,033	33	335
KP4CC...	133,280	49	915	DL4EF...	27,944	28	335
KP4UB...	102,344	44	780	VP5BH...	27,864	27	348
YV5DE...	94,201	47	661	KL7WC...	27,300	28	325
ZL3OA...	92,267	49	633	PA9EP...	24,288	32	257
EA4CN...	91,828	44	701	PY3QX...	24,128	29	280
VP7NM...	86,448	48	603	KG6FAA...	24,120	24	335
L88AE...	84,105	45	647	CE6AB...	23,636	38	210
PY2OE...	71,064	42	564	TA3AA...	23,610	20	203

All entries will be carefully checked before announcement of final results in a later *QST*.

Answer to QUIST QUIZ on page 10

"They both are, within limits. 'S9,' which means 'extremely strong signals' is a meaningless reference for a ratio, and decibels simply express the ratio of two power levels. Translated exactly, '20 db. over S9' means 'Your signal power at the input of my receiver is 100 times the signal power of an extremely strong signal.' If signal reports are to be given in db., a better reference might be total noise at the receiver. On B's side is the fact that any given receiver with an S-meter accurately calibrated in decibels can be used to give antenna and power-change checks over a constant radio path in the absence of interference."



How's DX?

CONDUCTED BY ROD NEWKIRK,* W1VMW

How:

Tester O'Riggs roared his disapproval 40 db. over the voices of the rest of us.

"I protest and deplore this projected action of the Echo Hollow Mud- and Signal-Slinging Society. Under no circumstances should we put our club on record as being in favor of the abolishment of *all* QRM, QRN and QSB!"

We recoiled aghast at this apparent in-league-with-the-devil attitude, this revolting development within our ranks. Indeed, if a vote had been called at that moment there is no question but that the outcome would have been 11½ in favor of the motion and only one against. Tester was alone — an outcast, a reprobate, a fiend among friends. (That half-vote belonged to Jeeves, behind in his dues again.)

Tester took the floor for the defendants — interference, static and fading — while we 11½ plaintiffs sat back querulously with folded arms.

"I speak from my own experiences as a QRP DX man," he began. "QRM, QRN and QSB are very often my best operating aids. Take that VR8 I worked last week — the one you guys drooled yourselves dry over. He started CQing and I barely got his call before he disappeared momentarily beneath two S9 birds calling CQ ZD8. I heard him sign beneath the racket and quickly grabbed him only because I was the only joker calling. Do you guys think my 6V6 would have had a chance if his long CQ had been called in the clear?"

"As for atmospherics, QRN is just what's needed to separate the men from the boys in 80-meter summer DXing. Thanks to noisy nights for sitting-duck shots last year I knocked off ZK2, FUS and a half-dozen others I wouldn't have gotten close to if the band had been quiet and more pleasant for the softies to use.

"And QSB — jimminy! When the Europeans fade out on Twenty to let those rare Oceanians and Africans leak through should you *complain*? Go ahead, chumps; cut your own DX throats if you like but *I* request to be recorded as voting opposed!"

This Bryant-like blast was followed by a few minutes of thoughtful silence, after which the motion was discreetly tabled and forgotten. More important business was taken up instead — for instance, the matter of our railroading through a proposal that Jeeves operate the club's 11-meter set-up again this Field Day.

What:

Other DX bands may flare up brightly from time to time but you can't get away from it — good old *twenty* is still boss. W4AIX (ex-W9NRB) finds time to get back into the thick of things for catches like these: AP2N (14,064),

* DX Editor, QST.

CP1BX (028), CR6CZ (040), EA9AP (040), FA3HH (055), FB8ZZ (048), FF8s AG (090), AN (038), FM7WD (048), FQ8AG (045), GC4LI (035), GD3UB (028), HC1KD (080), HZ1AB (060), 15GO (040-080), OE13RN (038), OQ5CP (030), OX3UD (010), OD5AD (048), TA3AA (010), PJ2CF (050), SP9KKA (080), TF5SV (078), TG9AC (080), VP5s 2KO (042), 3VN (050), 3TF (044), 4LZ (032), 5BF (080), 5BH (040), 6BS (052), 7ND (044), 8AP (038), VQs 2GW (024), 4DO (002), ZB1KQ (038), ZD4BL (050), ZE3JP (030), ZSs 3HX (060), 7D (090), 5A3s TR (050), TU (050) and TZ (090). Smitty needed only thirty-five watts and a folded dipole for these babies — all told, 85 countries in less than three months. The rig was a Collins 310-B and W4AIX receives with an HRO. Before packing up to return Statesward, W9YDZ/KG6 racked up C3BF (043), CRs 7LU (059), 9AF (052), FN8AD (049), FO8AI (041), MI3AT (044), SU1GB (071), SV9WE (071), VSs 2DF (064), 9AP (064), VU2s JV (052), 2ZW (017), XZ2OM (019), ZC5VS (072) and 4X4FW (075). These were worked between 1200 and 1630 GCT, obviously an excellent period of the day for Guam-based DXing. W8YGR scored with ST2AR (005) and narrowly missed one VS4AB (010) who popped through around suppertime. CN8CY, an FF8, GC2FZC (068), 11YCD/Trieste, MF2AE (065), SPs 1KAA (038), 2KAC (058) and FA8CR (042) appear on the good side of W2LYO's score sheet. UA1KAI and 3A2AX were heard but not worked. After a 2-year layoff, VE1PQ dived back in for HRIKS (075), SP2KAC (030), SU1MF (080), VU2JP (060), VSs 6AC (040), 9LO (070), ZB1BU (030) and ZC4IP (040). Doug also knocked off CP1, LZ1, MI3 and TA3 entries already mentioned. W8JGU, thinking about trying an 8JK, collected a CN8, FA9VN (058), TF3s AB (030), MB (040) and YN1AA. ET3Q (038), JAs 2AD (071), 5AB (055), OD5BN (081), VP6PV (065), VQ3AV (065) and ZE5JA (059) rang the bell with DL4JN. Bill is still after KG6s AEJ (070), GX (032), OQ5LL (019) and VQ5DQ (055). WIUCQ, doing a tour of duty with Arabian-American Oil in Saudi Arabia, found a chance to tune the band one evening and heard MI3SL (067), OD5XX (060), SU1CN (033) and VU2CR (023) boiling through. Some of the gang have been hitting 14 Mc. for pretty good c.w. stuff in addition to catches previously mentioned. At W1BTQ we find: CN8s CP HE, CT3AA, VP6GT, YU1ADA and YV5AK. W2HSZ:





an ST2, an MI3 and QSLs from VS7PM, YI2AM and ZC4IP. *W4THZ/4*: a CT3, FOSAC, GC5OU, KW6BC, ST2GL, SU1SS, VR2BZ, an Aden VS9, ZB1KQ, ZK1AA and 4X4FQ. *W470*: JAs 1AA IAR 1AU, KAs 9AA 0IJ, MP4BBD, OD5AD, an ST2, VK1EM, ZC4s RS XP, 4X4s DF FG and KJ6AX. *W1MX* (W4YHD and W9GQL operating): a CR7, IS1s AHK CXF, LB5Q, LU3ZO, OQ5s CP GU, an ST2 and TA3, ZB1s/BU-KA, 9S4s AL AX and VS9AP. *W6ZZ*: CE3AG, KA2HQ, KA9AA and OA4N. *W70EB/7*: DU7SV, JAs 3AC 3AQ, KA2LG, KG6ABN, KV4AQ, OX3GL; and a CPl. *KA8AB*: CX6AD, OX3RC, VSs 2DW16CL, ZE2KQ and sundry Europeans. *KL7ZG*: CN8EY, KAs 2AG 2MB 7SL 8AB, KG6IJ, KR6LL, OX3s AN MW, P11J, TF5SV, YU1AD and 5A3TK. *VE3DQC*: CE3AG, a CPl, CX7AC, KG4AF, KV4s AA AQ, PJ2s AK CB, PZ1WX, TL2TG, VPs 5BF 6EB 7NM and a 5A3. Don't look now but a few U.S.S.R. stations are being worked again outside the Curtain.

On twenty 'phone W9BWD fought through for CE2AN (14,265) at 1834 CST. F08AI (250) 1245, H16EC 1857, KT1WX (135) 1430 MF2AA (115) 1000, OH2RM (190) 1016, OE13HP (185) 1400, OQ9DZ (125) 1451, PJ2s AB and AD, TA2EFA (310) 1402, VP2AJ (180) 1707, ZK2AA (165) 2301, ZM6AA (275) 2400 and 5A1TI (200) 1345. Lew notes that VP2AJ does okay with a mere 10 watts and OH2RM has a modest suppressor-grid-modulated 15 watts input. G3HLS and VP9AV both report a mammoth roundtable QSO in which H1RFV, VP6AL, VPs NS NU, VPs BA AX and YN4CB also participated. The deal covered the better part of an hour. G3HLS is curious about one AC1AA and others are wondering about an AC2ID "near Sikkim." Information would also be appreciated concerning one LN4B of "Queen Maude Land, Antarctica" W1UCQ reports that a USAF group keeps HZ1AB on 14-Mc. 'phone and c.w. daily between 0800 and 2200 GCT. OE13s HL and RN bring W9MQK up to a neat ninety-four total while W8JG tried a little A3 for KV4BB and KG4AF. Ham-to-be L. M. Michel advises of the observed activity of 'phones (time EST) CRs 4AO (154) 2215, 6BX (144) 2211, EAs 6AR (121) 2121, 9AR (115) 1957, EL9A (311) 2315, GD2FRV (142) 1615, IS5C (164) 2011, FQ8AK (151) 1954, OY2Z (111) 1541, OD5AB (132) 1415, TF5SV (160) 2200, VP5BF (196) 2341, VQs 2DT (131) 2100, 3DY (164) 2030, 4ERR (125) 2015, ZD1SW (183) 1230 and ZS9G (196) 1955. West Gulf DX Club's *DX Bulletin* tips us off on the probable appearance of a 20-'phone candidate in 3A2AY, scheduled to be operated by G6LX in early July.

The new and interesting 16-meter 'phone range was abundantly patronized without delay. W5VIR bore down determinedly and worked 'phones CE1s 1AJ 6AB, HC1RT, HK4JB, HP3FL, H1RFV, KH6GG, KZ5s CP ML WZ, OA4s DI EK N, PJ2AD, PYs 1AGF 1AQT 2JU 4R3, T12TG and ZP5DC. KZ5DG, OA4C, XE3BR and a PJ2 answered K2BPS and his 60-watt A3er. Friend W6ZZ flipped on the modulator to chat with an HP3, an H1R, HK4DF, KZ5L, KP4FAC, KH6AR, PJ2AA, PYs 1KZ 2AC 2JU 3SI 5SN 5UG, VP5EM, XE1VD, ZL3GS, ZP5DC and an OA4. Miles is up to 130 worked now, including 41 countries on 21 Mc. KZ5WZ skimmed some of the cream off the 21-Mc. 'phone milk: CP5AB, HB9LA, HCAR, IS1CYZ, H1R1BG, KB6A, MI3SL, OD5BA, OQ5BQ, PZ1RM, VK9GW, VR2CG, VQs 2FU 4RF 5CB, XE3BR, ZD9AA, ZK2AA, ZD2S, ZS1s BV and MP. Amateurs in the southern latitudes scare up a lot of

QSLs from CE3CB of San Miguel, Chile, are to be found on many a W/VE hamshack wall. A modest fifty watts input and three-tube receiver do a fine job on several DX bands.



stuff the W/VE gang can't even hear right now. There'll come a day, though! Wally heard, but didn't raise, CN8MZ, EAs 8AX 9AR, FF8AK, YI3WH, ZD1SW and ZS7C.

Despite the new A3 competition, fifteen c.w. still does quite well. The *WGDXC DX Bulletin* tells of exploits by W5MIS and his 4-watt VFO. W6ZZ counters with CE6AB, KC6QY, KH6s AGX MG FM, LU4DAV, PY1ADA, VE2AWU, VK3AHH, XE1SA, YV5FH, ZLs 1ADX 1HY 2GS 2AFA 3JA and buddy KA9AA. CE1BX, CP1BX, FUSAA, LUs 2DS 3DAB, PJ2AD and YS10 didn't get away from W5VIR's key. VE1PQ did well for TA3AA (21,200), VQs 2DT (030), 4RF (190), 5CB (210), ZD9AA (180), ZS3K (100) and ZS7C (240) Doug is up to 43 countries on the band. W2GVZ was glad to catch VS9AP (050), FF8AG, MI3SL and ZS2A while W0HAW made off with KG4AF and KH6EJ. In addition to some already listed, the boys at W1MX accounted for EA9AP, FA9RZ, CT3AB and VQ4HJP. DL4JN calls attention to SM5CO (080), VQ4AQ (045) and ZC4GT (110). We'll have no more kidding about potential Novice WACs. KN3CHS put his 50 watts on 21 Mc. to raise ZD9AA, 9S4AX and F8BW. It may not be too far-fetched to imagine some future Novice scoring DXCC when 15 meters really gets hot!

Forty c.w. is still quite popular out west. Thanks to W6LRU, we hear that W6s CAE CGQ KYG and LRU have been working fellows like CR4AF (7051), LU4Z1 (7016), OK3MM (7033), ZC5VS (7040), ZSs 5B (7022) and 6EV (7016). W6LRU managed his 7-Mc. WAC after 19 100-watt years in the saddle and W6CGQ sports a new 2-element 7-Mc. bim. On VE1PQ's tally we note CT2BO (7057), EA8BK (7020), TA3AA (7035), YV5DE (7090), ZS3JP (7055), ZS9I (7025) and 5A3TU (7040). CR5AE (7002), MP4BAU (7015 t8), SP3s AN (7004), PL (7003) and a ZL replied to W4ZAE, SP3PL mentioned running a modest 5 watts. DL4JN nabbed OX3EL (7032) and heard SU1RS (7025) and ZC4GT (7040). W0FBI concentrated his 300-watter on the boys Down Under to the tune of VKs 2AMB 2A0J 2AJS 2IV 3AHH 3AHR 3AZW 3DQ 3EG 3PL 3ZA 4XJ 5XX, ZLs 1HQ 2HC 3GU 3JA 4BO and 4IH, all around sun-up or earlier and all between 7013 and 7041 kc. The W1MX guys hauled in CT3AA, CR5AE, EA9AP, IS1AHH, KB6AY, LU3ZO, OA4N, OQ5GQ, TA3AA, VP8AP, YUs 1AG 3AE and aforementioned ZS9I. Catches reported hither and yon follow. *W7LYO*: HH2LD, PYs 2BIG and 7ME. *W4UJT*: CO8AQ and FA9VN. *W6ZZ*: KG6FAA, PY4IE, VK6WT, VPs 5BE, 9BF and seeds of VK/ZLs. *W8PCS*: LU6GI and PY3AD. W6KHS zeroed in on JA2AI (7041), KC6QY (7004), W6TNG/KG6 (7021) and many KH6/VK/ZL aficionados. W7QJV has some good ones in DUUs 1DO 7SV, VKs 6MG 7MR and W6INQ/KM6.

Forty 'phone is one band on which our Mexican neighbors found. W7QJV talked with XEs 1AC 2AC 2OD and KH6DF. KH6GG's kw. worked W1BGJ and listener L. M. Michel found this stuff pouring through between 7075 and 7215 kc.: CT1QF, HC1FG, H1RL, KG6s ABN FAA, XE6s IJ SM, KJ6AX, KM6BG, KX6AV, KV4BB, PY2CK, TA3AA, T12RC, VKs 2WT 6WL, VPs 4LD 6SD 7NS 9AV, YV5PL, ZLs 1BY 1HY 1IX 1MQ 2BE 2KX 4DC 4EB, ZB2A and ZS6BW. The stuff is there, all right, but can be awfully tough to flag down.

Eighty c.w. has become troubled once more by summer QRN and W3AXT took time to figure out that QSOs with CE3AG, CT2BO, CT3AV, CX1FY, EA9AP, FA9RZ, FKS8AA, FP8AP, GD3UB, KH6ARA, LU1EP, OQ5RA, PY2AJ, SP3PL, TA3AA, VK5KO, VPs 4LZ 5BF 7NT 8AP, VQs 3KIF 4HJP, YV5FH, ZE3JP, ZLIADU, ZS3K and 4X4RE have assisted in enabling him to reach the 55-country mark on 80 since becoming interested in the subject last fall. Sam takes aim at all his 3.5-Mc. c.w. stuff between the low edge and 3550 kc., ninety per cent of which is worked between the hours of 7:00 P.M. and 1:00 A.M. EST. Cards from PY2AJ, G5VB, VQ4HJP, ZLIADU, 4X4RE and W/VEs chalked up W3AXT's 80-meter WAC.

W1MX & Co. got some of those as well as PJ2CB, KH6MG, ZK1AT, ZS 2A and 2HT. . . . W8PCS raised YV5FH (3510) while DL4JN advises that HA5KBA (3520) is active. . . . EA9AP (3507), FA9RZ (3534), GD3UB (3516), LU1EP (3525), YN1AA (3525) and ZL3GQ (3560) kept VE1PQ hopping. . . . W2QHH has been QRL with his line of traps but reports he is another one of these fantastic fellers with 100 3.5-Mc. countries confirmed. . . . ZLs 1ADU 1AJU 1BY 1CI 1HM 2AFA 3JT and 30A QSOd W7OEB/7. Ev has greater difficulty with several VKs whom he hears quite often. . . . KN2CFM worked a KL77JV in the 80-meter Novice band and would like to be sure of the call. Any help?

This is the time of year when 160-meter DX enthusiasts bring their bookkeeping up to date. W2EQS, located 20 miles north of Times Square, tabulates last season's low-band DXing in his log as follows: G GD GW GI EI EK KP4 KG4 KV4 VP4 and VP9. Charlie worked all U. S. call areas but the sixth. He also worked VE1 VE2 and VE3 and has received heard reports from New Zealand, Germany and Mexico. W2EQS uses a Viking-I, an HRO and a 275-foot antenna 25 feet in the air. . . . In the center of the continent, W9PNE's postwar 1.8-Mc. list reads thusly: G GW EI EK KG4 KP4 KV4 VP9 and, of course, the U. S. and Canada. Next season Brice will take up anew his chase for Asia, Oceania, South America and WAC.

Where:

Here's something for you from FEARL: "The Far East Amateur Radio League will no longer be able to accept QSL cards for contacts with JA stations made on or after August 1, 1952. After this date QSL cards from KA-stations-only will be accepted toward WFJIS and WAJAD awards. A mixture of the two will be accepted; i.e., QSLs from JA stations worked before August 1st and QSLs from KA stations worked after August 1st." . . . And a note from GAARC (German-American Amateur Radio Club) as follows: "All hams previously holding DL4 calls . . . are requested to submit their present QTHs, old DL4 calls and periods of holding such calls. Enclose this information plus enough postage to cover mailing costs for sending you your deserved QSL cards. . . . Send correspondence to DL4OR, QSL Manager, APO 757, % Postmaster, New York, N. Y." They can't keep these batches of pasteboards on file forever, guys, so if you have some due you, please get in touch with DL4OR and arrange for delivery.

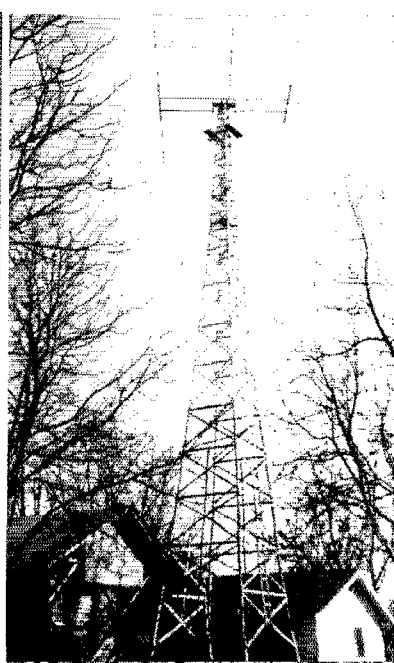
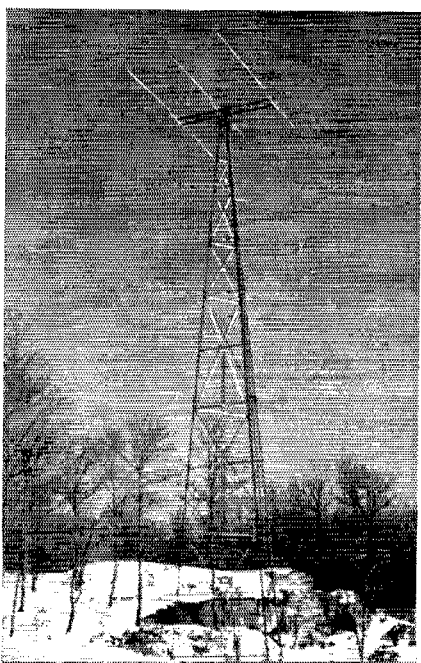
C8BF, (QSL via W1WAY)

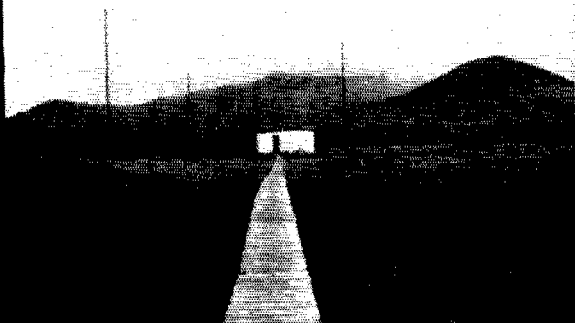
CE2AN, Radio Club Valparaiso, P. O. Box 3016, Valparaiso, Chile
CN8EM, J. Gelder, 4 Radio Relay, APO 117, % Postmaster, N.Y.C.

DJ1JX, Gottfried Hultsch, 136 Deisenhofen bei Muenchen, Germany
ET3Q, Box 1056, Addis Ababa, Ethiopia
FF8AJ, Yves Bijault, Service de la Navigation Aeriennne, Bamako, French Sudan
HH2ME, Max Etheart, P. O. Box 334, Port-au-Prince, Haiti
JA1CB, (QSL via JARL)
KG4AJ, (QSL via KG4AF)
KR6AK, Gene Brown, 851st AC & W Sqdn., APO 235, % Postmaster, San Francisco, Calif.
MI3AT, (QSL via MI3US)
MI3LV, (QSL via MI3LK)
OD5AW, Walid Tuani, P. O. Box 226, Beyrouth, Lebanon
OX3BFX, Arctic Amateur Radio Club, AACCS, APO 23, % PM, New York, N. Y.
PJ2AJ, Don Kurtz, Colony P. O., Lago Oil & Transport Co., Aruba, N. W. I.
PJ2AO, Geo. Hemstreet, P. O. Box 508, Lago Colony, Aruba, N. W. I.
PJ2AP, Geo. Echelson, Colony P. O., Lago Oil & Transport Co., Aruba, N. W. I.
PJ2CH, N. V. Barneveld, Sparrenweg 6, Juliana Dorp, Curacao, N. W. I.
PJ2CI, Sgt. V. Dijk, Marinierskazerne Sufficient, Curacao, N. W. I.
PY7ME, Pedro Americo 75, Campina Grande, Paraiba, Brazil
PZ1WK, % K. L. M., Paramaribo, Surinam
ST2AR, Box 253, Khartoum, Anglo-Egyptian Sudan
SV8WE, APO 206, % Postmaster, New York, N. Y.
SV8WG, LeRoy Wenger, American Embassy, USCGC Courier, APO 206, % Postmaster, New York, N. Y.
TA3MP, SFC Meade M. Padgett (W2JQU), Halfsee Box 14, Navy 525, FPO, New York, N. Y.
VQ3DY, (QSL via VQ4ERR)
VS2DF, Box 600, Penang, Malaya
VS9AS, Geo. H. Schuler (GC2BMU), % Air Ministry Directorate, General Works Mess, RAF Station, Khormaksar, Aden
ex-VS9AW, J. Wheeler, Royal Airflight Ft. (E), Dev. REU, RAF Station, Henlow, Beds., England
VU2JV, Post Box 7, Cuttack, Orissa, India
VU2ZW, Box 134, Agra Cantt, India
W8YDZ/KG6, John H. Wieting, 331 Citrus Ave., Palm City, Calif.
ZD1ST, Sierra Leone Selection Trust Ltd., Yengema, Sierra Leone
ZD4BK, Ron W Bishop (G2AHC), Box 154, Takoradi, Gold Coast
ZP5AX, (QSL via RCP)
ZP5CF, (QSL via RCP)
ZS3T, P. O. Box 263, Tstunbe, Southwest Africa
3A2AX, Jean Cossamati, 41 bis rue Plati, Monaco
4X4FW, Box 18, Nathanya, Israel
5A1TI, P. O. Box 372, Tripoli, Libya

If the forerunning are of any use to you, thank W1s RWS VG, W2s CJX LYO, W4s EBO TO, W5VIR, W8s BRA YGR, W9s BDW CFT KA TRD, W8YDZ, PJ2AJ,

Here are three types of mast construction in vogue for raising rotaries up into the blue. KG6HL does it with twin poles guyed (left), W1FH prefers self-supporting steel (center), and W6LW finds bolted wood (fir) sections to his liking. All three stations punch prodigious holes through 14-Mc. QRM with their respective twirlers.



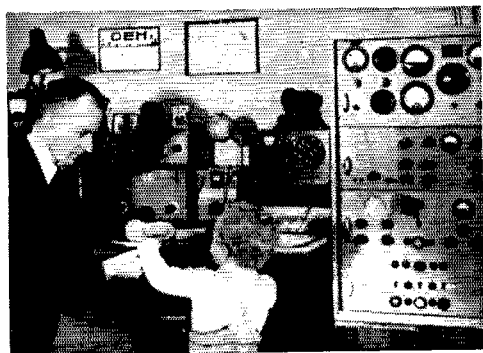


VE1PQ, L. M. Michel, West Gulf DX Club *DX Bulletin*, No. Calif. DX Club *DXer* and So. Calif. DX Club *Bulletin*. Come again!

Tidbits:

Asia — TA3MP (W2JQU) spends eight to ten hours on the air daily, mostly between 0600 and 1600 GCT, and is a good bet for Turkey on 20- and 40-meter c.w. and 'phone. Meade runs 100 watts to a Viking-I on the input end of a two-element beam. He'll have a home-grown half-kilowatt cooking soon. TA3MP's QSLs are in the mail within 20 hours after QSOs — *that's* service! . . . At this writing W/Ks are still forbidden to work F18s, although Indo-China authorities have licensed stations bearing the calls F18AA through F18AJ. Until FCC, proceeding accordingly through channels, gives us the green light for F18 contacts, the smart and only thing to do is to ignore them. QSLs from Indo-China for DXCC credit must bear dates-of-QSOs not corresponding to the ban period, anyway. . . . EZC1AL (VS2DQ) has a 100-watt rig cooking on 20 'phone and 15 c.w. He'll put Malaya on the 15-meter 'phone map as soon as expected 21-Mc. A3 authorization for VS2s becomes effective.

Africa — Via W3EQK, VQ4RF sends us a list of 82 Ws who have apparently failed to answer his QSLs. A lot of prominent DXers are on the roster, too. There is undoubtedly a "don't bother to QSL if you get a DX station's card first" school of thought in some quarters but we're inclined to believe that the usual answer is plain carelessness. It's easy to assume that one has already QSL'd if one receives a card from rare DX because that's the way it almost always works. Still, cases in any doubt should be resolved by log checks before said QSLs are relegated to the shoe box . . . CN2AS has trouble convincing some people that CN2 isn't the same DXCC country as CN8. As the Countries List stands, CN2 and KT1 both represent the Tangier Zone. It's a small world — the scene of the photograph of CN8EG and BERTA on page 47, March QST, was taken just across the street from the CN2AS shack and antenna. CN2AS was unaware of CN8EG's visit to his front yard and would like to meet the guy. . . . ZD4BK tells



Some most interesting examples of home-constructed equipment are to be found in the installations of our European colleagues. Here possibly destructive advances by the junior op are warded off at DL1EZ.

There's a long, long trail a-winding from the spot where this photograph was taken to the shack and antenna site of ZS2MT. This rare Marion Island catch is frequently workable on 20 and 40 meters. (Photo via W5MIS)



W4EBO that anyone still due his Gold Coastal QSL is invited to apply or reapply, enclosing full QSO particulars Fellows counting on ECZ1 for Rio de Oro DXCC credit deserve our sympathy. W1WPO has it that the station is not, and never was, in the amateur category. Dark Continent note from WGDXC's *DX Bulletin*: W6MLY (HZ1MY, 4W1MY, et al) is scheduled to secure a CN8 call and looks forward to some possible Rio de Oro and Ifni operation. Dick will have to break his DX call-sign pattern because the CN8MY tag is already spoken for.

Europe — ARI (Italy) now makes available "CDM" (*Certificato del Mediterraneo*) certificate awards to stations working any 22 of 25 designated Mediterranean-adjacent countries in addition to any 30 provinces of peninsular Italy. Before embarking on collection of the necessary 52 QSLs you'd better check with ARI on full details. Write that association at via S. Paolo 10, Milano. IIs BJC and BQS were visited by W3UKZ and XYL WN3ULA during the latter couple's recent tour of Europe. Marcello and Gaston showed the visiting firemen the sights of Venice as well as the very interesting rotatable-retractable 20-meter beam at IIBJC. DL4JN (W4LAP) hopes that 14-Mc. conditions for communication between Wiesbaden and South America improve shortly so that he may further fatten his countries total. That area has been Bill's blind spot for quite a while. DL4AY, located in Germany's French occupation zone, finds 80- and 40-meter local QRM — commercial as well as amateur — plenty rough, although 14 Mc. is fairly free of the stuff. Art has a 32V3/75A-2 combo cooking and will remain in DL-land until late 1954. Amateurs interested in overseas correspondence pertinent to radio are advised of these candidates for such activity: W. A. Winchester, ISWL, 4 Woodgate Rd., Eastbourne, Sussex, England; Romanini Giovanni, Corso Palermo 61, Turin, Italy; and DJ1JX (see "Where").

Oceania — KH6MG, says W2VMX/1, knocked off a neat 6-bander with VE7VO in the DX Test. KB6AY has sad tidings for some. Fred writes that there was no KB6BZ working the Test from Canton Island and he should know. Only Canton calls KB6AA through KB6AZ have been apportioned by FCC to date. KB6s AQ and AY were plugging along in the Test and are now fighting out from under QSL stacks. The latter knocked off 45 United States in the fracas, missing only Maine, Rhode Island and Vermont. KB6AF is back on the island and intends immediate 20- and 40-meter c.w. shenanigans. G2ML, via W4LHT, advises that ZC2MAC (Cocos Islands) QSLs have arrived in bulk and will be getting around to W/Ks via bureaus.

South America — PJ2AJ had difficulty raising something besides Ws during his first few weeks on the air. His first non-W DX was old stand-by CP1BX. CE3s AG and DG reported considerable difficulty encountered in carrying through their Easter Island CE6AA plans. W1WPO learned Chile now has legally authorized the prefix CE0 for any amateur stations that become active on the isle. A few incidental facts on the place may save you a reach for the atlas. It's roughly two thousand miles west of Chile at 27° 6' south latitude, has an area of 50 square miles and a population of approximately 300 souls. The island got its name via discovery by a Dutch navigator on Easter Day and is famous for many weird archaeological remains of unknown origin.

Hereabouts — W6GFE, operating W6AM with W6AM and W6ADP kibitzing, almost fell off his chair when he ran into UA0s KPC and KKO calling CQ W/VE in this year's ARRL DX Test. They worked 'em both. In addition to this unusual development, W6AM and KH6LJ QSO'd on seven bands in the Test — 28, 27, 21, 14, 7, 3.5 and 2 Mc. W2QHH and KP4KD also have a 7-bander, theirs accomplished in routine non-contest DXing. KL7AGP writes to agree that amateur radio was of great value in keeping morale high among the Fletcher's Ice Island (T-3)

(Continued on page 180)

I.A.R.U. News



QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country, as listed below (bold-face type indicates a recent change from previous listings). Do not send foreign cards to A.R.R.L. headquarters except those for which no bureau is here listed.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs (page 144 of May QST) under the heading, "A.R.R.L. QSL Bureau."

Algeria: Via France
Argentina: R.C.A., Avenida Libertador General San Martin 1850, Buenos Aires
Australia: W.I.A., Box 2611W, G.P.O., Melbourne
Austria: Via ARRL
Austria: QSL Bureau (U. S. Occupation Forces), APO 168, % Postmaster, New York, N. Y.
Azores: Via Portugal
Bahamas: C. N. Albury, Telecommunications Dept., Nassau
Barbados: VP6PX, Wood Goddard, Bromley, Welches, Christ Ch., Barbados, British West Indies
Belgian Congo: P.O. Box 271, Leopoldville
Belgium: U.B.A., Postbox 634, Brussels
Bermuda: VP9D, James A. Mann, The Cut, St. Georges
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: Desmond Yong, 22 Sussex St., Charlestown, Georgetown #16
British Honduras: D. Hunter, Box 178, Belize
Burma: B.A.R.S., P.O. Box 376, Rangoon
Canton Island: Fred V. Carpenter, KB6AY, U.S.P.O. 06-50000, Canton Island, South Pacific
Ceylon: P. O. Box 907, Colombo
Chile: Radio Club de Chile, Box 761, Santiago
China: M. T. Young, P.O. Box 16, Taichung, Formosa
Colombia: L.C.R.A., P.O. Box 584, Bogotá
Cook Islands: Ray Holloway, P.O. Box 65, Rarotonga
Costa Rica: F. Gonzalez, Box 365, San Jose
Cuba: Radio Club de Cuba, QSL Bureau, Lealtad No. 660, Havana
Cyprus: MD7XP, P.O. Box 451, Nicosia
Czechoslovakia: C.A.V., P.O. Box 69, Prague I.
Denmark: E.D.R., Box 79, Copenhagen, K.
Dominica: VP2DC, Roseau
East Africa (VQ1, VQ3, VQ4, VQ5): P.O. Box 1313, Nairobi; Kenya Colony
Ecuador: Guayaquil Radio Club, Casilla 784, Guayaquil
Eire: I.R.T.S. QSL Bureau, % EI5Z, 23 Orwell Gardens, Rathgar, Dublin
Fiji: S. H. Mayne, VR2AS, Victoria Parade, Suva
Finland: SRAL, Box 306, Helsinki
France: R.E.F., 3 Avenue Hoche, Paris 8
Germany (DL2 calls only): QSL Bureau, % Posts & Telecommunications, Wahnheide, B.A.O.R. 19
Germany (DL4 calls only): DL4 QSL Bureau, APO 757, % Postmaster, New York, N. Y.
Germany (DL5 calls only): Via France
Germany (other than above): D.A.R.C., Postbox 99, Munich 27
Gibraltar: E. D. Wills, ZB21, 9 Naval Hospital Road
Great Britain (and British Empire): A. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent
Greece: C. Tavaniotis, 17-A Bucharest St., Athens
Greenland: APO 858, % Postmaster, New York, N. Y.
Grenada: VP2GE, St. Georges
Guam: G.R.A.L., Box 145, Agaña, Guam, Marianas Islands
Guantanamo Bay: KG4AD, Box 35Q, Navy 115, % FPO, New York, N. Y.
Guatemala: Manuel Gomez de Leon, P.O. Box 12, Guatemala City
Haiti: Roger Lanois, % R.C.A., P.O. Box A-153, Port-au-Prince

Hong Kong: Hong Kong Amateur Radio Transmitting Society, P. O. Box 541, Hong Kong
Hungary: H.S.R.L., Postbox 185, Budapest 4
Iceland: Islenskir Radio Amatorar, P.O. Box 1080, Reykjavik
India: Amateur Radio Club, India, P.O. Box 6666, Bombay 20
Indonesia: P.A.R.I., P.O. Box 222, Surabaya, Java
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Via San Paolo 10, Milano
Jamaica: Thomas Meyers, 122 Tower St., Kingston
Japan (JA): JARI, 3-5 Kanda Ogawanachi, Chiyoda, Tokyo
Japan (KA): F.E.A.R.L., APO 500, % Postmaster, San Francisco, Calif.
Kuwait: Doug Taylor, VT1AC, Box 54, Kuwait, Persian Gulf
Lebanon: RAL, B. P. 1202, Beyrouth
Libya: See Tripolitania
Luxembourg: G. Berger, 40 rue Trevires, Luxembourg
Macao: Via Hong Kong
Madeira: Alberto C. de Oliveira, CT3AA, Beco Chao da Loba, 4, Funchal
Malaya: C. E. Salton, Postal Services Dept., Johore
Malta: R. F. Galea, 20, Collegiate Street, Birkirkara
Mauritius: V. de Robillard, Box 155, Port Louis
Mexico: L.M.R.E., Apartado Postal 907, Mexico, D.F.
Montserrat: VP2MY, Plymouth
Morocco: C. Grangier, Box 50, Casablanca
Morocco (Tangier International Zone only): EK1MD, Box 57, British Postoffice, Tangier
Mozambique: Liga dos Radio-Emissores, P.O. Box 812, Lourenco Marques
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles: Sufficient T-24-1, Curacao
Netherlands East Indies: Hr. C. Loze, PK1LZ, Burgkuhrweg, 47 Bandoeng, Java
Newfoundland: N.A.R.A., Box 660, St. Johns
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington C1
Nicaragua: L. B. Satres, Bolivar Ave., 106 Managua
Northern Rhodesia: N.R.A.R.S., P.O. Box 332, Kitwe
Norway: N.R.R.L., P.O. Box 898, Oslo
Pakistan: P. O. Box 416, Lahore
Panama, Republic of: L.P.R.A., P.O. Box 1616, Panama
Paraguay: R.C.P., P.O. Box 512, Asuncion
Peru: R.C.P., Box 538, Lima
Philippine Islands: Elpidio G. DeCastro, Philippine Amateur Radio Assn., 931 R. Hidalgo St., Quiapo, Manila
Poland: Polski Zwizek Krotkofalowcow, P.O. Box 320, Warsaw
Portugal: R.E.P., Travessa Nova de S. Domingos, 34-1º Lisbon
Roumania: A.R.E.R., P.O. Box 95, Bucharest
Salvador: YSIO, Apartado 329, San Salvador
Siam (Thailand): Frank Speir (W6FUV), Saha Thai, 4th Mansion, Raja Damnoen Avenue, Bangkok, Thailand
Singapore: P.O. Box 176, Singapore, Malaya
South Africa: S.A.R.L., P.O. Box 3037, Capetown
Southern Rhodesia: R.S.S.R., Box 2377, Salisbury
Spain: U.R.E., P.O. Box 220, Madrid
St. Vincent: VP2SA, Kingstown
Sweden: S.S.A., Stockholm 4
Switzerland: U.S.K.A., Postbox 1203, St. Gallen
Syria: P.O. Box 35, Damascus
Trieste: MF2AA, Major M.H.R. Carragher, HQ V.G. Police
Trinidad: John A. Hoford, VP4TT, P.O. Box 554, Port-of-Spain
Tripolitania: Peter Keller, MT2DZ, P.O. Box 260, Tripoli
Uruguay: R.C.U., Casilla 37, Montevideo
U.S.S.R.: Central Radio Club, Postbox N-88, Moscow
Venezuela: R.C.V., P.O. Box 2285, Caracas
Virgin Islands: Richard Spenceley, Box 403, St. Thomas
Yugoslavia: SAJ, Postbox 48, Belgrade

June V.H.F. QSO Party

Fun for All in This June 6th-7th Activity—

Special Awards to Novice and Technician Section Leaders

HERE it is, v.h.f. men! Yes, another ARRL QSO Party, open to all amateurs who can work on 50 Mc. or higher, gets under way at 2:00 P.M. Local Standard Time, Saturday, June 6th. Ending time will be 11:00 P.M. Local Standard Time, Sunday, June 7th. And whether you wish to scout for new states, chat with old friends, or check out the rig you'll be using on Field Day, the increased v.h.f. activity during this 33-hour get-together should suit your fancy!

Rules Changes

By popular demand, three rules changes are being introduced in the June QSO Party. First, there is a change in the points earned for contacts on 220 Mc. and higher bands. In this party you may count 1 point for successfully-confirmed two-way exchanges on 50 or 144 Mc., 2 points on 220 or 420 Mc., and 3 points on the higher bands. It is felt that this new contact-points system will provide sufficient incentive for working the higher bands without unduly penalizing the fellows able to work only 2 or 6 meters. Secondly,

certificate awards will go to the top-scoring Novice and Technician in each ARRL section, where applicable, as well as to the over-all top scorer in the section. Lastly, the party will end one hour earlier than in the past — this to give participants desiring to work straight through a bit more time to recuperate before reporting for work Monday.

How To Take Part

Call "CQ contest" to get in touch with other contestants. When you contact another v.h.f. amateur, you must give him the name of your ARRL section. Though not a contest requirement, it is suggested that operators exchange signal-strength and readability reports, as many of the gang will be trying out new equipment.

Scoring and Reporting

The idea is to work as many stations on as many v.h.f. bands as possible. Count 1 point for successfully-confirmed two-way exchanges of sec-

(Continued on page 124)

SUMMARY OF CONTACTS, JUNE V.H.F. QSO PARTY

Station..... Class License..... ARRL Section.....

Freq. Band (Mc.)	Date and Time	Station Worked	Section	Record of New Sections for Each Band					Contact Points Claimed
				50	144	220	420	Other	
50	June 6 2:15 P.M.	W1CTW	E. Mass.	1					1
		W1RFU	W. Mass.	2					1
		W2LVQ	N.Y.C.-L.I.	3					1
144	3:00	W1CTW	E. Mass.		1				1
		W1BJN	E. Mass.						1
		W1HDF	Conn.			2			1
1215	3:24	W2GMT	N.Y.C.-L.I.			3			1
		W2LVQ	N.Y.C.-L.I.						1
		W1NY/1	W. Mass.					1	3
50	3:39	W2RGV	N. N.J.	4					1
		W2YXE	E. N.Y.	5					1
220	4:04	W1CTW	E. Mass.			1			2
		W1BJN	E. Mass.						2
		W2BNX/2	N.Y.C.-L.I.			2			2
50	June 7 8:10 A.M.	W9QM	Ill.	6					1
		W9QIN	Minn.	7					1
		W6ZBS	Santa Clara V.	8					1

Number of contacts: 50 Mc. 8 144 Mc. 5 220 Mc. 3 420 Mc. Other 1

Total contacts: 17 Total contact points: 22 Multiplier: 8+4+2=14

Claimed score: 22 × 14 = 308 Points Final Score

Names of operators having a share in above work.....

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

Transmitter:..... Signature.....

Receiver:.....

Antenna:..... Address.....

BANDS 144-148 220-225 210-215

The World Above 50 Mc.

1215-1300 2300-2450 3340-3300 5650-5925 10,000-10,500 21,000-22,000 50,000-7

CONDUCTED BY E. P. TILTON,* WHDQ

It's nearly fifteen years since ARRL sponsored the first v.h.f. contest. We didn't know, then, if the idea would take hold. Maybe inhabitants of the world above 50 Mc. were all pure experimenters who would turn thumbs down on any sort of competitive operating activity. Signs pointed the other way, however. For some years there had been increasing v.h.f. participation in the Field Day, the only spot in our operating program that made room for the v.h.f. man, and more letters were coming in all the time asking for a contest for v.h.f. men only.

But how to run it? None of the contest set-ups that had proved popular on lower frequencies quite fitted the v.h.f. picture, so new formulas had to be devised. In the years since 1939 many varieties of v.h.f. contests have been tried, and the form has been revised and streamlined whenever practical ideas have come up. We've had message-relaying parties, contests based on distances covered, long-term activity competitions, one-day QSO parties, week-end parties, and various modifications of popular low-frequency contest forms such as the Annual V.H.F. Sweepstakes.

Certain factors are musts in making up a contest form. From the viewpoint of the participant, any contest should be simple. Nobody likes extensive bookkeeping! It should be set up so that anyone who is caught in the contest unawares (and quite a few always are) can get going and have fun, without extensive reading or briefing. The scoring should be so contrived as to give everyone a fair chance, so far as possible. Awards should be plentiful, but not to the extent of

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

becoming meaningless. Anyone who wins a contest certificate wants to be proud to display it as a symbol of achievement.

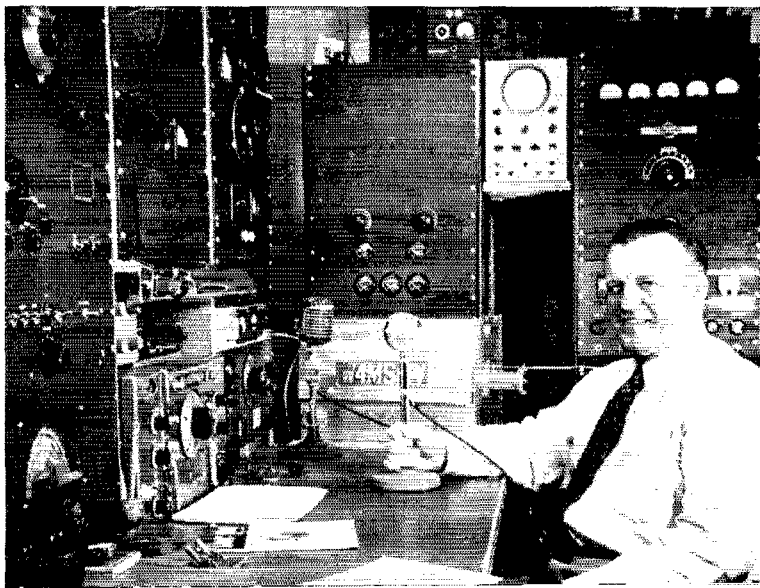
For those of us who wade through the reports, the ideal contest must be simple to check. This rules out many of the pet ideas that come in after each party. It must be so set up that the results can be displayed in *QST* without undue use of space, and in a form that can be interpreted readily by the reader. Of course, any contest should promote desirable ends, such as increased use of bands now sparsely occupied, and greater occupancy in areas where v.h.f. interest has been low. Most important, it should provide real operating enjoyment, for if this end is served well all other aims are achieved in proportion. Before each contest is announced in *QST*, the Headquarters Contest Committee goes over the current batch of suggestions, arguing out all conceivable angles. The latest session of this body resulted in the revised rules for the June V.H.F. Party, appearing on the facing page.

Novices and Technicians have complained that the contests offered them little incentive, as they had almost no chance of winning an award. Now they are in; see Rule 8. Contestants have claimed that the 5-point credit for contacts on 220 and higher gives operators who work those bands an unfair advantage. We agree — and the multiplier for 220 and 420 is reduced to 2 now, with 3 points credit for contacts made on 1215 or higher bands.

And, of course, everybody who works only one band objects to a scoring system that gives the multiband operator an advantage. The only solution to this would be to run a separate contest for

◆
No Johnny-come-lately is Eddie Collins, W4MS-W4RE, one of the South's most active v.h.f. men. Eddie was licensed in 1915, and he's been active ever since, except for wartime interruptions. W4MS is heard on 50 Mc. whenever the band is open, and on 20 meters otherwise, where he uses his kilowatt rig to talk v.h.f. with many of the gang. He is also set up for 2-meter operation, and is currently working on a 420-Mc. TV rig, the camera unit of which is visible in this shot of Eddie at his operating position. The lady of the house is also licensed, as W4AXF. Eddie has served a total of more than 10 years as SCM of the Western Florida ARRL Section.

◆



June 1953

50 WAS Mc.

WØZJB.....48	W4BEN.....35	W8BFO.....41
WØBJV.....48		W8OJN.....39
WØCJS.....48	W5VY.....48	W8LPD.....37
W5AJG.....48	W5GNQ.....46	
W9ZHL.....48	W5MJD.....46	W9ZHB.....48
W9OCA.....48	W5ONS.....45	W9QUV.....48
W6OB.....48	W5JTI.....44	W9HGE.....47
WØINI.....48	W5ML.....44	W9PK.....47
W1HDQ.....48	W5JLY.....43	W9VZP.....47
	W5JME.....43	W9RQM.....47
W1CLS.....46	W5SFW.....43	W9ALU.....47
W1CGY.....46	W5VV.....42	W9UIA.....45
W1LLL.....45	W5FAL.....41	W9UNS.....45
W1HMS.....43	W5FSC.....41	
W1LSN.....42	W5HLD.....40	W6QIN.....47
W1DJ.....40	W5HEZ.....38	W6IZM.....47
	W5LU.....37	W6NFM.....47
W2AMJ.....46		W6TKX.....47
W2RLV.....45	W6WNN.....48	W6KYF.....47
W2MEU.....45	W6UXN.....47	W6HVV.....45
W2DZ.....45	W6ANN.....45	W6MVG.....44
W2PHJ.....44	W6TMI.....45	W6JOL.....44
W2QYV.....40	W6IWS.....41	W6TJF.....44
W2QYH.....38	W6OVK.....40	W6JHS.....43
W2ZUW.....35	W6CGG.....35	W6PKD.....43
		W6IPI.....41
W3OJU.....45	W7HEA.....47	VE3ANY.....42
W3NKM.....41	W7ERA.....47	VE3AET.....38
W3MQU.....39	W7BQX.....47	VE1QZ.....34
W3RUE.....37	W7FDJ.....46	VE1QY.....31
W3OTC.....35	W7DYD.....45	ØØ6WW.....21
W3FFH.....35	W7JRG.....44	XE1GE.....19
	W7BOC.....42	
W4FBH.....46	W7JPA.....42	
W4EQM.....44	W7FV.....41	
W4QN.....44	W7CAM.....40	
W4FVH.....42	W7ACD.....40	
W4CPZ.....42		
W4FLW.....42	W8NSS.....46	
W4MS.....40	W8NQD.....45	
W40XC.....40	W8UJ.....45	
W4FNR.....39	W8CMS.....43	
W4IUI.....38	W8YLS.....41	
	W8RFW.....41	

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

each band, a highly impractical idea at this stage of the game. After all, one of the purposes of the contests is to promote versatility, and greater use of all our bands from 50 Mc. up. Why shouldn't the fellow who can work at least two bands win over the man who is stuck on one? We plan one concession to the one-banders, however: the *QST* report will carry a separate listing of the outstanding one-band scores.

Well, boys and girls, there it is. We hope you like the new set-up, and we urge you all to get into the June Party for all you're worth. We've placed an order for good conditions throughout the week end of the 6th and 7th. The rest is up to you!

Here and There on the V.H.F. Bands

Transatlantic contacts on 144 Mc.? Seems like a long shot, doesn't it? And so it is, but who is willing to state flatly that it is impossible? Certainly not the International VHF Society!

This group, formerly the VHF Society of Ireland, but recently renamed in view of the interest they've developed in

many other countries, is making a real try for a 2-meter transatlantic crossing in July. The date has been moved forward from the original schedule in order to put the test in a better spot in the sporadic-E season. The site has been selected and the station is in the works as we write.

Harry Wilson, EI2W, writes that a 200-watt c.w.-phone transmitter will be in continuous operation July 4th through 12th. The frequency will be 144,180 kc., and the location will be a seaside spot in Kilkee, County Clare, just north of the Shannon Estuary. Several receiving monitors will be in operation in the area but remote from, although in contact with, the transmitting site, so that if signals are heard in either direction arrangements can be made quickly for a two-way test. At least one station will be maintained on 14 Mc. for a check channel. Final details in July *QST*.

How far can you work regularly on 144 Mc.? We used to think that the reliable distance that could be covered from the average well-equipped station was about a hundred miles, but many schedules now being maintained call for an upward revision of this figure. There's the 275-mile hop from W2UK, New Brunswick, N. J., to W2ORI, Lockport, N. Y., for example. These two have been working nightly since late in the winter. It's a weak-signal c.w. proposition, and it takes high power and big antennas, but they *work*.

More recently, W2ORI has been keeping skeds with W1CCH, Springfield, Mass. This is more than 300 miles, and while it is far from a solid circuit, signals get through fairly often. You have to be familiar with the terrain west of Springfield to appreciate this one fully. It's the roughest country in Southern New England, and W1CCH has nothing special in the way of a location. His antenna is something to behold, however: 12 5-element arrays full-wave spaced, 3 high and 4 wide. This structure is mounted only a few feet above ground, but what a job it does! W1CCH swaps good signals regularly with W1MEP and W1NH, both in Bennington, Vt., nestled deeply in the Green Mountains, 65 miles northwest of Springfield.

Vermont, long sought on 144 Mc., as well as on most other bands, is now being worked more often as the result of good work by a recent convert, W1MMN, of Orange-George has a 1600-foot elevation, a sizable rhombic aimed south, and a twin-five for either horizontal or vertical. He works north to Montreal regularly, and puts a never-failing signal down to W1HDQ, 175 miles to the south. He's on 144.18 nightly at 1930.

Morning skeds kept for nearly two years show that the 210-mile path between W1HDQ and W2QED can be negotiated a high percentage of the time. In winter it is a ragged-edge proposition, except when marked inversions are present, but with the advent of warmer weather good voice contacts are often possible. The 420-Mc. band provides some surprising signals over this hop when conditions are right.

Examination of the records indicates that we have no very concrete idea of the best distance that can be covered when the 2-meter band is open. Even the 1400-mile DX between Southern California and Texas was characterized by fairly strong signals at each end. How much farther could have been covered if there had been good stations in the right places?

Several times we've had good signals between stations in the East and those in Western Iowa, in Missouri, and even Kansas. How much farther could the path have been extended than the 1200 to 1300 miles worked on these occasions? Wanted: some really hot 2-meter stations in Western Kansas, Nebraska and the Dakotas, whose operators will guarantee to be on deck whenever the band is open this summer and fall! WØGUD, Conway, Iowa, offers some hope for Nebraska contacts. He says that WØQOV, Snyder, Neb., is a regular customer these days.

North Carolina has invariably been the end of the line for Eastern stations working down the Atlantic Seaboard. Why no contacts in South Carolina, Georgia, or even Florida? Chances are that it was mostly a matter of nobody being on in the right spots at the right time. W4LNG is planning an effort for the June V.H.F. Party. Ruddy will be operating from Pine Mountain, near Thomaston, Ga., the 6th and 7th, using 145.3 Mc., horizontal polarization. He reports considerable 2-meter business around Atlanta these days, with W4s LRR MZQ HDC LNG and W4N4WIA most active. W4DBY is on in Rome, Ga., W4PYM in Dahlonega, W4OZK works from Alabama City, Ala., W4FSW in Birmingham, W4KCCQ in Tuscaloosa, and W4s VCC and AXU in Oneonta.

W9KLR, Ronselaer, Indiana, feels that organization of

message relaying routes would help maintain regular interest in 144-Mc. work, regardless of conditions. It might also provide a good set-up for intercity CD traffic when other frequencies are heavily loaded. Two-meter relays have been pulled off before, with distances up to as much as 1500 miles being lined up for a one-shot proposition. There is no stretch of 100 miles between New York and Chicago, for instance, that is without 2-meter activity. Why shouldn't a relay between these cities work any time, if the effort were properly organized? Boston to Dallas should be practical, too, and even a transcontinental relay is not beyond the realm of possibility. W9KLR has never experienced trouble working W9ORZ, 95 miles away in Anderson, though he runs only 15 watts, and W9ORZ's antenna is only 15 feet above the ground. Of such hops are long-distance circuits made. We have the stations — will someone volunteer to organize some skeds?

We hear often of the 75-meter band being used to promote contacts on 144 Mc., but seldom does it happen the other way around. One night recently, W9UDD, Ft. Wayne, Ind., was working W9PIN, Columbia City, on 147.5 Mc. Nothing tough about that, as it's only 20 miles or so. PIN mentioned that he was in contact with a local mutual acquaintance on 75, so UDD asked both to listen for his new low-powered s.s.b. rig on 3990. Result: no satisfactory communication on 75; too much QRM from DX. Signals on 147, meanwhile, remained a solid QRM-free S9!

V.H.F. Doings at the National Convention

Made your plans to attend the ARRL National Convention in Houston, July 10th, 11th and 12th? Better put the big party on your list. W5FEK, looking out for the v.h.f. gang, has a full program lined up for us. There will be an informal get-acquainted session Friday afternoon. No formal program for this one — just a gabfest, with plenty of time and room to circulate around and meet fellow inhabitants of the world above 50 Mc.

The entire morning Saturday will be devoted to technical talks of a v.h.f. nature. Speakers will include Cal Hadlock, W1CTW, Bill McNatt, W5FEW, B. D. Lee, W5AYU, and your conductor. Many other speakers will cover subjects of interest to the v.h.f. fraternity during the three-day convention. A v.h.f. men's luncheon will be held Saturday, following the technical sessions.

V.h.f. men will be provided with badges of a distinctive color, to permit spotting of kindred souls at a distance, and a special room will be set aside for us to congregate in whenever the spirit moves. A v.h.f. register will be kept available here, along with a p.a. system to permit calling anyone you wish to meet. This convention-within-a-convention promises to be the largest gathering of v.h.f. operators ever, so you won't want to miss it. See May QST for convention arrangements, and July QST for final details. Remember, it's Houston, July 10th, 11th and 12th. See you there!

What About 220 Mc.?

There are more letters from Technician Class licensees in our mail every week, all with the same story: "What can I do to get started on 220 Mc.?" These fellows are beginners. It does little good to point out that we have designs for crystal-controlled transmitters and converters in QST and the Handbook. Such gear is beyond them, at this stage of the game. They want (1) Commercial equipment ready to use, or in very simple kit form, or (2) Extremely simple gear that can be built with only the most rudimentary radio knowledge and little or no construction experience.

Item 1 seems out of the question at present. Few manufacturers are inclined to spend money developing new gear for the limited market 220-Mc. interest affords. How about Item 2? If the 220-Mc. gang want it, we can get out a series of QST articles describing elementary gear. The transmitters will, of necessity, be low-powered modulated oscillators, and the receivers will have to be superregens. What say, gang, shall we encourage the use of this sort of equipment on 220?

It's legal, and with some thought on the design we could probably come up with some gear that wouldn't sound too bad on the air, at least on a tolerant receiver. It looks like this is the only way to get the ever-growing beginners' class started off on their own. The question is, do you, the present and potential occupants of 220 Mc., want it that way? Let's have your answers! Division of the band according to the type of rigs used could keep QRM down. The advanced crystal-control and selective-receiver gang need no more

than the first megacycle. Shall we encourage use of modulated oscillators on 221 and up?

Several areas report growing activity on 220. W1CTW says that the Sunday night 220-Mc. workouts in the Boston area are attracting new customers. Most of these are crystal-controlled, but several modulated oscillators have come on recently. There is room enough for all, and most of the simple rigs can be copied on the superhets, once the transmitting operator can be convinced that he must modulate only an infinitesimal amount.

W1WAS, South Portland, Maine, reports that several stations are working on 220-Mc. gear in the Portland area.

(Continued on page 126)

2-METER STANDINGS

Call			Call			
States	Area	Miles	States	Area	Miles	
W1HDQ	18	6	850	W5SWY	7 2 —	
W1IZY	18	6	750	W5FBT	6 2 500	
W1RFU	15	7	1150	W5IRP	6 2 410	
W1MNF	14	5	600	W5FSC	5 2 500	
W1BCN	14	5	580	W5DFU	5 2 275	
W1DJK	13	5	520			
W1CTW	12	4	500	W6PJA	3 3 1390	
W1KLC	12	4	500	W6ZL	2 2 1400	
				W6WSQ	2 2 1390	
W2NLY	22	7	1050	W6NLZ	2 2 237	
W2UK	21	7	1075	W6CGC	2 2 210	
W2QED	18	7	1020	W6EXH	2 2 193	
W2AZL	18	7	1050	W6ZEM/6	1 1 415	
W2ORL	16	7	830	W6CGM	1 1 300	
W2PAU	16	6	740	W6YFG	1 1 300	
W2QNZ	14	5	400			
W2SFK	13	6	—	W8WJC	21 7 775	
W2DFV	13	5	350	W8BFG	21 7 775	
W2CET	13	5	405	W8WRN	19 7 670	
W2UTH	12	7	880	W8WXV	18 8 1200	
W2DPB	12	5	500	W8UKS	17 7 720	
W2FHJ	12	5	—	W8DX	17 7 675	
W2BVU	12	4	260	W8EP	17 7 —	
				W8WSE	16 7 830	
W3RUE	19	7	760	W8RWX	16 7 500	
W3NKM	19	7	660	W8BAX	15 6 655	
W3QIK	17	7	820			
W3KWL	16	7	720	W9FVJ	22 7 850	
W3LNA	16	7	720	W9EQC	21 8 820	
W3FPH	16	7	—	W9BPU	20 7 1000	
W3GKP	15	6	650	W9UCH	20 7 750	
W3OWW	13	6	600	W9LF	19 — —	
W3KUX	12	5	575	W9WOK	17 6 600	
W3PGV	12	5	—	W9MBL	16 7 660	
W3LMC	11	4	400	W9BOV	15 6 —	
				W9ZHL	15 6 —	
W4AO	20	7	950	W9LEE	14 5 780	
W4HHK	19	6	710	W9FAN	13 — 680	
W4JFV	18	7	830	W9UIA	12 7 540	
W4MKJ	16	7	665	W9GTA	11 5 540	
W4OXC	14	7	500	W9JBF	10 5 760	
W4IKZ	13	5	650	W9DSP	10 4 700	
W4JFU	13	5	720			
W4CLY	12	5	720	W9EMS	21 8 1175	
W4JHC	12	5	720	W9CUD	20 7 1065	
W4OLK	12	5	720	W9IHD	16 6 725	
W4FJ	12	5	700	W9NFM	14 7 660	
W4UMF	12	5	600	W9ZJB	12 7 1097	
W4LRR	5	2	900	W9INL	12 5 830	
				W9WGZ	11 5 760	
W5JTT	14	5	670	W9OAC	11 5 725	
W5RCL	14	4	790	W9JHS	9 3 —	
W5QNL	10	5	1400	W9HKY	9 3 —	
W5CVW	10	2	1180			
W5MWW	9	4	570	VE3AIB	17 7 850	
W5AJG	9	3	1260	VE3DIR	14 7 790	
W5ML	9	3	700	VE3BQN	13 7 790	
W5ERD	8	3	570	VE3BFB	12 6 715	
W5ABN	8	2	780	VE3AQQ	11 7 800	
W5VX	7	4	—	VE1QY	11 4 900	
W5VY	7	3	1200	VE3DER	10 6 800	
W5FEK	7	2	580	VE3BOW	8 5 520	
W5ONS	7	2	950	VE3TN	7 4 480	



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
R. L. WHITE, W1WFO, Asst. Comm. Mgr., C.W.
PHILLIP SIMMONS, W3VES, Communications Asst.

GEORGE HART, WINJM, Natl. Emerg. Coördinator
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, Administrative Aide

Listen Before Transmitting. How many times have we amateurs engaged in casual QSOs or net operation discovered another signal right on frequency sending a CQ? Such CQ calls are ordinarily fruitless and ineffective, since stations already in contact on a channel will usually add selectivity (crystal filter, Q5-er, or FL-8 variety) to overcome the difficulty, or a net member may briefly and courteously ask the station to choose a clear channel instead of the one in use. W1KC points up this problem in a recent letter: "Too many operators are not taking necessary pains to *listen on their frequencies before transmitting*. In recent months I have observed this condition getting worse. Personally, I always listen on a frequency to see if it is clear. It has paid dividends many times over. I refer to 75 mostly, but such procedure will pay off on all bands. . . ."

Portable or Mobile? The rules governing the amateur radio service, Sections 12.4 and 12.5, define amateur portable and mobile stations. Section 12.82 should be followed closely in complying with the requirements for identification of portables and mobiles. Note also that Section 12.91 requires that whenever portable operation is, or is likely to be, for an over-all period in excess of 48-hours away from the fixed transmitter location, the licensee shall give prior written notice to the Engineer in Charge of the radio inspection district in which such portable operation is intended. Mobiles likewise!

In doubt as to whether your contemplated operation is "portable" or "mobile"? This depends on your customary *operating use* situation and its inherent installation *ability* to operate mobile. When you suffer the handicap of being hitched or immobilized by a fixed antenna or power supply it follows from the definition that you are operating *portable*. While a set that is "conveniently moved about from place to place, but *not* operated while in motion" cannot be anything but a "portable," a "station that is so constructed that it may conveniently be transferred to or from a mobile unit . . . and is ordinarily used while such mobile unit is in motion" is bound to be a *mobile* — even if stopped at a stop light or at the side of the road, etc. Follow the two definitions of 12.4 and 12.5 and you cannot go wrong.

Just in passing, it should be noted that amateur mobiles water-borne on inland waterways should *not* sign "/MM," a designation reserved for work "on the high seas or aboard an aircraft on an international voyage." (12.82e). Instead, in keeping with FCC-specified practice, the ap-

propriate "/numeral" should be used (c.w.) or the geographical location given per Example 3 (12.82b) when telephony is used.

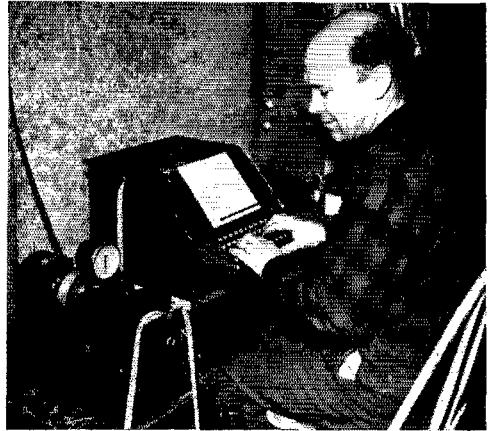
Operating Pointers for New and Old Stations. Brevity of expression is especially desirable in our Novice QSOs so we can say more in a limited time. A simple "R" tells your man that you copied him 100 percent, ND, Nil or just RPT (repeat) if you did *not* copy. Use AS, for wait. It is quite unnecessary to spell out "wait just a minute, stand by until I start sending again. . . ." ?WA asks for the *word after* when a word has been missed in a message or address. ?AA means *all after* or use ?AB for *all before*. Be sure to make use of the International Q signals liberally. These are the world-wide international standards for abbreviations. They are always fully used by the top operators on communications circuits. Amateur radio is two-way communication. To be most respected as a communicator, emulate standard communications practices! Use QTH? and QRM? to ask for an address or concerning interference conditions. Meaningless expressions that take several words are too often employed in ending contacts. HW? or OK? before your final call will convey your meaning. More operators will call you spontaneously for a contact if you develop a little snap and brevity in operating. You can use the time to say things more interesting than just a formula report. CL should be used when leaving your station (closing down), as a courtesy so other stations will not call you.

ARRL Field Day — June 20th-21st. To give one's emergency transmitter a workout, to test pre-cut antennas afield, to review equipment needs and *add* emergency power, to renew one's Amateur Radio Emergency Corps card by asking annual EC endorsement — all these things can fulfill the true intent and meaning behind our greatest annual ARRL operating activity, the Field Day. Each is a worthy objective. In combination they can't be beaten. To complete *one* emergency-powered QSO, whether your rig is battery or gas-generator powered, is to give personal proof of your *ability* to usefully employ amateur communications in the interest of community, state or one's own person when the chips are down. The Field Day is a top value, for the individual or for amateur radio as an institution.

ARRL Field Day features teamwork. We encourage advance club planning; also group discussion of message handling form and the systems of operating procedures applicable in Field Day and emergency situations. We want you to find fun and profit in FD activities; likewise we want

CODE-PRACTICE STATIONS

Along with the stations listed on page 79 of April *QST*, Ray Cornell, W6JZ, has long been an active participant in ARRL's on-the-air code practice program. Ray's amateur interest was aroused in 1910, and his first license was issued in 1917. Since that time he has held additional calls W6CC, W6AGW, W7VY and W6ZAP. Other amateur activities of W6JZ include being SCM of the East Bay Section, MARS-A6JZ, traffic, CD and DX progress, participation in many of the clubs in the Pacific Division, etc.



to strengthen our operating position individually and group-wise through the scheduling of this test or outing. There is not one but many combined values, highly positive values too, in an ARRL Field Day. Mobiles can and should be given a workout at the very same time completely-transportable units are given the test without which no unit really can be assured of workability. The club-and-group entry in any desired transmitter class is a natural, but the ARRL staff will be just as happy to receive unit and individual reports which most fully carry out the full spirit of the Field Day. *A box listing of all amateurs making either one to ten FD QSOs or one contact and FD message sent on these dates, as a successful tryout of gear but limited in score to such values due to lack of time, etc., might be an interesting feature to stimulate interest in the personal progress department of the FD.* Postcard size reports of "1 QSO and msg." or 1 to 10 contacts, showing FD results, will be examined for such type credit.

The suitcase portable or set with handles, as well as mobiles, are fine for vacation work as well as operation from emergency power when called for, if designed with an eye to 6- or 12-volt connections. A good number of amateurs make a point of using such small transmitters as regular station adjuncts. Try to make this FD the one for a personal test of gear, if ever so briefly, in addition to hitching your plans to club-arranged or coördinator-sponsored treks to the field. The sharing of problems and Field Day doings makes a never-to-be-forgotten experience which many amateurs find engenders an irresistible urge to return year after year. If you have never taken a share of cooperative working in the FD we point these things out to suggest you give it a try. There's a lot of operating know-how to learn. Working with people instead of alone develops fraternalism and understanding, pointers on radio propagation, and a wealth of new ideas, all in addition to checking the capabilities of equipment and showing up the weak and strong spots in design of gear in a true *communications* test. The FD is a flexible activity to accommodate everything from "aggregate mobile" club scores to the individual test.

Whatever your style of participation, whatever your transmitter class, see the FD rules elsewhere in this issue for guidance and information. Take part and report your luck. BCNU in the FD!

— F.E.H.

GROUP CODE INSTRUCTION

Affiliated clubs planning a summer or fall series of lessons designed to aid the code trainee would do well to note the availability of ARRL equipment. One of the most useful items, a TG-10 keyer, produces an audio tone from inked paper tapes. The tapes are available for use with the keyer or may be made by use of another training-aid item, a BC-1016 inked tape recorder. We'll be pleased to supply copies of our Reference Guide for Code Trainees to help get things started. Now is the time to have a club officer write to the Communications Department ARRL for further information on reserving a keyer or recorder for one convenient month-long period.

Special equipment for his code-practice schedules include a Kleinschmidt perforator and a Boehme galling head with drive. His potent signal is due to a full gallon input to a pair of 250-THs.

His up-to-date listing is as follows: Ray Cornell, W6JZ, 909 Curtis Street, Albany 6, California. 3590 kc., Mon. and Fri. 5, 7½, 10, 13 and 20 w.p.m., and Wed. 15, 25, 30, 35 and 45 w.p.m., 1845 Pacific Daylight Saving Time.

K6USN will round out the above schedule by transmitting code practice on Tuesday and Thursday at the same times, frequency and speeds as the Monday and Friday schedule of W6JZ.

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 WIAW will be made on June 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1887, 3555, 7130, 14,100, 21,020, 28,060, 52,000 and 146,000 kc. The next qualifying run from W6OWP only will be transmitted on June 7th at 2100 PST on 3590 and 7138 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 six speeds transmitted, 10 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 WIAW each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text is reversed during certain of the slow-speed transmissions. To get sending practice, hook up your own key and buzzer and attempt to send in step with WIAW.

Date	Subject of Practice Text from April <i>QST</i>
June 1st:	<i>Meteor Scatter</i> , p. 11
June 5th:	<i>TVI Hints for the V.H.F. Man</i> , p. 16
June 9th:	<i>Folded and Loaded Antennas</i> , p. 21
June 11th:	<i>A Sweep-Tube C.W. Rig for 3.5 and 7 Mc.</i> , p. 35
June 17th:	<i>A Different Approach to High-Power Mobile</i> , p. 28
June 19th:	<i>Improving the Series Noise Limiter</i> , p. 30
June 23rd:	<i>The Antenna Coupler Helps . . .</i> , p. 47
June 25th:	<i>Wide-Band Re-Entrant Networks</i> , p. 48
June 29th:	<i>Design Notes . . .</i> , p. 31



Recent correspondence on the subject of RACES has been most interesting, showing the variety of attitudes and reactions AREC leaders exhibit on this subject. It keeps our job from being dull, but at the same time makes it more exacting; sometimes even exasperating. We want each of you to know that for every other AREC member who feels the way you do, there are probably two or more who feel differently. For each one who feels that the amateur hasn't been given enough responsibility in RACES, there are others who think he has been given too much. For each one who thinks that emergency work is the ultimate in amateur radio, there are others who think the same of traffic work, of experimenting, of rag chewing, of DXing, of contest work, etc. Don't ever be misled into feeling that the majority opinion in your circle is representative of the majority opinion everywhere.

But about RACES. Gratifyingly enough, most of the comments on the recent series of *QST* articles have been favorable. Admittedly, it didn't cover everything. It was an attempt to sort things out so we'll all know where we stand, and it seems to have accomplished something in that direction. There still seems an incredible inability on the part of amateurs and civil defense people alike to decide who is going to be "boss." Tempers have flared on this subject, all for no good reason, because RACES has to be a combined effort of amateur radio and civil defense. Without the combination, it just cannot exist. Let's review, just briefly, some of the questions that have been asked us, and the answers we have given:

1) Do we have to "sign up" in civil defense to get into RACES? *Certainly!* RACES is a part of civil defense communications.

2) Who is the policy-making official in RACES? This may vary locally, but in general it can be said that the RACES Radio Officer calls the shots. He does this in accordance with local civil defense requirements, which are set down by the civil defense director in consultation with his heads of services, including the communications service. In other words, the "boss" bosses with the advice and acquiescence of the bossed.

3) How many "stages" must a RACES application pass through before it reaches FCC? Up to state level this may vary, depending on the set-up within the state. It definitely must have the approval of local and state c.d., whence it goes through the regional FCDA office, FCDA Washington, thence to FCC for final approval and authorization. Notice of approval and authorization is returned to the applicant the same way. This applies only to the communications plan and certification of the radio officer, not to station authorization applications, which may be sent directly to FCC after the plan is approved.

4) Is FCDA approval contingent on compliance with FCDA equipment specifications and/or FCDA-recommended frequency channelization? No, not on either. FCDA's equipment specifications apply only to equipment for which "matching funds" are being sought, and this

entails filling out a long and complicated form in addition to the communications plan. The FCDA frequency channelization at this stage is only tentative.

Perhaps these will start the ball rolling. Let's throw the floor open to further questions. If we don't know the answer, we'll try to find out for you.

W6JDN informs us of some calls left out of the report of the Northern California snowstorm emergency written up in March 1953 *QST*, page 71. In addition to those mentioned, the following also participated: W6s DFL ELO EXP IQP ZGA and W7MDI/6. Also W6OMR, W6EWG and W6FNU set up a station at the Forest Service station in Mt. Shasta and materially assisted the Southern Pacific Railroad and the telephone company.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C. W. 'PHONE

3550 kc. 14,050 kc. 3875 kc. 14,225 kc.
7100 kc. 28,100 kc. 7250 kc. 29,640 kc.

During periods of communications emergency these channels will be monitored for emergency 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; 'phone — 3815, 14,160 kc., 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCY

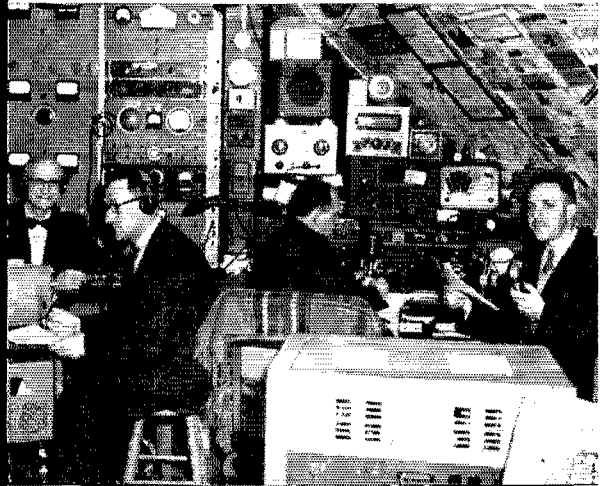
3620 kc.

This frequency is generally used by amateurs using radioteletype throughout the United States. Other frequencies are under discussion and will appear under this heading in future issues of *QST*.

On January 17th and 18th heavy storms and very serious floods occurred in the Eureka and Crescent City areas of Northern California. Amateurs figured prominently in emergency communications work over the emergency period, both independently and in conjunction with civil defense. Operations were conducted on 160, 75 'phone and 40 c.w. In the Eureka area, W6FYY operated on 75 meters intermittently for five days. W6YUH and W6JSY, with the help of W6CWR and W6EQQ, set up a station in the civil defense headquarters on 160 and 75 and operated it until late Sunday night (18th). W6KTV directed operation of commercial mobiles. W6BJO and W6BWV were active at Loleta and Fortuna on both 'phone and 40-meter c.w. The Humboldt County EC, W6SLX, doesn't say much about what he did, but other sources report he was plenty active. W6BME reported formation of a net on 1980 kc. on Sunday morning consisting of the following: W6s BME CHP GOS IQP JSY JVV KTF LRU NCV OMR W7QYS and others. This net handled much emergency traffic and secured at 0100 Monday. During the day Monday (20th) and Monday night a number of additional stations reported in to assist, including W6s HBI REF RQL SIY W7s BTF EJF KZU MKA

When the civil defense and AREC organization of Quebec, P. Q., have a drill, this well-equipped shack is activated as a civil defense auxiliary station. The gentleman on the left, VE2ZL, is the proprietor. VE2ALV and VE2OE are operators, and on the extreme right is the EC, VE2QN.

QST for



and others. Traffic consisted of drug orders, food orders, press dispatches and official state and highway patrol messages. The 1980 frequency proved to be excellent for the purpose. W7QYS was NCS, with W6CHP doing exceptionally good work in San Francisco and W6GOS in Crescent City. Total traffic was estimated in the hundreds.

On February 14th a USAF three-passenger liaison plane crashed near Atlanta, Ga., after the three occupants parachuted to safety. Amateur radio was the first source of communications on the scene and remained a vital part during the 48-hour searching operation. Mobiles participating in staggered duty were W4s OPS SLH KXT PFA EPM SYH URB RPO WWII and others. Fixed stations operating during the disaster were W4s ACH PFA SLH MZO MNZ and others. The mobiles were operating both 10 and 75 meters, while most of the fixed stations were on 75. Some hams not only operated the emergency equipment but went with searching parties, and W4ZD and crew helped scour the river for the one missing flier. Through the facilities of W4OPS and W4PFA the news services and radio stations were able to get first-hand news concerning progress of the search. All of the many participating amateurs did a fine job. — W4VTE

On March 28th, at the request of Maine SCM WIPTL and WISS, the FCC Regional Manager in New York invoked Section 12.156 of the regulations to clear 3960 kc. for emergency traffic in Maine, which was having severe floods. The clearance went into effect at 0900. Later the channel 3956-3962 was specified, and still later it was widened to 3955-3965. The declaration was terminated Monday, March 30th at 1800 after an FCC offer to extend it had been declined by the amateurs concerned. Little else is known so far except the identity of the stations who participated, furnished by WIPTL. They are W1s ACO AUR AWR BTY BOC BYK COV CMO EOP ED FV GKJ GJY GVS HIL HZE HUL HUT IIM INC ITH JIS JTH JJY KEZ KAS LHA LRQ LBJ LAO LEH LYK LPA KLP LGR MFJ MBB NDG PBE PTL PYF PS PXJ PGZ QJA RSB RNA RUO RAR RJL RWH RJL SS SPJ SEJ SPD SNT SMQ SZA SSF SWZ SUK SMP TVB TKP TNE TDI TZL TAS TNV TDK TKV TB TAM UXL UIW VYA VV VXU VSL WRY WWJ WXG WUW YDA and YDB; W2s RXZ/1 QBG BQM; W3s BRC PYF.

Fourteen SBC reports for February representing 3173 ARRL members have been filed, a decline of one from January. The February list included three new (for 1953) sections: Washington, Nebraska and Santa Clara Valley (Calif.). Eleven of the others maintained 100 per cent status for 1953.

A.R.R.L.-AFFILIATED CLUB HONOR ROLL

In accordance with the League policy for special recognition to all affiliated clubs whose entire membership consists of members of the League, it is a pleasure to present herewith the latest Honor Roll of such affiliated clubs. Clubs having 100 per cent ARRL membership are determined from information supplied in the 1953 affiliated-club questionnaire or Annual Information Survey. An additional QST Honor Roll will be published somewhat later this year to take care of those clubs reporting results of ARRL membership drives being conducted currently. Such list will include consideration of full reports from affiliated societies whose questionnaires gave incomplete information and others that qualify for listing on completing their membership program. Each below-listed club will receive the handsome certificate "100% ARRL Club" (described p. 71 July '52 QST) shortly after publication of this Honor Roll.

Abington Township Amateur Radio Association, Jenkintown, Penna.
Amateur Radio Club of Augusta, Ga.
Amateur U.H.F. Club of Jamaica, N. Y.
Batavia Amateur Radio Association, Batavia, N. Y.
Big Spring Amateur Radio Club, Big Spring, Tex.
Binghamton Amateur Radio Assn., Binghamton, N. Y.
Central Illinois Radio Club, Bloomington, Ill.
Central Kansas Radio Club, Salina, Kans.
Charlotte Amateur Radio Club, Charlotte, N. C.
Connecticut Wireless Association, Hartford, Conn.

Daniel Boone Radio Club, Columbia, Mo.
Enid Amateur Radio Club, Enid, Okla.
Hazleton Amateur Radio Club, Hazleton, Pa.
Kern County Radio Club, Inc., Bakersfield, Calif.
Kingsport Amateur Radio Club, Inc., Kingsport, Tenn.
M.A.K. Radio Assn., Lincoln, Mass.
Martha's Vineyard Amateur Radio Club, Vineyard Haven, Mass.
Medina County Radio Club, Medina, Ohio
Muskingum Amateur Radio Association, Zanesville, Ohio
Niles Amateur Radio Club, Niles, Mich.
Northwest Amateur Radio Club, Mt. Prospect, Ill.
Providence Radio Association, Providence, R. I.
Queen City Emergency Net, Cincinnati, Ohio
Ridgewood Amateur Radio Club, Paramus, N. J.
St. Louis Amateur Radio Club, Brentwood, Mo.
Skagit Amateur Radio Club, Sedro Woolley, Wash.
South Lyme Beer, Chowder and Propagation Society, West Hartford, Conn.
South St. Louis Amateur Radio Club, Afton, Mo.
Southern Oregon Radio Club, Grants Pass, Ore.
Suburban Radio Club, Overland, Mo.
Sussex County Amateur Radio Association, Sparta, N. J.
Treaty City Amateur Radio Association, Greenville, Ohio
Valley Radio Club of Eugene, Ore.
Westside Amateur Radio Club, New Orleans, La.
York Radio Club, Inc., Elmhurst, Ill.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....253	G2PL.....244	W2BXA.....237
W8HGW....248	W6ENV....242	W3JTC.....237
W0YXO....246	W6AM.....239	W3KT.....237
W3BES....245	W3GHD....239	W2AGW.....235
W6VFR....245	W6SN.....338	W3CPV.....235
	G6ZO.....238	

RADIOTELEPHONE

W1FH.....225	W1NWO....207	W9RBI.....200
PY2CK....225	W1JCX....204	W1MCW.....198
VQ4ERR....220	W8HGW....204	SM5KP.....196
XE1AC....213	ZS6BW....203	W6DI.....195

From March 15, to April 15, 1953, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W9PGW....151	G5US.....105	W8FJR.....100
G3HLS....117	G3FPQ....102	W8SSI.....100
KG6ABI....109	OH2UD....102	C6B6B.....100
G3APN....107	VR2CG....102	CT1FM.....100
PY2AJ....107	W0LEL....101	OH2WM.....100
DL1TM....106	ZD9AA....101	

RADIOTELEPHONE

YN4CB....106	G2MQ.....105	W3AEV.....100
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ENDORSEMENTS

W5ASG....230	F8PQ....173	PY1ADA....130
W6MX....230	W7KTN....170	VE3SR....130
W1CLX....220	W3ALB....163	HB9AO....129
W5KC....215	ON4GU....163	OH2TM....124
W6QJU....215	EA2CA....162	F3FA....123
W8DMD....211	E15F....152	KV4AQ....122
W7GUV....200	1I1AMU....152	W1PKW....120
HB9EU....200	W6LVN....150	ZL1QW....120
W6IBD....190	W1BOD....140	ZS1FD....120
GM3DHD....190	W8LAV....140	W1JOJ....112
W6UHA....183	EA4CR....140	G3CTG....110
W9AND....181	ON4FL....140	ZL1AH....110
W8KPL....180	G2FYT....132	ZS2IW....110
	W8CED....130	

RADIOTELEPHONE

GM3DHD....181	W3KT....160	ZS1DO....140
G8IG....170	W4OM....152	F9RM....131
EA2CQ....165	CT1PK....151	PY2JU....131
EA2CA....161	1I1AMU....150	G8BID....130

TRAFFIC TOPICS

Generalities are not particularly useful unless they are accompanied by specific action. At the same time, all the implementation in the world will become tangential unless there is some basis for it, some broad directional planning to guide it along effective lines. One of the troubles with most of our traffic nets today is that they spring up spontaneously as somebody's whim, and have no real purpose or foundation except congeniality; or if they have a purpose in the beginning, they eventually turn out to be more social than utilitarian by common unspoken consent. The social aspect usually attracts more participants than the utilitarian aspect, and the net spreads and broadens until it becomes a fraternal meeting place as much as a traffic net with a purpose — sometimes more. At the same time what purpose is left spreads, broadens, becomes diluted and eventually is engulfed in bigness and unwieldiness.

At Headquarters we have occasionally been criticized for indulging in lofty idealisms and vague generalities instead of coming to grips with the problem at hand. Actually, we are enmeshed every day in floods of details. If we tried to consider and act upon each one separately, we would be in constant turmoil. Instead, we must back off and look at the whole picture, to consider bases and principles and underlying philosophies. The procedure then is to apply the general rule to the detail, after which the action indicated is pretty obvious. The only alternative is chaos.

Applied to traffic handling, we have to ask this question: What are we trying to do? Handle traffic speedily, train ourselves to be better operators, enjoy ourselves, impress others or do something for the public? The answer is, of course, *all of them*. There are certain of them which can quickly be discounted because no emphasis is necessary. For example, every amateur will seek enjoyment, and most of us want to impress someone, even if it's only ourselves. To a lesser extent, amateurs will want to improve their operating ability and see that traffic *they* handle is handled speedily (but most of them care little once they get rid of the message). All too few, alas, are interested in the public service aspect as such.

Then we have to throw in a good measure of the popularity aspect, perhaps a pinch of politics, stir well and let simmer. The concoction that results is strongly suggestive of the need for emphasis on *system*, and on the necessary teamwork toward that system to accomplish, in the end *all* of the objectives mentioned in the previous paragraph — to accomplish them all together, at the same time, in the same system, rather than separately and tangentially. For the teamwork among traffic men necessary to establish an efficient net must be extended to teamwork among traffic *nets* to establish an efficient *system*. In all our generalizations, *that's* the main thing we've been trying to get across, after all. Traffic handling is a lot of fun, but it's much more fun to do it right than to do it slapdashly.

W6KYV has received a letter of commendation from the commanding general of KG6FAA for his extraordinary work in handling traffic from and to GIs overseas. It's quite a tribute, but Dave deserves it. Take a look at his consistently high BPL totals; most of those messages are GI-type hamgrams. Says the letter, in part: "The courtesy, cooperation and long hours you have contributed . . . reflect great credit on yourself and the American Radio Relay League."

W4SHJ is interested in handling transcontinental traffic on RTTY and is looking for a W6 who would like to attempt this on 14 Mc. Any takers?

W1EJO reports that 38 participating stations in the Transcontinental 'Phone Net handled 2814 messages in March. W3CVE reports the March total for the Transcontinental Relay Net as 3692 in 31 net sessions averaging 118 messages per session, with ten stations participating.

National Traffic System. Although we measure progress of nets and net systems on the basis of the calendar year, it has become customary to think of the "traffic season" as beginning in October and ending in May of the following year. That's because, after all, traffic is enjoyment to those of us who do it, and it's not so much fun sitting with perspiration dripping off your nose trying to copy a weak signal through static when you could, maybe, be sitting out in the shade with something tall and cool. But there is one ad-

vantage to the generally-poor propagation conditions we have been having this past season: how can conditions be any worse this summer? Some of the traffic men are even looking forward to summertime operation, QRN and all, in the hope and expectation of being relieved of the abnormal skip we have had during the winter months.

NTS improves every year. This is fact, although we're not kidding ourselves about how near it is to being perfect. Considering the conditions we've had, the fact of improvement is little short of astounding. How much could have been done if conditions had been like those in, for example, 1946! Some day we're going to get around to winter conditions like that again. Meanwhile, our felicitations, gang!

March reports:

Net	Ses- sions	Traffic	High	Aver- age	Most Consistent
EAN	22	886	78	40.3	All
CAN	21	576	58	27.4	All
PAN	22	453	54	20.5	RN7
1RN	44	350	23	7.9	W. Mass.
2RN	44	356	17	8	NJN
3RN	38	239	23	6.2	MDD
4RN	39	401	26	10.3	N. C.
RN6 (Feb.)	40	744	48	18.6	BAN
RN6	39	460	30	11.8	BAN
RN7	52	244	54	4.7	Wash.
8RN	35	105	16	3	Ohio
9RN	26	522	55	20.1	Ind.
TEN	30	743	62	24.7	
TRN	40	115	13	3.5	Ont.
Iowa (TLCN)	22	450	100	20.4	
Kans. (QKS)	22	135	13	6.1	
Kans. (QKS)	22	111	12	5	
(Jan.)					
QIN (Ind.)	52	667	44	12.8	
Minn. (MSN)	22	67	10	3	
Minn. 'Phone	26	108	—	4.2	
Total	599	6877	100	11.5	
Record	649	8064	268	14.2	

EAN almost reached the ultimate in attendance during March. All regions but one were 100%, and that one missed only once. 4RN has been 100% all year so far! EAN will remain on standard time.

3RN didn't actually lose any sessions, but there were nights when conditions were so bad that no one could hear anyone else. The boys were in there pitching, just the same. 3RN certificates go to W3s DUI, NOK, HC and UGF.

W6JQB is resigning as manager of RN6 due to a promotion. Representation is needed from Colo. and New Mexico to complete the absorption of the former 12th Regional Net.

VE7QC, VE7TF and W7RXH have received RN7 certificates.

The February-March 8RN bulletin announces 8RN will discontinue the late session but remain on standard time. 9RN will continue on CST, no change in schedule. W9HLY and W9UNJ have earned 9RN certificates.

VE3BUR reports lots of trouble covering the Thirteenth Region with conditions the way they've been, but traffic-wise March has been the best month yet.

A.R.R.L. ACTIVITIES CALENDAR

- June 6th-7th: V.H.F. Contest
- June 7th: CP Qualifying Run — W6OWP
- June 15th: CP Qualifying Run — W1AW
- June 20th-21st: Field Day
- July 3rd: CP Qualifying Run — W6OWP
- July 14th: CP Qualifying Run — W1AW
- July 18th-19th: CD QSO Party (c.w.)
- July 25th-26th: CD QSO Party ('phone)
- Aug. 1st: CP Qualifying Run — W6OWP
- Aug. 12th: CP Qualifying Run — W1AW
- Sept. 6th: CP Qualifying Run — W6OWP
- Sept. 17th: CP Qualifying Run — W1AW
- Sept. 18th: Frequency Measuring Test
- Sept. 19th-20th: V.H.F. Contest
- Oct. 2nd: CP Qualifying Run — W6OWP
- Oct. 3rd-4th: Simulated Emergency Test
- Oct. 10th-11th: CD QSO Party (c.w.)
- Oct. 16th: CP Qualifying Run — W1AW
- Oct. 17th-18th: CD QSO Party ('phone)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for March traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W6IAB.....	39	2782	2730	56	5607
W2B7B.....	52	2487	2754	39	5332
KG6FAA.....	387	1808	1682	126	4093
W6KYV.....	111	972	483	526	2092
W4USA.....	62	991	870	39	1962
W1SZQ/1.....	1825	0	0	0	1825
W0TQD.....	10	828	821	7	1666
K5FKF.....	46	754	762	55	1617
W5MN.....	60	710	488	275	1533
W1BGW.....	2	1000	484	23	1509
KA7LJ.....	265	506	270	236	1277
W0SCA.....	7	583	620	2	1212
W0CPL.....	23	581	508	73	1185
K4WAR.....	131	515	436	79	1161
KH6AJF.....	66	534	498	36	1134
W6YHM.....	12	528	492	29	1061
W9NZZ.....	256	381	2	379	1018
W9JUJ.....	38	496	467	7	1008
W0BDR.....	9	478	460	8	955
W7BA.....	40	452	415	35	942
W3PZW.....	12	420	388	32	852
W2BO.....	61	366	304	62	793
KZ5AA.....	309	225	160	65	759
W0KHQ.....	12	363	359	2	736
W3W1Q.....	26	348	310	30	714
W0QXO.....	2	344	338	5	689
W8RJC.....	11	322	288	22	643
KA6HQ.....	301	168	67	84	620
W1CRW.....	18	290	269	16	593
W4FV.....	2	283	265	18	568
W4PJU.....	22	256	220	36	534
W2LPJ.....	29	251	223	30	533
W2ZOL.....	3	398	121	10	532
W4AKC.....	1	272	237	17	527
W4TAV.....	14	269	226	12	521
W0XJ.....	4	258	226	29	517
W1SJO.....	8	259	217	21	505
Late Reports (Feb.):					
KG6FAA.....	335	1487	1380	68	3270
W8NZZ.....	4	358	351	7	720
KA6HQ.....	260	187	86	90	623
KZ5AA.....	68	271	132	37	508

BPL for 100 or more originations-plus-deliveries:

W1SS 322	W2JOA 117	Late Reports:	
W2LLI 234	W6YDK 115	VE2TA (Dec.)	272
W4WEC 181	KG6ACH 110	W0UPU (Feb.)	133
W0GTU 164	W0IFR 107		
W4DRD 130	W8DAE 103		

The BPL is open to all operators who report to their SCM a message total of 500 or more or 100 or more originations-plus-deliveries for any calendar month.

W1AW OPERATING SCHEDULE

The current W1AW operating schedule may be found on page 79 of May *QST*. The next listing of Headquarters Station operations will appear in the July issue.

BRIEF

In the April *QST* report on the Governors-to-President Relay, the Maryland message route from W3JE to W3KTR was inadvertently omitted.

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

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
North Carolina	June 1, 1953	J. C. Geaslen	Aug. 15, 1953
East Bay	June 1, 1953	Ray H. Cornell	Aug. 16, 1953
Yukon *	June 15, 1953	W. R. Williamson	Mar. 17, 1949
West Indies	June 15, 1953	William Werner	Aug. 15, 1952
Maritime *	June 15, 1953	Arthur M. Crowell	Oct. 16, 1952
Hawaii	June 15, 1953	John R. Sanders	Jan. 14, 1953
Southern New Jersey	June 15, 1953	Lloyd L. Gainey	Aug. 26, 1953
Wyoming	June 15, 1953	L. L. Daily	Resigned
West Virginia	June 15, 1953	John T. Steele	Resigned
San Joaquin Valley	June 15, 1953	E. Howard Hale	Resigned
Eastern Pennsylvania	June 15, 1953	John H. DuBois	Resigned
Indiana	Aug. 14, 1953	Clifford C. McGuyer	Oct. 14, 1953
South Carolina	Aug. 14, 1953	T. Hunter Wood	Oct. 15, 1953
Vermont	Aug. 14, 1953	Raymond N. Flood	Oct. 15, 1953
Western New York	Sept. 15, 1953	Edward Graf	Nov. 21, 1953

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director 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.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Colorado	Karl Brueggeman, W0CDX	Feb. 16, 1953
Sacramento Valley	Harold L. Lucero, W6JDN	Feb. 16, 1953
Oregon	John M. Carroll, W7BUS	Mar. 1, 1953
Manitoba	Leonard E. Cuff, VE4C	Mar. 2, 1953
Mississippi	Dr. A. R. Cortese, W5OTD	Mar. 8, 1953
Maine	Bernard Seamon, W1AFT	Apr. 16, 1953
Southern Texas	Dr. Charles Fermaglich, W5FJF	Apr. 29, 1953
Wisconsin	Reno W. Goetsch, W9RQM	May 12, 1953

In the British Columbia Section of the Canadian Division, Mr. Peter McIntyre, VE7JT, Mr. Wilf Moorhouse, VE7US, and Mr. Ernie Savage, VE7FB, were nominated. Mr. McIntyre received 75 votes, Mr. Moorhouse received 55 votes, and Mr. Savage received 50 votes. Mr. McIntyre's term of office began March 13, 1953.

• 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, John H. DuBois, W3BXE — SEC: IGW, RMs: AXA, BIP, PAM: PYP, E. Pa. Nets: 3610, 3915 kc. New officers of the Lancaster RTS are NOL, pres.; KKG, vice-pres.; OY secy.; TDO, treas. This Club is getting an early start in Field Day planning while still in the contest mood after the DX Tests. Consensus of reports throughout the section was that this activity claimed the efforts of DXers and traffic-handlers alike. The Frankford Club now has a trailer for its Field Day "Klunker." New E. Pa. "phone net shows great promise by its recent traffic total and tie-in with the c.w. net affords almost complete coverage of E. Pa. February's F.M.T. resulted in some very close readings by both OOs and non-Observers. New ECs for Chester and York Counties are KFQ and QOL, respectively. EC posts still are open for the following counties: Adams, Cumberland, Dauphin, Juniata, Lycoming, Montour, Northumberland, Perry, Pike, Schuylkill, Snyder, Sullivan, Susquehanna, Tioga, Union, Wayne, and Wyoming. Those interested should contact IGW. During the DX Contest, BES operated 2SAI and BIP was at MWL. LEZ's new electronic key got its "bath of fire" in the same fracas. PSH now is at Norfolk and OCU got hitched while spending a month in Wyoming. Yours truly has a new QTH at 4921 Chestnut Ave., Pennsauken 3, N. J., and because of my ineligibility as SCM for E. Pa., I'm requesting the Communications Manager to declare an election for this position. I would like to take this opportunity to thank all of you for the fine cooperation during my stay in office. Not only is the outstanding organizational work of AXA, BIP, IGW, and PYP to be particularly commended, but also the support of the "regulars," which made their success possible. I would also like to thank the clubs for the courtesy extended to me at their meetings and the opportunity afforded me to meet many of you personally. I hope I can continue these friendships on the air under my new call, K2CFR. Until a new SCM is elected, please continue to address correspondence to me as usual, by the 5th of the month. Best personal regards. Traffic: (Mar.) W3IGW 137, BIP 123, BFF 84, PYP 78, QOL 74, PDJ 70, AXA 64, DUI 42, KAG 37, ADE 31, BET 30, MLY 23, NOK 23, QLZ 21, AD 19, RSC 12, PVE 8, CKD 6, CDT 5, BES 2, LYU 2, VDE 1. (Feb.) W3NHI 174, LYU 4.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Arthur W. Plummer, W3EQK — Mobile support for the Muscular Dystrophy Telethon held Dec. 27th in D. C. was furnished by the Washington Mobile Radio Club and not the Washington Radio Club, as reported in March QST. A movie, "Lightning Masters," was shown by the Washington Radio Club Mar. 28th. ROU, newly-appointed ORS and OBS, likes traffic-handling. ILD joined the ranks of OOs. EEB, GA, and JE also are new ORS appointees. The untiring efforts of President PRL produced another ideal speaker for the BARC in the person of 6QYT, who spoke on s.a.b. at the Mar. 12th meeting held in Studio "A" of WFBR. The BARC learned something about Class B modulators from IPR at the Apr. 6th meeting. PTZ sold his 32V and expects to be on the air soon with home-grown 200-wattter. Jens also says he has no further use for a Panadapter with 30-Mc. input. QZC says school is QRming his ham activities and that he no longer is using a radiator for antenna. UQJ, of Aberdeen, Md., newly-appointed OBS, has been megacycling on 435 with sixteen elements for three months and hasn't been able to QSO anyone. Let's do something about it, gang. TKR, at Bainbridge USNCT, under the supervision of RMC Fairfield, 4TYK, ex-1KZL, soon will be heard on 40-, 80-, and 160-meter 'phone and c.w. JHW apparently still is going strong despite one end of his skywire being wrapped around a tree trunk. SMA, whose home QTH is Chester, Pa., is making mobile noise around Aberdeen

and Baltimore. 5GWD/3 is Harvey-Wellsing on wheels from MATS base at Andrews AFB and will be heard from soon via long wire on 20, 40, 80, and 160 meters. Your new SCM would like to see some applications for OO appointment. We have only 10 in the section and only 4 are Class I. The SCM also is wondering about the possibility of a 10-meter 'phone net to cover Maryland first then eventually take in the entire section. It would have to be a relay net in its fullest sense. Are there sufficient 10-meter operators strategically located to make this possible? Let's hear from you, fellows. Our deepest sympathy to NNX, whose mother passed away. RLR's shack soon will take on the appearance of a modern control room with operating console and everything. BARC station, PSG, recently acquired several motor generators and dynamotors. EF has been experimenting with a shortened 20-meter beam having a loading coil in each leg of the driven element, and reports success. Lecce-Neville Alternator equipment may be obtained by amateurs at an interesting discount by contacting EQK. The SCM wants to hear from the Delaware gang. He's sure there are hams there because thousands of WAS certificates have been issued. How about it, fellows? Senate Bill No. 166, providing an amateur call-letter license plate for Maryland hams in addition to the regular registration plate, is awaiting Governor McKeldin's signature to become law on June 1st. Traffic: W3PZW 852, COK 164, JE 90, UGF 85, AKB 52, QZC 43, ROU 37, ONB 28, NNX 24, QCB 15, CQS 13, JHW 9, EQK 7.

SOUTHERN NEW JERSEY — SCM, Lloyd L. Gainey, W2UCV — SEC: K2BG. The New Jersey Slow-Speed C.W. Net started operation Apr. 13th. This is an excellent opportunity to learn traffic procedure and not feel lost if your speed is on the slow side. Present plans call for a daily meeting on 3705 kc. at 8:00 p.m. EST. PCF is not superstitious, having received his 1st-class telephone and 2nd-class telegraph commercial license on Friday, the 13th of March. An election of officers was held at the last Delaware Valley Radio Assn. meeting with the following roster: QOK, pres.; UAE, vice-pres.; ZI, secy.; Charles Robman, treas. K2BG received his A-1 Operator's certificate and seems to be having a fine time on 2 meters. LS, BEI, and EET all turned in very close readings on the February Frequency Measuring Test. They are all Class I Observers so if you have any doubt of your operating frequency get in touch with one of them. FXT won the Heathkit Grid Dipper at the March meeting of the SJRA and proceeded to de-TVI his 2-meter transmitter. Traffic: K2BG 425, W2RG 136, ZVW 50, ASG 33, ZI 16.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — SEC: UTH, RM: RUF, PAM: GSS, NYS — 3615 kc. at 7 and 10 p.m. NYS — 3980 kc. at 8:30 p.m. daily. NYSS — 3595 kc. at 8 p.m. NYS C.D. — 3509.5 and 3993 kc. at 9 a.m. Sun. VBH, RMS, and QYT continue to work on REN mobile unit. The Rochester Mobile Club met at the QTH of QY to review the current phases of emergency operation. VBH has been appointed Monroe County Radio Officer by the N. Y. office of c.d. The Amherst Radio Group, under the leadership of Assistant EC RLW, has equipped a control station in the high school for emergency work and has mobiles out making tests of the area. At a meeting of the Lockport Radio Club, ALR and TPE gave a demonstration on TVI and then eliminated it step by step on a BC-696. New officers of the RAWNY are YZD, pres.; LXE, vice-pres.; PPY, corr. secy.; KLF, rec. secy.; and GVJ, treas. The RAWNY will sponsor a New York State Convention in Buffalo Sept. 19th and 20th. New officers of the Kenmore High School Radio Club are FTY, pres.; GMV, vice-pres.; KN2CRR, secy.; KN2CRQ, treas. DAN is sponsor. We regret to report the passing to Silent Keys of CEZ, DVE and JMT are active in NYSS. The Corning Radio Group was given publicity on work by mobiles when fire destroyed a local school, and has been donated a three-car garage to build into a club house. KBT meetings are devoted to Field Day preparation and UHI gave a talk on "Audio System Design." UTH visited UHI and SJV. While in N. Y. C. OZR had a c.d. meeting with BGO and IJG. IJG is an NCS on NYS c.w. IPC has a three-element beam on 10 meters and an Elmac and Tri-band for mobile work. UXP has sixteen-element beam on 2 meters and is working on crystal converter for 420 Mc. RUT is trying 20 meters. EMW is putting up a vertical. OE is rebuilding. UTH has a new NC-183D. SAW has a new HRO-60. FMX runs 75 watts on a 828B on 2 meters, has a 5-over-5 antenna and crystal converter. All who attended the annual banquet of the

(Continued on page 74)

SOJ VS XTAL

You will undoubtedly recall some of our previous ramblings on the subject of SOJ (Select-O-Ject) audio filter and some of the letters published in this column. In each instance the SOJ was first condemned then later praised after its operation has been mastered.

As sales of this item continue, the problem still persists, to a lesser degree. This is not unexpected, since if we packaged a crystal filter the same problem would exist, and the SOJ essentially gives many of the results expected of a good crystal filter.

First, let us review the proper operation of the Select-O-Ject with its dual ability to select or reject.

In select or "Boost" position, the SOJ is used to boost a c.w. signal above neighboring signals to the tune of 35 db (7 "S" units!). When the SOJ is switched into the circuit, *all* signals are attenuated 20 db, thus providing a quieting action. The boost control is then advanced to a spot just below where audio oscillation occurs. The frequency control is then set to the audio frequency of the desired c.w. signal which has previously been tuned in normally with the receiver main tuning control. As the Select-O-Ject frequency control nears the audio frequency of any signal, the signal will "pop out" of the quiet background, and appear to be all alone, even in the middle of a crowded band. It almost sounds like a *code record*. Code can then be copied under extremely difficult conditions.

Operation in the "Reject" position is similar although the device is then used to phase out unwanted signals such as heterodynes. When used to reject, the SOJ is switched to the "Reject" position and the SOJ frequency control is varied until the unwanted frequency is rejected 35 db or more. This is generally sufficient to take out most serious interference. Once it is set, the receiver tuning can be varied without affecting the phasing of the heterodyning signal.

Comparing the Select-O-Ject with a crystal filter, there is much to be said for either. First, the Select-O-Ject can be easily added to any AC receiver, since its low power drain will not upset the receiver voltages and it needs no alignment. A crystal filter, on the other hand, is usually rather difficult to install in any receiver not specifically designed for it. Second, the degree of "boost" or regeneration in the SOJ can be controlled so that the annoying "ringing" can be eliminated. In a crystal filter in the "sharp" position, this "ringing" can not be easily eliminated. The crystal, however, can be used to boost and reject at the same time, something the SOJ cannot do.

When the receiver is equipped with both crystal filter and SOJ, many operators use the SOJ almost exclusively, using the crystal only under conditions of extreme interference. Of course, with both devices you can reject two heterodynes or get other combinations of selectivity and boost, combinations which aid in getting thru when the QRM and QRN are at their worst.

Because its selectivity is a percentage of frequency, the SOJ is noticeably sharper when the audio beat note is say 300 cycles instead of 3000 cycles. It can be used in this position only in an extremely stable receiver, such as the HRO, since a shift in H.F. Oscillator frequency of only 300 cycles would take it down to zero beat. Under conditions of extreme interference when you use that "last ounce" of selectivity, try copying thru the SOJ at a low audio frequency.

Many c.w. men have spent much time and money developing selective filters to help when the going is tough. The SOJ will compare favorably with any of them and is more versatile than most filters. At \$28.75, it's a must in any good c.w. station.

W. W. BARTELL, W1PIJ



ELDICO TR-75TV's GO



ELDICO TR-75TV — MD-40P

Thousands of satisfied amateurs have constructed and are operating Eldico's TR-75TV Transmitters on the amateur bands. With the current FCC ruling permitting all classes of amateurs (except Novice and Technician) phone operation on the amateur bands formerly restricted, the swing is to Eldico's MD-40P Modulators.

This combination—TR-75TV Transmitter and MD-40P Modulator provides for CW or 100% AM phone operation on 160-80-40-20-15-11-10 meters and best of all—TVI proofed.*

Following are unsolicited testimonials received by Eldico from amateurs:

"You may be interested to know that the TR-75TV continues to serve and that without exception my signal reports are equal to those I received in pre-television days with my 500 watt transmitter—and with no TVI, even to my own TV set 10 feet from my transmitter."

W2RME

"Very satisfactory results both on phone and CW from your TR-75TV transmitter and MD-40 modulator."

VE6WH

"Operating on the air for six months and nothing but praise for my TR-75TV transmitter. It's second to none in its power class."

W1WAC

"I operate the TR-75TV transmitter about 5 feet from my TV set with no TVI. Congratulations to Eldico!"

KN2BZD

"My boys and I have recently assembled one of your TR-75TV kits with much fun and considerable success in operation. It surely is a nice job."

W2PQ

"Purchased TR-75TV and assembled it according to your easy instructions (Plenty excited — Hi Hi) it works perfectly and has never failed to operate. Antenna right over TV antenna and no TVI."

W6MJJ

*TVI proofed means: Special circuitry, shielding and filtering to eliminate spurious and harmonic energies that result in television interference.

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LOOK AT THESE OUTSTANDING FEATURES OF TR-75TV — MD-40P

- Simple enough for the beginner to assemble, sturdy enough for years of trouble free operation.
- Uses the time proven crystal oscillator—final amplifier combination.
- Permits use of 80 or 40 meter crystals to cover all bands.
- Modulator provides 40 watts of 100% amplitude modulated audio. (No trick circuits)
- Built-in husky power supplies in each unit employing 5U4G rectifiers with more than adequate filtering.
- Transmitter has built in antenna tuner which provides easy loading of transmitter with all type of antennas. Ideally suited for multi-band operation.
- All stages are metered using a meter which can be switched to oscillator plate or final grid and final plate. Separate meter used in modulator.
- All units completely shielded in modern designed Eldico cabinet to minimize television interference.

Complete kit—not another bolt or wire to purchase. For 110-120V, 50-60 cycle operation.

TR-75TV complete kit with Instructions..... **\$64.95**

TR-75TV factory wired and tested..... **94.95**

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ALL ELDICO PRODUCTS AVAILABLE AT THESE DISTRIBUTORS

THE NEW
"HQ-140-X"
 with modern receiver
 circuitry and
 improved performance



When you rest your hands on the large, convenient tuning knobs of the "HQ-140-X" and listen to its outstanding performance, you know it was built "for amateurs who appreciate professional standards." And the modern appearance, the smooth hammertone finish, the convenient layout of controls are only the frosting for the fine engineering and construction to be found inside.

The new circuitry makes use of modern miniature tubes wherever superior performance results. Now, there is also a more efficient, separate oscillator (6C4) and an independent mixer (6BE6). Also many other circuit improvements have been incorporated.

For the amateur, the newer 15 meter calibrated bandspread has been added, in addition to the direct reading calibrated bandspreads on the 80, 40, 20, and 10 meter amateur bands. In addition, there's an arbitrary logging scale for bandspread tuning of other ranges.

Now is the time to write to The Hammarlund Mfg. Co., 460 W. 34th St., New York 1, N. Y. for information about this fine new receiver. Just ask for Bulletin Q4.



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(Continued from page 70)

Northern Chautauqua Amateur Radio Club at Fredonia report a pleasant evening. ROL has been appointed Radio Officer for Zone 10 by the N. Y. office of c.d. AFY is in Emergency Hospital in Buffalo. New Niagara Mohawk Amateur Radio Club officers are SFS, pres.; K2DG, mgr.; OXI, tech. advisor; DVE, secy. Club call is GFN. RFO has joined UTH and UHI in nightly skeys on 2 meters. New appointments are OYI, QLK, and BTB as OPS; FEB as ORS; ICE as OO; IPC as OBS. Renewals are ICE as OPS; FE and QQ as OOs; ICE as OBS; BLO and K2DG as ORS; TEP, ABC, and VEY as ECs. NYS 'phone net certificates were issued to RJJ, KUD, ZPT, and RRL. The Buffalo Area Mobile Club met at the QTH of QLK, Traffic: (Mar.) W2BTB 5332, ZOL 532, RUF 308, NAI 231, COU 106, OE 86, SJV 47, HKA 26, K2DGG 24, W2IPC 20, ZRC 19, FEB 9, DVE 7, JWU 7, RJJ 6, JMT 5. (Feb.) W2QLI 5, IPC 2.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — This column can be kept filled and interesting only by the station activity reports, letters, and club publications that your SCM receives, so please let me hear from you of the Western Pennsylvania section. The Bucktail Amateur Club of Emporium, through the *Bucktail Hamster*, keeps that area information coming and suggests a slow-speed net on 3705 kc. for Novices and others who wish to get in on net operation. KUN, of Emporium, sandwiches nice 80-meter DX with contest and traffic work, turning up with VP4, PA8, G3, 5, and 8, OZZ, CNS, CTS, EI9, DL6, KZ5, ZLZ and 4, YN1, and ZS6 for three weeks during February. Glad to hear that WN3VEE, who recently was hospitalized, now is back and ready to give the Novice hand a try. The Steel City Amateur Radio Club paper, *Hilovalt Harmonics*, arrived and furnishes an interesting bit. The Weather Net on 2 meters now has been operating for approximately one year and has missed but one weekly session, and that during the past Christmas holidays. Credit for this is due RXT, with the aid of QEU, FPH, SDV, and all others who report into the net regularly. The Mercer County Radio Assn. president, GEG, has been quite a busy fellow recently. Along with regular work he attended the IRE meeting in New York, where he had dinner with Budlong, of ARRL Headquarters, and Hudson Division Director Cooke. *The Amateur Transmitters Association News* suggests that the gang there should have TVI well in hand with several talks already and more coming up concerning that persistent bug. They also are organizing a Novice net (VNN) on 3705 kc. at 1830 Mon. through Fri., so you Novices and any others interested, give it a hand, look for it, and join in. For details get in touch with SEA in Pittsburgh, telephone ST 1-9017. NRE, of Washington, Pa., also reports 80-meter DX good, with contacts to HC1JW and P2QGE recently. WIQ hit 8FL this month in traffic work. LXE scored 23,058 points on 'phone and 50,778 on c.w. in the February DX Contest. Traffic: (Mar.) W3WIQ 714, GEG 172, NCD 69, NUG 53, UHN 50, AAX 42, NRE 33, KUN 29, LXE 15, AER 2. (Feb.) W3LXE 15, KNQ 6.

CENTRAL DIVISION

ILLINOIS — SCM, H. F. Lund, W9KQL — SEC: HOA, RM: BUK, PAM: UQT. Section Nets: ILN (c.w.) 3515 kc. IEN (phone) 3940 kc. The Joliet Amateur Radio Society has 20 mobiles on 29,820 kc. and meets every other Tue. night. TTT stopped off in Springfield on his way to visit VER. REA is employed by C.A.A. in the Capital City. RCJ made a YL an XYL. The Elgin Radio Amateur Service Club is newly organized with QLK as pres.; WTJ, vice-pres.; and OTM, secy. ARRL affiliation has been granted to the Midway Club of Zion. McHenry County also is organizing a club. New ORS are TBI and DBO; both active on ILN. BPU got a one-eyed monster so now must clean out harmonics. The Danville Club elected CTX as pres.; YXP, vice-pres.; GCX, secy.; and UJ, treas., for the coming year. The Club plans to have the bus in operation for Field Day. New Novice in Rock Island is WXM, while Dick and Lois Zehr, of Planagan, hold OQI and UXL, respectively. In a beautiful candlelight ceremony at 4:30 p.m. April 5th LGR became Mrs. ADM; Nit and Doug will operate from Watertown, Wis., where he rides gain at a b.c. station. More family calls are added all the time; now QLZ's son is Novice WVT. PTZ now is employed at the home of the SX-71. Plans are being made for the reactivation of a club in the Peoria Area. Traffic: W9CSW 378, YIX 139, SXL 79, POL 70, OKI 45, LMC 35, STZ 34, LXJ 30, SYZ 30, W6CIW/9 27, W9TBI 21, DBO 9, FRP 9, KMN 8, KQL 8, DOR 7, BPU 4, KRE 2, SKR 2, ICF 1.

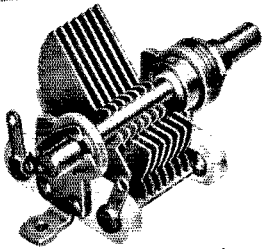
INDIANA — SCM, Clifford C. McGuyer, W9DGA — The Hoosier Lakes RC officers are NKC, pres.; VNQ, vice-pres.; WN9UKE, secy.; WVK, treas.; and UM, act. mgr. FSA, LZF, WWT, and TT had fine averages in the last F.M.T. MZE is DLACT. QYS, URA, QOR, WLV, and DEJ received RFN certificates. SWM is new OO. QOT is new EC for Jefferson County and KPZ is new EC for Adams County. UUN is checking for non-linear devices causing his TVI. IW has new 40-meter antenna. BRW is back on mobile. FMJ is building all-band mobile rig.

(Continued on page 76)

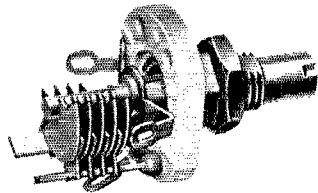
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Long, trouble-free service and continuous fine performance is assured when Hammarlund variable capacitors are used in your gear. You wire them in with the certainty that they will continue to function efficiently for the life of the set.

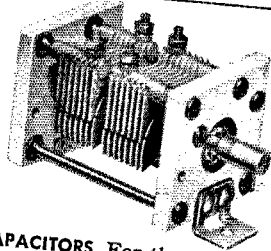
Here are descriptions of three capacitors that have become amateur favorites. They are all built with the same sturdiness and quality that have made Hammarlund products famous for more than 40 years.



"MC" CAPACITORS. The "MC" is a versatile, single section tuning capacitor designed to give the user a choice of mountings, connections and capacity characteristics. The threaded brass front bearing and tapped aluminum end brackets permit panel or base mounting. A rotor stop permits 180° clockwise rotation for increasing capacity. "MC's" are available with capacities ranging from 5.5 mmf to 320 mmf.



"MAC" CAPACITORS. The new miniature "MAC" was engineered to provide the low minimum capacity essential for use as a trimmer in the VHF range. Its silicone-treated base is only $\frac{3}{4} \times \frac{5}{8}$ inches. The rotor and stator are soldered assemblies of brass, silver-plated for low losses. Models are available with capacities ranging from 1.4 mmf to 19.6 mmf.



"VU" CAPACITORS. For those interested in VHF or UHF equipment, the "VU" offers a uniquely designed capacitor using completely original concepts. With it, conventional "lumped constant" circuits, rather than tuned cavity techniques, can be efficiently used up to 500 megacycles. Models are available with capacities ranging from 3.35 mmf to 45 mmf.

If you don't have your new Hammarlund Capacitor Catalog describing and illustrating these and many other standard parts in detail, write to The Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y., for one today. Ask for Bulletin T1.



HAMMARLUND

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(Continued from page 74)

KPM, JRR, and UUN gave a talk on TVI to the FWRC. The FWRC has new 80-meter antenna and 10-meter ground plane. LXW works mobile on 75 meters. AZJ and VDD got married. New officers of the MARC are ZIB, pres.; RE, vice-pres.; CC, secy.; and FIW, treas. Indiana hams will be able to have call-letter license plates effective Jan. 1, 1954. TKV needs 11 cards for DXCC. FYM has an HRO receiver. APJ is building mobile rig. RUC is getting new QTH. TKV gave a talk to the IRC on DX operating. VJM and JVN have new Viking rig. JAY works single sideband on 75 meters. HLE attends night school at Purdue Extension. POK has 20 states worked. NH is bandwitching his rig for the contests. RSN moved to Indianapolis. RXZ is back on the air after several years' absence. The North Central Indiana ARC was host to the Kokomo RC and the Tippecanoe County ARA on a tour of the Mallory Resistor plant. WN9VAY reports the hams at Chesterton are forming a club. JUJ reports QIN traffic for February as 1166. Net Control Stations of the Calumet Area 160-meter Net are AJO, DRJ, RWN, QCN, MNO, PAS, CNY, and RWJ. CNY receives that net on an IN-34, and DRM is their cartoonist. GRA, IBZ, and WFF are mobile on 160 meters. DWF specializes in pre-tuned resonant 160-meter whips for mobile operation. KZW is building all-band rig. LQE uses a Manecordette tape recorder for his Official Bulletins. New officers of the New Albany RC are PWB, pres.; ZWQ, vice-pres.; ZYO, secy.-treas.; ABN act. mgr.; and UVD, publicity; mobiles include ABN, BOF, EUC, PWB, UVD, and ZYO. BSZ reports the Sky Wire RC of Marion has a new clubhouse. Mary Frances arrived Feb. 15th, weight 5 pounds 7 ounces—mom and dad are JTX and RCB. FVE has TVI-proofed his p.p. 812 rig. PAS has 4-125A on 160 meters. RWN likes 40 meters. QBN is a member of two YL nets. DNA and JEX are broadcast operators in Gary. GUX sent in a nice report from Gary. The New Albany and Madison Clubs had a joint meeting to hear LZI and Mr. Audritsh. PMV has new 75-meter rig. KRJ spent three weeks in the hospital with a virus infection. NTR has new 50-foot tower and is building antenna tuner. EUC and PWB have vertical antennas. NXU reports Montgomery County has six 147.3-Mc. f.m. rigs. JBQ reports RFN traffic as 73. BKJ reports IFN traffic as 191, and works 40-meter 'phone with new antenna. KLR reports Aurora opening Mar. 8th on 2 meters. NZZ has new 75A-3 receiver with mechanical filters and reports it is PB. Stan had a traffic total of 1018, with an average of 103 words per message. 1HDQ gave a talk to the FWRC and the IRC. TT reports RFN was alerted for possible tornadoes by the Weather Bureau. WIN and STC have their Gen. Cl. licenses. New Novices are WJT, WMG, WML, WML, WMM, and WWI. KPM, UMS, FJI, WWM, and DGA are working on TVI. Traffic: (Mar.) W9NZL 1018, JUI 1009, YWE 337, IG 232, TT 233, BKJ 174, QLW 156, HLY 136, JEQ 83, DEI 74, ORW 63, RBX 61, CMT 56, NTA 53, SWM 53, PPS 52, WBA 47, KDV 46, FSA 42, OLV 37, FYM 35, DGA 31, FZW 29, UMS 23, IFR 20, NTR 20, DOK 16, VNV 14, ERB 12, BDP 11, GUX 9, RCB 6, JTX 4, KLR 4, EUC 3, STW 2, WN9UQP 2. (Feb.) W9OWZ 19. (Jan.) W9PPS 43.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. RMs: IQM and SFL. PAM; ESJ, C.W. Net (WIN) meets on 3625 kc. 7 P.M. daily; slow speed 6:30 P.M. Mon.-Fri.; 'Phone Net (BEN) 3950 kc., 6 P.M. daily; State Mobile and c.d. frequency 29,620 kc. VLL will be back on from home QTH after several months as portable in Detroit with 10 watts. FUS reports the FLARC is getting things in readiness for Field Day. EIZ says even he made a couple of contacts on 'phone. UCR has new antenna. LSK has mobile on 75 meters with new loading coil. OPS has new VFO. RTTY QRM near the WIN net frequency is reported as being quite heavy at times. A "snooper" developed by RBI is being used to good advantage by the Madison TVI committee. SBQ and his NYL, PVR, now are 8SBQ and 8MMS in Detroit. The Point Radio Amateurs elected BTD, pres.; VWX, vice-pres.; KXK, secy.-treas. New appointments: LEE as OO and OBS, FDX as ORS. UNJ as ORS, SAA as ORS and OPS. Appointment renewals: ERW as ORS, KXK as OPS. UPX and HZS supplied emergency communications during utility outage in Madison. AND, Central Division Director, has appointed GIL, JXY, and RQM as Wisconsin assistants. The Motor Vehicle Dept. has issued a notice requiring a mobile installation in the vehicle to qualify for call-letter license plates starting January 1954. UIT continues with Official Bulletins on s.s.s.c. daily on 3880 kc. at 0130. SGG has resigned as EC. WJN is new on 144 Mc. GFL is building 144-Mc. mobile. LEE reports 144-Mc. conditions below normal. QMBD/9, at Lawrence College, is active on 75-meter 'phone and 40-meter c.w. HDV's XYL now is 9RNV. The Green Bay Mike and Key Club is building 12 of the Detroit type handie-talkies. QLE now is on the air. RIL completed his WAS on 7 and 14 Mc. and also has 9 zones and 16 countries confirmed. MRAC mobile committee for 1953 includes BSR, ESR, FDX, GZR, IDW, MOT, MPF, NNV, ONY, VLK, SNK, and SZH. WN9YAF is new at Chilton. KXK added SP2 for a new country. QJB is active on the BEN with a

32V-3. Traffic: W9CXY 133, UNJ 96, LSK 37, DR 32, UCR 30, IQW 25, SAA 24, SFL 14, EIZ 13, ONV 11, VLL/8 10, IFS 9, SDK 6, OVO 4, ERW 3, RQM 3.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, J. W. Sikorski, W0RRN — SEC: GCP. PAM: UVL. RM: OLB. YQR and ZWL have been appointed Assistant SCMs. YQR roams the West River territory and visits clubs and individuals frequently. ZWL (who is building a modulator after all these years) will work with him. OLB reports regular schedules on 15 meters with GQH and says it works well for short-haul. ISWX/8 is assigned to foreign duty and ex-5SJN, just back from Korea, now is chief operator of K0FCR. He operates a Viking II and NC-125 at home, and is conducting ham classes at RCAFB, HWB and GNG have graduated from the Novice Class. In the F.M.T., LRN qualified as Class I OO with an error of only 6.9 parts per million; YQR made Class II. LRN has organized the South Depot RC and is holding weekly ham classes for 12 members. GWH, formerly of Sioux Falls, announces the arrival of his fifth jr. operator, Ex-WL7AOD, now WN0LWW, is working for Power City Radio. ZIQ's XYL is talking him into mounting his 20-beam atop the house—something he has been wanting to do for years—instead of on a pole in the back yard. Traffic: W0BLB 100, PHR 43, YQR 26, ISWX/8 8, K0FCR 4.

MINNESOTA — SCM, Charles M. Bove, W0MXX — Asst. SCM: Vince Smyth, 0GGG. SEC: ZDU. RMs: DQL, RPT. PAM: JIE. GYG has been appointed assistant to the SCM. BOL has resigned as Section Emergency Coordinator so ZDU is taking his place. ZDU is an officer in the Mobile Amateur Corps and has done a very good job with this unit. MXC has promised to help him in organizing the State Emergency Corps. It is suggested that all ECs whose appointments need endorsement and who wish to continue as EC mail their certificates to Robert Coons, care of Lighting Dept., Northern States Power Co., 15 So. 5 St., Minneapolis. TJA has purchased a new 75A-2. HNS now is operating 20-meter mobile from his new car. The Rochester Radio Club has purchased three walkie-talkies for emergency work. The Minneapolis Radio Club, Inc., now has a TVI committee in operation. AUI and DXZ head this committee and receive their complaints direct from the FCC office. AUI said the solving of complaints is 75 per cent public relations and the rest is technical. The Mobile Amateur Radio Corps now has an auto call at its station, PZT. In case of an emergency put your rig on 29,640 kc. and make five short whistles into the mike and you will break the squeal on their receiver and they will hear you. This frequency is monitored day and night. Our very good friend BGY went through surgery and now is doing well. JNC is putting up an all-band antenna 136 feet long fed with 300-ohm line. He hopes to work a lot of 40-meter DX with it. Traffic: W0UCV 113, DQL 97, WQM 76, CXN 56, CID 52, JIE 46, SWB 45, GGG 47, TJA 40, QYZ 33, RXL 32, DYD 28, GTX 23, ZDU 24, RPT 23, BUO 19, BWM 14, IPW 14, CO 12, CQY 11, KNR 11, RQJ 8, HKF 6, BRA 5.

DELTA DIVISION

ARKANSAS — SCM, Fred Ward, W5LUX — Act 146 of the Arkansas Legislature provides for license tags for Arkansas hams. The cost will be two dollars above your regular license fee, and you should make application direct to Mr. W. I. Woodyard, Director, Motor Vehicle Div., State Capitol, Little Rock. WUB made WAS from Mountain Home. A new call at Eureka Springs is YZM. SLL is a new operator at KS5BA, and OKU is leaving for his home in West Monroe, La. WUH is running 70 watts to a BC-458. PHP has a new NC-173 receiver. UZT has new Viking rig. PTD writes that a new club is being organized at El Dorado. QHI, Manager of RN5, writes that they need c.w. men from Arkansas to take traffic. Most Arkansas traffic is now unloaded on the Louisiana boys. How about it, fellows, do we have a couple of operators who can work c.w.? The Ft. Smith Club meets twice a month in members' homes. Hope everyone is getting things in shape for a big Field Day this year. We fell short last year, so let's make up for it this time. Traffic: W5WBA 92, EA 16, PX 4.

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — This will be the last report sent in by JHS. Your new SCM is Dr. A. Richard Cortese, OTD, of Crystal Springs. It has been a pleasure serving the hams in Mississippi. You have picked a very able ham for your SCM. JHS checks into three 'phone nets and two c.w. nets each day besides other skeds. New hams around Jackson are Novices WN5YTP, YUJ, and TYW, also YDH and YJW. The YL/XYL Net, the Southern Belles, meets each Fri. at 0700 CST on 3838 kc. and boasts of a membership of 26. YLs and XYLs around this section are invited to join. PNA is in DL-Land; look for him on 10, 20, or possibly 40 meters. NYV and YOZ are doing a nice job with their Novice classes. New Hurricane Net members are JR, SMD, USI, SNR, YOZ, TOB, UXJ, UTK, VMB, TBI, and 3VDD/5. USI has been giving the boys a thrill working them from Aeronautical Mobile. 73 from JHS. Drop in on the Hurricane Net

(Continued on page 78)

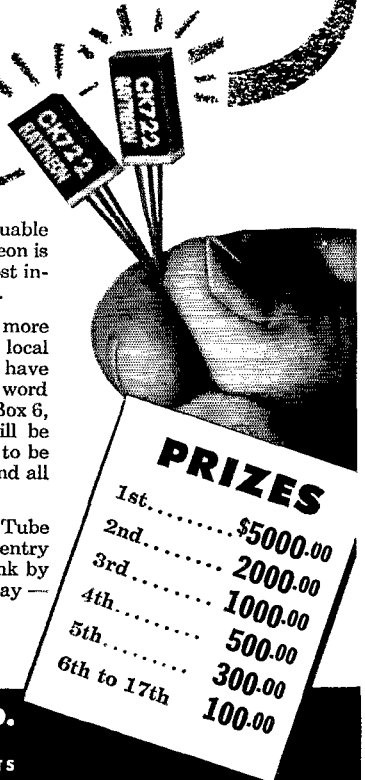
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Here's how to enter! Go to your nearest Raytheon Special Purpose Tube Distributor. Get your official entry blank which *must* accompany each entry and which contains complete contest rules or get the official entry blank by writing directly to Raytheon, P. O. Box 6, Newton 58, Mass. Enter today — the contest closes on Midnight August 31, 1953.



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some evening at 6:15 CST. Traffic: W5JHS 110, RIM 65.
TENNESSEE—SCM, Mark M. Bowelle, W4CXY/-
 WLG—SEC: NJE, RM: AGC, PAM: PFP. Skip conditions
 continue to be bad for net operation but the daily
 c.w. net on 3635 kc., the morning 'phone net daily on
 3980 kc., and the Tue. and Thurs. evening 'phone net and
 the Sun. morning 'phone net on 3980 kc. are sticking with
 it and doing a fine job. RLD is NCS of the morning 'phone
 net. Several of the gang attended a meeting in Nashville
 with State RO, AEF, and came away better informed on
 the RACES set-up. The Memphis 'fest will be held July
 19th. The Delta Convention at New Orleans will be held
 Labor Day week end. We hope to meet you all at one or
 both of the above affairs. RHO is rebuilding his 300-watt
 rig. WQW has added 75-meter 'phone to his activities.
 SCF reports Memphis is progressing with 2-meter mobile
 net plans. MKB is reworking his beam. FLW is working
 on a Weakley County 50,353-Mc. net. TYU has a new YL.
 DTI is doing shift work but is able to meet the c.w. net
 with regularity and also is interested in 6 meters if he can
 find some 6-meter boys nearby to check with. Fellows, we
 know many of you are moving traffic and doing things that
 would be of interest to the rest of the gang, but your SCM
 cannot give you publicity if you do not send in reports.
 You can reach us by a message on any of the state nets or
 by U. S. mail the first of each month. Let us hear from you.
 Traffic: W4SCR 216, PFP 275, YLE 116, APC 110, IFB
 102, WAX 87, IWW 79, WQW 74, TYU 31, VJX 29, PHQ
 22, CXY 20, RMJ 10, FLW 9, DTI 7, UDS 6, RHO 4.

GREAT LAKES DIVISION

KENTUCKY—SCM, Ivan C. Kelly, W4TUT—The
 7:00 A.M. Korn Krackers handle plenty of traffic. WZX
 moved to Kentucky from Alabama and is active in Paducah;
 he also is ORS. KRC and MRT keep Ashland open.
 OBG is new OPS at Stanford. TFK, OBG, NBY, QJU,
 ODK, and KRY keep the burner going in their mobile on
 75 meters. URF, a new OO in Louisville, now is only four
 short of WAS. Louisville and Paducah Clubs are most
 active on local emergency nets. ZKN, Louisville Ham Club,
 was part of the reason the Engineering Department won
 the best display on Engineer's Day. Corky is truly slapping
 that WN key. JUI graduated two WNs by remote control.
 Louis also keeps us in line to the half cycle. OMW and the
 Ohio Valley EA are keeping things moving in Northern
 Kentucky. YP and JUL, Official Observers, are doing fine
 work. AHL left the grocery business in Lexington and
 started farming (antenna) at Walton. SMU now has 20
 countries. JPP is new PAM. Kentucky hams really are
 giving 40 meters a workout. CDA is cooling his key and
 going to Europe for a short trip. TAV and WHC again
 made the BPL. KZF is getting fired up for more contests.
 JPP and the gang installed a rig for SKE in the polio ward.
 MIS, MOP, KLK, and OYG are using teletype. Traffic:
 W4TAV 521, MGT 232, BAZ 222, WBC 181, K4WBG
 123, W4ZXXN 80, KRC 19, CDA 14, SMU 11, JUI 6, WZX
 6, RFI 5, URF 4, WN4WXL 3.

MICHIGAN—SCM, Fabian T. McAllister, W8HKT
 —Asst. SCMs: Bob Cooper, 8AQA; Joe Beljan, 8SCW;
 Mickey Wills, 8CPB, SEC: GJH, RMs: YKC, UKV, ELW.
 New appointments: EC to AYV (Cass Co.), EVK (Muske-
 gon Co.), EGR (Hillsdale Co.), DXH (Crawford and Ros-
 common Co.), NZZ (Branch Co.), and EGI, Area EC for
 Area No. 5. The South Quadrangle Amateur Radio Club
 has been formed by nine hams living in South Quadrangle
 Dorm. at U. of M. The Catalpa Amateur Radio Society,
 with a membership of 64, boasts an average attendance of
 52 at meetings. Can anyone top that? 4YW, ex-3NQ,
 reports QMN pounding in down Florida way. The Genesee
 County Radio Club now has its TVI Committee in operation.
 JFW and JUA have left the Novice ranks for General
 Class. RJC is keeping his overseas traffic moving in fine
 shape. FLM reports a new harmonic in the person of Debrah
 Kay. NUL is enjoying his first TV receiver and it
 doesn't seem to have affected his traffic totals. FX has
 packed up the portable spark (I wonder!) in favor of 10-
 meter portable in the "new" 51 Chet. HPR, IKX, GBU,
 and HKT took part in the February Frequency Measuring
 Tests. KOD is finding increased power hard on his filter
 condensers. GJH has the c.d. wheels in motion for the
 State, but he still needs help in quite a few of the counties.
 If you are able to devote just a little time to EC work drop
 Gary a line. Let's see if we can't have Michigan 100 per
 cent organized before the summer. Come on, fellows, please
 "give" with more dope on your report cards. There must
 be more activity going on than you are sending to me!
 Traffic: (Mar.) W8RJC 643, FLM 135, WVL 133, SCW
 101, RTN 92, NOH 87, URM 70, ILP 59, SIF 57, ZLK 53,
 GTM 42, QIX 42, FGB 36, IKX 35, YKC 29, CPB 26,
 EGI 25, AQA 18, FFG 18, NUL 18, COW 17, FX 16, TBP
 13, GCP 12, HKT 12, THG 9, AHV 5, DLZ 4, TIC 4,
 KOD 2, EBF 1, (Feb.) W8NZZ 720, RTN 176, FLM 113,
 IKX 87, IQI 83, SPF 28, DLZ 24, YKC 21, THG 18,
 FBV 8, IUC 7.

OHIO—SCM, John E. Sringer, W8AJW—Asst.
 SCMs: C. D. Hall, 8PUN, and J. Erickson, 8DAE, SEC:
 UPB, PAM: PUN, RMs: DAE and PMJ. New appoint-
 ments made were SRF as OPS and GDB as EC. Only one
 made BPL this month, DAE. Although our traffic list is

the longest for quite some time only a few bulletins found
 their way to the SCM. No printed matter has been received
 anent the Dayton Hamvention but, according to all oral
 reports, the Daytonites put on a swell show. Let's hope
 they make it into a Division Convention in 1954. LYD, who
 has done a remarkable job as EC in the Cleveland Area,
 is about to retire and will be succeeded by AJH. The latter
 is one of the country's outstanding 10-meter 'phone DX
 men. DAE writes that RTTY QRM is raising havoc with
 the 80-meter traffic nets and has reported same to Director
 Brabb. JAR and MGW are building 829 rigs. An informal
 144-Mc. net meets Mon. at 9:00 P.M. in the Cleveland Area.
 DG will spend a couple of weeks on the West Coast. HXB
 has a new Johnson VFO and DXR has acquired a Viking II.
 The FEARA is just about set for Field Day. DL is con-
 structing an elaborate multi-band antenna which will oc-
 cupy a goodly portion of his acreage. AC, DCI, and NGJ,
 along with their NYLs, took in the Dayton Hamvention.
 TTY, ex-Wolverine, now is operating from Perrysburg.
 ET states that the YLs, for the most part, are better c.w.
 operators than the OMs. HOX is using a 40-ft. vertical on
 75 meters, with another soon to follow, so that he can beam
 into Texas, his homeland. On April 4th the Case Tech. gang
 held Field Day practice at Kirtland. NBK has gotten a
 60-acre farm, principally for the erection of DX antennas.
 The OVARA bulletin mentions that Field Day again will
 be held at Evendale. Springfield's Q6 tells us that the Mar.
 20th dinner meeting was a howling success. Jack Brabb
 was the chief "eleucationer." A new tent (11 x 14 ft.) has
 been obtained for Field Day and team captains will be
 DCJ and OKB. The following news is from Dayton: FHJ,
 vice-president of the DARA, has left for W4-Land and is
 being replaced by ZOF; HOX is heading the Field Day
 committee; HCD and PQZ have completed the 75-meter
 transmitter at the infirmary which will serve as control
 station in the event of an emergency. Cincy's Mike and
 Kay states that HQA and KP'D are answering Uncle Sam's
 call, MFH and MGF are new local licensees, and MAL is
 ex-9OCC. JNF is chairman of the West Park Radiop Field
 Day committee. We are pleased to report that, although
 badly shaken, NFD and QBF survived the N.Y.C. disaster
 near Conneaut, Ohio. Our official sections nets, Doghouse
 ('phone) and BN (c.w.) are enjoying good turnouts accord-
 ing to their NCSs. Our congratulations to DSX, manager of
 SRN, on the newsy bulletins he's been publishing. Inciden-
 tally, during March, the Buckeye turnout was greater
 than that of the Michigan gang. In conclusion, keep the
 reports coming in so that your Ohio neighbors will know
 what's going on. Traffic: W8DAE 331, JAR 289, FYO 286,
 SRF 108, LMB 74, RO 56, ILC 46, PMJ 36, DG 31, IFX
 30, EQN 28, YGR 28, WAV 21, AL 17, BEW 17, GZ 17,
 HXB 17, AJW 16, W8NKQY 15, W8DL 14, WE 14, HIV
 12, KNX 11, AQ 9, DNJ 8, CTZ 7, NYY 6, QIE 6, TLW 6,
 RN 5, TTY 5, BUM 4, ET 4, DZO 2, JWS 2.

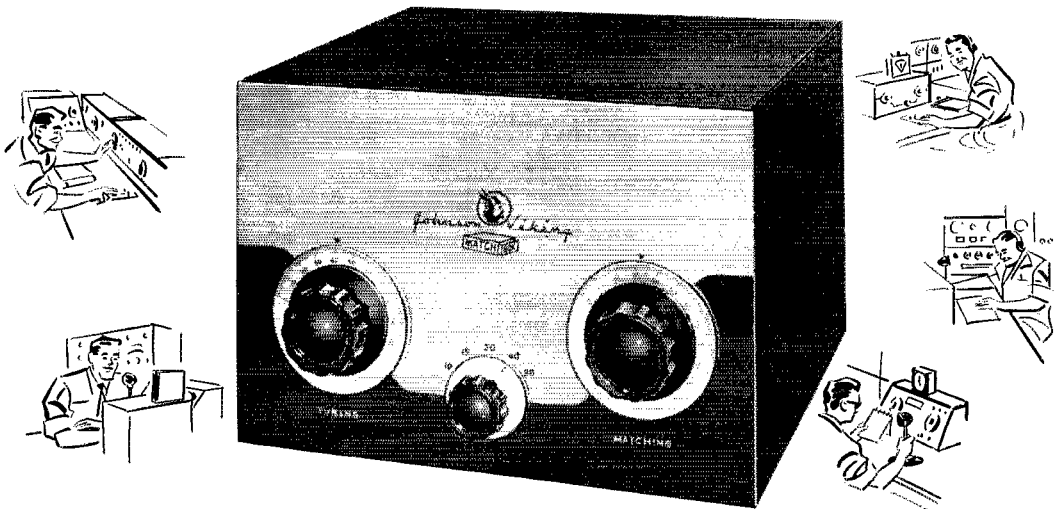
HUDSON DIVISION

EASTERN NEW YORK—SCM, Stephen J. Neason,
 W2ILI—SEC: RTE, RMs: TYC, KBT, PAMs: IJG,
 JQL, K2CA. HEI is QRT while revamping the BC-348.
 KN2CRI is a new ham in Sloatsburg. IFP had lots of fun
 in the DX Contest. MRQ has Lyco 600 fired up on 3.8-
 and 7-Mc. 'phone and made his first contact with Arizona.
 Director Cooke and Alternate Director Ryan were recent
 guests of the AARA. BM and VDX are on 1.8 Mc. again.
 EWO is working 3.8 and 7 Mc. these days. New in Catskill
 are K2CBS and his XYL, K2CTG. The RVWARS reports
 that the recent family party was a great success. The gang
 is making plans for Field Day. We regret to announce that
 BNC is moving to Binghamton. Helen is one of our most
 active ORS appointees and has set a traffic record that
 will be difficult to surpass in this section. Best of luck to
 you, Helen, from the SCM and the E.N.Y. gang. DVZ is
 using 100 watts on 144 Mc. The Hudson River V.H.F. Net
 is being reactivated. Please contact PCQ for details. The
 IBM Radio Club is installing low-frequency antennas, also
 twin-5 vertical and eight-element horizontal beams. A 522
 will be used on 144 Mc. and 250 watts output on the low frequencies.
 VP has a new Stancor mobile transmitter on 28 Mc. RTE
 has a new folded dipole antenna and a Viking II. Endorse-
 ments: ITX, QZH, SQW, VJE, VRE, K2AVE, PSH, YXE,
 MRE, JLE, JO, YBK, HSM, VP, CYW, AAD, and AAO
 as ECs; JQI as PAM; MHE, QJJ, and ILI as OOs; JQI,
 BNC, EQD, and BSH as ORS; EQD as OPS. Appoint-
 ments: MHE as OES, HZZ is NCS, with CSG and K2BAR
 as Alternates of the Dutchess County Emergency Net
 (144-350 Mc. every Mon. at 9 p.m. VPG is NCS on the
 Orange County Emergency Net (145,650 Mc.) every Mon.
 at 9 p.m. Details on Westchester next month. Avoid loss of
 appointment, check endorsement date now. Traffic: (Mar.)
 W2ILI 449, TYC 167, IFP 72, CFP 35, EFU 33, APH 32,
 LRW 32, HEI 25, MRQ 20, (Feb.) W2LRW 48, KBT 33.
NEW YORK CITY AND LONG ISLAND—SCM,
 George V. Cooke, Jr., W2OBU—Asst. SCM: Harry
 Danals, 2TUK, SEC: ZAL, RM: VNJ, PAM: YBT.
 The prediction of 500 members in the AREC in the
 section is fast approaching that figure. As of this report there
 are 475 now enrolled and one borough failed to report.
 Nassau County, FI EC, shows the highest total with 156

(Continued on page 80)

BIGGEST AMATEUR NEWS IN YEARS!

SIMPLIFIED ANTENNA MATCHING



NEW *Johnson* MATCH BOX

A fully engineered antenna coupling system

Performs all transmission line matching and switching functions required in medium powered amateur stations. Bandswitching and completely self-contained, the "Matchbox" will load an almost infinite variety of antennas from 3.5 to 30.0 mcs. Matches balanced antennas from 25 to 1200 ohms resistance. Successfully loads unbalanced, or single wire antennas of approximately 25 to 3000 ohms resistance. Tunes out large amounts of reactance.

Though designed as a companion unit to the Viking I and II, the "Matchbox" can be used with any 250 watt transmitter. Nominal input impedance is 52 ohms—power rating 250 watts. A change-over relay switches the antenna from receiver to transmitter, grounding the receiver antenna terminals in the "transmit" position. This same relay also mutes the receiver during transmission. Receiver performance improved by matching antenna input to receiver input impedance.

Supplied as a completely assembled and tested unit. Easy to use, front panel controls. No internal adjustments required to change bands. Fully shielded maroon and gray cabinet matches the Viking II. Dimensions 9 7/8" wide, 10 1/2" deep, 7" high, weight approximately 6 pounds.

\$49⁸⁵

Cat. No. 250-23

Amateur Net



Standing Wave Ratio Bridge

Provides accurate measurements of standing wave ratio permitting adjustment of the "Matchbox" for minimum SWR and maximum harmonic rejection. Insures the most effective use of a low pass filter providing the ultimate in TVI suppression.

Impedance is 52 ohms, can be changed to 70 ohms or any other desired value. Shielded construction, 2 3/4" dia. x 4 1/2" overall length. Equipped with SO-239 connectors and polarized meter jacks. Cat. No. 250-24

Amateur Net **\$9.75**



E. F. JOHNSON COMPANY

CAPACITORS, INDUCTORS, SOCKETS, INSULATORS, PLUGS, JACKS, DIALS, AND PILOT LIGHTS

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listed, of which 35 are mobile and 23 with c.d. vehicle-movement cards. KFV, TUK, and FI operate the county c.d. control. DQN and BTA have improved AREC/c.d. signals with new antennas. The Levittown Radio Club operates GLO at Levittown c.d. hq. The Brooklyn AREC groups are going through reorganization and c.d. planning. DUF, Bronx EC and liaison officer for c.d. city-wide, reports activity steady and RACES plans finalized and awaiting State approval. IVX, Brookhaven Township EC, states that all emergency operations are emergency-powered and all on 6 meters. Cooperation is good with police and c.d. officials. EHA has moved to the West Coast. CFT, IVX, and CKO attended s.s.b. meeting at the IRE show. GNI, Smithtown EC, is the new president of the Suffolk County Radio Club. In the Huntington Radio Club group, PZF and VFY are on 40-meter phone; VVF is turning out many Novices via adult education program; HAE has converted a TA-12 and BRV hooked TVI via the *Handbook*. CPBKB now resides in Valley Stream and attends Nassau Club meetings. The Radio Club of Brooklyn has elected the following officers: DDI, pres.; BMK, vice-pres.; JSL, treas.; and NUO, secy. Meetings are held in the National City Bank Bldg., Flatbush and Church Aves., Brooklyn, on the 2nd Fri. of each month. New members are welcome. BJ, KN2COG, NUO, and AGW have new T2FD squashed rhombics up. LWJ, a new call in Center Moriches. The Northern Nassau Radio Club became affiliated with the League and initiated NVG, BHI, LPZ, and NEK as new members. NTR has been appointed OBS. ENW and KN2AVB have received OES appointments. BA has accepted OO appointments. KFV has been appointed OPS. K2ZD received a pin from IRE for being one of nine charter members with continuous membership since 1912. BWA, VVT, K2CCB, and BLN are new members of the New York Radio Club. LOD was the highest 2nd district ham in the WAS Contest. OUT has moved to Union, N. J. The Tu-Boro Radio Club (BMW) will be battery-powered at Mastic on Field Day. The NYC-LI 75-Meter Phone Net has moved to 3980 kc. JOA's first month in the NLI Traffic Net earned him BPL; he manages the Teen-Age Net (TAN) locally. IVS has put DSC, the N.Y.U. station, on the air and checks into ESN/SSN regularly. KQC, NCSing the Astoria Radio Club Net on 146.23 Mc. Mon., Wed., and Fri. at 1935, sends bulletins using MCW for Novice practice. AKE has an RTTY outfit that would make one's eyes pop out operating on 2 meters. ZM reports on the QCWA as follows: Net—Sun., 1100/1200, 3810 kc.; 3DF, pres.; 2TQ, vice-pres.; ING, secy.-treas.; OOTC meets Thurs., 1800/1900, 3990 kc.; Morse Net—Sun., 0900/1000, 7005 kc. BO is all set for his annual W6-Land trip this summer and is going mobile, with new rig in the De Soto. IN has started a 2-Meter Maine to Florida Traffic Net, which now covers about 200 miles. Leo reports the Teen-Age Net operates on 3630 kc. at 1730 Mon. through Fri. Your SCM will be operating 80 meters with the Lake Success Club at Amityville, call 1AA/2, for those extra message points. Traffic: W2BO 793, LPJ 533, JZX 393, ABE 203, VNJ 166, GXC 158, EC 150, JOA 149, LEO 103, GP 64, LGK 62, DIC 40, IN 34, ZM 27, OBU 25, WDT 23, DSC/IVS 15, BQM 12, RA 10, PF 8, IDE 6.

NORTHERN NEW JERSEY—SCM, Lloyd H. Manamon, W2VQR—SEC: NKD, PAM; CGS, RMs: WCL, NKD, CGG. A slow-speed c.w. traffic net has been organized by RMs WCL and NKD. The net will operate on 3705 kc. Mon. through Fri. at 2000 local time. Participation is invited from any station interested in learning traffic procedure at slow speeds. The Bergenfield c.d. group is extending activities to 2-meter operation. KXD is the proud father of a new boy. LQP also is the daddy of a new daughter. RVRC was recent host to a large c.d. personnel gathering and ham group. JOE is back from a business trip to Florida. DXD sends his monthly report from Bombay, India. He will return to the States via European points in about two months. HB9HC now is a resident of East Orange. SM5AFC, who attended Upsala College here in the States, recently acknowledged his appreciation of the many courtesies extended him by the Bloomfield Radio Club by sending the club a linen block-printed handkerchief that was issued by the SSA (Sveriges Sandare Amatorer) in commemoration of their 25th anniversary. A personal inscription from SM5AFC was added to the block print. PGX is working on marine mobile rig and expects to be on the air soon. KN2BOW recently qualified for Technician Class license. CPB is rapidly nearing completion of a new 200-watt c.w. rig for 80 meters. The old Signal Shifter no longer will stand the competition. K2BCK is working on new RTTY rig. OO reports from NIY and GVZ show a total of 30 violations logged and reported during March. N.N.J. needs more candidates for OO appointment. The increasing activity on the bands demands more rigid observation. Those interested, please drop a card to your SCM. Appointments are open for more OBS. This activity needs building up a bit in N. N. J. All bands are not adequately covered in this respect. March appointments in N. N. J. are as follows: OO—DME, NTE; OBS—BTG; OPS—NKD, K2BCK. GSARA held an auction at the club rooms on April 8th. The section is sorry to learn of the illness of one of our old-timers, AHX. We all wish him a speedy recovery. KN2CTL, of

Eatontown, is a newcomer to our ranks. We also welcome K2CTM, of Neptune. CTM held the Novice ticket for two weeks then went back for more and made it. W8JWK/2, a newcomer to N. N. J., is heard regularly on s.s.b. with an 829 in the final. ILLR has joined the ranks of the s.s.b. gang with a pair of T240s in the output stage. AWW is about ready to hit the air on s.s.b. with a pair of O4A tubes. A new trick for the old bottles, ILLR is nearing completion of a new 4-250A final to be added to the 32V-3. WSN is getting closer to s.s.b. operation. KBI has run short on hi-pass filters, and will have the old gallon back on the air soon. VLSR has revamped his Viking I, employing additional speech equipment. Traffic: W2CCS 199, CUI 191, NKD 139, EAS 128, DXD 96, K2BCK 29, W2HIA 22, CFB 8, NIY 6, CJX 4.

MIDWEST DIVISION

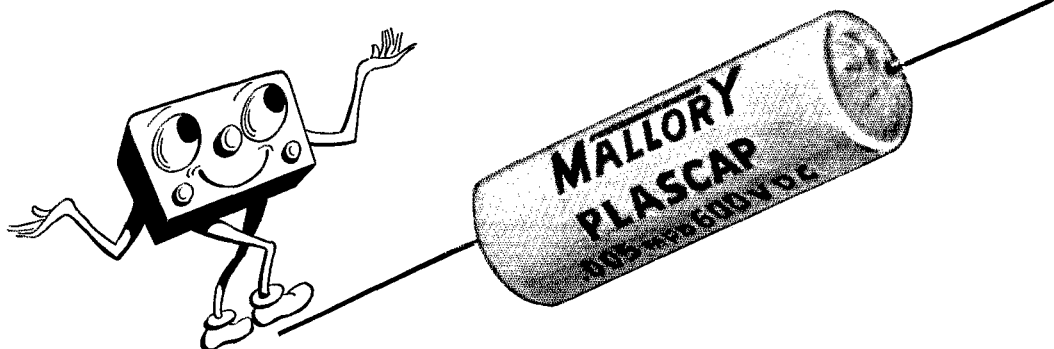
IOWA—SCM, William G. Davis, W0PP—It is with regret that I must report W0AS in Silent Keys. John was one of the real old-timers. EHH reports that he has received his MARS appointment. QVA reports that BDR was elected president of the Central Iowa Amateur Radio Club. Other officers are BDZ, vice-pres.; YNP, secy. and chief cook. FDM is getting the Indians out of his Viking. OZO is building a new rig with a pair of 813s and will use Rohman Modulation. BSQ is QNI TEN in place of PZO, who works a night shift now. SCW is having a session in the hospital in Waterloo. The newest man on TLCN is ZAM, of Grafton. ENM and QVA recently visited FP and enjoyed a visit through WOC/AM/EM/TV. SCA and BDR again made BPL Doc is going all out with his highest score yet with his connections on TLCN, TEN, CAN, DON, TCC, and PAN seven nights a week. BVE says that every time the wind is up his antenna is down. EHH used ham radio to get an emergency call through when his boy was rushed to the hospital and the land line was tied up. It is hoped that by the time this report appears you fellows will have done your duty to ham radio and voted for your SCM. For the first time since I've been SCM you will have a choice, which is as it should be. Your support and cooperation is urged for your SCM after the election. Iowa has a good record in the division because of your cooperation and activities to help keep the quality of the Iowa ham high. OM now is on s.s.b. and is enjoying it. Traffic: W0SCA 1212, BDR 955, QVA 111, BVE 100, RBZ 90, YTA 89, PZO 68, CZ 52, EHH 20, FSX 19, NYX 17.

KANSAS—SCM, Earl N. Johnston, W0ICV—SEC: PAH, RM: KXL, PAM; FNS, My sincere thanks to all you Kansas amateurs and your friends for your help in putting the license-plate legislation through the Kansas Legislature. We were told that it was the most popular bill introduced in the 1953 session. Hope to see most of you at Christy's picnic at Osage City May 24th. YFE has sold all his gear because of work schedule but soon will be mobile. LYF, of Chanute, has new mobile in the car. VBQ is working on portable 50-Mc. gear for c.d. EMY has new Viking and VFO. QQQ has new all-band antenna. IUB, VBQ, and DAE participated in the D.N. Contest. YZB is running 700 watts to the rig into 20-meter ground plane, and now has over 100 countries to his credit with 80 confirmed. WOB acquired an XYL as of Mar. 13th. FPX has moved to Meade. HAW is de-TVing the rig and making plans for Field Day. The KVRC is organizing an extensive interference committee and rushing the usual plans for Field Day. Thanks to House Bill 222 traffic reached an all-time high, with IFR, GTU, and UPU making BPL. Thanks for the reports, fellows. Let's keep 'em coming. Traffic: (Mar.) W0GTU 330, UPU 279, FUF 262, NIY 219, AFN 170, BLI 157, GEC 141, IFR 141, ICV 131, FEO 118, FNS 90, WMO 81, YOS 79, WGM 73, FSE 66, DEL 60, QQQ 56, BET 46, EOT 42, KSY 39, FHC 35, PDJ 33, FRK 22, ZGK 17, BHV 8, GHR 8, BEO 7, VBQ 7, HAW 2, JEB 2, DTN 1, GVI 1. (Feb.) W0NY 213, PDJ 22.

MISSOURI—SCM, Clarence L. Arundale, W9GBJ—SEC: VRF, PAM; AZL and BVL, RM: OUD and QXO. The Tri-State Radio Society elected the following officers: FKM, pres.; LEX, vice-pres.; Betty Davis, secy.; BUL, treas.; JEJ, sgt. of arms. UXQ has accepted a position as field engineer with Philco so is leaving Missouri. PLJ reports 144 Mc. was open one night during March and he made contacts with four call areas. ARH has built a new miniature VFO. GAR has a rig on 80 meters for use when 40-meter skip is bad. PME has finished a 40-meter converter to go with his 40-meter mobile rig. BVL missed making BPL again because of attending the I.R.E. Convention in New York. CPI hit a new high in traffic during March. CXE's operating time was curtailed because of his illness. A ham gathering was held on March 29th at QMF's with about 20 hams from the area being present. HUI and BPD visited 5VNV, HUT's brother, in Dallas. ICW has his new rig finished and on 75 meters. CPI, QXO, and JXJ again qualify for BPL. LCO has been appointed EC for St. Joseph. During 1952 a total of 17 BPL certificates were issued to Missouri net members. Current activity indicates that this year considerably more certificates will be issued. All traffic operators are urged to report

(Continued on page 82)

MALLOBY HAM BULLETIN



The MALLORY PLASCAP* Can Put New Pep In Your Old Receiver!

An average communications receiver has more than 25 paper tubular capacitors in its circuit. As a result, the chance of one or more of these capacitors becoming sub-standard and reducing the over-all performance of the set is quite likely—especially if the equipment is several years old.

As a matter of fact, there are probably many communications receivers in daily amateur service which, unknown to their owners, have gradually lost new-set pep as a result of leaking, inefficient and aged paper by-pass and coupling capacitors.

Unfortunately, sub-standard or inferior paper capacitors are not always apparent as a well-defined fault in the set's operation. A gradual reduction in gain in I.F. stages over a period of time, an occasional unexplained indication of R.F. or I.F. instability, audio distortion, or sluggish and erratic signal level meter operation may be the only outward signs that important by-pass or coupling capacitors are beginning to show their age.

When these symptoms begin to appear, it is time for drastic action. To delay, invariably means serious trouble with time off the air while repairs are made.

If there is any doubt at all about a paper capacitor in your equipment, the safest thing to do is replace it with a new Mallory Plascap plastic paper tubular capacitor, for the Plascap has exactly the kind of electrical characteristics you can depend upon. Separately molded plastic cases, pre-impregnated cartridges, special Mallotrol† impregnating oil, and moisture resistant Mallocene‡ plastic seal assures you of uniformly high insulation resistance (IR) and stable operation over the long life of the capacitor.

The Plascap is exactly the kind of capacitor you can depend on to put your equipment back in good operating condition. Ask to see it at your Mallory Distributor. In the meantime don't forget those other fine Mallory parts carried by your Distributor. They include volume controls, rheostats, pads, wire-wound potentiometers, dry electrolytic capacitors, dry disc rectifiers, rotary, push button and lever action switches, vibrators and vibrator power supplies.

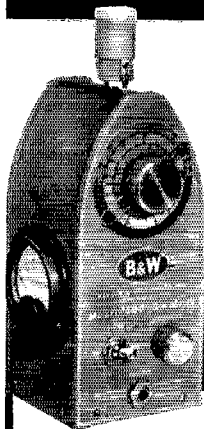
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B&W**MODEL 600**

Dip Meter



- ★ Frequency Range—1.75 to 260 MC. in 5 Bands
- ★ Adjustable Sensitivity Control
- ★ Wedge-shaped for Easy Access in Hard-to-get-at Places
- ★ Rust Proof Chassis, Sturdy Aluminum Case
- ★ Monitoring Jack and Diode Switch
- ★ Powered by 110 V. A.C. Line

New low price

\$39⁷⁵ net

A HIGHLY USEFUL INSTRUMENT FOR THE

**Amateur • Engineer • Service Man
Laboratory Technician • Experimenter**

The New B & W Model 600 Dip Meter provides you with a convenient means of doing the job in a minimum of time with dependable accuracy.

It is an extremely sensitive and reliable piece of test equipment having innumerable uses in the Ham Shack, Service Shop, Electronic Laboratory, or Production Plant.

Armed with this versatile and indispensable instrument, you eliminate the guess-work during measurement of—tank circuit frequencies, antennas, feed line systems, parasitics, and other pertinent tuned circuit characteristics, with speed and accuracy.

The handy instruction manual furnished with each instrument covers full information on how to use the Model 600 as an Absorption Meter, Auxiliary Signal Generator, R. F. Signal Monitor, and several special applications as well. See it at all leading electronic parts distributors throughout the U. S. A. and Canada; or write for descriptive bulletin.

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their traffic activity so they can receive proper credit to apply on the new Traffickers Club certificates being issued by Midwest Chix. New AREC members: W0KMW and WN0MRQ. Traffic: (Mar.) W0CPI 1185, QXO 689, JXJ 517, BVL 455, GAR 122, K0WBD 122, W0LJS 100, ZLN 64, CXE 45, JSR 43, EBE 36, GBJ 29, HUI 25, KIK 24, OUD 22, CKQ 15, GXZ 10, QMF 10, CIA 6, TGG 2. (Feb.) W0LJS 181.

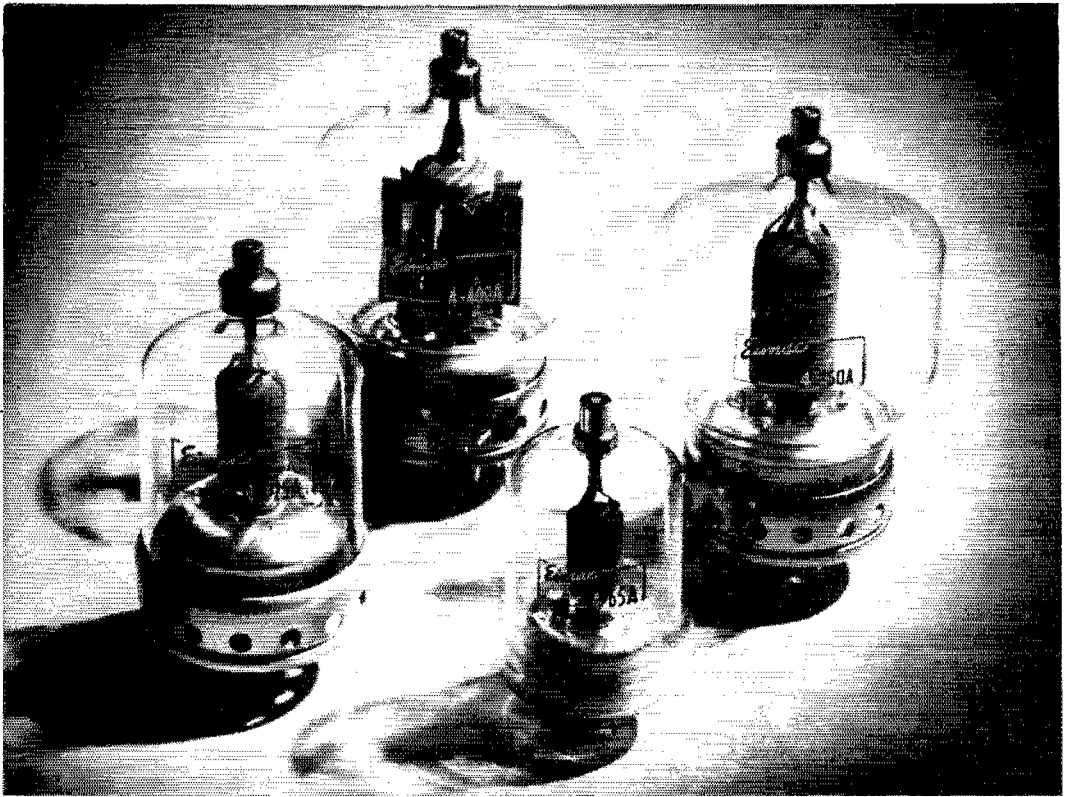
NEBRASKA—SCM, Floyd B. Campbell, W0CRH—Asst. SCM: Thomas S. Boydston, 0VYX. SEC: JJJ. RM: EUT. WN0MAO has added a VFO and modulator to his rig. KWQ is mobile with an 807 in the final. KWQ is NCS for the Cobtown Net on 28,720 kc. and also is a member of the Nebraska 75-Meter Phone Net. FQB now has a Viking II and off-center-fed antenna using Balaun Coils. FMW is ORS and is active on Nebraska 75-Meter Phone Net. RDN has received his TEN Certificate and also is a member of the Nebraska C.W. Net. TEN and CAN. KXD still is trying out new antenna for his Viking. LRK now is mobile with his Elmac and is using Morrow converter. GPX now is located at Cheyenne, Wyo. NET has a 65-foot tower for his 10-meter beam and 40- and 75-meter antennas. CBH finally has retired his S20-R for an NC-173. He worked RYG on phone for the first time. Thanks to MJK for the first YLRL report on traffic. Your SCM sure would like inquiries from fellows interested in such ARRL appointments as OBS, ORS, OO, etc. The SCM visited the Lincoln Club a while back and really had a swell time with a swell bunch of fellows. Traffic: (Mar.) W0TQD 1666, RDN 135, FQB 76, JJJ 76, VYX 53, WR 39, WBP 24, CBH 23, EGQ 18, FMW 12, MJK 13, MKP 12, HQQ 9, SAI 9, IDQ 8, QOU 8, TIP 8, HXH 6, UPY 6, ZJF 6, ERW 5, KVV 5, LUS 5, YSK 5, ASI 4, BUR 4, CC 4, TLF 2, K0FBD 2, W0HTA 2, IAY 2, JJO 2, KLO 2, WN0MAO 2, W0RYG 2, BEA 2, VPR 1. (Feb.) W0RYG 25. (Jan.) W0RYG 416.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Roger C. Amundsen. W1HYF—SEC: LKF. RM: KYQ. PAM: FQB. CN: 3640, CPN-3880, CEN-29,580 kc. SJO makes BPL again! The CN and CPN had a fine dinner at the Waverly in Cheshire on March 27th. KYQ did the hard work on arrangements and the gang really enjoyed the affair. We hope to make it an annual one. RTB has been visiting Texas, leaving IPQ batching it. HK3EO and his bride visited LIG, MZZ, and MQM. DBM is new RO for area one, with ODW, FRL, and HYF his alternates and JW, PCZ, and RTH their alternates. NFG is busy with o.d. net "India." CUH has a new job. KWK keeps 146.7 Mc. hot. ODW is visiting Texas, too. He now is hunting DX on 2 meters also. NJM works his c.w. mobile style. 2VMX/1 has a new 814 rig. AW has new modulator on 7 Mc. ZL invites all USNR personnel to join the Sunday morning net at 10 on 3675 kc. AOS sends his voluminous and very welcome annual report. RWD is planning a scouting exhibit. PXS is new president, TLZ is vice-president, and NOA is secretary-treasurer of the Stamford AREC. PCZ, founder and out-going president, received hearty votes of thanks and appreciation. NER and CTN are busy with TKA gear. SPO is active after Engineering School session. KZQ went to town in the F.M.T. KYQ renewed RM appointment for another year. As I start my second year as SCM I wish to thank all for the FB cooperation and ask that you be on the lookout for new SCM material as next April we will need a new man. I am more convinced than ever that one term is sufficient and that others should have an opportunity to try it. Traffic: (Mar.) W1SJO 505, AYC 175, KYQ 151, CUH 119, AW 97, NJM 88, FOB 84, RRE 61, RFJ 49, BDI 48, HYF 19, KV 16, QJM 16, LIG 12, EFW 10, ODW 8, WKW 8, BVB 6, ZL 6, UNG 2, NFG 1. (Feb.) W1EFW 9.

MAINE—SCM, Orestes R. Brackett, W1PTL—SEC: BYK. PAM: OLG. RM: LKP. The Pine Tree Net meets on 3596 kc. at 1900 Mon. through Fri. The Sea Gull Net will resume operation at the beginning of Standard Time after a vacation through the summer months. All the boys and girls who took part in the emergency during the very high waters which we had in the State of Maine are to be commended very highly for the splendid cooperation and assistance which was given. Many thanks go to those outside the area who made it possible to carry on by keeping the frequencies 3955 to 3965 kc. open so that many of the weaker stations could be heard. Special thanks go to SS, CPI, WUW, PBE, RNA, and 3BRC. RBD's home was damaged to the extent that possibly it cannot be used to live in again. New hams are YDA at Mapleton and YDB at Moscow (Maine). As this is the last report I will be sending in because of the expiration of my term I want to thank one and all for the wonderful cooperation which has been extended to me in the past two years. All I can say is that you out there on the airways are a swell bunch of people, and if the next SCM gets the help from all of you that I have, he really is going to do all right. It is with deepest regret that I have to report the passing of one of our very dear friends, DHD, Blair Jeffers, who died April 3rd. Traffic: W1LKP 151, OHT 79, TVB

(Continued on page 84)



Eimac tetrodes can take the overload demands of single sideband operation

Single sideband suppressed carrier operation can take a lot out of an ordinary tube. Since a signal is put on the air only when something is said, a continuously running carrier is not needed. With no carrier, it is easy to save power—but it also means high peak powers may be reached, that can frequently cause momentary overloads, when a signal is produced. Through years of dependable performance, in radar and other types of military and commercial application, Eimac radial-beam power

tetrodes have shown that they can easily meet the peak power requirements of SSB service. Through their inherent features of high power gain and ability to withstand momentary overloads, Eimac tetrodes are at home when filling sockets in SSB rigs.

Especially suited for amateur radio use are the Eimac radial-beam power tetrode Types 4-65A, 4-125A, 4-250A and 4-400A. For further information about their use in SSB, write our Amateurs' Service Bureau.

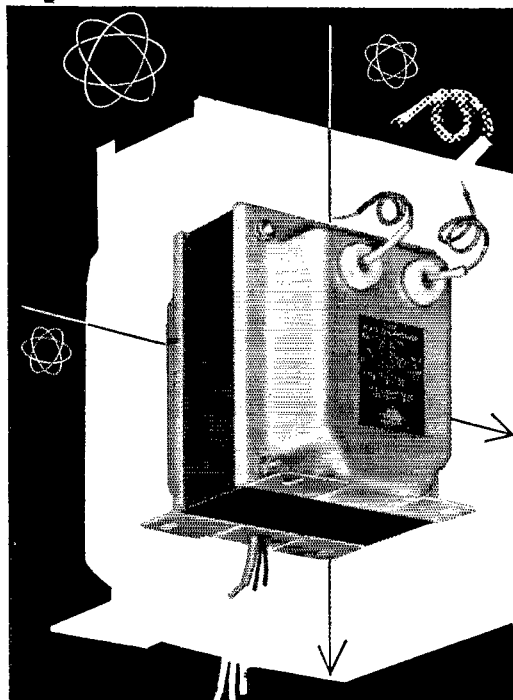
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The Triad Plate Power shown above was developed exclusively for ham use.

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Triad engineers help keep your rig modern by developing transformers best suited for your requirements. When you buy transformers, specify Triad.

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39, EFR 32, BTY 31, HXQ 30, PTL 29, BX 17, VV 13, LHA 8, SUK 5, GLZ 4, QEK 3.

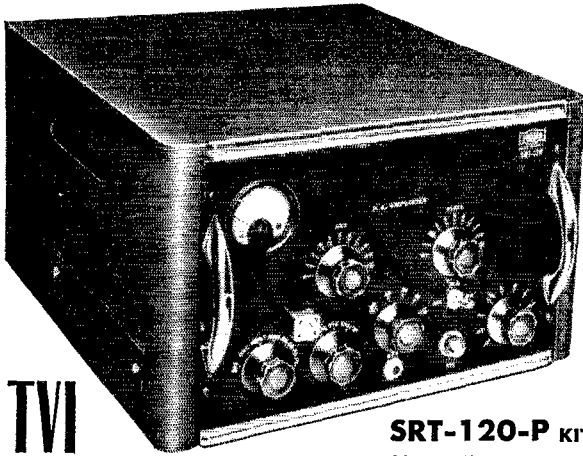
EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New appointments: VVZ as EC for East Bridgewater; AWA, UXL, and SCS as OBS; JNV and VHH as OOS; UXL as OPS; KNW as OES. Appointments endorsed: AWA North Reading, QGJ Woburn, SKN Medford, FEC Middleboro, MBQ Vineyard Haven as ECs; WI and PU as ORS; QGJ as OPS; SS as EC for Lincoln, ORS and OPS; SAI as OBS, OPS, and ORS; RDV as EC for Sharon, OBS, OPS, and ORS. We wish to extend our sympathy to SS on the death of his wife. UE is going to visit F3DY in France. LM says conditions on 40 are very bad. OPK is new secretary of M.I.T. Radio Society, MX. DMS has 300 watts with an 813 in home rig. UTH says the Teen-Age Net is on 7175 kc. at 1830 on Sat. BB worked OH3NY and ZC4XP and heard ZS3K and ZLIAH in the 160-Meter DX Tests. HIL has new Conset Super 6 converter and Elmac mobile. AF is on 28 Mc. The South Shore Club had CTW give a talk. Region 5 committee meeting was held with N/JN, KUC, TQP, KTG, DFS, OTK, BL, and RM present. WN1WPW, now in Framingham, is on 3742 kc. every morning. TOQ has 400 watts into 814 on s.s.b. The Quannapowitt Radio Assn. had a talk by PIJ on National receivers. The Wellesley Amateur Radio Assn. held a meeting at NWO's QTH. The following took part in ARRL's Frequency Measuring Test in February: BB, BCW, BSY, GDJ, QX, and THO. WAG, Taunton EC, would like some help from the hams in that city. He has WMX and DDB with him now. VVZ has TBS50D and S40AU. The T-9 Radio Club recently held a dinner and dance. AWA is working on a new antenna for 6 meters and is Net Control for Region 4. Heard on 10: TSK Chelsea, OGI Neponset. WN1WMO and VII have passed their Technician Class exams. Virginia King, VSK, now is General Class. The Gypsy Radio Club recently held an auction. FEC, Middleboro EC, has a net on every Sunday morning with JXF, KLS, LDZ, LEE, and VED. FEC is Radio Officer. Winthrop c.d. drill had DJ, OIR, MQB, CMW, BDU, HFJ, LVA, TTH, TQT on. BB now has an HFS receiver for 6 meters to check in with Revere. Frank Dodge is WJZ. LAZ attended I.R.E. in N. Y. C. YDH is a new ham in New Bedford. WGN tried 75-meter 'phone but likes 10-meter 'phone and 40- and 80-meter c.w. WKM, New Bedford C.D. Headquarters, has rig on 10 and 75 meters. NJN, State Radio Officer of Mass., attended a meeting in New Bedford. AVY was Net Control at WKM during a drill on 75-meter 'phone and had the following reporting in: AGW, UID, MNE, FXB, WG, LAZ, WGN, WU, SSS, CTZ, PWL, NSP, APN, ME, and mobile BMQ. The Hallicrafters Company, with volunteers from the Eastern Mass. Radio Club, had a message center at Jordan Marsh Company store in Boston. SZQ's call was used. Those helping were SS, AMO, PST, KKP, SZQ, URT, AT, RFE, TY, TTY, UVN, HKB, MBB, HOL, URU, SPL, UPZ, BCW, and MWX. BBP, AUU, OKE, MME, and ALP took part in Radiological Team drill with BL at Region 5. DFS, Somerville, was heard on with a good signal. GOU has a new beam for 20 meters. JYC, Sudbury EC, has a Viking 1. TVZ applied for OQ Class IV appointment. VYI and WSN are heard on 10 meters. Traffic: (MND) WISZQ/1825, BGW 1509, SS 450, MX 209, EMG 180, TY 123, UE 92, SMC 76, UXL 70, LM 60, DMS 51, AVY 36, UPZ 25, BY 21, WU 14, RSE 12, SCS 8, UTH 8, BB 6, HWE 5, HIL 2, TNK 2. (Feb.) W1UE 132, MX 50. (Dec.) W1MX 60.

WESTERN MASSACHUSETTS — SCM, Roger E. Corey, W1JYH — SEC: KUE, RM; BVR, PAM; RDR. WMN meets at 7 p.m. Mon. through Fri. and WMNS at 8 p.m. Mon., Wed., and Fri. 3560 kc. TVJ has built a 40-meter crystal converter for his BC-454 with good results. Congratulations to WN1YDP, the XYL of MND, who is the section's newest YL licensee. UVI keeps skeds on WMNS and MHT. YCE dropped the "N" from his call and is active on 80-meter c.w. YCG also has his General Class and is on 80 and 40 meters from Amherst College. BDV now is experimenting with a gating modulator. COI reports new second harmonic, input and output variable, changes bands often. MUN, RLQ, ULE, QQO, OJV, JYH, MND, and BKG took part in the F.M.T. and scored in that order. UYX is a new member of the section from W2. KIWA/AA1WAV now is on the air from the Springfield Armory with TCM, MNG, WDK, and WCV checking into the MARS nets during the lunch hour. Other MARS stations in Springfield are PHU and QUQ. JYH has a new, to him, HRO-5TA1 and is looking forward to the next CD Party to give it a workout. QWJ has an s.s.b. crystal lattice filter under construction and has finished a receiver using a Signal Slicer network. EHH has a new 6-meter mobile in operation using a 2E26. Appointments as ORS, OPS, OO, OBS, and OES are available to all interested ARRL members in the section. Are you taking advantage of the increased operating enjoyment they offer? Drop me a card for full information and application forms. Also, if your community does not have an EC now is the time to recommend one or volunteer yourself. Traffic: W1BVR 134, TVJ 112, DVW 41, HRV 41, TAY 35, HRC 15, MNG 14, JYH 13, RLQ 8, UVI 6, MVE 3, BDV 1, MND 1.

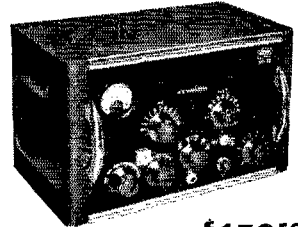
(Continued on page 86)

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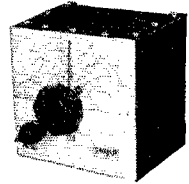
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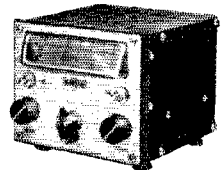
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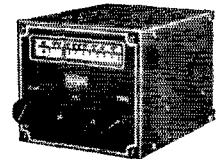
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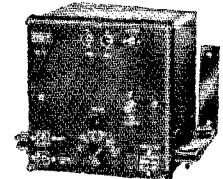
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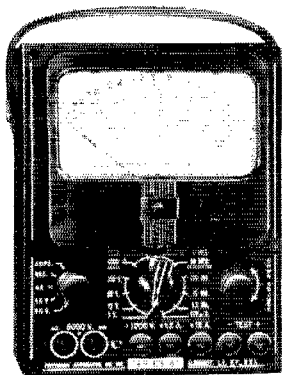


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NEW HAMPSHIRE—SCM, Carroll A. Carrier, WIGMH—SEC: OAK, RM: CRW, PAM: UNV. The Nashua Mike and Key Club has elected the following new officers: QJH, pres.; OMZ, vice-pres.; RYD, secy.; QHS, treas.; TZF, act. mgr. The Club's class has paid off with three more Novices. Suppose you have gotten out the portable gear for Field Day? CDX has built up an FB Rockingham County Emergency Net on 3685 kc. at 10:00 a.m. Sun. UAB is in the Army in Texas and through the kindness of QJH has been able to talk to his folks in Nashua. VAX has a new rig on 80- and 40-meter c.w. New appointments this month: WBM as ORS, TWP as OPS, UJL as ORS, VGX as ORS. What about getting your application in for an appointment? What is really needed is more OO appointments. Now that there are so many newcomers on 'phone, why not send in some suggestions to YFM, our Asst. Comm. Mgr. for 'Phone? Her bulletins are most interesting and contain many good suggestions. CVK has rigs on 80 through 2 meters as well as 75-meter 'phone in the car. Traffic: WICRW 593, POK 60, GMH 40, QJX 20, CDX 19, IJW 15, UNV 7, FZ 4, RJL 3.

RHODE ISLAND—SCM, Merrill D. Randall, W1JBB—SEC: MIL, RM: BTV, PAM: BFB, RIN meets Mon. through Fri. at 7 P.M. EST on 3540 kc. KNE, who has been away at school, has rejoined RIN. R. I. C.D. Net meets Sun. at 10 a.m. on 3993 kc. Sorry to report that OIK, who has ably guided the destinies of R.I.C.D., has had to resign because of the serious illness of his mother. BBN has assumed his duties as Net Control and OMC has taken over as RO for Middletown. Both jobs will be capably handled! PRA's recent election results show SGA, pres.; BLL, vice-pres.; AEI, rec. secy.; VXC, corr. secy.; KKE, treas.; and ex-ASZ in charge of publicity, with TQW, KKR, and OGT named as directors. A glance at each of their operating skeds indicates that all of the above may be reached almost every evening on 2 or 10 meters and most of them operate on all bands. ULG does not recommend BCR as an air guide for mobile equipment. While following BCR's over-the-air directions to BCR's antenna farm—or should we say aquarium—ULG's car, a tow truck sent by BCR, and a passing good samaritan all had to be pulled from the puddle into which BCR guided him. Traffic: W1BTV 26, BBN 14, OIK 14, BVI 9, TGD 7, KNE 2.

VERMONT—SCM, Raymond N. Flood, W1FPS—SEC: NLO, RM: OAK, Asst. RM: TAN, PAM: AXN. NLO has taken over SEC duties as JEN is QRL. AXN has a new Viking II. The Tri-County ARC elected new officers as follows: RWP, pres.; NHJ, vice-pres.; UJL, secy.; TXN, treas., and DAQ, act. mgr. CGX has new NC-183D receiver. The Middlebury Mike & Key Club has received its Charter from ARRL. The Caledonia ARC will sponsor the Vermont ARRL Convention this year which will be held some time in August. Watch QST for details and date. The 2nd International Field Day and Family Picnic will be held Sun., June 28th, at Bay-side, Malletts Bay, 7 miles north of Burlington, co-sponsored by the Montreal ARC and BARC. Officers of BARC are TZL, pres.; TZM, vice-pres.; NLO, secy.; and SEL, treas. The BARC has organized a QRM/TVI committee. Traffic: W1RNA 237, OAK 95, NDB 45, AVP 34, FPS 29, IT 26, AXN 20, TAN 14, EIJ 9, TXY 1.

NORTHWESTERN DIVISION

ALASKA—SCM, Glen Jefferson, KL7NT—KL7ATN, at Ladd Field (Fairbanks), advises that he is available with a 'phone patch for traffic in the Ladd Field-Fairbanks Area. He has a rhombic on all bands. The call-letter license-plate bill passed Territorial House and Senate and at this writing awaits final action by the Governor. The bill will authorize call-letter plates for those amateurs who have mobile equipment installed in their automobiles. The All-Alaska Hamfest for 1953, sponsored by the Anchorage Club, has been set for Aug. 8th and 9th, and preliminary plans suggest that it will be held at Paxton Lodge. Formal announcement will be forthcoming.

IDAHO—SCM, Alan K. Ross, W7IWU—Coeur d'Alene: A nice letter was received from KOG, who moved from Grangeville the latter part of February. Lewiston: OOW reports schedules on American Legion, FARM, and OEN Nets. His XYL, OOV, has applied for OBS appointment. New officers of the Lewiston, Clarkston Amateur Radio Club are OOW, pres.; IDZ, vice-pres.; OOV, secy.; treas.; and POZ, reporting secy. Craigmont: RSZ writes he is on 3.5 and 2 Mc. now, having cracked his 3648 crystal, with his old Novice frequency left—3726 kc. Boise: The Ten Meter Net is having hidden transmitter hunts frequently. NVO is OO and is teaching school now. We have an opening for Phone Activities Manager, so let's have some nominations. Traffic: W7NH 198, MKS 18, FIS 7.

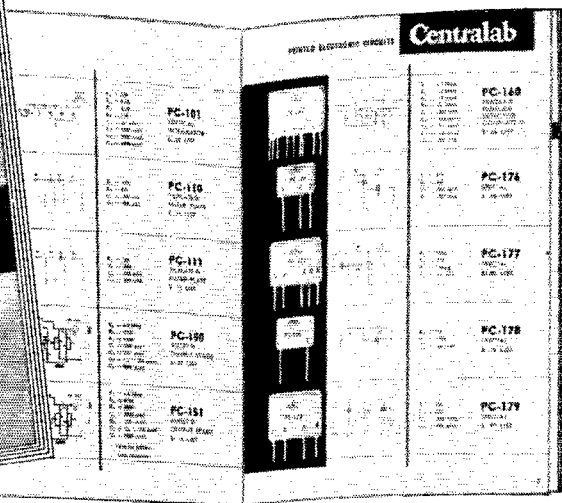
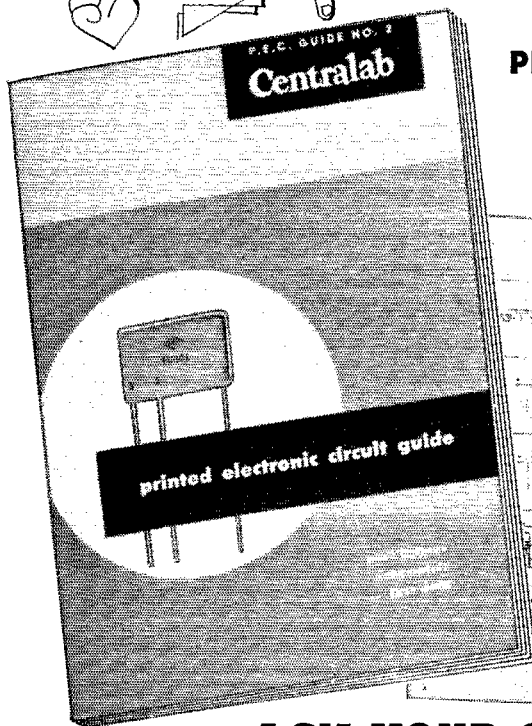
MONTANA—SCM, Edward G. Brown, W7KGI—The Glacier Hamfest will be held July 18th and 19th at Two Medicine and the Big Springs Hamfest at Big Springs, Idaho, Aug. 8th and 9th. The Great Falls Club has 25 members who are attending its code and theory classes. The Club also plans a lot more emergency activity. OVG is leaving Great Falls to go to x-ray school in St. Paul and plans to sell his equipment and go mobile. KUH, who

(Continued on page 88)



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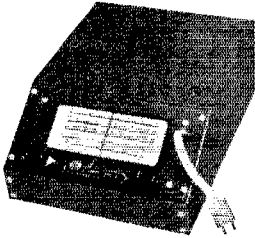
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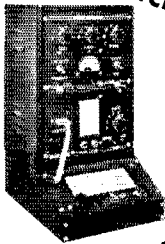
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recently moved to Great Falls, attended his first club meeting there. MBM, who has spent two years in the South Pacific, also attended. NGX has his transformers rewound and is back on the air. SFK is new Official Observer and plans to monitor mostly in the 'phone bands. WN7RSJ, WN7RSK, and WN7RSI visited SEW and WN7TAV at Malta and WN7RSK and WN7RSI bought a Viking I from SEW and plan to work 'phone when they make their General Class licenses. SBTY/7, now in Miles City, has received W7TKB as his new call. New calls are WN7TGF, Lothair, WN7TGG and XYL, WN7TGH, and WN7SZY, Brady. CT still needs attendance on MSN. Traffic: (Mar.) W7CT 18, OPM 10, BNU 4, (Feb.) W7CT 21.

OREGON — SCM, John M. Carroll, W7BUS — Oregon apparently will get ham license plates this year or as soon as details are ironed out. Fine cooperation from all over the State made it possible with no hitches appearing. PRA advises activity on OEN, OSN, and CTN. The Rogue Valley Club had its Annual Covered Dish Dinner at Ashland, with hams from Grants Pass and Klamath Falls attending. Norman Vance has been succeeded by EZR as secretary of the RVR Club. HJU advises that GOO, FNX, EBQ, COZ, QJC, RQN, PJK, EJU, and ACY formed a civil defense organization in Astoria. The Slow Net has a good bulletin for information put out by TH. The Pacific Area Net News is a fine reference for net operation and traffic-handling. For information, write PIX. The Cascade Traffic Net shows increasing activity. Traffic: W7PPG 51, AJN 40, PKN 32, PRA 28, HJU 10.

WASHINGTON — SCM, Laurence M. Sebring, W7CZY — SEC: BTY, RM: FIX, PAM: PGY, PYV had a bonfire in his rig when some insulation broke down. FGQ has been appointed EC for Spokane County. GBU and PXA visited FFD in Walla Walla and AIG in Freewater. PPM and MGG are going to school at W.S.C. JKF, who works at KHQ-TV, got a severe shock and was hospitalized. SBA is chairman of the Spokane TVI committee. OZZ passed away. OOV, OQW, and POZ, from Lewiston, were visitors in Spokane. PXA has cox vertical on 10 meters. KCU has more than her share of TVI, ITV, and TV troubles. FWD sends code practice on 3695 kc. at 1740 PST. LJM has new wide-spaced 14-Mc. beam. MUF was off the air because of trouble in his 32V-2. AIB installed new antenna coupler which improves his transmission and reception. LVB is back on the air with a 5514 in the final. HMQ, GWK, and MTX are the TVI committee for the VARC in Puyallup. EHJ is the boss at VARC Field Day, with OEB as publicity chairman. HMQ reports that the Club is only two members short of being 100 per cent ARRL. JJK is home from the Army. MCU is in KC6-Land with a Collins layout. PFZ is at Chanute AFB. PXY works 75 meters with a 15-watt rig. TGO is a new operator in Sumner. OEB has a new location with no noise level and is out after DX. NRB resigned as PAM. New PAM is PGY. DND is having modulation trouble on 20 meters. BA has new all-band VFO mobile. CO has a new home rig on the air. KZP installed mobile in his Plymouth station wagon. VI visited A6USA in San Francisco. IGM is on 20-meter 'phone. MSI is North King County RACES Radio Officer. NGF was promoted to Brigadier General of the Washington National Guard. JNC has new QTH and is building new rig. CBE built a new loop for mobile direction finding that includes selsyn-controlled indicator. King County amateurs furnished communications for the annual Sammamish slough outboard motor races. FIX is fighting parasites in his 813 rig. AEA and KKN are much in demand at TV service meetings to tell what is happening at KTNT-TV. Traffic: W7BA 942, CZX 378, PGY 314, PYV 312, FIX 292, KCU 116, FRU 94, BG 89, OE 84, OEB 73, AMC 64, AIB 47, RTQ 47, BLX 39, RXH 38, FWD 27, HNA 26, QOU 21, ETO 20, LVB 13, APS 12, GAT 9, EAU 6, CWN 5, SKT 5.

PACIFIC DIVISION

HAWAII — SCM, John R. Sanders, KH6RU — The HARC is mailing every KH6 a return postcard form for registering intent to attend the coming August Convention at Honolulu. This is going to be a big deal! Don't miss it! The Maui Club is holding a 7-Mc. 'Phone QSO Contest. The Hilo Club is continuing its amateur training classes. ARL is backing a move to revive the Territorial Radio Board. QH has returned to Oahu after a couple of years with the USAF. ARA is returning to W2-Land. DK will spend a year training at WWV. *Far Pacific Area*: 1VZL and 5QDF now are sole operators at KG6FAA, 9LHB having returned to the States. BPL for the month: KG6ACH, FAA, KH6AJF, KA6HQ, and KA7LJ. Traffic: (Mar.) KG6FAA 4003, KA7LJ 1277, KH6AJF 1134, KA6HQ 620, KG6ACH 122. (Feb.) KG6FAA 3270, KA6HQ 623.

NEVADA — SCM, Ray T. Warner, W7JU — SEC: HJ. ECs: KOA, LGS, NWU, OXX, TJY, YO, and ZT. OPS: JUO. RSY is starting a new antenna farm at his new QTH in Las Vegas. OXX now is mobile with an Elmac in his new station wagon. LHQ is Justice of Peace and Fire Chief at Overton. WN7IGK is a new Novice in Boulder City. JU is attempting to give West Coast stations on 144 Mc. a Nevada QSO with a 522 transmitter and 24-element beam. DVJ, in Las Vegas, is showing interest in 144-Mc. activities. WN7THH is the latest Novice in Gabbs, giving NWU some

(Continued on page 90)

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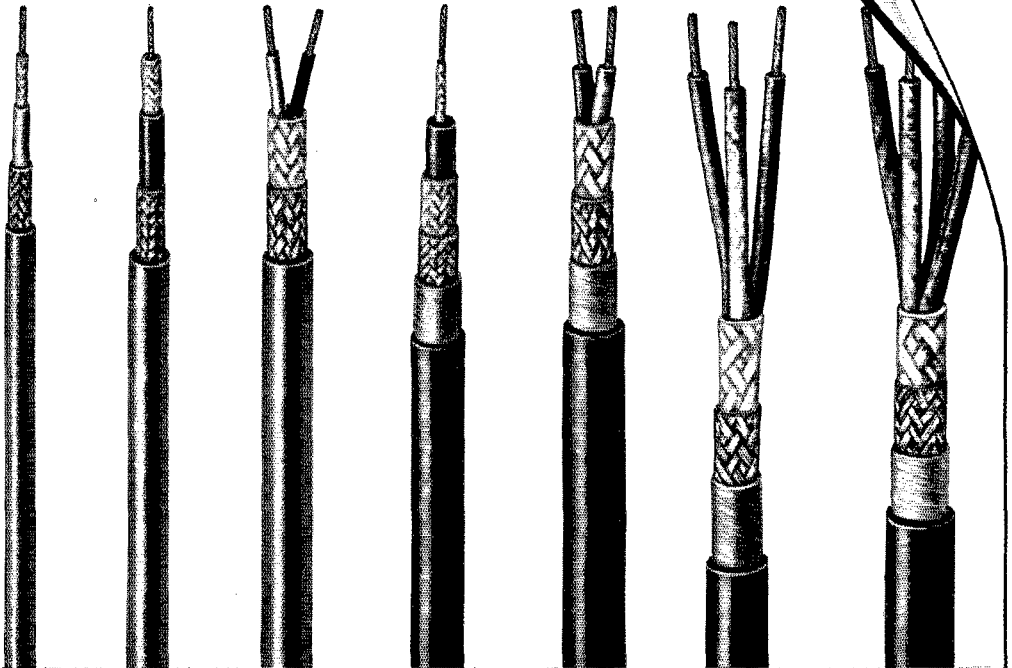
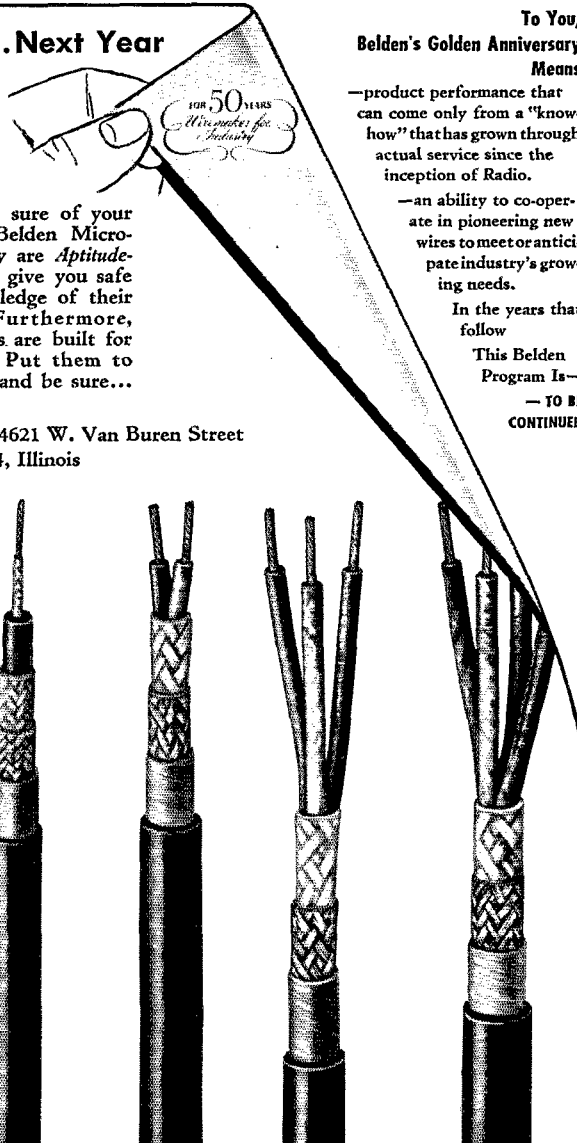
—product performance that can come only from a "know-how" that has grown through actual service since the inception of Radio.

—an ability to co-operate in pioneering new wires to meet or anticipate industry's growing needs.

In the years that follow

This Belden Program Is—

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No. 8411
Nominal Capacitance 37 mmf per ft. Use particularly for lapel microphone.

No. 8401
Nominal Capacitance 25 mmf per ft. For crystal, ribbon, carbon microphones.

No. 8422
Nominal Capacitance 32 mmf per ft. Use specially for carbon microphones.

No. 8410
Nominal Capacitance 33 mmf per ft. For crystal, ribbon, carbon microphones.

No. 8412
Nominal Capacitance 68 mmf per ft. Use specially for carbon microphones.

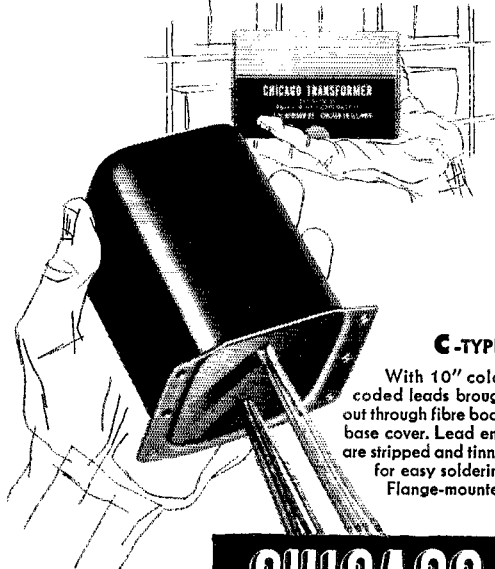
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Nominal Capacitance 54 mmf per ft. Use particularly for carbon microphones.

No. 8424
Use for interconnecting power cable for all electronic uses. Also microphone cable.

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Radio WIRE

The
Aptitude-Tested **LINE**

inside this package on your Jobber's shelf...
is the world's toughest transformer



C-TYPE

With 10" color-coded leads brought out through fibre board base cover. Lead ends are stripped and tinned for easy soldering. Flange-mounted.



there's nothing tougher than
CHICAGO'S "Sealed-in-Steel" construction



H-TYPE

Hermetic sealing meets all MIL-T-27 specs. Steel base cover is deep-seal soldered into case. Terminals hermetically sealed. Ceramic bushings. Stud-mounted unit.



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Steel base cover fitted with phenolic terminal board. Convenient numbered solder lug terminals. Flange-mounted.

CHICAGO "New Equipment" transformers (available in 3 mountings) feature one-piece drawn-steel cases—the strongest, toughest, best-looking units you can buy. The one-piece seamless design, enclosing an electronically perfect construction, provides the best possible electrostatic and magnetic shielding, with complete protection against adverse atmospheric conditions. For every application: Power, Bias, Filament, Filter Reactor, Audio, MIL-T-27, Stepdown—ask your electronic parts distributor for CHICAGO "Sealed-in-Steel" Transformers—the world's toughest with that extra margin of dependability.

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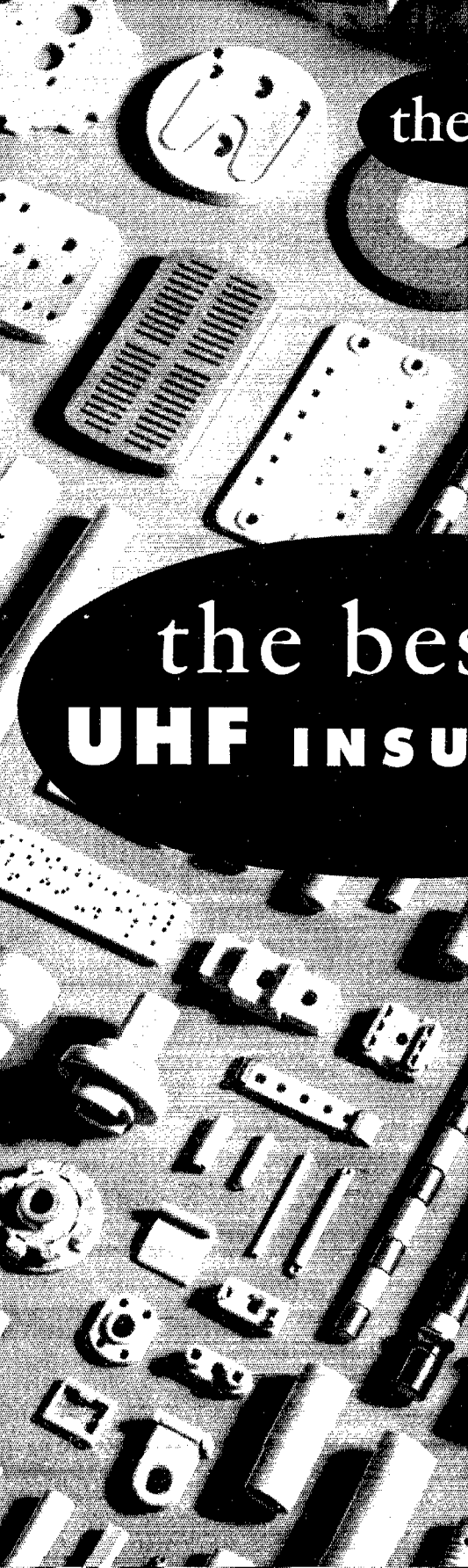
company. KOA has had another jr. operator added to his brood.

SANTA CLARA VALLEY—SCM, Roy L. Couzin, W6LZL—Clubs are swinging into high gear preparing for the coming Field Day in June. Committees are being formed and rigs are being planned according to the power to be used. MMG reports in with a slack month of operating but manages to keep his sked with BAN active. UKM now is pounding brass on 40 meters. CBX still is sending in those swell F.M.T. reports and his accuracy is amazing. IUUV reports in with very little activity but is keeping active on emergency net. AIT reports that he received a copy of PANV and liked it very much. WMM finds that working for a living is interfering with ham radio so retiring is in order. NTQ is happy to report the arrival of a new YL jr. operator named Jody Ann. YHM sends in a traffic report that really shows some effort and time consumed, also the XYL is feeding the OM so as not to halt the steady flow of traffic. OFJ still is handling traffic but has gone into hibernation with his night work. BPT is out of the hospital now after an operation and we hope getting well fast. The NPEC held two meetings this month, both business, but discussed a means of interesting more hams to attend the meetings. Field Day plans were made. The MBRC held its meeting at the Naval School, where Prof. Cooper spoke on antennas. The SCCAA had at its meeting JDD, who spoke on transistors. Bob is from Pacific Tel. and Tel. Co. Traffic: W6YHM 1061, OFJ 49, AIT 9, NTQ 4.

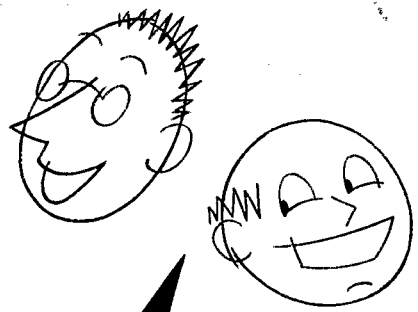
EAST BAY—SCM, Ray H. Cornell, W6JZ—Aast. SCMs: Guy Black, 6RLB, and Harry T. Cameron, 6RVC. SEC: WGM, RMs: IPW, JOH. East Bay still needs a PAM. Any suggestions? The AREC now has a total of 76 members. We could use a lot more than this. WGM has plenty of application blanks, so how about it? There will be a real humdinger of a c.d. drill on June 13th, involving eight western states. JZ now is c.d., communications organizer for Albany. Listeners to QYR's nightly show on KABC wouldn't be surprised to hear anything—even a little s.s.s.c.! The Mt. Diablo ARC now has a monthly newspaper, the *Carrier*, with IHR as editor. The Northern California DX Club's *DX'er* reports that most of the Club's 55 members are contest-groggy, and are not sending in enough news. Give the editor of your club paper a break. He works hard, and probably enjoys digging up the news, but he surely needs your help. Keep him happy and enjoy a good club paper. The Valley Mobile Brex now meets at El Monte Drive In on the first Sun. of every month. HMQ is back from being a KG6. LGW is training Novices in Alamo. The American Legion Amateur Radio Net has put out a swell list of disasters where amateur radio furnished the only means of communication. The Skyriders have had another election: ANK, pres.; ELP, vice-pres.; TM, secy.; Mrs. NCL, treas. The Skyriders sound like a club where the XYLs have a good time, so if yours is down on ham clubs try bringing her to this one. Among those with the construction bug lately are JOP, ASN, BSY, YSX, GIZ, CGG, TI, UHM, and RLB. We are sorry to report that RDA is very ill indeed. PWR was heard on 75 meters. FAQ has recovered from a bout with the microbes. EY hid the transmitter on the SARO's second HT hunt of the year. UHM and JZ enthusiastically recommended K6BJ's "tuna fish can volt-meter." Write to K6BJ at Eimac for details. The v.h.f. gang is sharpening its fangs for the V.H.F. HT Hunt at the Coyote Point Hamfest in June. The East Bay Radio Club meets the 2nd Fri. in City Hall, Solano Avenue, Albany. Everyone is welcome. The Club's new secretary is QIF, new TVI chairman is 0HTG. WZR is a prospective 2-meter mobile. If your Field Day chairman does not have a set of the revised rules for the CCRC Field Day Trophy Award, write at once to LZL. Traffic: W6IPW 243, YIJ/6 109, JOH 97, HHX 41, EJM 5.

SAN FRANCISCO—SCM, R. F. Czeikowitz, W6ATO—JU 7-5581. SEC: NL. PL 5-6457. *Eureka Area*: EC: SLX. Congratulations again are in order for GQY. His results in the ARRL Frequency Measuring Test were excellent, the official results showing his readings had an average accuracy of better than 54 cycles per million—an accuracy suitable for appointment as a Class I Official Observer. He also has received ARRL Public Service certificate for his work in the Arkansas-Tennessee tornadoes. SLX reports that a slide took out the telephone company wires for a 10-hour period, and that CWR handled its traffic, while FYY handled traffic for the Weather Bureau and the Northwestern Pacific Railroad, for which he received a letter of appreciation from the R.R. BZK and FQS handled the other end of the circuit. As mentioned in last month's notes, the Eureka Area group did outstanding work during the very disastrous floods of January. Those in the San Francisco section to whom great credit is due are BME, SLX, FYY, YUH, JSY, CWR, EQQ, KTV, BJO, BWV, CHP, and HBI. In the Sacramento Valley section: GOS, JVU, KTF, IQP, NCV, OMR, RQL, SIY, and REF/6. In the Oregon section W7a KZU, BTF, EJJ, and QYS at Coquille did an FB job of Net Control each night. LRU and others whose calls are unknown also contributed to a good job well done. BZK and FQS stood by in Marin County. The Humboldt Amateur Radio Club meets the 2nd and 4th Fri. in the YMCA rooms, Municipal Auditorium, entrance on "E" St., Eureka. *Marin Area*: EC:

(Continued on page 92)



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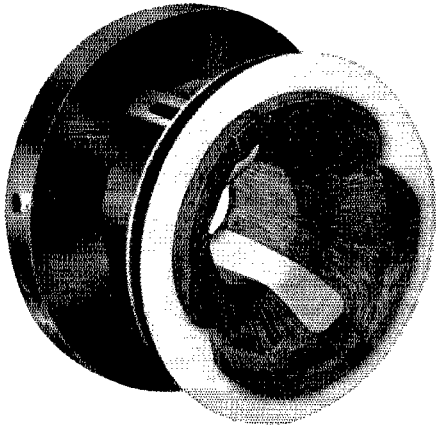
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KNZ, Tamalpais Club EC: ZUB. Hank Alvernaz advises that the Tamalpais Radio Club will work operator shifts around the clock on Field Day. BZK and FQS assisted in the Eureka flood emergency, with BZK handling traffic for the Weather Bureau, Southwest Airways, N.W.P.R.R., and P.T.&T. Guests at the last meeting were WNJ and WQI, as well as a father-and-son combination, WN6PSG and W6MWF. The Marin Radio Club had an interesting talk by John Hecomovitch on 2-meter construction, with a sample of his well-known 2-meter transceiver on exhibit. The Marin Radio Club meets the 2nd Fri. in the American Legion Hall, Larkspur. The Tamalpais Radio Club meets the 3rd Fri. at 7 Loma Ave., Tiburon — the home of OZC. **San Francisco Area:** EC: RYS. PHT and GMO, both XYLs, now are General Class licensees. RBQ is beaming with pride over the licensing of his daughter as WN6FJD. All are invited to check into "The 20'ers Net," meeting Thurs. at 8 P.M., on 29,000 kc. FVK is Net Control. GQA is OO, Classes III and IV. Mobileers are invited to attend the regular 1st and 3rd Sun. morning breakfast meetings of the Bay Area Mobileers, usually held at Perkins Fine Foods, 1700 Bayshore, Redwood City. The SFRC has lost its president, UEV, who has moved to Atascadero. GGC is the acting president. The thanks of the TVI committee are extended to the Cathay Radio Club for its generous donation to further equip the committee. The SFRC meets the 4th Fri. at 71 Lakeshore Plaza, opposite 34th Ave. and Sloat. The HAMS meets the 2nd Fri. at 1625 Van Ness Ave., Red Cross Bldg. **Santa Rosa Area:** EC: LOU. The SCRA meets the 1st Wed. in the Board of Supervisors room, County Court House, Santa Rosa. Traffic: W6GQY 224, PHT 9, PIH 9, BIP 8, ATO 7.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — ARR has 4E27 in the final; he is EC for Alt. Shasta, Calif. ZGA is on 40-meter 'phone. HRF has new 75-meter antenna. FNU's beam still is on the ground. NQA is about ready to leave the Novice ranks. FKI is enjoying 40-meter 'phone and is using the T2ED antenna. IRA is on c.w. OMR has installed TVI filter on his rig, has 3 new countries, and has received ORS, OPS, and OBS appointments. ILY is on 40-meter 'phone. DDC is giving 40-meter 'phone a try. NFX received a fine report on his Frequency Measuring Test. AF is back in the running after a long illness. CFU is a traveling man for the S.P.R.R. and doesn't get on very often. FYK has moved to the Sacramento Valley section. CIS has been on the road with very little time for ham radio. The Tall Pine Net is back in the running and will convene at 0930 Sunday mornings. The Mt. Shasta Club is making great plans for the Mission Trail Round-up June 27-28. McCloud reports three new Novices. KN6AOQ is a new ham in Chico. JRY has moved to a new house and has a special radio shack over the garage. The GERC held a successful auction. K6AKF is a new ham in Redding. Let's all read QST for April, page 59, then another article starting on page 74, then get on the ball, gang. We want to build up the Sacramento Valley section, but need the help of all, so let's hear from everyone next month. Traffic: W6JDN 25, ILY 8, OMR 3.

SAN JOAQUIN VALLEY — Acting SCM, Edward I. Bewley, W6GIW — As most of you know by now our SCM, FYM, has moved to Wilmette, Ill., near Chicago, and is employed by the Motorola Corp. He has appointed me Acting SCM and I hope I can uphold his confidence in me. Howard made a five-day trip to Turlock and the TARC enjoyed seeing him again at the March 31st meeting. He says he likes his new work but likes the WX in California better than in W9-Land. He is active on 7 Mc. and 14-Mc. 'phone and c.w. as W6FYM/9. EXH reports increasing activity on SJVN in spite of poor conditions. GRO achieved very good results in the February F.M.T. LAZ now is a member of MARS. MSU announces the Teenager's Net on Sun., 1 P.M., 3580 kc. UWY and RRN are active in CAP work and would welcome interest from local hams. QER is new president of TARC, replacing FIP, who had to resign because of new work assignment. The Fresno gang is working hard on the coming hamfest. That's it for this month, gang. Send me those reports. Traffic: W6EXH 61, GIW 12, OBA 4.

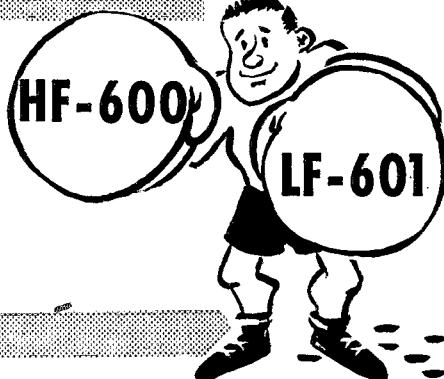
ROANOKE DIVISION

NORTH CAROLINA — SCM, J. C. Geaslen, W4DLX — Reports were very thin this month so this column is likewise. AKC had to resort to 40-meter 'phone to get the annual DUG traffic out of his system. Joe also made BPL again this month. Congrats. RRH has been made NCS on TCPN: Tues. and Thurs. nights. Brad, ex-JPY, now is KP4TF and checks in on NCN, MWH, Roanoke Division Director, has appointed the following as Asst. Directors: AKC, DLX, and ZG. The THN gang has been giving the SCM some traffic reports; keep it up, gang, and let's have more of them, including activity reports. Traffic: W4AKC 527, RRH 133, ANU 29, TMV 14, DXG 6, DLX 5, CVQ 4, GOB 2, WDI 2, PZH 1.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — NTD is the Rock Hill EC and reports that local plans for emergency are being prepared and being coordinated with the civil defense office. The Florence Club has organized a permanent TVI committee that is

(Continued on page 94)

A TWO-FISTED WAY TO BEAT T. V. I.



TELEVISION interference may be due to short wave broadcasting stations, amateur radio transmitting stations, diathermy equipment, X-ray equipment, automotive ignition noises or similar sources. The basic problem of eliminating this interference is that of rejection of the signals received from these sources. Interference to television receiver reception caused by transmissions from an amateur station can be caused by harmonics or by shock excitation from the transmitter. The shock from the transmitter fundamental can be cured at the television receiver with a Bud HF-600 high pass filter. Harmonics can be greatly reduced or eliminated at the transmitter by use of a Bud LF-601 low pass filter.

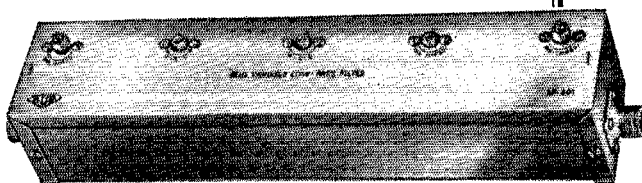
BUD LF-601 LOW PASS FILTER

Harmonics can be greatly reduced or eliminated at the transmitter by the use of a BUD LF-601 low pass filter, which has the following characteristics:

1. Minimum attenuation of 85 decibels on all frequencies above 54 megacycles and a minimum of 93 decibels above 70 megacycles.
2. Maximum rejection is adjustable from 60 to 90 megacycles. This tunable feature provides two slots at least 100 decibels down on any 2 TV channels.
3. The cut-off frequency is 42 megacycles.
4. The unit will easily handle a full kilowatt modulated on a reasonably flat line.
5. The insertion loss is less than one DB.
6. Since the design of this filter provides an adjustable feature, the unit can be used with either 52 ohm or 72 ohm coax.
7. Each inductance is in an individually shielded compartment.
8. All capacitors used are variable.

Size 12" x 2½" x 2¼"

Bud LF-601 Amateur Net — \$13.95



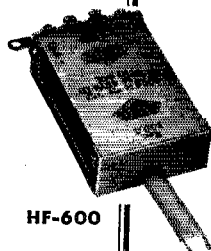
LF-601

BUD HF-600 HIGH PASS FILTER

The HF-600 high pass filter is designed to have a cut off frequency at 42 megacycles, thus this filter rejects signals from 0 to 42 megacycles. It is within this range that the majority of signals causing interference would be received. Since there is no attenuation above 42 megacycles, picture strength or quality is not affected. This unit is easily installed on the T.V. set.

Size 3¼" x 2½" x 1½"

Bud HF-600 Amateur Net — \$3.00



HF-600

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A valuable
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The INSTRUMENT FOR HAMS — has numerous transmitter applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design and many others.

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Covers the 80, 40, 20, 11, 10, 6, 2 and 1 1/2 meter bands. Complete coverage from 2-250 MC.

Easy one hand, one unit operation. Convenient thumb wheel drive of tuning condenser leaves one hand free for making circuit adjustments. No tuning head and meter with connecting cable to worry about. It's compact — case only 2 1/2" wide x 3" high x 7" long.

All plug-in coils (rack included) are wound and calibrated — no coil winding, drilling, punching, forming or painting to do — all fabrication is complete, and the kit goes together smoothly and easily.

The 500 microampere Simpson meter movement and sensitivity control allow operator to set instrument for easy detection of dips on all ranges. Instrument is transformer operated for safety. You'll like the appearance of this kit with its baked enamel panel and crackle finish cabinet.

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approved by the FCC and is working satisfactorily. TSU is building a 75-meter mobile rig. MPR has a Globe King 2V1B/4 is a student at the College of Charleston. WN4ZFR is a new ham in North Charleston. TTG is the Emergency Coordinator for Orangeburg County and is building a 500-watt rig. YQB has a Viking on the air from Clover. Official Phone Stations and Official Relay Stations are appointed upon application to the SCM. These appointments entail an agreement to operate according to approved practices. Every ARRL member in South Carolina not now holding one of these appointments should request application blanks from the SCM. The Anderson Club planned to have the Deputy Director of Civil Defense for South Carolina as its guest speaker for Mar. 27th. Traffic: W4ANK 138, TSU 17, EDQ 14.

VIRGINIA — SCM, H. Edgar Linddauer, W4FF — FV finally crashed the BPL with a nice 568. In a speech before the Washington Chapter of Sojourners, Maj. Gen. Ed Lynch, USAF, known to us as EMJ, gave a good account of ham radio and its value to the country in technical, military, educational, and social aspects, a medium of good will between persons of all nationalities. PWX informs us he will be moving to Norfolk and has relinquished the job of proxy of the Washington Mobile Club to BOP. Harrisonburg is organizing a Novice club sponsored by OWV. RVO now is in Landover Hills, Md., as 3USW. UCN sports a Viking II. It will push the ether through a true matcher automatic tuning device under construction. KFC has returned to Virginia after 6 weeks on special assignment in N.Y.C. Week ends found Vic pounding the contest hours at his home rig, however, FF and NTZ operated on a shift basis, assisting HQN in the DX Contest. PNK tried out the rig at 3GRF while the latter teamed up with ESK on special location at Leesburg. The Frankford Radio Club was out in front by a large margin over PVRC. The latter's best effort to date over a period of years still wasn't sufficient to tame the Pennsylvania Medalists. Roanoke Division Director MWH's conference of Asst. Directors and SCMs at Danville was attended by AKN, NV, IYC, ZD, DLX, BPD, KX, DX, and FF. JRR, who introduced MWH to ham radio a decade ago, was on hand to admire his protegee in the role of top man in the Division. Records still are soaring in the section. This time 45 stations submitted traffic reports and topped a previous high of 35. 6CIW/9, ex-NUU, QSOed over a salad bowl on two recent luncheon engagements, accompanied by FF. Traffic: (Mar.) W4FV 568, SEJ 301, JOT 143, KRR 127, JJK 119, TYC 87, UWS 83, GR 77, JAQ 75, KX 60, FF 59, RJW 55, MWH 52, SAD 51, NV 43, JAU 37, UHG 33, RTV 31, KRX 29, WAB 24, KSW 20, AKN 18, CFV 18, OWV 18, PWX 17, RDJ 17, JZG 16, IYI 12, LW 12, MCY 11, SWA 9, SPE 8, VUY 8, K4WDS 8, W4KMS 7, LJE 7, KFC 6, GQL 4, LK 3, HQN 2, JUJ 2, (Feb.) W4JK 56.

WEST VIRGINIA — SCM, John T. Steele, W8MCR — RIO has been appointed Civil Defense Officer to assist Lt. Col. Ziekafosse in future RACES work within the State. YPR has completely rebuilt and again is active on the air, now working to get the mobile going for the summer. CD appointments went to EMG, AUJ, CIB, ULJ, DFC, and GLX/UEB, all appointed March 20th to run concurrently in new CD set-up. VCA has forsaken 10 meters and now is heard on 75 meters. Congratulations to the Tri-State Amateur Radio Assn. of Huntington on becoming an ARRL affiliated club. The Club secretary is FUM. AUJ reports TVI trouble. The W. Va. Phone Net is away out ahead of WVN in traffic this month, 114 to 77. Traffic: W8AUJ 460, ETF 42, HXG 21, GEP 16, FYD 15, EVR 6, WSL 6, FGL 5, HZH 5, AEN 4, DPF 4.

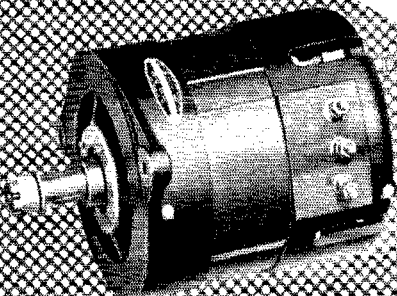
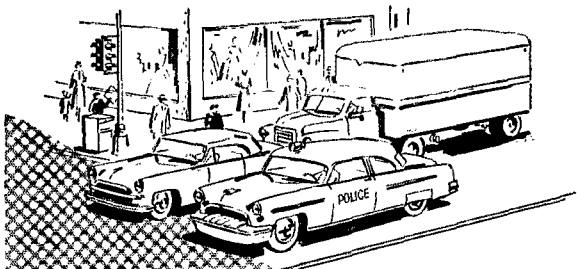
ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Karl Brueggeman, W0CDX — SEC: AEE. We wish to welcome AEE into the fold as the new Colorado SEC. Hank took over from KHQ, who did a wonderful job for us. COP won the transmitter hunt put on by the El Paso Radio Club. CMO, WPK, RCU, CQU, HKE, and FAN are active on 2 meters. GMB has moved to the Springs from Denver. He has a new ham shack and plans to let the family live in what he doesn't need for his equipment. OWP reports a new ham club in Brush, with SFS as president and CAM as secretary. APK has his 6146 TVI-proof exciter with a constant running VFO finished and can really work break-in with it. 9NLZ/6's new call is NST. He is monitoring 7275 kc. for the Chicago and Green Bay gangs. AZT gave a nice talk at the last Denver Radio Club meeting on how to snag DX. IO is the Denver Radio Officer for RACES. SLN has been in the hospital with a heart attack. IC, our Director, made a flying trip to Washington, D. C., and had quite a time getting acquainted with the gang back there. He then flew to Minneapolis to meet Mr. Dosland. BWJ was his pilot from Minneapolis to Denver. Don't forget the Rocky Mountain Convention at Estes Park on June 20th and 21st. See you there. Traffic: W0KHQ 736, EKQ 407, APK 66, OWP 14.

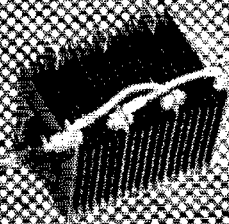
UTAH — SCM, Floyd L. Hinshaw, W7UTM — GN, Ogden EC, has appointed SU as his assistant. Carl advises of the formation of a new e.d. net on 29.6 Mc. with the following QNS: SU, NAV, NIA, QNV, NHQ, and NZZ; net times Mon., Wed., and Fri. at 0200 MST. #EAT/7 is (Continued on page 36)

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Job!*

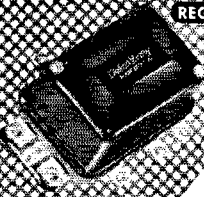
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Application packages for popular makes of cars and trucks are now available. The conversion job is simple, complete and profitable. For further details and for application data, call on your nearest United Motors distributor.

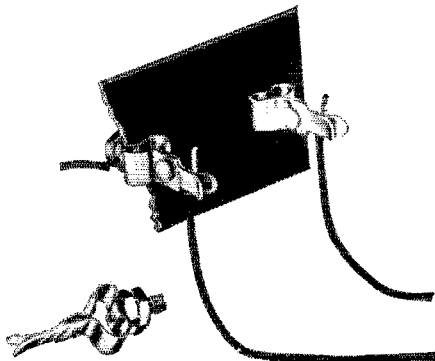
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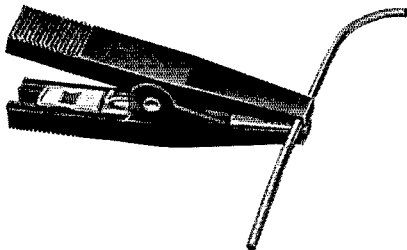
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rebuilding and experimenting with series gate modulation. NXC is working on a new shack and power supply. SP advises of a joint meeting of the Salt Lake City and Ogden Clubs in April to meet our new Rocky Mountain Division Director, Claude Maer, Jr., WIC. The Ogden Club has a new Onan generator and BC-348 receiver and is preparing for establishment of a club station to be located in KOPP's building. TVL is using all his spare time repairing the "one-eyed monsters." DAD again is in Salt Lake City. CB is going FB in the Salt Lake City Area with the 10-meter mobile net, and the auxiliary police boys carrying most of the load. PJS is working on new s.s.b.s.c. rig. NOE has moved to Saltair and is giving SP strong competition. CEI has moved to Idaho. Traffic: W7UTM 152.

WYOMING — SCM, L. L. Daily, W7JDB — Mr. Daily, W7JDB, has resigned as SCM in view of transfer to Denver, Colo. On his recommendation Marion Neary, W7KFF, has been asked to serve as SCM until ARRL members complete nomination and election of an SCM under the League Rules for SCM elections that appeared in April QST. Notice soliciting nominating petitions appears elsewhere in this issue.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW — KIX continues to pursue his traffic hobby with remarkably effective results being felt on AENB, SUF, OAO, EJZ, and KIX have been reporting into RN5. MVM presented the first OO report this writer has seen in his many years as SCM, and more reports would be welcome. MVM is getting a high fever about s.s.b. OAO has enlarged his net activities to include MARS, NQK in the chorus and PPK in the orchestra helped with a recent presentation of Verdi's Requiem. RLG has qualified for ORS, TVM is affiliated with AENB and QIN, and still is not satisfied with the rebuilding he did on his rebuilt VFO. UHA still keeps at the top of the traffic score, answering AENB, TLL, DON, RN5, RN4, VN, and TCPN. Weekly code classes are under way at UJJ, also more de-TVing has been accomplished. UJJ now is MARS affiliate. WN4YPC started and officiates at the Novice Net on 3715 kc., the old AENB frequency, and information about crystals can be obtained from your SCM. All Novices and ex-Novices are invited, urged, and expected to QNI. The Huntsville Club now meets at Redstone Arsenal. The Huntsville Novice Net meets Tues. at 7:30 on 3735 kc. TKL and RQS now meet AENP regularly. Traffic: W4UHA 204, KIX 92, RLG 76, UJJ 66, PPK 20, OAO 12, TVM 11, MVM 7.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — WN4YOX advises that the Novice Net meets on 3727 kc. each Sun. at 2:00 p.m.; WN4YCS is NCS. The Florida 'Phone Traffic Net handled 317 in March. All on 144 Mc., advise me for new listing, please. WS has retired as NCS for Emergency 'Phone Net and HUY has taken over. Daytona: RWM reports two c.d. drills with good results. Ft. Meade: SVB reports he and FIO, CPG, and NAK mobilized for reported storm nearby for good practice run. Gainesville: The Gator Club officers at University are UQC, OWX, TPU, OGI, and SVX. Jacksonville: The JARS set up downtown on Armed Forces Day to relay to overseas relatives. UHE was in charge. HKR sports an HRO-60, QJC rebuilt with a 4-125, and the BEAM relays the news that the Atlanta Hamfest will be held Aug. 30th. Key West: Club station LLO is getting a face-lifting by WN4YUQ and others. EC KOH reports AREC activity is good, and BCZ (the OM of KOH) is polishing rocks for all emergency frequencies and their jr. operator now is WN4ZIG. TZS is on s.s.b. on 75 meters. EJD will be s.s.b. AT got 32V-3. (TVI won over his half gallon.) BHJ uses 32V-2. SWI is AEC for mobiles and WN4YUQ is talking up emergency net for Novices. Lakeland: AVQ will direct the club's theory course. SVB, MVY, VIE, and UDB will demonstrate amateur radio at Florida Southern. Miami: WYR has dropped the "N." IEH is on s.s.b. IEH and MVR set up Dade Emergency Net on 28 Mc. MVR is EC for Dade. The Flamingo Net hamfest hidden transmitter hunt used "Detroit" walkie-talkie a la MVR. DRD makes BPL again. UJX is using Lettine 240. Orlando: TVQ got NC-125 and WAC! WGR reports a Novice net on 3735 kc. New Port Richey: KJ and UMJ worked in Pinellas c.d. drill. Clewiston: PJU makes BPL again. Traffic: W4PJU 534, FPG 288, DRD 250, PZT 204, WS 123, LMT 108, TKD 79, DDW 55, TFR 51, KJ 33, FWZ 31, RWM 29, SJK 29, AXX 8, TVX 7, IYT 5, WGR 5, TVQ 4, IM 3, SVB 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE. QK has VHF-152 and SCR-522 for 2-meter rig. DAO is going great guns on 75 meters. RZV is Net Control of the Dagwood Net. UTB is being transferred. KZ5TB was a visitor to the section. SZH is a civilian again. BKVX now is in charge at K4FAR and is increasing power. KWM and POT have new telegraph poles. NJH has added new antennas to mast — TV antennas. PLE is nearly ready with the big rig. RKE is putting 110VAC in the car. UXW now is QRming Eglin Village. ROM is active in new car but not on the air. RSP and MS are looking at s.s.b. SUQ has left our section. SWF is in the market for mobile rig. UNE operates 25 hours per day. PQW is starting TV camera. AXP is finding out things

(Continued on page 98)

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about the 7-Mc. band. VCB is enjoying 21-Mc. 'phone. FHQ keeps old 7-Mc. c.w. skeds on 'phone. ODO is QRL camera. GQM spends 90 per cent of his time ragchewing. Traffic: W4GQM 4.

GEORGIA—SCM, James P. Born, jr., W4ZD—The following certificates have been endorsed: As OBS, MZO and NS; as ORS, HYW, KSZ, KGP, KFL, MTS, BOC, K4WAR, and ZD; as OPS, MZO, NS, BOC, and FBH; as OO, IMQ, KL, and HDC; as OES, FBH and ZD. KL is doing a swell job as OO. Congratulations to the Atlanta Ten 'Phone Net on the FB job they did in furnishing communications and handling traffic for the Naval Air Station and Dobbins Air Force Base when a plane crashed near Roswell, Ga. A letter of appreciation was received by the net from the Commanding Officer of the Naval Air Station. The Camp Gordon Radio Club and the Augusta Radio Club will hold a joint hamfest July 25th and 26th at Julian's Casino in Augusta. AAY is chairman of the hamfest committee. The Kenneloochee Amateur Radio Club's hamfest will be held May 31st at Lithia Springs, Ga. A Johnson Viking II will be given to some lucky attendant. LNG was guest speaker at the Atlanta Radio Club's April meeting and gave an FB lecture and demonstration on the design and construction of amateur audio equipment. KSZ has returned to the air after an absence of two years and is conducting a code class for hams in the Columbus Area. WN4ZDL is a new ham in Atlanta. WKL has a new 28 Mc. over 14 Mc. beam complete with 60-foot tower. YUM is rebuilding. FBH now has worked 100 KZ5s for a certificate. MZO has a new 3.85-Mc. antenna. Traffic: W4USA 1962, K4WAR 1161, W4ACH 120, ZD 43, MA 36, OPE 18, UMM 12, MTS 9, OPE 6.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: HZ, GP, BR, RD, AZ, NJ, RA, PW, PJ, and ZK renewed AREC memberships. CH has new Lettine transmitter and National 54 receiver on 75 meters. DJ is working 40-meter 'phone with new half-wave antenna. RC has new Harvey-Wells transmitter. PZ changed to end-fed antennas. HN has de luxe 20-meter beam. UB built 829 final 829 modulator transmitter for all-band operation. TZ, a new station on 3925 kc., uses Elmac transmitter. TP bought 150-B from RD. AL resumed activity after several years' layoff. JM has an HRO-60, a Viking I, and 250-ft. antenna. RP is building broad-band exciter. SK put up 136-ft. Window antenna. New officers of PRARC are MS, pres.; GP, vice-pres.; RA, secy.; BV, treas.; CN, CY, DJ, HZ, and RD, directors. DC has been appointed to civil defense committee. PW has been requested to act as amateur liaison to civil defense. ZP5CB is vacationing in KP4-Land. DV is repairing BV's TBS50. OB now has BC-610 on all bands. PJ finished assembling Viking II. DN has returned from W-land TV course. JC, at Ramey AFB, received Extra Class license. RK received WPR-50 certificate. KD made ten 160-meter contacts during the DX Contest. RL was the only representative of West Indies in the February F.M.T. Traffic: KP4DJ 4, KD 2.

CANAL ZONE—SCM, Nelson W. Magner, KZ5NM/W4QBS—Effective April 15th the KZ5 traffic watches were changed: 21,325 kc. will be monitored daily at 1215 EST; 28,900 kc. will continue to be monitored daily at 1700 EST. WZ with a four-element and GD and DG with three-element beams on 21 Mc. are working lots of DX. RD has ordered an s.s.b. exciter. GS, at Coco Solo, maintains watches on 14- and 28-Mc. 'phone bands Mon. through Sat. 1530 to 2000, Sun. 1300 to 2000. RT became the owner of NM's 10-meter mobile rig when his XYL, LM, consented to installing her Elmac in the family car. ML thanks the St. Petersburg, Fla., gang for their daily contacts with FL and JD while she and her sister were there during the serious illness of their father. Traffic: (Mar.) KZ5AA 759, WA 94, ML 66, DG 31, FL 28, NM 26, NN 20, KA 10, RM 8, (Feb.) KZ5AA 508, WA 55, ML 49, FL 32, NN 17, RM 4.

SOUTHWESTERN DIVISION

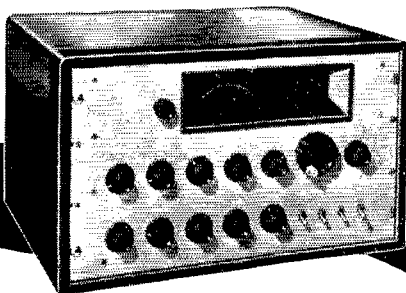
LOS ANGELES—SCM, Howard C. Bellman, W6YVJ—Asst. SCM: Bill Coe, 6KWQ, PAM; QR, RMs: FMG (LSN), GJP, and JQB. Acting SEC: YVJ. 5PXW/6 wants his OBS appointment transferred from Louisiana. LZS, from Nashville, is in town and needs appointment. DPL has leave of absence from OBS duties until June. KYV made BPL in February and March, and handles loads of traffic as accurately as conditions permit. ZRZ, crack NCS American Legion Net, is OBS. UTE is OO. Another OO is LGP. K6EA reopened ORS privileges. HPV applied for OO appointment. PZN, of Bishop, is a brand-new ORS. OI renewed EC appointment. LSN report shows 24 sessions, 278 station check-ins, traffic total 276 for February; for March 26 meets, 225 check-ins, total 279 messages. CAK received Section Net certificates. There are 23 ORS appointees in our section now. These stations nominated and elected the SCM this trip: KWQ, ICG, WII, UTE, LGP, SRJ, KTH, NVI, and 18GB/6. WJE converted his BC-348 to 110 volts. These boys qualified in the February F.M.T. for Class I OO: CIX, CK, CBO, CJ, YVJ, K6FA, W6YSK, VG, and GKZ. Class II qualifiers: DCD and YUY. Honorable mention to entrants who did not qualify goes to LHY, ENR, KA, and LKF. Sure would like to have some more
(Continued on page 100)

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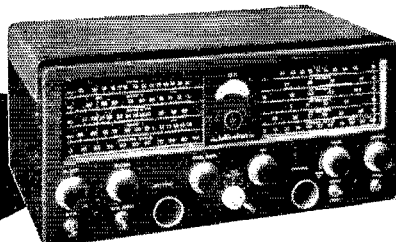
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00s. HIF is a Santa Fe railroad man and operates from the caboose. Wow!! DAD is leaving the U.S.S. *Rupertus* to be a civilian and wants club information. QJW is busy in c.d. PMJ took over Mt. Lee and JYP and AWI will rehash antenna farm. A new voice at this Region 9 control is VDT. IHD is looking forward to new TV station. Did I report that right? EPL has a new grid-dip oscillator like that in March QST. MU has Gonset Communicator and new Collins 32V-3. RBW reports on the UCLA Radio Club: The transmitter is de-TV'd and on the air. The 20-meter beam blew down but now is up atop a 50-foot tower on the Engineering Bldg. Code and theory classes are conducted for those desiring Novice tickets. MMU is on 2 meters with 90 watts. RBW is going to W2-Land to make cross-country schedules. EBK wants OBS and OO appointments renewed. YHF reports on a farewell party for ZQI to send him to KH6-Land. ZQI was the founder of MCAN-4, and enjoyed a successful send-off. PIB and the American Legion Net are working like dogs to get license plates for us. If California doesn't get them, it sure won't be because of laziness on their part. A visit to the Glen Area Net was rewarded by a down-to-earth discussion of changing the name to correspond with state-wide civil defense requirements to give the club its own call letters. SCR made the introductions and OKN was in charge. ICG is in and out of the hospital. NJU has a new vertical. KYV likes traffic on a mill. KW visited the 50 Club at Whittier. COZ reports the Tri-County Assn. call is K6AGP. HIF is in Oregon. Traffic: (Mar.) W6KXV 2092, NTN 241, GYH 211, LYG 166, CMN 149, QJB 147, QR 146, BHG 130, HIZ 118, FMG 112, DPL 105, CAK 95, YBF 95, MDA 94, UGA 85, QJW 66, BLY 63, K6EA 38, W6GJP 26, HKD 16, CK 12, ESR 12, COZ 11, CBO 10, HIF 9, NJU 7, NCA 5, YVJ 5, DTY 4. (Feb.) W6JQB 59, CAK 56, (Jan.) W6HKD 12.

ARIZONA—SCM, Albert Steimbacher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZT; Dr. John A. Stewart, 7SX. SEC: OIF. RM: JZJ. PAM: KOY. Arizona Phone Net: Tue. and Thurs., 7 p.m., 3865 kc. Arizona C.W. Net: Mon., Wed., Fri., 8 p.m., 3515 kc. Phoenix Net: Tue., Thurs., 7 p.m., 29 Mc. Tucson Net: Nightly, 8 p.m., 29 Mc. Tucson 6-Meter Net: Mon., 7 p.m. Arizona MARS: Tue., Thurs., 9 p.m., 4925 kc. Arizona Restricted-Speed C.W. Net: Mon., Wed., Fri., 8 p.m., 3700 kc. Phoenix had another successful Don's Trek into the Superstition Mountains in quest for the Lost Dutchman's Gold Mine. Fixed and mobile communication was established by the following: JYH, KOY, LDS, MAE, OIF, OTQ, OYK, PFC, QZZ, and RIJ. We regret to announce the passing of two of our very active net members, PXC, who was killed in his Aero-Mobile in a crash near Phoenix, and MDK, who died of heart trouble. KOY, our PAM, requests that all stations who can conveniently do so, monitor 3865 kc, daily at 8 a.m.—12 Noon and at 4 p.m. for the purpose of dispatching traffic during these hours rather than at regular net times when QRM and QRN are at their maximum. Again, your SCM requests that appointees please send in station activities reports. Traffic: W7KOY 215, PDM 59, LVR 34, FQZ 27, PKU 10.

SAN DIEGO—SCM, Edgar M. Cameron, jr., W6FJH — Asst. SCMs: Thomas H. Wells, 6EWU; Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6D1N. SEC: SK. Asst. SECs: WYA, FOP, EC: DEY. RM: MUE. PAM: JPM. FJH awarded JPM a PAM certificate at the San Diego AREC picnic held at Felicita Park in Escondido. FJH would like to have an RM and PAM in Orange County, as well as in the El Centro region. OFT will blast forth with ARRL-organized code practice drills. TZB now is overseas. SK informs us that the San Diego Mobileers have elected ZUM as president, and BZW as secretary-treasurer. The mobile gang will convene every Sun. at 1130 and will hold a breakfast on the last Sun. of each month at 0800. AREC worked with the Coast Guard on speed-boat races. HRI sparks Chula Vista c.d. KSI is c.d. work-horse for the county. FOP is AREC for 75 meters and WYA for 10 meters. Local R. I., UDU, pitched in with an FB turnout of the gang from all over the section to work out the horrors of TVI. ZJO gave top accounts of his personal experience with TVI. Twelve Novices at IAC, high school radio club, are working hard on General Class theory. QBM advanced from Technician to General Class. QPN cooled Technician Class exam. QBN is enjoying the privileges of General Class. He worked KH6 on 80-meter c.w. with his 75 watts. FJH now is on 2-meter mobile. The Escondido Radio Class and Physics Class went on a field trip to the telephone company's "cool" microwave installation on Mount Palomar under the guidance of GDC, who is local telephone company engineer. MUE is struggling for a bit of sleep between c.w. traffic net work. EC DEY reports plenty of activity up in Orange County on 2 meters, and OHK is working on 420-Mc. gear. SAK now is General Class. An FB job is being done by QZQ, ICN, and OZO as TVI committee of the Orange County Amateur Radio Club. Traffic: W6LAB 5607, YDK 447, MUE 24, FCT 8, CHV 4.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, William J. Gentry, W5GF — Asst. SCM: Thomas B. Craig, 5JQD. SEC: QHL. RM: BKH. PAM: IQW. ROH finally has worked all

(Continued on page 108)



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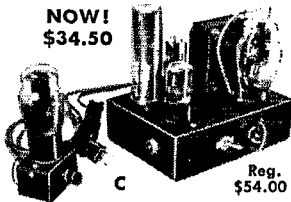
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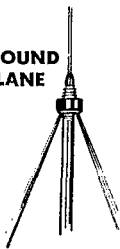
10 Meters. CO-10	\$29.95
6 Meters. CO-6	\$19.95
2 Meters. CO-2	\$14.95
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(4 element for RG-8U)

2 Meters. SC2	\$34.95
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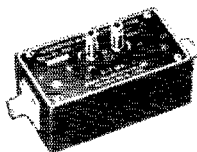
40 Meters.....	\$35.00	15 Meters.....	\$25.00
20 Meters.....	\$30.00	10 Meters.....	\$25.00

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states. UZM is building a new VFO and re-TVing his transmitter. WHB is building a new receiver. The Abilene Amateurs are to be congratulated on the fine job they did with the Knox City disaster. Central Texas Amateur Radio Club of Waco has a new 5-kw. Koehler power plant. The Club's new station call is ZDN. JQD has a new transmitter. GF has all calls for his antenna tuner now. Traffic: W6FKD 436, PAK 274, VEH 119, TFB 102, AUJ 74, RRM 67, VRX 39, SRG 19, UZM 19, JQD 14, AVT 10, RGH 67.

OKLAHOMA — SCM, Jesse M. Langford, W5GVV — SEC; AGM, RM; MQI, PAM, SVR and ROZ. The Easter Pageant at Lawton was held in cold and rainy weather, cutting the traffic total down considerably, but some excellent planning had been done and the gang could have handled any reasonable amount of traffic. Thanks to RN5, CAN and the other groups and individuals that worked through Saturday night and into Sunday in order that the traffic might be kept moving. WAH is using a pair of 818s. WN5ZAJ is a new Novice in Edmond and PYW has a new 813 rig. TKI has a new TBS50-D and is working all bands. NVD has a new 75A-2. ADC is working on 2-meter converter and transmitter, and also is trying to get the TVI out of the new VFO. The Holdenville Club has its plans for Field Day ready. ORH was 24th in the Sweepstakes. Another 2-meter warning net has been formed between Hobart, Lonewolf, Carter, Sayre, and Mayfield. A mobile club has been organized in Oklahoma City. TEI has new mobile and is working on an 80-40-meter c.w. rig for emergencies. The Green Onion Net now is in full swing daily on 75-meter 'phone each noon. GVS is recovering slowly from his illness. The Blackwell gang has a trailer house complete with 5-kw. generator and 300-watt transmitter ready for use in emergencies or for civil defense. HXC and HFW are working with the local authorities regarding civil defense. HFW now is using a Viking II. Traffic: W6GZK 291, SWJ 100, ROZ 99, MRK 81, SVR 74, QVV 60, TEI 60, PML 51, MQI 37, KY 35, GVV 34, TFP 22, VHP 16, FRB 13, MFX 12, OQD 11, ORH 10, EHC 9.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — The Houston gang has been busy making arrangements for the 7th Annual ARRL National Convention, to be held at the Shamrock Hotel July 10-11-12. NHB still is TVI-proofing the rig. NIX reports 3.5 Mc. was FB in the DX Contest. ACL has a new NC-183D. ABQ is building a new mobile rig. MN is over the top in traffic. UUK worked 28 countries on 20 meters in two months. WN5WZF is the first Novice in the MARS Novice Net. LSE is going to town with kw. to 100THs. BVF reports from Galveston that locals active on 160 meters are OGG, TRE, TOM, and BVF. URW now is in Woodville and is active on MARS. RFG is trying for a better antenna system for his 32V-3 and 75A-3. HQR reports: The Corpus Christi Radio Club sent AQK, BKG, HQR, TEL, and YCV on Padre Island Mar. 27-28-29 to handle traffic for the 100-mile walkathon up Padre Island from Point Isabel to Bob Hall Pier at Corpus. JHW, YJB, MVY, RLC, ONG, and OOG helped relay or clear traffic to other towns. Mobiles were operated by IFU, GMT, PMT, QKF, and RKR on the upper part of the Island. Fifty-five messages were originated and 15 were received and delivered. The Corpus gang included EV, GMT, LMU, PMT, QEM, QFA, QKF, RKR, UUI, WID, WPC, and YGL. At a recent meeting the HARC elected SDA, pres.; VWF, vice-pres.; FEK, treas.; VHR, secy. VHR now is on 75 meters with an armchair. Zone 2 of STEN had its annual picnic at Conroe Air Port April 12th. JYM and EEX found the hidden transmitter. Some of us got together and organized the Drag Net, a mobile net for South Texas, which meets on 3855 kc. from 7:15 a.m. to 9 a.m. and 4:30 p.m. to 6 p.m. FQQ is Net Control and LHJ is Alternate. All fixed stations, please leave 3855 kc. open for mobile use. The Port Arthur Radio Club has a swell publication, *The Monitor*. FCD and BUZ, both DX men, are fighting TVI. BUZ is communications officer in the TSGRC. FCD has 32 countries. WN5WRW worked KH6 on 3.5 Mc. with 21 watts. UUQ reports: APX added WP8 and a G6 to his 80-meter DX. VOM has a new rig. WRE is working on an antenna coupler. WPL has a new 1/2 vertical on 40 meters. UUQ finished a new modulator, is on 40-meter 'phone, is going to put up a 1/2-wave 40-meter doublet and is rebuilding his antenna coupler. ZAT found that his call had at long last arrived. Traffic: K5FKF 1617, W6MNI 1593, QFA 54, AFZ 49, ABQ 15, N1Y 6.

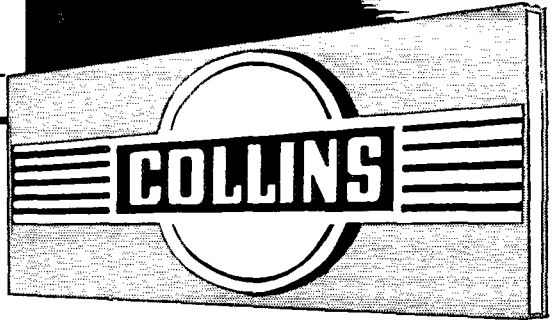
NEW MEXICO — Acting SCM, Dick Matthias, W6BIW — Senate Bill No. 136 was passed by both houses and signed by the Governor, making call-letter license plates for amateurs in New Mexico available to all who wish to pay the \$3.00 above regular price of their car license. First ones will be issued sometime after July 1st. The following have gone portable/mobile with new Elmac transmitters: WPA, LLG, and FVY. RWH still is sweating out results of his XYL's exam for ham ticket. AKR reports he has spent many hours helping Novices. BIW Net Control for New Mexico 75-Meter Emergency 'Phone Net is back on the air after a few weeks' absence while he was putting the new Viking II transmitter kit together. The Mesilla Valley Radio Club at its first meeting in March elected the following officers: SAZ, pres.; VLZ, vice-pres.; UMO, secy-treas. At its second meeting in March the members heard an interesting talk and saw films on Guided Missile Photog-

(Continued on page 104)



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Gonset Communicator	199.50
Morrow 3BR \$64.95; 5BR	74.95
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Elmac PMR6A mobile receiver	134.50
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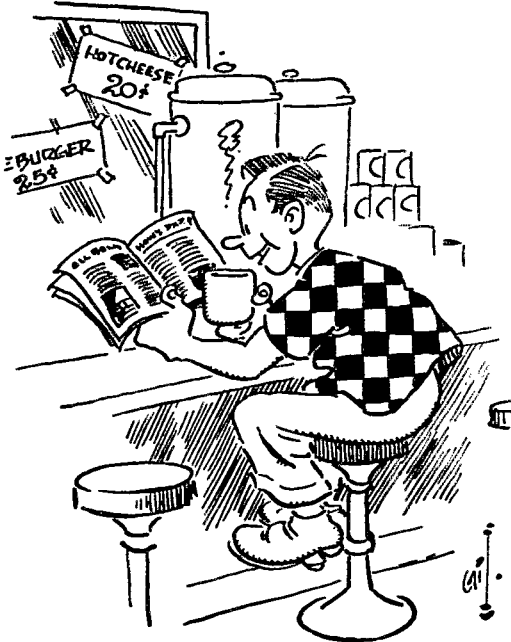
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raphy by Gilbert Moore, Associate Engineer of the Physical Science Laboratory of the New Mexico College of A. & M. A. RFJ is back on the job as major at Holloman Air Force Base, after an illness of several months. Traffic: W5ZU 24.

CANADIAN DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ, EC, EK, RM; OM, YU is a new man on 'phone. ET has been working out well on 3.8- and 14-Mc. 'phone from the new QTH. OM has appeared with nice-sounding n.f.m. signal on 14 Mc. FRAC Notes: The March meeting sked showed a demonstration and talk on the C.R. Tube by YW. CM is building low-pass filter. BM is using the TA-12 portable in the basement location. OL now is VO2B. ABT is very active in YL/OM contests. LX and BI are working on the T2FD antenna. AM is on 14 Mc. WB handled emergency traffic during a recent sleet storm. Following are VOI notes via VOID: 'The VO boys' net meets on 3750 kc. nightly at 1730 EST. NARA officers are IX, pres.; 1AB, vice-pres.; IHD, secy.; IR, treas.; 2BV, 3X, 4D, and 6B, dist. reps. IH is back on 3.5 Mc. with battery-powered rig. 2B worked ZD9AA on 14-Mc. 'phone and ZL2BE on 3.8 Mc. with new modulator. 1J is ex-VEJJS, active on 3.8 Mc. 2R has FB gating modulator going. 2AF, ex-4AF, is active again. 1I is mobile on 7 and 3.8 Mc. New active calls are 1AA, 2AA, 1X, and 2U. Via VO6N comes the following on the VO6 gang: The four boys on at Cape Harrison are VO6L, VO6R, VO6AB, and VO6N. 6B, mostly on 14-Mc. 'phone, is looking for VE3 contacts. 6AR is on 3.5-Mc. c.w. as well as 7 and 14 Mc. 6N has 50-wattter and checks in nightly on the Labrador 'Phone Net and also Mon., Wed., and Fri. on MTN c.w. Traffic: (Mar.) VE1EQ 133, DW 95, LY 58, OM 46, MK 28, HT 14, VO2A 7. (Feb.) VE1MK 18.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Welcome to the Dryden Radio Club and the Sudbury District Radio Club on becoming affiliated clubs of the ARRL. We would greatly appreciate your bulletins and any news of monthly activities. Field Day seems to be the main topic of the ham fraternity these days, and competition should be keen this year. VD plugs away with five watts and is having fun and surprises. DOC, in Fergus, tried out a nineteen set in mobile but reports output rather limited. AVS has completed screening job and included a real feature in his rig — a safety interlocking door. BIK took part in the recent Frequency Measuring Test. TO also has completed rebuild job. The newly-appointed Emergency Coordinator for Belleville is AUU. EAB suffered heavy wind damage to arrays. BUR now finds more time for ham radio and is getting back in his stride. Conditions continue to be bad on all bands and those sticking to traffic network schedules are worthy of much credit. Up Ottawa way, the gang enjoyed a talk and demonstration on mobile gear very ably delivered by Paul Vateher. It was "Hobby Night" recently at the Quinte Amateur Radio Club. A nice representation from Kingston was on hand. Various films were shown and YP gave a very instructive talk on the matching of transmitters to various types of antennas. Traffic: VE3ATR 218, BUR 185, GI 172, WY 147, IA 71, CBR 68, EAM 60, BVJ 48, AJR 47, NO 35, TO 35, PH 28, EAU 22, BSU 9, VZ 8, SG 5, VD 5, AUU 4, DOC 1.

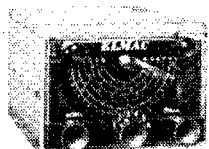
QUEBEC — SCM, Gordon A. Lynn, VE2GL — The St. Maurice Valley Club held election with AML, pres.; VE, vice-pres.; EC, secy.; and PV, treas. The South Shore Club election resulted in KG, pres.; GD, vice-pres.; and GR, secy. BK reports he got on the air in time for the DX Contest but still has lots to do re TVI. WW reports a score in excess of 100,000 and WA made over 40,000 in the DX Contest. BB, FP, XZ, and BK are all planning Field Day groups, and XM is Field Day chairman for the Montreal Club. Get in touch with any of them and join in on the Field Day fun. CA reports activities at a low ebb, as Phyl finds it very tiresome concentrating on traffic-handling after her recent sojourn in the hospital. The Montreal Amateur Radio Club is sponsoring an Eastern Canada ARRL Convention in Montreal on Sept. 19th. AIM had the misfortune to have his TVI antenna tower fall across the 6600-volt lines last December during a bad sleet storm. It is suggested that we all look over our antenna installations and see that they cannot tangle up with power lines in the event of damage by storms. Traffic: (Mar.) VE2DR 52, BB 10, CA 9, GL 7, BK 1. (Dec.) VE2TA 305.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — SN has been having trouble with his modulator. KF and DZ have had several contacts on 50-Mc. 'phone. CE is building a converter for 50 Mc. W4SGC/VE6 is building new modulator unit. ZR has been having good luck with his small rig on 14-Mc. c.w. The hi-fi bug has bitten our old chum, HM. Congratulations to EA on his recent marriage. The gang extends all good wishes to Roy and Mary. JJ has recovered from a recent operation. KP is a new call at Wetaskiwin and regularly checks into the Alberta Net. JP visited Edmonton during the Easter holiday. NH is on the air from Leduc. ZA has 815 rig in the drafting board. MJ did well in the Frequency Measuring Test, as did HM and LQ. QZ has been posted to Germany. EH and KH are sporting new automobiles. KN has been bitten by the mobile bug. WC is QRL painting the house. EO has new mobile working. OD would like to have more stations check

(Continued on page 106)



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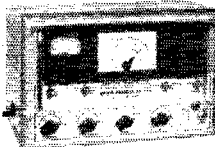
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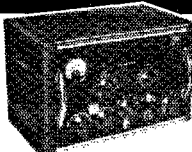
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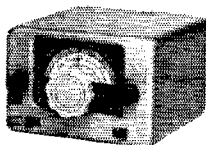
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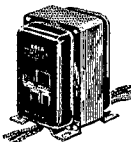
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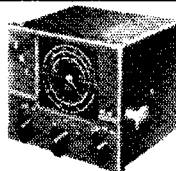
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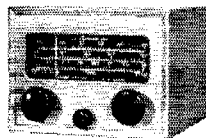


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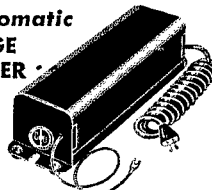
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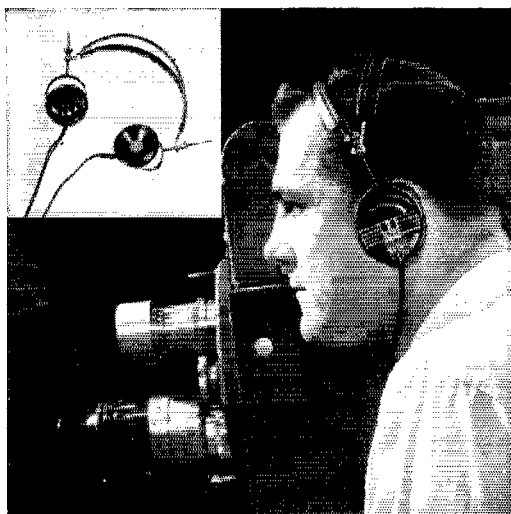
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into the Alberta 'phone net. Let's see how well we can cover our Province, gang. The net meets Mon., Wed., and Fri. at 1830 on 3765 kc. All stations are welcome. Traffic: VE6HM 58, WC 26, OD 16, MJ 14.

BRITISH COLUMBIA — SCM, Peter McIntyre, VE7JT — Mobile interest seems to be coming into full swing, with DH, CX, ALW, and JT, trying to get rigs into their respective jallopies. AD suffered a fairly serious industrial accident last month and now is operating with a body cast and one arm in a cast. AFJ is operating from Clinton. The Victoria Club had a very successful transmitter hunt, as did the VARC, with others to follow for the d.f. snoopers. You soon will hear from the BCARA with a program for TVI and your cooperation with them will be in good stead for future operations. By the time this is in print the editor of the *Amachever*, HI, should be getting ready to march down the center aisle. Formation of a mobile club in Vancouver is in the making so the boys can profit from each other's experience in this form of operation. Those holding appointments are asked to inform the SCM of their activity and send in their certificates for renewal when necessary. Any comments, etc., will find me at 981 W. 26th Ave., Vancouver 9. The BC AREC Network has an average of over sixty check-in stations daily on 3755 kc. at 1730 PST. These cover the Province. Roll call is finished in 20 minutes with traffic following. Three sectional NCS call this roll, one each for the Western, Eastern, and Island sections. QC, as Net Manager, double-checks these NCSs and carries the Net after they are through. The Net is in session for one hour with all stations welcome to check in. The more towns represented the better. Why not join the AREC Net? It is a net with a purpose! Traffic: VE7QC 85, DH 20, JT 20, AC 7, AOB 4.

MANITOBA — SCM, Leonard E. Cuff, VE4LC — XO has been trying out vertical long-wire antennas with the help of a hydrogen balloon. HG has left us for VE6-Land, where he has been transferred by his firm. HB has taken a position with the Canadian General Electric Co., after having completed engineering studies at the U. of Manitoba. HL is using TBS-50 now on railroad/mobile. Our heartiest congratulations to CE on his promotion to the position of Deputy Chief of Police of the City of Winnipeg. JO is operating mobile on 75- and 20-meter 'phone using super modulation. JE is active again on 75-meter 'phone after a long layoff. JM transmits Official Bulletins at noon on Tues., Thurs., and Sun. on 75-meter 'phone. How about sending along news of your activities, gang, so that it may be put in this column. Traffic: VE4HL 72, MX 13, ER 11, KN 6, RG 3, AK 1, DJ 1, NT 1, OS 1.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — A communication center again was set up at the Civil Defense School at Port Qu'Appelle with TE, UQ, and WH mobiles and GI and LU at the school station. These drills are providing good practice for those taking part and those checking in for relays. Ex-4NN now is 5NN at Regina as Radio Inspector. BU, TE, AQ, and CB provided hockey score service between Rosetown and Moosemin, using 7QC for relay when conditions changed. Ex-5IJ and JI, now 3DLL and 3DLM, wish to be remembered to the gang. The SARL now is affiliated with ARRL and received the Charter in January. Are you a member? If not, join SARL and ARRL now; GI will look after your application. PD is visiting in B. C. and the VE7s. CO is heard on 75 meters after a long absence and will be new OES. UQ is leaving Regina for a position with the Department of Natural Resources at P. A. LU is on 3798 kc. as OBS. Traffic: VE5HR 36, GI 27, TE 22, DR 17, DS 11, GO 9, PJ 9, CR 3, QL 3, DD 2, FG 2, LE 2, RE 2, WH 2, PQ 1.

Strays

K2s AFL and CIO have been reported QSOing harmoniously on 75 'phone.

Gifted concert pianist LeRoy Anspach, WØBD (ex-W3BD), appearing as soloist with the Topeka Symphony Orchestra, found WØNCV playing first French horn and that WØHS had tuned the piano.

Owners of Elmac A-54 and A-54H mobile transmitters may obtain mimeographed pamphlets of instructions for easiest conversion to bands not included in the original design (such as 7 or 21 Mc.) by writing the manufacturers.

WINNERS BOTH! * See Foot Note

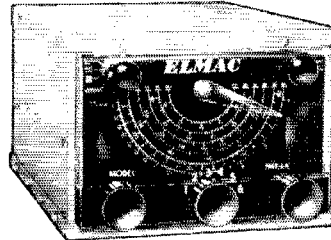


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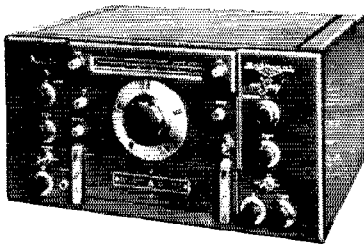
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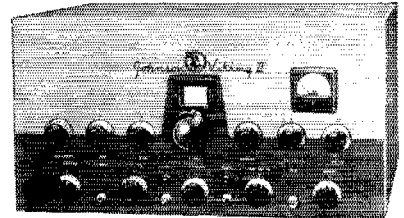
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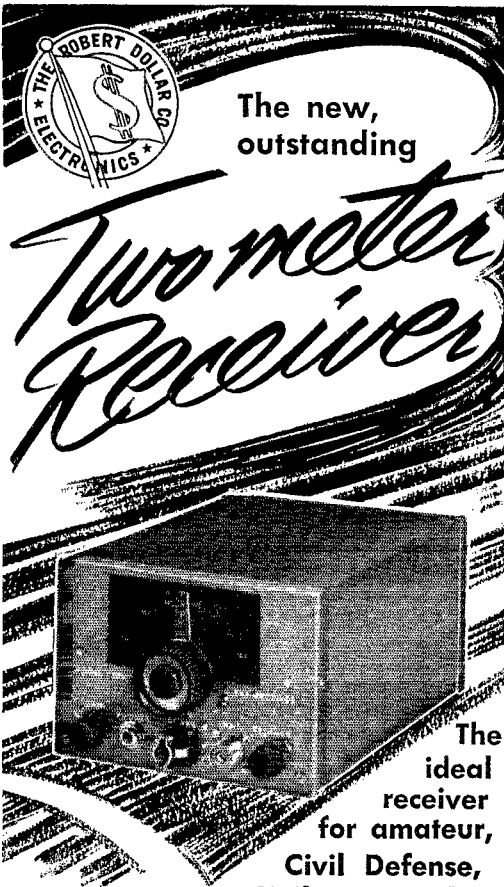
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Mobile Antennas

(Continued from page 13)

Approximate values for 10- and 20-meter operation are 2.21 microhenrys for L_1 , 0.85 microhenry for L_2 and 36 $\mu\text{fd.}$ for C_1 . The photograph, appearing on page 11, shows a production version of the network in which L_2 and L_3 are made variable.

The antenna can be three-banded by the addition of another network as shown in Fig. 6. In this case the frequencies F_1 , F_2 and F_3 are in increasing order. L_2C_1 is series resonant at F_3 , as is also L_4C_2 . L_5C_3 is series resonant at F_2 . The network $L_1L_2C_1$ is the same as the network shown in Fig. 5B, and is tuned to F_2 and F_3 (previously designated F_1 and F_2) as described above. L_3 is electrically shorted at F_2 and F_3 by the series circuits connected at A and B. L_3 is of a value which will resonate the entire system at F_1 .

It should be observed that these network techniques may be used for fixed antenna installations, both vertical and horizontal, and for various band combinations.

Results

The antenna measurement program and the automatic switching network resulting therefrom has

made possible a transmitting equipment with "built-in" antenna coupling circuitry which requires no electrical adjustment within the 10-, 11-, 15-, 20-, 40- and 75-meter bands.

In addition, the antenna program permitted further experimentation and evaluation of multi-band antenna networks which had been under development for some time. This work has proved the practicality of these networks.

The combination of a bandswitched, gang-tuned transmitter and automatic multiband antenna networks has resulted in exceptionally good flexibility and convenience — to the extent that bandchanging can usually be accomplished more quickly with the transmitter than the receiver.

Acknowledgments

The developments described in this paper were greatly facilitated by the cooperation and assistance of Fred Hager, WØDRG, and Manley Youngberg, who contributed in large part to the over-all project.

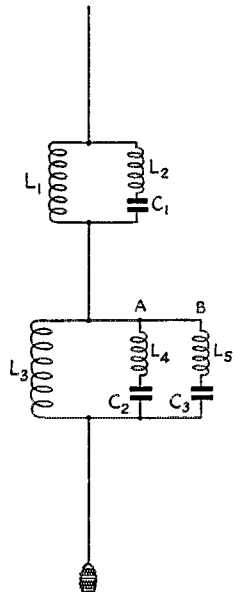


Fig. 6—Three-band automatic switching network.

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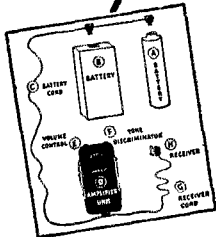
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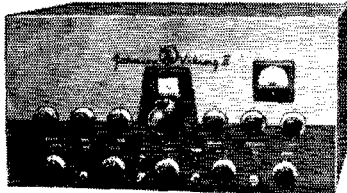
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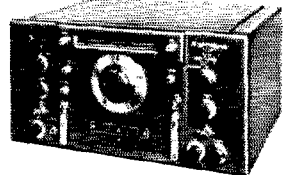
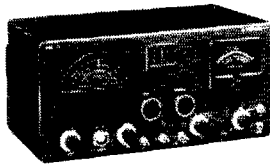
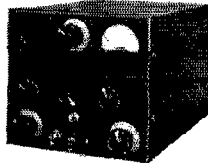
The Johnson Viking II transmitter kit incorporates all the desirable features of its predecessor plus those required for effective TVI suppression, 100 watts output on phone and 130 watts on CW on all bands 160 thru 10 meters. New final amplifier uses parallel 6146 tubes. All parts supplied, including copper plated steel cabinet, chassis, wiring harness, all hardware and tubes. Complete construction test and operation manual also supplied. Viking II Transmitter Kit..... **279.50**

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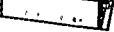
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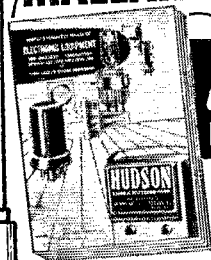


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(Continued from page 21)

should blow. A receiving-type r.f. choke connected across the low-impedance output will provide a protective path to ground and keep the plate voltage off the coax line should the blocking condenser fail.

4) Audio Equipment

The rules of construction set forth for power supplies will serve equally well for most speech amplifiers and modulators. An important additional precaution that should be taken is that the microphone stand and enclosure should always be connected to the microphone-cable shield which, in turn, should be grounded to the chassis. At least one ham has met death by failing to do this.

5) Auxiliary Equipment

Particular attention should be paid to the use of pick-up links for monitors and scopes. Too often such links are made in haywire fashion from any piece of wire that happens to be handy. Use well-insulated wire and ground one side of the link.

In conclusion it should be reiterated that no voltage, including those in the lower hundreds, can be considered free from danger. With a good contact, tests have proved that the maximum that a person can take and still have the power to release his grip is 40 volts a.c.! Handle every circuit with caution and remember that the lowly 115 volts has more electrocutions to its credit than any other. None of the measures recommended above involves any considerable amount of complication or expense. It's just a matter of taking the time to make sure that they are complied with.

Electronic Voltmeter

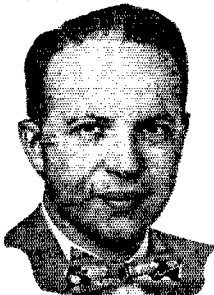
(Continued from page 52)

Evaluating Capacitors

Filter capacitors used in low-voltage power supplies are usually of the electrolytic type. Some leakage in this type of capacitor may be tolerated; the general level of resistance in typical samples is shown in Table I. Coupling and by-pass capacitors are also listed in the table. The readings shown do not represent limits or standards, but are recorded as a guide for use in the evaluation of capacitors in equipment being serviced. When electrolytic capacitors are tested, the positive probe from the ohmmeter should always be connected to the positive terminal of the capacitor. Polarity of paper and mica capacitors does not matter.

Resistance measurements on capacitors having a value below 1 microfarad can be obtained quickly on the 1-megohm scale. Because capacitors having higher values require a longer charging time to arrive at a leakage equilibrium

(Continued on page 112)



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Marie Martin with her Globe King

Signed MARIE C. MARTIN

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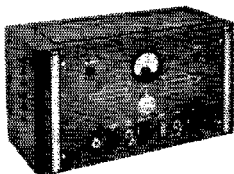
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point, it saves time to bring the capacitor up to a partially charged condition quickly on a lower scale. If the capacitor is left on the lower scale too long, the needle will move backward to equilibrium when the ohm-switch is swung to the final reading scale. Too short a charging time on the lower scale will produce a rise on the final scale.

The position at which equilibrium may finally occur can be approximated by making several attempts, discharging the capacitor before each attempt. With a 1000-microfarad capacitor, however, even this procedure is lengthy; the 100,000-ohm *R* scale is used, therefore, to obtain an equilibrium leakage reading. When leakage of unused electrolytic capacitors is being measured, it is good practice to operate the capacitor near the rated voltage before testing in order to "form" the dielectric film.

Resistance of good mica capacitors will be considerably above 1000 megohms. These capacitors can be evaluated, as can other high-resistance devices, by the use of an external high-voltage source and the d.c. scale of the electronic voltmeter. Fig. 4 shows both the test set-up and the formula for the determination of results.

In Table I, the "charging time" is listed as an estimation of the capacitance rating. The input resistance for the 1-megohm *R* scale on the meter used for these data was 11 megohms. Meters having different input resistances would give other charging times for the same capacitor, but all electronic voltmeters having an 11-megohm base could be used for the capacitor evaluation as given in the table. "Charging time" is dependent upon the capacitance of the unit being tested and the resistance of the circuit through which the voltage is applied.

Receiver and Transmitter Circuits

In the basic circuit diagrams, all capacitors marked *C_x* are those in which negligible leakage (greater than 1000 megohms of resistance) is required. Voltage points marked *E_x* are those where important variations in circuit behavior can be identified. Fig. 5 shows fundamental Class A audio amplifiers. Where current is indicated as (*I*), the value is obtained from the *E* and *R* relationship.

Points for measurement of Class B amplifiers are shown in Fig. 6, and some of the tricks used to examine the transformers and load conditions are listed.

Class A r.f. amplifiers are generally found in the input and i.f. stages in receivers. Fig. 7 illustrates these circuits and Figs. 8 and 9 show the remaining basic receiver circuits, the mixer or converter stage and the beat-frequency oscillator.

Transmitter Components

One device frequently utilized in both receivers and transmitters is the voltage regulator, Fig. 10. Gas-tube regulators are easily built and serviced,

(Continued on page 114)

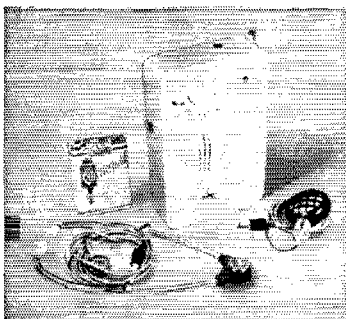
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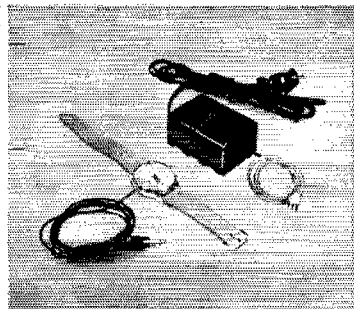
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The world's smallest complete recorder, requiring no outside power source, the sensational MINIFON is precision-built like a fine imported camera. It measures only 1 $\frac{3}{8}$ x 4 $\frac{3}{8}$ x 6 $\frac{5}{8}$ ". It weighs only 2 lbs. 7 oz.!

slip it in your briefcase!

Tuck MINIFON in a corner of your briefcase on business trips, for dictation in trains, planes, cars, hotel rooms. Use it as your secretary at conferences. Operates on its own batteries and may be completely concealed if desired.

records anything, anywhere!

Ideal for on-the-spot interviews, field trips, conferences etc. Hundreds already in use by broadcast stations, doctors, lawyers, executives, scientists, insurance and private investigators, police departments. Continuous recording up to 2 $\frac{1}{2}$ hours!

the unseen secretary!

MINIFON may be easily concealed to serve as a private memory for small details which might be decided verbally and which might later be in question. Among available accessories are a fine crystal microphone cleverly concealed in a wrist watch housing and a telephone recording attachment.

versatile, economical to operate!

MINIFON records . . . plays back . . . rewinds . . . erases — immediately! Recordings may be stored or wire may be re-recorded. Operates on standard 1 $\frac{1}{2}$ volt "A" battery, standard 30 volt "B" battery and 7 Mallory RM-4Z mercury batteries. Mercury batteries are good for 24 hours continuous recording, A and B batteries are good for shelf life. MINIFON will record continuously for as long as 2 $\frac{1}{2}$ hours!

\$289.50

Complete with batteries, crystal microphone, stethoscopic earphones and 1-hour spool of wire. Terms if desired. Order No. 34-290

RADIO SHACK

CORPORATION

167 Washington St., Boston 8, Mass.

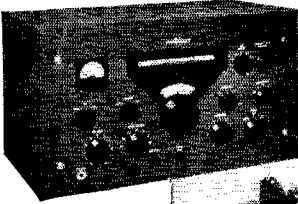
*Optional extra accessories.

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for speedy and
dependable serv-
ice plus complete
stocks always on
hand.

COLLINS EQUIPMENT



COLLINS
75A-3
AMATEUR
RECEIVER



with
Built-in
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COLLINS EQUIPMENT

Net Prices

75A-3 receiver.....	\$ 530.00
75A-2 receiver.....	420.00
Matching speaker.....	20.00
32V3 transmitter.....	775.00
KW-1 transmitter.....	3,850.00
70E8A-VFO.....	97.50
35C2 lo-pass filter.....	40.00

MECHANICAL FILTERS

F-455B-31 3.1 KC plug in.....	75.00
F-455B-08 800 cycle plug in.....	75.00
F-455A-31 3.1 KC solder terminals.....	75.00
F-455A-08 800 cycle solder terminals.....	75.00

ATTENTION 75A-2 OWNERS!

You, too, can enjoy the advantages of Collins New MECHANICAL FILTER. Return your 75A-2 Receiver to us for FACTORY MODIFICATION which includes installation of Mechanical Filter Conversion Kit, complete with a 3 KC Filter, minor repairs and complete realignment of your receiver..... **Net \$125.00**

CONVERSION KIT, with 3 KC MECHANICAL FILTER, complete with instructions for modifying your 75A-2 Receiver..... **Net \$100.00**

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Serving the Entire Electronic Industry
SOUND...INDUSTRIAL...SERVICE...AMATEUR

150 JAMES STREET, NEW HAVEN 13, CONN.

and with only two components, a resistor and a VR tube, constant output voltage can be maintained with a range of load currents from 5 to 40 milliamperes.

The first stage in many transmitters is a crystal oscillator. One of the various circuits used for this stage is shown in Fig. 11. In addition to the regular readings of E and R , a periodic check is made of the d.c. voltage at E_x to give an account of the behavior of the oscillator. If the voltage at E_x gradually drops, check the tube and possibly clean the crystal.

Class C amplifiers and multipliers (Figs. 12 and 13) do most of the heavy-duty r.f. work in transmitters. Rigid control of the final-amplifier plate current requires a regular meter in the circuit at all times, and it is just as important to have a permanent meter in series with the grid-No. 1 return to indicate the proper drive. Preceding stages in the transmitter usually operate at conservative power levels, and spot-checking is adequate for normal operation. A milliammeter with a switching arrangement may be used to obtain plate and grid current readings while the various stages are tuned up.

When Class C stages are being serviced, the electronic voltmeter is handy for checking leakage in coupling and by-pass capacitors, and for locating leakage paths of the type that break down or arc only when high voltage is applied. It is also used for maintaining a record of plate and screen voltages, grid-driving voltages, and resistor values. When a.c. or d.c. voltages are checked in the presence of strong r.f. fields, such as are encountered near operating transmitters, misleading readings may be obtained unless the instrument is well shielded. Not all vacuum-tube voltmeters exhibit this reaction; a metal case is helpful in minimizing the effect. When the reaction does occur, however, there is an appreciable meter reading when the probe tip is merely placed in the vicinity of the transmitter. If the reading persists when the shielded probe cable is disconnected, a need for filtering of the v.t.v.m. a.c. cord and possibly additional shielding of the instrument is indicated.

Workbench Activities

Electronic voltmeters, besides being important in development and servicing operations, are flexible and handy meters to have within reach at all times on the workbench. Getting a reliable check on a capacitor, resistor, battery, transformer, choke, or switch in a hurry when an odd job calls for an immediate answer saves time, effort, and peace of mind.

Strays

Germanium, the metal used for transistors, is nearly worth its weight in gold. It now sells for \$350 a pound or about 65 per cent of the price of gold. Present methods recover only one pound of the metal in the sludge from the production of 2,500,000 pounds of zinc ore.

— The Ohmite News

GO MOBILE at NEWARK

GONSET AMATEUR EQUIPMENT

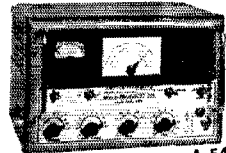
3016 "COMMANDER" TRANSMITTER
Fig. A. Multi-band transmitter covering 1.7 to 54 mc continuous. Power requirements: 300 volts DC at 200-225 ma (phone) and 6.3 volts AC or DC at 3.15 amp. 35 watts input on phone. 50 watts on CW. Provision for all conventional feed lines. Tubes: 6AG7, 6146, 12AT7, 2-6AQ5. With tubes and two high Q final tank coils for 10-11, 15, 20, 40, 75 and 80 meters. Final coils for other frequencies available on special order. 8 lbs. **124.50**
97F111. NET.....

New! vfo. Specifically designed for use with the Commander above. Arranged for convenient external mounting. Covers 10, 15, 20, 40, 75 and 80 meters. Size, 3 1/2 x 5 1/4 x 5 1/4". Shipping weight, 5 lbs. **29.95**
97F094. NET.....

New! Fig. B. "Super Six" Converter. Covers 10, 11, 15, 20, 40 and 75 meter bands. High stability and sensitivity. Gray case, 3 1/2 x 5 1/4 x 5 1/4". Shpg. wt., 3 lbs. **52.50**
97F095. NET.....



PMR-6-A



A-54

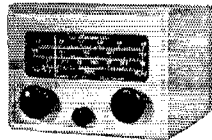
ELMAC PORTABLE UNITS

New! Model PMR-6-A Receiver. 10-tube dual-conversion unit. Covers 10, 15, 20, 40, 75, 80 and 160 meter bands as well as the broadcast band. Requires 6 volts AC or DC at 3.3 amps and 250 volts DC at 90 ma. Gray cabinet, 4 1/2 x 6 x 8 1/2". Wt., 6 1/2 lbs. **134.50**
97F500. NET.....

Model A-54 Transmitter. 50 watt unit for 80, 75, 20 and 11-10 meters. Temperature compensated VFO. Requires 6 volts at 4.5 amps and 600 volts DC (max.) at 225 ma. Gray cabinet, 7 1/2 x 7 1/2 x 12". 17 lbs. **139.00**
97F180. NET.....

Model A54H. Similar to above, but for use with crystal or high impedance dynamic microphone. **149.00**
97F181. NET.....

New! MORROW 5BR 5-BAND CONVERTER



High gain superheterodyne tuner for use with auto radio for the reception of 10, 15, 20, 40, and 75 meters. Features RF amplifiers and mixers to improve image rejection ratio. Calibration accuracy, better than 1%. 1525 kc output. Has 1 microvolt sensitivity on all bands. 3 gang tuning condenser with tuning ratio of 20:1. Powered by receiver—requires 6 volts and 100 volts DC at 16 ma. Size, 4 x 5 1/4 x 6 1/2". 5 lbs. **74.95**
97F118. NET.....

MASTER MOBILE ANTENNAS AND MOUNTS



Fig. A. All-band Antennas. Rugged and versatile antennas for operation on all Amateur bands from 10 through 80 meters. Heavily chrome-plated for beauty and durability. Center-loaded for maximum efficiency. Supplied complete with coil for 20, 40 or 75 meters. Operates on 10 meters by shorting out coil. Easily installed—fits any mount with 3/8" SAE female thread. Highest quality workmanship and materials. Coils are easily interchangeable. Overall length, 8', 10". Less mount. Shpg. wt., 3 lbs. **8.58**
92F300. With 20 meter coil.
92F301. With 40 meter coil.
92F302. With 75 meter coil.
NET EACH.....

Fig. B. Whip Antennas. Finest stainless steel whips for maximum flexibility and strength. 3/8" threaded studs fit all mounts. Shipping weight, 3 lbs. **5.10**
92F306. Model 100-90S. 90". NET.....
92F307. Model 100-96S. 96". NET.....5.15



C



D

Model 118 Coaxial Kit. Converts all body mounts above to coax input. Provides an excellent match for 72 ohm coax line without the need for supplement matching. Shpg. wt., 1 lb. **98c**
92F320. NET.....

MASTER MOBILE MOUNTS

Sturdy mobile mounts for all types of installations. Available for body or bumper mounting with straight or double tapered springs. All are tapped for 3/8" antenna or extension studs. Swivel base types are excellent for cowl mounting. With hardware. Wt., 3 lbs.

92F322. Fig. C. Model 132XC. Heavy duty body mount with coax fitting for whip antennas. Has adjustable split ball swivel. Built-in coax connector. NET.....9.65

92F316. Fig. D. Model 140X. As above but with extra heavy duty spring. NET.....7.50

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Mobile or Portable Operation THIS SUMMER?



Then, your log-keeping needs can be met by the ARRL MINILOG. Convenient, pocket-size, it contains proper headings for all necessary entries. MINILOG will help you comply with FCC regs, provide a lasting record of the many pleasant QSOs you'll enjoy this summer.

Spiral bound, 4" x 6" 30¢

USA Proper, 35¢ elsewhere

If you prefer more detailed station records, the ARRL Log Book with ruled 8½ x 11 sheets (also spiral bound to lie flat when open), will make record-keeping a pleasure. Useful also for portable or mobile as well as fixed station operation! **50¢**

USA Proper, 60¢ elsewhere

These are available in loose-leaf form (punched for 3-ring binders), 100 sheets. **75¢**

Available at Your Dealer

The

**American Radio Relay League, Inc.
WEST HARTFORD 7, CONNECTICUT**

Single-Package Mobile

(Continued from page 87)

tenna and mixer grid-coil tuning cores for maximum output. Next, rotate the gang so that it is at minimum capacitance and set the signal source to approximately 30.2 Mc. Adjust the tubular trimmers C_{19} and C_{27} for maximum output. This procedure should be repeated a second time for best results. Alternatively, a signal may be used at about 28 Mc. and both tuning cores and trimmers adjusted for maximum output at this frequency. Since the range is small, the tracking error is not likely to be excessive. Adjust the tuning core of the converter plate coil, L_8 , for maximum output when receiving a weak signal.

It may be convenient to use a small 250-volt power supply in place of the auto-receiver supply when checking the unit on the bench, since a 6-volt storage battery for the auto receiver may not be readily available. The switching relay will not operate when a 6.3-volt a.c. supply is used. However, the supply lead may alternately be connected to converter or transmitter, depending on which is being tested.

Transmitter Adjustment

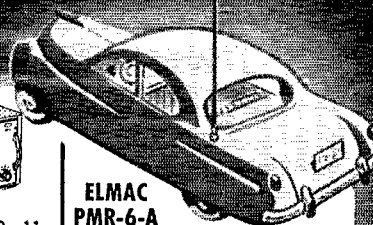
We may now tune up the transmitter. First, connect a low-range d.c. voltmeter or milliammeter between the doubler grid test point (Pin 5, J_4) and ground. (The negative meter terminal is connected to the test point.) Adjust the tuning core of the oscillator tank coil, L_1 , for maximum voltage indication. Move the negative terminal of the meter to the test point corresponding to the grid circuit of the 6AQ5 (Pin 6, J_4). Adjust the tuning core of the doubler tank coil, L_2 , for maximum output. Disconnect the plate and screen voltages of the 6AQ5. Couple a sensitive resonance indicator to the final-amplifier tank coil. A good indicator can be made by connecting a 1N34 crystal in series with the coupling loop and a d.c. milliammeter with a 1-ma. scale. Using the resonance indicator, adjust the 75- μ fd. tank tuning capacitor, C_{12} , for resonance. Readjust L_2 for maximum output; adjust the compression neutralization trimmer, C_6 , for minimum output. Again, readjust L_2 , and also the tank tuning capacitor, for maximum output, and the neutralizing trimmer for minimum or zero. The final amplifier is now neutralized.

Reconnect plate and screen supplies and connect a 56-inch length of wire to the antenna output terminal, J_2 . Connect a 100-ma. meter across test points *C* and *D*. Adjust the 75- μ fd. tank capacitor, C_{12} , for minimum current and then adjust the antenna tuning capacitor, C_{13} , until the plate current increases to about 35 to 40 ma. Continue alternately adjusting C_{12} for minimum current and C_{13} for the desired input power until the plate-current dip as the tank capacitor is adjusted becomes small. The transmitter is approximately in adjustment. As a matter of interest, the actual power output of the unit was measured when using approximately a 240-volt

(Continued on page 118)

TERMINAL LEADS IN MOBILE EQUIPMENT BIGGEST VALUES IN TOWN!

Everything for the Car and Home Base!



MODERN MOBILE MIKES



by ELECTRO-VOICE

All feature high speech intelligibility, ruggedness, press-to-talk switch for operating relay and are provided with handy mounting bracket.

- 208—Low cost, S. B. carbon, close talking, noise-cancelling Differential type... 9.70
- 210—S. B. carbon, extra rugged, high articulation... 16.76
- 205—Like the 210, but with Differential feature... 20.28
- 600-D—One of the best, Dynamic, choice of high or low impedance... 22.64
- 602—Like the 600-D, but with Differential feature... 26.46



AMPHENOL

Each antenna has 75 ft. 300 ohm lead-in. Flat-top portion is #16 copper-clad steel twin-lead. With instructions.

- 139-010 10 Meters 5.24
- 139-020 20 & 15 M. 5.88
- 139-040 40 Meters 7.64
- 139-080 80 Meters 11.03

JOHNSON

Viking



Mobile Kit
A mobile powerhouse, up to 60 watts. Band-switching, 4-position crystal selector, fully metered and with many other outstanding features. 240-141 KIT, less tubes, crystals, microphone and power supply. 99.50

This kit as well as the famous Viking I, Viking II and VFO are available wired and air-tested, or unwired but with tubes, etc. Write W2BUS for special prices.

GONSET "COMMUNICATOR"

A truly fine and self-contained communications station complete with 19" whip antenna ready for operation.



Weights 16 lbs. • Output 5-7 watts on 144-148.3 Mc • Operates on 110 Volts AC and 6 Volts DC with no other power supplies required • 10 tube 6BQ7 cascode receiver with a noise clipper that really works • Sensitive built-in speaker • Only 10 x 9 x 7 inches • Uses carbon, crystal or dynamic mike • Over 100 mile range.
COMMUNICATOR, with tubes but less crystal and mike... 199.50
COMMUNICATOR, complete with crystal, BRUSH crystal microphone, cord and plug—NOTHING ELSE needed to go on the air. 205.95



TRCRAFT
Crystal Controlled
CASCODE
CONVERTER

Low noise, 1 microvolt gives 20 db quieting, high sensitivity, 0.1 microvolt provides a signal 6 db over noise level. The ultimate for top performance. Power supply of 150 to 250 volts required.

- CV-2—144-148 Mc. 42.50
- CV-10—10 & 11 Meters 37.50

FOR THE SHACK

Hallcrafters HT-20 transmitter, 100 watts, TVI suppressed. Continuous coverage from 1.7 Mc. to 30 Mc. with full band switching. Choice of 10 crystals. Less microphone and crystals... 449.50

COMMUNICATIONS RECEIVERS

- NATIONAL SW-54 49.95
- NATIONAL NC-125 149.50
- NATIONAL NC-183D 369.00
- NATIONAL HRO-Sixty 483.50
- HALLCRAFTERS S-38 49.50
- HALLCRAFTERS S-40B 119.95
- HALLCRAFTERS S-53A 89.95
- HALLCRAFTERS S-76 179.50
- HALLCRAFTERS SX-71 224.50
- HALLCRAFTERS S-81 49.50
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- HAMMARLUND HQ-140X 264.50

ELMAC A-54

TRANSMITTER
A-54 is an excellent mobile or fixed station transmitter. Only 7½ x 7½ x 12", will tuck away anywhere but can take a husky 50 watts input. Bandswitching provides 10, 11, 20, 40, 75 and 80 meters. VFO-xtal selector switch provided.
A-54—Carbon mike input 139.00
A-54H—Dynamic or crystal mike... 149.00
PSA-500—115 VAC power supply... 39.50

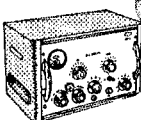


GONSET "COMMANDER"

Powerful mobile 35-50 watt transmitter covering 1.7 to 54 Mc. Not a kit. With tubes, less pwr. supply. 124.50
GONSET VFO for Commander... 29.95



New SONAR SRT-120 Multi-Band XMR

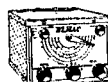


A compact TVI-suppr. 10, 11, 15, 20, 40, 75 and 80 meter all-purpose transmitter measuring only 8½x8½x14" packing 100 watts phone or 120 watts CW. Suitable for mobile or fixed station with selection of power supply.

- SRT-120—With tubes, less power supply... 198.50
- SRT-120-M—in 8x8x10 mobile cabinet... 198.50
- PS-500—115 volt AC power supply... 49.50
- PS-501—115 V pwr supply with built-in push-talk relay and circuit... 59.50
- SRT-120-P—the SRT-120 and PS-501 in single handsome cabinet... 279.50
- V-120—A VFO for all above transmitters... 19.95
- MR-3—Receiver for 10-11-20-75 meters... 89.95
- MR-4—Receiver for 20-40-75-80 meters... 89.95

All other SONAR products in stock.

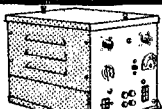
ELMAC PMR-6-A



6-Band Receiver

Elmac has designed this receiver to be the finest possible in its class without regard to cost. Dual conversion, ten tuned circuits, six bands covering all the amateur bands from 10 meters thru 160 meters plus the broadcast band, less than 1 microvolt to produce 3½ watts audio output, effective noise limiter and many, many other features.

- PMR-6-A—Less power supply... 134.50
- PSR-6—6 Volt power supply... 24.50
- PSR-12—12 Volt power supply... 24.50
- PSR-116—115 VAC power supply... 24.50



ROBERT DOLLAR Model 222

New TWO METER quality mobile transmitter. With tubes, less crystal, mike and power supply. 89.50
Model 226—Companion receiver. 99.50

GONSET "SUPER SIX" CONVERTER



Covers 10, 11, 15, 20, 40 and 75 meters. Compact, stable, highly sensitive... 52.50
TERMINAL carries all GONSET products. Hams with Tri-Bands or Supers who have acquired 12 volt cars, write W2BUS for free modification instructions.

FOR THE CAR:

MASTER MOBILE All-Band ANTENNAS

- AB/W20 8.75
- AB/W40 8.75
- AB/W75 8.75
- AB/W2374 Kc (C.A.P.) 9.95

- Extra coils for above, each 3.30
- 142 Bumper Mount 3.25
- 140 Spring Bumper Mount 6.55
- 132 Spring Swivel Mount 8.75

Write W2BUS for complete Master Mobile dope sheets.

FOR HOME BASE: KRECO ANTENNAS

Features low angle of radiation; low standing wave ratio; solid brass for high weather resistance; all antennas threaded to fit brass or galvanized ¾" pipe available anywhere in lengths up to 21 feet; mounts as easily as a TV mast; absolutely no compromise with quality; no dangling feedline, cable enclosed in pipe mast.

- CO-AX Antenna for RG-11 or 59/U Cable
- CO-2 meters 14.95
- CO-150-170 Mc 14.95
- CO-6 meters 19.95
- CO-10 meters 29.95

- Ground Plane Antennas for RG-8 or 58/U Cable
- GP-2 meters 14.95
- GP-150-170 Mc 14.95
- Stacked 4-Element Co-ax Antennas for RG-8/U cable
- SC-2 meters 34.95
- SC-150/170 Mc 34.95

Antennas cut for middle of band unless otherwise specified — write W2BUS for the dope and quotations on beams, multi-element vertical or horizontal polarized hi-freq arrays, etc.

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ELECTRON TUBE TECHNICIANS

*We now have
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for technicians
to work in the fabrication
and processing of
advanced type electron
tube research models.*

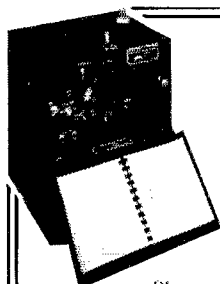
To qualify for one of these openings you should be experienced in experimental work for research and development in vacuum tubes, which includes the fields of mechanics, electronics, chemistry and high-vacuum techniques.

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LOOK HERE, FELLOWS!

We will gladly pay the highest possible price for the purchase of any Heterodyne Frequency Meter as illustrated here, including the BC-221, the TS-173, the TS-174, the TS-175, and the TS-323.

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information on nomenclature and condition to*

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Littleton 3 Massachusetts

supply. The power was measured in a noninductive resistor using a thermo-milliammeter. With normal loading, the power output was approximately 4.5 watts.

Before installation, it may be wise to check the modulation and to listen to the signal on a communications receiver. If things are normal the modulation should be quite linear and the quality good.

The photographs show two small mounting brackets near the front of the chassis. These brackets provide a simple means of fastening the chassis beneath the dash. A single screw on the rear of the chassis provides means for rear support.

When tuning up in the car, a small field-strength meter, consisting of a 1N34 crystal in series with a tuned circuit and a microammeter, will be very valuable.

A good noise limiter is, of course, an essential addition to the receiver as with any mobile or fixed-station installation operating in this frequency range.

This little rig has given very gratifying results and it is hoped that others will find similar satisfaction with it.

The best DX so far is a W4 at about 1000 miles, but just wait till the band gets hot again!

TVI Complaints

(Continued from page 51)

his TV set. A TV set operating satisfactorily in your own house with the transmitter is very, very good evidence. Additional evidence may be displayed in most cases by temporarily installing a high-pass filter in the complainant's antenna lead-in at the TV set terminals. If this reduces the interference *any at all*, it is a good indication that if it were properly installed as close to the TV tuner input as possible (inside the set), all of the interference might disappear. From this point, the complainant must assume the lead and have his serviceman (preferably one working under the dealer who sold the TV set) install the filter as you suggest. Once the test is made with your filter, you should remove it for your next demonstration. Inform the complainant that the dealer has sold him a TV set without all the necessary parts. Tell him it is a job for his dealer and/or manufacturer to correct. Encourage him to demand satisfaction from his dealer.

3) From this point on, you can gain a little more of the complainant's confidence by setting a deadline beyond which you intend to operate at will. Give him a reasonable time to have something done and agree in the meantime to put your transmitter on the air for tests. Make sure you begin your operations at will on the date you have

(Continued on page 120)

LOOK STEINBERGS LOOK

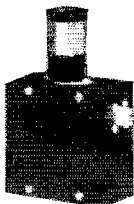
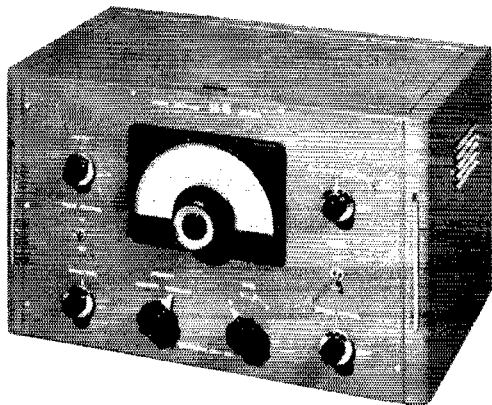
IMMEDIATE DELIVERY

Single Sideband Exciter SS-75

Check these specifications and you'll see why the SS-75 is now the one piece of equipment that places all the advantages of single sideband at your finger tips:

- ★ Built-in stable VFO, with voltage regulation.
- ★ Carrier injection to receiver antenna terminals . . . tune in SSSC signals the same as AM, no other gadgets necessary.
- ★ Illuminated VFO tuning dial provides 31 inches of band-spread 3800-4000 KC in 4 bands, with 5 to 1 gear reduction.
- ★ Built-in voice control and receiver disabling circuit. Also provides for break-in CW operation.
- ★ Specially designed crystal filter network for maximum stability and reliability.
- ★ Carrier injection to transmitter available for working single sideband WITH CARRIER, for tune-up adjustments, or CW.
- ★ 10 watts output, with additional 807 socket for up to 100 watt operation with external power supply.
- ★ Handsome grey crackle cabinet, chrome trimmed, 20" x 12" x 12". Complete with 12 tubes, including one 807, operating manual. \$245.00

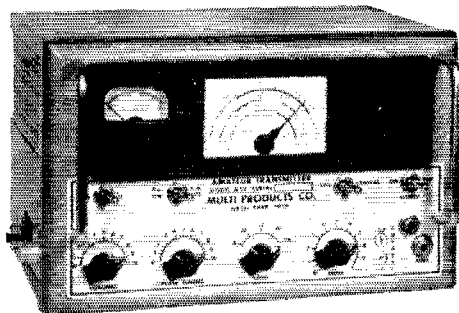
Frequency conversion mixer for 40-20 meters, rack mfg. 3 1/2" x 19" less power supply. 75.00



WRIGHT T-R SWITCH

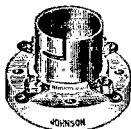
For break-in operation on CW, AM, or SSSC. Use one antenna for transmitting and receiving. It's instantaneous! No moving parts, no power needed to operate. Coax fitting for connections to feeder and receiver. Will handle 1 Kw. With 75 meter plug-in coil. . . \$9.95
Extra coils \$1.75 per band

ELMAC-A54 Under-dash Mobile Xmr.



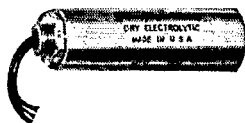
VFO or Crystal control. Direct-reading VFO on all bands—7.5, 40, 20, 10 • Plate modulation • Completely band-switching fone or CW. • 50 Watts max. input. Power required, 300-500 V.D.C. at 250 ma., 6.3 V AC or DC at 4.5A. • Uses 3-6AG5, 6AR5, 6C4, 12AU7, 2-6L6G, 807 (included). • Only 7 1/2" x 7 1/2" x 12", 1 1/2 lbs.

- For carbon mike input \$139.00
- For Dynamic or crystal mike 149.00
- Power Supply, 110 Volt AC. 39.50
- ELECTRO-VOICE 210 Mobile Carbon Mike. 17.10
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TUBE SOCKETS

For 4-prong tubes 866, 809, 811, 100th etc. Heavy phosphor bronze side wiping contacts, metal shell, white porcelain base. Regular list \$1.50, while they last. 45¢



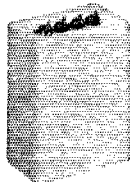
Triple 8 mfd. 450 V. electrolytic upright can condenser, separate negatives, all leads insulated from can. Nationally known mfr. Reg. dealer net \$2.58. ONLY 59¢
10 for \$5.00



PHOSPHOR BRONZE AERIAL

125 ft. of the finest aerial wire obtainable. 42-strand phosphor-bronze with linen center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list \$4.95. 90¢

MINIMUM ORDER \$2.00. Send 20% deposit with COD orders. Please include sufficient postage or instruct us to ship by Express Collect. Overpayment will be refunded by check.



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

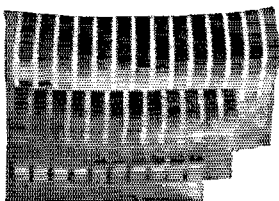
Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed. 5" x 3 3/4" x 2 1/4" \$1.95

Steinbergs

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Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines . . . let us know what you need.
73, Jule Burnett W8WHE



* FINGER STOCK

**Electrical Weather-stripping
by Eimac—
Now Available!**

Silver-plated, spring alloy, pre-formed finger stock especially suited for electrical "weather-stripping" for TVI-proofing cabinet access doors, etc. Also ideal for making coaxially constructed tube connections and many other uses. Available in 17/32", 31/32", and 1 7/8" widths.

- * Write for new Eimac Catalogue Summary showing Eimac tubes and other accessories.

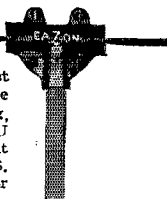


Eimac
THE QUALITY OF A PRO

Eitel-McCullough, Inc.
San Bruno, California

EaZon

Correct matching will put that lost power into the antenna. The EaZon type 3WA is designed for this purpose. Strong, easy to install and foolproof. Fits RG8/U or any coax of similar dimensions. Weight 4 ozs. Satisfied users throughout the U.S. Types 3W and 4W are ideal junctions for stubs or harmonic traps.



Pat. No. 2587676

Type 3WA (see cut) Antenna Match	\$4.60 Net
Type 3W Tee Junction	3.00 Net
Type 4W Cross Junction	3.60 Net

Your jobber can supply you or write
DALLAS C. AKERS CO.

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set. Under no conditions should you let him scare you off the air and, under no conditions should you enter additional arguments with him. *Keep the rig on the air* and keep suggesting he take it up with his dealer and/or manufacturer.

4) As soon as you know the facts about your TV set or other TV sets having no trouble from your transmitter, you should notify the FCC office of your findings. You should follow up with the results of the tests you have made with the high-pass filter. Give name and address of complainant, make and model of TV set involved, and as much other factual information as possible in each individual case. This is necessary because the complainant will usually check with FCC before he challenges his dealer.

You are wasting your time and that of the complainant if you agree to assume the responsibility of forcing the dealer or manufacturer's representative to get on the job. Remember, no one can get this done as quickly as the dealer's customer.

After you have convinced a few of your neighbors and a satisfactory solution has been reached for them, they will begin spreading the word and it will not be necessary for you to go through all the details with all the remaining complainants. The atmosphere will clear rapidly and peace will break out all over again. You will have done much more for all concerned by this procedure than you could have done by fixing, free of charge, every TV set in your community.

Beware again of assuming any responsibility to "make the dealer or manufacturer's representative do anything." The actions herein recommended will cause their customers to do a much better job of this than you can do. You cannot "make" the dealer or manufacturer's representative do anything anyway. The recommended procedure works! You cannot escape the responsibility and obligation of proclaiming and demonstrating the truth.

How's DX?

(Continued from page 58)

gang of which he was a member. . . . W2TXB reports the Rochester DX Association membership enthusiastic participants in this year's DX brawl. W2FBA was top club man with 84,000 hard-earned points in the c.w. session. W2TXB heard FR7ZA for a would-be new one that got away but CE6AB puts AI's WACE effort in the bag. . . . There are 52,924 DX stations listed in W9TRD's Summer, 1953, *Call Book*. Anybody worked 'em all? KL7ZG (W6VSN) erected a 4-wavelength Vee to help his 700-watter keep a longstanding schedule with G3HSN on 14 Mc. . . . DXCC members W9s LI NN and GDI are engineers for b.c. station WGN in Chicago. . . . VE8BV (ex-VE5AGF) has been hamming in the Yukon for some twenty years. He has two rigs winding up with 4D32 and 829B finals, respectively.

After recording DXCC memberships for VR2CG and YN4CB, W1WPO established that DXCC certificates have now been awarded to amateurs in 101 countries. DXCC is now DXCC!

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June—Now for that Skywire

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Collins 32V-3 Transmitter



\$775

VFO Controlled, Bandswitching, Gangtuned. Covers 80, 40, 20, 15, 11 and 10 meters; 150 watts CW; 120 watts phone; entire RF section enclosed in metal shield. (In Stock)

COLLINS 75A-3 RECEIVER \$550
With Mechanical Filter and Speaker

EXTRA SPECIAL

Heavy Duty ANTENNA ROTOR

Very Popular National Brand

WITH 75 FEET OF 4 CONDUCTOR CABLE

A REAL BUY **\$29.95**

BEAMS

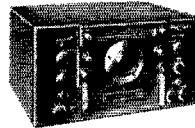
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PREMAX
10 and 20

Complete Stock of
ROTATING EQUIPMENT

MASTER MOBILE

Whips and Mounts

NATIONAL HRO SIXTY



\$483.50

Matching Speaker
\$16.00

Here's the latest and the greatest of the famous National HRO series! Features dual-conversion plus 12 permeability-tuned IF circuits!

NC 183-D (Less Speaker) \$369.50

NC 125 (Less Speaker) \$149.50

SW 54 (Complete) \$49.95

VIKING MOBILE TRANSMITTER KIT



\$99.50

Amateur Net

In Stock for
Immediate Delivery

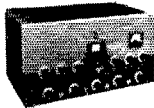
ELDICO TR-75-TV TRANSMITTER KIT



The ideal novice transmitter. New TVI circuit. Uses 6L6 as oscillator and 807 amplifier to PI Network output. **\$64.95**

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JOHNSON VIKING II



Kit, complete with tubes—**\$279.50**
less crystal, key and mike
(In Stock)

Wired and Tested \$334.50

SONAR SRT 120 TRANSMITTER

All bands 120 watts CW, 100 watts phone.



Switches to all six bands. TVI suppressed, with 10 tubes.

Less Power Supply **\$198.50**

SONAR MR-3 (Complete Mobile Band Receiver) **\$89.95**

SONAR SR-9 (Mobile Receiver) **\$72.45**

SONAR MB-26 (Mobile Transmitter) **\$72.45**

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Demonstrator (Complete)

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AVAILABLE — WRITE FOR DETAILS

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TELEPHONE ALBANY 5-1594

YL News & Views

(Continued from page 53)

100 per cent. Stations who do not receive her QSLs within a reasonable length of time after QSOs should write to Lucia and she will be happy to oblige with other cards. When not on duty as a radio operator at Beiraeradio (aeronautical station), she QSOs daily with American stations from 1900 to 2400 GCT on 20 c.w. and from 0300 to 0430 on 40 c.w.

On July 3rd women of the famed Ninety-Nine Club will take off from Lawrence, Massachusetts, in their Seventh Annual Women's Transcontinental Air Race. For the first time last year, amateurs aided the flyers throughout the race period. Again this year under the coordination of Viola Grossman, W2JZX, amateurs (YLS and OMs) at key points along the flight route will assist. See *QST*, Sept. and Oct., 1952, pp. 45 and 40 respectively, for information on last year's activities.

The W8 YLRL District Chairman, Inga Hoffman, W8KOY, is one of only a handful of YLS in North Dakota. Inga would like to see more girls get their licenses not only in her state but also in the entire tenth call area. She holds RCC, WAS, MM, and Public Service Certificates.



Field Day Rules

(Continued from page 49)

station in Class A, B or C. Cross-band contacts are not allowed. Contacts by mobile stations may be made in motion or from any location(s). A station may be worked more than once only if the additional contacts are made on different bands.

9. Field Day Message: Field Day Message is one originated by a Class A, B or C station and addressed to the SEC or SCM (see address in *QST*, p. 6) stating the number of operators, the field location, and the number of AREC members at the Field Day station. Only one Field Day Message may be originated.

10. Scoring:

Points: Each valid contact counts 1 point.

Credit for handling messages may be obtained only as follows: 25 points for originating one Field Day message to SEC or SCM. In addition, each Field Day Message received for relay will score 1 point when received by radio and 1 point when sent onward by radio. Any FD message can be handled (originated or relayed) only once for credit. There will be a deduction of 10 points for omission of handling data or for defects in form. Copies of all messages originated and relayed must accompany Field Day reports.

Multipliers:

Power: Output-stage plate input under 30 watts: 3. Output-stage plate input over 30 and under 100 watts: 2. Output-stage plate input over 100 and under 1000 watts: 1.

Independence-of-Mains: All radio equipment independent of commercial power source: 3. All radio equipment not independent of commercial power: 1.

Battery Power (applies to Class B and C only): 1.5. The battery capacity or size shall in all cases be adequate to permit one hour's continuous operation of the station. Charging batteries from commercial mains while batteries are connected to transmitter or receiver voids the "independence-of-mains" and "battery power" multipliers.

Multipliers do not apply to Class D and E entries.

Final Score: The final score equals the total "points" multiplied by the "power multiplier" multiplied by the "independence-of-mains" multiplier (multiplied by the "battery power" multiplier, if applicable). Where different multipliers apply during the Field Day period, points are multiplied by the multiplier in effect at the time the points were earned.

(Continued on page 124)

CODE SENDING SPEED RECEIVING

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 radio-telegraph experts learned code and developed skill and speed.

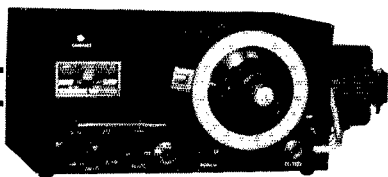
CANDLER SYSTEM CO.

Dept. 4-G, P. O. Box 928, Denver 1, Colo., U. S. A.
and at 52b, Abingdon Road, Kensington High St., London W. 8, England

PAYING PROPOSITION

Hams maintain many mobile-radio systems for police, power, petroleum, taxicab and other commercials. You need a 2nd class ticket, PLUS frequency and modulation test gear. Here's a way to

PICK UP EXTRA CASH!



Type 105-B Micrometer Frequency Meter. Measures center frequency, any number nearby transmitters, CW, AM, FM, 0.1 to 175 MC. Meets FCC mobile specs. Weighs 13 lbs. Price \$220.00.



Type 205 FM Modulation Meter. Indicates peak modulation deviation 0-25 Kc, either side of carrier. Tunable, 25 to 200 MC. Meets FCC mobile specs. Weighs 12 lbs. Width 12". Price \$240.00.

LAMPKIN LABORATORIES, INC.

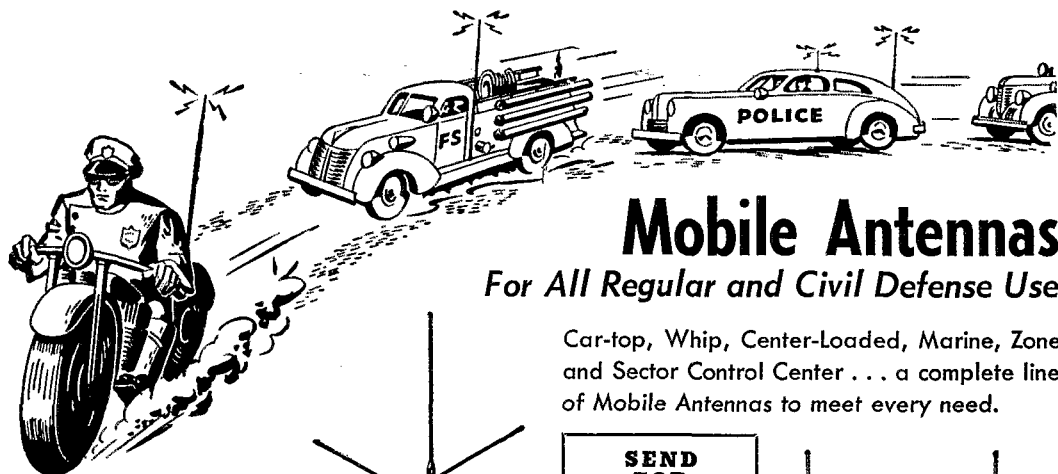
Mfg. Division, Bradenton, Florida

Please send more dope on the 105-B and 205.

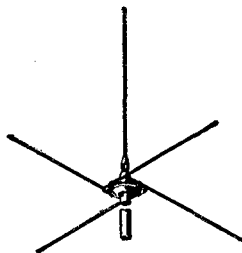
Name

Address

City.....State.....

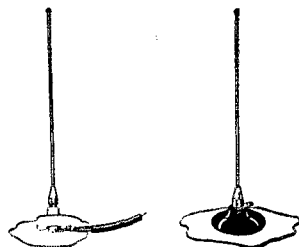


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Ground Plane Antenna used in Civil Defense Zone and Sector Installations.

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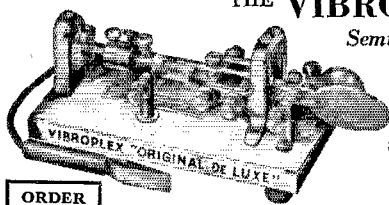
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THE VIBROPLEX

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KEY



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There's no arm-tiring effort, no nerve strain, no arm fatigue, when you send with this easy-working Vibroplex. Simple to operate. Suits any hand or any style of keying. Adjustable to any desired speed. And remember, *only* Vibroplex has *Jewel Movement* that gives it the smooth, positive action and easy manipulation that gives it no other key so easy on the arm. For better keying with less effort—insist on Vibroplex! Choice of five models, \$12.95 to \$29.95. Left-hand models, one dollar more. **ORDER YOURS TODAY!** At dealers or direct. Write for FREE descriptive folder.

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EASY,
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78 RPM

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- No. 3—COMPLETE RADIO THEORY COURSE. A complete, simplified home study theory course in radio covering the Novice, Technician, conditional and general classes—all under one cover—with nearly four hundred typical FCC type questions to prepare you for license exam. No technical background required. You also get, FREE, one year of consultation and a guide to setting up your own Ham station. All for the amazing low, low price of...\$6.95
- No. 4—NEW ADVANCED COURSE. Prepares Novice operators for the amateur general class and second class commercial license tests. Contains 12 recordings (8 through 18 W.P.M.) PLUS the complete code book—PLUS typical F.C.C. code examinations for general and commercial tests. ALL for only.....\$6.95

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11. Club Aggregate-Mobile Scores: Entries under Class C may be combined to form a "Club Aggregate-Mobile Score. The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the club territory, may contribute to the aggregate-mobile club listing.

12. Reporting: Mail reports or entries on or before July 15th. Reports must show bands used, dates and contact times, calls of stations worked, signal reports received and sent, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, number of transmitters in simultaneous operation, location of station, number of persons participating, and score computations.

Sample Score

Assume a station operating in Class B with independent power and less than 30 watts input. If 27 valid contacts are made, 1 FD message originated, and 2 FD messages relayed, the score would be computed as follows: $27 + 25 + 4 = 56$ points. 56×3 (power below 30 watts) $\times 3$ (independent power) = claimed score of 504. If the station were using battery power, the claimed score would be $1.5 \times 504 = 756$ points.

V.H.F. QSO Party

(Continued from page 60)

tion information on 2 or 6 meters. A one-way exchange, even though confirmed, does not count. Count 2 points for two-way exchanges on 220 or 420 Mc., and 3 points on 1215-Mc. or higher bands. The sum of station points earned is multiplied by a section multiplier. Each time a new section is worked two-way, this multiplier is increased by one. *The multiplier grows by one if you rework this same section on another band.* Scoring differs in this respect from other ARRL competitions in order to encourage everyone to make use of as many v.h.f. bands as possible. A simple tabulation with points and section list is all that is required, or a card to Headquarters will bring the simple form (as shown in the box) on which to report.

Certificate Awards

You compete only with amateurs in your own ARRL section for the certificate awards. Novice and Technician licensees compete also for section awards *with others holding the same class of license.* It is possible for three awards to be made in a given section, one to the section winner, one to the top Novice, and one to the top Technician. All contestants are urged to submit their logs to Headquarters at the close of the competition, regardless of whether the score is large or small—not only to qualify for awards, but also to facilitate the cross-checking of other logs.

Rules

- 1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, June 6th, and ends at 11:00 P.M. Local Standard Time, Sunday, June 7th. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.

(Continued on page 126)

PACKAGED POWER

with the new Gonset "TWIN-SIX" 2 METER BEAM

Now... the "TWIN SIX" a rugged, quickly assembled dual Yagi array which provides well over 10 DB gain and front-to-back ratio throughout the two meter band. (Referred to a matched, resonant half-wave dipole.)

The Twin-Six is designed for use with 52 ohm line; extremely low standing wave ratio and electrical symmetry being assured by the use of special balun and matching networks. A spacing of approximately 3/4 wavelength between bays has been found optimum from the standpoint of gain and reduction of spurious lobes when oriented for vertical polarization. This same spacing also provides optimum gain when horizontal polarization is utilized.

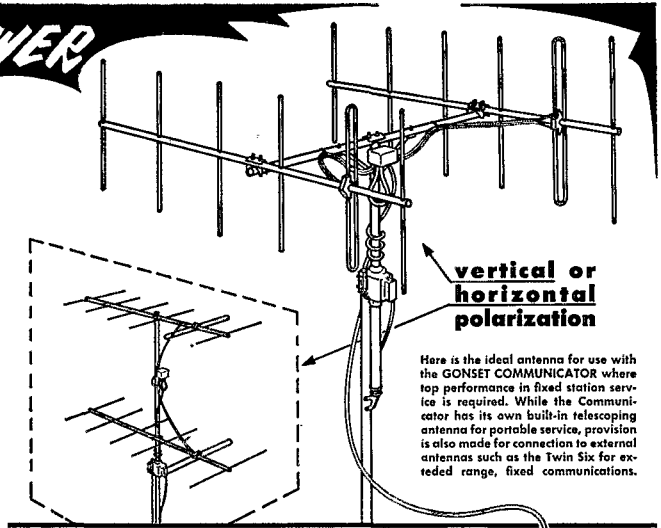
This array is largely preassembled and is designed for use with typical TV antenna rotators. STANDARD MODEL 1560 attaches to your rotating mast section, (up to 1 3/4" O.D.) for horizontal polarization, or to a 5 foot cross-boom "T" section, (not supplied) for vertical polarization. DE LUXE MODEL 1560-V includes braced, tubular steel "T" assembly, (5 foot boom and mast section) for vertical polarization.

Both models are complete with matching harness, balun and rain shield junction box ready to attach to 52 ohm coax. Instructions are furnished describing simple modification to permit use of GONSET 450 ohm open wire line, recommended where runs exceed 100 feet.

MODEL 1560, STANDARD TWIN SIX. (For horizontal or vertical use) includes: (1) Model 1558, (2) Model 1559's. Amateur net. **29.50**

MODEL 1560-V DE LUXE VERTICAL TWIN SIX. Includes: (1) Model 1557, (1) Model 1558, (2) Model 1559's. Amateur net. **34.50**

Model 1558 Matching harness for (2) Model 1559's.....net 7.50
Model 1559, Single, 6 element Yagi.....net 11.00
Model 1557 Braced, tubular steel assembly.....net 5.00



vertical or horizontal polarization

Here is the ideal antenna for use with the GONSET COMMUNICATOR where top performance in fixed station service is required. While the Communicator has its own built-in telescoping antenna for portable service, provision is also made for connection to external antennas such as the Twin Six for extended range, fixed communications.

THE GONSET "COMMUNICATOR"

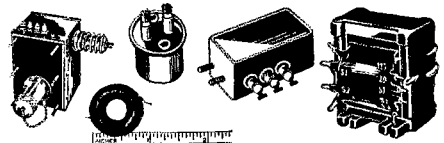
A completely self-contained 2 meter station in a single, highly compact unit. Power supply is arranged for both 6V, DC and 110V, AC operation to provide utmost flexibility and the ability to adequately handle casual or emergency communications. Receiver is a red-hot superhet, transmitter is crystal controlled for maximum stability. Self-contained speaker and audio channel that may be utilized as an excellent emergency PA system. Covers 2 meter band and adjacent CAP frequencies. The top unit in the field for amateur or Civil Defense applications.

AMATEUR NET. **199.50**



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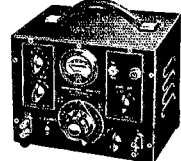


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DIRECT READING
Self-contained and A.C. operated with electronically regulated supply. 1 megohm to 2 million megohms.

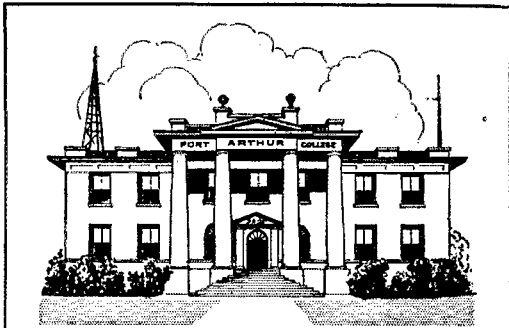


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Self-contained and A.C. operated. For rapid and accurate test of Resistors, Condensers and Inductors.

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A.C.—V.T. Voltmeter |
| NO. 1150 Universal Bridge | NO. 1250 Decade Condenser |
| NO. 1170 D.C. Supply | NO. 1410
Harmonic Distortion Meter |
| NO. 1210 Null Detector and Vacuum Tube Voltmeter | and . . . Decade Inductors |

SEND FOR COMPLETE CATALOG DESCRIBING ALL FREED INSTRUMENTS AND TRANSFORMERS

FREED TRANSFORMER CO., INC.
1703 WEIRFIELD ST., BROOKLYN (RIDGWOOD) 27, N. Y.



Founded in 1909
RADIO TELEPHONY
RADIO TELEGRAPHY
RADAR & TELEVISION

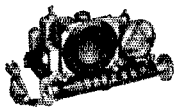
Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$40.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details. New: Advanced TV Engineering Course.

PORT ARTHUR COLLEGE **PORT ARTHUR TEXAS**
 Approved for G. I. training

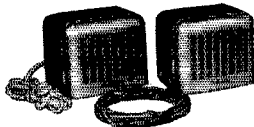
XTALS FOR ALL PURPOSES!

LOW FREQ.—FT 241A for SSB, lattice filter, 1/2" spc. 54th or 72nd harm channels listed by fund. Fractions omitted.	SCR. 522 1/2" sp.	BC-610 2 banana plug 3/8" spc.	FT-43-1/2" spc
374 395 418 487 511	400 464 5910	2030 2435	6190 1015 5940 6640
375 396 419 488 514	440 466 6370	2045 2442	5030 1129 5973 6673
377 397 420 490 515	441 468 6450	2105 2532	5485 2045 6273 6706
379 398 422 491 516	442 470 6470	2125 2545	6040 3735 6306 6740
380 401 423 492 518	446 472 6497	2145 2557	6073 3305 6325 7440
381 403 424 493 519	447 474 6522	2155 3202	6106 5677 6340 7506
383 404 425 494 520	450 475 6547	2220 3215	6140 5775 6373 7506
384 405 426 495 522	452 476 6610	2258 3237	6173 5725 6406 7540
385 407 427 496 525	461 477 7350	2280 3250	6175 5740 6450 7573
386 408 431 497 526	462 479 7580	2282 3322	6206 5760 6473 7606
387 409 433 498 530	463 480 7810	2300 3510	6773 5773 6475 7640
388 411 435 503 531	499 ea.	2300 3520	6873 5800 6506 7650
390 412 436 504 533	\$1.29	2305 3550	6906 5806 6540 7673
391 413 481 506 537	10 for each	2320 3580	7140 5825 6573 7706
392 414 483 507 538	\$9.00	2360 3945	7773 5840 6575 7973
393 415 484 508	Add 20¢ for each 10 xtals or less for postage and handling	2415	7806 5850 6600 8240
394 416 485 509		2390 3995	7840 5873 6606 8250
		2415	7873 5906 6625 8273
			7906 7940
			99¢ each
			49¢ each
			10 for \$9.00
49¢ each, 10 for \$4.50		\$1.29 ea.	

Special Purchase: FM RADIO CHASSIS



88-108 MC — Complete with 6 tubes. Built-in antenna and speaker. Product of Famous Radio and TV Manufacturer whose name we promised not to mention..... **\$16.95**
 Maroon plastic cabinet for above \$5.95



TWO-STATION Intercom System

Consists of Master and remote station, 20 feet of 3 wire cable, 115 V. operation A.C. or D.C. Extra wire, 05..... **\$17.95**

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FREE QUOTATIONS

on hi-fi equipments yours on request. All famous brands of amplifiers, tuners, changers, pick-ups, speakers, etc. Just tell us how much you want to spend and we'll recommend the best matched system your budget will allow!

Sun

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520 TENTH ST., N.W. — WASHINGTON, D.C.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2- or 3-point units.

3) Fixed-, portable- or mobile-station operation under one call, from one location only, is permitted.

4) A "contestant" is a single operator working without the help of any other person. Results may be presented with names of all participating persons for listing, but only single-operator scores will be considered for certificates.

5) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. The band your transmitter is on determines whether a QSO counts 1, 2 or 3 points — cross-band work does not count.

6) A contact per band may be counted for each station worked. Example: W9PK (Ill.) works W9UJM (Wis.) on 50, 144 and 220 Mc. for complete exchanges. This gives W9PK 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W9PK contacts more Wisconsin stations on these bands they do not add to his section multiplier but they do pay off in additional contact points.)

7) Each section multiplier requires completed exchanges with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

8) One certificate award, endorsed as appropriate, will be made to recognize the over-all section winner, the Novice winner, and the Technician winner in each ARRL section. Awards will be limited to one per entrant per section, as earned. It will be necessary for each Technician licensee to indicate his class of license in order to qualify for the Technician award. Award Committee decisions will be final.

9) All reports must be postmarked no later than June 22, 1953, to be entered for awards. See the box accompanying this article for the correct form, or a message to Headquarters will bring a lithographed blank for your contest report.

World Above 50 Mc.

(Continued from page 65)

He has contacts with W1TJN, and with W1QQY on 420 Mc., and Wis QQN MXQ QUA and JVU are expected to be on 220 before long.

If you are working 220 Mc. regularly, send us the dope on your operating schedule. We'll publish it in these pages in the hope of attracting more of the 220-Mc. potential that is building up in many areas. We'd like to have better answers to those letters that ask, "Can you give me the names and addresses of any amateurs in this area who may be working on 220 Mc.?"

How Many States?

For some months now there's been no major change in our states-worked listings. Not much new DX is worked in the colder months, but the big season is getting under way as this issue goes to press. To be of real interest and value, the 50- and 144-Mc. states-worked boxes must be accurate and up to date. How about checking up on your listing right now? Is it complete and correct? If not, let's have the latest information on the states you've worked on 50 Mc., and the states, call areas and best DX worked on 144.

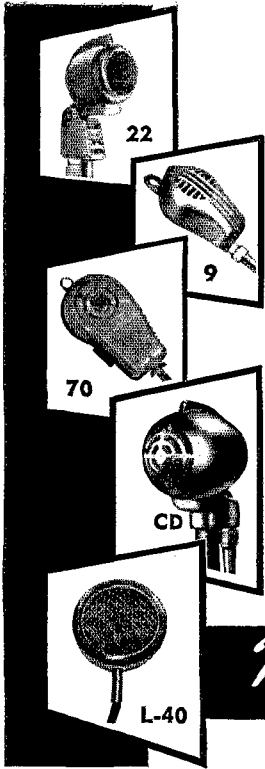
Obviously, we can't list everyone, and with the possibilities varying somewhat with geographical location, the same method for determining whether a call will be listed cannot be applied to all call areas. What we try to do is to list the outstanding and more active men in each area. If you have a respectable record on 6 or 2, or both, send it in. And if your listing is outmoded, better bring it up to date, or your space may be taken over by someone who is up to date.

Note that there are quite a few 47s in the 50-Mc. box. Some of these undoubtedly will catch that elusive Number 48 this summer. We remind them that there is a special hand-lettered serial-numbered 50-Mc. WAS certificate waiting for them. If you knock off the last one this year, send us 48 50-Mc. QSLs for examination and your certificate will be on the way. It's a rarely-won and highly-prized award.

slender design
excellent response
new low cost

**The New TURNER ADA 95D
DYNAMIC MICROPHONE**

Here's the microphone that amateur operators everywhere have been waiting for . . . a slim, modern dynamic priced within your budget! Maximum sensitivity to voice is achieved through Alnico V magnets and moving coils. Frequency response, 70 to 10,000 cps; output level, -58 db; standard $\frac{3}{8}$ "--27 coupler swings microphone in 60° arc; satin chrome finish; 20 ft. removable cable set; choice of 50, 200, 500 ohms or high impedance. Switch models also available. Write for complete information.



THE TURNER COMPANY
917 17th Street N.E. Cedar Rapids, Iowa

Microphones by **TURNER**

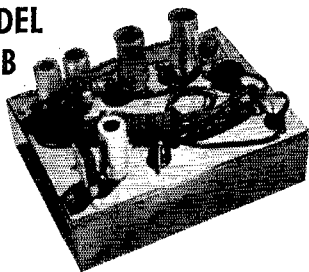
In Canada: Canadian Marconi Co., Toronto, Ont., and Branches
Exports: Ad. Auriema, Inc., 89 Broad Street, New York 4



**CRYSTAL CONTROLLED
CONVERTERS**

For
2, 6, 10-11, 15 or 20 Meters

**MODEL
RC-1B**



\$45.00
NET

(Complete,
with
power
supply,
crystal
and all
tubes)

Converter for any one band, complete with built-in power supply, crystal, tubes, output cable and input fitting for 52, 75, or 300 ohm line, \$45. Now available at leading distributors. Specify band and input impedance when ordering.

Crystal Converter for Collins 75A2 \$65.00
For further information, write Dept. Q-4

**SUMMIT ELECTRONICS
LABORATORIES, INC.**

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QUADRAPOLE

2 MTR ANTENNA

Designed by W2NGA— \$7.95

• 2 MQ-P ----- \$7.95

• 4 E 2 ----- \$8.75

2 MTR—4 ELEMENT YAGI

• 8 E 2 ----- \$20.50

2 MTR—TWO 4 EL. YAGI

• PD 3 E 10 ----- \$24.95

3 EL. 10 MTR/T-MATCH
PLUMBERS DELIGHT

• 3 E 10F ----- \$42.40

3 EL. 10 MTR/FOLD, DIPOLE

• 3 E 10T ----- \$41.80

3 EL. 10 MTR/T-MATCH

• 3 E 15T ----- \$59.00

3 EL. 15 MTR/T-MATCH

• 2 E 20T ----- \$47.95

2 EL. 20 MTR/T-MATCH

• 6 E 10-20T ----- \$98.95

3 EL. 10 MTR/3 EL. 20 MTR
STACKED/2 T-MATCHES

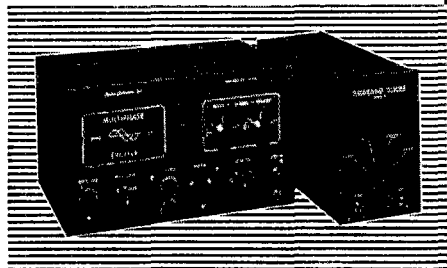
Write Dept. Q6 for Catalogs

HY-LITE Antennae INC.
242 E. 137 ST., N. Y. 51, N. Y.

**HY-LITE
BEAMS
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BEAMS**

MULTI-BAND OPERATION

S
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G
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E



SIDEBAND

8 TIMES THE VOICE POWER
HARMONIC TVI VIRTUALLY ELIMINATED

MULTIPHASE EXCITER MODEL 10A (upper left). Approx. 10 watts peak output 160 to 20 meters, somewhat less on 10-15 meters. Will drive beam power tetrodes to more than 1 KW input from 20 to 160 meters. SWITCHABLE SSB, with or without carrier, double sideband AM, PM, break-in CW, VOICE OPERATED BREAK-IN and receiver disabling, it's ALL BUILT-IN to this truly versatile exciter. Built-in power supply also furnishes blocking bias for linear amplifier and voltage for optional VFO. With internal xtal and coils for one band. Wired and tested \$159.50. Complete kit \$112.50. Extra coil sets for \$3.95 per band.

NOVICES — ATTENTION
Plug your 40 or 80 meter xtals into the MULTIPHASE EXCITER for break-in CW operation. Later it's an excellent fone exciter, for use with your General Class ticket. No expensive high-level modulator required.

SIDEBAND SLICER
MODEL A RECEIVER ADAPTER (upper right). Improves any receiver. SWITCHABLE upper and lower sideband reception of SSB, AM, PM and CW. Cuts interference and heterodynes in half. Eliminates distortion caused by selective fading. Works into any receiver having 450-500 KC IF. Built-in power supply. Use a Model A Slicer — notice the "holes" in even our most crowded bands and hear signals you have never heard before. Wired and tested \$74.50. Complete kit \$49.50.

PS-1 Plug-in prealigned 90° phase shift network and socket available separately for use with GB Signal Slicer and SSB Jr. \$7.95 postpaid.

WRITE FOR LITERATURE

Central Electronics, Inc.

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For Selectivity
Never Before Achieved In a
Communications Receiver

Dr. Qwak

R The Collins 75A-3
With Mechanical Filter

Dr. Qwak (Willard Wilson — W3DQ) also has Collins transmitters, National, Hallicrafters, Johnson, Elmac, etc. . . . all for prompt delivery, and on the easiest of terms. Write today.

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405 Delaware Ave., Wilmington, Delaware

Est. 1920

Willard S. Wilson, President

Member OOTC — VWOA — QCWA



U. S. N. R.



Louisiana Radio Clubs

The Central Louisiana Radio Club meets at the Naval Reserve Training Center, Alexandria, La., (K5NAG) on the first and third Wednesdays of each month. The club membership includes 19 licensed amateurs. Some of the activities sponsored by the club are hidden-transmitter hunts and assistance in eliminating local TVI. The president of the club is Charles R. Hammock, RM1, USNR, stationkeeper of the Naval Reserve Training Center at Alexandria.

The Greater New Orleans Amateur Radio Club meets on the first Friday and third Sunday of each month at the Naval Reserve Training Center, New Orleans, La. (K5NAW). Organized in November, 1952, the club has been instrumental in the formation of a TVI committee consisting of local electronics dealers, technicians, and club members. The club conducts code and theory classes three nights a week at Loyola University. Over 28 persons are at present enrolled in these classes. Naval Reservist club members: W5s EGX SPL SPZ and TZV.

Emergency

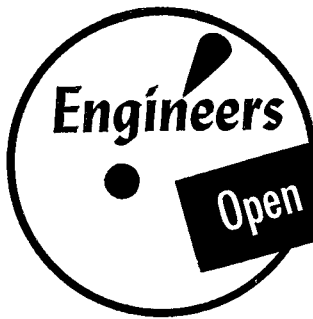
The Naval Reserve Training Center, Dallas, Texas, (K5NRD) mobile radio station receives frequent requests to provide communications during emergencies. Recently the station furnished communications for a local railroad during a three-day ice storm and materially assisted in keeping the railroad operating.

Message Service

The Naval Reserve Training Center, Laurel, Miss., (K5NAK), assisted by local amateurs and W9FCF at Wausau, Wis., recently teamed up to provide a daily message service via amateur radio. Laurel high school students, visiting Wausau as part of a student exchange program, were able to exchange messages with home. Operators at K5NAK were W5s ECT EUS OAE and NRU. W5ECT assisted in some schedules from his home station. W9FCF operated from the Wausau Valley Radio Club quarters part of the time. The same service will be provided when the Wausau students visit Laurel.

Reservist QSO Parties

A group of amateurs on active duty with the Naval Reserve Electronics program conducts daily and weekly QSO parties. One group operates Monday through Friday at 7 P.M. EST on 3515 kc. The other group operates once a week at 10 P.M. EST on 7110 kc. Among the actives are: W1s BWR JBB NK/4 SGC, W3s GUF/4 TDH, W4s CE/2 LW RPI SSN, W5s HNW KJA NEL PLQ SPZ, K6s DL and DY. Active duty Reservists are invited to join these parties.



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You will benefit from high wages, a modern, air-conditioned plant, paid vacations and holidays, group insurance and a good chance for advancement.

Housing immediately available in the beautiful suburban and county areas that surround the Bendix Radio plant.

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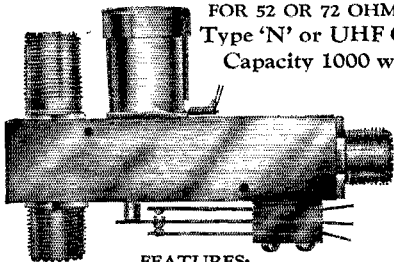
DIVISION OF BENDIX AVIATION CORP.
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You're needed to work on: Radar, G.C.A., Mobile Radio, Auto Radio, Airborne Communication & Navigation Equipment, Television, Antennas, Microwave Equipment, Servo Mechanisms and Guided Missiles.

NOTE THE NEW FEATURES OF THE DOW CO-AX RELAY

FOR 52 OR 72 OHM LINE
Type 'N' or UHF Conn.
Capacity 1000 watts



FEATURES:

1. AC types entirely free of hum and are guaranteed equally as silent as DC.
2. Causes negligible change in SWR up to 100 MC.
3. Now available with type 'N' or UHF connectors.
4. Magnet coils entirely shielded.
5. Special type receiver connector automatically grounds receiver contact inside of connector during transmit and protects receiver from RF (Optional).
6. External SPDT switch (Optional).
7. Tongue pressure on contacts both AC and DC energized or de-energized, sufficient for all types of mobile service.
8. Overall length 4 1/2", width 3".

AC types (all voltages). Amateur net. \$10.50
 DG types (all voltages). Amateur net. 9.50
 Add \$1.00 for SPDT external switch.
 Add \$1.00 for special type receiver connector.

See your distributor, but if he has not yet stocked Dow co-ax relays order direct from factory. Send check, money order, or will ship COD. Prices are net FOB Warren, Minn. Dealer inquiries invited—literature on request.

THE DOW-KEY CO., INC.
WARREN, MINNESOTA

MORE SIGNALS PER DOLLAR
From Money Invested in an Antenna

Self Supporting
STEEL TOWERS
For Rotary Beams, FM, TV



ATTRACTIVE—NO GUY WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel—Will Last A Lifetime
- SAFE—Ladder to Top Platform
- COMPLETE—Ready to Assemble
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Pay Only 1/3 Down!
12 EASY MONTHLY PAYMENTS
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Width of
Base Equal
to 1/5 Height

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'-\$104.00, 28'-\$127.00, 33'-\$149.00, 39'-\$182.00, 44'-\$208.00, 50'-\$239.00,

61'-\$299.00, 100'-\$1,260.00. Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now! Send check or money order . . . or write for free information.

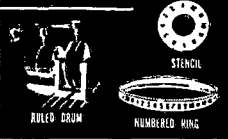
WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

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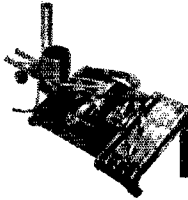
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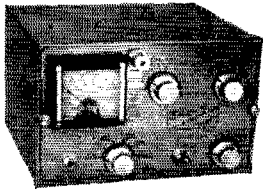
Special attachments and engineering service available for production work.

FREE: Brochure—yours upon request.

Green Instrument Co.
INCORPORATED
398 PUTNAM AVENUE • CAMBRIDGE • MASS.

LOOK FELLAS!

**BANDSWITCHING
10, 11, 15, 20, 40, 80
METERS**



**BABCOCK
MOBILE D-X MITTER**

Can be tuned up to switch between 2 of the 6 bands with 2 crystals in each band — then one of the 4 frequencies and the proper antenna may be selected by the 4-position switch with no further tuning required.

- No plug-in coils
- The 4 xtals fit inside transmitter
- 8" wide x 5" high x 7" deep
- Tubes: 6AQ5 osc-doub-quad, 6146 final amp. 12AU7 speech ampl., 2 — 6AQ5 mods, Class AB
- Input to final amp. when using Babcock PS 4A power supply: 35 watts
- Complete metering, including RF output watts

PRICE \$99.50

including tubes and connecting plugs, less crystals.

Write for Details

S 4A 6VDC • Dual vibrator supply with vibrators, tubes and connecting plugs \$67.50
NET PS 1B 115VAC • Power supply for home station, with tubes \$44.95
LS 1 • 2-band antenna tuning unit \$15.00

C & G RADIO SUPPLY CO.

2505-6 Jefferson Ave.

Tacoma 2, Wash.



M. A. R. S.



MARS Refile Procedure

Standardized procedure used on MARS frequencies as prescribed by the military is somewhat different than the procedure used by amateurs. In order to permit greater flexibility and at the same time reduce confusion the Chiefs, MARS, have worked out a standard conversion process whereby MARS stations may refile amateur traffic via MARS and vice versa.

Personal messages (third-party traffic) suitable for transmission via amateur circuits are originated in ARRL form. If a MARS station transmits the message via MARS, he places thereon a MARS refile heading. If the message requires relay, the relaying station will handle as military traffic if sent on a MARS circuit or will delete the refile heading entirely and transmit as an amateur message if sent on an amateur circuit. Examples follow:

Amateur to MARS

Received via Amateur

NR6 W9PDS CK9 SOUTH BEND IND 2130 MAY 5
TO JOHN ADAMS AA
324 FERNDAL E AVE AA
ATLANTA GA BT
YOUR LETTER RECEIVED X WILL EXPECT
YOU JUNE THIR D BT ART AR

Refiled via MARS

A4USA DE WAR NR18
NM 061300Z
FM WAR WASH DC
GRNC BT
NR6 W9PDS CK9 SOUTH BEND IND 2130 MAY 5
TO JOHN ADAMS
324 FERNDAL E AVE
ATLANTA GA BT
YOUR LETTER RECEIVED X WILL EXPECT
YOU JUNE THIR D BT ART BT

MARS to Amateur

Third-party messages originating at overseas MARS stations will be reoriginated as amateur messages by the U. S. MARS station introducing them into the amateur bands. Third-party messages originating at U. S. MARS stations will be refiled as amateur messages when necessary to make delivery. In such cases conversion to amateur form will be made by the MARS station introducing the message into the amateur bands.

Received via MARS

WAR DE AJ5AB NR21
NM 081223Z
FM AJ5AB FRENCH MOROCCO
TO MRS JOHN DOE
123 SPRING DRIVE
KANSAS CITY KANSAS
GR10 BT
PACKAGE AND LETTER RECEIVED PD LETTER
FOLLOWS PD SGD JACK BT

(Continued on page 132)

GET INTO ELECTRONICS

You can enter this uncrowded, interesting field. Defense expansion, new developments demand trained specialists. Study all phases radio & electronics theory and practice: TV; FM; broadcasting; servicing; aviation, marine, police radio. 18-month course. Graduates in demand by major companies, U.S. or equivalent required. Begin Jan., March, June, Sept. Campus life. Write for Catalog.

VALPARAISO TECHNICAL INSTITUTE
Dept. TN Valparaiso, Ind.

MOBILE RADIO'S

Morrow 5BR

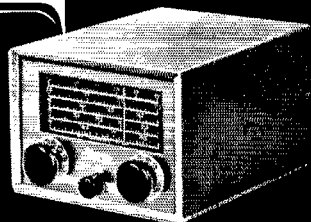
BIG PERFORMER!

CONVERTER

THE MORROW 5BR HAS NO EQUAL! *Compare these features:*

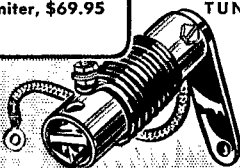
FOR OPERATING EASE—5 BANDS on 5 easy to read, accurately calibrated slide rule scales; 3.5—4.0 Mc, 7.0—7.3 Mc, 14.0—14.35 Mc, 21.0—21.45 Mc, and 28.0—28.7 Mc. TEMPERATURE COMPENSATED CLAPP OSCILLATOR assures low drift performance. Each Osc. coil is slug-tuned for calibration accuracy. Car generator voltage fluctuations will not affect stability. SINGLE POINT TUNING with high image rejection, negligible birdies or BC break-thru. BETTER THAN 1/2 MICROVOLT SENSITIVITY by using Polystyrene coil forms. Zero-temp ceramic trimmers on all Ant., Osc. and Mixer circuits. AVC on preselector, NO BLOCKING ON STRONG SIGNALS. IF Amp with 4 tuned circuits. 1525 Kc output. A VERY EFFECTIVE NOISE LIMITER. ANTENNA TRIMMER on front panel. Tube complement: 6CB6 RF Amp., 12AT7 Mx & Osc., 6BA6 IF Amp. and 6AL5 Noise Lmtr. STRONG CASE finished in lustrous Hammer-Tone. Complete with hardware and instructions. H: 4 in, W: 5 5/8 in, D: 6 5/8 in. For 6 or 12 volt operation. Yes . . . THE 5BR SATISFIES THE MOST CRITICAL OPERATOR.

5BR with built-in Noise Limiter, \$74.95. 5BRLN less Noise Limiter, \$69.95 (Amateur Net)



**10, 15, 20, 40, & 75
METER BANDS**

MORROW GC10 and GC20 TUNED GENERATOR NOISE FILTERS for 28 and 14 Mc Bands. Easy to install, simple to adjust. Just tune to minimum 'hash' level in your mobile receiver. AMATEUR NET \$3.75.



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5 ELEMENT NON-ROTATING BEAM

"THE BACK YARD RHOMBIC"

10M—15M—20M KITS

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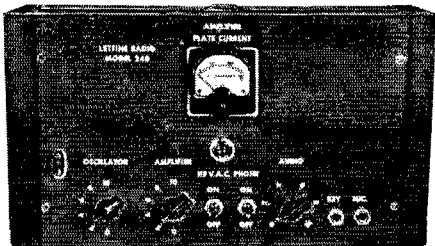
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If the addressee desires to reply, the station which made delivery will know at once that the message goes to French Morocco via MARS. MARS stations, in turn, will relay the message to the appropriate station in the system maintaining schedules with French Morocco. The same procedure can be followed for each overseas country when MARS traffic outlets are available.

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FEED-BACK

In reference to W6OXR's article on the 14-Mc. ground-plane antenna in the March issue, Lt. John J. Dougherty, USN, W2LHB/6, points out that sloping of the ground-plane radials in the manner shown raises the feed-point impedance. Therefore, the design referenced in the footnotes on page 39 cannot be followed in this instance.

Before you wire up a portable rig according to the description of the Detroit c.d. portables that appeared in QST for February, 1953, here are two corrections on the wiring diagram, Fig. 1, page 17. Pins 3 and 6 on the audio-modulator tube are interchanged. Pin 6 is the control grid, Pin 3 the screen. The transformers, T_1 and T_2 , are also interchanged. Using the numbers shown on the diagram, T_2 is the mike transformer.

THE "ULTIMATE" C.W. RECEIVER

A scheme for reducing by three the number of tubes in the 37-kc. i.f. channel of the "Ultimate C.W. Receiver" (QST, Sept., 1952) has been reported by one of the authors, W5FKQ. Instead of using two tuned circuits interstage, four are used (in all but the last stage, where two are still used). In the original design the transformer gain was deliberately reduced by mounting the coils at opposite ends of the shield cans, but the revision mounts the two coils as close as practicable in all seven cans. The first, third and fifth i.f. tubes are replaced by link coupling former grid and plate windings. This link coupling is obtained by tapping the six coils involved at 30 turns up from the "cold" ends and inserting an 0.003- μ fd. coupling condenser. Gain and coupling can be controlled by changing the size of this condenser. Readers are reminded again that the 37-kc. circuits tune with 0.001 μ fd., not 0.01 as shown.

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Tech Topics

(Continued from page 46)

Substituting in the equation for the far field, F now becomes

$$F = K \sqrt{\frac{P}{R_r}} \frac{G}{2}$$

A good approximation of the radiation resistance when G is small is $R_r \approx 20G^2$, where G is expressed in radians, rather than in electrical degrees. The far-field expression for F becomes

$$F = K \sqrt{\frac{P}{20G^2}} \frac{G}{2}$$

The far-field equations for the half-wave dipole, and for the electric dipole for the condition of the square loop placed in a plane normal to, and passing through, the mid-point of a half-wave dipole become

$$F_{\frac{1}{2}\lambda} = K \sqrt{\frac{P}{73}} \doteq 0.117K \sqrt{P}$$

$$F_{(el. dip.)} = K \sqrt{\frac{P}{20G^2}} \frac{G}{2} \doteq 0.112K \sqrt{P}$$

It can be seen that if the power is kept constant, there is only a small reduction in the far field of the electric dipole as compared to the half-wave.

Since it has been shown that the power radiated from the magnetic dipole is equal to that of the electric dipole, the magnetic dipole should perform nearly as good as the half-wave dipole so far as far field are concerned.

The conclusion is that the radiating efficiency of a small magnetic loop is nearly that of a half-wave dipole under the assumption that the same power can be fed to both. This fact, again, indicates that it is paramount to keep coupling-circuit losses at a minimum.

This limited discussion assumes the ideal and does not include polarization or the associated reflection problems. — Robt. F. Lewis, W2EBS

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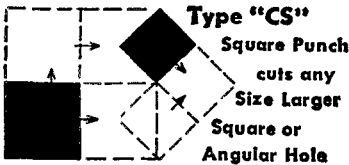
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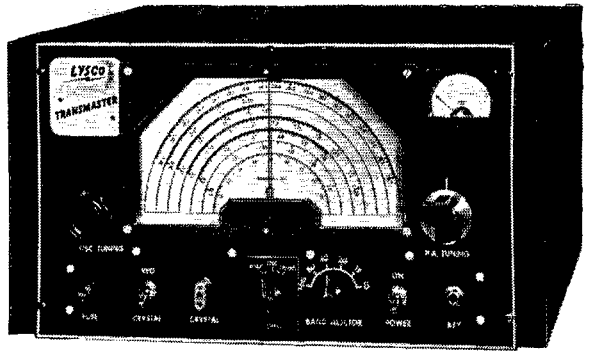
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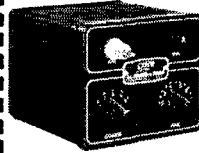
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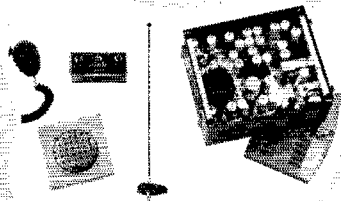
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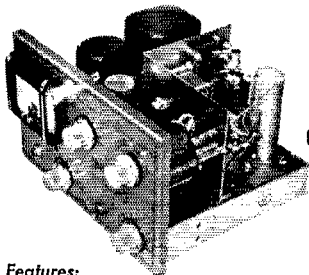
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Correspondence

(Continued from page 46)

have set was now an odd-looking black mass. The only recognizable part on this end of the chassis was the melted envelope of the 1-V rectifier.

To give you a clearer idea of the over-all circuit, I should tell you that several other small units were being operated from the receiver power supply. In *QST* articles it had been recommended that each of these units should be powered from the receiver supply. I have so far completed only the following units—all of which were running at the time: R-9er, converter, break-in unit, xtal calibrator, Q5-er, n.f.m. adapter, limiter-filter, Select-O-Ject, Monitone.

To say the least I am rather perturbed and most annoyed with *QST*, as I followed your instructions explicitly. Being an unprejudiced and open-minded individual, I think it only just that the ARRL replace my prized receiver.

In case you, too, are mystified as to just what might have happened, I am shipping to you express collect the remains of my trusty inhaler.

I know you will give this your fullest attention and consideration.

— R. A. Ninklehoffer, KNØWIT

[Editor's Note: Mr. Ninklehoffer's receiver, upon arrival at Hq., was inadvertently mistaken for a box of floor sweepings and tossed into the incinerator before the trouble could be diagnosed.]

NOVICE GEAR

4831 Wentworth Blvd.
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Editor, *QST*:

I just wanted to tell you that when I started studying for my Novice ticket I built the one-tube receiver described in *How to Become a Radio Amateur*. When I obtained my ticket I went on the air with the one-tube transmitter described in the same book. I used this combination for the entire three months that I had my Novice license and worked DX up to 500 miles using a quarter-wave 80-meter antenna about 15 feet off the ground. In my opinion this combination of transmitter and receiver is the best that any Novice could start out on.

I also want to mention that when I visited ARRL Headquarters a few weeks ago I was treated very well, taken on a tour of the Headquarters building and W1AW. This kind of treatment makes me realize that my \$4.00 has not been wasted. I think that any amateur that is in the area should drop in at Headquarters and see the work that is being done.

Thanks a lot. . . .

— Allen Landreth, W9STW

FAMILY HOBBY

421 Rodger Young Village
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Editor, *QST*:

I'm hopping mad. I finished reading the letter in *QST* from Thomas Tountas, W7MQB, about his ham-hating wife. I don't think he should stop; he'd better educate her on the family enjoyment of having a rig. We have three girls, all of them being brought up on radio. It's a lot better to have hubby out in his shack gabbing with some guy than to have him in a bar gabbing with some blonde. She (Mrs. Tountas) had better be glad her hubby is a ham. She doesn't know when she's well off.

Our little rig is a source of fun and enjoyment to all of us and I'm just as happy as he is when he gets some DX or something. Mrs. Tountas had better count her blessings and share her hubby's hobby.

— Mrs. J. L. Surtain, XYL of WNB8MR

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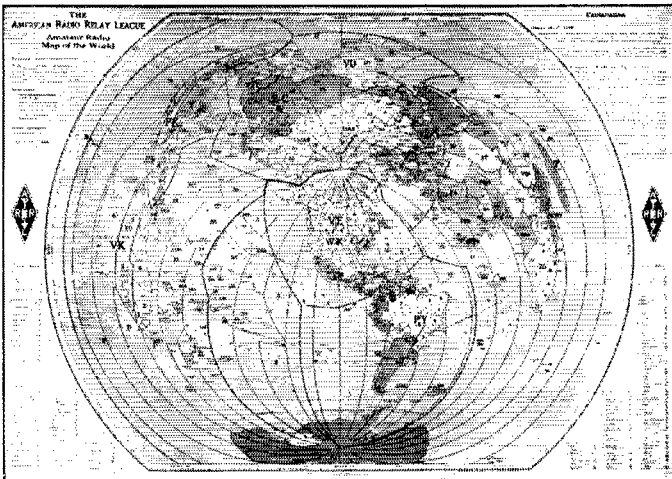
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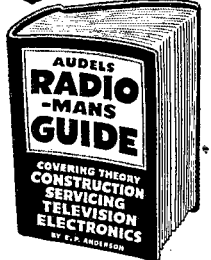
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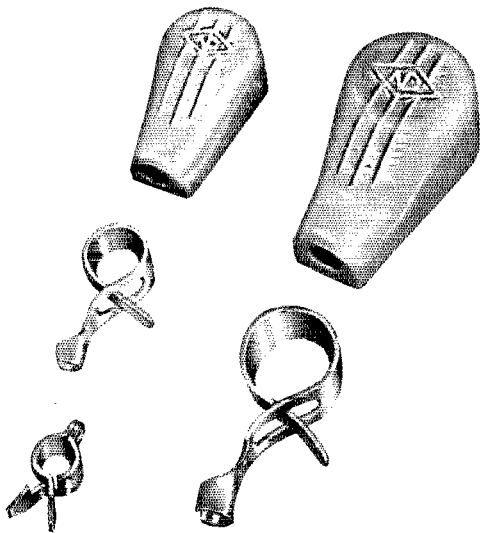


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... "A Short- and Medium-Wave Receiver," by Chauncey Coston, 7ABN, uses two Type 201A tubes and features a variable primary coupling coil.

... "Notes on Design of the Radio Frequency Choke," by Kendall Clough, dwells upon one of the knottiest problems confronting amateur builders and experimenters.

... J. T. McCormick, 9BHR, reports on his experiments undertaken in a search for clean keying and stable wavelength in "Keying for Break-In."

... Details on how one can convert an old watt-hour meter into an effective wattmeter are provided by I. Vee Iversen, 7AW.

... A. Binneweg, jr., 6BX, recommends "The Space-Turned Coil" as an approach to the optimum form-factor and limited fields necessary in short-wave work.

... E. Gherzi writes from an observatory near Shanghai on "Fading on Short Waves at Long Distances," as translated from the French by A. L. Budlong.

... Possible relationship between moon phase and short-wave radio transmission is discussed in C. E. Paulson's "Lunar Effects on Electro-Magnetic Waves."

... "Meow r r R R-9," by Ma, conveys strong feelings from T.O.M. toward redundant QRKking and a widespread epidemic of signal-report inflation.

... "Some Overlooked Possibilities for the Radio Club," by M. H. Pancost, 8KN-8ZF, recommends activities toward development of live-wire school ham clubs.

... ARRL announces the appointment of Rocky Mountain Division Director and Denver attorney Paul M. Segal, 9EEA, as its General Counsel.

... The Communications Department urges that amateurs be cautious and on guard in the preservation of their valuable noncommercial status.

... Reports of successful 10-meter work become numerous. ... BPL this month is led by 6AJM. ... Hq. station 1MK schedules WSBS of the expedition yacht *Carnegie*.

Silent Keys

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

- W1DHD, Alder B. Jeffers, Otter Creek, Me.
- W2BPF, Laverne T. Heaps, Schenectady, N. Y.
- W2KEZ, David R. Wingate, Bayside, L. I., N. Y.
- W2THI, Stanley T. Kulpa, Hyde Park, N. Y.
- W3SER, Henry J. Kosin, Erie, Penna.
- W4LE, Maurice C. Carpenter, Pine Castle, Fla.
- W4VXY, Robert B. Thompson, Orlando, Fla.
- W5ZE, Glen W. Earnhart, Kingsville, Texas
- W6HOV, Myron M. Thoen, North Hollywood, Calif.
- W6VZ, Horatio Seymour, Santa Monica, Calif.
- W7DSN, Mike Dutchak, Great Falls, Mont.
- W7MDK, John Edward Lynch, Tucson, Ariz.
- W7PXC, W. G. Sweitzer, Phoenix, Ariz.
- WN9TQS, John D. Allen, Danvers, Ill.

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 take the 7¢ rate. An attempt to deal in apparatus in violation 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.

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.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS, Radio publications. Latest Call Books, \$3.00. Earl Mead, Huntley, Montana. W7LCCM.

QSL'S-SWL'S Meade W0KXL, 1507 Central Avenue, Kansas City, Kans.

QSL'S, SWL'S Samples, 10¢. C. Fritz, 1213 Briargate, Joliet, Ill.

QSL'S Fluorescent QSL's radiant and glowing with quality-control. QSL's Kromekote three colors and up. Rainbow maps. DX QSL's. Samples rushed. 10¢. Uncle Fred, Box 86, Lynn, Pa.

WANTED: Cash or trade, fixed frequency receivers 28-42 Mc. W9V1V, Troy, Ill.

QSL'S, SWL'S High quality. Reasonable prices. Samples. Write to Bob Teachout, W1FSV, 204 Adams St., Rutland, Vermont.

WANTED: Marconi multiple tuner, coherer, spark coil, magnetic detector, etc.; DeForest responder, coherer and other early equipment; Marconigraphs, Modern Electrics; Electrical Experimenter and early Call Books and text books of wireless. Franklin Wingard, Rock Island, Illinois.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

WANTED: Top prices paid; Navy selyns 1 DG, 1F, 1CT, 5CT, 5D, 5DG, 5G, 6G, 6C, etc. and BC-1221, AN/ARC-13, AN/ARC-1, AN/ARC-3, RTA-1B, AN/APR-4. Electronic Research, 719 Arch St., Philadelphia 6, Penna.

WANTED: Selyns and syncros. Top dollar paid. Write full descriptions to: Box 84, Babson Park 57, Massachusetts.

BEAT TVI. One 7" television receiver, \$35.00. One 10", \$50. Excellent as monitor, other uses around shack. W4API, Spitz, 1420 South Randolph, Arlington, Virginia.

WANTED: AN/ARC-1 or AN/ARC-3 or components. Write to J. Durrant, 5526 Parkland Court, Apt. 202, Washington, D. C.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

SELYNS or syncros wanted: Navy or Army ordnance 60 cycle types. Will pay \$35.00 each for 1DG, 1DF, 1CT, 1G, 1F; \$25.00 each for 5DG, 5G, 5F, 5CT; \$20.00 each for 5D, 6G, 6CT, 6DG, or sizes 7. Subject to inspection. Other types advise. Also want: Autogyros, Servo Control motors, PM motors, inverters, tubes and other electronic components. Electro Sales Co., Inc., 50-58 Eastern Ave., Dept. O, Boston 13, Mass.

AHOV, any of your maritime mobile hams or fixed station landlubbers know where the Mystic Marine Museum can locate a portable amplifier in control box? QSO B. M. Steers, Marine Museum, Mystic, Conn.

QSL'S-SWL'S as low as \$1.50 per color. Samples dime. Stronberg, P.O. Box 151, Highland Station, Springfield, Mass.

QSL'S: "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

TRADE new TG-10 code machine with tapes. Want oscilloscope 7 inch TV, \$40, 10 in. \$50. W4API, 1420 South Randolph, Arlington, Virginia.

WANTED: Marconi, Wireless Specialty, Electro Importing, DeForest or other manufactured apparatus made before 1920. QST, Wireless Age, Marconigraphs, Modern Electrics or any wireless periodicals issued before 1920. Early catalogs, bulletins, books. Describe all items in detail and price wanted. Louis Rizoli, W1AAT, 100 Bay View Ave., Salem, Mass.

QSL'S? QSL'S? Modernistic? Cartoons? State-maps? Rainbow-man? QSL samples. 25¢. Rus Sakkers, W8DED, Ham Print Shop, 53 East 7th St., Holland, Michigan.

SELL: Hallicrafters SK-42, like new, with special Peerless Hi-Fi output transformer. Operation and maintenance manuals included. Used very little as had other sets. Only \$195.00. Dwight Baum, W6FRB, 1011 Oak Grove Ave., San Marino, Calif.

SELL: 2000 issues of QST, from 1920 to date. Single copies 20¢. min. \$1.00, yearly \$1.50 per year. All postpaid. W. L. Holst, W9MD, 2553 Winnemac Ave., Chicago 25, Ill.

\$700 value imported Hertel & Reuss monocular compound microscope with 5X, 8X, and 12X oculars; 10X, 50X, and 100X oil-immersion objectives; 45° angle, vernier mechanical stage on 360 degree calibrated platform; sub-stage condenser with iris diaphragm shutter and dark-field condenser. Guaranteed superior condition. Swap for a Johnson Viking II with VFO or Collins 32V. All inquiries answered. Captain Atherton, W4RVE, Crime Laboratory, Camp Gordon, Georgia.

DELUXE QSL'S. Petty, W2HAZ, 17 Southard, Trenton, N. J. Samples 10¢.

SELL your microwave test equipment and communications equipment to Weston Laboratories, Inc., Littleton, Massachusetts. Highest cash prices offered or trade for new ham gear.

PRECISION made, custom built antennas for all bands . . . literature available. Antenna Incorporated, Wakefield, B. A.

FREE list Used Collins, Elmac, Hallicrafters, Hammarlund, Harvey-Wells, Lyco, National, RME, Sonotone, etc. Lowest prices. Liberal trades. Dossett, W9BHV, 855 Burlington, Frankfort, Indiana.

WANT QST's older than 1920. Have 200 copies from 1932 to 1953 at 25¢ each. W0MCC Jablonsky, 1022 No. Rock Hill Road, Rock Hill 19, Mo.

SELL Collins transmitter 32V2, like new, and in first class condition. Jim Umstatch, W9CWF, 1318 N. Linden, Bloomington, Ill.

PROP-PITCH motor, \$16.00. Like new Alliance HIR tenna rotor with control, \$20.00. 120 watt PP807 modulator with power supply, exact unit described Dec. 1951 QST, \$70.00. W. E. Leeder, W8MFB, 8 Sanborn, Port Huron, Mich.

COLLINS 310B1 exciter, \$200.00. 2-el. 20 meter Hy-Lite Antennae beam, \$22.00. ARV-13 mod. affrm, \$5.00. Sonotone 329, \$29.00. \$7.00; modulator for Collins exciter, \$20.00. Dodd, W5NUX, 526 Brookhurst Drive, Dallas, Texas.

WANTED: RAS-5 instruction book and coil container CNA-10037. Johnson Viking I kits. Wilcox CW-3, 2 Mc coil sets. W4ES.

VHF-152A. Gonset 2-meter converter, TBV-8 for sale. W6RLB, Black, 1546 Spruce St., Berkeley 9, Calif.

COLLINS 32V3 transmitter, perfect condition, original carton, manual, extras. Submit cash offers. Dr. Raynold Arcuri, W2KSV, 8 Linden Ave., Pelham, N. Y.

WILL pay \$10.00 each for February, April, May, June and July 1916 QST. Must be in good condition. Write to EDC, 83 Deerfield Dr., Manchester, Conn.

WANTED: AN/APR-4, APR-5A, ARC-1, ARC-3, ART-13, etc.; TS-12 and other TS's particularly Microwave equipment, even salvaged. VFO or phony frequency meters and signal generators; quantities of 723A/B, 3C22, etc., tubes; any laboratory equipment. Top cash or swap. Rush Engineering Associates, 434 Patterson Road, Dayton 9, Ohio.

HT-18: VFO direct output on all ham bands with or without NBFM. Cabinet, chassis and decals refinished like new, \$80.00. Microphone P-104, with interchangeable plug and connector, exactly like new, \$8.50. Write or phone: Rush Engineering, W2NNU, Glen Head, L. I., N. Y. Phone: Wheatley Hills 5-4297.

COLLINS 32-VI, also National HRO-50-T with 7 coils and all accessories built-in, both perfect, like new, in original packing, ready to ship. Motorola mobile FMT-30-DMS xmitter with three xtals, P-69-13 rec., whip and mount, Gonset 10-11 converter, P-327-E speaker with all cables and control head, perfect, \$150.00 cash. Also a large inventory of new antenna tuners, standing wave indicators, automatic level meters, etc. Due to designs and changing in photography as No. One hobby. Above for best cash offer and/or trade for Hasselblad reflex, or Roliflex 2.8 c or Automatic. Write the Old, Old Timer C. C. Price, E.E., W9OUB.

QSL'S: Quality printing as low as \$1.07 per hundred. Maps, cartoons, fluorescent, special Notice dead, fast deliveries. Dozen samples rushed, 10¢. Robinson, W9AYH, 12811 Sacramento, Blue Island, Ill.

JOHNSON Viking transmitters, wired and tested, \$319.95; modified for 6 meter operation by doubling in the final, \$5.00 extra; other modifications as desired, available on special order at reasonable cost. Viking VFO's wired and tested \$54.95. We trade and offer terms. Write to Carl, WBFT at Evans Radio, Concord, N. H.

FOR Sale: Transmitter 6 ft. rack panel, 500 watts, three stage two power supplies. Pair 812 H's, 807's, 814's. Coils 80-40-20 and relay. \$75.00 cash. S. J. Dallas, W3RZV, 233 West Broad St., Tamaqua, Penna.

HARVEY-WELLS TBS-50D with AP-50 power supply. A year old, in excellent condition: \$128.00. Gonset 2-meter converter, \$28.00. Tepper, W4VGU, 510 N E 56th St., Miami, Fla.

FOR Sale: Navy TBV transceiver, complete; BC906; Link fixed frequency receiver, ARC-7 transmitter, 1 Mc. not converted; essential parts; or high power final and power supply; four 75TL; four 304TL and sockets. Would like to sell lot to the highest bidder. All letters answered. Raymond De Vos, W2TAM, Box 236, West Trenton, N. J.

JOHNSON Viking I, year old, TVI-d, New York area only. Best offer over \$250. Howard Feiner, W2JBX, SE 3-8749.

SELL: XLV demands room for television. Millen xmitter 90810, Biley xtals, coils 2,6,10,11 with modulator; new spares 3E29, 832, 2E26, 812, 829, 832, 807, 6AG7, Hudek, W9MQR, Peahontas, Iowa.

WANTED: Duomatic type AKS-7 electronic key. Hank Zimmerman, W3JUV, 529 1/2 Smithson, Erie, Penna.

WALLMAN Circuit 2-meter converter, 11 Mc. IF in cabinet, very sensitive DX converter, \$35.00. Electro-Voice 3000 clipper, in original carton, never used, \$10.00. Precise model 630, RF and AF signal generator, factory tuned RF, brand new, \$30.00. W. Lawrence LePage, W3QCV, Box 127, Ardmore, Penna.

WANTED: SX28, Super Pro or NC 183 receiver. W. S. Williams, 1273 No. Parkway, Memphis 5, Tenn.

AMATEUR Paradise vacation spot. Livingstone Lodge and log cabins, Mascoma Lake, Enfield, N. H. Swim, fish, boats, 100 acres, eleven buildings, churches, recreation room, main dining lodge; 75 and 40 meter rig in lobby. Family groups, 25th year, low rates, booklet. Al Livingston, WZQP, 12-02 Ellis Ave., Ft. Lawn, N. J.

FOR Sale: Complete 55 watt CW transmitter in 30' enclosed rack; 813 final BC-312 VFO, \$175.00. Dixie Kiefer, WZVVS, 266 Midland Ave., Montclair, N. J.

FOR Sale: Hammarlund Super Pro SP-400X power supply and speaker, \$250. Thordarson T-32W10 audio amplifier, \$25.00. Prices F.o.b. Hingham, Mass. Both are in perfect condition. James L. Crawshaw, 142 Otis St., Hingham, Mass.

SELLING out: HQ-129X, \$150.00; 150-B and V.F.O., \$150.00; Hy-Lite beams, multiplier unit, BC-696, BC-453, selensyns, tubes, meters. Ask for list. Hayden Anderson, W1FDL, 13 Page Avenue Caribou, Maine.

MOTOROLA FMT-30-DMS, 10 meter mobile, complete, controls, cables, power supply, mike, etc; \$75.00; Gonset Tri-Band, \$30.00; Tube tester, \$10.00; Astatic DK-1 mike, \$7.50; Triplet 3256 frequency meter, \$12.00; Junior Master Mount \$3.00, F. S. Eggert, W8FL, 11833 Wisconsin, Detroit 4, Michigan.

FOR Sale: Hallcrafters HT-19, 185 watt transmitter wonderful buy, hams in 2 and 3 areas, come and have a look at it. Richard M. Kraus, WJALE, 1220 Wheatseaf Lane, Abington, Penna.

WANTED: Perfect Collins 75A2 or 75A3. Bob Knox, 503 West Main St., Waxahachie, Texas.

COLLINS 32V2 in excellent condition, \$500.00. Girzi, W9HLA, 2229 W. Taylor, Chicago, Ill. For sale in Chicago or vicinity.

JOHNSON Viking I and I22 VFO, HROSTAL, coils Abdefed, power supply and speaker all like new, station operating on all bands 160-10, \$350.00. Need tape recorder, W4RAZ, Ted Davis, 1309 Hyman Ave., Kinston, North Carolina. Telephone 5661 or Tar Heel Fnet 3.865.

SELL: 274N transmitters, receivers, dynamotors, components; two new I-81A selensyns; transmitter 200 w., phone, complete; BW type coils, three power supplies, 813 final, no junk! \$100.00; PE-103 base, cover, new; DM 19H dynamotor, less armature, KAI rec., new, 13.5-20 Mc; 4 new Micro-SW type B-1-10 new switch boxes, each containing four aptd glow tipped toggle switches and one (nor-oft) micro-switch, \$1.75 ea. Four selensyns 370 rotation, \$5.00 pair; two Lear receivers, 200-400 Kc dry pack type, \$8.00 and \$12.00. Make an offer. Write to WJEF, M. Shores, Fillmore, Missouri.

SACRIFICE: Tri-Band converter, 40uv-375 ma Carter dynamotor; 40-watt mobile fone xmitter. All in A-1 condition. First offer over \$100.00 takes it. Express collect. Larry Sloan, 848 Williams, Fayetteville, Ark.

NAVY ARCS series 40 and 80 meter transmitters, converted to V.F.O. with common power supply, in perfect condition, with tubes; \$35.00; SCR-522 with tubes, converted, \$35.00; Six 304T1, \$4.00 each; BC-1161A receiver, in good condition, no tubes. Clement Gouveia, W6TSS, 3310 63rd St., Sacramento, Calif.

SELLING BC-312-E receiver. In fine operating condition. Has crystal filter, spare r.f. oscillator coil section. Plus matching, top quality 110 V.A.C. power supply, \$100.00 or best offer. Paul Rybak, W2HZR, 1224-48 St., Brooklyn 19, N. Y.

SONAR SRT-120P 100 watt fone, 125 watt CW xmitter like new, with built-in supply, external VFO head, band-switching, TV1 proof, cost \$300.00. Will sell for \$200.00. E. Adams, W2HXL, 755 Delaford Ave., Staten Island 410, N. Y., N. Y.

"SURECHECK Tasts" Novice, \$1.50; General, \$1.75. Amateur Extra, \$2.75. Similar to F. C. Amateur Radio Supply, 1013 Seventh Ave., Worthington, Minnesota.

ELECTRIC time-switch clock control lights, furnaces, fans, motors, defrost refrigerators, etc. Three on-off operations in 24 hours. Heavy duty contacts. Can be set to skip days of week no control is desired. Quality not found in clocks costing many times this low price. Money back guarantee. Clock mechanism only, no case, \$2.95. Deluxe model \$3.95. Has additional mechanical clock which maintains correct time in case of power failure. Supply limited. Send orders to C. G. Gray, 3224 Montgal, Kansas City 28, Mo.

COMPLETE Station: NC240D and speaker, monitors, 2 crystal mikes and one stand. Several crystals. Transmitter complete with PP813s, c.w. and 'phone with speech clipping, in 0 ft. Bud rack, all stages metered, \$500.00. F.o.b. St. Joseph, Mo. W9IAC.

BARGAINS: New and good reconditioned Collins, Hallcrafters, National, Hammarlund, Johnson, Elmec, Gonset, Morrow, Babcock, Harvey-Wells, RME, Millen, Lyaco, others. Reconditioned \$38, \$29.00; \$404, \$69.00; SX-43, \$119.00; SX-43, \$129.00; NC57, \$69.00; NC125, \$129.00; NC173, \$149.00; NC183, \$199.00; HF-10-20, \$49.00; VHF152A, \$59.00; RME45, \$89.00; HO129X, SP400X, SX71, SX42, SX62, NC240D, HRO5TAL, HRO7, HRO80, HRO50T1, HRO60, NC183D, Collins 75A1, 75A2, 32V1, 32V2, many others, shipper's trial. Term payments. Write for details. Henry Radio, Butler, Mo.

BARGAINS: Extra special: Motorola P-69-13 mobile receivers, \$29.50; Globe King, \$315.00; HT-9, \$199.00; Supreme AF100 or Tenco 75GA, \$250.00; HRO-50, \$275.00; Collins 75A1, \$275.00; SX-71, \$169.00; SX-42, \$189.00; SX-43, \$129.00; HRO-Senior, \$119.50; RME 2-11, \$99.50; RME-45, \$99.00; Meissner EX Shitter, \$69.00; S-40A or SX-10, \$69.50; VHF-152, \$49.00; HF 10-20, \$59.00; Globe Triplet, \$69.50; M6G11 Mobile transmitters \$19.95; 90800 exciter, \$29.50; DM-36-10 meter converter, \$19.50; XE-10, \$14.95; Gonset 10-11 converter, \$17.50 and many others. We need used receivers. We give highest allowances for S20R; S-40 A, B; NC-57; NC-100; NC-125; SX-24; SX-25; HO-129X and similar receivers. Free trial. Terms financed by Leo, W4GFC. Write for catalog and best deal to World Radio Laboratories, 740-42-44 West B'way., Council Bluffs, Iowa.

BANDMASTER DeLuxe Model TBS-50D with AC power supply, almost new. First \$100 takes it. Oliver Jones, W9PNB, 128 Berteau Ave., Elmhurst, Ill.

"TAPE-TALK" with radio amateurs here and abroad by joining Tape-Respondents, International, a non-profit amateur association of recorder owners. Fred Goetz, 3488 2nd St., San Francisco 10, Calif.

JOHNSON Viking I, de-TV'd, Johnson VFO, plus spare 4D32, \$270.00. A complete mobile rig; Babcock "DXmitter" and antenna tuner, \$85.00; Gonset MK-5 receiver, \$70.00; Mallory Vibra-tek frequency meter with modulator, \$65.00; Collins 32V-2, \$515.00. Will trade. Want APN-9, APR-4, APR-5, ARC-1, ARC-3 receiver. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. Richmond 2-0916.

DISCONTINUING experimenting activities. Write requesting description of these and dozens of other accumulated items. Everything guaranteed unused or perfect. FOB, trial privileges arranged: Collins 310-B-1, \$185.00; 1BS-50, \$85.00; Mon-Key, \$17.50; PE-103-A, complete, \$25.00; Dynamotor, only \$12.50; Meissner shifter, 160 thru 10, \$37.50; National 1-10, power, \$37.50; AVR20-A, AVT, 112 6 volt 75-meter rig, \$37.50; 19 inch enclosed cabinet, 14 inch panel, \$10.00; Bud WM-8, \$6.00; Millen grid dipper, \$49.50; components 2000, 17500, 1500 VDC 30 Ma supply, \$45.00; crystals: Novice, 75 phone, 6 meters; 813, 807, 808, many others; Command transmitters: Howard O. Severoid, W0PFL, 2431 East Riverside Drive, Indianapolis 23. Telephone Winthrop 2184.

SELL: correspondence course, electronics textbooks. Roy L. Gale, W1BD, Waterford, Conn.

10, 15 and 20 meter beams, aluminum tubing, etc. Perforated Aluminum sheets for shielding. Kadcliff's, 1720 North Countyline St., Fostoria, Ohio.

SELL Collins 32V2 transmitter, Hallcrafters SX43 with matching speaker B&W low pass filter, D-104 mike, Vibroplex bug. All in excellent condition. Will sell for \$600.00. H. E. Galloway, W4MBZ, 1353 Rhodes St., Columbus, Ga.

FOR Sale: 2-meter transmitter, 3-decker, described in QST February, March, April 1950, \$22 receiver converted, V.H.F. 152A, Instructograph 10 tapes, electric driven. All priced right. Bert Kavanagh, W2MCCZ, 3311 Broadway, New York 31, N. Y.

TRADE: ARC-4, less tubes, good condition, for surplus rotorator motor and T-17 mike, or for \$14.00. KNZARO, Sandao, 112 Croton Ave., Ossining, N. Y.

SALE: 75-90 watt 'phone xmitter with VFO. Band-switching 80 thru 10 except final plug-in coils, \$29R final, \$150. 807's modulator with filter clipping. Enclosed cabinet, \$150. W3KUC, Carlisten, 507 Margaret Dr., Spring, Md.

WANTED: HROS ABCD coils, State price and condition. Chapin, W6DUD, 6715A Crest, University City 4, Mo.

FOR Sale: 1 Kw rig; PP250THs mod. by 100THs. 3000 V 700 Ma. supply for final PP807's driver, separate 3000 Ma supply for mod. Variac. Control on final and mod. supplies, all first quality components in 6 ft. all metal rack cabinet. Rig was never used on air. Everything new. \$500 cash. Fritz Alderson, W6UQI, 140 So. 8th, El Centro, Calif.

RIDICO TR-1, 300-watt, filtered, cabinet, extras, \$299.00. Drenon, W6FXV, 2722 University, Fresno, Calif.

QSTS, May 1929 to present. Unbound. Good condition. Any reasonable offer accepted. J. A. Langford, 141 Brookdale Ave., Toronto 1, Ont., Canada.

DIODES IN34, 10 for \$5.98; Mobile whip antenna, 72". Antenna mounting base \$2.99; 8000 Hz. mike, cable and switch \$2.95; your surplus tubes, equipment. Free Tabogram. TAB, 111 Liberty St., N. Y. C.

FEBRUARY 1917 QST needed. Will pay cash or trade a 1916 copy. W1VG.

BEAT TVI and other annoying disturbances to television reception. Remarkably famous high-pass filter now available without fancy case, just the filter itself for only \$1.00 postpaid. Box 8, Hillside Manor Branch, New Hyde Park, N. Y.

QSL! Interesting samples, 10¢. Tooker Press, P.O. Box T, Lakehurst, N. J.

FOR Sale: Collins 32V1 transmitter. In very good condition. Best offer over \$325.00 takes it. Complete range of 274N Command sets. Free name it. Rex C. Bean, W7JJC.

HT-9 grey, postwar; 10-20-40 coils. In excellent condition: \$195.00. W9VF, 608 Richards, Geneva, Ill.

WANTED: Ham receivers and commercial-built transmitters. Not government surplus. Need them for export. Will discuss trade on anything you need. Uncle Dave's Radio Shack, 904 Broadway, Albany 4, N. Y.

RME-45, \$99.00; DB-22A, \$49.00; BC-459, \$15.00. "Rus" Sakkers, W8DED, 53 East 7th St., Holland, Michigan.

BIRTH announcements: ham-styled, 25, \$1.00. Carl T. Narvestad, Granite Falls, Minnesota.

FOR Sale: Model 3BR5 Morrow converter, in excellent condition, \$40.00; Webster-Chicago Hi-Fi 10 watt amplifier, \$20.00; T-3 Astatic crystal mike, \$7.00. W. H. Vogel, W8EZX, 710 Williamson Bldg., Cleveland 14, Ohio.

VHF 2-meter converters, crystal controlled, wired, \$12.00 transmitters, 15 watts, 'phone, pre-assembled kits, \$34.50. L W Electronic Laboratory, Route 2, Jackson, Michigan.

STATE Map postcards for QSL, QTH, WAS confirmations. Ward-Sharp, 56 Kendall Avenue, Rutland, Vermont.

SWAP Robot Luftwaffen-Eigenumt wing camera with following Robot lenses: Schneider-Kreuznach Tele-Xenar f: 3.8 F-7.5 cm; Carl Zeiss Jena Sonnar 1:4 f-7.5 cm; Carl Zeiss Jena Biotar 1:2 f-4 cm. All inquiries answered. Wanted: TVI'd VFO controlled bandswitching, cabineted, beam-CW, 1.8 to 30 Mc. 115v 60C transmitter, 120 W. 500 w. at 500 w. ready to use. Norman Mayne, 90 Prospect Ave., Springfield, N. Y.

HAM Special RG-8/U Cable, 225 ft. reel, \$12.25; HI-8A filter, \$2.95; 1000 Kc crystals, \$3.60; manuals for BC-348, BC-779, BC-610, SCR-522, \$1.00 each. Postage is additional. Request free bulletin. Leotron Research Laboratories, 719 Arch Streets, Philadelphia 6, Penna.

SELL: Thordarson 10-watt speech amplifier with cover, type T-31WIOAX, used about 1 hour, \$40.00, cost \$74.97; Collins 310-B, like new, \$190.00; Collins 75A-1, like new, \$350.00; Collins low-pass filter 35-0.1, \$25.00; Simpson modulation and frequency meter No. 380, \$25.00; Bud frequency calibrator No. FCC-90, 100 Kc oscillator, \$10.00. All prices are F.o.b. Dallas, Texas. W5BG, J. H. Robinson, 522 Cumberland St., Dallas, Texas.

FOR Sale: Hallcrafters SX-71 receiver and HT-9 transmitter, also 50 watt transmitter AM fone bandswitching, VFO transmitter, best offer. W2MPN, De George, 20 Berkeley Road, Mineola, L. I., N. Y.

SELL: Dumont #241 scope, \$245; 21A teletype printer, \$50; receiving distributor for 21A or #12 printers, \$45; page printer only, \$65. I have new type frequency meter with modulator, \$65.00; Collins 32V-2, \$515.00. Will trade. Want APN-9, APR-4, APR-5, ARC-1, ARC-3 receiver. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. Richmond 2-0916.

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SELL: Gonset Communicator, new, \$175. HT-18, like new, \$75.00. WIQXV, 973 Prospect St., Fairview, Mass.

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WANTED: HRO-SK, HRO-STAI, HQ-129X, HQ-120X or similar. Also EX signal shifter. Give price and condition. H. J. Haley, 5341 McCulloch, Houston, Texas.

COLLINS 32V2 for sale, in original packing. Used very little, \$510.00. New spare 4D32 \$10.00, W5GOC, C. Atkinson, Jr., 2433 Stanmore, Houston, Texas.

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WANTED: ART-13, ATC, DV-12, DV-17, and any parts. APN-9, APR-4, APR-5, TCS, SCR-694, GN-58, PE-237, BC-348, BC-312, BC-342, ARC-1, ARC-3, ARN-7. Alltronics, Box 19, Boston 1, Mass. Tel. Richmond 2-0916.

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WANTED: Coils for Collins 32RA-7 transmitter, SX-15 for sale or for trade. Write D. Gogglo, W4OGG, 2671 Barron, Memphis, Tenn.

NATIONAL HPS with 5886 power supply. Like new condition. \$125.00. F.o.b. Columbus, Ohio. W. R. Bryan, 3244 Fishinger Rd., Columbus 14, Ohio.

FOR Sale: AR388 rcvr, new, \$275.00; Meissner Band-switching signal shifter, \$45.00; W. S. A. PE103, \$65.00; or separate units, Sky Buddy, \$25.00. Hallcrafters Transceiver, \$75.00; oil condensers, 5000V-10 mid, \$25.00; money back guarantee, new 833A's, \$15.00. Plate transformer, 115-230 primary 4000-5000 ct secondary, 500 Ma., \$25.00. G. Steed, W5BUX, 1912 Beech, Pine Bluff, Arkansas.

FOR Sale: SCR300 walkie-talkie radio set with canvas carrying case. T. Rae, 224 Brookside Ave., Mt. Vernon, N. Y.

SELL: BC459 and BC696 converted complete with common power supply. 55 watts input. Also modulator with own power supply. Spare tubes. Send for dope on this FV setup. \$70.00 complete for quick sale. W3PVZ, Olmick, 300 3rd Ave., Burnham, Penna.

BC459, \$12.00; BC696, new, \$20.00; BC733, new, \$10.00; BC522, new, revamped for 10-Meters, \$45.00; BC454 used, \$10.00; Bendix TA12, used, \$45.00; MP28BA modulator for same, \$15.00; new Bendix modulation transformer will modulate 250 watt final, \$2.50; four 304THs, \$5.00 ea., new, and in orig. cartons. Several new 807's, at \$1.25 ea.; 24V50 amp. gen., \$20.00; 12 V power supply for BC522, \$15.00; new, in box. King, W8GU, 18944 Sorrento, Detroit, Mich.

GRID Dipper, Lysox, for AC or battery, complete with separate AC supply, \$22.00. 6M 3-el. Workshop beam, \$7.00. Ferguson, W3AEV, 336 Brookside, Pittsburgh 34, Penna.

WANTED: Recent commercially made transmitter, multi-band low-medium power, preferably phone. Ed Rose, W3NHC, 426 Owen Road, Wynnewood, Penna.

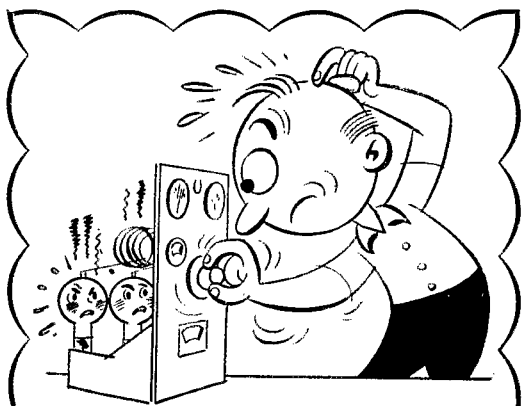
SELL: Harvey-Wells, TB550 'phone transmitter plus APS-50 power supply, in good condition: \$115.00. Mike Hamann, 228 W. 119th St., Los Angeles, Calif.

FOR Sale: Meissner EX signal shifter, with FMX modulator, \$50.00. Henry Blesse, 13-058 Sperber Road, Fairlawn, N. J.

SELL: BC610-E, factory converted, excellent condition, with BC-614-E, BC 939A, W9BJP, John Nosbaum, 2540 West Gunnison St., Chicago 25, Ill.

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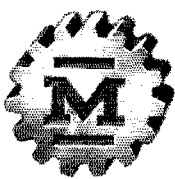
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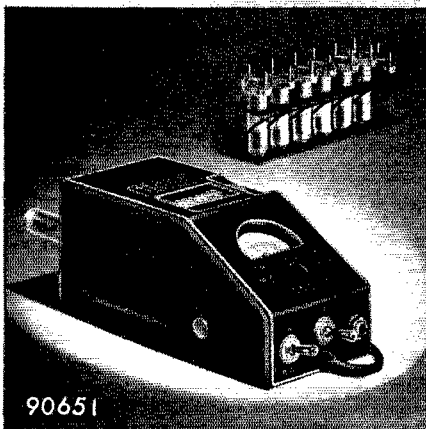
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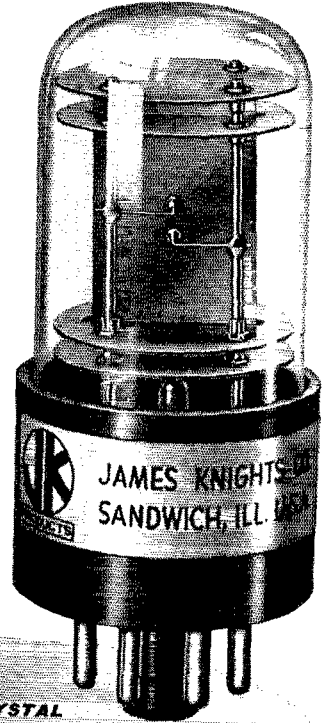
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